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PUBLIC SERVICE  
COMMISSION

Ms. Gwen R. Pinson  
Executive Director  
Kentucky Public Service Commission  
211 Sower Boulevard  
Frankfort, Kentucky 40601

**Louisville Gas and  
Electric Company**  
State Regulation and Rates  
220 West Main Street  
P.O. Box 32010  
Louisville, Kentucky 40232  
www.lge-ku.com

Rick E. Lovekamp  
Manager Regulatory  
Affairs/Tariffs  
T 502-627-3780  
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November 22, 2017

**RE: Louisville Gas and Electric Company Alleged Failure to Comply with  
KRS 278.495, 807 KAR 5:022, and 49 C.F.R. Part 192  
Case No. 2017-00119**

Dear Ms. Pinson:

Enclosed please find and accept an original and ten copies for filing of Louisville Gas and Electric Company's Responses to the Commission Staffs Post Hearing Request for Information in the above referenced matter.

Also, enclosed are an original and ten (10) copies of a Petition for Confidential Protection regarding certain information included in the responses.

Should you have any questions regarding the enclosed, please contact me at your convenience.

Sincerely,

Rick E. Lovekamp

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

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NOV 22 2017

PUBLIC SERVICE  
COMMISSION

**In the Matter of:**

**LOUISVILLE GAS AND  
ELECTRIC COMPANY**

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**CASE NO. 2017-00119**

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**ALLEGED FAILURE TO COMPLY  
WITH KRS 278.495, 807 KAR 5:022, AND  
49 C.F.R. PART 192**

**LOUISVILLE GAS AND ELECTRIC COMPANY'S  
PETITION FOR CONFIDENTIAL PROTECTION**

Louisville Gas and Electric Company ("LG&E"), pursuant to 807 KAR 5:001, Section 13, respectfully petitions the Commission to classify as confidential and protect from public disclosure certain information provided in response to Item 3 of the Commission Staff's Post-Hearing Request for Information.

In further support of this Motion, LG&E states as follows:

1. Under the Kentucky Open Records Act, the Commission is entitled to withhold from public disclosure information confidentially disclosed to it to the extent that open disclosure would "have a reasonable likelihood of threatening the public safety by exposing a vulnerability in preventing, protecting against, mitigating, or responding to a terrorist act and limited to: ... (f) infrastructure records that expose a vulnerability referred to in this subparagraph through the disclosure of the location, configuration, or security of critical systems, including public utility critical systems. These critical systems shall include but not be limited to information technology, communication, electrical, fire suppression, ventilation, water, wastewater, sewage, and gas systems and (g) the following records when their disclosure will expose a vulnerability referred to in this subparagraph: detailed drawings, schematics, maps, or

specifications of structural elements, floor plans, and operating, utility, or security systems of any building or facility owned, occupied, leased, or maintained by a public agency." See KRS 61.878(1)(m)1. LG&E's response to Item 3 attaches a contract between it and Southern Pipeline and attached to that contract is a map of LG&E's Ballardsville transmission line. This map provides information about one of the Company's gas pipeline systems; as such, the disclosure of it could threaten the public safety generally. LG&E produced in discovery in this matter a similar map on May 26, 2017 and sought confidential protection of that map at that time. For the same reasons set forth in that May 26, 2017 Petition for Confidential Protection, LG&E seeks protection of the similar map attached to the Southern Pipeline contract.

2. The Kentucky Open Records Act also exempts from disclosure certain commercial information. See KRS 61.878(1)(c). To qualify for the exemption and, therefore, maintain the confidentiality of the information, a party must establish that the material is of a kind generally recognized to be confidential or proprietary, and the disclosure of which would permit an unfair commercial advantage. Section 10 of the contract between LG&E and Southern Pipeline includes sensitive pricing information for the work to be performed by Southern Pipeline. Publicly disclosing that pricing information would hinder LG&E's ability to receive the best proposals and procure the best contract terms in future negotiations for similar services by providing potential vendors the price ceiling on what LG&E would be willing to pay, which would reduce, if not eliminate, vendors' incentive to provide their most competitive bids. Diminishing LG&E's ability to receive the best proposals and contract for the best possible terms would harm both LG&E and its customers through increased costs of service. This information should therefore be afforded confidential protection.

3. The information for which the Company is seeking confidential treatment is not known outside of the Company, except by regulators, is not broadly available within LG&E, and is generally recognized as confidential and proprietary information in the energy industry.


4. If the Commission disagrees with this request for confidential protection, it must hold an evidentiary hearing (a) to protect the Company's due process rights and (b) to supply the Commission with a complete record to enable it to reach a decision with regard to this matter. Utility Regulatory Commission v. Kentucky Water Service Company, Inc., Ky. App., 642 S.W.2d 591, 592-94 (1982).

5. In compliance with 807 KAR 5:001, Section 13, LG&E is filing with the Commission one paper copy that identifies by highlighting the pricing information for which confidential protection is sought and additional paper copies with the same information obscured. LG&E seeks protection of the entire map of the Ballardsville transmission line.

**WHEREFORE**, LG&E respectfully requests the Commission to grant confidential protection as set forth above.

Dated: November 22, 2017

Respectfully submitted,



Allyson K. Sturgeon  
Senior Corporate Attorney  
LG&E and KU Services Company  
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*Counsel for Louisville Gas and Electric Company*

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**In the Matter of:**

**LOUISVILLE GAS AND ELECTRIC COMPANY** )  
\_\_\_\_\_ )  
**ALLEGED FAILURE TO COMPLY** )  
**WITH KRS 278.495, 807 KAR 5:022,** )  
**AND 49 C.F.R. PART 192** )

**CASE NO.**  
**2017-00119**


**RESPONSE OF**  
**LOUISVILLE GAS AND ELECTRIC COMPANY**  
**TO**  
**COMMISSION STAFF'S POST-HEARING REQUEST FOR INFORMATION**  
**DATED NOVEMBER 15, 2017**

**FILED: November 22, 2017**

VERIFICATION

COMMONWEALTH OF KENTUCKY )  
 ) SS:  
COUNTY OF JEFFERSON )

The undersigned, **Lonnie E. Bellar**, being duly sworn, deposes and says that he is Senior Vice President – Operations for Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.

  
\_\_\_\_\_  
**Lonnie E. Bellar**

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 22<sup>nd</sup> day of November 2017.

  
\_\_\_\_\_  
Notary Public (SEAL)



My Commission Expires:  
JUDY SCHOOLER  
Notary Public, State at Large, KY  
My commission expires July 11, 2018  
Notary ID # 512743

**LOUISVILLE GAS AND COMPANY**

**Response to Commission Staff's Post-Hearing Request for Information  
Dated November 15, 2017**

**Case No. 2017-00119**

**Question No. 1**

**Witness: Lonnie E. Bellar**

- Q-1. Refer to LG&E's Responses to Commission Staff's Second Request for Information at its response to Item 2. The response states that LG&E's initial review of records indicates that the operating pressure of the Ballardsville transmission pipeline exceeded 300 psig on 72 days from January 5, 1998, to April 30, 2011, but that as a result of anomalies in the data, the actual number of days may be less than 72. The response further states that LG&E is continuing to investigate this issue. Provide an update to this response. If the information in the response remains accurate and no supplementation is necessary, so state.
- A-1. The company has completed additional records review and has determined that the Ballardsville transmission pipeline operating pressure exceeded 300 psig on 69 days over the January 5, 1998 to April 30, 2011 time period.



**LOUISVILLE GAS AND COMPANY**

**Response to Commission Staff's Post-Hearing Request for Information  
Dated November 15, 2017**

**Case No. 2017-00119**

**Question No. 2**

**Witness: Lonnie E. Bellar**

- Q-2. LG&E previously provided to the Commission the DOT Form PHMSA F 7100.2, dated October 17, 2014, by which LG&E reported the September 17, 2014 incident to the Pipeline and Hazardous Materials Safety Administration ("PHMSA"). Provide copies of all other reports relating to the incident that LG&E submitted to PHMSA pursuant to 49 C.F.R. Part 191.
- A-2. LG&E did not file any additional reports with PHMSA regarding the September 17, 2014 incident.

**LOUISVILLE GAS AND COMPANY**

**Response to Commission Staff's Post-Hearing Request for Information  
Dated November 15, 2017**

**Case No. 2017-00119**

**Question No. 3**

**Witness: Lonnie E. Bellar**

- Q-3. Provide the written agreement pursuant to which Southern Pipeline employees performed the excavation work that exposed the mechanical coupling system that failed on September 17, 2014.
- A-3. See attached. Certain information being provided is confidential and proprietary, and is being provided under seal pursuant to a petition for confidential protection.

## CONTRACT

This Contract is entered into, effective as of June 11, 2014, between Louisville Gas and Electric Company, a Kentucky corporation ("Company"), whose address is 220 West Main Street, Louisville, Kentucky 40202, and Southern Pipeline Construction Company, Inc., a Kentucky Corporation ("Contractor"), whose address is 1272 Old Fern Valley Road, Louisville, Kentucky 40219.

The parties hereto agree as follows:

### **1.0 GENERAL**

Contractor shall perform the following:

**Ballardsville Line Piggability Project**: modifying multiple locations along the Ballardsville pipeline to make the pipeline piggable. There will be approximately eleven (11) locations along the pipeline requiring modification. Old pipe removed and replaced with new pipe should be hauled to ISA on Grade Lane for recycling (if applicable). The work will take place in Jefferson and Oldham counties. Company contact is Bill Norton, Mechanical Engineer II; Phone -- [REDACTED].

Services to be performed are described more specifically within the Scope of Work provided in Article 2.0 hereof and Appendix A- Ballardsville Modifications Specific (hereinafter referred to as the "Work") and Company shall compensate the Contractor for the Work, under all the terms and conditions hereof.

#### **Customer Experience**

Business partners must share responsibility for the Company's commitment to create a positive experience for LG&E and KU customers through dedication to safety, respectful relationships, professional behavior, timely solutions to issues and exceptional service. At all times, business partners must align operations and business processes to meet the needs of the customer and proactively address potential issues with the company to ensure they are resolved in the customer's best interest.

**ORIGINAL**

## 2.0 DESCRIPTION OF WORK

### SCOPE OF WORK:

- 2.1 **Location:** The pipeline runs through Jefferson and Oldham Counties in Kentucky.
- 2.2 **Scope of Work:** This project consists of modifying the following locations to make the Ballardsville Transmission pipeline piggable:
- ~~2.2.1 Site 1 (Receiver at Moody Lane Station) – Removed~~
  - 2.2.2 Site 2A (Launchers at Elder Park City Gate)
  - 2.2.3 Site 2B (Heater Piping at Elder Park City Gate)
  - ~~2.2.4 Site 3 (12" Carrier Pipe Insertion at LaGrange Road [Highway 146] Crossing) – Removed~~
  - ~~2.2.5 Site 4 (12" Carrier Pipe Insertion at I-71 Crossing) – Removed~~
  - 2.2.6 Site 5 (Valve and Fitting Replacements at Highway 42N 8" Goshen Branch)
  - 2.2.7 Site 6 (Plug Valve 3:14 Replacement at Highway 42 and Hunting Creek Drive)
  - 2.2.8 Site 7 (Plug Valve 6:07 Replacement at Wolf Pen Branch Road and River Road)
  - 2.2.9 Site 8 (Valve and Fittings Replacement at River Road and Zorn Avenue)
  - 2.2.10 Site 9 (Receiver at Zorn Avenue Water Tower Platform)
  - 2.2.11 Site 10 (Drip Removal at Fox Trail Drive and Deer Run Drive)
- 2.2 **Project Documents:** The following LG&E documents show the location and extent of the new gas pipelines associated appurtenances to be installed as well as the construction specifications to be followed:
- 2.2.1 **Drawings:**
    - 2.2.1.1 Overview Cover – LG&E Gas D-23151, Sheet 1
    - 2.2.1.2 Ell References – LG&E Gas D23151, Sheet 2
    - 2.2.1.3 Valve References – LG&E Gas D-23151. Sheet 3
    - 2.2.1.4 Site 1 – EMS 58984101, 58988102, 58984901
    - 2.2.1.5 Sites 2A and 2B – EMS 58984102, 58984103, 5894301, 5894302, 58984902, 58984903, 58988101, 58988201
    - 2.2.1.6 Site 3 – EMS 58984104
    - 2.2.1.7 Site 4 – EMS 58984105
    - 2.2.1.8 Site 5 – EMS 58984106, 58984904
    - 2.2.1.9 Site 6 – LG&E Gas D-23151, Sheet 4

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**CONTRACT NO. 907191**

- 2.2.1.10 Site 7 – LG&E Gas D-23151, Sheet 5
- 2.2.1.11 Site 8 – LG&E Gas D-23151, Sheet 6
- 2.2.1.12 Site 9 – EMS 58984107, 58984905, 58988103
- 2.2.1.13 Site 10 – LG&E Gas D-23151, Sheet 7
- 2.2.1.14 Typical Pipe Supports – 58988202, 58988203

- 2.2.2 **Attachment A:** Pipe Coating Wax- Tape and Outer Wrap Application and Bill of Materials – GCS 50 10 602
- 2.2.3 **Attachment B:** Rock Shield Application Standards for Coating Protection
- 2.2.4 **Attachment C:** Casing: Steel Casing / Steel Carrier – GCS 10 20 750
- 2.2.5 **Attachment D:** Lifting Lug Blind Flange – GCS 10 20 800
- 2.2.6 **Attachment E:** Pipeline Design Minimum Cover – GCS 10 10 001
- 2.2.7 **Attachment F:** Purge and Blowdown – GCS 80 30 020
- 2.2.8 **Attachment G:** Pillow Pipe Support – GCS 80 20 360
- 2.2.9 **Attachment H:** Lock Out Tag Out – GAOP PO 001
- 2.2.10 **Attachment I:** Barricade – GCS 80 20 510
- 2.2.11 **Attachment J:** Gradient Control Mat
- 2.2.12 **Attachment K:** Valve Box 24 inch HDPE Pipe Style - GCS 80 20 020
- 2.2.13 **Attachment L:** Purge-Blowdown 2 inch CL 150-300 - New Construction - GCS 10 20 700
- 2.2.14 **Attachment M:** Purge-Blowdown 4 inch CL. 300 Flange Tee - GCS 10 20 704
- 2.2.15 **Attachment N:** Regulator Station Fisher 627-1808A Assembly with Strainer - GCS 40 20 402
- 2.2.16 **Attachment O:** Regulator Station 2 inch CL.300 Mooney Monitor Assembly - GCS 40 20 405
- 2.2.17 **Attachment P:** E-Z Line Guide With Steel Shim Block on Beam, PVC Coated

**2.3 Key Contacts:**

- 2.3.1 Project Engineer: Bill Norton
- 2.3.2 Project Inspector(s): TBD
- 2.3.3 Health and Safety: Frank Newton
- 2.3.4 Contract Proponent: Carrie Mattingly

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## 2.4 RECORDKEEPING

Federal regulations require that LG&E preserve certain records and files of as-constructed drawings of the pipeline facilities. Compliance with these requirements involves the recording of the location and length of each section of pipe and the components of each appurtenance of the pipeline system as it is placed in its final position in the pipeline.

Contractor is responsible for noting all historical update information. All historical update information shall be noted on a set of LG&E-supplied reproducible drawings. All required and relevant information shall be recorded on these drawings and returned to LG&E Field Representative once the pipeline installation is complete.

## 2.5 SCHEDULING AND PERMITS

2.5.1 **Schedule** – Work is tentatively scheduled to begin on July 15<sup>th</sup> and select sites shall be completed with pipeline in-service by October 15<sup>th</sup>. Sites 5 and 10 may be postponed until 2015 if needed.

2.5.2 **Deviations From Schedule:** It is imperative that the Contractor notify LG&E of any deviations from schedule, reasons for the delays, and measures available to return to schedule.

2.5.3 **Permits** - LG&E will obtain all needed permits for work on this project; including railroad coordination. The Contractor will be responsible for compliance with all permits obtained by LG&E. All other permits and operator qualifications shall be obtained by the Contractor unless agreed to otherwise, in writing by an authorized LG&E representative.

2.5.4 **Working Hours:** TO BE AGREED BETWEEN LG&E AND CONTRACTOR. LG&E's preferred working hours are Monday through Friday, 10 hour days and up to 16 hours during shutdown periods. Emergency situations may require additional resources.

## 2.6 FURNISHED BY CONTRACTOR

2.6.1 It is the responsibility of the Contractor to supply all additional material and equipment that are not listed as supplied by LG&E and are required for the installation, testing and completion of the gas pipeline, and appurtenances as shown on the Project Drawings. Contractor shall bear all costs for obtaining and maintaining any materials which he must supply. In addition, LG&E assumes no responsibility for work delays if materials

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## CONTRACT NO. 907191

supplied by Contractor are delayed. Contractor must supply all welding equipment necessary for welding operations.

- 2.6.2 Contractor will be responsible for off-loading, moving and installing backfill material in a manner required by LG&E's construction specifications. Contractor will be responsible for removal, loading, transporting and off-loading all debris as a result of this pipeline construction project including rock and dirt.
- 2.6.3 Traffic Control (if applicable) to be arranged and paid by Contractor.
- 2.6.4 All work to be completed in accordance with Company specifications as per the referenced drawings.
- 2.6.5 Contractor is required to work with LG&E personnel to install all anodes, wire, and equipment needed for cathodic protection on the new pipeline and tie-in points.

## 2.7 FURNISHED BY CONTRACTOR

- 2.7.1 The materials supplied by LG&E will include pipe, valves, and fittings. The pipe will be delivered to the sites at locations agreed upon by LG&E, the Contractor and the landowners. The Contractor will be responsible for loading, moving and off-loading of materials. This effort will be coordinated between the LG&E Field Representative and Contractor. Some materials may be located at LG&E's Muldraugh Compressor Station site. The Contractor shall inspect the materials prior to receipt and make arrangements for pickup at LG&E's Muldraugh location. The LG&E Field Representative shall accompany the Contractor when any material is to be picked up.
- 2.7.2 LG&E will be responsible for purchasing and supplying suitable backfill material for the project where required to meet LG&E's construction specifications. LG&E is also responsible for providing a site or sites for disposal of debris as result of the pipeline construction project.

### NOTES:

- Site will need to be restored with like kind.
- **Any temporary driveways will need to be removed upon project completion.**
- Contractor is responsible for returning any materials left over from the job to the Muldraugh Compressor Station site at no additional cost to LG&E. This includes material that is either job-sited or picked up by contract from LG&E's Muldraugh location.

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- Contractor must ensure that LG&E supplied material is properly handled and not damaged during construction. Any material that is found to be damaged due to Contractor negligence that cannot be used, returned to, or accepted by LG&E, will be the liability of the Contractor.
- Contractor shall make reasonable efforts to modify his work schedule as materials are available. Contractor may be required to make multiple trips for material pick up. Relative to materials, the term "jobsite" refers to any location for which permission has been granted to the Contractor for storing and maintaining materials used for the construction of the pipeline.

### **3.0 SAFETY**

Contractor shall be responsible for providing a safe work area for his crews and for the public. Contractor is required to adhere to all federal, state, county, and LG&E safety requirements outlined in LG&E Safety Manual as well as to follow good construction practices as outlined in, but not limited to: The Department of Transportation, Code of Federal Regulations, Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, Kentucky Administrative Regulations, Title 807, Chapter 5, Gas Safety and Service, OSHA, NOISH and Industrial Code Rule 53. Additionally, the following special requirements shall also apply:

- 3.1 **Contractor Safety Management.** LG&E's Contractor Safety Management program shall be utilized including completing all associated Tools.
- 3.1.1 Hazard Analysis and Mitigation Plan must be submitted to and approved by LG&E prior to work being started. Submit the information to Frank Newton, Safety/Tech Training Consultant; [REDACTED]; cell: [REDACTED] or email [REDACTED]
- 3.1.2 A copy of the Hazard Analysis and Mitigation Plan should be provided to Bill Norton: [REDACTED]
- 3.2 **Emergency Call Out Listing.** Contractor shall supply the LG&E Field Representative with a listing of names (with pager and/or mobile telephone numbers) of people who can be reached 24 hours a day in reference to this project.
- 3.3 **Drug Testing**
- 3.3.1 Contractor will comply fully with all the provisions in Article 9.03 titled "Drug and Alcohol" in the Standard Terms. In addition, within thirty (30)

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days of commencing Work the Contractor shall cause each of its employees to undergo drug screening. To the extent any of the Contractor's employees test positive, they shall not be allowed to engage in any Work for LG&E.

- 3.3.2 If a Contractor brings "transient" workers on site for "plant outages", "project work" or "major construction", the transient workers shall be required to have a negative drug pre-test when hired and within 7 days before reporting to work at an LG&E or KU site. The transient contractors are added to testing pool with 100% annual random testing for the duration of the assignment. If a contractor sends one of their workers to another LG&E or KU site with no interruption of service, no pre-work drug test is required. The worker remains in the 100% annual random testing pool. If a worker reports to another LG&E or KU site with an interruption in service of thirty days or more, the worker shall be required to have a negative drug test before reporting to work at that site. The worker remains in the 100% annual random testing pool.
- 3.3.3 **DOT Drug Testing** - In addition to, and not in lieu of, the legal obligations imposed by this Contract, the Contractor shall be required to plan and implement a drug and alcohol testing policy in accordance with the testing requirements and methodologies set forth in, without limitation, Title 49 of the United States Code of Federal Regulation, PARTS 199,382, 391, 392 and 395, and any amendments thereto. Notwithstanding any definition of "employee" set forth in applicable regulations, the Contractor's plan shall cover all employees performing Work under this Contract, regardless of the nature of the Work to be performed by the employee at this job site. The Contractor shall defend, indemnify and hold harmless LG&E, affiliated companies, and all of their directors, officers, employees, agents and representatives from any and all liability, loss or expense, including attorney's fees, arising by claims of any person or entity and related directly or indirectly to the Contractor's acts or omissions, or to the acts or omissions of its subcontractors, agents or representatives, in carrying out the drug and alcohol testing policy. Contractor shall maintain records in accordance with applicable regulations and, upon reasonable notice, shall allow inspection and audit of its records by LG&E with respect thereto. Furthermore, upon reasonable notice, Contractor shall allow LG&E to conduct on-site inspections of its drug and alcohol testing procedures and methodologies if requested. Any subcontractors to be used by Contractor in carrying out its obligations under this section shall be subject to approval of LG&E.
- 3.3.4 **DOT Operating Qualification for Gas Work** - Contractor shall be required to plan and implement an Operator Qualification policy in accordance with the testing requirements and methodologies set forth by federal law. Such

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plans and certifications must be submitted and approved by LG&E DOT compliance representative and Safety and Technical Training representative.

**3.4 Traffic Control**

Adequate traffic control must be maintained to safeguard the public and Contractor personnel. Any street that is open-cut must have one lane open at all times which will allow vehicles ingress and egress. Whenever a one lane section is under construction, traffic must be controlled by means of a flagperson positioned at either end of the section. The flagperson(s) must be able to communicate with each other verbally, by means of signals or by radio. All traffic signs must conform to the State of Kentucky Manual of Uniform Traffic Control Devices.

**3.5 Excavations**

Contractor is advised that he must call 811, toll free, a minimum of two working days prior to excavation for information on the location of existing underground utilities which subscribe to the Before-U-Dig (BUD) service. It is the Contractor's responsibility to coordinate excavation with all utility owners, including those who do not subscribe to BUD. Contractor is advised to check with County Clerk's office as necessary.

Test holes by the Contractor are required to determine the depth, size, and exact location of all subsurface facilities which may interfere with the installation of the gas main. Only the LG&E Field Representative will determine if a test hole is unnecessary.

Test holes shall be dug 72 hours or more ahead of the advancing pipeline excavation. Machine excavation shall not come within 2-1/2 feet of located facilities (utilities). Test holes shall be hand-excavated or vacuum excavated, except to remove surface paving. Contractor shall support any utility or structure that he encounters during the installation and is responsible for any damage that he may cause.

Contractor shall satisfy all OSHA requirements with regard to excavation and sheeting. An "Excavation-Competent" person as defined by OSHA must be on the jobsite at all times for evaluating soil conditions and sheeting requirements. All spoils and equipment must be placed 24-inches or more from the edge of any excavation.

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**3.6 Safety Equipment**

All Contractor personnel are required to wear hard hats, hand-soled shoes, hearing protection, and safety glasses while on the jobsite. All Contractor personnel who are exposed to vehicular traffic shall wear an approved high-visibility vest. All personnel working within a roadway or adjacent to a roadway are considered to be exposed to vehicular traffic unless the roadway is completely closed to public vehicles. Contractor is responsible for providing any other safety equipment that either he or the LG&E Field Representative deem necessary.

**3.7 After-Dark Illumination**

If it is necessary to work after daylight hours, e.g., pipeline pressure testing, pipeline cleaning and pigging, etc., Contractor shall obtain approval from the LG&E Field Representative to work by artificial light. Contractor shall supply equipment which will provide an intensity of illumination that will permit work to be done in a manner to prevent risk of personal injury or damage to the work. Such lighting must be mounted well above the line of vision of the workers so that hand signals to equipment operators, and others, can be clearly seen. At no time must this light impede, in any way, the normal visibility of the adjacent roadway.

**3.8 Employee Qualification**

Each and every Contractor employee that will be working on this job will be required to attend a safety "passport" training by a certified LG&E Passport trainer. Subsequent to the orientation, each employee will be issued a "passport" which allows that employee only to be on this job. Employees will be required to keep this passport with them at all times when on the job. Any employees found on the job without a current passport will be asked to leave immediately.

**3.9 Injury Reporting**

Any and all injuries, major and minor, incidents, and near-misses, will be reported to the LG&E Field Representative on the job at the time of the event. At the end of the project a total accounting of the man hours worked and a complete log of events as described in the previous sentence will be required of the Contractor.

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#### 4.0 ENVIRONMENTAL – PROJECT SPECIFIC

- 4.1 **Sediment Control.** Contractor is responsible for preventing sediment from migrating off-site and entering waterways. Appropriate sediment controls (silt fence, vegetated barriers, etc.) must be instituted by Contractor with Company approval.
- 4.1 **Mercury.** If mercury is found, Company shall be **notified immediately and all work shall cease** until Company mitigates the situation. Disposal or other mitigation of mercury is outside the scope of this contract.
- 4.2 **Pipeline Liquids.**
  - 4.2.1 The Contractor shall use caution when cutting and removing piping. Prior to cutting any pipeline located at a low area or at a site where liquids could be trapped, Company may require that a tapping tee be installed on the bottom of the pipeline at the lowest available location.
  - 4.2.2 If any liquids are discovered, all waste shall be contained as directed by Company.
  - 4.2.3 Any costs associated with liquid disposal, cleanup, etc. are outside of the scope of this contract.

#### 5.0 CONSTRUCTION – SCRAP/TRASH/SANITATION GUIDELINES

- 5.1 **Scrap:** All scrap steel associated with this project is considered the property of LG&E and shall be taken to ISA on Grade Lane for recycling.
- 5.2 **Trash:** The Contractor shall arrange for construction waste disposals and dumpster rental if necessary.
- 5.3 **Sanitation:** Contractor shall provide and maintain at least one portable toilet. Contractor shall make it available for all personnel working on the site. It shall be present upon commencement of work and shall be removed from the property within 30 days of completion of work.
- 5.4 Contractor must adhere to all project specific construction guidelines as listed within Appendix A.

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## 6.0 EXHIBITS AND ATTACHMENTS

All Work shall be performed in strict accordance with the following appendix, attachments, and exhibits which are incorporated herein by reference and made a part of this agreement.

| <u>Appendix No.</u>   | <u>Title</u>  |
|-----------------------|---|
| Appendix A            | Ballardsville Modification Specifics                  |
| <u>Attachment No.</u> | <u>Title</u>  |
| Attachment A          | Pipe Coating  |
| Attachment B          | Rock Shield Application                               |
| Attachment C          | Casing  |
| Attachment D          | Lifting Lug Blind Flange                              |
| Attachment E          | Pipeline Design Minimum Cover                         |
| Attachment F          | Purge and Blowdown                                    |
| Attachment G          | Pillow Pipe Support                                   |
| Attachment H          | Lock Out Tag Out                                      |
| Attachment I          | Barricade   |
| Attachment J          | Gradient Control Mat                                  |
| Attachment K          | Valve Box 24 Inch HDPE Pipe Style                     |
| Attachment L          | Purge – Blowdown 2 inch CL150-300                     |
| Attachment M          | Purge – Blowdown 4 inch CL 300 Flange Tee             |
| Attachment N          | Regulator Station – Fisher Assembly                   |
| Attachment O          | Regulator Station 2 in CL 300 Mooney Monitor Assembly |
| Attachment P          | E-Z Line Guide With Steel Shim Block                  |
| <u>Exhibit No.</u>    | <u>Title</u>  |
| Schedule A-           | Labor Hourly Rates                                    |
| Schedule B-           | Equipment Rates                                       |

## 7.0 CONTRACT TERM

This Contract shall become effective June 16, 2014 and continue through project completion subject to the Article titled “Term and Termination” set forth in the General Services Agreement.

## 8.0 STANDARD TERMS AND CONDITIONS

The Company's Standard Terms and Conditions – “General Service Agreement” as signed and agreed to by both parties on January 1, 2011 are hereby made a part of this Contract.

**ORIGINAL**

CONTRACT NO. 907191

**9.0 SPECIFIC REPORTING REQUIREMENTS**

Contractor shall promptly submit the documents and reports set forth below to the LG&E project engineer for approval and review:

- Tool 2 - Hazard Analysis
- Tool 3 - Hazard Mitigation (to be provided by Contractor)
- Tool 4 – Job Performance Monitoring Tool
- Tool 5 – Job Closure Form

**10.0 COMPENSATION**

10.1 Full compensation to Contractor for full and complete performance by Contractor of the Work, compliance with all terms and conditions of this Contract, and for Contractor's payment of all obligations incurred in, or applicable to, performance of the Work (hereinafter referred to as the "Contract Price") shall be determined in accordance with the following Lump Sum price:

**Cost Not-to-Exceed (with noted exclusions): Full compensation to Contractor for full and complete performance by Contractor of all the Work, shall not exceed the total amount** [REDACTED]

10.1.1 Pricing for the following items will be paid on the unit prices listed below:

- a. Silt Fence (\$/Linear Foot)                     \$ [REDACTED]
- b. Hoe Ram (\$/Cu. Yard)                             \$ [REDACTED]
- c. Concrete (\$/ Cu. Yard)                           \$ [REDACTED]

10.1.2 Pricing for the following items will be paid at actual plus 10% mark up:

- a. Road Repair
- b. Permanent Fencing
- c. Padding

10.1.3 Pricing for additional work not included within the stated scope of work shall be in accordance to the Labor and Equipment rates attached to this contract as Schedule A (Labor Hourly Rates) and Schedule B (Equipment Rates).

**ORIGINAL**

CONTRACT NO. 907191

10.1.4 Any work requiring Contractor to rent equipment not listed on Schedule B Equipment Rate sheet or purchase additional (unplanned materials); will be billed at Cost Plus █ %.

10.2 INVOICING INSTRUCTIONS

Invoices shall include Contract Number 907191 and shall be submitted as follows:

Original: Bill Norton (or appointed LG&E representative)

Phone: (█)

11.0 CONTRACTUAL NOTICES

See the Article titled "Notices" in the General Services Agreement for provisions governing contractual notices.

11.1 Company's address: Louisville Gas and Electric Company  
820 West Broadway  
P.O. Box 32020  
Louisville, Kentucky 40232  
Attention: Carrie Mattingly  
Strategic Sourcing Department  
Email: █

11.2 Contractor's Address: Southern Pipeline Construction Co., Inc.  
1272 Old Fern Valley Rd  
Louisville, KY 40219  
David Spencer  
█  
Cell: █  
Email: █

ORIGINAL

**12.0 ENTIRE AGREEMENT**

This Contract, including all specifications, exhibits, drawings, and attachments listed in this Contract and the General Services Agreement, constitutes the entire agreement between the parties relating to the Work and supersedes all prior or contemporaneous oral or written agreements, negotiations, understandings and statements pertaining to the Work or this Contract.

The parties hereto have executed this Contract on the dates written below, but it is effective as of the date first written above.

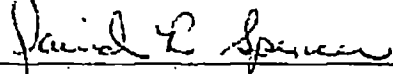
**LOUISVILLE GAS AND ELECTRIC COMPANY**

BY: 

TITLE: Manager, Supply Chain Energy Delivery

DATE: 6-11-2014

**SOUTHERN PIPELINE CONSTRUCTION CO., INC.**

BY: 

TITLE: CEO

DATE: 6-19-2014

**ORIGINAL**



**12.0 ENTIRE AGREEMENT**

This Contract, including all specifications, exhibits, drawings, and attachments listed in this Contract and the General Services Agreement, constitutes the entire agreement between the parties relating to the Work and supersedes all prior or contemporaneous oral or written agreements, negotiations, understandings and statements pertaining to the Work or this Contract.

The parties hereto have executed this Contract on the dates written below, but it is effective as of the date first written above.

**LOUISVILLE GAS AND ELECTRIC COMPANY**

BY:  \_\_\_\_\_

TITLE: Manager, Supply Chain Energy Delivery

DATE: 6-11-2014

**SOUTHERN PIPELINE CONSTRUCTION CO., INC.**

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

**ORIGINAL**

**CONTRACTOR CODE OF BUSINESS CONDUCT**

This LG&E and KU Services Company (a Kentucky corporation) Contractor Code of Business Conduct (“Code”) is incorporated by reference into the General Service Agreement or other agreement between you as the contractor (“Contractor”) and LG&E and KU Services Company and/or one of its affiliates Kentucky Utilities Company, and Louisville Gas and Electric Company (collectively the “Company”). This Code sets minimum standards for Contractor’s conduct in the areas addressed. Contracts between Company and Contractor may provide for standards exceeding the standards of this code.

Observance of Laws

Contractor shall fully comply with the provisions of all federal, state and local laws, regulations and ordinances applicable to its activities performed for the Company or any goods or services provided to or on behalf of the Company, including without limitation, all applicable laws, regulations and ordinances pertaining to occupational health and safety and environmental protection.

Bribes and Kickbacks

Contractor may not under any circumstances accept or pay bribes, kickbacks or other similar compensation or consideration in any way relating to the Company or any activity for or on behalf of the Company.

Dishonest and Fraudulent Activity

Contractor shall not engage in or allow its employees to engage in dishonest acts or fraudulent activity in connection with or in association with the Company’s business. For purposes of this policy, the definition of a dishonest act or fraudulent activity includes but is not limited to:

1. An intentional or deliberate act to deprive the Company or any person of something of value, or to gain an unfair benefit using deception, false suggestions, suppression of truth, or other unfair means which are believed and relied upon.
2. A dishonest act or fraudulent activity may be, but is not limited to; an intentional act or activity that is unethical, improper, or illegal such as:
  - a. Embezzlement;
  - b. Misappropriation, misapplication, destruction, removal, or concealment of property;
  - c. Alteration or falsification of paper or electronic documents, including the inappropriate destruction of paper or electronic documents;
  - d. False claims and/or misrepresentation of facts;
  - e. Theft of an asset, including, but not limited to, money, tangible property, trade secrets or intellectual property;

**ORIGINAL**

Harassment

Contractor shall not permit sexual advances, actions, comments, or any other conduct that creates an intimidating or otherwise offensive work environment on Company property or any site where Contractor is performing activity for or on behalf of Company. Further, Contractor shall not permit the use of racial and religious slurs, or any other conduct that breeds an offensive work environment, on Company property or any site where Contractor is performing activity for or on behalf of Company.

Drugs and Alcohol

Contractor shall not allow any employee to perform services for or on behalf of Company while under the influence of drugs or alcohol. Contractor shall maintain a drug and alcohol testing program meeting all applicable federal, state and local laws, regulations and ordinances and meeting or exceeding any and all standards stated in any contract with Company or any document incorporated in such a contract.

