

# ADDENDUM NUMBER 1

Date: December 13, 2013

Re: Central Steam / Condensate Lines I - Bull St. (H27-N291-FW)  
University of South Carolina

A/E Proj. No.: 133030

Submitted By: Danny Wilds, PE  
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The following items take precedence over referenced portions of the Contract Documents for the referenced project dated October 10, 2013, and, in executing a contract, shall become a part thereof.

Where any item called for in the documents is supplemented hereby, the original requirements shall remain in effect. All supplemental conditions shall be considered as added thereto.

Where any original item is amended, voided, or superseded hereby, the provision of such items not so specifically amended, voided, or superseded shall remain in effect.

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## **General:**

1. A non-mandatory Pre-Bid was held on 12/09/2013 at 10:00 am EST, and a subsequent site visit was made available. A site visit is highly recommended. Attached is a list of the attendees.
2. This Contractor shall be responsible for backfilling trenches as specified. The Streetscaping contractor will be responsible for final covering; asphalt, concrete, pavers, etc.
3. The north bound lane of Bull St. shall remain open to traffic during construction. The temporary fence currently blocking the north bound lane will be relocated to the east side of Bull St.
4. Access to the Russell House service entrance shall be strictly coordinated with USC during construction. The Russell House service entrance is located where the street curbs turn back towards Russell House at manhole E3-9D shown on drawing M1. Work around manhole E3-9D shall closely coordinated the USC project manager.
5. Piping from the connection point on the north side of Greene St. to manhole E3-9D shall be installed complete including backfill in 150 foot sections.

## **Specifications**

6. Refer to sections 23 07 00 MECHANICAL INSULATION and 23 21 13 - MECHANICAL, PIPING; the attached section 23 33 61 PRE-INSULATED PIPE / CONDUIT SYSTEMS may be used as an option for underground high pressure steam and pumped condensate piping systems.

END OF ADDENDUM NO. 1

## SECTION 23 33 61 - PRE-INSULATED PIPE / CONDUIT SYSTEMS

### PART 1 - GENERAL

- 1.1 Section 23 00 00 Mechanical, General applies to the work specified in this section of specifications.
- 1.2 Pipe locations shown are approximate. Exact location of pipes to be as approved by Engineer and determined in field, to avoid other pipes and maintain access clearances.
- 1.3 Piping to comply with best trade practice. Provide clearance between pipe and manhole structure so pipes can expand without damage to manhole structure.
- 1.4 New underground high pressure steam between manholes, as shown on plans, shall be installed in Perma-Pipe/Ricwil ESCON-A/FERRO-SHIELD prefabricated, insulated conduit system with all necessary fittings, anchors, expansion joints and conduit accessories, etc.,as hereinafter specified or equal by Rovanco or approved equal.
- 1.5 New underground pumped condensate lines of shall be XTRU-THERM as manufactured by Perma-Pipe/Ricwil or equal by Rovanco or approved equal.
- 1.6 All straight sections, fittings, anchors and other accessories shall be factory fabricated, insulated, and jacketed. The piping system layout shall be analyzed by the piping system manufacturer to determine the stresses and displacements of the service pipe. The piping system design and manufacture shall be in strict conformance with ASME B31.1, latest edition. Installation of the piping system shall be in accordance with the manufacturer's instructions. Factory trained field technical assistance shall be provided for critical periods of installation, unloading, field joint instruction and testing.

### PART 2 - PRODUCT

- 2.1 HIGH PRESSURE STEAM PIPE CONDUIT SYSTEM:
  - A. Internal piping shall be standard weight carbon steel. All joints shall be butt-welded. Where possible, straight sections shall be supplied in 40-foot random lengths with 6 inches of piping exposed at each end for field joint fabrication.
  - B. End seals, gland seals and anchors shall be designed and factory pre-fabricated to prevent the ingress of moisture into the system. All sub-assemblies shall be designed to allow for complete draining and drying of the conduit system.
  - C. Service pipe insulation shall be calcium silicate or mineral wool. Split insulation shall be held in place by stainless steel bands installed on 18 inch centers. The insulation shall have passed the most recent boiling test and other requirements specified in the Federal Agency Guidelines Specifications. The insulation shall be applied to a thickness of 3".

- D. The steel conduit casing shall be smooth wall, spiral weld steel conduit of the thickness specified below:

<u>Conduit Size</u>	<u>Conduit Thickness</u>
6" - 26"	10 gauge
28" - 36"	6 gauge
38" - 42"	4 gauge

Changes in casing size, as required at oversized casing to allow for service pipe expansion, shall be accomplished by eccentric and/or concentric fittings and shall provide for continuous drainage.

