COUNTY OF WESTCHESTER
NEW YORK

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

DIVISION OF ENGINEERING

ADDENDUM NO. 1

CONTRACT NO. 21-514

FOR

BOILER REPLACEMENT AND ASSOCIATED WORK
VERNON PLAZA FAMILY CENTER
17 SOUTH SECOND AVENUE
MOUNT VERNON, NEW YORK

The attention of the bidders is directed to the following changes, additions, and/or substitutions affecting the above-referenced contract(s).

I. RE: THE BOILER PLATE DOCUMENTS

ITEM A:
Delete: Table of Contents (Technical Specifications)
Insert: Attached Table of Contents (Technical Specifications)

II. RE: THE SPECIFICATIONS

ITEM A:
Insert: Following Attached Sections

230593 - TESTING ADJUSTING AND BALANCING FOR HVAC
235223 - CAST-IRON BOILERS
235313 - BOILER FEEDWATER PUMPS

III. RE: THE DRAWINGS

ITEM A:

Delete: Sheet P-2	**DEMOLITION AND NEW WORK PLAN, CELLAR LEVEL**	**6-4-21**
Insert: Sheet P-2	**DEMOLITION AND NEW WORK PLAN, CELLAR LEVEL**	**6-22-21**

ITEM B:

Delete: Sheet HV-3	**DEMOLITION AND NEW WORK PLAN, CELLAR LEVEL**	**6-4-21**
Insert: Sheet HV-3	**DEMOLITION AND NEW WORK PLAN, CELLAR LEVEL**	**6-22-21**

ITEM C:

Delete: Sheet HV-4	**SCHEDULE AND SCHEMATICS**	**6-4-21**
Insert: Sheet HV-4	**SCHEDULE AND SCHEMATICS**	**6-22-21**

ITEM D:

Delete: Sheet E-1	**BOILER ROOM POWER AND LIGHTING PLAN**	**6-4-21**
Insert: Sheet E-1	**BOILER ROOM POWER AND LIGHTING PLAN**	**6-22-21**

ALL PROVISIONS OF THE CONTRACT NOT AFFECTED BY THE FOREGOING SHALL REMAIN IN FULL FORCE AND EFFECT.

COUNTY OF WESTCHESTER
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION
By: Hugh J. Greechan Jr., P.E.
Commissioner

Dated: June 22, 2021
WHITE PLAINS, NEW YORK

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:
   a. Variable-air-volume systems.
2. Balancing Hydronic Piping Systems:
   a. Constant-flow hydronic systems.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

E. TAB Specialist: An entity engaged to perform TAB Work.

1.4 ACTION SUBMITTALS

A. LEED Submittals:

1. Air-Balance Report for Prerequisite IEQ 1: Documentation of work performed for ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
2. TAB Report for Prerequisite EA 2: Documentation of work performed for ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within [**15**] [**30**] [**45**] <**Insert number**> days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within [**15**] [**30**] [**45**] <**Insert number**> days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within [**30**] [**60**] [**90**] <**Insert number**> days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

D. Certified TAB reports.

E. Sample report forms.

F. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.6 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by [**AABC**] [**NEBB**] [**or**] [**TABB**].

1. TAB Field Supervisor: Employee of the TAB contractor and certified by [**AABC**] [**NEBB**] [**or**] [**TABB**].
2. TAB Technician: Employee of the TAB contractor and who is certified by [**AABC**] [**NEBB**] [**or**] [**TABB**] as a TAB technician.

B. TAB Conference: Meet with [**Architect**] [**Owner**] [**Construction Manager**] [**Commissioning Authority**] on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide **seven** days' advance notice of scheduled meeting time and location.

1. Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Coordination and cooperation of trades and subcontractors.
d. Coordination of documentation and communication flow.

C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms approved by [**Architect**] [**Owner**] [**Construction Manager**] [**Commissioning Authority**].

E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

F. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

G. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.7 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.8 COORDINATION

A. Notice: Provide **seven** days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on [**air**] [**and**] [**water**] distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

3.2 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

I. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.

J. Examine system pumps to ensure absence of entrained air in the suction piping.

K. Examine operating safety interlocks and controls on HVAC equipment.

L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.3 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Balance, smoke, and fire dampers are open.
5. Isolating and balancing valves are open and control valves are operational.
6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.

7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in [**AABC's "National Standards for Total System Balance"**] [**ASHRAE 111**] [**NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems"**] [**SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing"**] and in this Section.

1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in [**inch-pound (IP)**] [**and**] [**metric (SI)**] units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Where sufficient space in duct is unavailable for Pitot-tube traverse measurement, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

    a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet or through the flexible connection.
    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

    a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from [**Architect**] [**Owner**] [**Construction Manager**] [**Commissioning Authority**] for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 PROCEDURES FOR STEAM SYSTEMS

A. Measure and record upstream and downstream pressure of each piece of equipment.

B. Check settings and operation of each safety valve. Record settings.

C. Verify the operation of each steam trap.

3.8 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper

operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.9 PROCEDURES FOR BOILERS

A. Steam Boilers: Measure and record entering-water temperature and flow and leaving-steam pressure, temperature, and flow.

3.10 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.

1. Measure and record the operating speed, airflow, and static pressure of each fan.
2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
3. Check the refrigerant charge.
4. Check the condition of filters.
5. Check the condition of coils.
6. Check the operation of the drain pan and condensate-drain trap.
7. Check bearings and other lubricated parts for proper lubrication.
8. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.

B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:

1. New filters are installed.
2. Coils are clean and fins combed.
3. Drain pans are clean.
4. Fans are clean.
5. Bearings and other parts are properly lubricated.
6. Deficiencies noted in the preconstruction report are corrected.

C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.

1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.
2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
3. If calculations increase or decrease the air flow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
4. Balance each air outlet.

3.11 TOLERANCES

A. Set HVAC system's air flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: [**Plus or minus 10 percent**] verify in field.
2. Air Outlets and Inlets: [**Plus or minus 10 percent**] verify in field.

3.12 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare **weekly** progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.13 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.

8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Sheave make, size in inches (mm), and bore.
    i. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
    j. Number, make, and size of belts.
    k. Number, type, and size of filters.

2. Motor Data:

    a. Motor make, and frame type and size.
    b. Horsepower and rpm.
    c. Volts, phase, and hertz.
    d. Full-load amperage and service factor.
    e. Sheave make, size in inches (mm), and bore.
    f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).

3. Test Data (Indicated and Actual Values):

    a. Total air flow rate in cfm (L/s).
    b. Total system static pressure in inches wg (Pa).
    c. Fan rpm.
    d. Discharge static pressure in inches wg (Pa).
    e. Filter static-pressure differential in inches wg (Pa).
    f. Preheat-coil static-pressure differential in inches wg (Pa).
    g. Cooling-coil static-pressure differential in inches wg (Pa).
    h. Heating-coil static-pressure differential in inches wg (Pa).
    i. Outdoor airflow in cfm (L/s).
    j. Return airflow in cfm (L/s).
    k. Outdoor-air damper position.
    l. Return-air damper position.
    m. Vortex damper position.

F. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

    a. System identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Fuel type in input data.
    g. Output capacity in Btu/h (kW).
    h. Ignition type.
    i. Burner-control types.
    j. Motor horsepower and rpm.
    k. Motor volts, phase, and hertz.
    l. Motor full-load amperage and service factor.
    m. Sheave make, size in inches (mm), and bore.
    n. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).

2. Test Data (Indicated and Actual Values):

    a. Total air flow rate in cfm (L/s).
    b. Entering-air temperature in deg F (deg C).
    c. Leaving-air temperature in deg F (deg C).
    d. Air temperature differential in deg F (deg C).

e. Entering-air static pressure in inches wg (Pa).
f. Leaving-air static pressure in inches wg (Pa).
g. Air static-pressure differential in inches wg (Pa).
h. Low-fire fuel input in Btu/h (kW).
i. High-fire fuel input in Btu/h (kW).
j. Manifold pressure in psig (kPa).
k. High-temperature-limit setting in deg F (deg C).
l. Operating set point in Btu/h (kW).
m. Motor voltage at each connection.
n. Motor amperage for each phase.
o. Heating value of fuel in Btu/h (kW).

G. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches (mm), and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Total system static pressure in inches wg (Pa).
c. Fan rpm.
d. Discharge static pressure in inches wg (Pa).
e. Suction static pressure in inches wg (Pa).

H. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F (deg C).

d. Duct static pressure in inches wg (Pa).
e. Duct size in inches (mm).
f. Duct area in sq. ft. (sq. m).
g. Indicated air flow rate in cfm (L/s).
h. Indicated velocity in fpm (m/s).
i. Actual air flow rate in cfm (L/s).
j. Actual average velocity in fpm (m/s).
k. Barometric pressure in psig (Pa).

I. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.
i. Effective area in sq. ft. (sq. m).

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm (L/s).
b. Air velocity in fpm (m/s).
c. Preliminary air flow rate as needed in cfm (L/s).
d. Preliminary velocity as needed in fpm (m/s).
e. Final air flow rate in cfm (L/s).
f. Final velocity in fpm (m/s).
g. Space temperature in deg F (deg C).

J. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Service.
d. Make and size.
e. Model number and serial number.
f. Water flow rate in gpm (L/s).
g. Water pressure differential in feet of head or psig (kPa).
h. Required net positive suction head in feet of head or psig (kPa).
i. Pump rpm.
j. Impeller diameter in inches (mm).
k. Motor make and frame size.
l. Motor horsepower and rpm.
m. Voltage at each connection.

n. Amperage for each phase.
o. Full-load amperage and service factor.
p. Seal type.

2. Test Data (Indicated and Actual Values):

a. Static head in feet of head or psig (kPa).
b. Pump shutoff pressure in feet of head or psig (kPa).
c. Actual impeller size in inches (mm).
d. Full-open flow rate in gpm (L/s).
e. Full-open pressure in feet of head or psig (kPa).
f. Final discharge pressure in feet of head or psig (kPa).
g. Final suction pressure in feet of head or psig (kPa).
h. Final total pressure in feet of head or psig (kPa).
i. Final water flow rate in gpm (L/s).
j. Voltage at each connection.
k. Amperage for each phase.

3.14 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least [**10**] <**Insert number**> percent of air outlets.
b. Measure water flow of at least [**5**] <**Insert number**> percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Verify that balancing devices are marked with final balance position.
e. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by [**Architect**] [**Owner**] [**Construction Manager**] [**Commissioning Authority**].
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of [**Architect**] [**Owner**] [**Construction Manager**] [**Commissioning Authority**].
3. [**Architect**] [**Owner**] [**Construction Manager**] [**Commissioning Authority**] shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."

