DATE: May 18, 2023

DEPARTMENT OF GENERAL SERVICES
BUREAU OF CAPITAL PROJECT DESIGN MANAGEMENT
1800 HERR STREETS
HARRISBURG, PENNSYLVANIA

ADDENDUM NO. 3

on

PROJECT NO. DGS C-0304-0015 PHASE 002
PROJECT TITLE - Elizabethtown Training Academy - Renovate Boiler Plant and Domestic/Fire Protection Piping
PROFESSIONAL:
Arris Engineering
667 North River Street
Plains, PA, 18705

If you submitted a bid prior to this Addendum being issued, your bid has been discarded and you must re-submit your bid(s) prior to the bid opening date and time.

RFI Responses to date: See Attachment.
SPECIFICATION CHANGES **C-0304-0015 PHASE 001.2 & 002.2**

Item 1 - Phase 2.2 (only)

Page 010100-1: Add Paragraph 1.5C 9: Provide a temporary boiler plant to provide temporary heating source during construction at the Boiler Building. Perform alla associated work including, but not limited to, piping connections, controls and other work.

Item 2 – Phase 2.2 (0nly) Add Specification Section 010250

Item 3 - Page 010400-3: Paragraph 1.14A Change to read:
Phase 001.2 The Contractor's available working hours shall be from 7 A.M. to 4 P.M., Monday through Friday.
Phase 002.2 The Contractor's available working hours shall be from 6 A.M. to 4 P.M., Monday though Friday.
Additional working hours can be scheduled upon request with approval by the Clint Agency.
Item 4 – Phase 2.2 (only)
Page 015000-1: Paragraph 1.4A Change to read:
A temporary boiler shall be provided as specified in Specification Section 235239 (rev 1) Paragraph 1.16.
Item 5 – Page 235239-3: Add heading 1.8 "Temporary Trailer Mounted Boiler Room".
See attached Specification 235239-3 rev.1
Item 6 – Page 235239-5: Paragraph 2.3G 1 Change to read: Maximum Oxides of Nitrogen Emissions Natural Gas: 9PPM.
Add paragraph 2.3G.2: Maximum Oxides of Nitrogen Emission No. 2 Deisel Fuel: 90PPM.
Item 7 – Phase 2.2 (only)
Add specification Section 010250 Unit Prices in Lump Sum Contracts

DRAWING CHANGES **C-0304-0015 PHASE 002.2**

Item 1 – See attached modified drawing plan H-16. Add additional site steam line supports as noted.

SECTION 010250

UNIT PRICES IN LUMP SUM CONTRACTS

PART 1 – GENERAL

1.1 STIPULATIONS

A. The specifications sections "General Conditions of the Construction Contract", "Special Conditions", and "Division 1 - General Requirements" form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 DEFINITIONS

A. Unit Price: An amount bid by the Contractor for a unit quantity of a work item listed in the Schedule of Unit Prices.

B. Schedule of Unit Prices: The schedule of work items in the Contract for which the Contractor is to provide a price for adjusting the Contract amount for changes in quantity of work required.

1.3 PROCEDURES

A. Unit Prices will be used as the basis for computing "additions to" or "deductions from" the Lump Sum Contract amount for extra work and for reductions in quantities of work called for by the Contract Documents. The unit price applied for “Adds” to the bid quantity will be equal to the unit price applied for “Deducts” to the bid quantity for each item listed. Unit Prices shall remain binding and irrevocable for the entire period of the Contract.

B. Unit Prices shall include all costs by the Contractor, his suppliers and subcontractors for the work, including labor, material, tools, equipment, insurance, taxes, field overhead, general overhead and profit and bond. The work shall include all incidental items required to complete the work.

C. The Department will not be bound by the Unit Prices unless it accepts the same by indication on the Construction Contract. The Department may award the contract without accepting the bidder's Unit Prices. If the Department and the Contractor are unable to agree upon a new Unit Price, the Department may at its discretion, direct the Contractor to perform such work on a force account basis.

D. Work added to the Contract will be of the same general character as that required by the Contract Documents. Contractors are to assume that changes will be made in a timely manner, not requiring the Contractor to incur additional mobilization or other disproportional expenses in connection with the adjustment in contract quantities.

E. Each bidder shall carefully check the drawings and specifications for the Base Bid quantities required to be included under the Contract.

F. Contractors are to comply with requirements of the Instructions to Bidders and instructions for completion of the Bid Form.

1.4 SCHEDULE OF UNIT PRICES

A. The following Schedules of Unit Prices apply to the Contracts indicated on the Schedules. The Contractor is to provide Unit Prices for all items.

HVAC CONSTRUCTION (.2) CONTRACT – SCHEDULE OF UNIT PRICES					
ITEM NO.	DESCRIPTION	UNIT OF MEASUREMENT	QUANTITY IN LUMP SUM BID	UNIT PRICE	TOTAL PRICE
1	MOBOLIZATION	LUMP SUM	1		
2	DEMOBOLIZATION	LUMP SUM	1		
3	MONTH 1 RENTAL	LUMP SUM	1		
4	MONTH 2 RENTAL	LUMP SUM	1		
5	MONTH 3 RENTAL	LUMP SUM	1		
6	MONTH 4 RENTAL	LUMP SUM	1		
7	MONTH 5 RENTAL	LUMP SUM	1		
8	MONTH 6 RENTAL	LUMP SUM	1		

1.5 CHANGES

A. All changes in the quantity of work for which there is a Unit Price will be authorized using change order procedures provided in the General Conditions. Change Orders shall be written prior to performing the work where possible but may be written after the work is authorized, completed and measured when quantities are not able to be determined in advance.

1.6 MEASUREMENT

A. Measurement of the work quantities where the work is performed prior to issuance of a Change Order shall be net quantities and not include cutting waste, or other adjustments to the unit of measure of the Unit Price. The Department and Contractor shall arrive at a rational procedure for measurement prior to performing the work. The Contractor shall be responsible for measurement and will submit the calculations and worksheets to the Department for approval.