Misuse of Company Assets

No funds or assets of the Company may be used or paid for any unlawful or improper purpose. A Contractor's employees shall not have access to any Company computers unless the contract between such Contractor and the Company expressly provides for such access in writing.

Reporting of Violations

In the event Contractor learns of any violation of this Code, Contractor shall immediately report such violation to Company's Director, Compliance and Ethics at [REDACTED].

**ORIGINAL**

**COMMERCIAL SCHEDULE A  
LABOR HOURLY RATES**

| <b>Description</b>     | <b>Straight Time</b> | <b>Overtime</b> | <b>Premium Time</b> |
|------------------------|----------------------|-----------------|---------------------|
| <b>Foreman</b>         | █                    | █               | █                   |
| <b>Operator</b>        | █                    | █               | █                   |
| <b>Truck Driver</b>    | █                    | █               | █                   |
| <b>Skilled Laborer</b> | █                    | █               | █                   |
| <b>Steel Welder</b>    | █                    | █               | █                   |

1. The above rates may be used for Change Orders and Standby Time.
2. Except as many be expressly provided otherwise elsewhere in this Contract, the rates set forth above are inclusive of all direct wage rates, fringe benefits, labor allowances, payroll taxes, insurance, small tools which cost Contractor less than \$█ per tool, temporary construction facilities, consumables, expendables, overhead profit and all other costs and expenses incurred by Contractor in performing the Work and this Contract.
3. The rates will only apply to actual hours worked or standby time, as agreed and attested to by a Louisville Gas & Electric Representative.
4. Overtime rates will be paid for hours worked in excess of 8 hours per day when worker is on 5-8 hour day schedule for hours worked in excess of 10 hours per day when worker is on 4-10 hour day schedule. Overtime will be paid for hours in excess of forty (40) hours per week. All overtime must be pre-authorized by LG&E.
5. Premium time will be paid for all hours worked on and the following holidays.

|                  |               |
|------------------|---------------|
| New Years Day    | Labor Day     |
| Memorial Day     | Thanksgiving  |
| Good Friday      | Christmas Eve |
| Independence Day | Christmas Day |

**Commercial Schedule B  
EQUIPMENT RATES**

| <b>Equipment Description</b>    | <b>Hourly</b> | <b>Weekly</b> | <b>Monthly</b> | <b>Standby</b> |
|---------------------------------|---------------|---------------|----------------|----------------|
| <b>Pick-up Truck</b>            | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |
| <b>Fuel Truck</b>               | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |
| <b>Tractor &amp; Lowboy</b>     | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |
| <b>Single-axle Dump Truck</b>   | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |
| <b>Track Excavator</b>          | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |
| <b>Backhoe</b>                  | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |
| <b>Skid Steer w/attachments</b> | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |
| <b>SideBoom</b>                 | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |
| <b>Steel Welding Truck</b>      | [REDACTED]    | [REDACTED]    | [REDACTED]     | [REDACTED]     |

1. The above rates may be used for Change Orders and Standby Time.
2. The above rates are inclusive of all maintenance, repairs, fueling, lubrication, spare parts, insurance and taxes associated with the operation of the equipment and overhead and profit.
3. The rates are exclusive of all equipment drivers and operators who are set forth in Schedule A Labor hourly Rates.
4. Contractor shall be compensated for equipment rented and used in connection with this project at receipt cost, plus contractor's mark-up of [REDACTED] percent (%).
5. Prior approval by LG&E Engineer or Representative is required for all equipment rentals in connection with changes in the Scope of Work.
6. The Contractor shall be reimbursed the cost of extra materials plus a Contractor's mark up of [REDACTED] Percent.



**a PPL company**

LOUISVILLE GAS & ELECTRIC COMPANY (LG&E)

**PIPELINE CONSTRUCTION  
SPECIFICATION  
(PROJECT-SPECIFIC  
REQUIREMENTS)**

**BALLARDSVILLE LINE  
MODIFICATIONS**

APRIL 2014

INTEGRITY MANAGEMENT DEPARTMENT

# PROJECT-SPECIFIC REQUIREMENTS

## 1.0. PROJECT DESCRIPTION

1.1. Location: The location of this project shall be in Jefferson County and Oldham County, Kentucky.

1.2. Scope of Work: This project consists of modifying the following locations to make the Ballardsville Transmission pipeline piggable:

- 1.2.1. Site 1 (Receiver at Moody Lane Station)
- 1.2.2. Site 2A (Launchers at Elder Park City Gate)
- 1.2.3. Site 2B (Heater Piping at Elder Park City Gate)
- 1.2.4. Site 3 (12" Carrier Pipe Insertion at LaGrange Road [Highway 146] Crossing)
- 1.2.5. Site 4 (12" Carrier Pipe Insertion at I-71 Crossing)
- 1.2.6. Site 5 (Valve and Fitting Replacements at Highway 42N 8" Goshen Branch)
- 1.2.7. Site 6 (Plug Valve 3:14 Replacement at Highway 42 and Hunting Creek Drive)
- 1.2.8. Site 7 (Plug Valve 6:07 Replacement at Wolf Pen Branch Road and River Road)
- 1.2.9. Site 8 (Valve and Fittings Replacement at River Road and Zorn Avenue)
- 1.2.10. Site 9 (Receiver at Zorn Avenue Water Tower Platform)
- 1.2.11. Site 10 (Drip Removal at Fox Trail Drive and Deer Run Drive)

1.3. Project Documents: The following LG&E documents show the location and extent of the new gas pipelines associated appurtenances to be installed as well as the construction specifications to be followed:

- 1.3.1. Drawings:
  - 1.3.1.1. Overview Cover – LG&E Gas D-23151, Sheet 1
  - 1.3.1.2. Ell references – LG&E Gas D-23151, Sheet 2
  - 1.3.1.3. Valve references – LG&E Gas D-23151, Sheet 3
  - 1.3.1.4. Site 1 – EMS 58984101, 58988102, 58984901
  - 1.3.1.5. Sites 2A and B – EMS 58984102, 58984103, 5894301, 5894302, 58984902, 58984903, 58988101, 58988201
  - 1.3.1.6. Site 3 – EMS 58984104
  - 1.3.1.7. Site 4 – EMS 58984105
  - 1.3.1.8. Site 5 – EMS 58984106, 58984904
  - 1.3.1.9. Site 6 – LG&E Gas D-23151, Sheet 4
  - 1.3.1.10. Site 7 – LG&E Gas D-23151, Sheet 5

- 1.3.1.11. Site 8 – LG&E Gas D-23151, Sheet 6
- 1.3.1.12. Site 9 – EMS 5894107, 58984905, 58988103,
- 1.3.1.13. Site 10 – LG&E Gas D-23151, Sheet 7
- 1.3.1.14. Typical Pipe Supports – 58988202, 58988203
- 1.3.2. Attachment A: Pipe Coating Wax-Tape and Outer Wrap Application and Bill of Materials – GCS 50 10 602
- 1.3.3. Attachment B: Rock Shield Application Standards for Coating Protection
- 1.3.4. Attachment C: Casing: Steel Casing / Steel Carrier – GCS 10 20 750
- 1.3.5. Attachment D: Lifting Lug Blind Flang – GCS 10 20 800
- 1.3.6. Attachment E: Pipeline Design Minimum Cover – GCS 10 10 001
- 1.3.7. Attachment F: Purge and Blowdown – GCS 80 30 020
- 1.3.8. Attachment G: Pillow Pipe Support – GCS 80 20 360
- 1.3.9. Attachment H: Lock Out Tag Out – GAOP PO 001
- 1.3.10. Attachment I: Barricade – GCS 80 20 510
- 1.3.11. Attachment J: Gradient Control Mat
- 1.3.12. Attachment K: Valve Box 24 inch HDPE Pipe Style - GCS 80 20 020
- 1.3.13. Attachment L: Purge-Blowdown 2 inch CL 150-300 - New Construction - GCS 10 20 700
- 1.3.14. Attachment M: Purge-Blowdown 4 inch CL. 300 Flange Tee - GCS 10 20 704
- 1.3.15. Attachment N: Regulator Station Fisher 627-1808A Assembly with Strainer - GCS 40 20 402
- 1.3.16. Attachment O: Regulator Station 2 inch CL.300 Mooney Monitor Assembly - GCS 40 20 405
- 1.3.17. Attachment P: E-Z Line Guide With Steel Shim Block on Beam, PVC Coated

## 2.0. SCHEDULING AND PERMITS

### 2.1. Scheduling

2.1.1. The start date and duration of the Project shall be in accordance with the terms of the Agreement between LG&E and the Contractor. The **tentative start date is July 2014**. The Contractor must submit with the bid proposal a detailed project schedule. The following activities must be identified as a minimum:

- 2.1.1.1. Mobilization.
- 2.1.1.2. Weld procedure and welder qualification.
- 2.1.1.3. Pipe installation.
- 2.1.1.4. Pipeline cleaning.



- 2.1.1.5. Pressure testing.
- 2.1.1.6. Pipeline in-service.
- 2.1.1.7. Restoration.
- 2.1.2. The preferred order of construction shall be as follows:
  - 2.1.2.1. Sites 2A and 2B
  - 2.1.2.2. Site 5
  - 2.1.2.3. Site 7
  - 2.1.2.4. Site 3
  - 2.1.2.5. Site 4
  - 2.1.2.6. Site 5
  - 2.1.2.7. Site 1
  - 2.1.2.8. Site 8
  - 2.1.2.9. Site 9
  - 2.1.2.10. Site 10
- 2.1.3. If additional work crews are available, please propose an alternative schedule.

2.2. Scheduling Restrictions:

- 2.2.1. All work sites must be complete and pipeline ***In-service before October 15, 2014.***

2.3. Permits

- 2.3.1. All permits for the installation of the pipeline will be obtained by LG&E. All permit requirements must be strictly adhered to by the Contractor. LG&E will coordinate any necessary activity with the railroad such as scheduling flagmen.

- 2.3.2. Working Hours.

- 2.3.2.1. LG&E's preferred working hours are Monday through Friday, 10 hour days and up to 16 hours during shutdown periods. Emergency situations may require additional resources.

**3.0. SAFETY – PROJECT SPECIFIC**

- 3.1. Emergency Call Out Listing. As referenced in the GENERAL SAFETY section, emergency contacts shall be provided to LG&E if not already on file.

- 3.2. Lockout/Tagout. Contractor shall follow LG&E Lockout/Tagout procedures. (Reference: GAOP-PO-001.) This will require the Contractor to provide individual padlocks for all employees who are affected by the policy. A group lock out system (with on-site lock box) will be utilized.

3.3. Highway and Traffic Control Safety. Contractor shall follow LG&E Traffic Control and Highway Safety procedures referenced in the GENERAL SAFETY section. Numerous sites in this project are adjacent to highways, interstates, or railroads.

3.4. Electric Transmission Line Safety.

3.4.1. LG&E Corrosion Control Group will evaluate the area of construction and measure voltage on the pipeline to determine whether the AC mitigation procedures below are required. DO NOT include any AC mitigation costs in the lump sum bid. This cost will be handled on a time & materials basis if contractor is asked to assist with installation of temporary gradient control mats or other measures.

3.4.2. Bond Wires. Bond wires polices will be strictly followed when working in electric corridors when installing and removing pipe.

3.4.3. AC Safety. AC Stray Current safety procedures will be followed whenever a pipeline lies within an electric transmission corridor unless otherwise noted.

3.4.4. Excavating:

3.4.4.1. Contractor shall hand dig (or mechanical dig with probing and hand digging if approved) using fiberglass handled tools (shovels, etc.), dry leather gloves, and rubber dielectric mats. (Mats shall be provided by LG&E.)

3.4.4.2. Once the pipeline is exposed and prior to working on the pipeline, LG&E shall attach grounding clamps to both sides of work site. Contractor shall assist by installing grounding anodes or ground rods.

3.4.4.3. LG&E shall check AC potentials (pipe to ground). The Contractor shall assume that temporary gradient control mats will be required for bidding purposes. LG&E will make the final decision if gradient control mats are required.

3.4.4.4. If gradient control mats are determined to be required, using rubber mats and low-voltage gloves, LG&E shall install temporary gradient control mats at each excavation. Contractor shall excavate each bell hole at least 8 feet in length and width to allow the installation of the temporary ground mats.

3.4.4.5. Contractor shall spread a layer of aggregate, 2 to 4 inches in depth over the temporary ground mat. (#9 or #57 stone is acceptable.)

3.4.4.6. All work on the pipeline (above grade or below grade) shall be performed on temporary gradient control mats, not rubber dielectric mats unless otherwise approved by LG&E. (GCS 50 30 850 provides a high-level representation of planned procedures.)

3.4.5. Other: Pipelines being suspended by construction equipment shall be grounded.

3.4.6. Vehicles:

3.4.6.1. All trucks, equipment, etc. located within the electric corridor shall be grounded. Non-essential vehicles should be moved 200 ft from the electric corridor. Simple dragging chains will suffice as a ground.

3.4.6.2. Vehicles and equipment shall not be located under the electric transmission conductors when not being during non-working hours.

3.4.6.3. Fueling of vehicles shall be performed outside of the electric corridor, unless the vehicle is electricity bonded to a grounded fueling vehicle.

3.5. Working Near Electric Distribution and Transmission Lines. (Ref.: LG&E Health and Safety Manual A.41.18.)

3.5.1. All equipment must keep 20 feet from any point of the 138kV Transmission Electric Line conductors.

3.5.2. All equipment must keep 20 feet from any point of the 345kV Transmission Electric Line conductors.

3.5.3. All lines should be considered energized at all time.

3.5.4. Exceptions to this policy will be approved by the Project Engineer who will consult the appropriate company specialist.

#### **4.0. CONSTRUCTION – PROJECT SPECIFIC**

4.1. Project Specific Installation Requirements:

4.1.1. Pipeline Shutdowns:

4.1.1.1. The Contractor shall assume that one full 8-hour day will be required to isolate and purge each pipeline section prior to the Contractor being allowed to cut into the pipeline.

4.1.1.2. Contractor shall provide two (2) air compressors to operate ventilation equipment that operate at 90 psig and 64 cfm (minimum). (Only one will be needed for a normal shutdown; a second will be needed on stand-by for shutdown problems.)

4.1.2. Liquid Checks.

4.1.2.1. LG&E shall remove all free liquids found in drips and valves in advanced of the planned pipeline shutdown.

- 4.1.2.2. Prior to cutting any pipeline located at a low area or at a site where liquids could be trapped, a tapping tee shall be installed on the bottom of the pipeline at the lowest available location. The pipeline shall be checked for any liquids.
- 4.1.2.3. If liquids are found, work shall cease immediately and the LG&E inspector shall be contacted. Liquid removal and disposal shall be completed by LG&E employees unless otherwise directed by the LG&E Project Engineer. The Contractor will not be expected to perform work that is beyond their training or which is unsafe.
- 4.1.2.4. Tapping tees will generally be removed with retired piping. Any tapping tees that must remain upon the pipeline after construction will be protected by the Contractor via welded encapsulation as directed by the Project Engineer.
- 4.1.2.5. Exceptions to this policy will be approved by the Project Engineer based upon site characteristics.

4.1.3. Slope Stabilization: For slopes over 4:1, Erosion Control Mats must be acquired and installed by the Contractor. Unless otherwise specified, North American Green S75N Biodegradable Erosion Control Mats shall be utilized and installed per the manufacturer's instructions.

4.1.4. Line Markers and Test Stations.

- 4.1.4.1. The Contractor shall install line markers and corrosion test stations, which shall be provided by LG&E. The LG&E Inspector will determine the locations at the time of construction.
- 4.1.4.2. Any removed or damaged existing test station shall be replaced.

4.1.5. Foundation and pipe supports: Contractor shall construct all concrete pipe supports to the specifications outlined in relevant EMS construction drawings or LG&E Gas Construction Standards where applicable, with the exception of the heater foundation, which is addressed outside of this scope of work. E-Z Line "shim block" style supports will be used to support above ground piping. See Attachment P for detail.

4.2. Site Specific Scope of Work:

4.2.1. Site 1 (Moody Lane Station)

- 4.2.1.1. **Description of Work:** Install two prefabricated regulator assemblies and install piping needed to tie in these assemblies as replacements to the existing assemblies. Fabricate an assembly for attaching a temporary pig trap, including 12" trap ball valve, barred tees, 3R 45 degree ell, 3R 90 degree ells, and 4" blow down. Cutout the retired Moody Lane regulator assemblies. Install and tie in the pig trap assembly to the 12" main line and the inlet of the Moody Lane regulator assemblies. Also, the contractor will support the excavation and installation of a new 8" valve and 2" blowdown on the high pressure distribution outlet about 50 feet north of Moody Lane Station. Bottom out Mueller fittings are anticipated to be required for this 8" valve installation. Contractor shall verify this new valve is at least 100' away from the HP regulator outlet header.
- 4.2.1.2. **OPTIONAL WORK UPON COMPANY REQUEST:** Contractor shall provide pricing for prefabrication of the regulator assemblies to be installed at this site. The regulator assemblies are detailed in Attachment N and Attachment O.
- 4.2.1.3. **Design drawings:** EMS Drawings listed in section 1.3.1.4 of this specification detail the site plan and proposed work for this site.
- 4.2.1.4. **Fences:** Contractor will remove fence lines as needed for pipeline construction. Contractor shall temporarily restore the fence each night and minimize the duration and length of fencing removed. Contractor shall be responsible for permanently restoring fence around all above grade piping after construction is complete. Fence shall encompass new pig receiver and regulator assemblies. Gate shall be widened to allow access to pig trap valve as needed. All ground within the fence will be graveled by the contractor.
- 4.2.1.5. **Pillows:** Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
- 4.2.1.6. **Ground Conditions:** Contractor shall make provisions to restore property to its original condition.

- 4.2.1.7. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of a 12" Mueller fitting at the inlet to the site, two 8" stopples for the outlet valve installation, and any stopples required to tie in the replacement regulators.
  - 4.2.1.8. Temporary Piping: Contractor shall install temporary piping under direction and assistance of System Regulation and Operations (SR&O) personnel to maintain gas supply to the distribution system downstream of Moody Lane station.
  - 4.2.1.9. Supports: Contractor will install concrete supports for all above grade valves and fittings in the locations determined by the project engineer and indicated on the design drawing. Supports shall be formed and installed per existing Gas Construction Standards (GCS) or site specific foundation drawings.
  - 4.2.1.10. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor except where indicated on the design drawing or by the project engineer. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.
- 4.2.2. Site 2A (Launchers at Elder Park City Gate)
- 4.2.2.1. Description of Work: Fabricate a parallel assembly for attaching a temporary pig trap, including 12" trap ball valves, barred tees, 3R 45 degree ells, 3R 90 degree ells, side valves, 4" blowdowns and 4" emergency blow downs. Install and tie in this assembly to the Elder Park City Gate outlet header at MOV #1, which will be replaced with an 8" ball valve. Cutout and remove the existing outlet piping and associated valves from the Ballardsville transmission line to the Elder Park City Gate regulator outlet header, and replace with new pipe and piggable ells. Install an 8" bypass from the outlet header at valve 380052, which will be replaced with an 8" ball valve, to the outlet feeding the eastern portion of the Ballardsville line.

- 4.2.2.2. Design drawings: EMS Drawings listed in section 1.3.1.5 of this specification detail the site plan and proposed work for this site.
  - 4.2.2.3. Fences: Contractor will remove fence lines as needed for pipeline construction. Contractor shall temporarily restore the fence each night and minimize the duration and length of fencing removed. Contractor shall be responsible for permanently restoring fence line after the pipeline work has been completed. All ground within the fence will be graveled by the contractor.
  - 4.2.2.4. Pillows: Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
  - 4.2.2.5. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of Mueller fittings at the outlets to the site.
  - 4.2.2.6. Temporary Piping: Contractor shall install temporary piping under direction and assistance of SR&O personnel to maintain gas supply to the Ballardsville East-of-Elder Park section.
  - 4.2.2.7. Supports: Contractor will install concrete supports for all above grade valves and fittings in the locations determined by the project engineer and indicated on the design drawing. Supports shall be formed and installed per existing Gas Construction Standards (GCS) or site specific foundation drawings.
  - 4.2.2.8. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.
- 4.2.3. Site 2B (Heater Piping at Elder Park City Gate)
- 4.2.3.1. Description of Work: Cutout and remove existing below ground 8" header between the station meter house and regulator runs. Install a new above ground 8" header, 8" heater bypass valve, and tie-in the header to the new heater inlet and outlet piping

and valves. The heater itself will be pre-installed. Also, cutout and remove 45 feet of 4" below ground regulator bypass pipe. Install 35 feet of 4" above ground pipe and a 4" valve in its place. Lastly, remove existing 6" motor operated valve #1 at the regulator outlet header, extend the header to accommodate the new 4" above ground bypass, and install an 8" valve and actuator in place of MOV #1.

- 4.2.3.2. Design drawings: EMS Drawings listed in section 1.3.1.5 of this specification detail the site plan and proposed work for this site.
- 4.2.3.3. Ground Cover: All ground disturbed will be graveled by the contractor.
- 4.2.3.4. Supports: Contractor will install concrete supports for all above grade valves and fittings in the locations determined by the project engineer and indicated on the design drawing. Supports shall be formed and installed per existing Gas Construction Standards (GCS) or site specific foundation drawings.
- 4.2.3.5. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

4.2.4. Site 3 (12" Carrier Pipe Insertion at LaGrange Road [Highway 146] Crossing)

- 4.2.4.1. Description of Work: Contractor shall excavate a loading pit of sufficient size to allow insertion of 40-foot joints of 12" carrier pipe into the existing 146 feet long 16" diameter crossing. A receiving pit of sufficient size to tie-in the carrier pipe to the existing pipeline shall be excavated by the contractor on the opposite side of Highway 146. Any fittings cut out to enable access to the 16" crossing will be replaced.
- 4.2.4.2. Preparation and Insertion of carrier pipe: Contractor shall supply a foam cleaning pig to remove any debris from the 16" line prior to insertion, and will run a gauging plate pig to determine whether the pipe is excessively out-of-round. Contractor shall



install to the manufacturer's specifications casing spacers, end seals, and casing vents under direction of the project engineer and Corrosion Control personnel. Post-insertion, Contractor will hydrotest the crossing and all test water removed via cleaning pig.

- 4.2.4.3. Design drawings: EMS Drawings listed in section 1.3.1.6 of this specification detail the site plan and proposed work for this site.
- 4.2.4.4. Fencing: Contractor will providing temporary fencing around work sites, as well as any traffic control required by road permits.
- 4.2.4.5. Ground Conditions: Contractor shall make provisions to restore property to its original condition.
- 4.2.4.6. Pillows: Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
- 4.2.4.7. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of Mueller fittings at the outlets to the site.
- 4.2.4.8. Temporary Piping: Contractor shall install temporary piping under direction and assistance of SR&O personnel to maintain gas supply to the regulator assembly affected by the stopping operation. This piping may become the permanent inlet to the assembly in lieu of installing a new inlet.
- 4.2.4.9. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

4.2.5. Site 4 (12" Carrier Pipe Insertion at I-71 Crossing)

- 4.2.5.1. Description of Work: Contractor shall excavate a loading pit of sufficient size to allow insertion of 40-foot joints of 12" carrier pipe into the existing 300' long 16" diameter crossing. Contractor shall excavate a receiving pit of sufficient size to tie-in the

carrier pipe to the existing pipeline on the opposite side of I-71.

- 4.2.5.2. Preparation and Insertion of carrier pipe: Contractor shall supply a foam cleaning pig to remove any debris from the 16" line prior to insertion, and will run a gauging plate pig to determine whether the pipe is excessively out-of-round. Contractor shall install to the manufacturer's specifications casing spacers, end seals, and casing vents under direction of the project engineer and Corrosion Control personnel. Post-insertion, Contractor will hydrotest the crossing and all test water removed via cleaning pig.
- 4.2.5.3. Design drawings: EMS Drawings listed in section 1.3.1.7 of this specification detail the site plan and proposed work for this site.
- 4.2.5.4. Fencing: Contractor will providing temporary fencing around work sites, as well as any traffic control required by road permits.
- 4.2.5.5. Ground Conditions: Contractor shall make provisions to restore property to its original condition.
- 4.2.5.6. Pillows: Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
- 4.2.5.7. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of Mueller fittings at the outlets to the site.
- 4.2.5.8. Temporary Piping: Contractor shall install temporary piping under direction and assistance of SR&O personnel to maintain gas supply to the regulator assembly affected by the stopping operation. This piping may become the permanent inlet after construction.
- 4.2.5.9. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

4.2.6. Site 5 (Valve and Fitting Replacements at Highway 42N 8" Goshen Branch)

- 4.2.6.1. Description of Work: Contractor shall pre-fabricate the 12" valve, barred 12x8" tee, 8" valve, insulator, ells, and piping at this site to the greatest extent possible. A pre-installation hydrotest will be required under supervision of the LG&E pipeline inspector. At the discretion of the project engineer the blowdowns may be modified to use the bypass flange tees as shown in Attachment M.
- 4.2.6.2. Design drawings: EMS Drawings listed in section 1.3.1.8 of this specification detail the site plan and proposed work for this site.
- 4.2.6.3. Fencing: Contractor will providing temporary fencing around work sites, as well as any traffic control required by road permits.
- 4.2.6.4. Ground Conditions: Contractor shall make provisions to restore property to its original condition and preserve existing plants where possible.
- 4.2.6.5. Pillows: Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
- 4.2.6.6. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of Mueller fittings at the outlets to the site.
- 4.2.6.7. Temporary Piping: Contractor shall install temporary piping and any required tapping fittings under direction and assistance of SR&O personnel to maintain gas supply to the 8" Hwy 42N branch affected by the stopping operations.
- 4.2.6.8. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. Any gear operators on the retired valves will be returned to LG&E unless directed otherwise by the Project Engineer. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

**4.2.7. Site 6 (Plug Valve 3:14 Replacement at Highway 42 and Hunting Creek Drive)**

- 4.2.7.1. Description of Work:** Contractor shall pre-fabricate the 12" valve, fittings and piping being replaced to the greatest extent possible at this site. A pre-installation hydrotest will be required under supervision of the LG&E pipeline inspector. At the discretion of the project engineer the bypass flange tees may be modified to use as blowdowns as shown in Attachment M.
- 4.2.7.2. Design drawings:** LG&E Drawings listed in section 1.3.1.9 of this specification detail the site plan and proposed work for this site.
- 4.2.7.3. Fencing:** Contractor will providing temporary fencing around work sites, as well as any traffic control required by road permits.
- 4.2.7.4. Ground Conditions:** Contractor shall make provisions to restore property to its original condition.
- 4.2.7.5. Pillows:** Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
- 4.2.7.6. Stopping Operation:** Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of Mueller fittings at the outlets to the site.
- 4.2.7.7. Temporary Piping:** Contractor shall install temporary piping under direction and assistance of SR&O personnel to maintain gas supply to around the site affected by the stopping operations.
- 4.2.7.8. Retirement of existing pipe:** All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. Any gear operators on the retired valves will be returned to LG&E unless directed otherwise by the Project Engineer. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

**4.2.8. Site 7 (Plug Valve 6:07 Replacement at Wolf Pen Branch Road and River Road)**

- 4.2.8.1. Description of Work: Contractor shall pre-fabricate the 12" valve, fittings and piping being replaced to the greatest extent possible at this site. A pre-installation hydrotest will be required under supervision of the LG&E pipeline inspector. A portion of the existing inlet piping will be retired in place upon tie-in at the new side valve site.
- 4.2.8.2. Design drawings: LG&E Drawings listed in section 1.3.1.10 of this specification detail the site plan and proposed work for this site.
- 4.2.8.3. Fencing: Contractor will providing temporary fencing around work sites, as well as any traffic control required by road permits.
- 4.2.8.4. Ground Conditions: Contractor shall make provisions to restore property to its original condition.
- 4.2.8.5. Pillows: Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
- 4.2.8.6. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of Mueller fittings at the outlets to the site.
- 4.2.8.7. Temporary Piping: Contractor shall install temporary piping under direction and assistance of SR&O personnel to maintain gas supply to around the site affected by the stopping operations.
- 4.2.8.8. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. Any gear operators on the retired valves will be returned to LG&E unless directed otherwise by the Project Engineer. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

#### 4.2.9. Site 8 (Valve and Fitting Replacements at Zorn Avenue and River Road)

- 4.2.9.1. Description of work: Contractor shall pre-fabricate the valves and fittings being replaced at this site to the greatest extent possible. A pre-installation

hydrotest will be required under supervision of the LG&E pipeline inspector.

- 4.2.9.2. Design drawings: LG&E Drawings listed in section 1.3.1.11 of this specification detail the site plan and proposed work for this site.
- 4.2.9.3. Fencing: Contractor will providing temporary fencing around work sites, as well as any traffic control required by road permits.
- 4.2.9.4. Ground Conditions: Contractor shall make provisions to restore property to its original condition and preserve existing plants where possible.
- 4.2.9.5. Pillows: Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
- 4.2.9.6. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of Mueller fittings at the inlets to the site if stopping operations are determined to be necessary.
- 4.2.9.7. Temporary Piping: Contractor shall install temporary piping under direction and assistance of SR&O personnel to maintain gas supply as deemed necessary.
- 4.2.9.8. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. Any gear operators on the retired valves will be returned to LG&E unless directed otherwise by the Project Engineer. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

4.2.10. Site 9 (Receiver at Zorn Avenue Water Tower Platform)

- 4.2.10.1. Description of Work: Fabricate an assembly for attaching a temporary pig trap, including 12" trap ball valve, barred tees, 3R 45 degree ells, 3R 90 degree ell, side valve, and 4" blow down. Install and tie in this assembly to the 12" main line and the inlet of the Zorn Avenue Regulator Platform.
- 4.2.10.2. AC Mitigation: An LG&E corrosion technician must be on site at the time of construction to determine if

AC mitigation procedures are required at Site 9. Should AC mitigation procedures be required, the policies and procedures of Section 3.4 of this document will be followed.

- 4.2.10.3. Design drawings: EMS Drawings listed in section 1.3.1.12 of this specification detail the site plan and proposed work for this site.
- 4.2.10.4. Fencing: Contractor will remove fence lines as needed for pipeline construction. Contractor shall temporarily restore the fence each night and minimize the duration and length of fencing removed. Contractor shall be responsible for permanently restoring fence after construction is complete. Fence shall encompass new pig receiver. Gate shall be widened to allow access to pig trap valve. All ground within the fence will be graveled by the contractor.
- 4.2.10.5. Ground Conditions: Contractor shall make provisions to restore property to its original condition.
- 4.2.10.6. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and stopping of Mueller fittings at the inlet to the site if stopping operations are determined to be necessary.
- 4.2.10.7. Pillows: Contractor will install pillows under all below grade fittings. Pillows shall be formed and installed per existing GCS drawings wherever site specific foundation drawings are not available.
- 4.2.10.8. Supports: Contractor will install concrete supports for all above grade valves and fittings in the locations determined by the project engineer and indicated on the design drawing. Supports shall be formed and installed per existing Gas Construction Standards (GCS) or site specific foundation drawings.
- 4.2.10.9. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

- 4.2.11. Site 10 (Drip Removal at Fox Trail Drive and Deer Run Drive)
- 4.2.11.1. Description of Work: Contractor shall support LG&E Muldraugh Compressor Station personnel with the inspection of the drip for liquids. Should liquids be present, the Muldraugh personnel will drain the drip into an appropriate tanker truck. Upon removal and satisfactory results of PCB wipe samples, the contractor will be responsible for disposal of the retired drip at the city landfill.
  - 4.2.11.2. Design drawings: LG&E Drawings listed in section 1.3.1.13 of this specification detail the site plan and proposed work for this site.
  - 4.2.11.3. Fencing: Contractor will providing temporary fencing around work sites.
  - 4.2.11.4. Ground Conditions: Contractor shall make provisions to restore property to its original condition.
  - 4.2.11.5. Stopping Operation: Contractor shall support the LG&E stopping crew with installation, tapping, and bypass stopping of Mueller fittings at the outlets to the site.
  - 4.2.11.6. Temporary Piping: Contractor shall install temporary piping under direction and assistance of SR&O personnel to maintain gas supply around the site affected by the stopping operations.
  - 4.2.11.7. Pre-testing of replacement pipe: Contractor shall complete a pre-installation hydrotest of replacement pipe on-site prior to tie-in.
  - 4.2.11.8. Retirement of existing pipe: All retired pipe shall be cut out and removed from the ground by the contractor. The pipe cannot be removed from the site until PCB wipe samples have been taken and the results showing acceptable levels have been received. The contractor will then be responsible for the disposal of the retired pipe at the city landfill.

4.3. Test Cap Special Requirements. LG&E will provide all materials if the Contractor does not have adequate test caps. If requested, LG&E will inspect any existing test caps to determine their acceptability for use. All fittings and pipes shall be constructed for full test pressure. Valves shall be selected such that test pressures do not exceed maximum pressure recommended by manufacturer. If fittings and valves are accidentally pressurized beyond manufacturer limits, the applicable fittings shall be destroyed. Any fabricated



test caps using materials provided by LG&E will become the property of LG&E after the project.

4.4. Rock Purchases: The following rock shall be purchased and installed by the Contractor.

- 4.4.1. Site 1 – Receiver at Moody Lane Station- #9 stone
- 4.4.2. Site 2 – Launchers at Elder Park City Gate- #9 stone
- 4.4.3. Site 9 – Receiver at Zorn Avenue Water Tower Platform- #9 stone
- 4.4.4. Site 9 – Temporary Gradient Control Matting Aggregate-#9, #57, or other approved stone as desired (only required for AC Mitigation).

4.5. Coating Special Requirements.

- 4.5.1. Wax-Tape. All air-soil interfaces will be wrapped with 100% Wax-Tape with 100% outerwrap according to the procedures referenced. EXCEPTION: All references to wire brush preparation in the referenced document shall be changed to abrasive blast cleaning! All blasting shall be in conformance to SSPC SP-6, Commercial Blast Cleaning.
- 4.5.2. Spray Coating. All below grade welds will be spray coated and are addressed outside of this scope of work. Contractor should INCLUDE any anticipated down time during coating application or extra time to provide adequate clearance for application. Coating contractor will require 2 foot clearance around pipe for coating application.
- 4.5.3. Painting. Painting for this project shall be addressed outside of this scope of work.
- 4.5.4. Fusion Bonded Epoxy (FBE) Pipe Coating Inspection.
  - All FBE pipe coating shall be inspected using a high voltage holiday detector in accordance with manufacturer's Instructions.
  - Set the holiday detector voltage based upon the thickness of the FBE coating setting using the following coating thickness formula:  $525 \times (\text{Coating Thickness in mils})^{1/2}$ . (For example, a 15 mil coating will have a setting of 2033V.) Note: The actual voltage setting of the holiday depends on the grounding connection.
  - The holiday detector shall be field calibrated daily. This calibration shall be performed by creating an intentional holiday about 30 mil in diameter to the production pipe steel substrate. Using the normal

grounding, electrode configuration, travel speed down the pipe, and voltage, the known holiday is verified.

- If the holiday detector does not register the coating damage, a better ground connection shall be made.
- If the holiday detector does register the coating damage, the holiday detector shall be considered calibrated.
- Mark any location identify by the holiday detector with a "sharpie" marker.