5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.15 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 235223 - CAST-IRON BOILERS

1.01. REFERENCES

A. American Society of Mechanical Engineers (ASME) Section IV - Boiler and Pressure Vessel Code.
B. Hydronics Institute (HI) - Testing and Rating Standard for Cast Iron and Steel Heating Boilers.
C. UL, FM, MEA, NFPA 54, A.S.M.E. CSD-1, NYS Code Rule 4.

1.02. SUBMITTALS

A. Submit product data, wiring diagrams and near boiler piping schematics for manufactured heating units.

1.03. OPERATION AND MAINTENANCE DATA

A. Submit operations and maintenance data, including manufacturer's descriptive literature, installation instructions, operating instructions and maintenance and repair data.

1.04 WARRANTY

A. Units that do not carry a standard published warranty of ten or more years on the heat exchanger are not acceptable to this project. Job specific warranties are not acceptable unless executed by an authorized officer of the manufacturer under seal and submitted five (5) working days prior to the bid date of this project.

2.01 GENERAL DESCRIPTION

A. Furnish and install as herein specified two new boiler/burner units for Steam heating service and arranged for completely automatic operation firing natural gas. Boiler to be shipped knocked-down for field assembly by installing contractor.

B. Each boiler shall be furnished complete with an insulated metal jacket; Forced draft burner; Cast iron smoke hood with integral 14 gauge aluminized steel damper; Pressure-tight front and rear flame observation ports with covers; Steel angle floor rails; Cast iron burner mounting plate with insulation and additional controls and devices as hereafter specified.

C. Safety controls and limit devices shall be installed in accordance with the requirements of (NFPA 54). In every case, the boiler installation shall be accomplished in accordance with the recommended good practice and installation requirements of the A.S.M.E. Boiler and Pressure Vessel Code. (Section 4)

D. The boiler/burner unit shall have been rated in accordance with the Hydronics Institute Testing and Rating Standard for Heating Boilers, and shall be performance tested and listed by I=B=R at +0.10 inches (w.c.) draft as follows:

1. Each boiler to develop an I=B=R Gross Output of not less than 1,126 MBTU/Hr.

when fired at a rate of 1,356 MBH of natural gas. Each unit shall provide a minimum of 83.1% gas thermal efficiency.

2. Each boiler shall be manufactured by a ISO9001 registered company and shall conform to ASME Section IV requirements

E. The boiler/burner units shall be Model BG588-S-F series 2 Steam Boiler as manufactured by Weil McLain Boilers or approved equal.

2.02 BOILER CONSTRUCTION / INSTALLATION:

A. Boiler sections shall be manufactured from a flake graphite eutectic cell cast iron. The sections shall be of the wet base type designed for pressure firing and it shall be constructed and tested for 15 P.S.I.G. steam working pressure in accordance with the A.S.M.E. Section IV Rules for the Construction of Heating Boilers.

B. Boiler sections shall be of one-piece design incorporating the furnace space and flue gas collector space with perimeter joints between the sections arranged for permanent pressure sealing with high temperature ceramic fiber rope. Port openings must be of the captured seal design – a machined groove assures uniform compression of the sealing ring and protects from contaminants. Elastomer sealing rings are used to provide permanent watertight seals between sections. Sections shall be assembled with short draw rods, tightened to final torque after the section assembly is complete.

C. All boiler discharges shall be piped away from the boiler as shown on the contract drawings and as indicated by the engineer. Blow-down valves shall be brass, ball type and not less than one-inch IPS and they shall discharge away from the boiler as directed by the Engineer. Pipe ends shall be cut at a 45-degree angle to prevent a cap or plug from being installed. Hangars or standoffs to prevent the valve body from undue stress or strain shall support all such discharge piping.

D. Boiler drain valves shall be connected to the lowest water space available and shall be installed with pipe and fittings to connect the bottom blow off full size to drain.

E. All individual sections shall have legs to provide support on both sides. Two base angles shall be furnished to be set under field assembled boilers to provide level support for the sections when shimmed and grouted to a concrete floor. The base angles shall be tapped to receive the supporting frame for the insulated metal jacket.

F. Insulating metal jacket shall consist of 20-gauge steel panels fitted with 3" 1 1/2 Lb./Cu. Ft. density fiberglass insulation glued to the inside of the panels. Jacket panels shall be finished with blue hammer tone paint baked on and shall be arranged with slots and knockouts to accommodate the boiler piping and to allow jacket installation after the piping is in place. Left and right side panels shall be furnished with two recessed handles located above and below the horizontal centerline of the jacket for easy removal and to provide access to the boiler clean out covers and draw rods.

G. Cleanout covers shall be sized and located to allow full access to the extended pin type heating surface areas for cleaning and inspection of the HXT bars. Cleanout covers shall have grooves to contain high temperature ceramic fiber rope seals for gas-tight fit to the sections and incorporate cast on

horizontal baffles to reduce short-circuiting of flue gasses and also enhance performance by maximizing heat transfer.

H. Stop valves of the outside stem and yoke type shall be provided in the supply and return pipe connections to the boiler. Provisions shall be made for the expansion and contraction of the heating mains connected to the boiler by providing substantial anchorage at suitable points and assisted by the use of swing joints to allow the piping to expand and contract without imposing excessive forces on the boiler castings.

I. Boiler shipped Knocked-Down for field assembly by installing contractor.

J. Boiler installation shall be accomplished within acceptable A.S.M.E. piping practices and requirements and in strict accordance with the boiler manufacturer's recommendations and instructions.

K. A hydrostatic pressure test of one-and-one-half times the working pressure of the boiler shall be conducted on this boiler. Such tests shall be of such duration as necessary and as directed by the engineer to ensure the boiler has been assembled and installed correctly with no leaks or improper operating conditions.

L. The installing contractor shall contact and notify the Boiler Inspections Divisions of the State when the installation of the boiler, burner and controls is substantially complete. Installing contractor shall request an Inspection of the boiler to be conducted by the State Boiler Inspector and to have a Certificate of Inspection issued upon satisfactory inspection.

2.03 STEAM BOILER TRIM:

A. The boiler shall have the following minimum trim items:

1. A.S.M.E. schedule side outlet safety valve set for 15 PSI
2. 8-1/2” compound gauge
3. Honeywell L404A operating control
4. Honeywell L4079B high limit control
5. Honeywell L91B modulating control
6. McDonnell & Miller # 51-2 feed water control & LWCO
7. McDonnell & Miller # 63A LWCO
8. McDonnell & Miller # 63M LWCO – manual reset
9. Barometric damper with spill switch
10. gauge glass

2.04 GAS BURNER UNIT:

A. Furnish and install as indicated herein Underwriters Labeled natural gas burner on each Weil McLain boiler. The burner design, construction, components and installation shall meet all applicable code requirements.

B. The burner shall be Power Flame model CR1-G-12ATI forced draft flame retention burners. Each burner shall be capable of firing its respective boiler to a rate of 1,356 MBH natural gas. The burners are to be supplied for Modulation operation.

C. Each burner shall be listed by Underwriters Laboratories and shall bear the appropriate U.L. label. In addition to the U.L. requirements, all equipment and installation procedures will meet the requirements of FM, NFPA 54 and ASME CSD-1. Each burner shall be designed and constructed as an integrated combustion system package and shall be factory fire tested.

D. Each burner shall be of welded steel construction. The combustion head shall incorporate a multi blade, stainless steel, flame retention diffuser. The gas firing head shall be of the multi-port type and constructed such as to place annular gas distribution opening between two parallel airflow streams to achieve maximum fuel/air mixing. Burners with cast alloy blower housings will not be accepted. The design shall also include an adjustable primary air/gas mix chamber constructed such that a mixture of primary air and gas will be introduced into the combustion area, upstream of the secondary combustion air and ignition introduction zone.

E. All air required for combustion shall be supplied by a blower-mounted integral to the burner. The blower wheel shall be of the forward curved centrifugal design and shall be directly driven by a 1/3 horsepower 3450 RPM single phase motor. A dual blade damper assembly located on the inlet side of the blower wheel shall meter the combustion airflow. Design shall permit the disconnecting and locking of either damper if firing rates are near minimum burner input ratings.

F. Each burner ignition system shall utilize natural gas as the fuel source for ignition of natural gas. The gas pilot system components shall include spark ignited pilot assembly, 6000 Volt ignition transformer, pilot solenoid valve, pilot gas pressure regulator and manual gas shutoff cock. The flame proving system shall incorporate a Ultra-Violet flame detector that will monitor both the pilot and main flames. The pilot assembly shall fit within the confines of the blast tube - avoiding special burner front plate pilot cutouts.

G. Dual motorized gas valves shall control the main On/Off gas supply. A two position gas valve shall control the staged positioning of the air inlet dampers, and gas valve to best meet varying system load conditions.

H. Each burner shall be complete with a gas head / tube assembly, The burners shall be equipped with a main gas train, minimum size 1-1/4” equipped as follows:

1. Main gas shut off valve – manual ball type
2. Main gas pressure regulator
3. Motorized main gas valve
4. Auxiliary solenoid valve
5. High and low gas pressure interlocks
6. Leak test valve
7. CSD-1 test valves.

I. Each burner shall incorporate U.L. approved components as supplied by the burner manufacturer to

provide specified Fuel/Air Control System operation.

J. The Combustion Air System (see other spec sections and drawing schedules) will be electrically interlocked with the burner operating circuit to ensure that the burner will not operate if the Combustion Air System is not operating. All system circuitry shall be interlocked with the burner circuitry to insure correct sequencing of all combustion system components.

2.05 BURNER CONTROL PANEL

A. Each burner shall be complete with a burner mounted control panel that shall house all required operating electrical components. All wiring within the combustion system shall be pre-wired to a terminal strip mounted within the control panel. Appropriate electrical knockouts shall be provided on both sides of the panel to allow for necessary power and limit control wiring. The control panel shall be constructed of 16-gauge steel and shall be complete with a top switch and control section that shall be hinged to allow for full access to all panel mounted components. The control panel shall be painted in a color and finish identical to the burner being supplied.

B. The control panel shall include a control circuit fuse -Honeywell RM7897A flame safeguard control - On-Off switch - motor starters for burner motor, motor fuses, relays, , terminal blocks and other electrical devices as required. All wiring shall be color coded.

C. The flame safeguard control system shall include Ultraviolet sensor for flame detection and provide fully automatic sequencing of pre-purge, blower motor, interrupted ignition system, and fuel/air flow components. The flame safeguard control shall be the Honeywell model RM7897A.