1.7 DESCRIPTIONS OF UNIT PRICES

A. HVAC Construction (.2) Contract:

1. Unit Price 1: Mobolization
2. Unit Price 2: Demobolization
3. Unit Price 3: Month 1 Rental
4. Unit Price 4: Month 2 Rental
5. Unit Price 5: Month 3 Rental
6. Unit Price 6: Month 4 Rental
7. Unit Price 7: Month 5 Rental
8. Unit Price 8: Month 6 Rental

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

DEPARTMENT OF GENERAL SERVICES
BUREAU PRE-CONSTRUCTION
1800 HERR STREET
HARRISBURG, PENNSYLVANIA

ADDENDUM NO. 3

on

PROJECT NO. DGS C-0304-0015 PHASE 001 & 002
PROJECT TITLE - Elizabethtown Training Academy – Upgrade HVAC Elder Hall & Renovate Boiler Plant and Domestic/Fire Protection Piping

PROFESSIONAL:
Arris Engineering
667 North River Street
Plains, PA, 18705

Request For Information

2.1 General Contractor

1. No questions to date.

1.2 & 2.2 HVAC Contractor

1. **Asbestos Abatement:** During the project walkthrough it was mentioned that some asbestos abatement may need to be carried by a contractor. Please verify if this is the case. Some contractor insurances do not allow any asbestos abatement to fall under their scope of work. Will you accept proposals that exclude asbestos abatement?

    a. **Response:** Requirement for asbestos abatement by the .2 Contractor is not a requirement. Client Agency will remove ASM.

2. **Boiler Specifications:**

    1. What is the required boiler design pressure rating for the new 300 HP boiler (B-1)? The schedule calls for a max operating pressure of 200 psig, which would require a 250 psig design pressure boiler. However, drawing H-1 indicates the boiler operating pressure is 125 psig with a 150 psig safety valve setting. Based on this information, a 150 psig design pressure boiler would be sufficient. Please advise if 150 psig design pressure is acceptable.

        Response: 150 psig design pressure is acceptable.

    2. The boiler schedule calls for the new 300 HP boiler (B-1) to have a gas emissions level of 30 ppm NOx. Per the latest Pennsylvania state GP-1 emissions regulation, boilers of this size are required to be 9 ppm NOx. Will the project documents be reissued to reflect 9 ppm NOx?

        Response: Specification requirement has been changed per this addendum.

3. What is the required NEMA rating for the boiler and deaerator/condensate tank control panels? Specification section 235239 paragraph 2.2.D.5 states NEMA 4. Specification section 235239 paragraph 2.6.B.1 states NEMA 1. Please clarify.

   Response: NEMA 4 shall be required.

4. The boiler/burner gas train detail drawing on H-14 shows a proof of closure switch on each of the motorized gas valves with a solenoid vent valve in between the two valves. This is typically a requirement to meet NFPA-85, which only applies to boilers with inputs above 12.5 MMBTU. Please advise if (2) POC's and a solenoid vent valve are required, or if it is acceptable to provide a gas train that will meet CSD-1 code requirements as called for in the specification.

   Response: Meeting the requirements of CSD-1 is acceptable.

5. What are the expected temperatures and percentages of the cold-water makeup and condensate returns for the deaerator and condensate tank?

   Response: 47 deg. F @ 15%.

6. What is the required gallonage of the deaerator storage tank? The schedule shows 1,000 gallons. A tank sized for 10 minutes of storage feeding 650 BHP would only need to be 450 gallons.

   Response: 1,000 gallons required to match existing conditions of the plant.

7. What is the required gallonage of the condensate storage/surge tank? The schedule shows 110 gallons. A tank sized for 10 minutes of storage feeding 650 BHP would need to be at least 450 gallons.

   Response: Min. storage required is 3 min. (270 gallons) in order to avoid short cycling of the pumps.

8. What is the approximate distance between the deaerator and surge tanks?

   Response: ~ 35 feet.

3. **HVAC – Steam Pipe Insulation:** Specification 230700, 3.14, A - There is no insulation information listed for this spec section. Please provide missing information.

   Response: Piping insulation thickness is shown on Sheet H-18. 2” mineral wool for steam and 1” mineral wool for condensate piping.

4. **Insulation Thickness:** Detail 19 on Sheet H-18 conflicts with 230700, 3.13, B. Please clarify the insulation thickness.

   Response: Detail 19 on Sheet H-18 is for exterior installations. Please follow interior specification for indoor applications.

5. **HVAC – Steam Piping Product Requirements:** Please confirm the manufacturer and product type shown on sheet H-16 for the steam piping. This sheet refers you to spec 232213, which does not list this type of pipe or manufacturer. Likewise, the type of insulation for this product is not listed in the insulation specification. It would be beneficial to list at least (2) other acceptable products.

   Response: We are listing Ravenco as the basis of design piping manufacturer. Or equals may be submitted for approval.

6. **HVAC – Steam Pipe Support Lower Kicker Attachment:** Detail 17 on sheet H-18 depicts a retrofitted support and kicker. Based on the height of the existing steam line and this detail, it would appear that the lower kicker attachment will be below grade. Please clearly state that this is the intent and if so, please also state if there are any special backfill requirements for the excavations necessary to facilitate this installation.

   Response: The steel kicker shall not extend below grade. The angle of the kicker may be modified and/or shifted closer to the existing pier as necessary.

7. **HVAC – Steam Pipe Support Details:** Details for steam pipe supports of various nature are shown on the structural drawing S-10 and mechanical drawings. Please clearly state which prime contractor is responsible for these items.

   Response: These details are applicable to the .2 contractor.

8. **HVAC – Steam Pipe Support Overturning Loads:** Please confirm that the proposed piping arrangement shown on Detail 17 on H-18 will not create an overturning condition to the existing monolithic support. The steam lines appear to be cantilevered off the side of the existing support, and the lines may exhibit significant vertical loads.