#### 4.5.5. FBE Pipe Coating Repair.

- Repair FBE holidays that were identified by the holiday detector by using two-part liquid epoxy.
- Remove oil and grease in accordance with SSPC-SP-1 using non-oily solvent cleaner (i.e., xylene and methyl ethyl ketone (MEK)).
- Roughen approximately 1 inch around the defective FBE surface using an 80-grit sandpaper to provide an anchoring surface for the repair epoxy.
- The roughening shall be at the surface only – the FBE coating thickness shall not be significantly reduced or abraded through to the steel substrate.
- The purpose of the roughening to prepare the surface, and not to remove the coating.
- Remove loose coating, foreign materials, and the gloss from adjacent coating.
- Brush away all loose material or use compressed air that is dry and oil-free.
- Mix the epoxy and apply the epoxy by hand application using an application pad to the coating holidays.
- Overlap the epoxy on to the existing FBE coating, a minimum of, 0.5 inches.
- Repaired section shall be reinspected per the previous instructions.

4.6. Anchor Bolts: The Contractor shall install four (4) ½" expansion anchors per each pipe support. The bolts will be provided by LG&E.

4.7. Pig Bar Tees. The Contractor shall assume that pig bar tees will be supplied to them and they will not be required to fabricate the tees. If the Contractor is requested to fabricate pig bar tees, it will be under a scope of work change order.

- 4.8. Flange Tightening.
  - 4.8.1. The Contractor will assemble all flanges in the hand-tight condition followed by tightening to the “snug tight” condition (few impacts with an impact wrench) following applicable Gas Construction Standards.
  - 4.8.2. LG&E crews will check the bolt tightness with a torque wrench and the Contractor shall retighten, as needed.
  
- 4.9. Welding Special Requirements:
  - 4.9.1. Welders: The Contractor shall provide a minimum of 2 welders during Shutdown periods and be expected to work up to 16 hours per day for each site.
  - 4.9.2. X52 Pipe. Some of the piping related to this pipeline is X52 pipe. It should be assumed that all pipe fit this category when welding. Therefore, the following welding procedures should be used, as applicable, by qualified welders. Copies can be furnished upon request.
    - 4.9.2.1. WPS-SMAW-DH-E6010
    - 4.9.2.2. WPS-SMAW-DH-E6010-G
    - 4.9.2.3. WPS-SMAW-DH-E7010-G
    - 4.9.2.4. WPS-GMAW-X52-DH-ER70S-6
    - 4.9.2.5. WPS-GMAW-DH-ER80S-D2
  - 4.9.3. In-service Welding. Welding procedure WPS-SMAWE6010-7018 should be used for all branch connections, stopper/hot/tap fittings, and flanged tees.
  - 4.9.4. All welds larger than 2-inch NPS will be 100% x-ray. Welds 2-inch and under will be magnetic particle tested. LG&E will coordinate NDT contractor. Bidder must maintain sufficient access to weld sites for complete x-ray inspection.
  - 4.9.5. Lifting Lugs. Unless otherwise specified by design drawings or by the Project Engineer, all lifting equipment shall be welded with a low-hydrogen electrode such as E7018 using Shielded Metal Arc Welding (SMAW) according to AWS D1.1 by qualified welders. Deviations from this welding qualification may be made by a qualified engineer. Gas Metal Arc Welding-Short Circuiting (GMAW –S) is not allowed unless otherwise approved.
  - 4.9.6. Taper Bored Fittings: The contractor shall assume that all standard weight fittings will be taper-bored if needed to transition to thin wall pipe. The following exception applies.
    - 4.9.6.1. Above Grade Piping: Above grade pipe shall be standard wall pipe and the transition to thin-wall pipe will be located below grade. At a pipe to pipe, if any, the transition shall be hand beveled with a 1:3 to 1:4 transition.

4.9.7. Miter Limitations. As a general rule, no miters joints will be allowed. The project engineer may make an exception in certain circumstances and must be consulted before any miters are made.

4.9.8. Arc Burns. Special attention will be devoted to arc burns. All arc burns shall be removed by grinding. If loss of wall thickness after grinding is evident, the arc burn shall be removed by cutting out a section of pipe. Weld repair of arc strikes is prohibited.



# **PIPELINE CONSTRUCTION SPECIFICATION**

## **GENERAL REQUIREMENTS**

August 2013

GAS ENGINEERING DEPARTMENT

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# GENERAL REQUIREMENTS

## 1.0. GENERAL

1.1. Specification: This Specification and any other general specifications and drawings to which reference is made together with the Contractual Agreement, are intended to cover all supervision, labor, materials and equipment beyond what is provided, to install the pipeline referenced in the Scope of work.

1.2. Workmanship. All construction is to be representative of the best practices in the gas pipeline industry and as defined in this Specification.

## 2.0. INDUSTRY STANDARDS

In addition to this Specification, referenced standards include the following organizations and specifications:

- 2.1. ANSI American National Standards Institute
- 2.2. API American Petroleum Institute
- 2.3. ASME American Society of Mechanical Engineers
- 2.4. ASNT American Society of Non-Destructive Testing
- 2.5. AWS American Welding Society
- 2.6. DOT Department of Transportation (49 CFR 192 – Transportation of Natural or Other Gas by Pipeline: Minimum Federal Safety Standards)
- 2.7. DOW Kentucky Division of Water
- 2.8. KAR Kentucky Administrative Regulations (807 KAR 5:022, Gas Safety and Service.)
- 2.9. OSHA Occupational Safety and Health Administration

## 3.0. SAFETY

3.1. General. The Contractor shall be responsible for providing a safe work area for their crews and for the public. The Contractor is required to adhere to all federal, state, county, local and LG&E safety requirements outlined in the LG&E and KU Health and Safety Manual. The Contractor will follow good construction practices as outlined in, but not limited to, the following: The Department of Transportation, Code of Federal Regulations, Part 192, Transportation of Natural and Other Gas by Pipeline; Kentucky Administrative Regulations, Title 807, Chapter 5, Gas Safety and Service; OSHA; etc. LG&E will provide copies of the E.ON-US Health and Safety Manual at the pre-bid meeting, if requested in advance.



3.2. Traffic Control.

3.2.1. Adequate traffic control must be maintained to safeguard the public and contractor personnel. It shall be the responsibility of the Contractor to fulfill all the traffic control criteria of the Commonwealth of Kentucky, county, and local municipalities as delineated in the road opening permits.

3.2.2. Any street that is open-cut must have one-lane open at all times, which will allow vehicles ingress and egress. Whenever a one-lane section is under construction, traffic must be controlled by means of a flag person positioned at either end of the section. The flag persons must be able to communicate with each other verbally, by means of signals or by radio. All traffic signs must conform to the Commonwealth of Kentucky Manual of Uniform Traffic Control Devices.

3.3. Excavations

3.3.1. The Contractor is advised to call Kentucky 811 a minimum of two working days prior to excavation for information on the location of existing underground utilities that subscribe to the one call. It will be the Contractor's responsibility to coordinate excavation with all utility owners, including those who do not subscribe to the one call. The Contractor is advised to check with County Clerk's office.

3.3.2. Test holes by the Contractor may be required to determine the depth, size, and exact location of all subsurface facilities that may interfere with the installation of the gas main. Only the LG&E Inspector will determine if a test hole is unnecessary.

3.3.3. Test holes shall be excavated 72 hours or more ahead of the advancing pipeline excavation. Machine excavation shall not come within 2-1/2 feet of located facilities (utilities). Test holes shall be hand-excavated or vacuum excavated. The Contractor shall support any utility or structure that is encountered during the installation and is responsible for any damage that may caused.

3.3.4. The Contractor shall satisfy all E.ON-US and OSHA requirements with regard to excavation. An Excavation Competent Person as defined by OSHA must be on the jobsite at all times for evaluating soil conditions.

3.4. Safety Equipment

3.4.1. All Contractor personnel are required to wear hard hats, hard-soled shoes, hearing protection (when needed), and safety glasses while on the

jobsite. All Contractor personnel who are exposed to vehicular traffic shall wear an approved high-visibility vest. All personnel working within a roadway or adjacent to a roadway are considered to be exposed to vehicular traffic unless the roadway is completely closed to public vehicles. The Contractor shall be responsible for providing any other safety equipment that either they or the LG&E Inspector deem necessary.

3.5. Emergency Call Out Listing

3.5.1. The Contractor shall supply the LG&E Inspector with a listing of names (with pager and telephone numbers) of people who can be reached 24 hours a day in reference to this project.

3.6. After-Dark Illumination.

3.6.1. If it is necessary to work after daylight hours (e.g., pipeline pressure testing, pipeline cleaning and pigging, etc.), the Contractor shall obtain approval from the LG&E Inspector to work by artificial light. The Contractor shall supply equipment that will provide an intensity of illumination that will permit work to be done in a manner to prevent risk of personal injury or damage to the work. Such lighting must be mounted well above the line of vision of the workers so that hand signals to equipment operators, and others, can be clearly seen. At no time must this light impede, in any way, the normal visibility of the adjacent roadway.

3.7. Employee Qualification. The Contractor shall participate in the E.ON U.S. Contractor Health & Safety Program (Passport) and possess training for all applicable tasks associated with this project. Employees will be required to keep their passport with them at all times when on the job. Any employees found on the job without the passport will be asked to leave.

3.8. Injury Reporting. All injuries, major and minor, incidents, and near-misses, will be reported to the LG&E Inspector on the job at the time of the event. At the end of the project, a total accounting of the hours worked and a complete log of events as described in the previous sentence will be required of the Contractor.

4.0. QUALITY CONTROL/INSPECTION

4.1. All work performed by the Contractor shall be inspected by an LG&E Inspector and is subject to their approval or rejection. This includes, but is not limited to, the following:

4.1.1. Handling and storage of the pipe, valves and associated materials. See also MATERIALS section for more specific requirements.

4.1.2. Methods used to identify, excavate, support, and protect other utilities and structures in close proximity to the gas main installation.

4.1.3. Proper welding procedures as outlined in the WELDING QUALIFICATIONS AND RADIOGRAPHY REQUIREMENTS Section of this Specification.

4.1.4. Proper restoration (both permanent and temporary) as outlined in this Specification and on the project drawings.

4.1.5. The Contractor shall be responsible for promptly responding to any customer complaints with regard to their operation. Any interface with the customer by LG&E will normally be conducted by the LG&E Inspector, Right of Way Agent, or Project Engineer.

## 5.0. WELDER QUALIFICATIONS AND RADIOGRAPHY REQUIREMENTS

5.1. All welding shall be performed in accordance with the requirements the latest edition of API 1104 and 49 CFR Part 192, "Transportation of Natural and Other Gas by Pipeline."

5.2. Welding procedures used for fabricating and/or joining pressure piping shall be qualified in accordance with the requirements of LG&E's Welding Procedures. Use of welding procedures provided by the contractor are subject to the review and approval of LG&E's Gas Engineering Department.

5.3. Welding Processes. Welding may be performed by the gas metal arc and shielded metal arc welding processes. Oxyfuel gas welding shall not be permitted.

5.4. Welding procedure and procedure qualification reports will be retained by LG&E. The Contractor shall be required to have each welder complete a weld specimen for evaluation in accordance with API 1104 prior to production welding. No production welding will be permitted until completed weld qualifications have been accepted by LG&E.

5.5. Upon request, material test reports supplied by the manufacturer for all welding rods and/or wire to be used in the construction of this project shall be provided to the LG&E Inspector or Project Manager prior to using said rods and/or wire. Any welding done by the Contractor using rods and/or wire for which material test reports have not been supplied will be cut out and replaced at the Contractor's expense.

## 5.6. Welding Operations.

5.6.1. Protection from Weather. Welding shall be protected from weather conditions that would impair the quality of the completed weld. Heated welding areas shall be protected against chilling drafts, rain, snow, sleet, or contact with cold metal parts.

### 5.6.2. Welding Electrodes.

5.6.2.1. Only approved welding electrodes shall be used.

5.6.2.2. Welding electrodes shall be kept dry and shall be protected from mechanical damage and deterioration.

5.6.2.3. For low-hydrogen electrodes, a storage cabinet and/or drying oven shall be provided for electrodes removed from the manufacturer's container.

### 5.6.3. Joint Design and Preparation.

5.6.3.1. Joint design shall be in accordance with the qualified welding procedure being used.

5.6.3.2. Miter joints shall not deflect the pipe more than 3 degrees.

5.6.3.3. Before beginning any welding, the welding surfaces shall be clean and free of any material that may be detrimental to the weld, and the pipe or component shall be aligned to provide the most favorable condition for depositing the root bead.

5.6.3.4. Beveling shall be performed using a machine tool or machine flame cutting device. The surfaces of the bevel shall be thoroughly cleaned to remove slag, scale, and oxidation, by filing or abrasive disc buffing before welding is performed.

5.6.3.5. Whenever available for the pipe diameter involved, internal line-up clamps shall be used. Internal clamps shall not be removed until the root pass is completed.

5.6.3.6. When external line-up clamps are used, the root pass shall have a cumulative length of at least 50 percent of the circumference and shall be uniformly spaced before the clamps may be removed.

5.6.4. All butt and branch connection welds shall be full penetration open root joint designs.

5.6.5. Backing rings shall not be permitted.

5.6.6. Alignment of abutting pipe joints shall be made to minimize high-low between welding surfaces. Hammering of pipe ends to eliminate high-low shall not be permitted.

5.6.7. Longitudinal welds in pipe joints shall be offset a minimum of 20 degrees. Assuming that the top center of the pipe in the ditch is in the 12:00 position, the longitudinal seam shall be located in the 3:00 to 4:30 or the 7:30 to 9:00 position.

5.6.8. A minimum distance shall be maintained between welds as follows:  
5.6.8.1. Fillet Weld Adjacent to Butt Weld or Fillet Weld. 1-inch if the maximum allowable operating pressure is equal to or less than 20% of the Specified Minimum Yield Strength (SMYS). Otherwise, the minimum distance shall be 2-inches. Deviations shall be approved by the Gas Engineering Department.  
5.6.8.2. Parallel Butt Welds. 12-inches or one pipe diameter, whichever is less. For shop fabrication or completely unrestrained conditions, one pipe diameter or 4-inches, whichever is less. When using factory welded fittings, these restrictions do not apply.

5.6.9. One welder may be used for depositing all welding passes for all pipe sizes less than 16-inches outside diameter. A minimum number of two welders shall be used for depositing the root bead and hot pass for all pipe sizes 16-inches outside diameter and larger.

5.6.10. Ground connections shall be properly designed to prevent arc burns.

5.6.11. When welding thin-film coated pipe, shields shall be used to protect the coating from weld spatter. Protective shields shall be a minimum of 24-inches wide. Shield length shall not be less than one-half the circumference of the circumferential weld. Shields shall be of sufficient thickness and material to adequately protect the pipe coating.

5.6.12. The root pass weld bead shall be deposited in a manner to ensure complete fusion of the lands and beveled surfaces of the pipe joint. There shall be complete penetration with a minimum inside build-up of 1/32-inch and a maximum build-up of 1/8-inch.

5.6.13. Interpass Temperature. Consult the applicable Welding Procedure

Specification for the interpass temperature (between the completion of the root bead and beginning of the hot pass).

5.6.14. Interpass Cleaning. Each completed welding pass shall be thoroughly cleaned to remove scale, slag, and other impurities prior to beginning subsequent passes.

5.6.15. Preheat. To avoid thermal cracking and brittle structures, preheating shall be required prior to beginning or resuming welding when the ambient air temperature is at or below 40°F. Preheating shall also be required when moisture is present on the pipe. Consult the applicable Welding Specification Procedure for preheat temperature ranges.

5.6.16. Preheat Process. A butane or propane torch shall be used for preheating. Oxy-acetylene torches shall not be used for preheating. Exceptions shall be allowed per LG&E Welding Procedures or by the Project Engineer.

5.6.17. Preheat Measurement. Preheat temperatures shall be determined by the use of temperature indicating crayons or pyrometers.

5.6.18. Each welder shall appropriately mark his completed weld to identify his work. When two or more welders are welding to produce a single weld, each welder shall mark the portion of the weld he completed. Steel die stamping shall not be used.

5.7. Welding Inspection:

5.7.1. All production welds shall be carefully visually examined in accordance with the requirements of the latest edition of API 1104 and the qualified welding procedures.

5.7.2. One hundred percent (100%) of all production welds larger than 2-inch NPS on the project shall be radiographically examined in accordance with the latest edition of API 1104. Exceptions shall be approved by LG&E's Gas Engineering Department.

5.7.3. All welds 2-inch and under shall be magnetic particle tested in accordance with the latest edition of API 1104.

5.7.4. Where radiographic inspection is required, such inspection will be performed at Company's expense. Company will provide the radiographic inspection service.

5.7.5. At the Company's request, Contractor shall remove a weld from the pipeline for testing. The strength and quality of the weld shall be determined by the Company in accordance with API Standard 1104. Test welds that meet the requirements of API Standard 1104 shall be replaced at Company's expense. Test welds that do not meet the requirements of API Standard 1104 shall be replaced at no additional cost to the Company.

5.8. Repair and Removal of Weld Defects.

5.8.1. Welders who experience an unacceptable rejection rate, as determined by the LG&E Inspector or Project Engineer will have their qualification removed and be prohibited from welding. As a rule of thumb, welders should consistently maintain a rejection rate under 5% or three (3) welds, whichever is greater for the work performed on the project.

5.8.2. Any welds that are determined to be defective will be repaired or removed at the Contractor's expense. Retesting is mandatory for any repaired weld and will be performed at the Contractor's expense.

5.8.3. Each weld that is repaired shall have the defect removed to sound metal and the segment to be repaired shall be preheated if conditions exist which would adversely affect the quality of the weld repair. After repair, the segment of the weld that was repaired shall be inspected to ensure its acceptability.

5.8.4. Arc burns that are determined to require removal, shall be removed by cutting out the damaged portion of pipe as a cylinder.

5.8.5. Cracks shall be removed by cutting out the damaged portion of pipe as a cylinder. Exceptions shall be allowed with approval from the Project Engineer after consultation with applicable codes.

6.0. BENDING. (DOES NOT APPLY TO THIS PROJECT UNLESS SCOPE CHANGES.)

6.1. Bending of pipe to conform as nearly as practical to the profile of the trench.

6.2. It is desired to hold the number of bends in the pipeline to a minimum and still conform to the trench profile and maintain the required cover over the pipe. In order to achieve this, it may be necessary to perform additional grading and trenching at the crests of ridges, approaches to roads and railroads, water courses, foreign pipelines, and other crossings.

6.3. Bends shall be made behind the finished trench.

6.4. Bends shall be made with an approved bending machine in such a manner as not to gouge, groove, buckle, or otherwise weaken the pipe. Wrinkle bends shall not be allowed.

6.5. Bending shall be performed in a manner that provides a minimum of 5-feet of straight pipe at each end of the pipe. Where possible, the center of the bend shall coincide with the midpoint of the length of pipe being bent.

6.6. Pipe bends shall be made so that the longitudinal weld of the pipe is located in the neutral axis of the bend. An internal bending mandrel shall be used for bending pipe 10-inches outside diameter and larger.

6.7. The longitudinal axis of the pipe shall not be deflected more than 1.5 degrees in any length along the pipe equal to the diameter of the pipe. After bending, the difference in measurements taken across the maximum and minimum diameters of the bend shall not exceed 2.5 percent of the nominal pipe diameter.

6.8. Bends shall fit the contour of the trench. Sag bends shall rest firmly against the trench bottom. Overbends shall sit 8- to 12-inches above the trench bottom. Side bends shall rest against the outer curvature of the trench wall with a minimum clearance of 6-inches between the throat of the bend and the inner wall of the trench.

6.9. When bends are made on mill-coated pipe, neoprene or rubber padding shall be required on the bending machine shoes to prevent damage to the pipe coating. Ovality and wall thicknesses should be checked after bending for conformance to acceptable standards.

**7.0. CASING INSTALLATION:**

7.1. Casing pipe shall be designed to withstand the superimposed loads.

7.2. Casing pipe for all crossings shall be welded into one continuous length.



7.3. Pipe to be installed in a casing shall be insulated by installing casing insulators. Casing insulators shall be installed per the manufacturer's recommendation or per the design drawings. One insulator shall be placed on each end of the casing, 6-inches from the casing end. The balance of insulators shall be equally spaced.

7.4. Pipe installation in a casing shall be performed in such a manner to ensure that the pipeline will be electrically isolated from the casing. Tests to ensure electrical isolation shall be made before and after backfill operations.

7.5. Casing ends shall be sealed using mechanical or rubber seals.

7.6. When casing vents are necessary, vent holes shall be cut in the casing and the vent pipe installed before the carrier pipe is inserted in the casing. The below-ground portion of casing vents shall be cleaned and coated with epoxy or wax tape unless otherwise specified.

## 8.0. INSTALLATION OF THE GAS PIPELINES (GENERAL)

8.1. Notification of Local Authorities. It is the Contractor's responsibility to notify all the appropriate local authorities before they begin work, as required by construction permits and/or by the LG&E Inspector. These include, but are not limited to, the issuer of the permit (state, town, etc.), the police department, the fire department and local churches, civic centers, schools and hospitals.

### 8.2. Support of Existing Utilities and Structures

8.2.1. The Contractor shall be responsible for supporting exposed and undermined subsurface facilities. All subsurface facilities shall be adequately supported by the Contractor to assure their protection from damage. The Contractor shall be responsible for any damage that they may cause.

8.2.2. The Contractor shall be responsible to hold and/or support any fences, poles, and ponds adjacent to the trench. The Contractor shall be responsible for any costs incurred as a result of damage to any fences, poles and ponds, or installing temporary fencing if necessary.

### 8.3. Valve and Purge Installation

- 8.3.1. Valves and purges must be installed in accordance with the project drawings.
- 8.4. Gas Pipeline Cover and Clearance
- 8.4.1. Depth of cover shall be measured from the top of the pipe to the elevation of the original ground.
- 8.4.2. The Contractor shall install the gas transmission pipelines with a standard depth of cover of 48-inches minimum, 54-inches maximum unless otherwise specified.
- 8.4.3. Each buried distribution main shall be installed with a minimum of 30-inches of cover in soil and 24-inches of cover in consolidated rock, unless specified otherwise to provide additional protection.
- 8.4.4. If the distribution main is to be laid through a plowed field or known future development, 48-inches of cover is required.
- 8.4.5. Each pipeline which is installed in a navigable river or stream shall have a minimum cover of 48-inches in soil or 24-inches in consolidated rock.
- 8.4.6. Each main shall be installed with a minimum of 12-inches of horizontal and vertical clearance from any other underground structure to allow proper maintenance and to protect against damage that might result from proximity to other structures. Trenching shall be performed in a manner that provides for appropriate clearance.
- 8.4.7. When trenching in rock, a minimum clearance of 8-inches on each side of the pipe and 6-inches of rock free soil beneath the pipe shall be provided.
- 8.4.8. The Contractor shall notify the LG&E Inspector of any proposed deviations from these requirements. The LG&E Project Engineer must review and approve such deviations.
- 8.5. Mechanical Damage
- 8.5.1. Any dent, gouge, groove, scratch, tear, arc burn or similar irregularity must be brought to the attention of the LG&E Inspector as soon as it is detected. (For the purpose of this section a "dent" is a depression that produces a gross disturbance in the curvature of the pipe wall without reducing the pipe-wall thickness. The depth of a dent is measured as the gap

between the lowest point of the dent and a prolongation of the original contour of the pipe.)

8.5.2. Dents not containing gouges, grooves, scratches, arc burns, tears, or kinks and which, in the opinion of the LG&E Inspector, are smooth and contain no stress-raising defects, will be permitted unless the dent has a depth of more than ¼-inch in pipe 12 ¾-inches or less in outside diameter; or more than 2 percent of the nominal pipe diameter in pipe over 12 ¾-inches in outside diameter.

8.5.3. Dents must be measured utilizing a straight-edge long enough to fully bridge the dent and measuring the gap below the straight edge at the deepest location. Any dent exceeding this criterion must be considered a defect and must be cut from the pipe as a cylinder.

8.5.4. Any dent in any weld, regardless of the orientation of the weld, must be considered a defect and must be cut out of the pipe as a cylinder.

8.5.5. Gouges, grooves, scratches, tears, or other stress raising anomalies, may be ground such that, in LG&E's opinion, the anomaly is completely removed leaving only a smooth, shallow, oval depression. If a repair is made by grinding, the remaining wall thickness must be at least equal to either the minimum thickness required by the tolerances in the specification to which the pipe was manufactured; or the nominal wall thickness required for the design pressure of the pipeline. Otherwise, the ground area must be considered a defect and must be cut from the pipe as a cylinder.

## 8.6. Pipe Loading, Unloading and Handling.

### 8.6.1. Pipe Loading and Unloading.

8.6.1.1. Pipe shall be loaded, hauled, and unloaded in a manner that prevents damage to the pipe wall or beveled ends. Valves, flanges, fittings, and other materials shall be loaded, hauled, and unloaded in a manner that prevents damage to shafts, facings, and machined surfaces.

8.6.1.2. Longitudinal welds of submerged arc welded pipe shall be hauled and stacked in a manner to prevent the welds from contacting the bearing strips, separator strips, blocking, and adjacent pipe.

8.6.1.3. Chains and boomers shall be used to secure pipe, valves, and fittings, when hauling on roads or right-of-way. When pipe has

been mill coated, truck bolsters, chains, and boomers shall be padded in a manner that protects the coating during hauling.

8.6.1.4. Slings with padded hooks and tag lines shall be used in handling to prevent damage to mill coating.

8.6.1.5. Thin film coated pipe shall be hauled with sufficient padding between layers and adjacent joints to maintain separation between all pipe joints.

8.6.1.6. The "A" frames of side booms used to handle pipe shall be sufficiently padded.

8.6.1.7. When storing pipe, the pipe shall be placed on leveled skids that shall be a minimum of 4-inches nominal width. For the bearing strips, a double skid shall be placed approximately 1.5 diameters from each end of the pipe, and single skids shall be equally spaced at no more than 12-feet apart. The pipe shall be nested with sufficient padding on skids, between layers and adjacent joints to maintain separation between all pipe joints.

8.6.1.8. When storing pipe 12 ¾-inches outside diameter and larger, the maximum height to which the pipe may be stacked shall be four diameters. Successive layers or tiers of pipe shall be separated by timbers of appropriate dimensions. The contact area of the pipe and timbers and the timber spacing under the pipe shall be sufficient to prevent denting or bending of the pipe or damage to the coating. Pipe stacked for storage shall be chocked and blocked to prevent shifting.

8.6.1.9. Valves and fittings stored outdoors shall be placed on skids. Flange faces and all machined surfaces shall be greased or similarly protected to prevent corrosion.

8.6.1.10. Pipe shall be unloaded from trucks using a side-boom tractor, crane, or gin-pole truck. Pipe remaining on the truck during unloading shall be secured.

8.6.1.11. Pipe shall not be dropped from the stringing conveyance to the ground.

8.6.1.12. Pipe shall rest on padded skids. Padding shall be placed in such a manner that prevents the pipe from contacting the skids. Skids shall be placed in such a manner that prevents the pipe from contacting the ground.

8.6.1.13. Where it is necessary to string pipe ahead of trenching operations, stringing shall be performed in a manner that prevents damage to the pipe from construction equipment.

8.6.1.14. Where rock excavation is required, pipe stringing shall not commence until blasting operations are completed.

**8.6.2. Pipe Lowering.**

**8.6.2.1.** Prior to lowering a pipe segment, the trench shall be inspected and rocks, skids, tree roots, and other debris shall be removed. Stumps and tree roots protruding from the trench wall shall be cut off flush with the trench wall to prevent damage to the pipe during lowering-in operations.

**8.6.2.2.** Immediately prior to lowering a pipe segment into the trench, an electronic holiday detector (Jeeper) shall be used to inspect the pipe coating. All damaged coating shall be repaired prior to lowering the pipe segment into the trench. Contractor shall furnish the holiday detector.

**8.6.2.3.** The holiday detector voltage shall be adjusted according to the manufacturer's instructions for the appropriate coating. The pipe shall be grounded whenever the holiday detector is used. Holidays detected by inspection shall be repaired by applying an epoxy or wax-tape to cover the holiday unless otherwise specified.

**8.6.2.4.** After all coating damage has been repaired, the pipe may be lowered into the trench.

**8.6.2.5.** The pipe shall be handled with slings manufactured from materials that will not damage the pipe or the pipe coating. Wire rope shall not be used for lowering pipe into the trench.

**8.6.2.6.** Slings shall be inspected prior to rigging to ensure that they are not damaged. Damaged slings shall not be used.

**8.6.2.7.** Slings shall be rigged in a manner that provides for rapid removal after pipe is lowered into the trench.

**8.6.2.8.** Lowered pipe segments, if not immediately tied together, shall be placed on padded skids to prevent the entrance of mud and water into the pipe.

**8.7. Backfilling.**

**8.7.1.** The Contractor shall perform all backfilling across drainage ditches, irrigation ditches, public highways, private drives, trails or roads, creeks, and streams in a manner in accordance with any permitting requirements and satisfactory to any federal, state, municipal or other public or private authority having jurisdiction over the same.

**8.7.2.** The pipe must be inspected in the trench by the LG&E Inspector prior to backfilling and after all damage to the protective pipe coating has been repaired and approved by LG&E.

8.7.3. Backfill operations shall be performed in a manner that prevents damage to the pipe and pipe coating and results in a firm, stable terrain.

8.7.4. Debris such as trash, welding rods, roots, and brush shall not be allowed in the backfill.

8.7.5. Where a trench has been excavated in rock, soil padding shall be used to prevent damage to the pipe and pipe coating. The trench bottom shall be padded with at least 6-inches of compacted soil before the pipe is lowered into the trench. Soil shall be compacted on each side of the pipe and to a minimum of 6-inches over the pipe. The remaining backfilling and compaction must be performed in 12-inch lifts.

8.7.6. Where road pavement or sidewalks have been cut for pipe installation, backfill shall conform to the requirements of the agency having jurisdiction over the right-of-way involved. If there is no controlling authority, backfill shall be placed in 6-inch lifts. Backfill shall be compacted around and over the pipe and for each subsequent lift. The backfill shall be compacted to at least the density of the adjacent undisturbed soil.

8.7.7. Backfill within the paved area of state highways or county roads shall be mechanically tamped earth, non-shrinkable backfill or flowable fill installed in accordance with Kentucky Transportation Cabinet standard drawing TC99-13, "Surface Restoration Methods".

8.8. End of Day Restoration

8.8.1. The installed pipeline shall be temporarily capped at the end of each workday. Excavations that must remain open shall be barricaded and/or fenced.

8.9. Clearing, Grading, and Restoration

8.9.1. Prior to construction, Contractor shall review the work area and significant features of the surrounding area in order to establish a record of preexisting conditions.

8.9.2. Upon request and prior to construction, Contractor shall videotape the work area and significant features of the surrounding area in order to establish a record of preexisting conditions.

8.9.3. Restoration in agricultural areas needs to be graded to prior elevations for surrounding fields.

8.9.4. Contractor shall restore private property to at least its original condition. Yards damaged by construction shall be restored with seed and mulched with straw, as like in kind of property. Sod may be used when the season of the year will cause a delay in the germination of the grass seed. All disturbed areas other than slopes shall be seeded at a rate of 30 lb. per acre, lime at two tons per acre and fertilizer (10-10-10) at 800 lbs. per acre.

8.9.5. The Contractor shall not encroach on private property or property lines with equipment, excavation, or spoils unless prior arrangements have been made with said property owner. Any unresolved claims between landowners and Contractor as result of the Contractor's activities during the construction project must be settled before LG&E make final payments to the Contractor.

8.9.6. LG&E reserves right to negotiate payments with landowners for restoration activities in lieu of the Contractor performing restoration at agreed upon unit costs in the contract for the project.

8.9.7. LG&E retains responsibility for compensating landowners for crop damages inside the pipeline construction work zone that is normally defined as area 25 feet to either side of the centerline of installed pipeline. Crop damages outside of the construction area are the responsibility of the Contractor.

8.9.8. Restoration within public right-of-way shall conform to the requirements of the agency having jurisdiction over the right-of-way involved. If a controlling authority does not exist; all lawn areas shall be replaced with seed and straw, all other unpaved areas shall be seeded with a mixture of 70% Kentucky 31 fescue & 30% perennial rye grass and mulched with clean straw at the rate of two tons per acre of seeding. Erosion control methods and/or devices shall be installed where storm water runoff could result in erosion of the restored area.

8.9.9. Private sidewalks cut and/or damaged by construction shall be replaced with like material.

8.9.10. Private roads and drives cut and/or damaged by construction shall be replaced to at least their original condition at Contractor's expense.

8.9.11. Where applicable, public roads and drives cut and/or damaged by

construction shall be replaced in accordance with City of Louisville standard drawing T-115 or Kentucky Transportation Cabinet standard drawing TC99-13, whichever applies.

8.9.12. Erosion and sediment control shall be used at all creek crossings and on all slopes. Refer to project details, applicable permits, and design drawings.



## 9.0. INSTALLATION OF THE GAS PIPELINES (DIRECTIONALLY DRILLED)

9.1. Directional Drilling Requirements. Shall the Contractor elect to directionally bore the road crossing for this project, the following standards shall apply:

9.1.1. The Contractor shall provide for a remote navigation system capable of accurately tracking the position of the drill, reamer, and pipe during the drilling and pullback operation in both the vertical and horizontal planes. A walk over system is acceptable.

9.1.2. The Contractor shall arrange, and shall be responsible for providing the fresh water supply for mixing the drilling mud. River/creek water shall not be used. The Contractor shall use an inert substance such as bentonite for the drilling slurry. The Contractor is to supply information on the type of slurry material to be used.

9.2. Entry and Exit Angles and Required Depth. The Contractor shall state the entry and exit angles of the directional drill and the carrier pipe for LG&E's review. The Contractor shall be required to maintain the depth defined on the project drawings.

9.3. Drilling Log and Field Historical Data. The Contractor shall prepare a drilling log documenting the following:

9.3.1. Drill pipe joint lengths.

9.3.2. Inclination angle.

9.3.3. Azimuth.

9.3.4. Deviation from the design path reference line.

9.3.5. Elevation.

9.3.6. Drill bit to probe distance.

9.3.7. Drilling rig setback.

9.3.8. The Contractor shall report the drill stem locations as well as document the location of the drilled pipe on field historical drawings. The Contractor shall also be responsible for locating and identifying each circumferential butt weld on the drilled pipe and relating it to the project historical drawings.

9.4. Pipe String and Pullback. The pipe shall be set on rollers to prevent damage to the pipe during pullback. The rollers shall be spaced such that the point loading on the pipe is distributed over enough rollers to prevent damage to the pipe.

9.5. Slurry Pits. Since normal drilling operations require slurry pits to be excavated for containment and collection, the following shall be adhered to by the Contractor:

9.5.1. All slurry shall be collected in the excavation slurry pits. Slurry pits shall be excavated only in the launching and receiving areas.

9.5.2. The Contractor shall be required to excavate the pits for the collection of the slurry.

9.5.3. Hay bales and silt curtains shall be installed two feet away and around the slurry pits to collect any run-off.

9.5.4. Once work has been completed and prior to backfilling the slurry pits, any remaining water must be pumped from the slurry pits into a tank truck for disposal by the Contractor. The bentonite, which has accumulated in the pit, shall be removed and disposed of by the Contractor.

9.5.5. The Contractor is to develop contingency plans for the collection of any slurry that might rise through the ground during drilling operations and outside the containment area of the slurry pits. If this happens, the Contractor shall immediately stop drilling operations and take containment and mitigation measures. Such measures shall include, but not be limited to, excavating collection pools, setting up barriers of hay bales and silt curtains to prevent the mud from spreading, and cleaning up any spills on the job site.

9.5.6. Silt fencing shall be placed at all construction activity at the launching and receiving areas. The silt fencing shall be placed around the pits so that no runoff can enter the existing roadside ditches. The Contractor shall maintain extra quantities silt fencing to be used as required during the directional drilling operations.