D. The control panel shall be furnished with standard panel lights. The following points shall be annunciated on the panel:

1. Power On
2. Main Fuel
3. FSG Alarm
4. Load Demand

2.06 BOILER BURNER COMMISSIONING:

A. The contractor shall retain the services of the equipment manufacturers local authorized service representative for purposed of startup, testing and system adjustment. All testing to be complete using the manufacturers start up and testing procedure and shall be documented using the test forms found in the installation and instruction manuals. On completion of the burner system start up - the installing contractor will complete the "Burner Start up Information and Test Data" form and "Control Settings" form and deliver to the Architect and owner. The commissioning shall include but not be limited to the following:

B. The startup sheet furnished by the burner manufacturer must be complete in its entirety. A print out of the combustion readings shall be furnished and attached to the startup sheet. Combustion readings shall be by means of an electronic combustion test instrument with print out capability Actual testing shall be accomplished by a factory authorized service agency whose personnel have been trained by

the burner manufacturer. The individual technician must have a minimum of five (5) years' experience in startup and service of equipment of the size and complexity similar to this installation. Startup will cover all tests as outlined in ASME CSD, including fuel valve leakage test. The owner's operating personnel shall be furnished with detailed instruction manuals on the following topics:

1. Overview of the burner operation
2. Detailed instructions regarding the applicable combustion control
3. Detailed instructions regarding the modulating motor applied to the burner, including linkage.
4. Detailed gas fuel flow diagrams.
5. These items are in addition to the standard service manual provided with the equipment.

2.07 FIELD TRAINING:

A. Field training course shall be provided for staff members. Training shall be provided for a total period of 8 hours of normal working time and shall start after system is functionally complete. Field training shall cover items contained in approved safety, operation and maintenance instructions as well as demonstrations of routine maintenance operations. Mechanical contractor should notify manufacturer in writing at least 10 days prior to training.

END.

SECTION 235313 - BOILER FEEDWATER PUMPS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Unit shall be a Domestic□ heating boiler feedwater duplex unit, series CM□, as manufactured by Bell & Gossett, a Xylem brand.□.

B. Furnish and install extended life pumps with capacities as indicated in the plans.

1.2 RELATED SECTIONS

A. Section 235313 – Boiler feed water pumps.

B. Section 262716 – Electrical cabinets and enclosures.

1.3 REFERENCES

A. HI - Hydraulic Institute.

B. ANSI - American National Standards Institute.

C. NEMA - National Electrical Manufacturers Association.

D. UL - Underwriters Laboratories.

E. ETL - Electrical Testing Laboratories.

F. CSA - Canadian Standards Association.

G. NEC - National Electric Codes.

H. ISO - International Standards Organization.

I. IEC - International Electrotechnical Commission.

1.4 SUBMITTALS

A. Submit data cover sheet.

B. Unit description sheet.

C. Dimensional print(s).

D. Sales bulletin.

E. Piping diagram(s).

F. Wiring diagram(s).

G. Installation, operation & maintenance manual.

1.5 QUALITY ASSURANCE

A. The manufacturer shall have a minimum of 30 years experience in the design and construction of heating boiler feedwater equipment.

B. The pump manufacturer shall be fully certified by the International Standards Organization per ISO 9001. Proof of this certification shall be furnished at the time of submittal.

C. The manufacturer shall carry a minimum product liability insurance of $5,000,000.00 per occurrence.

D. The Unit shall be UL listed or recognized by Underwriters' Laboratories, Inc as a complete Boiler Feedwater Package.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
1. Bell & Gossett, a Xylem brand. Domestic series CM duplex.
2. Pre-approved equal.

2.2 COMPONENTS

A. Cast iron receiver
a. The boiler feed receiver shall be of close grained cast iron construction (warranted for 20 years from the date of shipment against failure due to corrosion).
b. The receiver shall be sized for five minutes net storage based on the boiler evaporation rate.
c. The receiver shall offer maximum protection from corrosion and feature an inlet, vent and overflow opening to provide a means of secondary venting.
d. The water make up shall be installed on the receiver of capacity equal to one boiler feed pump.
1) The make-up assembly shall consist of:
a) One electric solenoid that shall be packless, piston pilot operation type with cushioned closing feature and epoxy resin molded waterproof coil.
b) One water level float switch.
c) One Y-strainer located upstream of the solenoid valve.

B. Water pump

1. Two water pumps shall both be series C35 or C17 bronze fitted, centrifugal pumps, close-coupled to 3500 RPM or 1750 RPM motor, permanently aligned, and flange mounted for vertical operation.
2. Each pump shall include:
    a. One cast Iron volute with:
    b. One discharge gauge port tapping.
    c. One drain tapping.
    d. One dynamically balanced enclosed bronze centrifugal impeller.
    e. One renewable bronze wearing ring.
    f. One stainless steel shaft.
    g. Carbon/ceramic/Buna N/stainless steel mechanical seal suitable for 250^{o}F (121C) operation.
3. Each pump shall be sized for two times the system return rate.
4. Each motor shall meet NEMA specifications and shall be the size, voltage, insulation class, duty rating and enclosure called for in the plans.
5. Capacities and electrical characteristics for the pump shall be scheduled on the drawings.

C. Manual by-pass valve around the water make-up solenoid consisting of:
1. Two ball valves to isolate the solenoid valve.
2. One gate valve for the direct water feed line.

D. Air gap fitting for make-up valve.

E. Water level gauge glass for visual tank level inspection.

F. Lifting eye bolts for unit placement.

G. A dial thermometer.

H. Pump discharge pressure gauge.

I. Two bronze fitted butterfly isolation valve (up to 115 GPM (435 L/M) pump capacity) between the pump suction and receiver for easy Isolation of the pump and motor assembly for servicing.

J. Cast iron inlet basket strainer with vertical self-cleaning bronze screen and large dirt pocket for sediment collection. The screen shall be easily removable for cleaning, requiring no additional floor space for servicing. This option ships loose for field installation BY INSTALLING CONTRACTOR

K. Consolitrol NEMA 2, UL electrical panel mounted and wired with drip lip and piano hinged door is available with the following options:
1. Two magnetic starters with thermal overload protection. Starters may be provided with disconnect devices:
    a. Fusible disconnect with cover interlock
2. Two selector switches:
    a. “Off-Hand-Lead-Lag” selector switches.
3. Two auxiliary contacts on the magnetic starters normally open for remote monitoring of pump operation.
4. An audible alarm to indicate water level conditions.
    a. Alarm may be provided with alarm light to provide visual indication of alarm condition.

5. One single point power connection.
6. Control power switching relay shall allow the switch over of control power from one pump to the other in the event of a power failure or pump failure.

L. Liquid tight conduit suitable for NEMA 2

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.

C. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram.

D. All interconnecting wiring between the pump controls and control panel shall be enclosed in liquid tight flexible conduit.

E. The unit shall be factory tested as a complete unit and the unit manufacturer shall furnish elementary and connection-wiring diagrams and piping diagrams. Installation and operation instructions shall also be provided.

F. The unit manufacturer shall furnish, mount on the unit and wire a NEMA 2 control cabinet with drip lip and piano hinged door.

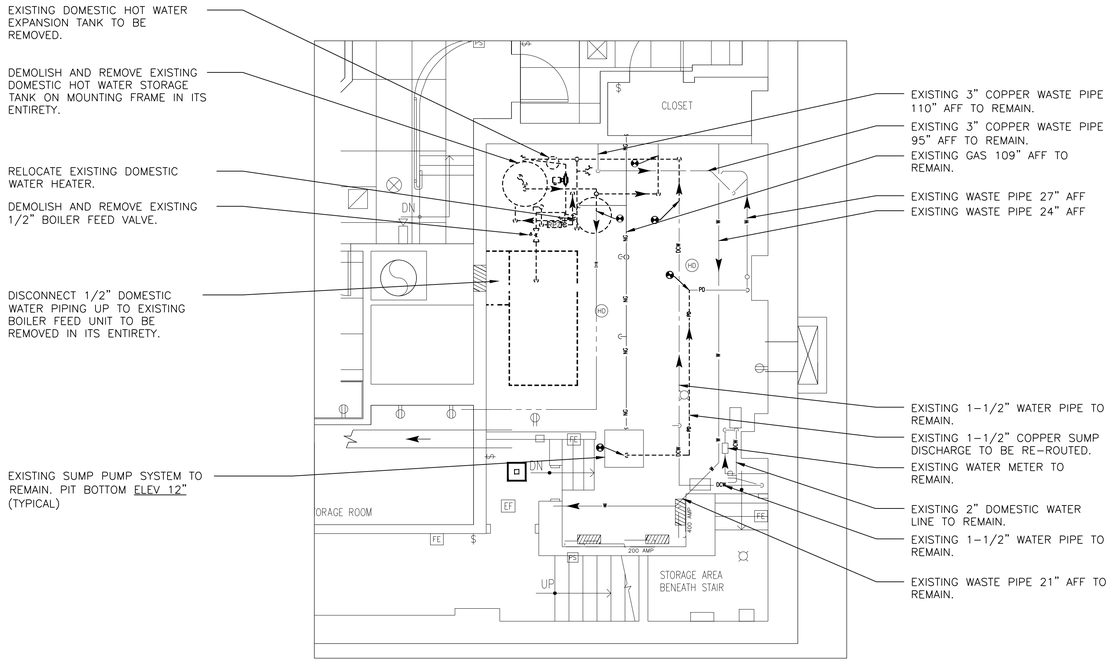
G. The unit shall be shipped completely assembled.

H. The factory shall provide a certified test report.

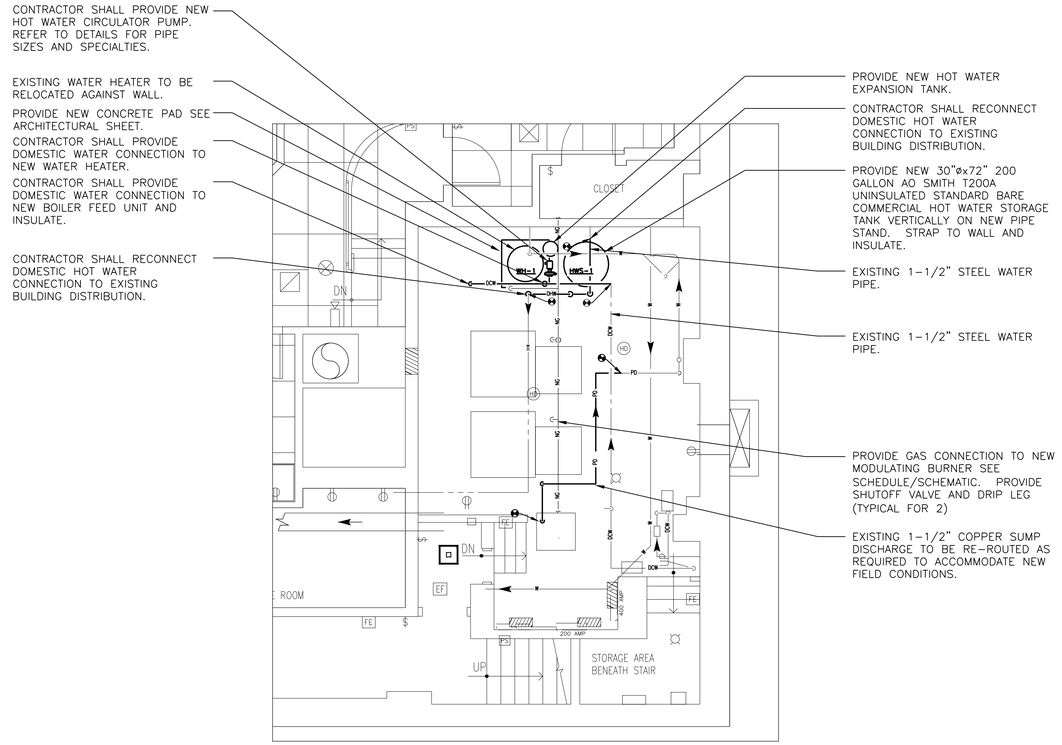
I. Unit shall be a Domestic series CM duplex as manufactured by Bell & Gossett, Morton Grove, IL.