   Response: The arrangement will not impose an overturning moment on the concrete support.

9. **HVAC – Underground Steam Pipe Support Locations:** Detail 14 on H-18 shows a support for the underground steam line. Please note on H-16 where these are needed and/or provide the required lateral spacing.

   Response: The locations are shown on details 1 and 6 on sheet H-17.

10. **HVAC – Boiler NOX Levels (Gas):** Please confirm that the gas NOX requirements for the boilers are the current PA requirements. If they are not, provide a revised selection and specification for equipment that will meet the current requirements.

    Response: See revised specification section per this addendum.

11. **HVAC – Tree Removal:** We assume "tree removal" shown in Base Bid #3 is to create an access along the steam line. Please consider moving "tree removal" to Base Bid #1. Any contractor will have to construct an access road to one side of the existing steam line, in it's entirety, to facilitate construction of the new lines. This access road will have to be wide enough to haul 40' sections of pipe to the installation site, lift them into position and allow access for a welding truck and other possible support vehicles.

    Response: Whatever is needed to be cleared and/or moved to allow access for the new steam line installation is the responsibility of the contractor to complete.

12. **HVAC – DGS Trailer:** Confirm lead contractor supplied trailer for DGS personnel is not required as stated in Phase 1, 015000, 1.2, D.

    Response: Confirmed. This trailer is not required.

13. **HVAC – Daily Excavation Backfills**: Confirm that Phase 1, 016100, 1.14 applies to this site. It will be difficult and expensive to perform excavations, pipe placement, welding, testing, and backfilling for steam line construction on a daily basis.

    Response: Excavations and backfilling only apply to Phase 2.2 work. Closer of trenches exemptions can be granted by the Client Agency upon request.

14. **HVAC – DOC Policy Applicability:** Confirm Phase 1, 016100, Department of Corrections Policy 6.3.1 actually applies to this project. There are contradictory things, such as work hours and allowable items, between this document and other references within the specifications. If it does apply, then please correct contradictory work times.

    Response: Working hours are governed by specification section 010400 as modified under this addendum.

15. **HVAC – Covid-19:** Confirm that 017000 is still necessary. It is our understanding that this requirement has gone away in general. There are costs associated with this, specifically 017000, 1.6.

    Response: 017000 is still applicable to this project.

16. **HVAC – Insulation Type/Thickness:** In Phase 1, 230700, 3.10, A, where are materials and thicknesses identified?

    Response: Mineral Fiber insulation at 1 ½" thickness shall be provided.

17. **HVAC – Hydronic Piping Question:** In Phase 1, 232113, Part 2, can we use Type L copper with either press or sweat fittings for HW and CW?

    Response: Yes, this is acceptable for use where domestic HW and CW piping needs to be installed.

18. **HVAC – Phase 1 Chemical Water Treatment:** For Phase 1, the hydronic piping tie-in work appears to be minimal. Please clearly state if full flushing and subsequent chemical water treatment are required.

    Response: Full flushing and water treatment is required.

19. **HVAC – Office for Contractors:** In spec 010400, 1.21, confirm that each prime contractor provides their own electrical, telephone and internet service.

    Response: Yes, this is correct**.**

20. **Snow/Ice Removal Limits:** Phase 1 and 2, 015000, 1.9, A and B, please clearly state the intent of "snow/ice" removal. Are we responsible for snow removal at the proposed staging areas, or every road and sidewalk within the compound?

    Response: Responsible for removal at staging areas only.

21. **HVAC – Secured Perimeter Limits:** Phase 1 and 2, 016100, 1.14, A, please clearly define the "secured perimeter" for Phase 1 and Phase 2. Phase 1 is assumed to be the elder building, but Phase 2 is more vague. This potentially impacts the daily production rates for portions of the steam line construction.

    Response: Excavations and backfilling only apply to Phase 2.2 work. Closer of trenches exemptions can be granted by the Client Agency upon request.

22. **HVAC – Commissioning:** Confirm that the CxA will be provided by the Owner at no cost to the Contractors.

    Response: The .2 contractor is responsible for supporting the commissioning agencies work.

23. **HVAC – Chemical Water Treatment:** Please provide the contact information for the current chemical water treatment provider for the facility.

    Response: Proasys - Marty Myers 484-824-2742

24. **HVAC – Breeching Bracing:** The drawings show guy cables for the breeching. Spec 235100, 2.2 lists 3/8 cable for 18-24" ID. The breeching that requires the cables is significantly larger at 36" ID. Confirm guy cable size and clarify what "four galvanized" and "three galvanized" refer to.

    Response: Cable size is to be 1/2” ID and four cables shall be required to support breaching.

25. **HVAC – Base Bid 3 Tree Cutting:** Clarify that the tree stumps are not to be removed, just cut at grade and the tree removed.

    Response: Tree stumps are not required to be removed. Just cut at grade.

26. **HVAC – Tree and Plant Protection:** Confirm that Spec 312000, 1.6, B does not apply to this project.

    Response; Confirmed that this section does not apply to this project.

27. **Coal Boiler Removal:** Specification section 010100-1.5-B-1 G.C. summary of work stipulates demolition of Coal Boilers; this task is also referenced on drawing H-3 Note 1 for removal by HVAC Contractor. Please clarify.

    Response: The .2 contractor is responsible to removing the coal boilers.

2.3 Plumbing Contractor:

1. **Plumbing Contract:** Are there separate Prime contracts for this project, or is it only HVAC contract? The specifications (010100 and 010300) only make reference to C-0340-0015 .2 HVAC Contract. The solicitation does list four prime contracts, but again, no information is given as what the other three contracts would include. Is it possible the wrong specifications were uploaded for this project - C-0340-0015 2.3 Plumbing Contract?