- E. The conduit system sections shall be covered with PERMA-PIPE's urethane elastomer coating. Quality control at the manufacturing facility shall ensure that all coatings are able to pass a 5,000 volt holiday test. The coating shall be spray applied onto a shot blasted steel conduit to a thickness of 30 mils. All field joints shall be covered with a heat-shrinkable, adhesive-backed sleeve. The factory applied coating on the conduit fittings shall be either hand applied elastomer coating or a heat shrinkable sleeve.
- F. All pipes within the outer casing shall be supported at not more than 10-foot intervals. These supports shall be designed to allow for continuous airflow and drainage of the conduit in place. The straight supports shall be designed to occupy not more than 10% of the annular air space. Supports shall be of the type where calcium silicate pipe insulation thermally and electrically isolates the service pipe from the outer conduit. Supports which directly contact both the service pipe and the outer casing shall not be allowed. The surface of the insulation shall be protected at the support by a metal sleeve not less than 12 inches long.

## 2.2 PUMPED CONDENSATE PRE-INSULATED PIPING SYSTEM:

- A. The service pipe shall be Schedule 80 ASTM A53 Gr. B ERW carbon steel. All joints shall be butt-welded. Where possible, straight sections shall be supplied in 40-foot random lengths with piping exposed at each end for field joint fabrication.
- B. Elbows, tees, reducers, anchors, field joints, and end seals shall be designed and factory fabricated to prevent the ingress of moisture into the system.
- C. The service pipe insulation shall be polyurethane foam with 2.0 Lbs./SF minimum density, 90% minimum closed cell content and initial thermal conductivity of 0.16 Btu in./Hr. SF °F. The insulation shall completely fill the annular space between the service pipe and jacket and shall be bonded to both. Systems using open cell insulation or a non-bonded design shall not be allowed. The insulation shall be minimum 2" thickness.
- D. The outer protective insulation jacket shall be seamless high-density polyethylene (HDPE) in accordance with ASTM D1248, type 3, Class C. PVC or tape materials are not allowed. The minimum thickness of the HDPE jacket shall be 0.125".

- E. All fittings shall be factory prefabricated and pre-insulated. Straight tangent lengths shall be added to all ends so that all field joints are at straight sections of pipe. Elbow jackets shall be molded HDPE. Tee jackets shall be extrusion welded or butt fusion welded HDPE. Gluing, taping or hot air welding shall not be allowed.
- F. The service pipe shall be hydrostatically tested. Insulation shall then be poured in place into the field joint area. All field-applied insulation shall be placed only in straight sections of pipe. Field insulation of fittings is not acceptable. The installer shall seal the field joint area with a heat shrinkable adhesive backed sleeve. Backfilling shall not begin until the heat shrink sleeve has cooled. All insulation and jacketing materials for the field joint shall be furnished by PERMA-PIPE.

### PART 3 - EXECUTION

- 3.1 Manufacturer's Field Installation Instructor who is technically qualified to determine whether or not the installation is being made in accordance with the manufacturer's recommendation shall be present during critical periods of installation and test of the system. On completion of the installation, the Contractor shall deliver to the owner a certificate from the manufacturer stating that the installation has been made in accordance with the manufacturer's recommendations.
- 3.2 Run pipes using a few fittings consistent with required flexibility. Pipe penetrations shall be perpendicular to walls. Wherever pipes change size, use eccentric fittings.
- 3.3 PIPE TESTS
  - A. All ferrous pipe field joints shall be welded by competent mechanics and hammer tested under hydrostatic pressure of 250 psig or one and one-half times the design pressure, whichever is greater. Concealed pipe welds in prefabricated conduit fittings shall be factory tested the same as specified for field welds prior to assembly. No leakage shall be allowed.
  - B. Immediately after the system has been installed in the trench, a partial backfill shall be made in the middle of each unit, leaving the joints exposed for inspection during the hydrostatic tests.
  - C. Contractor shall fill the pipe to be tested with water and bring the section up to pressure with a test pump. These tests shall be conducted before any insulation is installed (except factory installed insulation and any insulation installed prior to these tests shall be removed. Gauges used in the tests shall have been recently calibrated with a dead weight tester. All tests shall apply full test pressure to the piping for a minimum of 24 hours.
- 3.4 Furnish all necessary equipment and labor to perform the air test, including air compressor, gauges, conduit caps, temporary pipe and connections, etc. and complete the test to the satisfaction of the Engineer.

### 3.5 CHEMICAL CLEANING OF PIPES

- A. Furnish all labor and chemicals for the cleaning of pipes.
- B. Chemically clean all new piping systems with Mitco BL-5 (or equal), using 1 gallon for each 1000 gallons of system capacity to remove dirt, oil, grease, and other foreign contaminants. Drain off 25% of system water every two hours and recharge with water and Mitco BL-5. Circulate for six (6) hours or until all contaminants are removed.
- C. After cleaning, drain and flush all systems.

3.6 See section 23 21 13 - MECHANICAL, PIPING for trenching and backfilling.

END OF SECTION 23 33 61

## University of South Carolina

Columbia, South Carolina

**Project Name:** Central Steam/Condensate Lines I - Bull Street  
**Project Number:** H27-N291-FW  
**Pre Bid Date & Time:** December 9, 2013 @ 10 am

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Lee Hammerle	Hammer Construction	795 Hampton Creek Way Columbia, S.C. 29209	803-309-0864	Lee@HammerConstructionCompany.com
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