9.6. Removal of Slurry. During drilling operations at the launching and receiving slurry pits, the Contractor shall make all necessary arrangement for the safe and clean collection and removal of all slurry. Prior to the slurry reaching two feet to the top of grade, the Contractor shall take all necessary steps to empty the slurry pit and remove the slurry from the construction area. This slurry is to be properly transported and disposed of in accordance with all state and/or federal requirements.

9.7. Dewatering. The Contractor shall be responsible for any and all dewatering necessary to progress the construction operations. The dewatering shall be performed according the permit.

## 10.0. CORROSION CONTROL

### 10.1. Coating Systems.

10.1.1. Epoxy Coating. The majority of underground pipe and fittings will have epoxy coating, the following criteria apply:

10.1.1.1. Application and inspection of epoxy coating shall follow manufacturer's and LG&E specifications.

10.1.1.2. Weld Joints are to be sandblasted prior to installation of the epoxy. Contractor is required to provide all sandblasting equipment.

10.1.2. Wax Tape. Some underground pipe, valves, and fittings are to be coated with wax tape primarily at the soil interface.

10.1.2.1. Wax tape may be used on valves, bolted couplings, and other appurtenances.

10.1.2.2. Surfaces to be coated shall be prepared according to the manufacturer's instructions. Oil and grease shall be removed with a suitable solvent.

10.1.3. Tapecoat H35 Gray Cold Applied Tape. Cold applied tape shall generally not be allowed unless specifically approved by LG&E. If approved, LG&E application procedures shall be used.

### 10.2. Electrical Isolation.

10.2.1. The pipeline will be protected by both galvanic anodes and impressed current rectifiers.

10.2.2. The casing may be filled with wax at a later date. This process will not be completed by this contract.

### 10.3. Electrical Inspection .

10.3.1. Refer to holiday inspection notes in Specification for all coated pipe and field joints

10.3.2. Inspection shall be performed immediately prior to lowering a segment of pipe into the trench.

### 10.4. Test Stations.

10.4.1. Test stations, if required, shall be of the aboveground or below ground type as shown on project drawings.

10.4.2. Contractor will be required to install new or replace removed existing stations at a location to be determined by LG&E.

### 10.5. Galvanic (Sacrificial) Anode Installation.

10.5.1. Anodes shall be installed as shown on the construction drawings.

10.5.2. Anodes shall be installed below the pipe in a vertical position by digging a hole at least 4-inches larger than the anode. Anodes may be oriented horizontally when installed in rock.

10.6. After the anode is installed, Contractor shall pour water on the anode to initiate the electrochemical reaction.

#### 11.0. PIPE CLEANING AND PRESSURE TESTING

11.1. Pipe Cleaning. Prior to the pressure testing, the Contractor shall be required to run a brush pig for cleaning the pipeline. A minimum of two (2) subsequent foam pigs shall be run behind the wire brush pig to remove any remaining debris.

11.2. Testing Scope. All piping in this Contract, shown on Project Drawings, will be subjected to a pressure test the section of pipe to verify its integrity.

11.3. Test Procedure. The test medium, pressure, duration, and procedure shall be as shown on the Project Drawings or as otherwise directed by Company.

11.4. Test Equipment. The Contractor must provide all test equipment for the water tests including, but not limited to, the compressor equipment, pressure gauge, fittings, tubing, hoses, valves, etc. Pressure recorders will be provided by LG&E and will be certified within six (6) months of test.

11.5. Water Tests. If water is used as the test medium, Contractor shall, upon completion of testing, run a drying pig through each section as many times as is necessary to clean and dry the pipeline. Fresh water shall be used; non-potable water (i.e. water from a river, creek, pond, etc.) shall not be used. Water disposal will be in accordance with LG&E project-specific guidelines. Generally, this will involve either disposal on site with according to the discharge permit guidelines or transportation to an approved disposal site.

11.6. Defects. All cost for repairing leaks on Contractor-installed piping will be paid for by the Contractor. All costs associated with locating or pinpointing of leaks on Contractor installed piping shall also be paid for by the Contractor.

12.2.2. The Contractor shall inspect the materials prior to receipt. The LG&E Inspector shall accompany the Contractor when any material is to be picked up unless the Inspector waives this requirement.

12.2.3. The Contractor will be responsible for returning any materials left over from the job to Auburndale Operations Center at no additional cost to LG&E. This includes material that is either delivered to the jobsite or the Contractor.

12.2.4. The Contractor must ensure that LG&E-supplied material is properly stored and not damaged during construction. Any excess material that is found to be damaged due to Contractor negligence that cannot be returned to, or accepted by LG&E, will be the liability of the Contractor.

12.2.5. The Contractor shall make reasonable efforts to modify the work schedule as materials are available. The Contractor may be required to make multiple trips for material pick up. Relative to materials, the term "jobsite" refers to any location for which permission has been granted to the Contractor for storing and maintaining materials used for the construction of the pipeline.

**12.3. Material Supplied By Contractor**

12.3.1. It is the responsibility of the Contractor to supply all additional material and equipment that are not listed as supplied by LG&E and are required for the completion of the gas pipeline shown on the Project Drawing(s). The Contractor shall bear all costs for obtaining and maintaining any materials that they must supply. In addition, LG&E assumes no responsibility for work delays if materials supplied by the Contractor are delayed.

12.3.2. The Contractor must supply the following:

12.3.2.1. Welding equipment. This includes electrodes with Material Test Reports, shielding gas, line-up clamps, grinders, bevel machines, and any other required accessories necessary for welding.

12.3.2.2. Ancillary Equipment: Air Compressors (for all necessary activities including purging, construction, painting, etc. as required), pumps, shoring, etc.

12.3.2.3. Backfill/Site Construction. Contractor is responsible for supplying suitable backfill material for the project where required to meet LG&E's construction specifications. Contractor is also

responsible for appropriate disposal of debris as result of the pipeline construction project.

- 12.3.2.4. Concrete for supports
- 12.3.2.5. Concrete bags when specified in designs.
- 12.3.2.6. Crushed stone for road maintenance required to access the sites or restore roads damaged during construction.
- 12.3.2.7. Erosion Control matting.
- 12.3.2.8. Geotextile Fabric.
- 12.3.2.9. Hydrotest water
- 12.3.2.10. Dechlorination equipment and chemicals.
- 12.3.2.11. Shot Rock
- 12.3.2.12. Silt fences.
- 12.3.2.13. Consumables. (Safety supplies, rags, cleaning supplies, etc.)
- 12.3.2.14. Pigs for dewatering.

## **13.0. RECORDKEEPING**

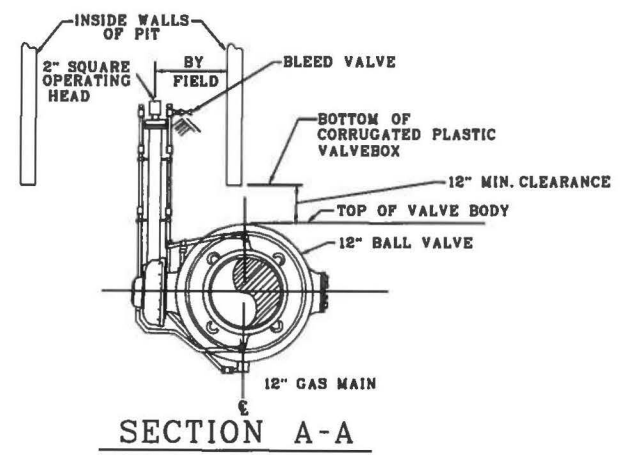
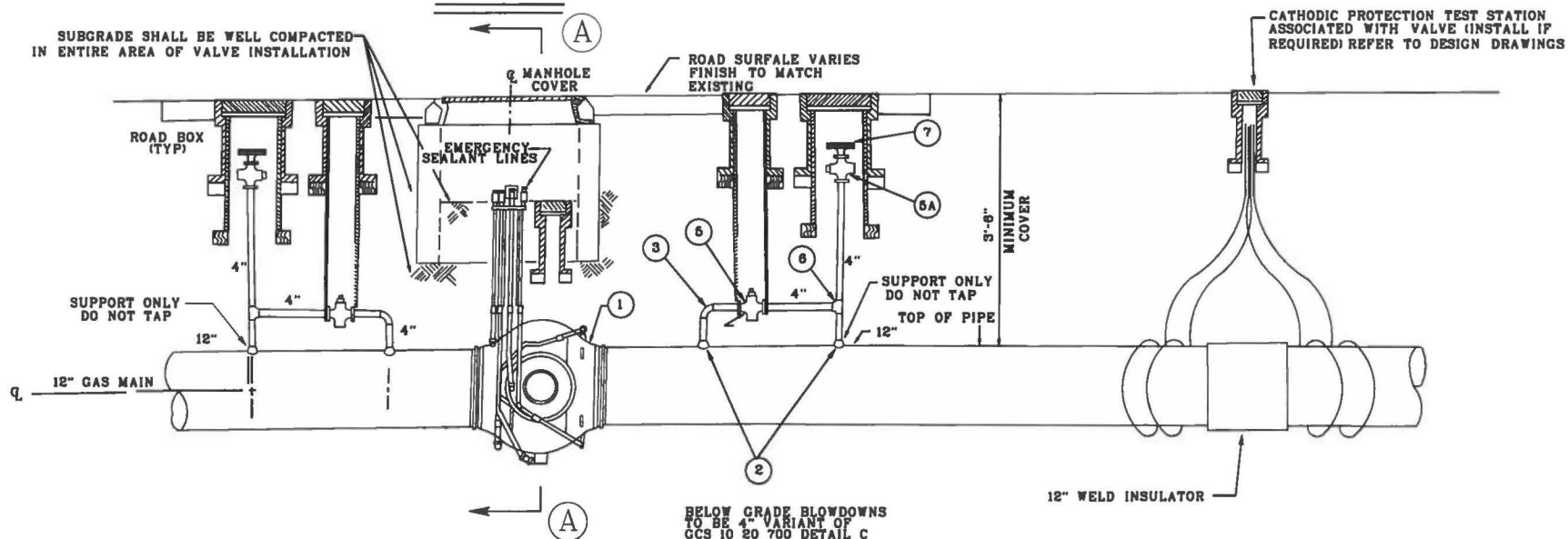
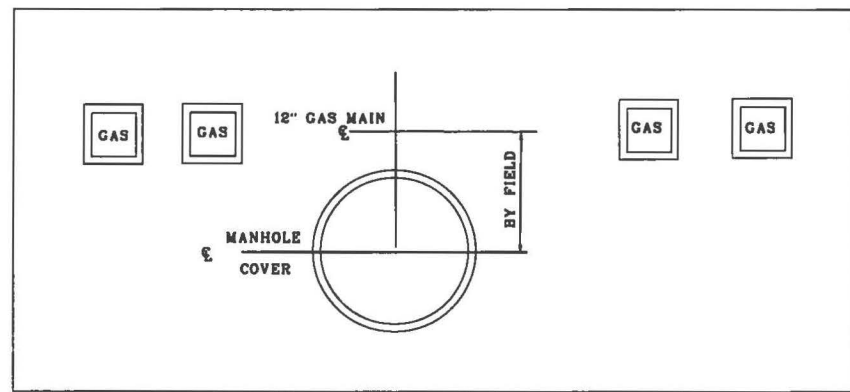
13.1. Federal regulations require that LG&E preserve certain records and files of as-constructed drawings of the pipeline facilities. Compliance with these requirements involves the recording of the location, length, and material information for each section of pipe and for the each components of the pipeline system as it is placed in its final position in the pipeline. Pipe components should not be substituted without approval from the Project Engineer.

13.2. For maps or drawings not completed by the LG&E Inspector, the Contractor is responsible for noting all historical update information. All historical update information shall be noted on a set of drawings. All required and relevant information shall be recorded on these drawings and returned to LG&E Inspector once the pipeline installation is complete.

13.3. The Contractor is responsible for submitting daily reports to the LG&E Inspector detailing the work performed, equipment utilized, and personnel who worked on the job.

13.4. Welding Electrode Documents. As specified in the WELDER QUALIFICATIONS AND RADIOGRAPHY REQUIREMENTS Section, material test reports for all welding electrodes shall be provided to the LG&E Inspector or Project Manager prior to using said rods and/or wire.

**Attachment page provided under  
confidential seal has been removed.**



DETAIL FOR 12" INLINE VALVE INSTALLATION (TYPICAL FOR 4 LOCATIONS)  
(FLUSH MOUNTED OPERATOR)

DETAIL  
NO SCALE

| ITEM | DESCRIPTION              | EST. QTY |
|------|--------------------------|----------|
| 1    | 12" FP BALL VALVE        | 1 EA     |
| 2    | SADDLE 4"x12"            | 4 EA     |
| 3    | 4" 90 DEG ELL            | 2 EA     |
| 4    | 4" PIPE X42.188 WALL     | 24 FT    |
| 5    | 4" BALL VALVE WXW CL 300 | 4 EA     |
| 5A   | 4" BALL VALVE WXF CL 300 | 2 EA     |
| 6    | 4"x4" TEE                | 2 EA     |
| 7    | 4" BLIND FLANGE CL 300   | 2 EA     |

| REVISIONS |    |
|-----------|----|
| DATE      | BY |
|           |    |
|           |    |
|           |    |
|           |    |

LOUISVILLE GAS AND ELECTRIC COMPANY  
6900 ENTERPRISE DR  
Louisville, Kentucky 40214

**LGE**  
A MEMBER OF  
LGE ENERGY

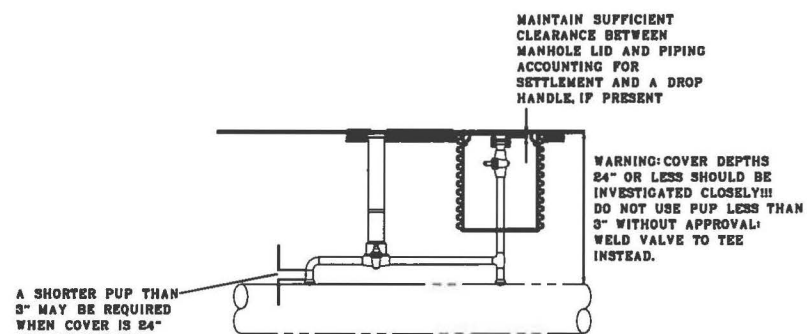
GAS & ELECTRIC  
ENGINEERING

Title  
**BALLARDSVILLE LINE  
PIGGABILITY PROJECT**

Scale: NONE Date: 4-24-14 Gas Design: ROBISON Elec. Design: GAS-D-23151  
Approved By: \_\_\_\_\_



**PURGE/BLOWDOWN  
CL. 150/800 (NEW CONSTRUCTION)** GCS 10 80 700  
Rev. A



A SHORTER PUP THAN 3" MAY BE REQUIRED WHEN COVER IS 24" OR LESS. CONSULT ENGINEERING BEFORE CHANGING.

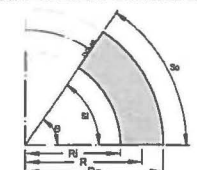
MAINTAIN SUFFICIENT CLEARANCE BETWEEN MANHOLE LID AND PIPING ACCOUNTING FOR SETTLEMENT AND A DROP HANDLE, IF PRESENT

WARNING: COVER DEPTHS 24" OR LESS SHOULD BE INVESTIGATED CLOSELY!!! DO NOT USE PUP LESS THAN 3" WITHOUT APPROVAL! WELD VALVE TO TEE INSTEAD.

**TYPICAL** **DETAIL C**  
**BELOW GRADE ALTERNATIVE**

**ELBOWS  
3D ELBOWS SEGMENTING** GCS 10 10 801  
Rev. A

**3D (3R) ELBOWS - SEGMENTED ANGLES DIMENSIONS**



| PIPE SIZE (NPS) | R (CL.) | DIMENSION PER ANGLE (INCHES) |                        |       |        |        |        |        |         |
|-----------------|---------|------------------------------|------------------------|-------|--------|--------|--------|--------|---------|
|                 |         | MINIMUM ANGLE                | CUT DIM.               | 1°    | 5°     | 10°    | 22.6°  | 30°    | 45°     |
| 2               | 6       | S <sub>1</sub> = 2"          | S <sub>2</sub> = 0.125 | 0.627 | 1.254  | 2.508  | 3.762  | 5.016  | 11.280  |
|                 |         | S <sub>1</sub> = 1 5/8"      | S <sub>2</sub> = 0.084 | 0.420 | 0.840  | 1.680  | 2.520  | 3.360  | 7.559   |
|                 |         | S <sub>1</sub> = 2 1/8"      | S <sub>2</sub> = 0.249 | 1.244 | 2.487  | 4.974  | 7.461  | 11.192 | 22.384  |
| 4               | 12      | S <sub>1</sub> = 1 1/2"      | S <sub>2</sub> = 0.170 | 0.851 | 1.702  | 3.404  | 5.106  | 7.659  | 15.318  |
|                 |         | S <sub>1</sub> = 2 1/4"      | S <sub>2</sub> = 0.372 | 1.860 | 3.720  | 7.440  | 11.160 | 16.740 | 33.480  |
|                 |         | S <sub>1</sub> = 1 1/2"      | S <sub>2</sub> = 0.258 | 1.292 | 2.584  | 5.168  | 7.752  | 11.528 | 23.056  |
| 6               | 18      | S <sub>1</sub> = 2 5/16"     | S <sub>2</sub> = 0.494 | 2.471 | 4.941  | 9.881  | 14.821 | 22.231 | 44.461  |
|                 |         | S <sub>1</sub> = 1 5/8"      | S <sub>2</sub> = 0.344 | 1.718 | 3.436  | 6.871  | 10.306 | 15.459 | 30.918  |
|                 |         | S <sub>1</sub> = 2 7/16"     | S <sub>2</sub> = 0.740 | 3.698 | 7.396  | 14.791 | 22.186 | 33.279 | 66.558  |
| 12              | 30      | S <sub>1</sub> = 1 11/16"    | S <sub>2</sub> = 0.517 | 2.585 | 5.170  | 10.340 | 15.510 | 23.265 | 46.530  |
|                 |         | S <sub>1</sub> = 2 3/8"      | S <sub>2</sub> = 0.977 | 4.887 | 9.774  | 19.548 | 29.322 | 43.983 | 87.966  |
|                 |         | S <sub>1</sub> = 1 11/16"    | S <sub>2</sub> = 0.658 | 3.291 | 6.581  | 13.162 | 19.743 | 29.614 | 59.228  |
| 20              | 60      | S <sub>1</sub> = 2 3/8"      | S <sub>2</sub> = 1.222 | 6.109 | 12.217 | 24.434 | 36.651 | 54.976 | 109.952 |
|                 |         | S <sub>1</sub> = 1 11/16"    | S <sub>2</sub> = 0.873 | 4.363 | 8.727  | 17.454 | 26.181 | 39.271 | 78.542  |
|                 |         | S <sub>1</sub> = 2 3/8"      | S <sub>2</sub> = 1.465 | 7.330 | 14.660 | 29.320 | 43.980 | 65.970 | 131.940 |
| 24              | 72      | S <sub>1</sub> = 1 11/16"    | S <sub>2</sub> = 1.047 | 5.236 | 10.472 | 20.944 | 31.416 | 47.124 | 94.248  |

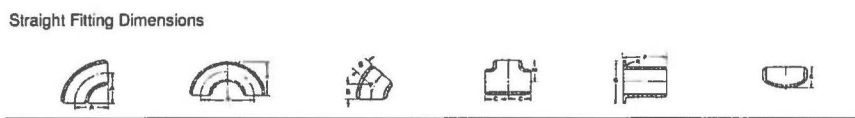
- NOTES:
- MINIMUM ANGLE CALCULATIONS ARE BASED UPON STANDARD WALL ELBOWS AND 40 DEG. WELD BEVELS
  - DIMENSIONS NOT SHOWN MAY BE CALCULATED USING FOLLOWING FORMULA:  
 $S_1 = 0.01745 \times R \times \theta$  WHERE  $\theta$  IS IN DEGREES  
 $S_2 = 0.01745 \times R \times \theta$  WHERE  $\theta$  IS IN DEGREES
  - DIMENSIONS MAY BE ADDED TO THE DETERMINED DESIRED ANGLE, BUT ANGLE CANNOT BE LESS THAN THE MINIMUM ANGLE.
  - REFERENCE: ASME B31.8 SECTION 841.2.33. MINIMUM ANGLE.
  - REFERENCE: 807 KAR 5.022 SECTION 5 (6) MAXIMUM METER.  
 •  $\leq 3'$  LIMIT FOR PIPELINE WITH SMYS  $\geq 30\%$  SMYS  
 •  $\leq 12'$  LIMIT FOR PIPELINE WITH SMYS  $> 10\%$  AND  $< 30\%$  AND 1 PIPE DIA. AWAY FROM ANOTHER METER.

EXAMPLE:

- PIPE: 12" NPS
- DESIRED ANGLE:  $21^\circ (20^\circ + 1^\circ)$  (WHICH IS CHECKED TO BE GREATER THAN THE 3" MINIMUM)
- OUTSIDE ARC LENGTH:  $S_0 = 0.740 \times 7.396 + 7.396 = 15.540'$  (15 1/2')
- INSIDE ARC LENGTH:  $S_1 = 0.517 \times 5.171 + 5.171 = 10.852'$  (10 7/8')

**LGE** Gas Engineering and Planning  
 REPLACES GCS 10 10 801 SCALE NONE DRAWN BY: MCGUIRE  
 DATE: 10/14/10 DESIGNED BY: BEATTY  
 PAGE 1 OF 1

**HACKNEY LADISH, INC.** The Most Trusted Name In Fittings



| Nom. Pipe Size | 90° Elbows |           | 45° Elbows |           | 180° Return Bends |           |          |           | Tee   |       | Lap Joint Stub Ends |       |      | Cape  |  |
|----------------|------------|-----------|------------|-----------|-------------------|-----------|----------|-----------|-------|-------|---------------------|-------|------|-------|--|
|                | Long Rad   | Short Rad | Long Rad   | Short Rad | Long Rad          | Short Rad | Long Rad | Short Rad | C     | M     | F                   | G     | R    | E     |  |
| 1/2            | 1.50       |           | 0.62       |           | 3.00              | 1.88      |          |           | 1.00  | 1.00  | 3.00                | 1.38  | 0.12 | 1.00  |  |
| 3/4            | 1.50       |           | 0.75       |           | 3.00              | 2.00      |          |           | 1.12  | 1.12  | 3.00                | 1.69  | 0.12 | 1.00  |  |
| 1              | 1.50       | 1.00      | 0.88       |           | 3.00              | 2.19      | 2.00     | 1.82      | 1.50  | 1.50  | 4.00                | 2.00  | 0.12 | 1.50  |  |
| 1 1/4          | 1.88       | 1.25      | 1.00       |           | 3.75              | 2.75      | 2.50     | 2.08      | 1.88  | 1.88  | 4.00                | 2.50  | 0.19 | 1.50  |  |
| 1 1/2          | 2.25       | 1.50      | 1.12       |           | 4.50              | 3.25      | 3.00     | 2.44      | 2.25  | 2.25  | 4.00                | 2.85  | 0.25 | 1.50  |  |
| 2              | 3.00       | 2.00      | 1.38       | 2.50      | 6.00              | 4.19      | 4.00     | 3.19      | 2.50  | 2.50  | 6.00                | 3.82  | 0.31 | 1.50  |  |
| 2 1/2          | 3.75       | 2.50      | 1.75       | 3.12      | 7.50              | 5.19      | 5.00     | 3.94      | 3.00  | 3.00  | 6.00                | 4.12  | 0.31 | 1.50  |  |
| 3              | 4.50       | 3.00      | 2.00       | 3.75      | 9.00              | 6.25      | 6.00     | 4.75      | 3.38  | 3.38  | 6.00                | 5.00  | 0.38 | 2.00  |  |
| 3 1/2          | 5.25       | 3.50      | 2.25       | 4.50      | 10.50             | 7.25      | 7.00     | 5.50      | 3.75  | 3.75  | 6.00                | 5.50  | 0.38 | 2.50  |  |
| 4              | 6.00       | 4.00      | 2.50       | 5.00      | 12.00             | 8.25      | 8.00     | 6.25      | 4.12  | 4.12  | 6.00                | 6.19  | 0.44 | 2.50  |  |
| 5              | 7.50       | 5.00      | 3.12       | 6.00      | 15.00             | 10.31     | 10.00    | 7.75      | 4.88  | 4.88  | 6.00                | 7.31  | 0.44 | 3.00  |  |
| 6              | 9.00       | 6.00      | 3.75       | 7.44      | 18.00             | 12.31     | 12.00    | 9.31      | 5.62  | 5.62  | 6.00                | 8.50  | 0.50 | 3.50  |  |
| 8              | 12.00      | 8.00      | 5.00       | 9.84      | 24.00             | 16.31     | 16.00    | 12.31     | 7.00  | 7.00  | 6.00                | 10.62 | 0.50 | 4.00  |  |
| 10             | 15.00      | 10.00     | 6.25       | 12.44     | 30.00             | 20.38     | 20.00    | 15.38     | 8.50  | 8.50  | 10.00               | 12.75 | 0.50 | 5.00  |  |
| 12             | 18.00      | 12.00     | 7.50       | 14.88     | 36.00             | 24.38     | 24.00    | 18.38     | 10.00 | 10.00 | 10.00               | 15.00 | 0.50 | 6.00  |  |
| 14             | 21.00      | 14.00     | 8.75       | 17.38     | 42.00             | 28.00     | 28.00    | 21.00     | 11.00 | 11.00 | 12.00               | 18.25 | 0.50 | 6.50  |  |
| 16             | 24.00      | 16.00     | 10.00      | 19.88     | 48.00             | 32.00     | 32.00    | 24.00     | 12.00 | 12.00 | 12.00               | 21.00 | 0.50 | 7.00  |  |
| 18             | 27.00      | 18.00     | 11.25      | 22.38     | 54.00             | 36.00     | 36.00    | 27.00     | 13.00 | 13.00 | 12.00               | 24.00 | 0.50 | 8.00  |  |
| 20             | 30.00      | 20.00     | 12.50      | 24.88     | 60.00             | 40.00     | 40.00    | 30.00     | 14.00 | 14.00 | 12.00               | 27.00 | 0.50 | 9.00  |  |
| 22             | 33.00      | 22.00     | 13.75      | 27.38     | 66.00             | 44.00     | 44.00    | 33.00     | 15.00 | 15.00 | 12.00               | 30.00 | 0.50 | 10.00 |  |
| 24             | 36.00      | 24.00     | 15.00      | 29.88     | 72.00             | 48.00     | 48.00    | 36.00     | 16.00 | 16.00 | 12.00               | 33.00 | 0.50 | 10.50 |  |
| 26             | 39.00      |           | 16.25      | 32.38     |                   |           |          |           | 17.00 | 17.00 |                     | 36.00 |      | 11.00 |  |
| 28             | 42.00      |           | 17.50      | 34.88     |                   |           |          |           | 18.00 | 18.00 |                     | 39.00 |      | 11.50 |  |
| 30             | 45.00      |           | 18.75      | 37.38     |                   |           |          |           | 19.00 | 19.00 |                     | 42.00 |      | 12.00 |  |
| 32             | 48.00      |           | 20.00      | 39.88     |                   |           |          |           | 20.00 | 20.00 |                     | 45.00 |      | 12.50 |  |
| 34             | 51.00      |           | 21.25      | 42.38     |                   |           |          |           | 21.00 | 21.00 |                     | 48.00 |      | 13.00 |  |
| 36             | 54.00      |           | 22.50      | 44.88     |                   |           |          |           | 22.00 | 22.00 |                     | 51.00 |      | 13.50 |  |
| 38             | 57.00      |           | 23.75      | 47.38     |                   |           |          |           | 23.00 | 23.00 |                     | 54.00 |      | 14.00 |  |
| 40             | 60.00      |           | 25.00      | 49.88     |                   |           |          |           | 24.00 | 24.00 |                     | 57.00 |      | 14.50 |  |
| 42             | 63.00      |           | 26.25      | 52.38     |                   |           |          |           | 25.00 | 25.00 |                     | 60.00 |      | 15.00 |  |
| 44             | 66.00      |           | 27.50      | 54.88     |                   |           |          |           | 26.00 | 26.00 |                     | 63.00 |      | 15.50 |  |
| 46             | 69.00      |           | 28.75      | 57.38     |                   |           |          |           | 27.00 | 27.00 |                     | 66.00 |      | 16.00 |  |
| 48             | 72.00      |           | 30.00      | 59.88     |                   |           |          |           | 28.00 | 28.00 |                     | 69.00 |      | 16.50 |  |

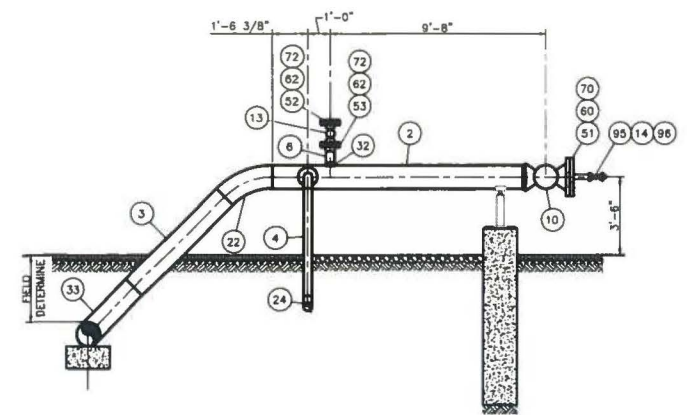
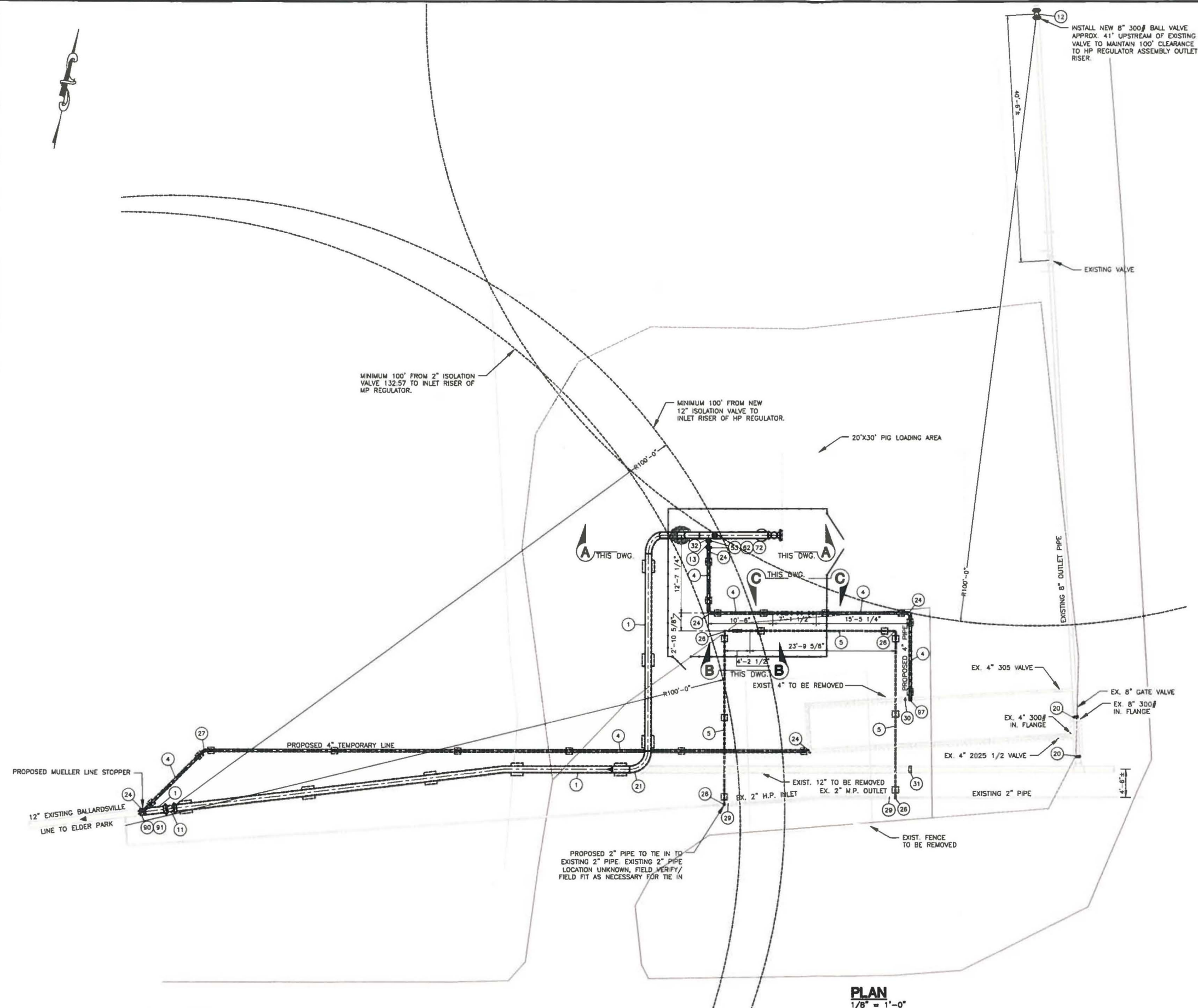
All dimensions given in inches for common diameters and wall thicknesses.  
 Dimensions in accordance with ASME B16.9. Other sizes, schedules and wall thicknesses also available.  
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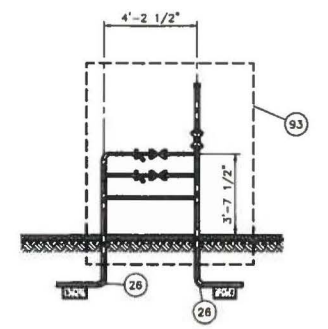
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 6900 ENTERPRISE DR  
 Louisville, Kentucky 40214

**LGE** GAS & ELECTRIC ENGINEERING

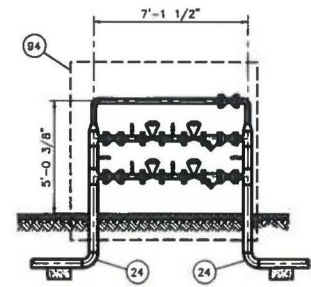
| REVISIONS |    | Title                                     |      |               |              |
|-----------|----|---|------|---------------|--------------|
| DATE      | BY | BALLARDSVILLE LINE<br>PIGGABILITY PROJECT |      |               |              |
|           |    | Scale:                                    | NONE | Date:         | 4-24-14      |
|           |    | Approved By:                              |      | Gas Design:   | ROBISON      |
|           |    |   |      | Elec. Design: | GAS-D-023151 |



**SECTION A-A**  
1/4" = 1'-0"  
THIS DWG.



**SECTION B-B**  
1/4" = 1'-0"  
THIS DWG.



**SECTION C-C**  
1/4" = 1'-0"  
THIS DWG.

**PLAN**  
1/8" = 1'-0"

**SITE #1**

**ISSUED FOR CONSTRUCTION**  
06/02/2014

| GENERAL NOTES |             | REFERENCE DRAWINGS |      |    | REVISIONS   |     |      | REVISIONS |             |     | DRAWING STATUS |                             | SCALE:   |
|---------------|-------------|--------------------|------|----|-------------|-----|------|-----------|-------------|-----|----------------|-----------------------------|----------|
| DWG. NO.      | DESCRIPTION | NO.                | DATE | BY | DESCRIPTION | NO. | DATE | BY        | DESCRIPTION | NO. | DATE           | DESCRIPTION                 | AS SHOWN |
|               |             |                    |      |    |             |     |      |           |             | A   | 04/17/14       | ISSUED FOR CLIENT REVIEW    | 04/23/14 |
|               |             |                    |      |    |             |     |      |           |             | B   | 04/30/14       | RE-ISSUED FOR CLIENT REVIEW | 05/02/14 |
|               |             |                    |      |    |             |     |      |           |             | D   | 05/02/14       | ISSUED FOR CONSTRUCTION     | 05/02/14 |