END OF SECTION

END OF SECTION 235313

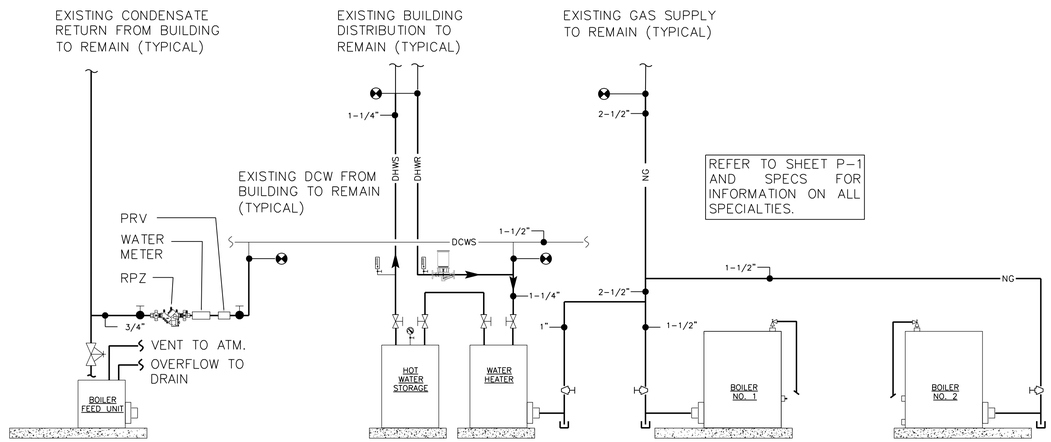


1 P-2 PLUMBING ROOM DEMOLITION PLAN
SCALE: 1/4" = 1'-0"



1 P-2 PLUMBING ROOM NEW WORK PART PLAN
SCALE: 1/4" = 1'-0"

ALL PIPING SHALL BE ROUTED TIGHT AGAINST WALL AND CEILING TO FACILITATE EASE OF PASSAGE.



3 P-2 BOILER ROOM PLUMBING SCHEMATIC
SCALE: NONE

REVISION NUMBER	DATE	MADE BY	APP'D BY	REVISION
1	6-22-2021	VJL	VJL	ADDENDUM #1: REPLACED SHEET

RECORD DRAWING CERTIFICATION
☐ AS BUILT – CHANGES AS NOTED
☐ AS BUILT – NO CHANGES

CONTRACTOR
NAME
SIGNATURE
TITLE DATE

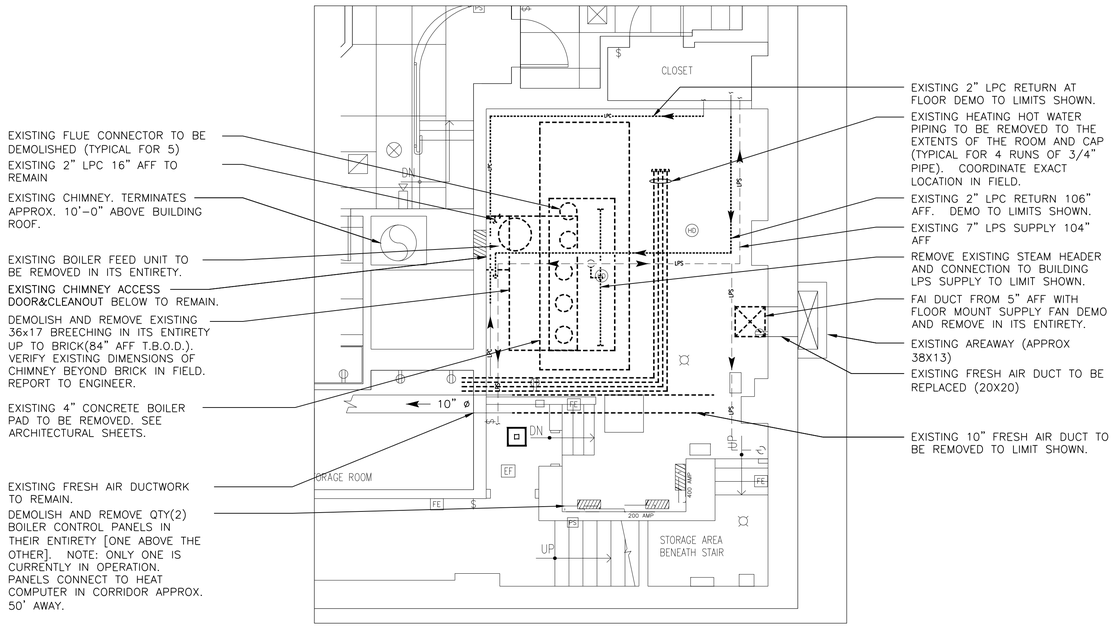
PROJECT COORDINATOR
NAME
SIGNATURE
TITLE DATE

IN CHARGE OF JAI PUNNOOSE, P.E.
CHECKED BY
MADE BY VINCENT LEONE, P.E.

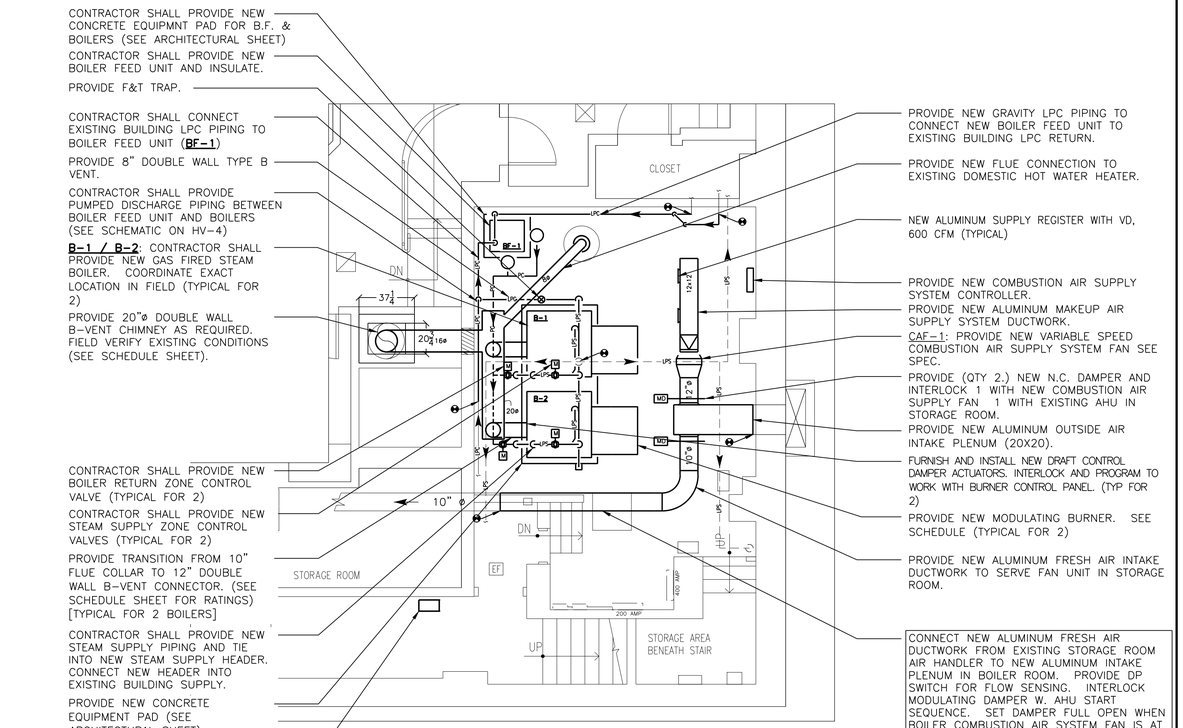
WESTCHESTER COUNTY, NEW YORK
DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING

BOILER REPLACEMENT AND ASSOCIATED WORK
VERNON PLAZA FAMILY CENTER
17 SOUTH SECOND AVENUE, MOUNT VERNON, NEW YORK
DEMOLITION AND NEW WORK PLAN, CELLAR LEVEL

CONTRACT NUMBER	SHEET NUMBER
21-514	P-2
SHEET NO. 4 OF 9	
SCALE: AS SHOWN DATE: 06/04/21	
DPW FILE NO. 54-29-P-50	REV. NO. 0

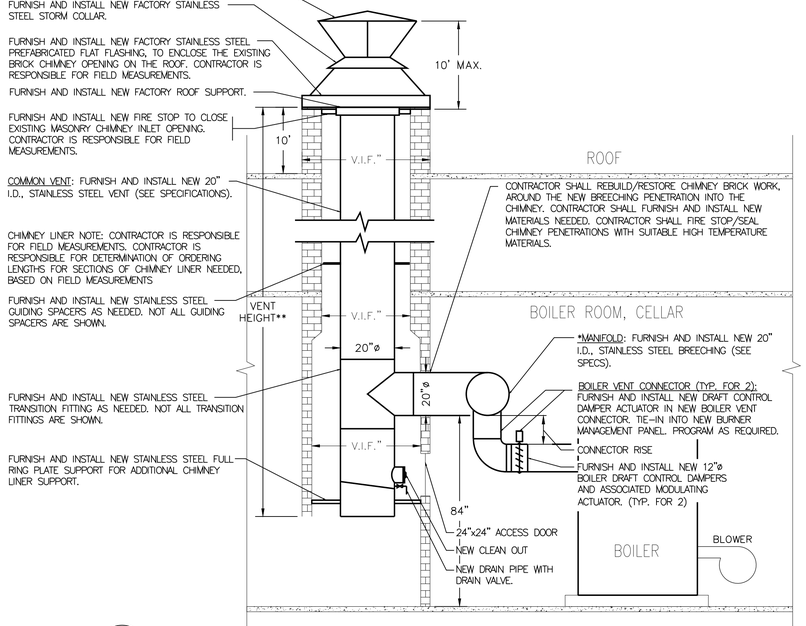


1 HV-3 DEMOLITION PLAN, BOILER ROOM
SCALE: 1/4" = 1'-0"



1 HV-3 NEW WORK PLAN, CELLAR LEVEL
SCALE: 1/4" = 1'-0"

ENSURE PROPER SUPPORT OF ALL EXISTING PIPING DESIGNATED TO REMAIN FROM CEILING. REMOVE LALLY COLUMNS.