   Response: There are two sets of specifications bound into one set for bidding the two phases of this project together. Phase 1 of the project involves only the .2 contractor. Phase 2 of the project has .1, .2, .3 and .4 contracts.

2.4 Electrical Contractor:

1. **Fire Alarm & Security:** Who is the fire alarm & Security vender for the training academy?

   Response: Vector Security- 717-285-0050

2. **Base Bids:** On E2, E3, E4, and E9 the coal silo is listed as Base Bid #2 On E10 it is listed as Base Bid #3 Please advise what work is under Base Bids 2 and 3.

   Response: The Coal Silo removal is a Base Bid No. 2 item.

5 **Raceways:** Specs for raceways says EMT may be used for raceways not subject to physical damage. Drawing E-1 note 9 says All conductors shall be routed via RIGID conduit unless otherwise noted. Please advise. Is EMT permitted to use?

Response: EMT Interior, RGS Exterior locations.

END OF ADDENDUM

SECTION 235239 (rev 1)

FIRE-TUBE BOILERS

PART 1 - GENERAL

1.1 STIPULATIONS

A. The specifications sections “General Conditions of Contract”, “Special Conditions”, and “Division 1 – General Requirements” form a part of this section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

A. This Section includes packaged, factory-fabricated and -assembled boilers, trim, and accessories for generating steam with the following configurations and burners:

1. Horizontal, fire-tube boiler.
2. Combination gas and oil burner.

1.4 SUBMITTALS

A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: For boilers, boiler trim, and accessories. Include plans, elevations, sections, details, and attachments to other work.

1. Design calculations and vibration isolation base details, signed and sealed by a qualified professional engineer.

a. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
b. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails and equipment mounting frames.

2. Wiring Diagrams: Power, signal, and control wiring.

C. Manufacturer Seismic Qualification Certification: Submit certification that boiler, accessories, and components will withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

    a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Source quality-control test reports.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For boilers, components, and accessories to include in emergency, operation, and maintenance manuals.

G. Warranty: Special warranty specified in this Section.

H. Other Informational Submittals:

1. ASME Stamp Certification and Report: Submit "A," "S," or "PP" stamp certificate of authorization, as required by authorities having jurisdiction, and document hydrostatic testing of piping external to boiler.
2. Startup service reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.

C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."

D. UL Compliance: Test Boilers for compliance with UL 726, "Oil-Fired Boiler Assemblies" and UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

1.6 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace front- and rear-door refractories and heat exchangers of boilers that fail in materials or workmanship within specified warranty period.

1. Horizontal, Fire-Tube and Fire-Box Boilers: Refractory in front and rear doors, 10 years from date of startup by factory-authorized personnel.

1.8 TEMPORARY TRAILER MOUNTED BOILER ROOM

A. **The .2 Contractor shall, prior to removing the existing boilers from service and demolition of those boilers, provide a fully piped, powered, and operating trailer mounted boiler room.**

1. **The .2 Contractor shall provide a temporary access stairs and platform for entering the trailer, complete with OSHA compliant safety rails.**

B. **All costs associated with maintaining heating hot water service to the facility during the entire time that the permanent boilers are out of service shall be borne by the .2 Contractor, with the exception of the cost of domestic water, sewer, electric power, and natural gas utilities which shall be borne by the Client Agency.**

C. **During the time that the temporary trailer mounted boiler room is in service, the .2 Contractor shall provide all required routing maintenance, repair, and chemical treatment to keep the system continuously in proper working order. Comply with all requirements and recommendations of the Boiler Rental Company and the manufacturer of the boiler in the trailer.**

1. **Should operational issues arise with the temporary boiler room during non-working hours, the .2 Contractor shall respond with personnel to correct the problem with 3 hours of being first notified of the problem.**
2. **Should the .2 Contactor's personnel be unable to resolve the problem within 12 hours of being first notified of the problem, the .2 Contractor shall be responsible for costs of engaging the assistance of a technical representative of the boiler rental company. The technical representative shall be on site no less than 24 hours after the .2 Contractor has been first notified of the problem.**

D. **The rental boiler company's technical representative shall provide a service technician to perform startup of the temporary boiler room and shall conduct a minimum 2 hour training session with employees of the .2 Contactor. Maintenance personnel of the Client Agency shall be permitted to attend and no less than 1 week advance notice shall be given to the Client Agency prior to the training session taking place.**

E. **Rental Boiler Room Supplier: Subject to compliance with requirements, provide a rental boiler room from one of the following**

1. **Powerhouse**
2. **Nationwide Boiler Inc.**
3. **Redwave**
4. **Or equal as approved by the Professional.**

F. **The trailer mounted boiler room shall be a 350 boiler horsepower mobile boiler room complete with one (1) 350 boiler horsepower high efficiency dual fuel natural gas, no. 2 diesel fuel fired boiler, design pressure 110 psi, capable of producing 12,000 lbs. of steam per hour and at 212 Deg. F. The unit shall be prepped and totally enclosed in a trailer suitable for exterior installation. The boiler shall be equipped with a low NOx, natural gas power burner, reducing natural gas firing emissions to 9 ppm NOx or less, and carbon monoxide to 130 ppm or less, both at 3% stack O2, as required by the Commonwealth of Pennsylvania DEP.**

G. **The boiler shall be compete with gas and oil trains, second low water cut-off, pressure controls, flame safeguard control, relief valves, feedwater valve, blowdown valves, and a fully modulating high efficiency burner equipped with auto flame controls. The boiler room shall have an emergency stop button located near the exit, on the outside of the trailer.**

H. **The trailer mounted boiler room shall be complete with main steam valves, deaerator, variable speed feedwater pumps, water softeners, chemical feed tanks and pumps, blowdown separator, blowdown aftercooler (condensate cooler), electrical gear, and automatic operating controls.**

1. **The blowdown aftercooler shall utilize domestic water to prevent the drainage discharge from the trailer boiler room from being above 140 deg. F.**