**EMSENG**  
ENGINEERING MANAGEMENT & SERVICES CO.

CORPORATE OFFICE:  
100 WILLOW DRIVE  
P.O. BOX 1007  
MORRISVILLE, NC 27560  
TEL: (800) 873-0278 • FAX: (800) 873-5872

BRANCH OFFICES:  
HOUSTON, TX • BETHOFS, MS • BAYTOWN, TX  
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**IGE KU**

PPL companies

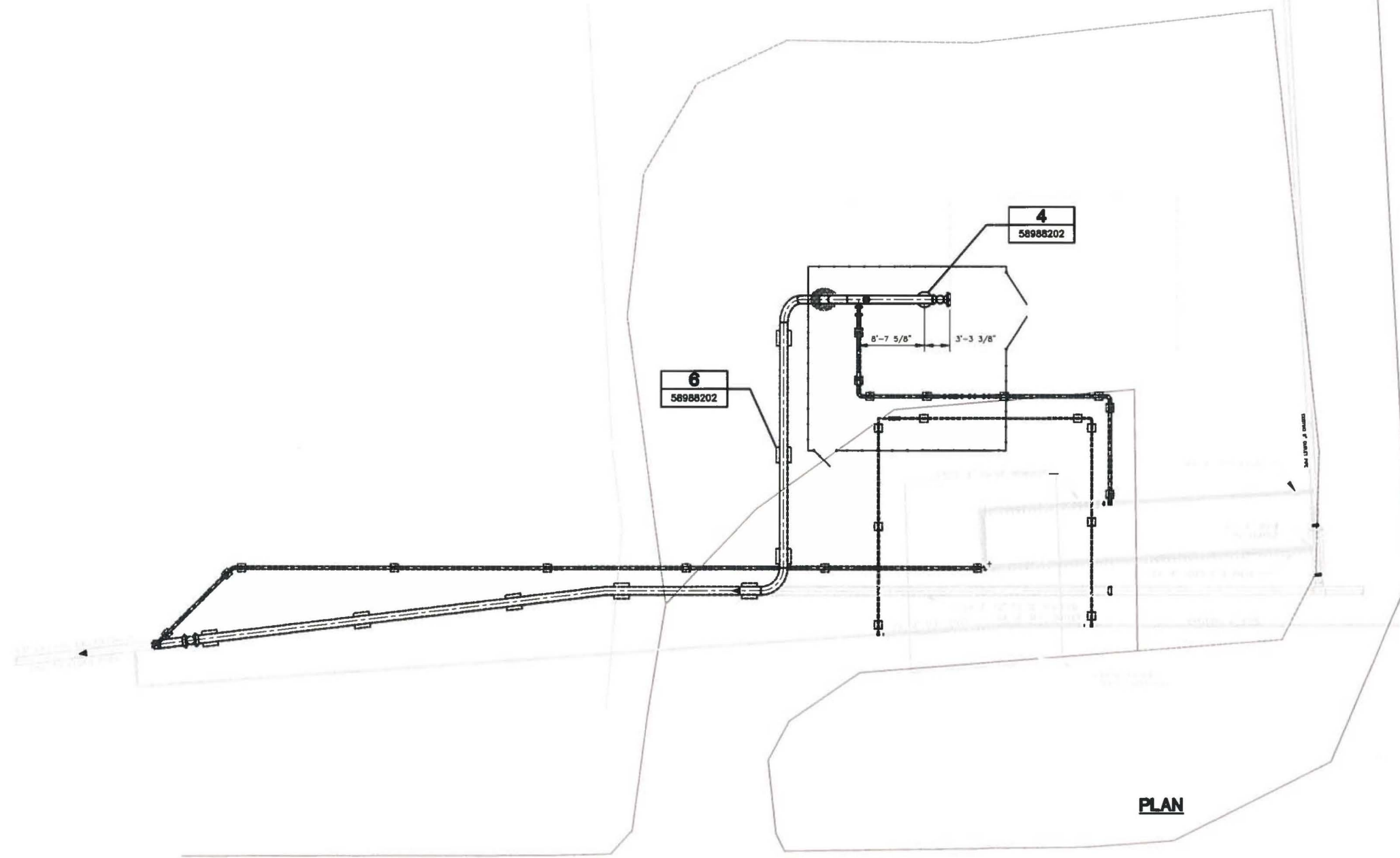
ISSUING PLAN

**BALLARDSVILLE LINE PIGGABILITY**  
MOODY LN. RECEIVER LAYOUT  
OLDHAM COUNTY, KY

NO. 58984101

REV. 0

Z:\5898 - LG&E - Ballardsville\_V000-Piping\_58984101.dwg Plotdate: May 05, 2014 - 10:50am by CRoberts



SITE #1

RE-ISSUED FOR  
REVIEW  
05/02/14

Z:\5898\5898-Structure\58988102.dwg Plotted: May 02, 2014 - 9:12am by mcdonn

**GENERAL NOTES**

**NOTE:**  
ALL DIMENSIONS OF EXISTING CONDITIONS SHALL BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCING WORK. DIMENSIONS OF EXISTING CONDITIONS TO NEW CONDITIONS ARE BASED UPON SURVEY INFORMATION AND ARE TO BE VERIFIED BY CONTRACTOR TO ENSURE PROPER FIT-UP.

| REFERENCE DRAWINGS |             |  | REVISIONS |      |    | REVISIONS |      |    | DRAWING STATUS |          |                             |
|--------------------|-------------|--|-----------|------|----|-----------|------|----|----------------|----------|-----------------------------|
| DWG. NO.           | DESCRIPTION |  | NO.       | DATE | BY | NO.       | DATE | BY | NO.            | DATE     | DESCRIPTION                 |
|                    |             |  |           |      |    |           |      |    | A              | 04/17/14 | ISSUED FOR CLIENT REVIEW    |
|                    |             |  |           |      |    |           |      |    | B              | 04/30/14 | RE-ISSUED FOR CLIENT REVIEW |
|                    |             |  |           |      |    |           |      |    | 0              | 05/02/14 | ISSUED FOR CONSTRUCTION     |
|                    |             |  |           |      |    |           |      |    |                |          |                             |
|                    |             |  |           |      |    |           |      |    |                |          |                             |
|                    |             |  |           |      |    |           |      |    |                |          |                             |

SCALE: 1" = 5'

DRAWN: ASA DATE: 04/14/14  
 CHK'D: AUC DATE: 05/02/14  
 APPROVED: WAF DATE: 05/02/14

DWG. JOB NO.: 5898  
 A/E/P. O. NO.:  
 CLIENT FILE NO.:  
 DWS FILE NO.: 58988102.dwg

**ICE KU**

PPL companies

ENGINEERING

CORPORATE OFFICE:  
100 WILSON DRIVE  
P.O. BOX 1007  
VERMILION, KY 40383  
TEL: (606) 873-0576 • FAX: (606) 873-8872

BRANCH OFFICES:  
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CHARLESTON, WV • PITTSBURGH, PA  
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BALLARDSVILLE LINE PIGGABILITY  
MOODY LN. FOUNDATION LOCATION  
OLDHAM COUNTY, KY

NO. 58988102 REV. 0

**BILL OF MATERIAL**

**EMS #5898 - LG&E Ballardsville Piggability Project Moody Lane**

| NO.                   | QTY. | DESCRIPTION  |
|-----------------------|------|--|
| <b>PIPE</b>           |      |  |
| 1                     | 110' | PIPE, 12.750" O.D. X 0.250" W.T., API-5L PSL2, X-42, ERW, w/ 14-16 mils FBE  |
| 2                     | 12'  | PIPE, 12.750" O.D. X 0.375" W.T., API-5L PSL2, X-42, ERW, BARE   |
| 3                     | 6'   | PIPE, 12.750" O.D. X 0.375" W.T., API-5L PSL2, X-42, ERW, w/ 14-16 mils FBE  |
| 4                     | 168' | PIPE, 4.500" O.D. X 0.237" W.T., API-5L PSL2, X-42, ERW, w/ 14-16 mils FBE   |
| 5                     | 82'  | PIPE, 2.375" O.D. X 0.218" W.T., API-5L PSL2, GR. B/X-42, ERW, w/ 14-16 mils FBE   |
| 6                     | 1'   | PIPE, 4.500" O.D. X 0.237" W.T., API-5L PSL2, X-42, ERW, BARE  |
| <b>VALVES</b>         |      |  |
| 10                    | 1    | VALVE, BALL, 12" ANSI 300, W x RFFE, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D  |
| 11                    | 1    | VALVE, BALL, 12" ANSI 300, W x W, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D, W/ 2" NUT FOR BURIED SERVICE                 |
| 12                    | 1    | VALVE, BALL, 8" ANSI 300, W x W, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D, W/ 2" NUT FOR BURIED SERVICE                  |
| 13                    | 2    | VALVE, BALL, 4" ANSI 300, RFFE, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D   |
| 14                    | 1    | VALVE, BALL 1", FNPT, 3000 PSI WP, FULL OPENING, THREADED, CARBON STEEL BODY, W/LEVER  |
| <b>WELD FITTINGS</b>  |      |  |
| 20                    | 2    | CAP, WELD, 8.625" O.D. X 0.322" W.T., MSS-SP75 WPHY42  |
| 21                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 90°, 0.375" W.T., MSS SP-75 GR. WPHY42, TAPER BORE TO 0.250"                             |
| 22                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 45°, 0.375" W.T., MSS SP-75 GR. WPHY42   |
| 24                    | 6    | ELL, WELD, 4.500" O.D. X 0.237" W.T., 90° LR, MSS-SP75 WPHY42  |
| 26                    | 6    | ELL, WELD, 2.375" O.D. X 0.218" W.T., 90° LR, ASTM A-234 GR. WPB   |
| 27                    | 1    | ELL, WELD, 4.500" O.D. X 0.237" W.T., 45° LR, MSS-SP75 WPHY42  |
| 29                    | 2    | CAP, WELD, 2.375" O.D. X 0.218" W.T., ASTM A-234 GR. WPB   |
| 30                    | 1    | CAP, WELD, 4.500" O.D. X 0.237" W.T., MSS-SP75 WPHY42  |
| 31                    | 1    | CAP, WELD, 12.375" O.D. X 0.375" W.T., MSS-SP75 WPHY42, TAPER BORE TO 0.250"   |
| 32                    | 2    | SADDLE, WELD, 4.500" ON 12.750", GR. X-42, STD WALL  |
| 33                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 90°, 0.375" W.T., MSS SP-75 GR. WPHY42, TAPER BORE ONE SIDE TO 0.250"                    |
| <b>FLANGES</b>        |      |  |
| 51                    | 1    | FLANGE, BLIND, 12" ANSI 300, RF, ASTM A-105, CD&T 1"   |
| 52                    | 1    | FLANGE, BLIND, 4" ANSI 300, RF, ASTM A-105   |
| 53                    | 2    | FLANGE, WELD, 4" ANSI 300, RFWN, STD. BORE, ASTM A-105   |
| <b>GASKETS</b>        |      |  |
| 60                    | 1    | GASKET, 12" ANSI 300, FLEXITALLIC TYPE CGI, SPIRALWOUND, 1/8" THK, 304 WND, GRAPHITE FILLER, 304 IR, CS OR.                        |
| 62                    | 4    | GASKET, 4" ANSI 300, FLEXITALLIC TYPE CGI, SPIRALWOUND, 1/8" THK, 304 WND, GRAPHITE FILLER, 304 IR, CS OR.                         |
| <b>STUD BOLTS</b>     |      |  |
| 70                    | 16   | STUD BOLT, 1-1/8" DIA. X 6-3/4" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (12" ANSI 300; 16 PER SET) TEFLON COATED |
| 72                    | 32   | STUD BOLT, 3/4" DIA. X 4-1/2" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (4" ANSI 300; 8 PER SET) TEFLON COATED     |
| <b>MISC. MATERIAL</b> |      |  |
| 90                    | 1    | 12" MUELLER NO-BLO LINE STOPPER FITTING  |
| 91                    | 1    | 12" MUELLER PIG-PLUG LINE STOPPER FITTING INSERT CATALOG NUMBER 682644   |
| 93                    | 1    | 2" LG&E MP REGULATOR STATION ASSEMBLY  |
| 94                    | 1    | 4" LG&E HP REGULATOR STATION ASSEMBLY  |
| 95                    | 1    | NIPPLE, 1" NOMINAL X 4" LONG, XH, SMLS, A106 GR.B, T.B.E.  |
| 96                    | 1    | PLUG, HEX HEAD, 1" MNPT, 6000#, ASTM A-105   |
| 97                    | 1    | 4" MUELLER NO-BLO LINE STOPPER FITTING   |

**SITE #1**

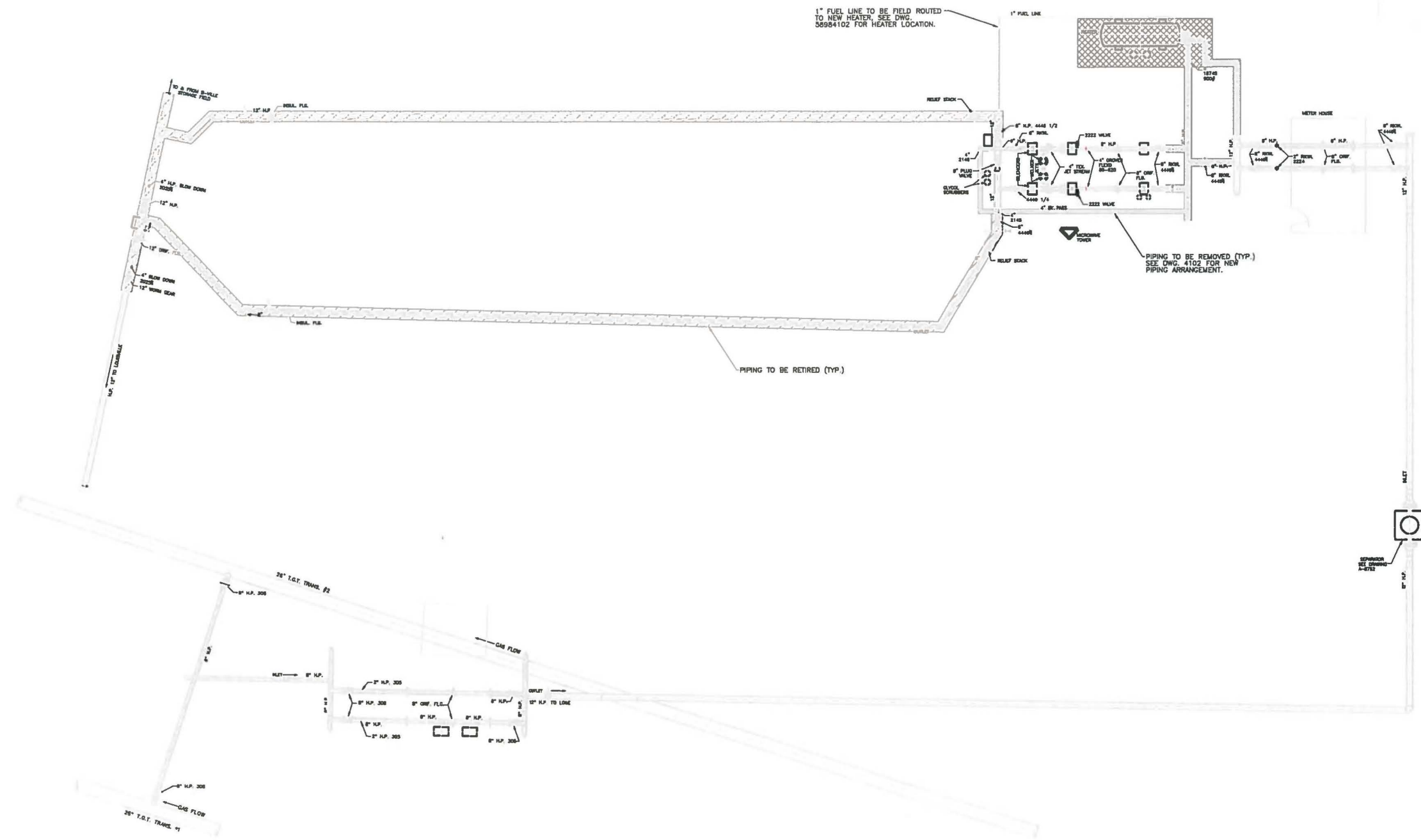
**ISSUED FOR CONSTRUCTION**  
06/02/2014

Z:\5898 - LG&E - Ballardsville\_V000-Piglog\_58984901.dwg PlotDate: May 05, 2014 - 11:53:am by CRoberts

| GENERAL NOTES | REFERENCE DRAWINGS |             | REVISIONS |      |    | REVISIONS   |     |      | DRAWING STATUS |             | SCALE: NTS |                             | CORPORATE OFFICE:<br>108 FIELDS DRIVE<br>P.O. BOX 1007<br>VERMILION, KY 40383<br>TEL:(606) 873-0078 • FAX:(606) 873-0873 |                | PPL companies<br>BALLARDSVILLE LINE PIGGABILITY<br>MOODY LN. RECEIVER LAYOUT<br>OLDHAM COUNTY, KY | NO. | REV. |     |
|---------------|--------------------|-------------|-----------|------|----|-------------|-----|------|----------------|-------------|------------|-----------------------------|--|----------------|---|-----|------|-----|
|               | DWG. NO.           | DESCRIPTION | NO.       | DATE | BY | DESCRIPTION | NO. | DATE | BY             | DESCRIPTION |            |                             |  |                |   |     |      | NO. |
|               |                    |             |           |      |    |             |     |      |                |             |            |                             |  |                |   |     |      |     |
|               |                    |             |           |      |    |             |     |      |                | A           | 04/17/14   | ISSUED FOR CLIENT REVIEW    | DRAWN: CHR   | DATE: 04/16/14 |   |     |      |     |
|               |                    |             |           |      |    |             |     |      |                | B           | 04/30/14   | RE-ISSUED FOR CLIENT REVIEW | CHECK: MAS   | DATE: 05/02/14 |   |     |      |     |
|               |                    |             |           |      |    |             |     |      |                | 0           | 05/02/14   | ISSUED FOR CONSTRUCTION     | APPROVED: JAF  | DATE: 05/02/14 |   |     |      |     |
|               |                    |             |           |      |    |             |     |      |                |             |            |                             | EMS JOB NO.:   | 2883           |   |     |      |     |
|               |                    |             |           |      |    |             |     |      |                |             |            |                             | APP. P.O. NO.:   |                |   |     |      |     |
|               |                    |             |           |      |    |             |     |      |                |             |            |                             | CLIENT FILE NO.:   |                |   |     |      |     |
|               |                    |             |           |      |    |             |     |      |                |             |            |                             | EMS FILE NO.:  | 58984901.dwg   |   |     |      |     |

58984901

Z:\5898 - LGE - Ballardsville\4000-Piping\58984102.dwg Printed: Apr 25, 2014 - 2:20pm by crosbert



**SITE #2  
RETIREMENT**

**ISSUED FOR  
CONSTRUCTION  
04/25/2014**

| GENERAL NOTES |  |
|---------------|--|
|               |  |

| REFERENCE DRAWINGS |  |     |      |    |
|--------------------|--|-----|------|----|
| DWG. NO.           | DESCRIPTION                            | NO. | DATE | BY |
| 58984102           | NEW PIPING PLAN - ELDER PARK CITY GATE |     |      |    |
| 58984301           | SECTIONS - ELDER PARK CITY GATE        |     |      |    |
| 58984302           | SECTIONS - ELDER PARK CITY GATE        |     |      |    |
| 58984902           | BILL OF MATERIAL                       |     |      |    |
| 58984903           | BILL OF MATERIAL                       |     |      |    |

| REVISIONS |      |    |             |     | REVISIONS |    |             |  |  |
|-----------|------|----|-------------|-----|-----------|----|-------------|--|--|
| NO.       | DATE | BY | DESCRIPTION | NO. | DATE      | BY | DESCRIPTION |  |  |
|           |      |    |             |     |           |    |             |  |  |

| DRAWING STATUS |          |                          |
|----------------|----------|--------------------------|
| NO.            | DATE     | DESCRIPTION              |
| A              | 04/17/14 | ISSUED FOR CLIENT REVIEW |
| 0              | 04/25/14 | ISSUED FOR CONSTRUCTION  |

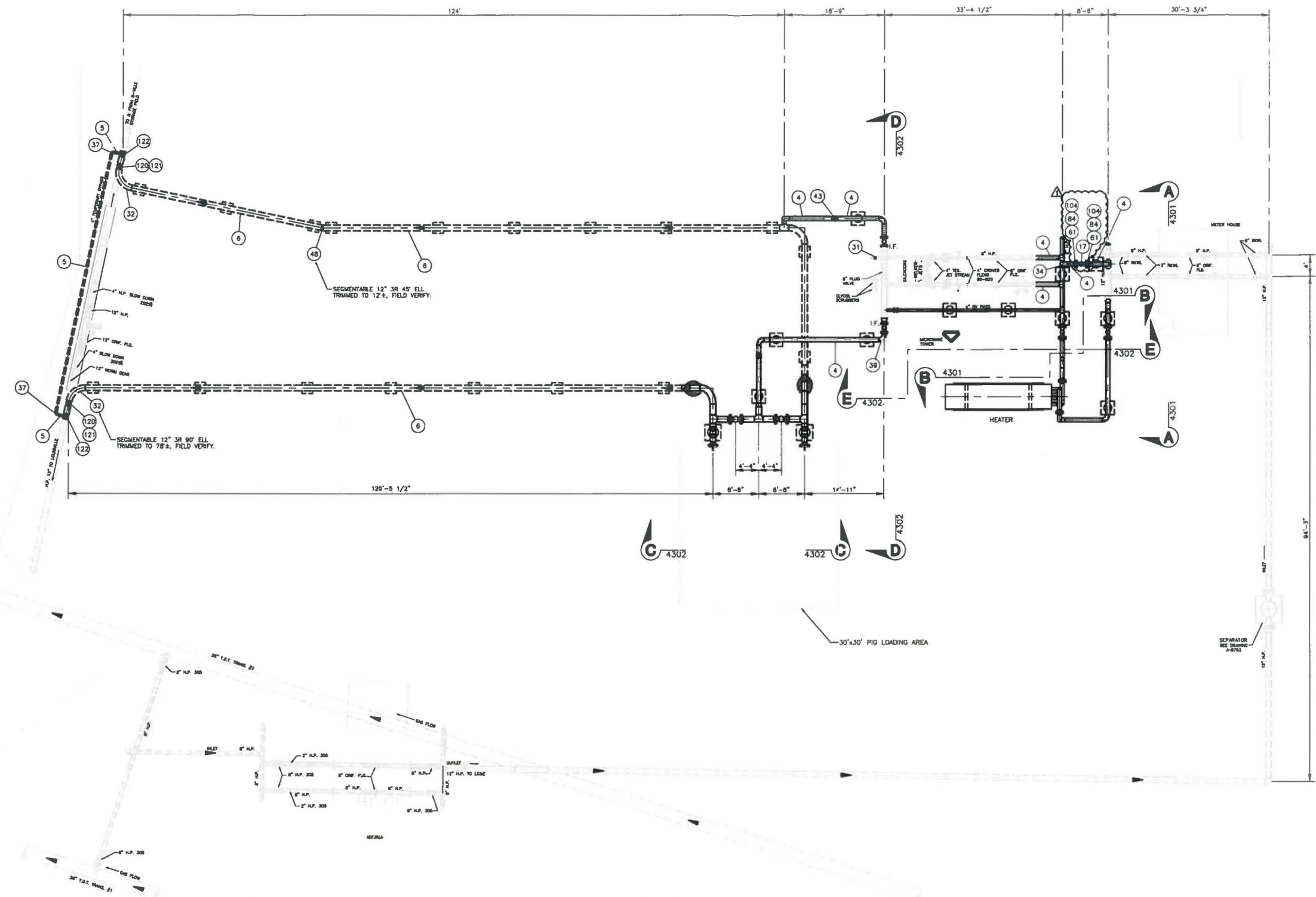
SCALE: 1" = 10'-0"

**Corporate Office:**  
 105 HOLDING DRIVE  
 WHEELERS, KY 40385  
 TEL (606) 675-0975 • FAX (606) 675-0872

**Branch Offices:**  
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 www.amsseng.com

**Ballardsville Line Piggability**  
 ELDER PARK CITY GATE  
 OLDHAM COUNTY, KY

NO. 58984102      REV. 0



**SITE #2  
PROPOSED**

**RE-ISSUED FOR  
CONSTRUCTION  
04/30/2014**

Z:\5898 - LG&E - Ballardsville\4000-Piping\58984103.dwg Printed: Apr 29, 2014 - 2:35pm by crobant

**GENERAL NOTES**

**REFERENCE DRAWINGS**

**REVISIONS**

**REVISIONS**

**DRAWING STATUS**

SCALE: 1" = 10'

| DWG. NO. | DESCRIPTION            |
|----------|------------------------|
| 58984102 | PIPING DEMOLITION PLAN |
| 58984301 | SECTIONS               |
| 58984302 | SECTIONS               |
| 58984902 | BILL OF MATERIAL       |
| 58984903 | BILL OF MATERIAL       |

| NO. | DATE | BY | DESCRIPTION |
|-----|------|----|-------------|
|     |      |    |             |
|     |      |    |             |
|     |      |    |             |
|     |      |    |             |

| NO. | DATE | BY | DESCRIPTION |
|-----|------|----|-------------|
|     |      |    |             |
|     |      |    |             |
|     |      |    |             |
|     |      |    |             |

| NO. | DATE     | DESCRIPTION                |
|-----|----------|----------------------------|
| A   | 04/17/14 | ISSUED FOR CLIENT REVIEW   |
| 0   | 04/25/14 | ISSUED FOR CONSTRUCTION    |
| 1   | 04/30/14 | RE-ISSUED FOR CONSTRUCTION |

|                  |                |
|------------------|----------------|
| DRWING           | DATE: 04/03/14 |
| CHK'D            | DATE: 04/30/14 |
| APPROVED         | DATE: 04/30/14 |
| DWG JOB NO.:     | 5898           |
| CLIENT FILE NO.: |                |
| DWG FILE NO.:    | 58984103.dwg   |

**EM&E ENGINEERING & SURVEYING, INC.**

**CORPORATE OFFICE:**  
100 PULASKI DRIVE  
VERMILION, KY 40383  
TEL: (606) 673-0670 • FAX: (606) 673-0672

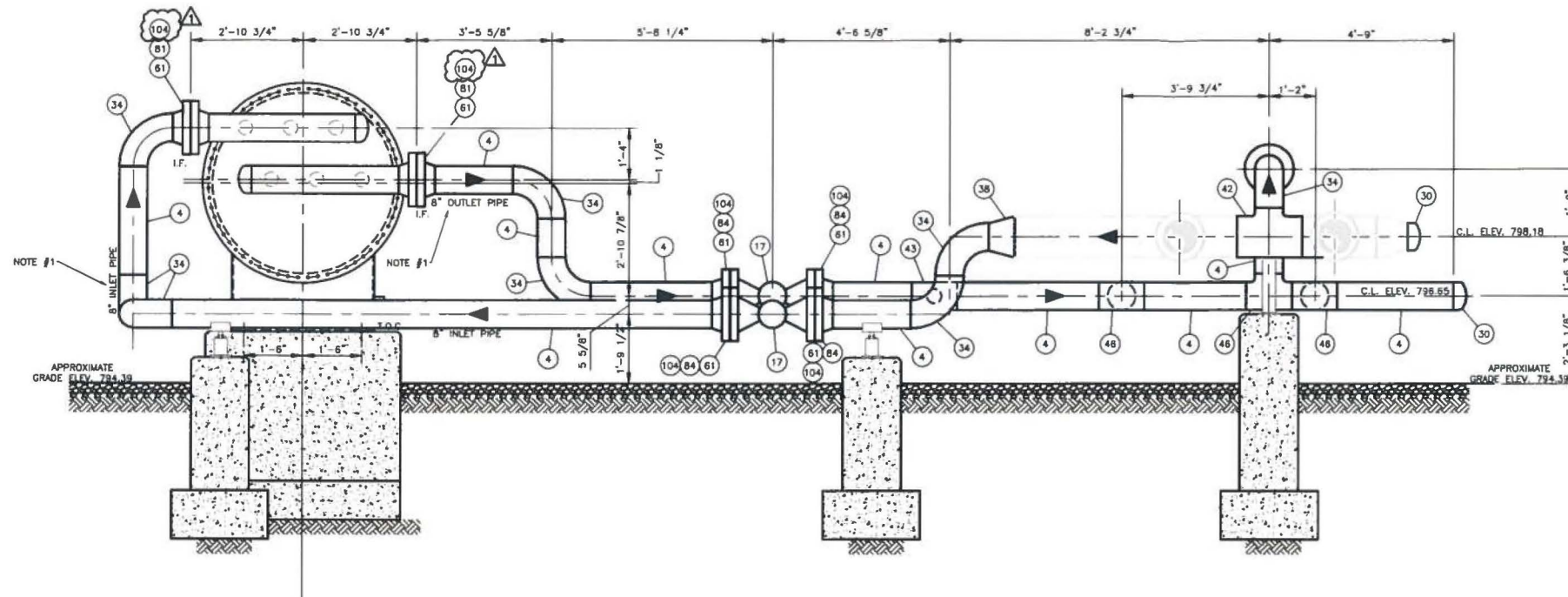
**BRANCH OFFICES:**  
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CHARLESTON, WV • PITTSBURGH, PA  
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**IG&E KU**

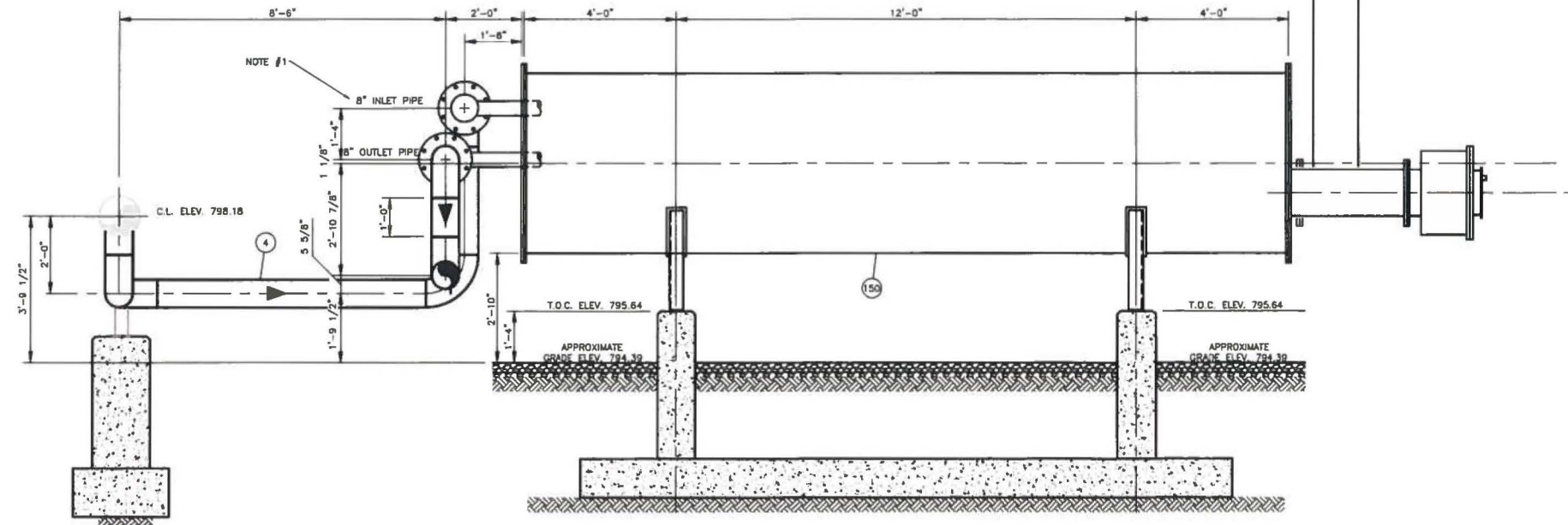
PPL companies  
ENGINEERING

**BALLARDSVILLE LINE PIGGABILITY  
ELDER PARK CITY GATE**  
OLDHAM COUNTY, KY

NO. **58984103** REV. **1**



**SECTION A-A**  
4103



**SECTION B-B**  
4103

**SITE #2**

**RE-ISSUED FOR CONSTRUCTION**  
04/30/2014

Z:\5898 - LG&E - Ballardsville\_4000-Piping\58984301.dwg Printed: Apr 29, 2014 - 2:14pm by eroberts

| GENERAL NOTES   |                  | REFERENCE DRAWINGS |             |    |             | REVISIONS |      |    |             | REVISIONS |          |                            |          | DRAWING STATUS |      | SCALE: 1/2" = 1' |      | CORPORATE OFFICE: |      | BRANCH OFFICES: |  |
|---|------------------|--------------------|-------------|----|-------------|-----------|------|----|-------------|-----------|----------|----------------------------|----------|----------------|------|------------------|------|-------------------|------|-----------------|--|
| DWG. NO.  | DESCRIPTION      | NO.                | DATE        | BY | DESCRIPTION | NO.       | DATE | BY | DESCRIPTION | NO.       | DATE     | DESCRIPTION                | DATE     | DESCRIPTION    | DATE | DATE             | DATE | DATE              | DATE |                 |  |
| 1. HEATER INLET AND OUTLET WERE REVERSED PER LG&E AS SHOWN. |                  | 58984103           | PIPING PLAN |    |             |           |      |    |             | A         | 04/17/14 | ISSUED FOR CLIENT REVIEW   | 04/17/14 |                |      |                  |      |                   |      |                 |  |
| 58984302  | SECTIONS         |                    |             |    |             |           |      |    |             | 0         | 04/25/14 | ISSUED FOR CONSTRUCTION    | 04/25/14 |                |      |                  |      |                   |      |                 |  |
| 58984902  | BILL OF MATERIAL |                    |             |    |             |           |      |    |             | 1         | 04/30/14 | RE-ISSUED FOR CONSTRUCTION | 04/30/14 |                |      |                  |      |                   |      |                 |  |
| 58984903  | BILL OF MATERIAL |                    |             |    |             |           |      |    |             |           |          |                            |          |                |      |                  |      |                   |      |                 |  |