2 HV-3 BOILER ROOM/ROOF MECHANICAL NEW WORK VENTING SKETCH
SCALE: N.T.S.

REFER. TABLE 504.3 2018 IFGC

*MANIFOLD LENGTH FROM THE BASE OF THE VERTICAL VENT TO THE NEAREST APPLIANCE SHOULD NOT EXCEED 10 FEET OR 50% OF THE TOTAL VENT HEIGHT, WHICHEVER IS GREATEST.

**APPROX 50' (VERIFY IN FIELD)

NOTE: EXISTING WATER HEATER IS IN THE BACKGROUND AND NOT SHOWN HERE FOR CLARITY. CONNECT NATURAL DRAFT HOOD TO END OF MANIFOLD WITH 8" VENT DOUBLE WALL VENT CONNECTOR (SEE PLAN VIEW).

WATER HEATER	
VENT CONNECTOR PARAMETER	**VALUE**
VENT HEIGHT	50
CONNECTOR RISE (FT)	3
TYPE B DOUBLE WALL VENT ø(INCHES)	8
APPLIANCE INPUT RATING LIMIT (MBH) FAN_{min} / FAN_{MAX} / NAT_{MAX}	103 / 661 / 343
BOILER	
VENT CONNECTOR PARAMETER	**VALUE**
VENT HEIGHT	50
CONNECTOR RISE (FT)	2
TYPE B DOUBLE WALL VENT ø(INCHES)	12
APPLIANCE INPUT RATING LIMIT (MBH) FAN_{min} / FAN_{MAX} / NAT_{MAX}	206 / 1479 / 689
COMMON VENT PARAMETER	**VALUE**
VENT HEIGHT	50
TYPE B DOUBLE WALL VENT ø(INCHES)	16
COMBINED APPLIANCE INPUT RATING (MBH) FAN + NAT	3,183

CHIMNEY NOTES:
CONTRACTOR TO VERIFY THE FOLLOWING AND REPORT BACK TO ENGINEER:
1. ACTUAL VENT HEIGHT OF EXISTING CHIMNEY.
2. ACTUAL VENT DIAMETER OF EXISTING CHIMNEY/LINER AND CONDITION.

BOILER 1:	FAN MBH (MIN/MAX) (450/1,356)
BOILER 2(NOT SHOWN):	FAN MBH (MIN/MAX) (450/1,356)
WATER HEATER(NOT SHOWN):	NATURAL DRAFT (300MBH)

EXISTING BRICK CHIMNEY NOTES:

1. CONTRACTOR SHALL CHECK FOR CRACKS, MISSING BRICKS/MORTAR OR ANY OTHER LOOSE MATERIALS THAT COULD INHIBIT NEW LINER INSTALLATION AND CORRECTING PROBLEMS, PRIOR TO INSTALLATION.
2. CONTRACTOR SHALL PERFORM VIDEO INSPECTION, THE ENTIRE LENGTH OF EXISTING CHIMNEY, SUBMIT REPORT TO COUNTY.
3. CONTRACTOR IS RESPONSIBLE FOR INTERIOR CLEANING AND NEUTRALIZATION OF EXISTING MASONRY CHIMNEY.
4. CONTRACTOR SHALL CLEAN WITH A WATER JET ALL INTERIOR SURFACES OF EXISTING MASONRY CHIMNEY TO REMOVE ANY COMBUSTION RESIDUE.
5. CONTRACTOR SHALL WASH WITH CLEAN WATER ON AIR PRESSURE WITH A MIXTURE OF 10% POTASSIUM CARBONATE TO NEUTRALIZE ACCUMULATED ACID INSIDE THE CHIMNEY, AND LET IT ACT FOR A MINIMUM OF 12 HOURS PRIOR TO RINSING WITH CLEAN WATER ON AIR PRESSURE.
6. CONTRACTOR SHALL OPEN UP THE EXISTING BRICK CHIMNEY, AT THE BASE, AS NEEDED, INSIDE THE BOILER ROOM, TO PERFORM CHIMNEY LINER COMPONENTS ASSEMBLY WORK OR STRUCTURAL SUPPORT WORK ETC. CONTRACTOR SHALL PROVIDE TEMPORARY STRUCTURAL SUPPORTS TO EXISTING BRICK CHIMNEY DURING LINER INSTALLATION WORK. CONTRACTOR SHALL REBUILD/ RESTORE CHIMNEY BRICK WORK AFTER LINER WORK IS COMPLETED. CONTRACTOR IS RESPONSIBLE FOR MATERIALS AND LABOR NEEDED FOR REBUILDING CHIMNEY. CONTRACTOR SHALL FIRE STOP, FIRE/WATER SEAL CHIMNEY.

BREECHING DEMOLITION NOTES:

1. AS PART OF DEMOLITION WORK, CONTRACTOR SHALL DISCONNECT EXISTING BREECHING FROM THE BOILERS AND CHIMNEY, PRIOR TO CUTTING INTO SMALLER SECTIONS AND REMOVAL FROM THE BOILER ROOM.
2. CONTRACTOR SHALL CLEAN EXISTING BREECHING INSIDE FOR SOOT REMOVAL, PRIOR TO CUTTING INTO SMALLER PIECES FOR DISPOSAL OFFSITE.
3. CONTRACTOR IS RESPONSIBLE FOR LEGAL OFFSITE DISPOSAL OF EXISTING BOILER BREECHING.
4. CONTRACTOR IS RESPONSIBLE FOR CUTTING AND PATCHING.
5. CONTRACTOR IS RESPONSIBLE FOR ANY REPAIR WORK NEEDED TO EXISTING BRICK CHIMNEY.
6. ANY CUTTING, GRINDING, TORCH WORK SHALL FOLLOW HOT WORK SAFETY PROCEDURES.
7. ALL WORK AREAS SHALL BE EXHAUST VENTILATED TO THE OUTDOORS OR CHIMNEY TO PREVENT ODORS/FUMES WITH-IN THE BUILDING.

NEW CHIMNEY LINER INSTALLATION NOTES:

1. CONTRACTOR SHALL FURNISH AND INSTALL NEW STAINLESS STEEL, CHIMNEY LINER PER SPECIFICATIONS.
2. CONTRACTOR SHALL FURNISH AND INSTALL NEW STAINLESS STEEL PREFABRICATED FLAT FLASHING, TO ENCLOSE THE EXISTING BRICK CHIMNEY OPENING ON THE ROOF. CONTRACTOR IS RESPONSIBLE FOR FIELD MEASUREMENTS.
3. CONTRACTOR IS RESPONSIBLE FOR FIELD MEASUREMENTS PRIOR TO FINALIZING LINER LENGTHS NEEDED AND ORDERING NEW LINER MATERIALS.
4. CONTRACTOR IS RESPONSIBLE FOR ALL LABOR REQUIRED FOR TRANSPORTING/ DELIVERING SECTIONS OF THE NEW LINER MATERIAL TO 8TH FLOOR ROOF OF THE BUILDING.
5. CONTRACTOR IS RESPONSIBLE FOR ALL HOISTING, LIFTING, GUIDING, RIGGING PERMITS AND SAFE OPERATION REQUIREMENTS ETC. NEEDED AND ALL COSTS, LICENSES ASSOCIATED.
6. CONTRACTOR IS RESPONSIBLE FOR STRUCTURAL SUPPORTS, FIRE/WATER STOPPING OF EXISTING BRICK CHIMNEY/NEW CHIMNEY LINER.
7. CONTRACTOR IS RESPONSIBLE FOR CUTTING AND PATCHING.
8. CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS NEEDED ON EXISTING BRICK CHIMNEY TO ACCOMMODATE INSTALLATION OF NEW CHIMNEY LINER.
9. CONTRACTOR IS RESPONSIBLE FOR COMPLETE ASSEMBLY NEW CHIMNEY LINER SECTIONS FOR SUCCESSFUL INSTALLATION.
10. CONTRACTOR IS RESPONSIBLE FOR TESTING FOR LEAKS, FIXING LEAKS AND PUTTING NEW CHIMNEY IN OPERATION.

DEMOLITION NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR ALL PIPING/WIRING DISCONNECTIONS NEEDED, PRIOR TO DEMOLITION OF EXISTING BOILER AND ASSOCIATED FLOOR MOUNTED CONTROL PANELS.
2. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF EXISTING PIPING CONNECTIONS/ROUTING AND WIRING CONNECTIONS THROUGHOUT BOILER/CONTROL PANELS.
3. CONTRACTOR IS RESPONSIBLE TO DEMOLISH AND REMOVE EXISTING NATURAL GAS PIPING. NG PIPING SHOWN ON THE DRAWING IS FOR BID PURPOSES ONLY. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF PIPING LENGTHS, ROUTING, ETC.
4. CONTRACTOR IS RESPONSIBLE FOR TRANSPORTATION AND LEGAL OFFSITE DISPOSAL OF ALL MATERIAL CALLED OUT TO BE DEMOLISHED AND REMOVED.
5. CONTRACTOR IS RESPONSIBLE FOR CUTTING AND PATCHING. CONTRACTOR IS RESPONSIBLE FOR RESTORING ANY BUILDING SURFACES DAMAGED DURING DEMOLITION WORK.
6. CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS NEEDED TO EXISTING CONCRETE FLOORS, BRICK WALLS AND BUILDING STRUCTURE DAMAGED DURING DEMOLITION PROCESS.
7. DEMOLISH EXISTING BOILER COMPLETE. CUT 6"LPS PIPING TO LPS HEADER, 2"LPC PIPING TO LPC HEADER, AND BREECHING AS INDICATED ON DEMOLITION FLOOR PLAN.
8. DEMOLISH EXISTING STEEL FLOOR SUPPORTS, BURNER, BURNER CONTROLS, CONTROL CABINET, CONDUITS, WIRING, PIPE VALVES, & SPECIALTIES COMPLETE.