I. **Steam and steam condensate shall be conveyed to and from the trailer to the main steam and condensate headers. Provide steam and steam condensate piping between the steam plant and the Boiler Building.**

J. **External Connections: The required external utility connections shall be limited to diesel fuel, natural gas, water supply, drainage, and electrical power. The trailer mounted boiler room shall not require a softened water supply.**

K. **Fuel Consumption: Natural Gas – 14,645 SCFH. No. 2 Fuel Oil – 104.6 GPH**

L. **Voltage and Amperage Requirements: 240/480V volts, 200/100 amp service, 3 phase.**

M. **Piping Connection Sizes:**

1. **Main Steam Outlet - 6", ANSI Class 300 flanged**
2. **Steam Condensate Return - 2-1/2", ANSI Class 150 flanged**
3. **Fuel Oil Connection – ¾" NPT**
4. **Natural Gas Connection – 2 1/2", ANSI Class 150 flanged**

    a. **Maximum inlet pressure: 10 psig**
    b. **Minimum inlet pressure: 8 psig.**

5. **Water / Feedwater - 2" MPT**
6. **Blowdown / Drainage – 2" MPT**

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cleaver-Brooks
2. Burnham
3. Hurst Boiler & Welding Company, Inc.
4. Fulton Boiler Works, Inc.
5. Or equal approved by the Professional.

2.2 MANUFACTURED UNITS

A. Description: Factory-fabricated, -assembled, and -tested, horizontal, fire-tube boilers with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket, flue-gas vent, water supply and return connections, and controls.

B. Pressure Vessel Design: Straight, steel tubes rolled into steel headers. Two passes with wet-back design. Minimum heat-exchanger surface of 5 sq. ft./bhp. Include the following accessories:

1. Handholes for water-side inspections.
2. Lifting lugs on top of boiler.
3. Minimum NPS 1 hose-end drain valves at shell low point.
4. Tappings or flanges for supply- and return-water piping.
5. Built-in air separator.

6. Accessible drain and blowdown tappings, both high and low, for surface and mud removal.
7. Tappings for steam supply, makeup, level controls, and chemical treatment.

C. Front and Rear Doors:

1. Davited, sealed with heat-resistant gaskets and fastened with lugs and cap screws.
2. Designed so tube sheets and flues are fully accessible for inspection or cleaning when doors are open.
3. Include observation ports in doors at both ends of boiler for inspection of flame conditions.
4. Door insulation shall be accessible for inspection and maintenance.

D. Casing:

1. Insulation: Minimum 2-inch thick, mineral-fiber insulation surrounding the boiler shell.
2. Flue Connection: Flange at top of boiler.
3. Jacket: Galvanized sheet metal, with screw-fastened closures and baked-enamel protective finish.
4. Mounting base to secure boiler to concrete base.

5. Control Compartment Enclosure: NEMA 250, Type 4.

E. Barometric Damper: Galvanized-steel assembly with flue-gas thermometer having a minimum 3-1/2-inch diameter dial.

2.3 BURNER

A. Burner: Welded construction with multivane, stainless-steel, flame-retention diffuser for fuel oil and natural gas. Mount burner on hinged access door to permit access to combustion chamber.

B. Blower: Forward-curved centrifugal fan integral to burner, directly driven by motor; with adjustable, dual-blade damper assembly and locking quadrant to set air-fuel ratio.

1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."

a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

C. Oil Supply: Control devices and low-high-low control sequence shall comply with requirements in ASME CSD-1.

1. Oil Pump: Two-stage, gear-type oil pump shall be capable of producing 300-psig discharge pressure and 15-inch Hg vacuum.
2. Oil Piping Specialties:

a. Suction-line, manual, gate valve.
b. Removable-mesh oil strainer.
c. 0- to 30-inch Hg vacuum; 0- to 30-psig vacuum-pressure gage.
d. 0- to 300-psig oil-nozzle pressure gage.
e. Nozzle-line, solenoid-safety-shutoff oil valve.

D. Gas Train: Control devices and modulating control sequence shall comply with requirements in ASME CSD-1 and IRI.

E. Gas Pilot: Interrupted-electric-spark pilot ignition with 100 percent main-valve and pilot-safety shutoff with electronic supervision of burner flame.

F. Oil Pilot: Intermittent-electric-spark pilot ignition with 100 percent main-valve and pilot-safety shutoff solenoid with UV scanner flame-safety control.

G. Flue-Gas Recirculation: Burner connections shall be equipped for recirculating flue gas.

1. Emissions: Maximum Oxides of Nitrogen Emissions Natural Gas: 9PPM.

2. Maximum Oxides of Nitrogen Emmision N0. 2 Diesel Fuel: 90PPM

2.4 TRIM

A. Include devices sized to comply with ANSI B31.9, "Building Services Piping."

B. Pressure Controllers: Operating, firing rate, and high limit.

C. Safety Relief Valve:

1. Size and Capacity: As required for equipment according to ASME Boiler and Pressure Vessel Code.
2. Description: Fully enclosed steel spring with adjustable pressure range and positive shutoff; factory set and sealed.

a. Drip-Pan Elbow: Cast iron and having threaded inlet and outlet with threads complying with ASME B1.20.1.

D. Pressure Gage: Minimum 3-1/2-inch diameter. Gage shall have normal operating pressure about 50 percent of full range.

E. Water Column: Minimum 12-inch glass gage with shutoff cocks.

F. Drain Valves: Minimum NPS 3/4 or nozzle size with hose-end connection.

G. Blowdown Valves: Factory-installed bottom and surface, slow-acting blowdown valves same size as boiler nozzle. Blowdown valves shall be combination of slow and quick acting as required by ANSI B31.1.

H. Stop Valves: Boiler inlets and outlets, except safety relief valves or preheater inlet and outlet, shall be equipped with stop valve in an accessible location as near as practical to boiler nozzle and same size or larger than nozzle. Valves larger than NPS 2 shall have rising stem.