**ICE KU**

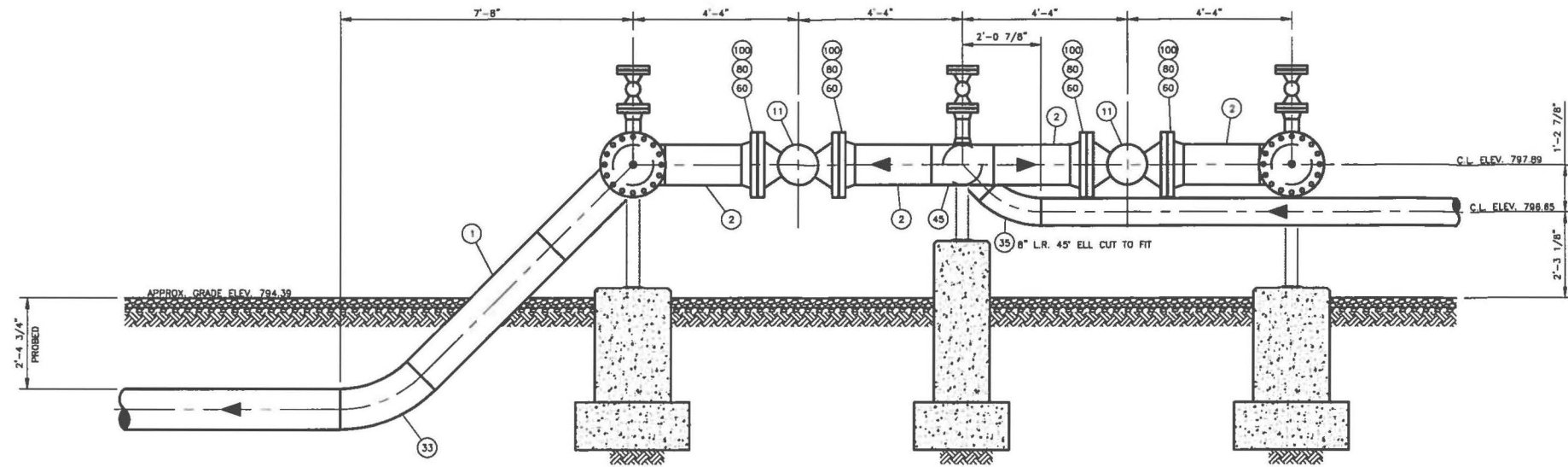
INGENIERING & CONSTRUCTION

100 HOLDEN DRIVE  
VERMILION, KY 40383  
TEL: (606) 673-0276 • FAX: (606) 673-8872

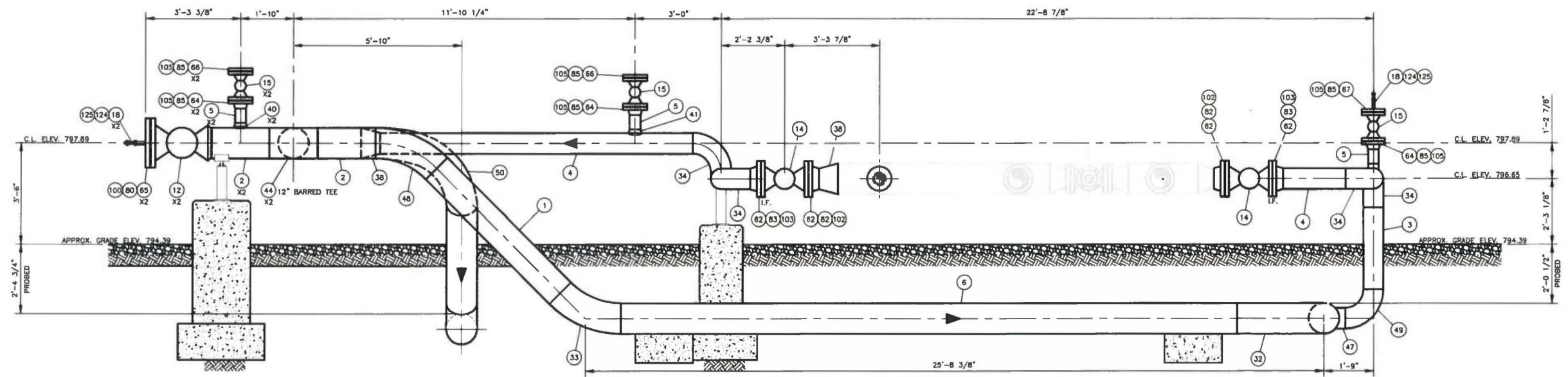
BRANCH OFFICES:  
HOUSTON, TX • BOSTON, MA • BRYANTON, TX  
CHATELAIN, WV • PITTSBURGH, PA  
www.iceku.com

NO. 58984301

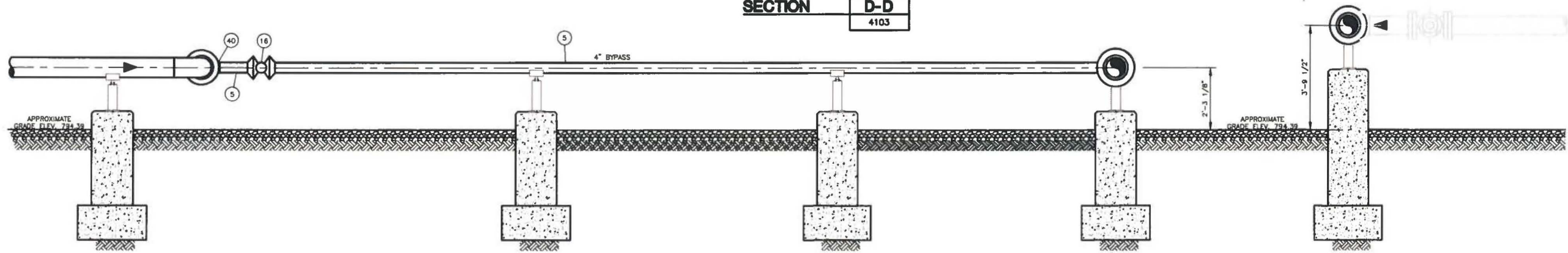
REV. 1



**SECTION C-C**  
4103



**SECTION D-D**  
4103



**SECTION E-E**  
4103

**SITE #2**  
**ISSUED FOR CONSTRUCTION**  
04/28/2014

**GENERAL NOTES**

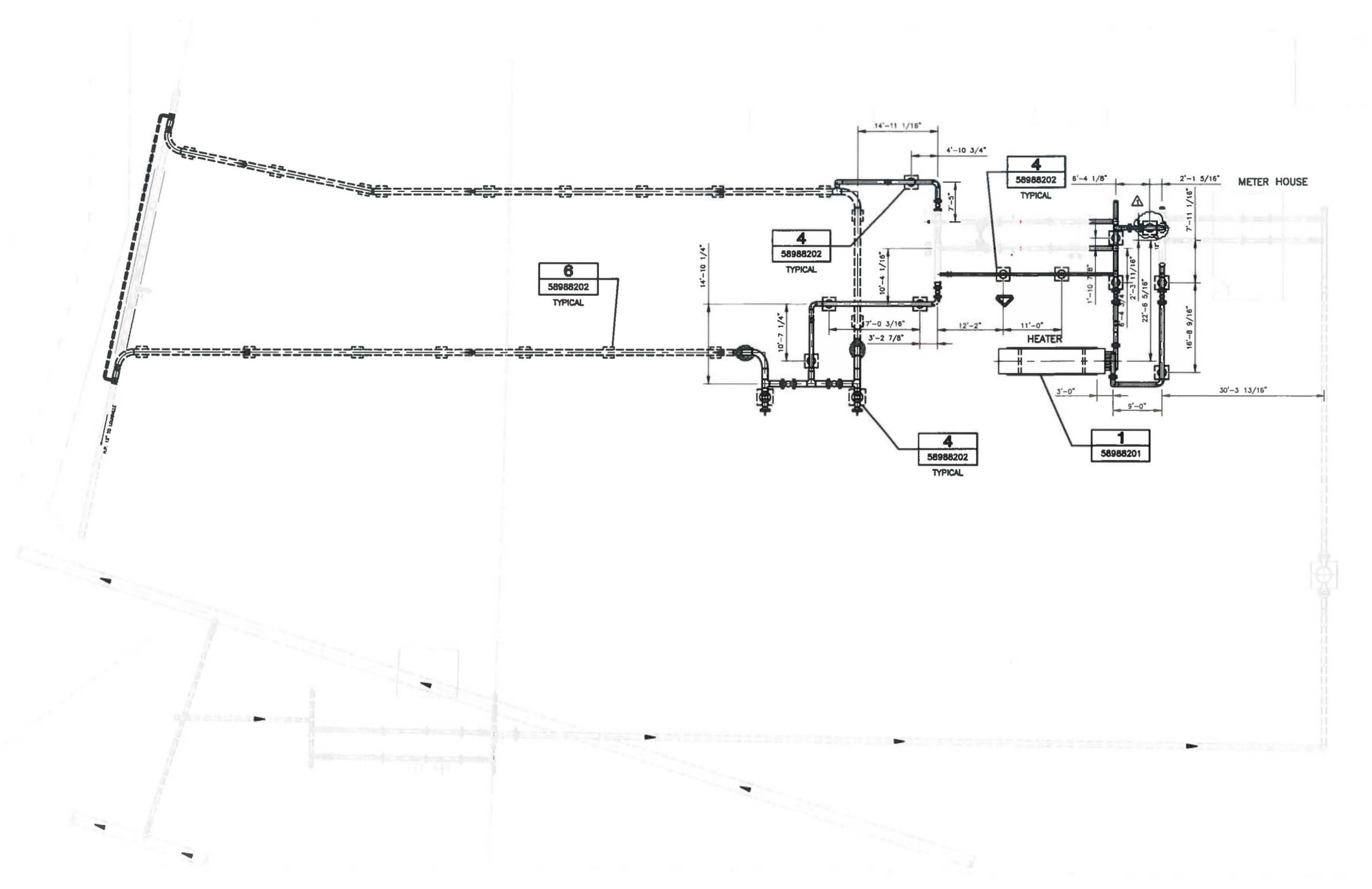
| REFERENCE DRAWINGS |                  | REVISIONS |      |    | REVISIONS |      |    | DRAWING STATUS |             |                          |
|--------------------|------------------|-----------|------|----|-----------|------|----|----------------|-------------|--------------------------|
| DWG. NO.           | DESCRIPTION      | NO.       | DATE | BY | NO.       | DATE | BY | NO.            | DESCRIPTION |                          |
| 58984103           | PIPING PLAN      |           |      |    |           |      |    | A              | 04/17/14    | ISSUED FOR CLIENT REVIEW |
| 58984301           | SECTIONS         |           |      |    |           |      |    | 0              | 04/25/14    | ISSUED FOR CONSTRUCTION  |
| 58984902           | BILL OF MATERIAL |           |      |    |           |      |    |                |             |                          |
| 58984903           | BILL OF MATERIAL |           |      |    |           |      |    |                |             |                          |

SCALE: 1/2" = 1'  
 DRAWN: SED DATE: 04/03/14  
 CHK'D: MAS DATE: 04/25/14  
 APPROVED: MAF DATE: 04/23/14  
 DWS JOB NO.: 5893  
 A/E/P/DWG.:  
 CLIENT FILE NO.:  
 DWS FILE NO.: 58984302.dwg

**ICE KU**  
 PPL companies  
 PIPING SECTIONS AND DETAILS  
 BALLARDSVILLE LINE PIGGABILITY  
 ELDER PARK CITY GATE PIPE SECTIONS AND DETAILS  
 OLDHAM COUNTY, KY  
 58984302  
 REV. 0

Z:\5898 - LG&E - Ballardsville Line Piping - 58984302.dwg Plot Date: Apr 25, 2014 - 2:27pm by: crobot





**SITE #2  
PROPOSED**

**RE-ISSUED FOR  
CONSTRUCTION  
04/25/14**

Z:\58988 - LG&E - Ballardsville\B000-Structural\58988101.dwg Plotdate: Apr 29, 2014 - 2:29pm by wsdems

**GENERAL NOTES**

**NOTE:**  
ALL DIMENSIONS OF EXISTING CONDITIONS SHALL BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCING WORK. DIMENSIONS OF EXISTING CONDITIONS TO NEW CONDITIONS ARE BASED UPON SURVEY INFORMATION AND ARE TO BE VERIFIED BY CONTRACTOR TO ENSURE PROPER FIT-UP.

| REFERENCE DRAWINGS |             | REVISIONS |      |    | REVISIONS   |     |          | DRAWING STATUS |                            |
|--------------------|-------------|-----------|------|----|-------------|-----|----------|----------------|----------------------------|
| DWG. NO.           | DESCRIPTION | NO.       | DATE | BY | DESCRIPTION | NO. | DATE     | BY             | DESCRIPTION                |
|                    |             |           |      |    |             | A   | 04/17/14 |                | ISSUED FOR CLIENT REVIEW   |
|                    |             |           |      |    |             | 0   | 04/25/14 |                | ISSUED FOR CONSTRUCTION    |
|                    |             |           |      |    |             | 1   | 04/30/14 |                | RE-ISSUED FOR CONSTRUCTION |

SCALE: 1" = 10'

DRAWN: ASA DATE: 04/11/14  
 CHK'D: LJC DATE: 04/30/14  
 APPROVED: WAF DATE: 04/20/14  
 DES. JOB NO.: 5898  
 A/E/P. D.A.M.  
 CLIENT FILE NO.  
 DES. FILE NO.: 58988101.dwg

**ICE KU**

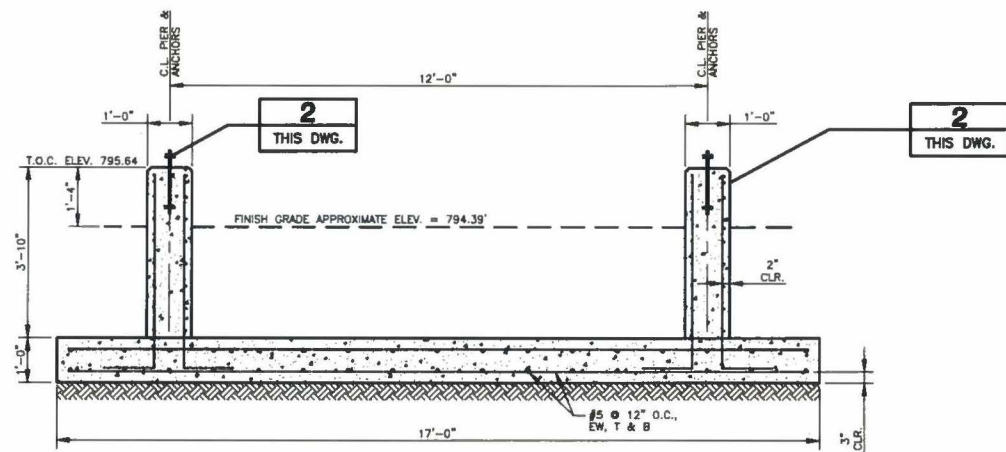
PPL companies

CORPORATE OFFICE:  
100 WILSON DRIVE  
P.O. BOX 1007  
WESSELICA, KY 40385  
TEL: (502) 873-5073 • FAX: (502) 873-5872

BRANCH OFFICES:  
HOUSTON, TX • DETROIT, MI • BAYTOWN, TX  
CHARLESTON, WV • PITTSBURGH, PA  
www.emeeng.com

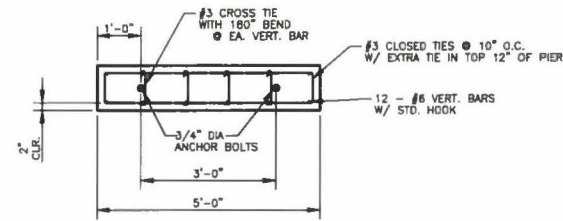
BALLARDSVILLE LINE PIGGABILITY  
ELDER PARK CITY GATE FOUNDATION LOCATION  
OLDHAM COUNTY, KY

NO. 58988101 REV. 1



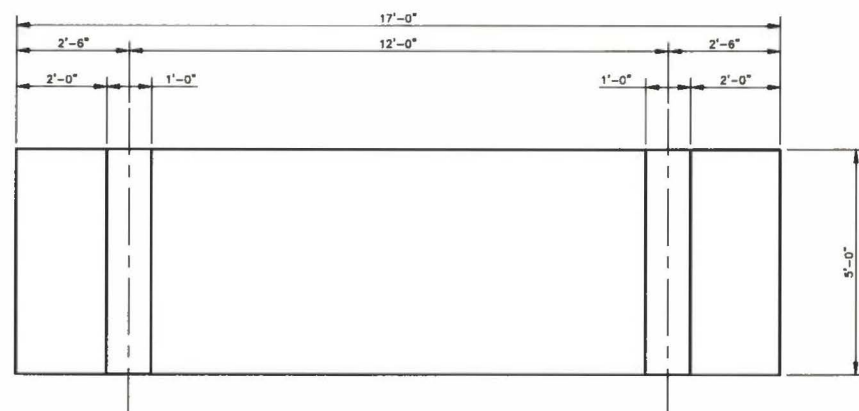
**ELEVATION**

**SECTION A-A**  
THIS DWG.

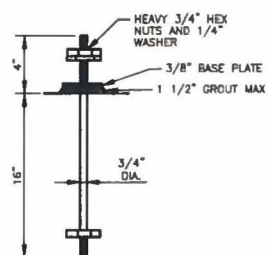


**PIER DETAIL**

**DETAIL 2**  
THIS DWG.



**PLAN**



**ANCHOR ROD DETAIL**

**DETAIL 3**  
THIS DWG.

**NOTES:**

- CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS. ALL CONCRETE SHALL BE AIR-ENTRAINED FOR EXTREME EXPOSURE.  
REINFORCING STEEL SHALL BE NEW BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.  
NET BEARING VALUE OF SOIL IS ASSUMED TO BE 2000 PSF AT A DEPTH OF 4'-0" BELOW FINISHED GRADE.  
THE CONSTRUCTION MANAGER OR HIS REPRESENTATIVE SHALL OBSERVE FOUNDATION EXCAVATIONS TO DETERMINE THE PROPER FOUNDING ELEVATION. HE SHALL DETERMINE THE NEED FOR ADDITIONAL EXCAVATION OR COMPACTION. NO CONCRETE SHALL BE ORDERED WITHOUT HIS AUTHORIZATION.  
ANCHOR BOLTS SHALL BE GALVANIZED AND CONFORM TO ASTM F1554, GRADE 36.  
ALL EXPOSED VERTICAL AND HORIZONTAL EDGES OF CONCRETE SHALL HAVE 3/4" x 45° MINIMUM BEVEL OR CHAMFER, UNLESS OTHERWISE NOTED.  
THE FIELD IS TO VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATION.  
BACKFILL AND COMPACTION OF ALL AREAS WITHIN THE PROJECT LIMITS SHALL BE PERFORMED IN ACCORDANCE WITH LG&E REQUIREMENTS. COMPACTION OF SOIL SHALL BE AT 95% STANDARD PROCTER FOR FOUNDATION CONSTRUCTION.
- SEE CONSTRUCTION SPECIFICATIONS FOR DETAILED INFORMATION.

**HEATER FOUNDATION AND DETAILS**

**DETAIL 1**  
58988101

**SITE #2  
PROPOSED**

**ISSUED FOR  
CONSTRUCTION  
04/25/14**

Z:\58988 - LG&E - Ballardsville\6000-Structure\58988201.dwg Plotted: Apr 29, 2014 - 8:31am by asdama

| GENERAL NOTES |             | REFERENCE DRAWINGS |      |    | REVISIONS   |     |      | REVISIONS |             |     | DRAWING STATUS |                          |          | SCALE: 1/2" = 1'-0" |   |   |
|---------------|-------------|--------------------|------|----|-------------|-----|------|-----------|-------------|-----|----------------|--------------------------|----------|---------------------|---|---|
| DWG. NO.      | DESCRIPTION | NO.                | DATE | BY | DESCRIPTION | NO. | DATE | BY        | DESCRIPTION | NO. | DATE           | DESCRIPTION              | DATE     | DATE                |   |   |
|               |             |                    |      |    |             |     |      |           |             | A   | 04/17/14       | ISSUED FOR CLIENT REVIEW | 03/24/13 |                     | CORPORATE OFFICE:<br>110 HOLDING DRIVE<br>WHEELERS, KY 40385<br>TEL: (606) 673-0676 • FAX: (606) 673-0672 | BALLARDSVILLE LINE PIGGABILITY<br>ELDER PARK HEATER FOUNDATION DETAILS<br>OLDHAM COUNTY, KY |
|               |             |                    |      |    |             |     |      |           |             | 0   | 04/25/14       | ISSUED FOR CONSTRUCTION  | 04/25/14 |                     |   |   |


| BILL OF MATERIAL  |      |   |
|---|------|---|
| EMS #5898 - LG&E Ballardsville Piggability Project Elder Park |      |   |
| NO.   | QTY. | DESCRIPTION   |
| <b>PIPE</b>   |      |   |
| 1   | 12'  | PIPE, 12.750" O.D. X 0.375" W.T., API-5L PSL2, GR. X-42, ERW, w/ 14-18 mils FBE   |
| 2   | 14'  | PIPE, 12.750" O.D. X 0.375" W.T., API-5L PSL2, GR. X-42, ERW, BARE  |
| 3   | 3'   | PIPE, 8.625" O.D. X 0.322" W.T., API-5L PSL2, GR. X-42, ERW, w/ 14-18 mils FBE  |
| 4   | 62'  | PIPE, 8.625" O.D. X 0.322" W.T., API-5L PSL2, GR. X-42, ERW, BARE   |
| 5   | 58'  | PIPE, 4.500" O.D. X 0.237" W.T., API-5L PSL2, GR. X-42, ERW, BARE   |
| 6   | 258' | PIPE, 12.750" O.D. X 0.250" W.T., API-5L PSL2, GR. X-42, ERW, w/ 14-18 mils FBE   |
| <b>VALVES</b>   |      |   |
| 11  | 2    | VALVE, BALL, 12" ANSI 300, RFFE, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D   |
| 12  | 2    | VALVE, BALL, 12" ANSI 300, W x RFFE, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D   |
| 14  | 2    | VALVE, BALL, 8" ANSI 300, RFFE, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D  |
| 15  | 4    | VALVE, BALL, 4" ANSI 300, RFFE, FULL OPENING, LEVER OPERATED, C.S. BODY, PER API-6D   |
| 18  | 3    | VALVE, BALL 1", FNPT, 3000 PSI WP, FULL OPENING, THREADED, CARBON STEEL BODY, W/LEVER   |
| <b>WELD FITTINGS</b>  |      |   |
| 31  | 1    | CAP, WELD, 4.500" O.D. X 0.237" W.T., MSS-SP75 WPHY42   |
| 32  | 3    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 90°, 0.375" W.T., MSS SP-75 GR. WPHY42, TAPER BORE TO 0.250"                              |
| 33  | 2    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 45°, 0.375" W.T., MSS SP-75 GR. WPHY42, TAPER BORE ONE SIDE TO 0.250"                     |
| 34  | 4    | ELL, WELD, 8.625" O.D. X 0.322" W.T., 90° LR, MSS-SP75 WPHY42   |
| 35  | 1    | ELL, WELD, SEGMENTABLE, 8.625" O.D. X 0.322" W.T., 45° LR, MSS-SP75 WPHY42  |
| 37  | 2    | ELL, WELD, 4.500" O.D. X 0.237" W.T., 90° LR, MSS-SP75 WPHY42   |
| 38  | 2    | REDUCER, WELD, CONC., 12.750" O.D. X 8.625" O.D., (0.375" W.T. X 0.322" W.T.), MSS-SP75 WPHY42                                      |
| 40  | 2    | SADDLE, WELD, 4.500" ON 12.750", GR. X-42, STD WALL   |
| 41  | 1    | SADDLE, WELD, 4.500" ON 8.625", GR. X-42, STD WALL  |
| 43  | 1    | TEE, WELD, REDUCING, 8.625" O.D. X 4.500" O.D., (0.322" W.T. X 0.237" W.T.), MSS-SP75 WPHY42  |
| 44  | 2    | TEE, WELD, STRAIGHT, 12.750" O.D. X 0.375" W.T., MSS-SP75 WPHY42, W/ BARRED BRANCH  |
| 45  | 1    | TEE, WELD, STRAIGHT, 12.750" O.D. X 0.375" W.T., MSS-SP75 WPHY42  |
| 47  | 1    | TEE, WELD, REDUCING, 12.750" O.D. X 8.625" O.D., (0.375" W.T. X 0.322" W.T.), MSS-SP75 WPHY42, TAPER BORE TO 0.250" W/BARRED BRANCH |
| 48  | 2    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 45°, 0.375" W.T., MSS SP-75 GR. WPHY42  |
| 49  | 1    | ELL, WELD, 8.625" O.D. X 0.322" W.T., 90° LR, MSS-SP75 WPHY42, TAPER BORE TO 0.250"   |
| 50  | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 90°, 0.375" W.T., MSS SP-75 GR. WPHY42  |
| <b>FLANGES</b>  |      |   |
| 60  | 4    | FLANGE, WELD, 12" ANSI 300, RFWN, BTM 0.250" W.T., GR F42   |
| 62  | 4    | FLANGE, WELD, 8" ANSI 300, RFWN, BTM 0.250" W.T., GR F42  |
| 64  | 4    | FLANGE, WELD, 4" ANSI 300, RFWN, STD. BORE, ASTM A-105  |
| 65  | 2    | FLANGE, BLIND, 12" ANSI 300, RF, ASTM A-105, CD&T 1"  |
| 66  | 3    | FLANGE, BLIND, 4" ANSI 300, RF, ASTM A-105  |
| 67  | 1    | FLANGE, BLIND, 4" ANSI 300, RF, ASTM A-105, CD&T 1"   |
| <b>GASKETS</b>  |      |   |
| 80  | 6    | GASKET, 12" ANSI 300, FLEXITALLIC TYPE CGI, SPIRALWOUND, 1/8" THK, 304 WND, GRAPHITE FILLER, 304 IR, CS GR.                         |
| 82  | 2    | GASKET, 8" ANSI 300, FLEXITALLIC TYPE CGI, SPIRALWOUND, 1/8" THK, 304 WND, GRAPHITE FILLER, 304 IR, CS GR.                          |
| 83  | 2    | FLANGE INSULATING KIT, 8" ANSI 300, RF, PHENOLIC SLEEVES & WASHERS, TYPE FNDW, NEOPRENE FACED PHENOLIC GASKET, DOUBLE WASHER SETS   |
| 85  | 6    | GASKET, 4" ANSI 300, FLEXITALLIC TYPE CGI, SPIRALWOUND, 1/8" THK, 304 WND, GRAPHITE FILLER, 304 IR, CS GR.                          |

| BILL OF MATERIAL  |      |   |
|---|------|---|
| EMS #5898 - LG&E Ballardsville Piggability Project Elder Park |      |   |
| NO.   | QTY. | DESCRIPTION   |
| <b>STUD BOLTS</b>   |      |   |
| 100   | 98   | STUD BOLT, 1-1/8" DIA. X 6-3/4" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (12" ANSI 300; 18 PER SET) TEFLON COATED    |
| 102   | 24   | STUD BOLT, 7/8" DIA. X 5-1/2" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (8" ANSI 300; 12 PER SET) TEFLON COATED       |
| 103   | 24   | STUD BOLT, 7/8" DIA. X 6" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (8" ANSI 300 INSUL KIT; 12 PER SET) TEFLON COATED |
| 105   | 64   | STUD BOLT, 3/4" DIA. X 4-1/2" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (4" ANSI 300; 6 PER SET) TEFLON COATED        |
| <b>MISC. MATERIAL</b>   |      |   |
| 120   | 2    | 12" MUELLER NO-BLO LINE STOPPER FITTING   |
| 121   | 2    | 12" MUELLER PIG-PLUG LINE STOPPER FITTING INSERT CATALOG NUMBER 682844  |
| 122   | 2    | 4" MUELLER TAPPING TEE 400# WOG   |
| 123   | 2    | TAPPING TEES (TO BLOW DOWN ISOLATED LINE)   |
| 124   | 3    | NIPPLE, 1" NOMINAL X 4" LONG, XH, SMLS, A108 GR.B, T.B.E.   |
| 125   | 3    | PLUG, HEX HEAD, 1" MNPT, 6000#, ASTM A-105  |

24/0888 - LG&E - Ballardsville LG&E-Piggyback\Users\lgandrew\Projects\Apr 25, 2014 - 2:58pm by cwharts

**REV. 02**  
**READY FOR CONSTRUCTION**  
**04/28/2014**

| GENERAL NOTES |                   | REVISIONS CHANGES |      | REVISIONS |             | REVISIONS |      | REVISIONS |             | REVISIONS |          | REVISIONS |                          | REVISIONS |      | REVISIONS |             | REVISIONS |      | REVISIONS |             |
|---------------|-------------------|-------------------|------|-----------|-------------|-----------|------|-----------|-------------|-----------|----------|-----------|--------------------------|-----------|------|-----------|-------------|-----------|------|-----------|-------------|
| NO.           | DESCRIPTION       | NO.               | DATE | BY        | DESCRIPTION | NO.       | DATE | BY        | DESCRIPTION | NO.       | DATE     | BY        | DESCRIPTION              | NO.       | DATE | BY        | DESCRIPTION | NO.       | DATE | BY        | DESCRIPTION |
| 3884103       | PIPING PLAN       |                   |      |           |             |           |      |           |             | A         | 04/17/14 |           | ISSUED FOR CLIENT REVIEW |           |      |           |             |           |      |           |             |
| 3884301       | SECTIONS          |                   |      |           |             |           |      |           |             | D         | 04/22/14 |           | ISSUED FOR CONSTRUCTION  |           |      |           |             |           |      |           |             |
| 3884302       | SECTIONS          |                   |      |           |             |           |      |           |             |           |          |           |                          |           |      |           |             |           |      |           |             |
| 3884603       | BILL OF MATERIALS |                   |      |           |             |           |      |           |             |           |          |           |                          |           |      |           |             |           |      |           |             |

  
 PPL Companies  
**BALLARDSVILLE LINE PIGGABILITY**  
 ELDER PARK CITY GATE  
 CLATSOP COUNTY, OR  
 58984902

### BILL OF MATERIAL

**EMS #5898 - LG&E Ballardsville Piggability Project Elder Park Heater, Header and Bypass**

| NO.                  | QTY. | DESCRIPTION   |
|----------------------|------|---|
| <b>PIPE</b>          |      |   |
| 4                    | 62'  | PIPE, 8.625" O.D. X 0.322" W.T., API-5L PSL2, GR. X-52, ERW, BARE   |
| 5                    | 32'  | PIPE, 4.500" O.D. X 0.237" W.T., API-5L PSL2, GR. X-52, ERW, BARE   |
| <b>VALVES</b>        |      |   |
| 16                   | 1    | VALVE, BALL, 4" ANSI 600, W x W, FULL OPENING, LEVER OPERATED, C.S. WELDED BODY, PER API-6D                                       |
| 17                   | 3    | VALVE, BALL, 8" ANSI 600, RAISED FACE FLANGE END, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D                              |
| <b>WELD FITTINGS</b> |      |   |
| 30                   | 2    | CAP, WELD, 8.625" O.D. X 0.322" W.T., MSS-SP75 WPHY52   |
| 34                   | 9    | ELL, WELD, 8.625" O.D. X 0.322" W.T., 90° LR, MSS-SP75 WPHY52   |
| 38                   | 1    | REDUCER, WELD, CONC., 12.750" O.D. X 8.625" O.D., (0.375" W.T. X 0.322" W.T.), MSS-SP75 WPHY52                                    |
| 40                   | 1    | SADDLE, WELD, 4.500" ON 12.750", A694 Y52, STD WALL   |
| 42                   | 1    | TEE, WELD, REDUCING, 12.750" O.D. X 8.625" O.D., (0.375" W.T. X .0322" W.T.), MSS-SP75 WPHY52                                     |
| 43                   | 1    | TEE, WELD, REDUCING, 8.625" O.D. X 4.500" O.D., (0.322" W.T. X 0.237" W.T.), MSS-SP75 WPHY52                                      |
| 46                   | 3    | TEE, WELD, STRAIGHT, 8.625" O.D. X 0.322" W.T., MSS-SP75 WPHY52   |
| <b>FLANGES</b>       |      |   |
| 61                   | 8    | FLANGE, WELD, 8" ANSI 600, RFWN, STD. BORE, GR F52  |
| <b>GASKETS</b>       |      |   |
| 81                   | 2    | FLANGE INSULATING KIT, 8" ANSI 600, RF, PHENOLIC SLEEVES & WASHERS, TYPE FNDW, NEOPRENE FACED PHENOLIC GASKET, DOUBLE WASHER SETS |
| 84                   | 6    | GASKET, 8" ANSI 600, FLEXITALLIC TYPE CGI, SPIRALWOUND, 1/8" THK, 304 WND, GRAPHITE FILLER, 304 IR, CS OR.                        |
| <b>STUD BOLTS</b>    |      |   |
| 104                  | 72   | STUD BOLT, 1-1/8" DIA. X 7-3/4" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (8" ANSI 600; 12 PER SET) TEFLON COATED |
| <b>EQUIPMENT</b>     |      |   |
| 150                  | 1    | INDIRECT WATER BATH HEATER  |

Z:\5898 - LG&E - Ballardsville\000-Piping-Piggy\58984903.dwg Plotted: Apr 29, 2014 - 2:34pm by cshelton

SITE #2

RE-ISSUED FOR CONSTRUCTION  
04/30/2014

| GENERAL NOTES | REFERENCE DRAWINGS | REVISIONS | REVISIONS | DRAWING STATUS | SCALE:      | HTS |          |    |                            |     |      |             |
|---------------|--------------------|-----------|-----------|----------------|-------------|-----|----------|----|----------------------------|-----|------|-------------|
| DWG. NO.      | DESCRIPTION        | NO.       | DATE      | BY             | DESCRIPTION | NO. | DATE     | BY | DESCRIPTION                | NO. | DATE | DESCRIPTION |
| 58984103      | PIPING PLAN        |           |           |                |             | 0   | 04/25/14 |    | ISSUED FOR CONSTRUCTION    |     |      |             |
| 58984301      | SECTIONS           |           |           |                |             | 1   | 04/30/14 |    | RE-ISSUED FOR CONSTRUCTION |     |      |             |
| 58984302      | SECTIONS           |           |           |                |             |     |          |    |                            |     |      |             |
| 58984902      | BILL OF MATERIALS  |           |           |                |             |     |          |    |                            |     |      |             |

SCALE: HTS

DRAWN: CHM DATE: 04/25/14

CHECKED: MAS DATE: 04/25/14

APPROVED: MAF DATE: 04/30/14

DWG. JOB NO.: 5898

CLIENT FILE NO.:

DWG. FILE NO.: 58984903.dwg

**PPL** companies

100 PIGGABILITY DRIVE  
VERMILION, KY 40389  
TEL: (606) 673-0070 • FAX: (606) 673-0073

**BALLARDSVILLE LINE PIGGABILITY  
ELDER PARK CITY GATE - HEATER  
OLDHAM COUNTY, KY**

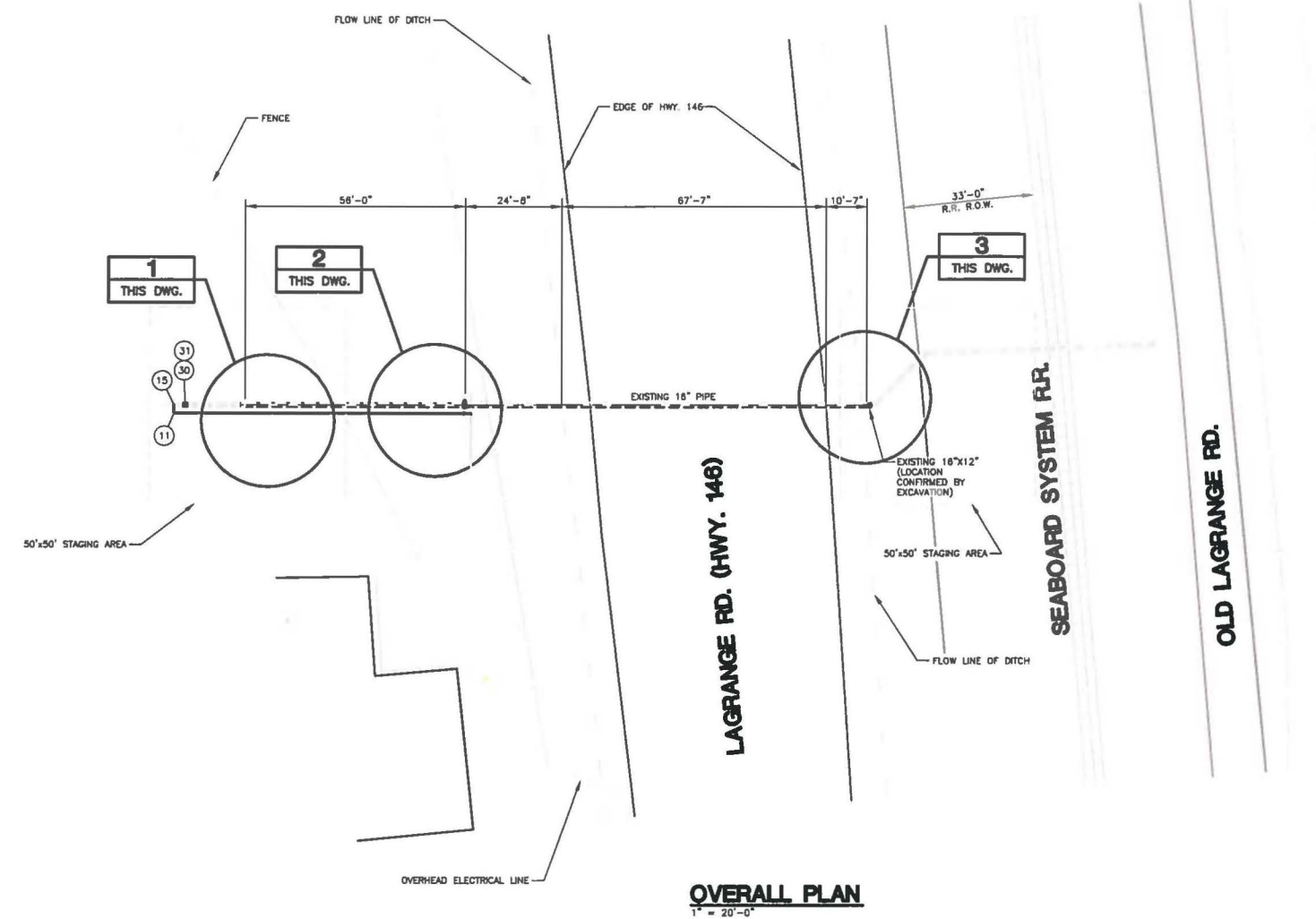
NO. 58984903

REV. 1

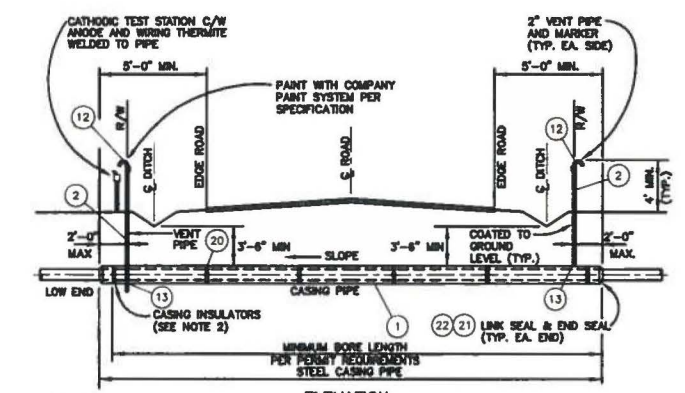
**BILL OF MATERIAL**

EMS #5898 - LG&E Ballardsville Piggability Project HWY 146 Crossing

| NO.                    | QTY. | DESCRIPTION   |
|------------------------|------|---|
| <b>PIPE</b>            |      |   |
| 1                      | 180' | PIPE, 12.750" O.D. X 0.250" W.T., API-5L PSL2, GR. X-42, ERW, w/ 14-16 mils FBE   |
| 2                      | FD   | PIPE, 2.375" O.D. X 0.218" W.T., API-5L PSL2, GR. B/X-42, ERW, w/ 14-16 mils FBE  |
| <b>VALVES</b>          |      |   |
| 5                      | 1    | VALVE, BALL, 2" ANSI 300, W x W, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D, W/ 2" NUT FOR BURIED SERVICE                                     |
| <b>WELD FITTINGS</b>   |      |   |
| 10                     | 1    | CAP, WELD, 6.825" O.D. X 0.280" W.T., MSS-SP75 WPHY42   |
| 11                     | FD   | ELL, WELD, 2.375" O.D. X 0.218" W.T., 90° LR, ASTM A-234 GR. WPB  |
| 12                     | 2    | RETURN, WELD, 2.375" O.D. X 0.218" W.T., 180° LR., ASTM A-234 GR. WPB   |
| 13                     | 2    | WELDOLET, 18-12 X 2", XH WT., FS, ASTM A-105  |
| 14                     | 1    | SADDLE, WELD, 6.825" ON 16.000", GR. X-42, STD WALL   |
| 15                     | 1    | SADDLE, WELD, 2.375" ON 12.750", GR. X-42, XH WALL  |
| <b>CASING MATERIAL</b> |      |   |
| 20                     | 20   | INSULATOR, CASING, FOR 12.750" O.D. CARRIER PIPE, 15.376" I.D. CASING PIPE (16.000" O.D. X 0.312" W.T.), NON-METALLIC, PSI MODEL RANGER II MIDI 28-10 |
| 21                     | 2    | END SEAL, CASING, FOR 12.750" O.D. CARRIER PIPE, 15.376" I.D. CASING PIPE (16.000" O.D. X 0.312" W.T.), PSI MODEL S 12X16                             |
| 22                     | 2    | LINK SEAL, CASING, FOR 12.75" O.D. CARRIER PIPE, 16.000" O.D. CASING PIPE, PSI MODEL LS-425-C-12  |
| <b>MISC. MATERIAL</b>  |      |   |
| 30                     | 1    | 12" MUELLER NO-BLO LINE STOPPER FITTING   |
| 31                     | 1    | 12" MUELLER PIG-PLUG LINE STOPPER FITTING INSERT CATALOG NUMBER 682644  |

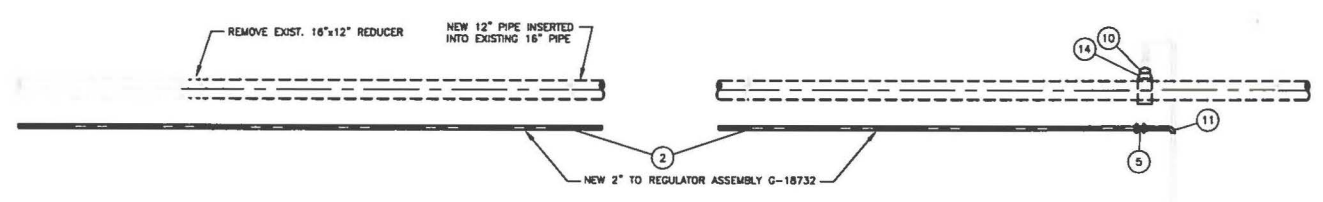


**OVERALL PLAN**  
1" = 20'-0"

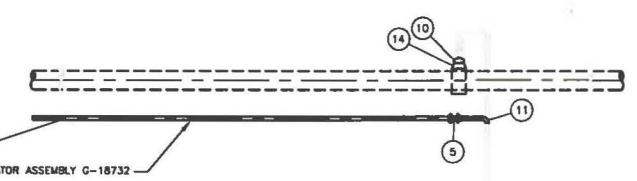


- NOTES:**
- 1) WORK SHALL BE PERFORMED IN ACCORDANCE WITH PERMITS REQUIREMENTS, RESTRICTIONS AND COMPANY'S SPECIFICATIONS.
  - 2) INSULATORS ARE TO BE PLACED A MAXIMUM OF 1'-0" FROM EACH END OF THE CASING AND ON MAXIMUM 8'-0" CENTERS FOR THE REMAINING LENGTH OF THE CASING.
  - 3) VENTS TO BE LOCATED AT RIGHT-OF-WAY LINE.
  - 4) INSPECTION AND TESTS OF PIPELINE INSTALLED IN A METALLIC CASING MUST BE MADE TO ASSURE THAT ELECTRICAL ISOLATION IS ADEQUATE.
  - 5) EXACT MATERIAL QUANTITIES TO BE DETERMINED PER INDIVIDUAL SITE.

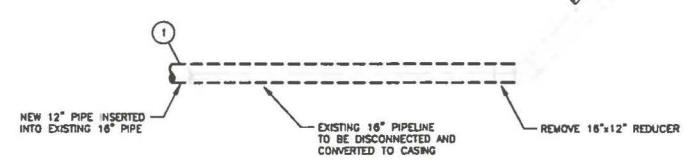
**TYPICAL ROAD CROSSING DETAIL**  
NTS



**DETAIL 1**  
THIS DWG.  
NTS



**DETAIL 2**  
THIS DWG.  
NTS



**DETAIL 3**  
THIS DWG.  
NTS

**SITE #3**

**ISSUED FOR CONSTRUCTION**  
04/28/2014

Z:\5898 - Ballardsville\000-Piping\5898\104.dwg Plotter: Apr 30, 2014 - 12:40pm by CRoberts

**GENERAL NOTES**

1. PIPELINE CONTRACTOR IS RESPONSIBLE FOR ROAD CROSSING CONTROL MEASURES.
2. PIPELINE OPERATOR/CONTRACTOR IS RESPONSIBLE FOR ENSURING EXISTING 16" PIPELINE IS CAPABLE OF RECEIVING 12" PIPE USING HYDROTEST AND/OR PIGGING METHODS PRIOR TO INSTALLATION.
3. PIPELINE CONTRACTOR TO VERIFY EXISTING 16" PIPE IS NOT OUT-OF-ROUND/EGGED AND WILL ACCEPT 12" PIPE PRIOR TO BEGINNING INSTALLATION OF 12" PIPE. CONTRACTOR MAY USE WIRE-LINE AND SIZING PLATE IF PRACTICAL.

| REFERENCE DRAWINGS |             |  | REVISIONS |      |    | REVISIONS |      |    | DRAWING STATUS |          |                          |
|--------------------|-------------|--|-----------|------|----|-----------|------|----|----------------|----------|--------------------------|
| DWG. NO.           | DESCRIPTION |  | NO.       | DATE | BY | NO.       | DATE | BY | NO.            | DATE     | DESCRIPTION              |
|                    |             |  |           |      |    |           |      |    | A              | 04/17/14 | ISSUED FOR CLIENT REVIEW |
|                    |             |  |           |      |    |           |      |    | 0              | 04/25/14 | ISSUED FOR CONSTRUCTION  |

SCALE: 1" = 20'-0"

DRG: CHR DATE: 04/08/14  
CHKD: MAS DATE: 04/25/14  
APPROVED: MAF DATE: 04/25/14

EMS JOB NO.: 5898  
SHEET NO.: 3828  
CLIENT FILE NO.:  
DWG FILE NO.: 5898104.dwg

**LG&E KU**

PPL Companies  
PIPELINE PLAN

**BALLARDSVILLE LINE PIGGABILITY**  
16" HWY 146 CROSSING  
OLDHAM COUNTY, KY

NO. 5898104 REV. 0





**SITE #8**

**ISSUED FOR CONSTRUCTION**  
04/28/2014

Z:\5898 - LC&E - Ballardsville\58984106.dwg Printed: Apr 25, 2014 - 2:23pm by eroberts

**GENERAL NOTES**

1. ALL DIMENSIONS TO BE FIELD DETERMINED PRIOR TO FABRICATION OF PIPING. DIMENSIONS SHOWN ON THIS DRAWING ARE FOR REFERENCE PURPOSES ONLY.

| REFERENCE DRAWINGS |                  | REVISIONS |      |    | REVISIONS   |     |      | DRAWING STATUS |             |
|--------------------|------------------|-----------|------|----|-------------|-----|------|----------------|-------------|
| DWG. NO.           | DESCRIPTION      | NO.       | DATE | BY | DESCRIPTION | NO. | DATE | BY             | DESCRIPTION |
| 58984904           | BILL OF MATERIAL |           |      |    |             |     |      |                |             |
|                    |                  |           |      |    |             |     |      |                |             |
|                    |                  |           |      |    |             |     |      |                |             |
|                    |                  |           |      |    |             |     |      |                |             |
|                    |                  |           |      |    |             |     |      |                |             |

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

DATE: 04/27/14

DATE: 04/25/14

DATE: 04/25/14

DATE: 04/25/14

DATE: 04/25/14

DATE: 04/25/14

DATE: 04/25/14

DATE: 04/25/14

**ICE KU**

PPL companies

**BALLARDSVILLE LINE PIGGABILITY**  
HWY 42 NORTH AT GOSHEN  
OLDHAM COUNTY, KY

NO. 58984106

REV. 0

**BILL OF MATERIAL**


**EMS #5898 - LG&E Ballardsville Piggability Project Goshen (HWY 42N)**

| NO.                   | QTY. | DESCRIPTION   |
|-----------------------|------|---|
| <b>PIPE</b>           |      |   |
| 1                     | 13'  | PIPE, 12.750" O.D. X 0.250" W.T., API-5L PSL2, GR. X-42, ERW, w/ 14-18 mils FBE   |
| 2                     | 7'   | PIPE, 8.625" O.D. X 0.250" W.T., API-5L PSL2, GR. X-42, ERW, w/ 14-18 mils FBE  |
| <b>VALVES</b>         |      |   |
| 10                    | 1    | VALVE, BALL, 12" ANSI 300, W x W, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D, W/ 2" NUT FOR BURIED SERVICE                  |
| 11                    | 1    | VALVE, BALL, 8" ANSI 300, W x W, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D, W/ 2" NUT FOR BURIED SERVICE                   |
| <b>WELD FITTINGS</b>  |      |   |
| 30                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 90°, 0.375" W.T., MSS SP-75 GR. WPHY42, TAPER BORE TO 0.250"                              |
| 31                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 45°, 0.375" W.T., MSS SP-75 GR. WPHY42, TAPER BORE TO 0.250"                              |
| 33                    | 1    | ELL, WELD, SEGMENTABLE, 8.625" O.D. X 0.322" W.T., 45° LR, MSS-SP75 WPHY42, TAPER BORE TO 0.250"                                    |
| 34                    | 1    | TEE, WELD, REDUCING, 12.750" O.D. X 8.625" O.D., (0.375" W.T. X .0322" W.T.), MSS-SP75 WPHY42, TAPER BORE TO 0.250" W/BARRED BRANCH |
| <b>MISC. MATERIAL</b> |      |   |
| 50                    | 1    | 12" MUELLER NO-BLO LINE STOPPER FITTING   |
| 51                    | 2    | 12" MUELLER PIG-PLUG LINE STOPPER FITTING INSERT CATALOG NUMBER 682844  |
| 52                    | 1    | 8" MUELLER NO-BLO LINE STOPPER FITTING  |
| 53                    | 1    | 8" MUELLER PIG-PLUG LINE STOPPER FITTING INSERT CATALOG NUMBER 682773   |
| 54                    | 1    | 12" KEROTEST CP ISOLATION JOINT, ANSI 300, TO MATCH 0.250 IN W.T., X-42 PIPE  |
| 55                    | 1    | 8" KEROTEST CP ISOLATION JOINT, ANSI 300, TO MATCH 0.250 IN W.T., X-42 PIPE   |
| 56                    | 2    | TAPPING TEES (TO BLOW DOWN ISOLATED LINE)   |
| 57                    | 2    | LG&E PURGE/BLOWDOWN ASSEMBLY GCS 10 20 700 REV A (FOR 4" FLUSH GROUND MOUNT)  |

**SITE 05**

**ISSUED FOR CONSTRUCTION**  
04/28/14

Z:\2008 - LG&E - Ballardsville\000-Project\000\000.dwg Plotout Apr 28, 2014 - 3:53pm by csharts

| GENERAL NOTES | REFERENCE DRAWINGS |             |     | REVISED |    |     | REVISED |    |     | DRAWING STATUS |                          |  | <br>PPL companies<br>ALL OF MICHIGAN<br>CORPORATE OFFICE<br>10000 W. HAWTHORNE BLVD.<br>FARMINGTON HILLS, MI 48334<br>(248) 850-4000 • FAX (248) 850-4001<br>BRANCH OFFICES<br>10000 W. HAWTHORNE BLVD. SUITE 100<br>FARMINGTON HILLS, MI 48334<br>WWW.LG&EKU.COM | BALLARDSVILLE LINE PIGGABILITY<br>HWY 42 NORTH AT GOSHEN<br>CLATSOP COUNTY, OR<br>58984804<br>0 |
|---------------|--------------------|-------------|-----|---------|----|-----|---------|----|-----|----------------|--------------------------|--|--|---|
|               | ORIG. NO.          | DESCRIPTION | NO. | DATE    | BY | NO. | DATE    | BY | NO. | DATE           | DESCRIPTION              |  |  |   |
|               | 00004106           | PIPING PLAN |     |         |    |     |         |    | A   | 04/17/14       | ISSUED FOR CLIENT REVIEW | ISSUED: 04/17/14<br>DATE: 04/17/14<br>APPROVED: [Signature]<br>DATE: 04/17/14<br>REVISED: [Signature]<br>DATE: 04/17/14<br>CLIENT FILE NO.:<br>DWG FILE NO.: |  |   |
|               |                    |             |     |         |    |     |         |    | 0   | 04/28/14       | ISSUED FOR CONSTRUCTION  |  |  |   |



**SITE 6:  
PLUG VALVE 3:14 REPLACEMENT  
AT HWY 42 & HUNTING CREEK DRIVE**

**PHASE 1**

INSTALL:  
2-12" MUELLER STOPPERS  
1-4" TEMPORARY H.P. STEEL BYPASS

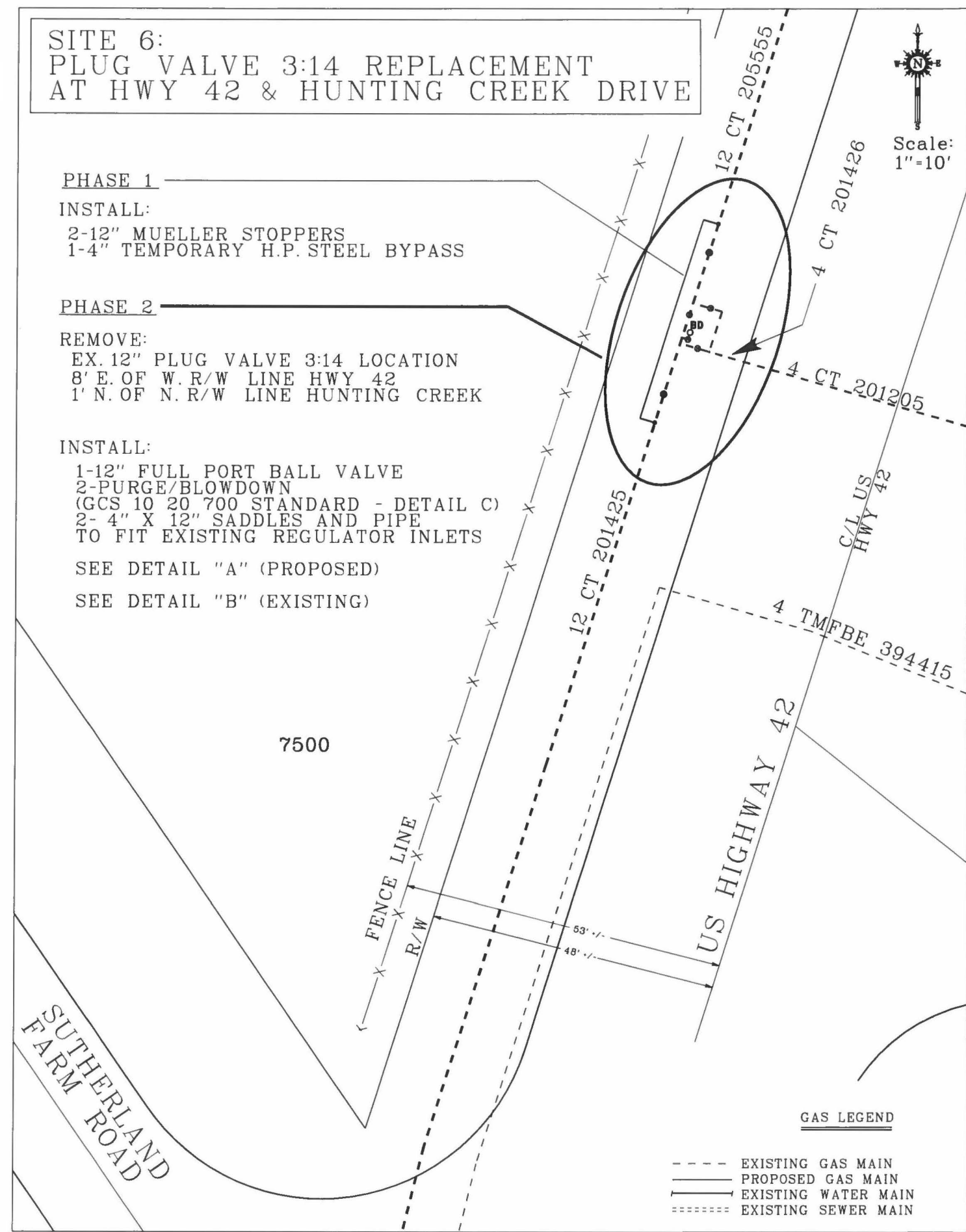
**PHASE 2**

REMOVE:  
EX. 12" PLUG VALVE 3:14 LOCATION  
8' E. OF W. R/W LINE HWY 42  
1' N. OF N. R/W LINE HUNTING CREEK

INSTALL:  
1-12" FULL PORT BALL VALVE  
2-PURGE/BLOWDOWN  
(GCS 10 20 700 STANDARD - DETAIL C)  
2- 4" X 12" SADDLES AND PIPE  
TO FIT EXISTING REGULATOR INLETS  
SEE DETAIL "A" (PROPOSED)  
SEE DETAIL "B" (EXISTING)



Scale:  
1"=10'



**GAS LEGEND**

- EXISTING GAS MAIN
- PROPOSED GAS MAIN
- EXISTING WATER MAIN
- EXISTING SEWER MAIN

INSTALL:  
PILLOW  
SUPPORT

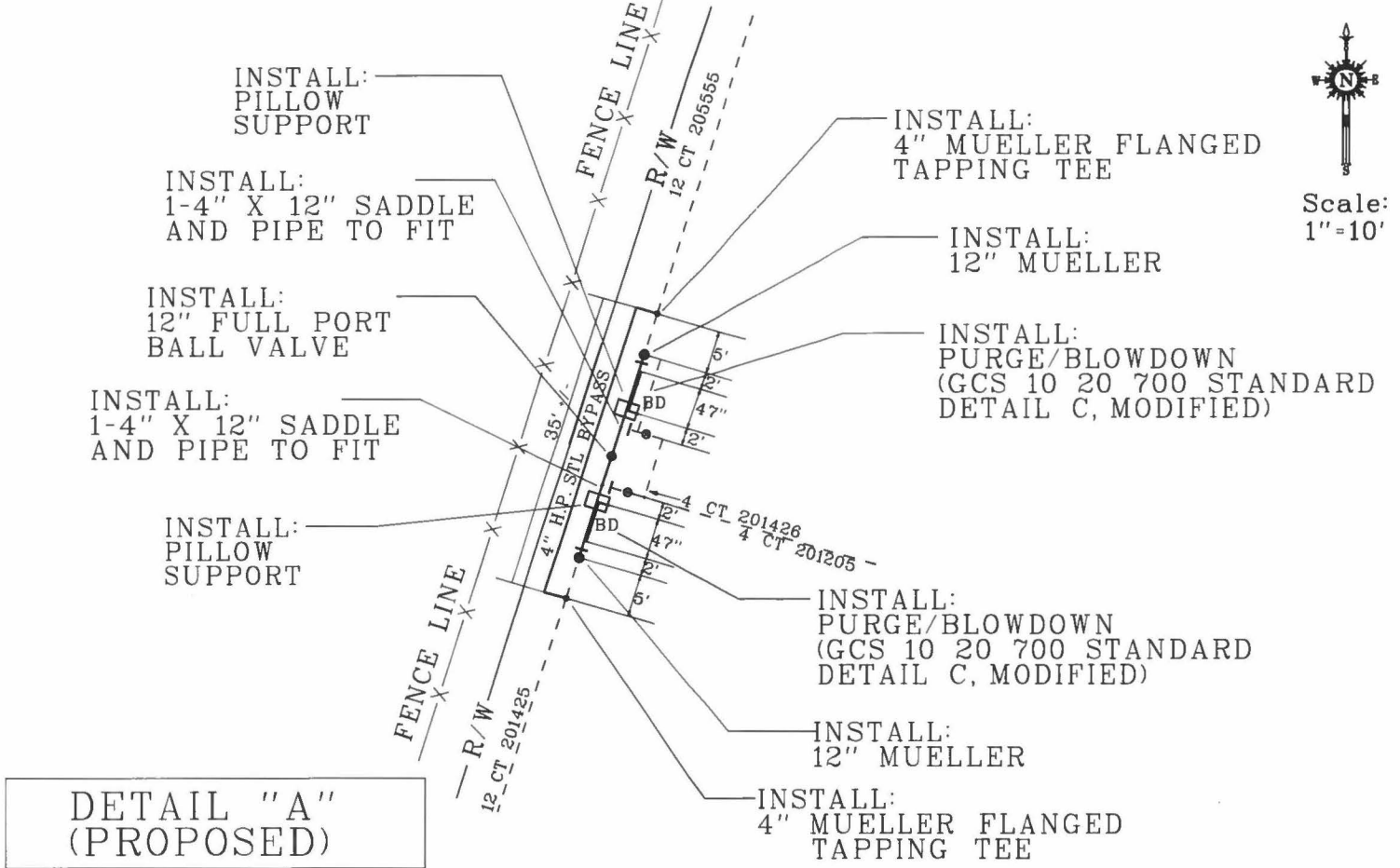
INSTALL:  
1-4" X 12" SADDLE  
AND PIPE TO FIT

INSTALL:  
12" FULL PORT  
BALL VALVE

INSTALL:  
1-4" X 12" SADDLE  
AND PIPE TO FIT

INSTALL:  
PILLOW  
SUPPORT

**DETAIL "A"  
(PROPOSED)**



Scale:  
1"=10'

**DETAIL "B"  
(EXISTING)**

REMOVE:  
EX. 12" PLUG VALVE 3:14  
8' E. OF W. R/L HWY 42  
1' N. OF N. R/L HUNTING CREEK

EXISTING VALVE AND SADDLE  
LOCATIONS FOUND ON MAIN  
REPORT # 201425

EX. 4" PLUG VALVE 3:15  
11' E. OF W. S/L HWY 42  
3' N. OF N. S/L HUNTING CREEK

EX. 4" PLUG  
VALVE 3:13  
11' E. OF W. S/L  
OF HWY 42  
4' S. OF N. S/L  
HUNTING CREEK

REMOVE:  
EX. BLOW DOWN VALVE 3:21  
9' E. OF W. S/L OF HWY 42  
3' S. OF N. S/L OF HUNTING CREEK



Scale:  
1"=5'

BEFORE "U" DIG  
CALL 811  
FOR BURIED LINE/  
CABLE LOCATIONS.

LOUISVILLE GAS AND ELECTRIC COMPANY  
6900 ENTERPRISE DR  
Louisville, Kentucky 40214  
**LGE**  
GAS & ELECTRIC ENGINEERING

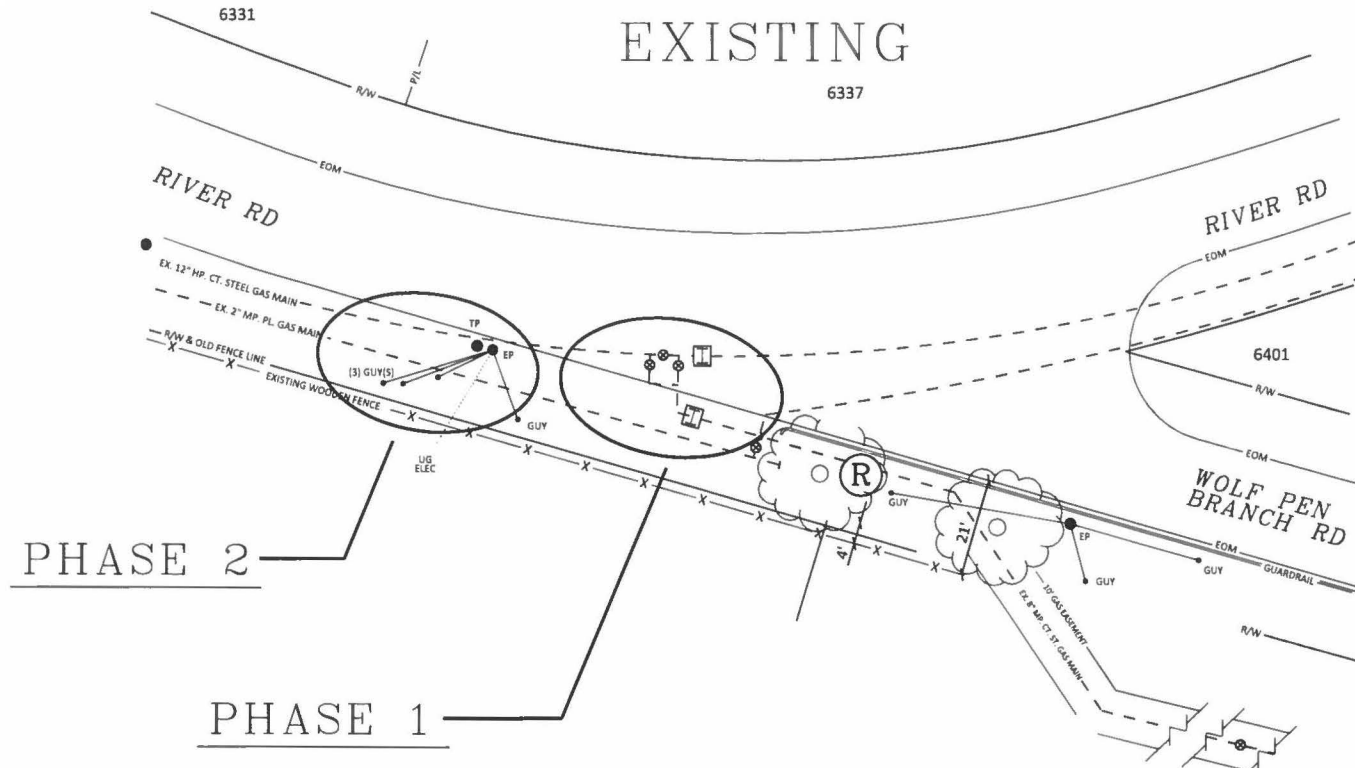
**BALLARDSVILLE LINE  
PIGGABILITY PROJECT**

| REVISIONS |    |
|-----------|----|
| DATE      | BY |
|           |    |
|           |    |
|           |    |
|           |    |

|                 |                     |                      |
|-----------------|---------------------|----------------------|
| Scale: 1"=10'   | Date: 04-24-14      | Designer: C. ROBISON |
| PROJECT: 138033 | TASK: HUNTING CREEK | GAS-D-023151         |

**SITE 7: PLUG VALVE 6:07 REPLACEMENT AT RIVER ROAD AND WOLF PEN BRANCH**

EXISTING



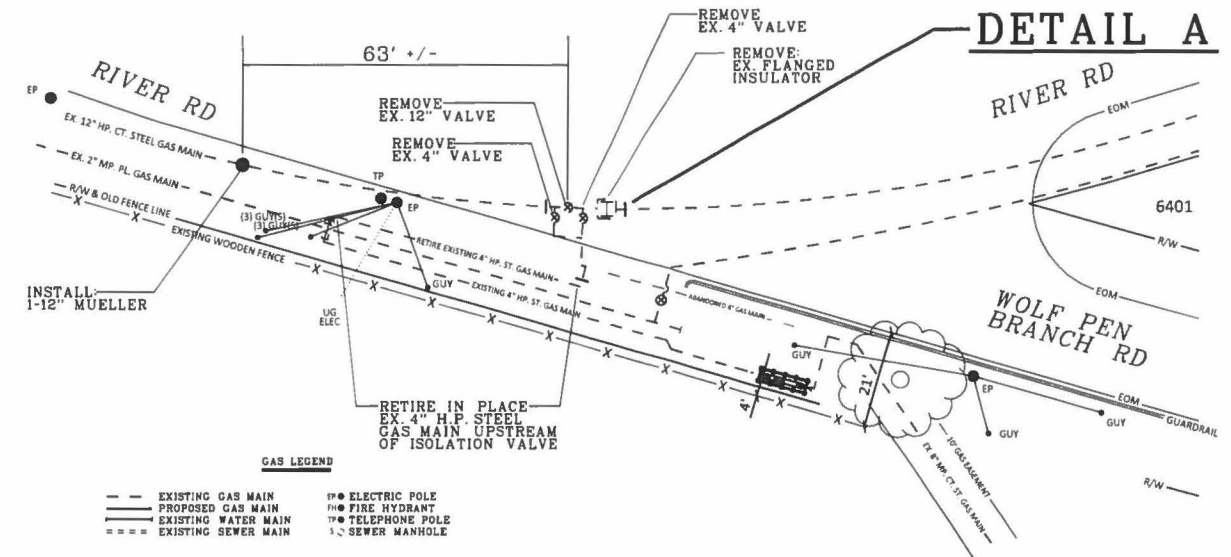
Scale: 1"=20'

**PHASE 1**

INSTALL MUELLER AND CLOSE IN REGULATOR STATION

ISOLATE NORTH OF HARRODS CREEK AT VALVE 6:44

BACKFEED FROM SOUTH, REMOVE EXISTING VALVE NEST AND RETIRE EXISTING 4" H.P. STEEL GAS MAIN



Scale: 1"=20'