NEW WORK NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR COMPLETE INSTALLATION OF NEW MODULATING GAS BURNERS AND ALL ASSOCIATED EQUIPMENT.
2. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF CONTROLS PANEL AND ASSOCIATED EQUIPMENT.
3. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF DRAFT CONTROL ACTUATORS AND ASSOCIATED CONTROLS DISPLAY PANELS.
4. CONTRACTOR IS RESPONSIBLE FOR COMPLETE INSTALLATIONS OF ALL EQUIPMENT.
5. CONTRACTOR IS RESPONSIBLE FOR NEW ELECTRICAL/CONTROLS WIRING AND CONDUIT NEEDED. CONTRACTOR IS RESPONSIBLE FOR WIRING TERMINATIONS.
6. NEW GAS BURNERS ASSOCIATED FIELD DEVICES OR ELECTRICAL/CONTROLS WIRING DETAILS NOT SHOWN ON THE DRAWINGS.
7. CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH VENDORS TO OBTAIN ADDITIONAL INFO OR DRAWINGS.
8. CONTRACTOR SHALL PROVIDE NEW MOUNTING HARDWARE NEEDED FOR MOUNTING THE NEW CONTROL PANELS AND ASSOCIATED FIELD DEVICES.
9. CONTRACTOR IS RESPONSIBLE FOR CUTTING/PATCHING.
10. CONTRACTOR IS RESPONSIBLE FOR ALL MODIFICATIONS, REPAIRS, RESTORATION, ETC NEEDED ON EXISTING CONCRETE FLOORS, BRICK WALLS, ETC INSIDE THE BOILER ROOM AS NEEDED FOR NEW INSTALLATION WORK.
11. CONTRACTOR IS RESPONSIBLE FOR ALL WORK RELATED TO SWITCHING OVER THE BUILDING FROM RENTAL BOILERS TO NEW MODULATING GAS FIRED BURNERS. SEE BID ITEM B ON HV-2.
12. CONTRACTOR IS RESPONSIBLE FOR TESTING AND PUTTING NEW MODULATING GAS FIRED BOILERS IN SERVICE.
13. CONTRACTOR IS RESPONSIBLE FOR TROUBLE SHOOTING NEW GAS BOILERS AND ASSOCIATED EQUIPMENT FOR PROPER OPERATION. ANY BOILER PROBLEMS SHALL BE BOUGHT TO THE ATTENTION OF THE ENGINEERS.
14. CONTRACTOR IS RESPONSIBLE FOR PROVIDING FACTORY AUTHORIZED TRAINING PERSONNEL FOR A MINIMUM OF 20 HRS, TO TRAIN BUILDING OPERATIONS PERSONNEL, ON NEW SYSTEMS.

IN CHARGE OF JAI PUNNOOSE, P.E.
CHECKED BY
MADE BY VINCENT LEONE, P.E.

REVISION NUMBER	DATE	MADE BY	APP'D BY	REVISION
1	6-22-2021	VJL	VJL	ADDENDUM #1: REPLACED SHEET

RECORD DRAWING CERTIFICATION
☐ AS BUILT – CHANGES AS NOTED
☐ AS BUILT – NO CHANGES

CONTRACTOR
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SIGNATURE
TITLE DATE

PROJECT COORDINATOR
NAME
SIGNATURE
TITLE DATE

WESTCHESTER COUNTY, NEW YORK
DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING

BOILER REPLACEMENT AND ASSOCIATED WORK
VERNON PLAZA FAMILY CENTER
17 SOUTH SECOND AVENUE, MOUNT VERNON, NEW YORK
DEMOLITION AND NEW WORK PLAN, CELLAR LEVEL

CONTRACT NUMBER	SHEET NUMBER
21-514	HV-3
SHEET NO. 7 OF 9	
SCALE: AS SHOWN DATE: 06/04/21	
DPW FILE NO. 54-29-HV-53	REV. NO. 0

BOILER SCHEDULE

1. BOILER(**B-1 & B-2**) SHALL BE WEIL MCLAIN BG-588-S CAST IRON SECTIONAL OR APPROVED EQUAL. BOILER SHALL BE GAS FIRED, 33.6 BHP, ,1356INPUT / 1,1260UTPUT MBH WITH THERMAL EFFICIENCY OF 83.1%, FORCED DRAFT TYPE, WITH 10" FLUE OUTLET; 44-1/4"W x 65"H x 42-3/4" L; DRY WEIGHT OF 3210 LBS. BOILER CONNECTIONS:
2. BURNER SHALL BE POWER FLAME CR1-G-12 ATI OR EQUAL. BURNER INPUT SHALL BE 1356 MBH (845 MBH I=B=R RATING), 1/3HP BLOWER, 1-1/4" GAS TRAIN SIZE, 4" WC MIN, 14" WC MAX GAS INLET PRESSURE; 10-1 MODULATING; 115V/1/60.
3. PROVIDE INTERLOCKS FOR THE BREAK GLASS STATIONS, FRESH AIR DAMPERS, GAS DETECTION.
4. INCLUDE BURNER MOUNTED BURNER PANELS, AND FSG CONTROL.
5. INCLUDE GAS TRAIN – FIELD PIPED AND WIRED.
6. THE CONTRACTOR SHALL FURNISH AND INSTALL UL APPROVED POWER FLAME MODEL SYNC-MATIC HMI PROGRAMMABLE CONTROLLER BASED LEAD-LAG SYSTEM. SEE BOILER CONTROLS SYSTEM DETAILS ON THIS SHEET.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD ASSEMBLY OF BOILERS IN PLACE WITHIN THE BOILER ROOM.

BOILER FEED UNIT SCHEDULE

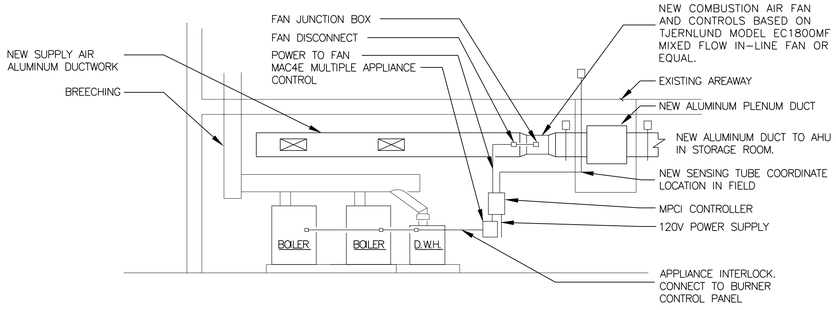
1. BOILER FEED UNIT SHALL BE BELL & GOSSETT DOMESTIC PUMP MODEL 61.5CM DUPLEX OR APPROVED EQUAL. UNIT SHALL INCORPORATE 2 PUMPS OPERATING AT ½ HP 115/1/60HZ & 7.9 FLA EACH @ 1750 RPM; 6 GPM @ 15PSI WITH 2" INLET, ¾" OUTLET, 6-3/16" IMPELLER; 632 LBS., 21"W x 13" H x 23" L AND 2" OVERFLOW AND VENT CONNECTIONS.
2. NEMA 2 TYPE CONTROL PANEL, UNIT MOUTNED & WIRED; LIQUID TIGHT CONDUIT; MAGNETIC STARTERS WITH FUSED DISCONNECT W/ FUSES; SELECTOR SWITCHES – BOILER/PUMP; POWER CONTROL SWITCHING RELAY; SINGLE POWER POINT CONNECTION; UL LISTING.
3. 3-VALVE BYPASS AROUND MAKEUP VALVE; AIR GAP FITTING ON MAKEUP ASSEMBLY; LOW LEVEL FLOAT AND LOW WATER CUTOFF – WIRED TO TERMINAL FOR REMOTE ANNUNCIATION; GAUGE GLASS; DIAL THERMOMETER; DISCHARGE PRESSURE GAUGE; LIFTING EYES; BUTTERFLY SUCTION VALVE; 1-CONTROL RELAY

BOILER FEED UNIT CONTROL NOTES:

1. BOILER FEED UNIT CONTROL SHALL CONSIST OF THE FOLLOWING:
   - 2 COMBINATION MAGNETIC STARTERS (3 OVERLOAD RELAYS) WITH FUSED DISCONNECTS AND COVER INTERLOCKS.
   - 2 "OFF-HAND-LEAD-LAG" PUMP SELECTOR SWITCHES
   - 2 PUMP RUNNING PILOT LIGHTS.
   - 1 NUMBERED TERMINAL BLOCK
   - 1 FUSED CONTROL CIRCUIT TRANSFORMER WHEN THE MOTOR EXCEEDS 130 V
   - 1 CONTROL CIRCUIT RELAY
   - 1 CONTROL POWER RELAY.
2. CONTROL CABINET SHALL CONTAIN U.L. LISTED OR RECOGNIZED COMPONENTS.
3. CONTROL COMPONENTS SHALL BE PROVIDED BY THE UNIT MANUFACTURER, FOR OPERATION AS FOLLOWS:

3.1. AS THE LEVEL IN THE BOILER RECEDES, THE PUMP CONTROL SWITCH WILL CLOSE OPENING THE FEED VALVE AND STARTING ONE PUMP (THROUGH THE END SWITCH). AS THE LEVEL IS RESTORED, THE SWITCH WILL OPEN, CLOSE THE VALVE, AND STOP THE PUMP. SHOULD THE LEVEL CONTINUE TO RISE, THE LOWER CONTACTS WILL CLOSE AND START THE REMAINING PUMP. EACH PUMP SELECTOR SWITCH SHALL PROVIDE "OFF-HAND-LEAD-LAG" POSITIONS.

4. MANUAL SEQUENCE CONTROL SHALL PROVIDE FOR MANUAL SELECTION OF THE ACTIVE OR LEAD PUMP, SIMULTANEOUS OPERATION OF BOTH PUMPS UNDER ABNORMAL LOAD CONDITIONS AND AUTOMATIC OPERATION OF THE LAG PUMP IF THE LEAD PUMP OR ITS CONTROL FAILS.
5. THE UNIT MANUFACTURER SHALL FURNISH (1) MCDONALD MILLER PUMP CONTROL: NO.150S RATED TO 150 PSI FOR BOILERS WITH SEPARATE WATER COLUMNS
6. THE INSTALLING CONTRACTOR, IN ADDITION TO THE ABOVE NOTED PUMP CONTROL, SHALL PROVIDE AND INSTALL A LOW WATER CUTOFF SWITCH, A LOW WATER BOILER ALARM SWITCH AND ASSOCIATED CIRCUITS IN ACCORDANCE WITH LOCAL CODES.
7. THE UNIT SHALL BE FACTORY TESTED AS A COMPLETE UNIT WITH A CERTIFIED TEST REPORT OF PUMP CHARACTERISTICS SHALL BE SUBMITTED PRIOR TO SHIPMENT. THE UNIT MANUFACTURER SHALL FURNISH COMPLETE ELEMENTARY AND CONNECTION WIRING DIAGRAMS (2dw408), PIPING DIAGRAMS (1 DPD08-A), INSTALLATION AND OPERATION INSTRUCTIONS.
8. MANUFACTURER SHALL BE BELL & GOSSETT DOMESTIC PUMP, MORTON GROVE, IL OR EQUAL.



COMBUSTION AIR INTAKE FAN DETAIL

SCALE: NONE

CONTRACTOR SHALL PROVIDE MPCI MODULATING PRESSURE CONTROLLER WITH UC1 BURNER CIRCUIT INTERLOCK BY TJERNLUND OR EQUAL FOR BOILER BURNER CONTROL AND COMBUSTION AIR FAN SPEED CONTROL.