I. Stop-Check Valves: Factory-installed, stop-check valve and stop valve for field installation at boiler outlet with free-blow drain valve for field installation between the two valves and visible when operating stop-check valve.

J. Tankless Heater: Carbon-steel header with copper-tube heat exchanger, mounted in a port of upper manifold and sealed with fiber gasket.

1. Tappings NPS 2 and Smaller: Threaded ends according to ASME B1.20.1 for pipe threads.
2. Tappings NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges, and according to ASME B16.24 for copper and copper-alloy flanges.

2.5 CONTROLS

A. Boiler operating controls shall include the following devices and features:

1. Control transformer.
2. Set-Point Adjust: Set points shall be adjustable.
3. Operating Pressure Control: Factory wired and mounted to cycle burner.
4. Low-Water Cutoff and Pump Control: Operate feedwater pump(s) continuously and modulate valve for makeup water control.
5. Sequence of Operation: Electric, factory-fabricated and field-installed panel to control burner firing rate to maintain a constant steam pressure. Maintain pressure set point plus or minus 10 percent.

    a. Include automatic, alternating-firing sequence for multiple boilers to ensure maximum system efficiency throughout the load range and to provide equal runtime for boilers.

B. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation.

1. High Cutoff: Manual reset stops burner if operating conditions rise above maximum boiler design pressure.
2. Low-Water Cutoff Switch: Float and electronic probe shall prevent burner operation on low water. Cutoff switch shall be manual-reset type.
3. Audible Alarm: Factory mounted on control panel with silence switch; shall sound alarm for above conditions.

C. Building Automation System Interface: Factory-install hardware and software to enable building automation system to monitor, control, and display boiler status and alarms.

1. Hardwired Points:

a. Monitoring: On/off status, common trouble alarm low water level alarm.
b. Control: On/off operation, steam pressure adjustment.

2. A communication interface with building automation system shall enable building automation system operator to remotely control and monitor the boiler from an operator workstation. Control features available, and monitoring points displayed, locally at boiler control panel shall be available through building automation system.

2.6 ELECTRICAL POWER

A. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.

B. Single-Point Field Power Connection: Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.

1. House in NEMA 250, Type 1 enclosure.
2. Wiring shall be numbered and color-coded to match wiring diagram.
3. Install wiring outside of an enclosure in a metal raceway.
4. Field power interface shall be to nonfused disconnect switch.
5. Provide branch power circuit to each motor and to controls with a disconnect switch or circuit breaker.
6. Provide each motor with overcurrent protection.

2.7 SOURCE QUALITY CONTROL

A. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.

B. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.

C. Allow Owner access to source quality-control testing of boilers. Notify Architect 14 days in advance of testing.

PART 3 - EXECUTION

3.1 EXISTING TRAILER MOUNTED BOILER

A. Before boiler relocation, the contractor shall engage the services of a factory representative of the boiler manufacturer to complete a full inspection and operational test of the boiler. A report of finding shall be generated listing any and all deficiencies noted during the inspection and testing.

B. Any deficiencies shall be corrected by the Client Agency prior to boiler relocation.

C. Proceed with re-location only after unsatisfactory conditions have been corrected.

3.2 EXAMINATION

A. Before boiler installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.

1. Final boiler locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

B. Examine mechanical spaces for suitable conditions where boilers will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 BOILER INSTALLATION

A. Complete CSD-1 and all DEP applications/submissions prior to installations.

B. Install boilers level on concrete base. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.

C. Vibration Isolation: Elastomeric isolator pads with a minimum static deflection of 0.25 inch. Vibration isolation devices and installation requirements are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

D. Install gas-fired boilers according to NFPA 54.

E. Install oil-fired boilers according to NFPA 31.

F. Assemble and install boiler trim.

G. Install electrical devices furnished with boiler but not specified to be factory mounted.

H. Install control wiring to field-mounted electrical devices.

3.4 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to boiler to allow service and maintenance.

C. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of gas train connection. Provide a reducer if required.

D. Connect oil piping full size to burner inlet with shutoff valve and union.

E. Connect steam and condensate piping to supply-, return-, and blowdown-boiler tappings with shutoff valve and union or flange at each connection.

F. Install piping from safety relief valves to nearest floor drain.

G. Install piping from safety valves to drip-pan elbow and to nearest floor drain.

H. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.

I. Connect breeching full size to boiler outlet. Comply with requirements in Division 23 Section "Breechings, Chimneys, and Stacks" for venting materials.

J. Install flue-gas recirculation duct from vent to burner. Comply with requirements in Division 23 Section "Breechings, Chimneys, and Stacks" for recirculation duct materials.

K. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

L. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform installation and startup checks according to manufacturer's written instructions.
2. Leak Test: Hydrostatic test. Repair leaks and retest until no leaks exist.
3. Stack Testing.
4. Operational Test: Start units to confirm proper motor rotation and unit operation. Adjust air-fuel ratio and combustion.
5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

    a. Burner Test: Adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency.
    b. Check and adjust initial operating set points and high- and low-limit safety set points of fuel supply, water level, and steam pressure.
    c. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

C. Remove and replace malfunctioning units and retest as specified above.

D. Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

E. Performance Tests:

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect component assemblies and equipment installations, including connections, and to conduct performance testing.
2. Boilers shall comply with performance requirements indicated, as determined by field performance tests. Adjust, modify, or replace equipment in order to comply.
3. Perform field performance tests to determine the capacity and efficiency of boilers.

    a. For dual-fuel boilers, perform tests for each fuel.
    b. Test for full capacity.
    c. Test for boiler efficiency at low fire, 20, 40, 60, 80, 100, 80, 60, 40 and 20 percent of full capacity. Determine efficiency at each test point.

4. Repeat tests until results comply with requirements indicated.
5. Provide analysis equipment required to determine performance.
6. Provide temporary equipment and system modifications necessary to dissipate the heat produced during tests if building systems are not adequate.
7. Notify Professional in advance of test dates.
8. Document test results in a report and submit to Professional.

F. Permit Testing:

1. Provide and perform an independent 3rd party combustion flue gas stack test at no additional cost to the Using Agency. If full load steam is not available, and/or a combustion stack test acceptable to DEP is not possible during the regular contract time, the contractor shall return when full load can be delivered, and acceptable testing can be performed at no additional cost to the Client Agency.
2. The contractor shall notify the DEP Regional Office of its intent to commence operation of the boilers at least five days prior to the completion of construction. The notice shall be in writing and shall specify the expected construction completion date and the date of commencement of operation of the boilers.
3. Within 180 days after initial start-up the contractor shall, through an independent 3rd party, and at no additional cost to the Using Agency, demonstrate compliance with the applicable emissions limitations for NOx and CO by means of stack testing in accordance with 25 PA Code Chapter 139 related to sampling and testing.

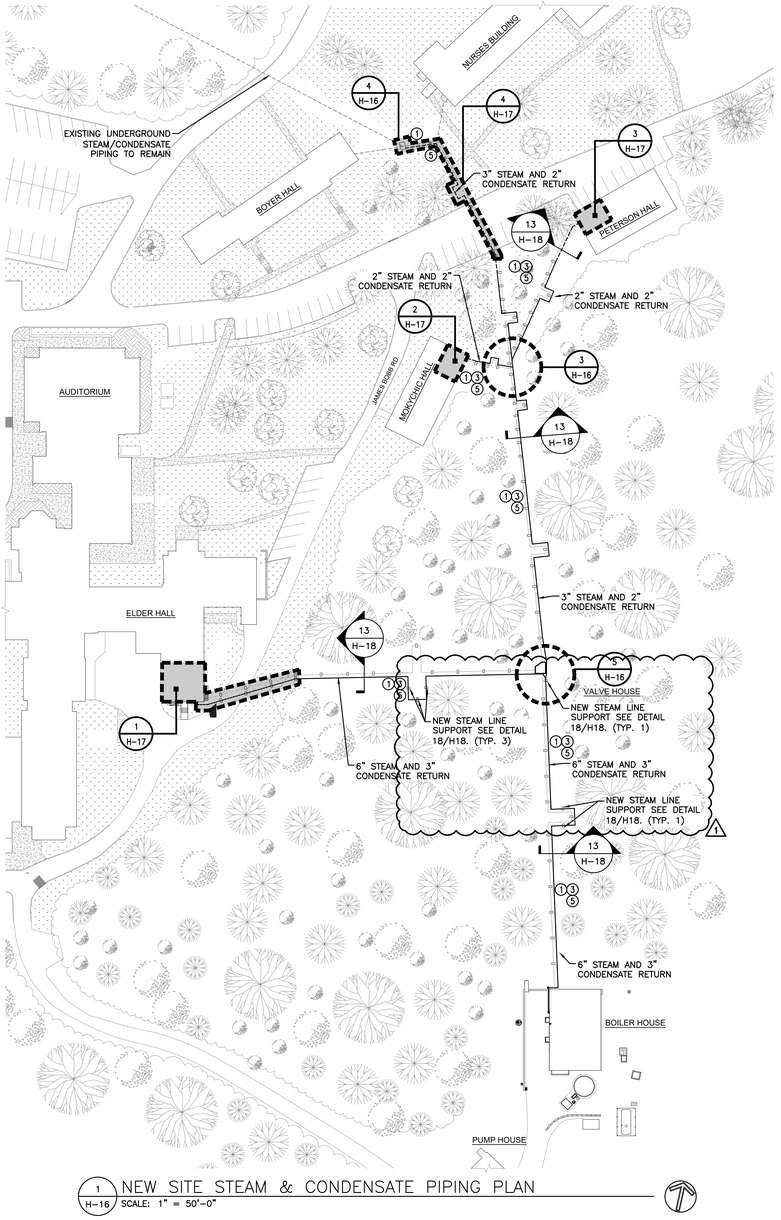
    a. A stack protocol shall be submitted to the DEP Regional Air Quality Program Manager for approval at least 60 days prior to the performance of the stack test.
    b. The date and time of any testing shall be submitted to the DEP Regional Air Quality Program Manager at least 30 days prior to the stack test.

c. Two copies of the completed stack test reports, including all operating conditions shall be submitted to the DEP Regional Air Quality Program Manager within 60 days of the completion of testing.

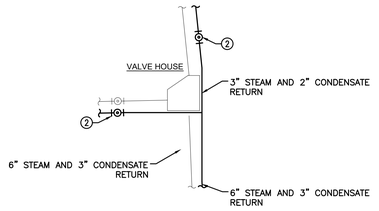
3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain boilers. Video training sessions. Refer to Division 01 Section "Demonstration and Training."

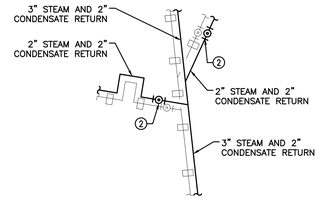
END OF SECTION 235239



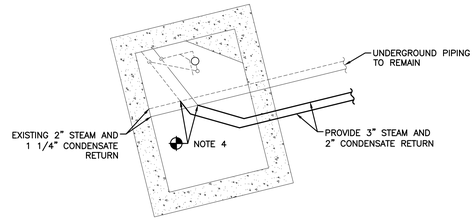
1 H-16 NEW SITE STEAM & CONDENSATE PIPING PLAN
SCALE: 1" = 50'-0"