PROGRAM OPTION	FACTORY PRESETS	ADJUSTMENT RANGE
EXHAUST PRESSURE	-0.10" W.C.	-0.01" TO -0.40" W.C.
SUPPLY PRESSURE	+.00" W.C.	+0.01" TO +0.40" W.C.
ALARM CIRCUIT TIME	10 SEC.	1 SEC. TP 15 MIN
ACCELERATION RATE	50	SCALEE OF 1 TO 999
POWER REQUIREMENTS	120 VAC, 7AMPS	

ELECTRICAL ENCLOSURE SHALL BE 18-GAUGE GALVANIZED STEEL WITH HINGED ACCESS DOOR.

ETL C/US TO UL508 AND CSA C22.2 LISTINGS

WARRANTY: 1 YEAR

REQUIRED OPTIONS: MAC4E MULTIPLE APPLIANCE CONTROL; IPS-1 INDOOR PRESSURE SENSOR WITH DECORATIVE COVER TO BE MOUNTED IN CORRIDOR.

MAINTAINS PRESSURE IN BOILER ROOM EQUAL TO PRESSURE IN REFERENCE SPACE.

COMBUSTION AIR FAN

CONTRACTOR SHALL PROVIDE EC1800MF MIXED FLOW IN-LINE FAN BY TJERNLUND OR EQUAL FOR COMBUSTION AIR VOLUME CONTROL. HOUSING SHALL BE GALVANIZED SHEET METAL WITH FOLDED SEEM AIR TIGHT CASING, 1" CONNECTION COLLAR, MIXED FLOW IMPELLER, EXTERNAL ROTOR EC-MOTOR. INPUT SIGNAL SHALL BE 0-10V DC FROM MPC-SERIES. FFP-1 FREEZE AND FIRE PROTECTION SWITCH.

WEIGHT: 39 LBS

MOTOR SHLL BE ECM 120/1/60 VAC, 366 WATTS

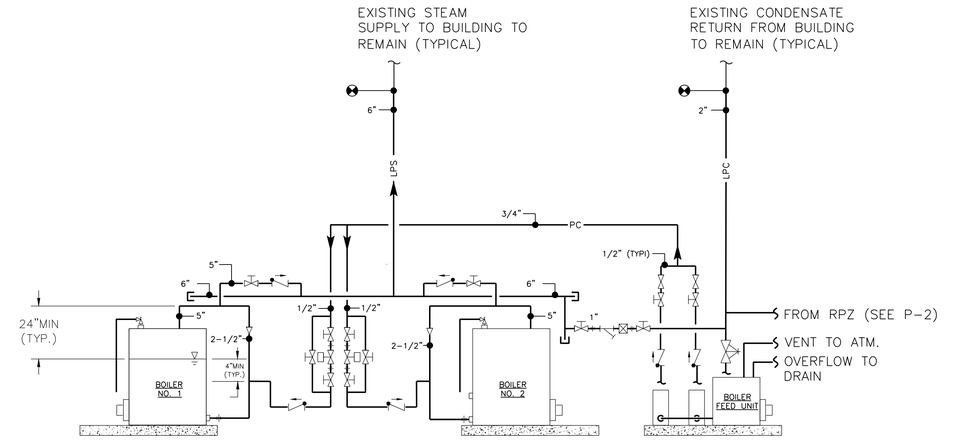
UL/ULC LISTINGS

1 HV-4 COMBUSTION AIR INTAKE SYSTEM

BOILER CONTROL SYSTEM DETAILS

THE CONTRACTOR SHALL FURNISH AND INSTALL A UL APPROVED POWER FLAME MODEL SYNC-MATIC HMI PROGRAMMABLE CONTROLLER BASED LEAD-LAG SYSTEM. THE LEAD-LAG FUNCTION SHALL BE BY THE PROGRAMMABLE CONTROLLER AND SHALL SERVICE 2 BOILER/BURNER UNITS. A 5.7"MINIMUM HMI OPERATOR TOUCH SCREEN SHALL BE STANDARD EQUIPMENT. THE HMI SHALL ALLOW THE OPERATOR TO INPUT SYSTEM OPERATING PARAMETERS AS WELL AS PROVIDE VISUAL INDICATION OF EACH BURNER'S OPERATION STATUS, FIRING RATE, OPERATING SET POINT, AS WELL AS THE PRESSURE OF THE COMMON HEADER. MODBUS COMMUNICATIONS SHALL BE STANDARD.

1. THE LEAD-LAG CONTROL PANEL SHALL INCLUDE THE FOLLOWING FEATURES:
   - DIRECT ENTRY OF SYSTEM SET POINT THROUGH THE HMI.
   - PID CONTROLLED AUTOMATIC MODULATION WITH BASELOAD OR PARALLEL MODULATION RESPONSE 4-20 mA SIGNAL).
   - MANUAL MODULATION INPUT FOR SYSTEM TESTING AND ADJUSTMENTS.
   - INDICATING LAMPS TO INDICATE BURNER ONLINE OR BURNER FAILED.
   - LEAD LAG/ BACKUP SELECTOR SWITCH TO ALLOW CONTROL FUNCTION TO BE SWITCHED TO
     - THE PROGRAMMABLE CONTROLLER;
     - THE INDIVIDUAL BOILER-MOUNTED OPERATING AND MODULATION CONTROLLERS.
   - ADJUSTABLE LEAD AND LAG BURNER ON AND OFF DELAY TIMERS, ACCESSIBLE THROUGH THE HMI.
   - BOILER CYCLE AND BOILER HOUR COUNTERS.
   - MULTIPLE LEAD SELECTION MODES: MANUAL, TIME ALTERNATE, TIME EQUALIZE, CYCLE ALTERNATE, CYCLE EQUALIZE, AND DAY OF WEEK.
   - NIGHT AND/OR WEEKEND SETBACK SETTINGS ALLOW FOR REDUCED SET POINTS AT NON- PEAK TIMES TO REDUCE FUEL USAGE.
   - FAILURE TRANSFER AUTOMATICALLY TRANSFERS FAILED BURNER'S SETTINGS TO THE NEXT AVAILABLE BURNER.
2. THE SEQUENCE OF OPERATION SHALL BE AS FOLLOWS:
   - UPON START UP, BURNERS SHALL ALWAYS START IN THE LOW FIRE POSITION. UPON RELEASE OF THE COMBUSTION CONTROL SYSTEM, THE BURNERS SHALL MODULATE VIA THE PROGRAMMABLE CONTROLLER.
   - AS THE PRESSURE/TEMPERATURE INCREASES, THE HEADER MOUNTED TRANSDUCER WILL SIGNAL THE PROGRAMMABLE CONTROLLER. IN TURN, THE CONTROLLER SHALL SEQUENCE THE PID FIRING RATE CIRCUITS OF EACH ACTIVE MODULATING BURNER IN AN APPROPRIATE LEAD-LAG SEQUENCE.
   - UPON STILL FURTHER INCREASE IN PRESSURE/TEMPERATURE, THE PROGRAMMABLE CONTROLLER WILL DE-ENERGIZE THE LAG BURNER(S) THEN THE LEAD BURNER IN THE APPROPRIATE SEQUENCE. THIS FUNCTION WILL EITHER TAKE PLACE IMMEDIATELY OR AFTER A TIME DELAY BASED ON THE VARIANCE FROM SETPOINT. THE BURNERS WILL BE IN THE LOW FIRE POSITION BEFORE DE-ENERGIZING.
   - WITH A DROP IN PRESSURE/TEMPERATURE, THE PROGRAMMABLE CONTROLLER WILL REVERSE THE SEQUENCE TO CALL THE BURNERS TO FIRE AND TO MODULATE THE BURNERS IN AN APPROPRIATE LEAD-LAG SEQUENCE.
   - IN THE EVENT THAT ANY BURNER FAILS TO OPERATE, THE PROGRAMMABLE CONTROLLER SHALL AUTOMATICALLY TRANSFER CONTROL TO THE NEXT AVAILABLE BURNER.
   - AN APPROPRIATE PRESSURE/TEMPERATURE TRANSDUCER SHALL BE SUPPLIED WITH EACH SYSTEM. THE TRANSDUCER SHALL BE INSTALLED IN THE MAIN STEAM/WATER HEADER.
3. OPTIONS:
   - OUTDOOR RESET: RAISES THE STEAM PRESSURE SET POINT AS OUTSIDE TEMPERATURE INCREASES.



2 HV-4 BOILER ROOM MECHANICAL SCHEMATIC

SCALE: NONE

BOILER CONTROL SEQUENCE OF OPERATION

1. BUILDING LOAD CONTROL SHALL SEND A SIGNAL TO SYNCMATIC, IN RESPONSE TO SPACE TEMPERATURE, TO RUN THE BOILERS. THE SYNCMATIC LEAD-LAG BOILER CONTROLLER SHALL CYCLE AND MODULATE BOILERS AS REQUIRED TO MAINTAIN STEAM PRESSURE FOR AS LONG AS THE BUILDING IS CALLING FOR HEAT.
2. DOMESTIC WATER HEATER SHALL CYCLE ON TO MAINTAIN HOT WATER TEMPERATURE AT SETPOINT.
3. APPLIANCE BURNER INTERLOCK: ALL GAS BURNING APPLIANCES IN THE ROOM SHALL BE INTERLOCKED WITH THE OPERATION OF THE COMBUSTION AIR FAN CAF-1.
   - WHEN THE SYNCMATIC CONTROLLER SENDS A SIGNAL TO A BOILER BURNER TO ENERGIZE (OR THE DOMESTIC WATER HEATER BURNER IS CALLED TO ENERGIZE) THE COMBUSTION AIR SYSTEM WILL RECEIVE A SIGNAL TO INITIATE FROM A LIMIT SWITCH ON THE BURNER.
   - THE COMBUSTION AIR SYSTEM MODULATING DAMPER WILL MODULATE OPEN AND THE LIMIT SWITCH WILL ENERGIZE THE FAN.
   - WHEN THE COMBUSTION AIR SYSTEM FAN RUNS, AND PROVES AIRFLOW, THE "MAC4E" MULTIPLE APPLIANCE CONTROL WILL ALLOW ANY APPLIANCE BURNER TO FIRE.
4. SELECTING LEAD BOILER: THE BOILER WITH THE LOWER QUANTITY OF OPERATING HOURS WILL BE SELECTED BY THE SYNCMATIC CONTROLLER TO BE THE LEAD BOILER.
5. INITIATING THE LAG BOILER: THE REMAINING BOILER WILL INITIATE ONLY AFTER THE LEAD BOILER MODULATES TO ITS FULL CAPACITY AND CANNOT MAINTAIN SYSTEM STEAM PRESSURE.
6. CONTROLLING THE C.A.F.: THE COMBUSTION AIR FAN WILL CYCLE ON AND MODULATE SPEED TO MAINTAIN ROOM PRESSURIZATION AT A CONSTANT RELATIVE TO A REFERENCE PRESSURE SENSOR LOCATED IN AN ADJACENT ROOM.
7. OUTDOOR TEMPERATURE RESET: BOILER CONTROLLER SHALL ADJUST THE SETPOINT PRESSURE TO BE MAINTAINED IN RESPONSE TO OUTDOOR TEMPERATURE SUCH THAT A DECREASE IN OUTDOOR TEMPERATURE SHALL DECREASE SYSTEM STEAM PRESSURE THEREBY INCREASING THE HEAT DELIVERABLE BY 1 POUND OF STEAM.