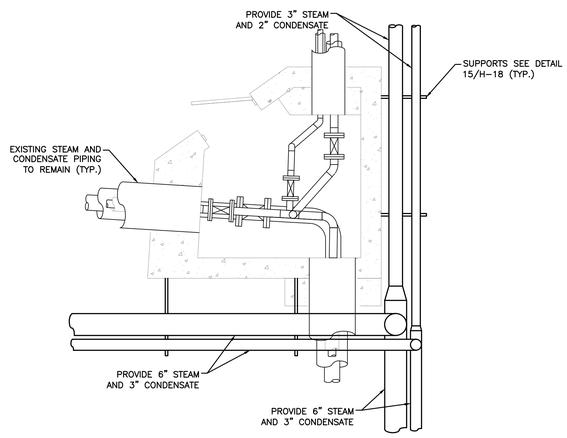
2 H-16 ENLARGED STEAM LINE PLAN
SCALE: 1/16" = 1'-0"



3 H-16 ENLARGED STEAM LINE PLAN
SCALE: 1/16" = 1'-0"



4 H-16 STEAM LINE MANHOLE PLAN
SCALE: 1/2" = 1'-0"



5 H-16 ENLARGED VALVE HOUSE PLAN
SCALE:

GENERAL NOTES:

1. DRIP LEGS ARE NOT REQUIRED ON EXTERIOR SITE STEAM AND CONDENSATE PIPING.
2. PROVIDE DRIP LEGS AT ALL BUILDING INTERIOR CONNECTION LOCATIONS.
3. CONTRACTOR TO INCLUDE QUANTITIES OF PIPING REQUIRED FOR ALL OF PIPING REQUIRED FOR ALL OFFSETS AND VERTICAL TRANSITIONS REQUIRED FOR INSTALLATION.
4. CONTRACTOR SHALL NOT DISTURB EXISTING ASBESTOS ON PIPING ALL ASBESTOS TO BE ABATED BY CLIENT AGENCY PRIOR TO WORK.
5. THE .2 CONTRACTOR SHALL BID ADDING THREE ADDITIONAL STEAM SUPPORTS PER DETAIL 18/H18. THESE SUPPORTS WILL BE INSTALLED IN LOCATIONS CHOSEN BY DESIGN PROFESSIONAL AT THE TIME OF STEAM LINE INSTALLATION. 1

NEW SITE STEAM & CONDENSATE PIPING SPECIFICATION: (OR EQUAL APPROVED BY PROFESSIONAL)

PIPING: ROVANCO – RHINOCOAT HIGH TEMP. CONDUIT ELITE: SIZES AS INDICATED ON PLANS. INSTALL PER MANUFACTURERS WRITTEN RECOMMENDATIONS AND INSTRUCTIONS. REFER TO SPECIFICATION SECTION: 232213 STEAM AND CONDENSATE HEATING PIPING FOR ADDITIONAL REQUIREMENTS.

KEYED CONSTRUCTION NOTES

BASE BID NO. 1 WORK

1. PROVIDE STEAM AND CONDENSATE PIPING (ABOVE & BELOW GRADE) PARALLEL TO EXISTING STEAM PIPING
2. PROVIDE VALVES FOR BRANCH STEAM AND CONDENSATE LINES

BASE BID NO. 2 WORK

3. PROVIDE EXPOSED LINE WITH FACTORY PRIMER COATING. PAINT PER MANUFACTURERS RECOMMENDATIONS. (COLOR TO BE SELECTED BY CLIENT AGENCY)
4. NOT USED

BASE BID NO. 3 WORK

5. .2 CONTRACTOR SHALL REMOVE 150 TREES (APPROX 100' TALL X 6.5' IN CIRCUMFERENCE). TREES TO BE MARKED BY CLIENT AGENCY PRIOR TO REMOVAL BY CONTRACTOR. TREES SHALL BE CUT AT GRADE LEVEL AND REMOVED FROM SITE IN THEIR ENTIRETY.

PLAN KEY

- EXISTING STEAM/CONDENSATE PIPING
- EXISTING UNDERGROUND STEAM/CONDENSATE PIPING
- NEW STEAM/CONDENSATE PIPING
- NEW UNDERGROUND STEAM/CONDENSATE PIPING

CALL BEFORE YOU DIG
PENNSYLVANIA ONE CALL SYSTEM, INC.
1-800-242-1776
PA ACT 287 (1974) REQUIRES THREE WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL OR BLAST

CONSTRUCTION DOCUMENTS SUBMISSION
FEBRUARY 28, 2023

1	ADDENDUM NO. 3	

RECORD REVISIONS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
RICHARD SZATKOWSKI
ENGINEER No. 044481-E

02-28-2023
SIGNATURE DATE

ARRIS ENGINEERING GROUP, LTD.
667 SOUTH RIVER STREET
PLAINS, PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

D.G.S. PROJECT No.
C-0304-0015 PHASE 2

ELIZABETHTOWN TRAINING ACADEMY – RENOVATE BOILER PLANT AND DOMESTIC / FIRE PROTECTION PIPING
DEPARTMENT of CORRECTIONS
ELIZABETHTOWN, LANCASTER COUNTY, PA

NEW SITE STEAM & CONDENSATE PIPING PLAN

VERIFY SCALE

BAR IS ONE (1) INCH LONG ON ORIGINAL DRAWING:
0 — 1
IF BAR IS NOT ONE (1) INCH LONG, ADJUST SCALE ACCORDINGLY

CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS. VARIANCE FROM CONTRACT DOCUMENTS NOT PERMITTED WITHOUT PROFESSIONAL & BUREAU OF CONSTRUCTION APPROVAL.

DRAWN BY	DATE	DRAWING No.
D NEVEL	FEB 2023	H-16
CHECKED BY	SCALE	
R SZATKOWSKI	AS NOTED	

FILE PATH: F:\1400.01 0304-0015 P2 Elizabethtown Boiler\Drawings\3.Mechanical CD\H-16 New Site Steam & Condensate Piping Plan.dwg
LAST SAVED: 2023.05.16 03:05 PM