REVISION NUMBER	DATE	MADE BY	APP'D BY	REVISION
1	6-22-2021	VJL	VJL	ADDENDUM #1: REPLACED SHEET

RECORD DRAWING CERTIFICATION

☐ AS BUILT – CHANGES AS NOTED
☐ AS BUILT – NO CHANGES

CONTRACTOR
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TITLE DATE

PROJECT COORDINATOR
NAME
SIGNATURE
TITLE DATE

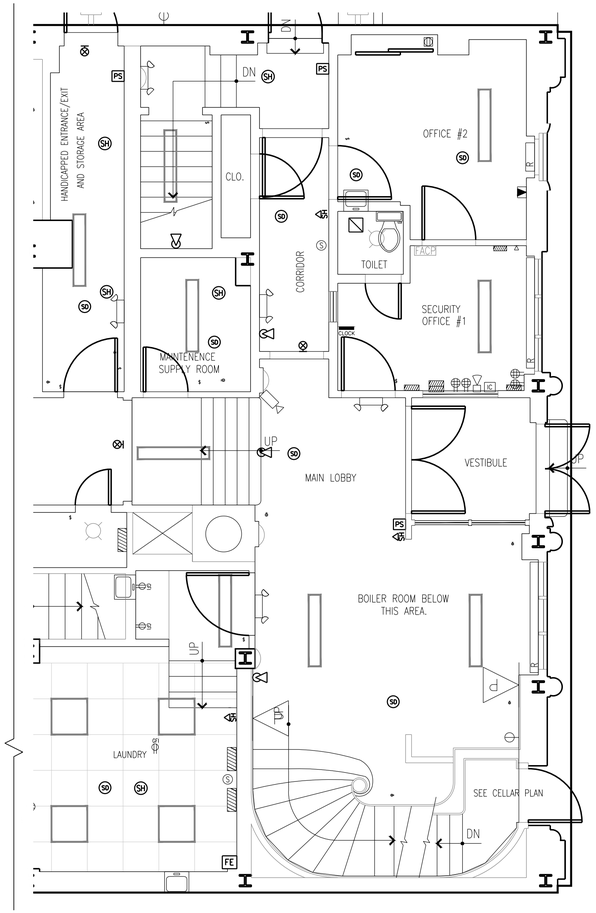
WESTCHESTER COUNTY, NEW YORK
DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING

CONTRACT NUMBER 21-514 | SHEET NUMBER HV-4
SHEET NO. 8 OF 9

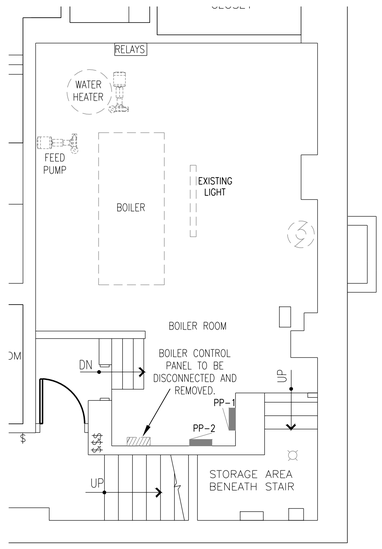
BOILER REPLACEMENT AND ASSOCIATED WORK
VERNON PLAZA FAMILY CENTER
17 SOUTH SECOND AVENUE, MOUNT VERNON, NEW YORK
SCHEDULE AND SCHEMATICS

SCALE: AS SHOWN
DATE: 06/04/21
DPW FILE NO. 54-29-HV-54
REV. NO. 0

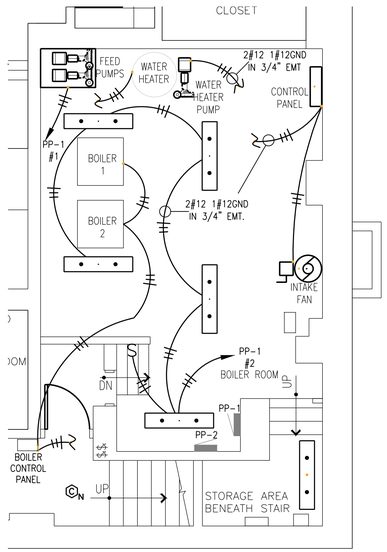
IN CHARGE OF JAI PUNNOOSE, P.E.
CHECKED BY
MADE BY VINCENT LEONE, P.E.



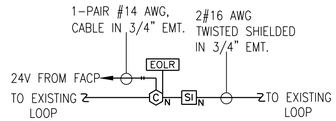
1 E-1 **PARTIAL 1ST FLOOR**
SCALE: 1/4"=1'-0" FACP LOCATED IN SECURITY OFFICE



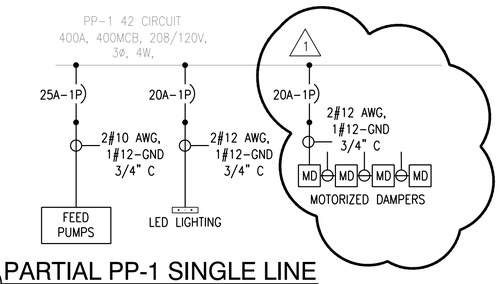
2 E-1 **BOILER ROOM ELECTRICAL**
SCALE: 1/4"=1'-0" EXISTING BOILER ELECTRICAL



3 E-1 **BOILER ROOM ELECTRICAL**
SCALE: 1/4"=1'-0" BOILER ELECTRICAL



4 E-1 **PARTIAL FIRE ALARM SINGLE LINE**
SCALE: NONE



5 E-1 **PARTIAL PP-1 SINGLE LINE**
SCALE: NONE

SYMBOLS LIST

- EXISTING POWER PANEL SURFACE MOUNTED.
- BRANCH CIRCUITRY. # OF TICKS INDICATES # OF CONDUCTORS. #12 AWG MINIMUM.
- BRANCH CIRCUITRY. # OF TICKS INDICATES # OF CONDUCTORS. #12 AWG MINIMUM. TO EXISTING CIRCUIT AND EXTEND IF NEEDED.
- BRANCH CIRCUIT HOMERUN. #OF ARROW HEADS INDICATES # OF SEPARATE HOMERUNS. # OF TICKS INDICATES # OF CONDUCTORS. #12 AWG MINIMUM.
- S 125/277 VOLT, 20AMP TOGGLE SWITCH ASSEMBLY.
- C_N CO DETECTOR. EDWARDS: #260 CO DETECTOR
- SI_N TRI-S SINGLE INPUT MONITOR MODULE.
- FACP EXISTING FIRE ALARM CONTROL PANEL.
- 42 WATT LED LUMINAIRE FOR MECHANICAL ROOM AS MANUFACTURED BY H.E. WILLIAMS LIGHTING MODEL #82-4-L64-840 L24-DRV-UVN. TO BE CHAIN HUNG.

NOTES:

1. CONTRACTOR SHALL DISCONNECT EXISTING WIRING FROM EXISTING BOILER AND EXTEND TO NEW BOILERS AND CONTROL PANEL. CONTRACTOR SHALL DISCONNECT AND REMOVE ALL BOILER ASSOCIATE WIRING AND EQUIPMENT/DEVICES NOT NEEDED FOR NEW BOILERS.
2. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL AND LABOR NEEDED TO INSTALL BOILER ROOM ELECTRICAL.
3. CONTRACTOR SHALL COORDINATED ALL POWER SHUTDOWNS WITH COUNTY CONSTRUCTION COORDINATOR AND BUILDING MANAGER PRIOR TO ANY SHUTDOWNS.
4. CONTRACTOR SHALL FURNISH AND INSTALL A CO DETECTOR WITH ALL ASSOCIATED CABLE AND WIRING NEEDED TO INSTALL THE CO DETECTOR. THE CO DETECTOR SHALL BE FULLY COMPATIBLE WITH THE EXISTING FIRE ALARM SYSTEM.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR THE TESTING AND REPROGRAMMING OF THE EXISTING FIRE ALARM SYSTEM AFTER INSTALLING CO DETECTOR.
6. THE CONTRACTOR SHALL COORDINATE ALL FIRE ALARM WORK WITH THE COUNTY FIRE ALARM SERVICE CONTRACTOR (OPEN SYSTEMS METRO INC, MIKE TIANO, (914)241-0057. CONTRACTOR SHALL INCLUDE ALL COSTS IN HIS BID.
7. CONTRACTOR SHALL BE RESPONSIBLE TO TRACE OUT ALL CIRCUITS HE IS WORKING ON AND UPDATE PANELBOARD SCHEDULES.
8. CONTRACTOR SHALL PERFORM ALL WIRE/CABLE TERMINATIONS AND LABEL WIRE/CABLES ON BOTH ENDS.
9. ALL WORK SHALL COMPLY WITH 2020 NEC AND NFPA 72 CODES.

REVISION NUMBER	DATE	MADE BY	APP'D BY	REVISION
1	6/22/21	MD	MD	PROVIDE POWER FOR ADDITIONAL MOTORIZED DAMPERS AND PUMP.

RECORD DRAWING CERTIFICATION

☐ AS BUILT – CHANGES AS NOTED
☐ AS BUILT – NO CHANGES

CONTRACTOR
NAME
SIGNATURE
TITLE DATE

PROJECT COORDINATOR
NAME
SIGNATURE
TITLE DATE

WESTCHESTER COUNTY, NEW YORK
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
DIVISION OF ENGINEERING

CONTRACT NUMBER 21-514 | SHEET NUMBER E-1
SHEET NO. 9 OF 9

BOILER REPLACEMENT AND ASSOCIATED WORK
VERNON PLAZA FAMILY CENTER
17 SOUTH SECOND AVENUE, MOUNT VERNON, NEW YORK
BOILER ROOM POWER AND LIGHTING PLAN

SCALE: AS SHOWN
DATE: 6/11/21
DPW FILE NO. 54-29-E-55 | REV. NO. 0

IN CHARGE OF GARRY LYNCH
CHECKED BY GARRY LYNCH
MADE BY MICHAEL DEFONCE