PHASE 2

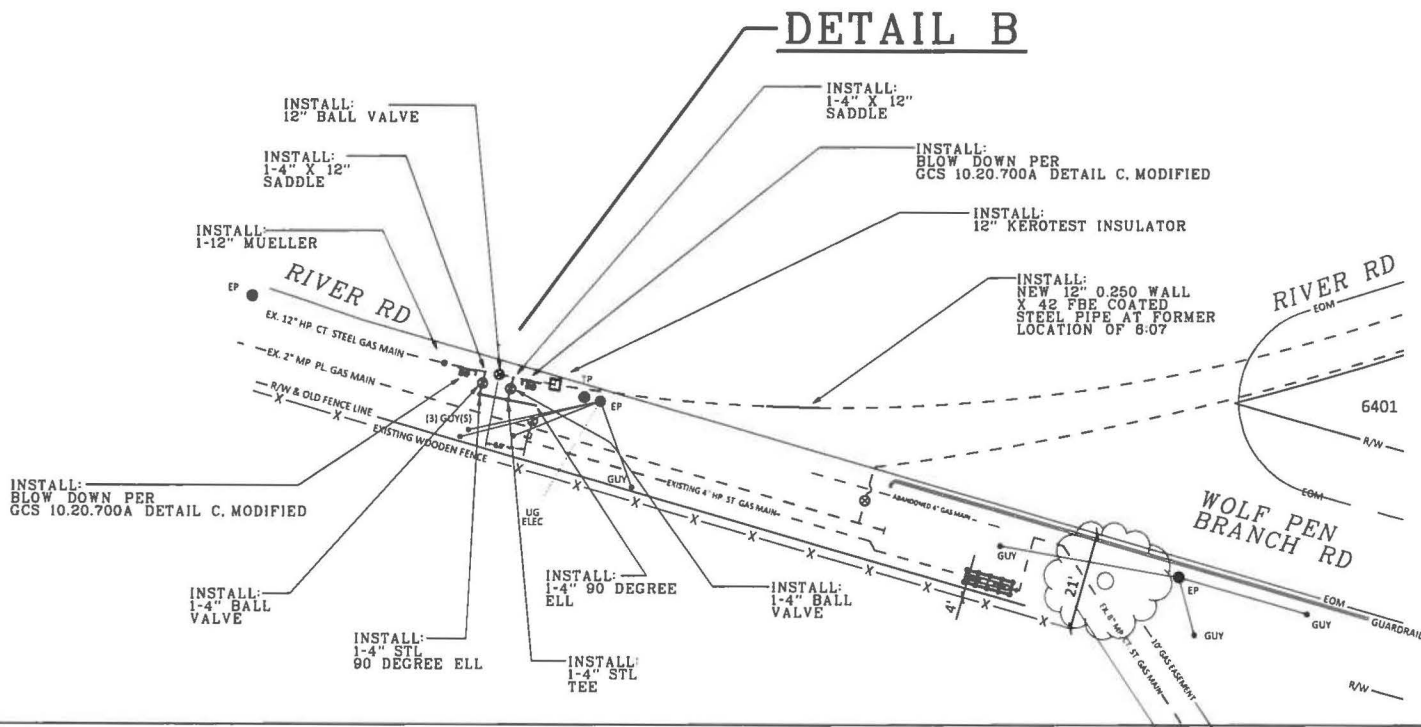
PHASE 1

**PHASE 2**

INSTALL VALVE NEST BLOW DOWNS AND INSULATOR

TIE-INTO EXISTING 4" INLET VALVE

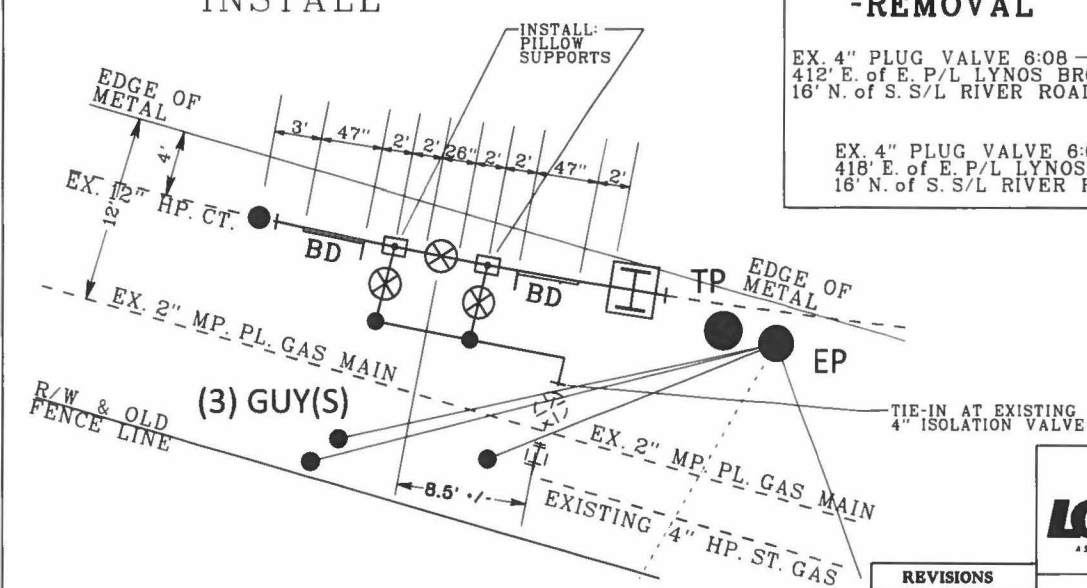
**DETAIL B**



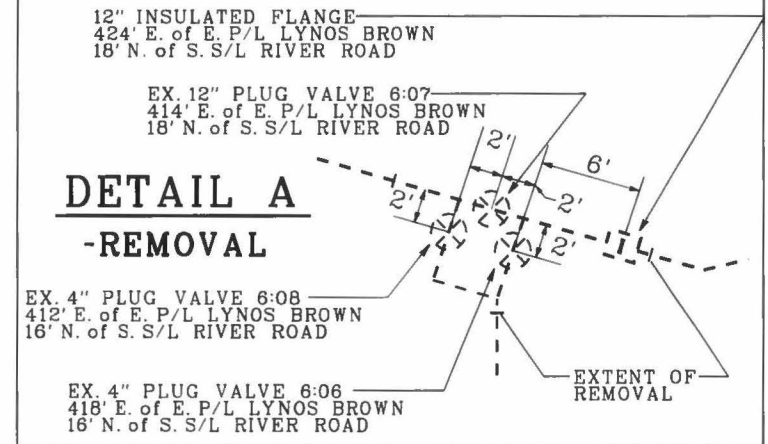
Scale: 1"=20'

Scale: 1"=60'

**DETAIL B**  
INSTALL



**DETAIL A**  
-REMOVAL



LOUISVILLE GAS AND ELECTRIC COMPANY  
6900 ENTERPRISE DR  
Louisville, Kentucky 40214

**LGE**  
GAS & ELECTRIC ENGINEERING

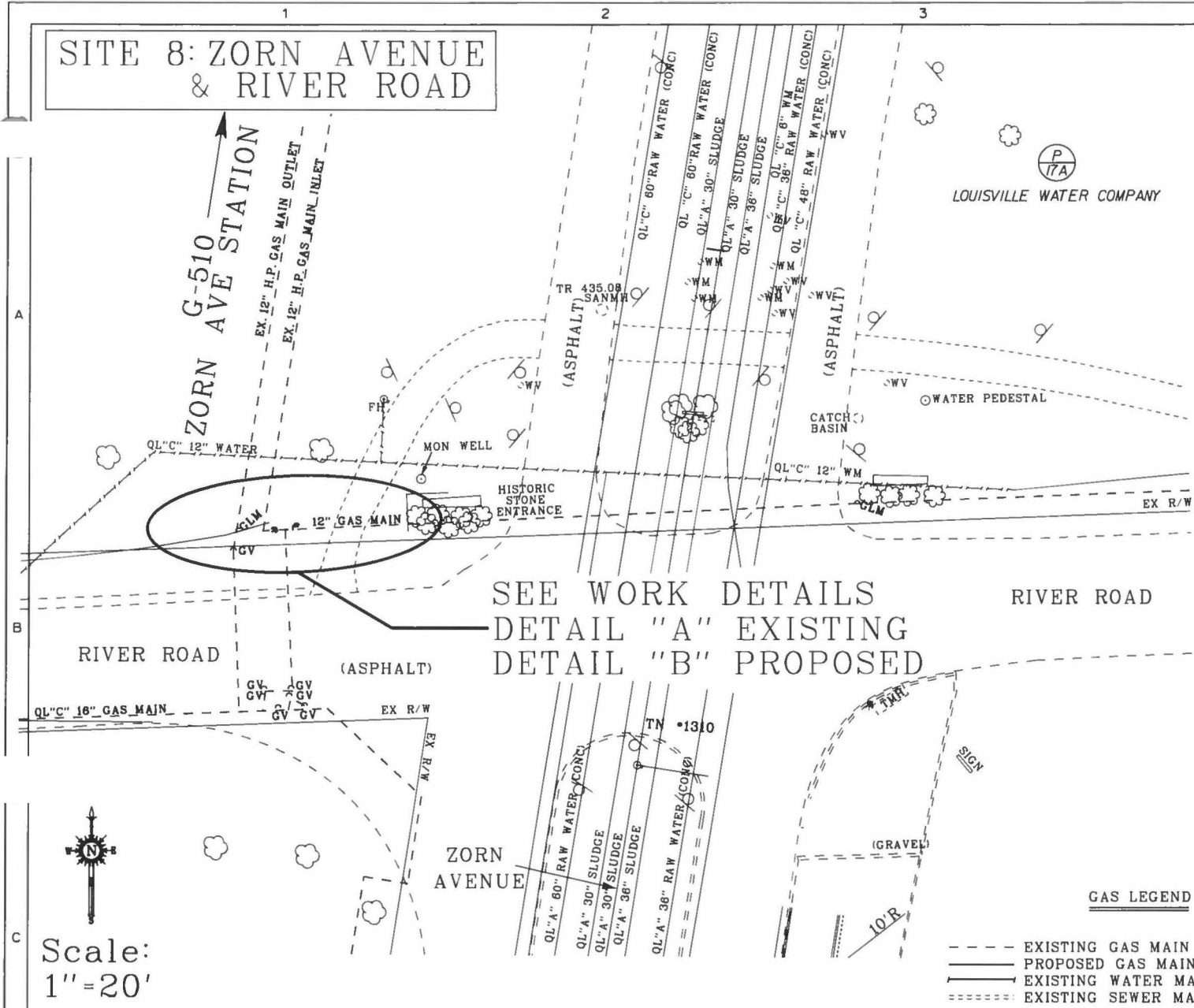
**GAS**

Title  
**BALLARDSVILLE LINE PIGGABILITY PROJECT**

| REVISIONS | DATE | BY |
|-----------|------|----|
|           |      |    |
|           |      |    |
|           |      |    |

Scale: VARIES Date: 04-24-14 Designer: C. ROBISON  
PROJECT: 138033 TASK: WOLF PEN BRANCH GAS-D-023151

**SITE 8: ZORN AVENUE & RIVER ROAD**



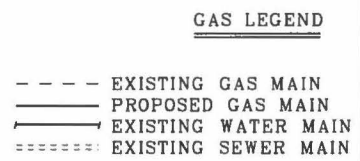
SEE WORK DETAILS  
 DETAIL "A" EXISTING  
 DETAIL "B" PROPOSED

**WORK DETAILS:**

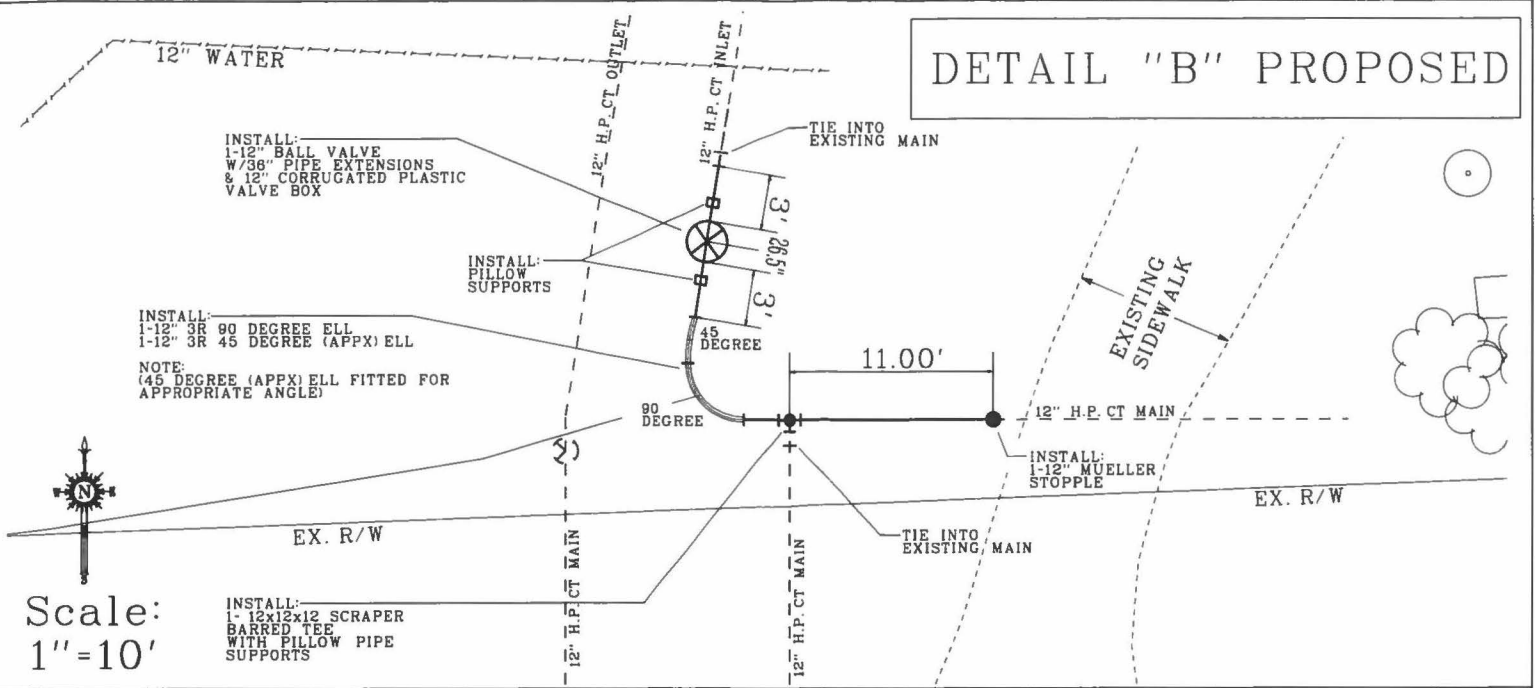
INSTALL 12" MUELLER SHUT OFF ZORN AVE STATION G-510

REMOVE EXISTING:  
 11:03 12" VALVE  
 12" 90 DEGREE ELL  
 12" 45 DEGREE ELL  
 12x12x12 UNBARRED TEE

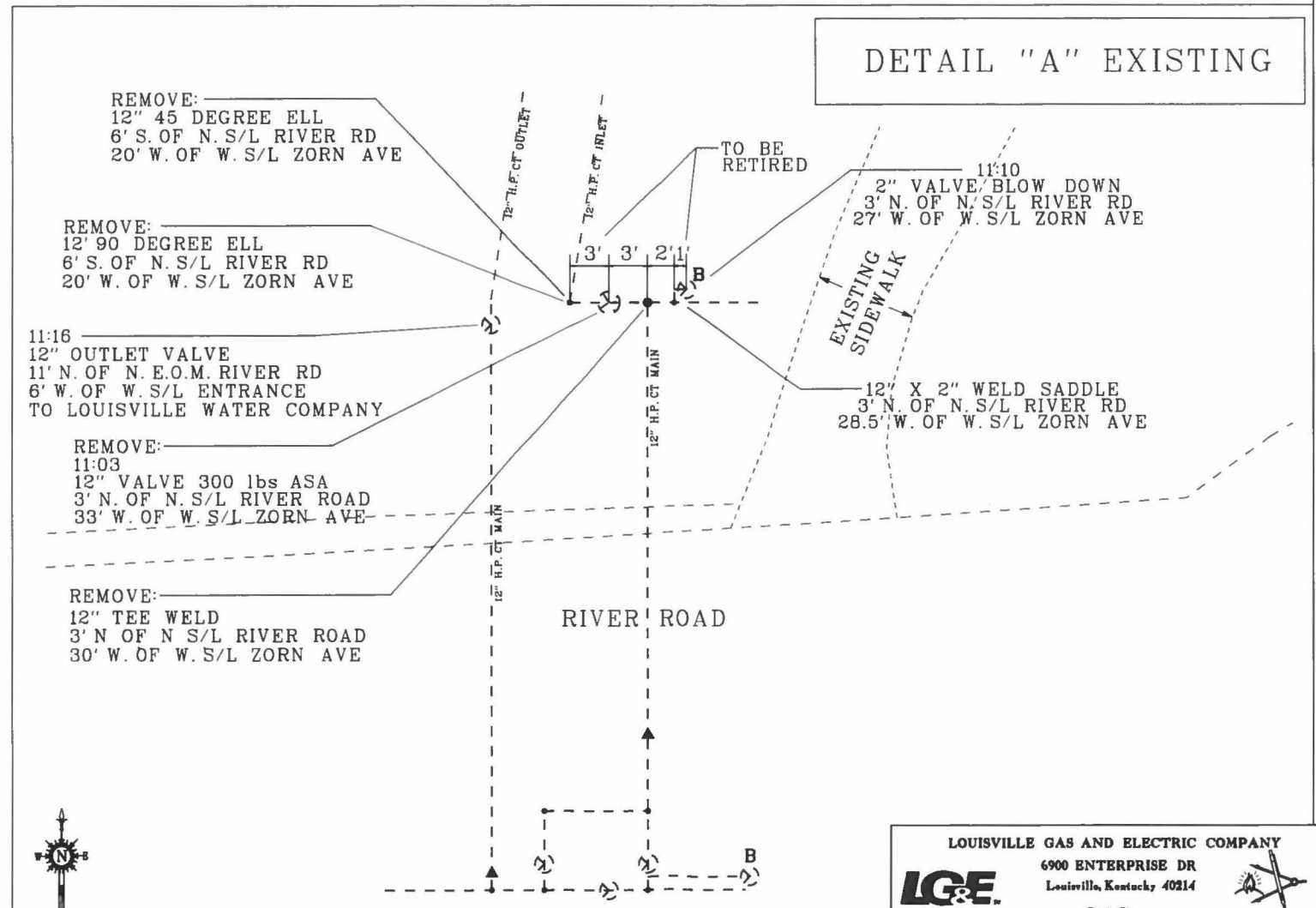
INSTALL:  
 12x12x12 SCRAPER BARRED TEE, 12" BALL VALVE,  
 12" 3R 90 DEGREE ELL AND 12" 3R 45 DEGREE (APPX) ELL WITH ENOUGH CLEARANCE TO TIE IT ALL BACK TOGETHER



**DETAIL "B" PROPOSED**



**DETAIL "A" EXISTING**



LOUISVILLE GAS AND ELECTRIC COMPANY  
 6900 ENTERPRISE DR  
 Louisville, Kentucky 40214

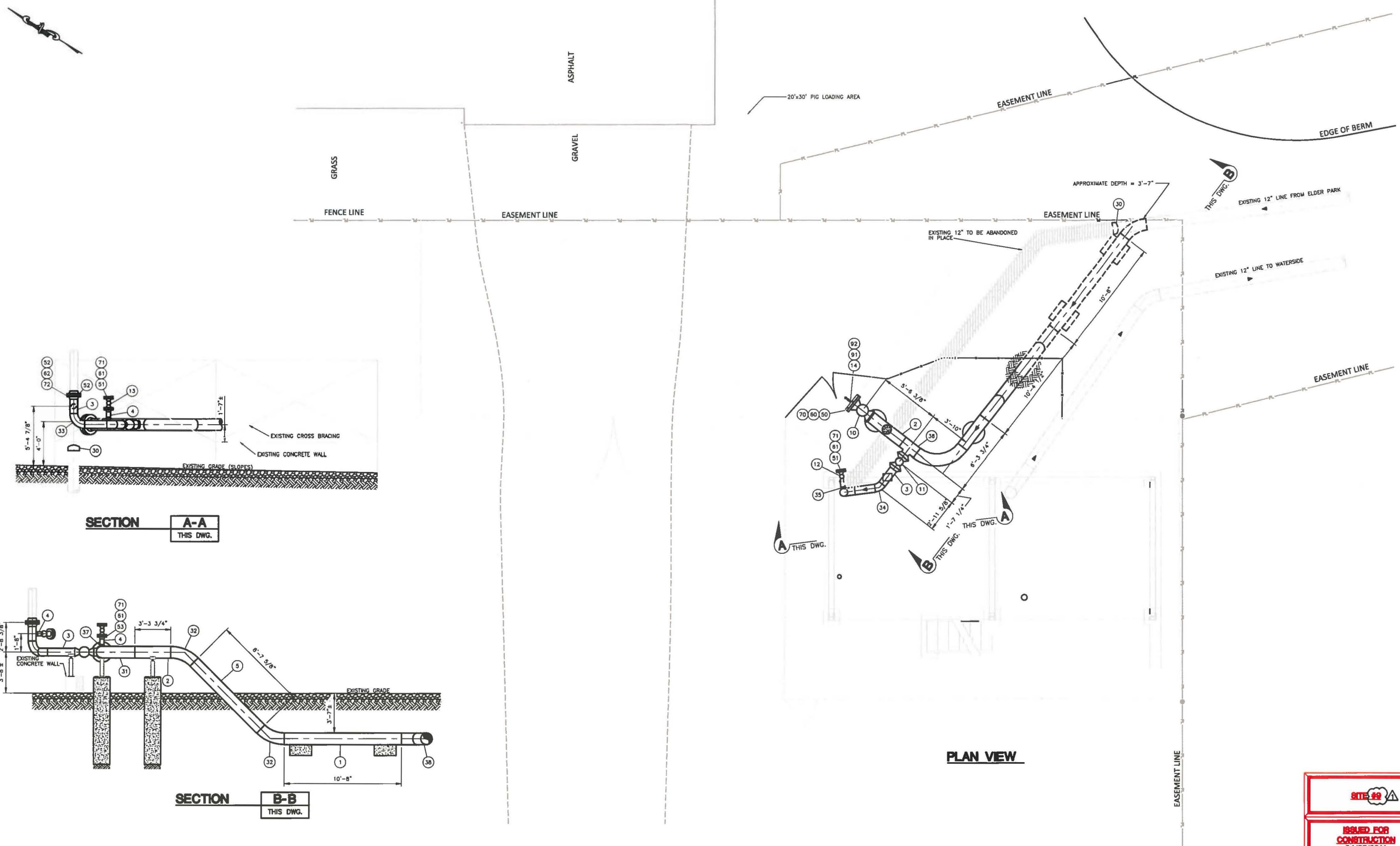
**LGE**

**GAS**

GAS & ELECTRIC ENGINEERING

| REVISIONS |  | DATE | BY |
|-----------|--|------|----|
|           |  |      |    |
|           |  |      |    |
|           |  |      |    |

Scale: VARIES Date: 04-24-14 Designer: C. ROBISON  
 PROJECT: 138033 TASK: ZORNANDRIVERRD GAS-D-023151



SITE 99

ISSUED FOR  
CONSTRUCTION  
04/28/2014

Z:\5898 - LC&E - Ballardville, KY - Piping\5898A107.dwg Plotted: Apr 30, 2014 - 12:36pm by CRoberts

**GENERAL NOTES**

**REFERENCE DRAWINGS**

**REVISIONS**

**REVISIONS**

**DRAWING STATUS**

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

| DWG. NO. | DESCRIPTION      | NO. | DATE | BY | DESCRIPTION |
|----------|------------------|-----|------|----|-------------|
| 58984905 | BILL OF MATERIAL |     |      |    |             |
|          |                  |     |      |    |             |
|          |                  |     |      |    |             |
|          |                  |     |      |    |             |
|          |                  |     |      |    |             |

| NO. | DATE     | BY | DESCRIPTION                |
|-----|----------|----|----------------------------|
| A   | 04/17/14 |    | ISSUED FOR CLIENT REVIEW   |
| 0   | 04/25/14 |    | ISSUED FOR CONSTRUCTION    |
| 1   | 04/30/14 |    | RE-ISSUED FOR CONSTRUCTION |

| NO. | DATE | DESCRIPTION |
|-----|------|-------------|
|     |      |             |
|     |      |             |
|     |      |             |

**ENGINEERING MANAGEMENT & SERVICES CO.**  
 CORPORATE OFFICE:  
 130 HOLMES DRIVE  
 VINCENNES, KY 40083  
 TEL: (800) 873-6878 • FAX: (800) 873-8872

PPL companies  
 DESIGN PLAN  
**BALLARDSVILLE LINE PIGGABILITY**  
**ZORN AVENUE RECEIVER**  
 JEFFERSON COUNTY, KY

BRANCH OFFICES:  
 HOUSTON, TX • BETHUN, MI • BAYTOWN, TX  
 CHARLESTON, WV • PITTSBURGH, PA  
 www.emscorp.com

NO. **58984107** REV. **1**

**BILL OF MATERIAL**

**EMS #5898 - LG&E Ballardsville Piggability Project Zorn Ave.**

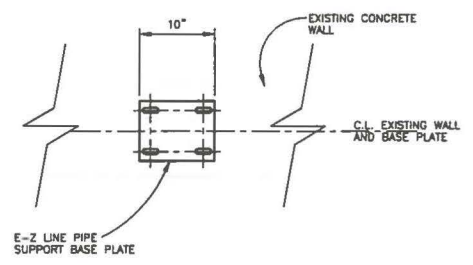
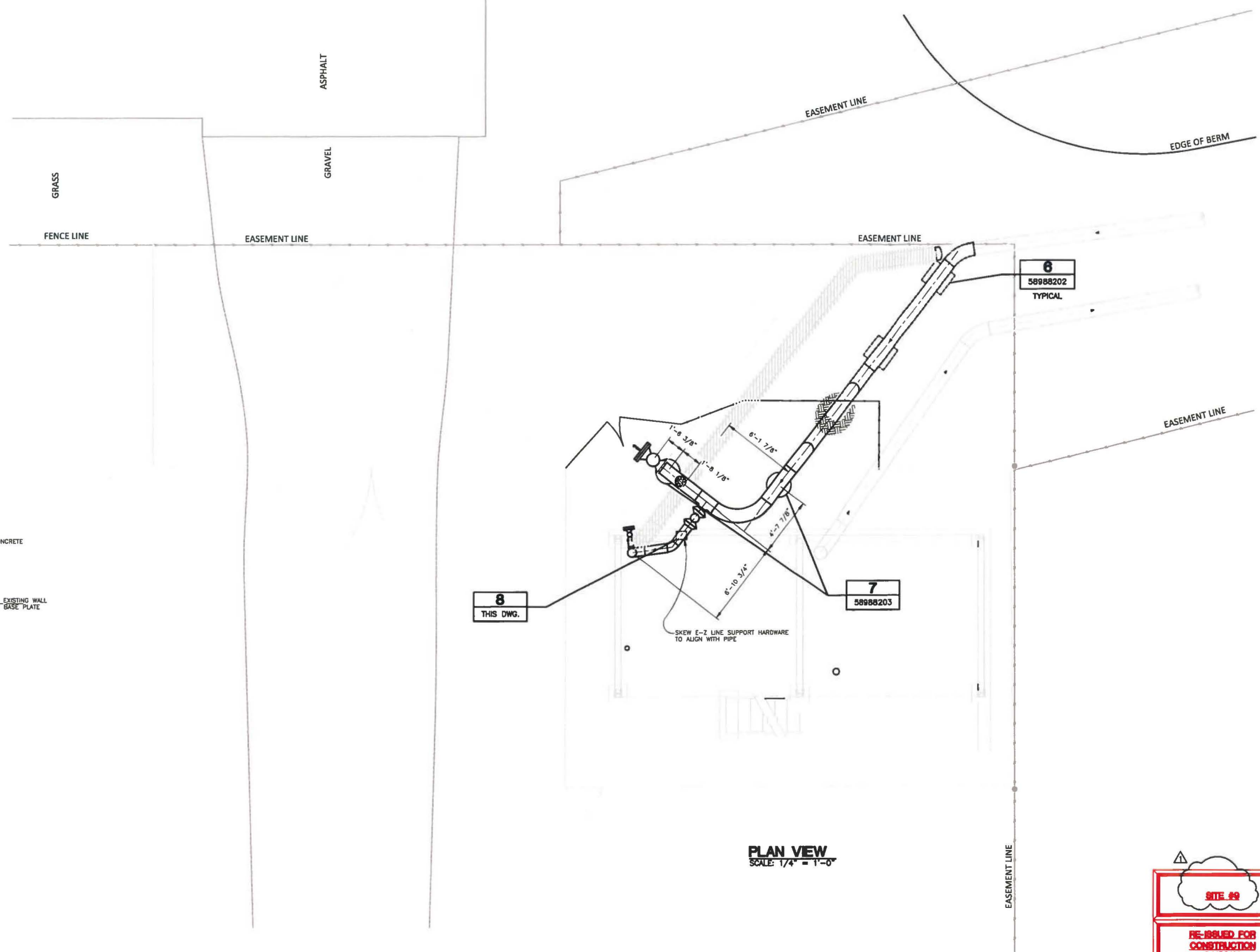
| NO.                   | QTY. | DESCRIPTION   |
|-----------------------|------|---|
| <b>PIPE</b>           |      |   |
| 1                     | 11'  | PIPE, 12.750" O.D. X 0.250" W.T., API-5L PSL2, GR. X-42, ERW, w/ 14-16 mils FBE   |
| 2                     | 8'   | PIPE, 12.750" O.D. X 0.375" W.T., API-5L PSL2, GR. X-42, ERW, BARE  |
| 3                     | 6'   | PIPE, 8.625" O.D. X 0.322" W.T., API-5L PSL2, GR. X-42, ERW, BARE   |
| 4                     | 2'   | PIPE, 4.500" O.D. X 0.237" W.T., API-5L PSL2, GR. X-42, ERW, BARE   |
| 5                     | 9'   | PIPE, 12.750" O.D. X 0.375" W.T., API-5L PSL2, GR. X-42, ERW, w/ 14-16 mils FBE   |
| <b>VALVES</b>         |      |   |
| 10                    | 1    | VALVE, BALL, 12" ANSI 300, W x RFFE, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D   |
| 11                    | 1    | VALVE, BALL, 8" ANSI 300, W x W, FULL OPENING, GEAR OPERATED, C.S. BODY, PER API-6D   |
| 12                    | 1    | VALVE, BALL, 4" ANSI 300, W x RFFE, FULL OPENING, LEVER OPERATED, C.S. BODY, PER API-6D   |
| 13                    | 1    | VALVE, BALL, 4" ANSI 300, RFFE, FULL OPENING, LEVER OPERATED, C.S. BODY, PER API-6D   |
| 14                    | 1    | VALVE, BALL 1", FNPT, 3000 PSI WP, FULL OPENING, THREADED, CARBON STEEL BODY, W/LEVER   |
| <b>WELD FITTINGS</b>  |      |   |
| 30                    | 2    | CAP, WELD, 12.750" O.D. X 0.375" W.T., MSS-SP75 WPHY42, TAPER BORE TO 0.250"  |
| 31                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 90°, 0.375" W.T., MSS SP-75 GR. WPHY42  |
| 32                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 45°, 0.375" W.T., MSS SP-75 GR. WPHY42  |
| 33                    | 1    | ELL, WELD, 8.625" O.D. X 0.322" W.T., 90° LR, MSS-SP75 WPHY42   |
| 34                    | 1    | ELL, WELD, 8.625" O.D. X 0.322" W.T., 45° LR, MSS-SP75 WPHY42   |
| 35                    | 1    | SADDLE, WELD, 4.500" ON 8.625", GR. X-42, STD WALL  |
| 36                    | 1    | TEE, WELD, REDUCING, 12.750" O.D. X 8.625" O.D., (0.375" W.T. X .0322" W.T.), MSS-SP75 WPHY42, W/BARRED BRANCH                        |
| 37                    | 1    | SADDLE, WELD, 4.500" ON 12.750", GR. X-42, STD WALL   |
| 38                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 45°, 0.375" W.T., MSS SP-75 GR. WPHY42, TAPER BORE TO 0.250"                                |
| 39                    | 1    | ELL, WELD, SEGMENTABLE, 12.750" O.D., 3R, 45°, 0.375" W.T., MSS SP-75 GR. WPHY42, TAPER BORE ONE SIDE TO 0.250"                       |
| <b>FLANGES</b>        |      |   |
| 50                    | 1    | FLANGE, BLIND, 12" ANSI 300, RF, ASTM A-105, CD&T 1"  |
| 51                    | 2    | FLANGE, BLIND, 4" ANSI 300, RF, ASTM A-105  |
| 52                    | 2    | FLANGE, WELD, 8" ANSI 300, RFWN, BTM 0.250" W.T., GR F42  |
| 53                    | 1    | FLANGE, WELD, 4" ANSI 300, RFWN, STD. BORE, ASTM A-105  |
| <b>GASKETS</b>        |      |   |
| 60                    | 1    | GASKET, 12" ANSI 300, FLEXITALLIC TYPE CGI, SPIRALWOUND, 1/8" THK, 304 WND, GRAPHITE FILLER, 304 IR, CS OR.                           |
| 61                    | 3    | GASKET, 4" ANSI 300, FLEXITALLIC TYPE CGI, SPIRALWOUND, 1/8" THK, 304 WND, GRAPHITE FILLER, 304 IR, CS OR.                            |
| 62                    | 1    | FLANGE INSULATING KIT, 8" ANSI 300, RF, PHENOLIC SLEEVES & WASHERS, TYPE FNDW, NEOPRENE FACED PHENOLIC GASKET, DOUBLE WASHER SETS     |
| <b>STUD BOLTS</b>     |      |   |
| 70                    | 16   | STUD BOLT, 1-1/8" DIA. X 6-3/4" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (12" ANSI 300; 16 PER SET) TEFLON COATED    |
| 71                    | 24   | STUD BOLT, 3/4" DIA. X 4-1/2" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (4" ANSI 300; 8 PER SET) TEFLON COATED        |
| 72                    | 12   | STUD BOLT, 7/8" DIA. X 6" LONG, A-193 GR. B7, c/w (2) HEAVY HEX NUTS A-194, GR. 2H, (8" ANSI 300 INSUL KIT; 12 PER SET) TEFLON COATED |
| <b>MISC. MATERIAL</b> |      |   |
| 90                    | 2    | TAPPING TEES (TO BLOW DOWN ISOLATED LINE)   |
| 91                    | 1    | NIPPLE, 1" NOMINAL X 4" LONG, XH, SMLS, A108 GR.B, T.B.E.   |
| 92                    | 1    | PLUG, HEX HEAD, 1" MNPT, 6000#, ASTM A-105  |

**SITE #8**

**ISSUED FOR CONSTRUCTION**  
04/28/2014

Z:\5898 - LG&E - Ballardsville\4000-Piping\58984905.dwg Plotter: Apr 30, 2014 - 12:43pm by CRoberts

| GENERAL NOTES | REFERENCE DRAWINGS |                   | REVISIONS |      |    | REVISIONS   |     |      | DRAWING STATUS |             | SCALE: NTS<br>DATE: 04/18/14 | CORPORATE OFFICE:<br>100 WILSON BLVD<br>P.O. BOX 1007<br>VERMILION, KY 40383<br>TEL (606) 673-0878 FAX (606) 673-0873 | BRANCH OFFICES:<br>HOUSTON, TX • DALLAS, TX • HOUSTON, TX<br>CHARLOTTE, NC • PITTSBURGH, PA<br>www.enr.com | PPL companies<br>BILL OF MATERIAL<br>BALLARDSVILLE LINE PIGGABILITY<br>ZORN AVENUE RECEIVER<br>JEFFERSON COUNTY, KY | NO. 58984905 | REV. 0 |     |
|---------------|--------------------|-------------------|-----------|------|----|-------------|-----|------|----------------|-------------|------------------------------|---|--|---|--------------|--------|-----|
|               | DWG. NO.           | DESCRIPTION       | NO.       | DATE | BY | DESCRIPTION | NO. | DATE | BY             | DESCRIPTION |                              |   |  |   |              |        | NO. |
|               | 58984107           | PLAN AND SECTIONS |           |      |    |             |     |      |                | A           | 04/17/14                     | ISSUED FOR CLIENT REVIEW  | DATE: 04/29/14   |   |              |        |     |
|               |                    |                   |           |      |    |             |     |      |                | 0           | 04/25/14                     | ISSUED FOR CONSTRUCTION   | DATE: 04/25/14   |   |              |        |     |



**DETAIL**  
NTS  
**8**  
THIS DWG.

**PLAN VIEW**  
SCALE: 1/4" = 1'-0"

**SITE #9**  
**RE-ISSUED FOR CONSTRUCTION**  
04/30/14

Z:\58988 - LCAE - Ballardville\0000-Structural\58988103.dwg Plotter: May 02, 2014 - 9:15am by sddms

**GENERAL NOTES**

**NOTE:**  
ALL DIMENSIONS OF EXISTING CONDITIONS SHALL BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCING WORK. DIMENSIONS OF EXISTING CONDITIONS TO NEW CONDITIONS ARE BASED UPON SURVEY INFORMATION AND ARE TO BE VERIFIED BY CONTRACTOR TO ENSURE PROPER FIT-UP.

| REFERENCE DRAWINGS |             | REVISIONS |      |    | REVISIONS   |     |          | DRAWING STATUS |                            |
|--------------------|-------------|-----------|------|----|-------------|-----|----------|----------------|----------------------------|
| DWG. NO.           | DESCRIPTION | NO.       | DATE | BY | DESCRIPTION | NO. | DATE     | BY             | DESCRIPTION                |
|                    |             |           |      |    |             | A   | 04/17/14 |                | ISSUED FOR CLIENT REVIEW   |
|                    |             |           |      |    |             | 0   | 04/25/14 |                | ISSUED FOR CONSTRUCTION    |
|                    |             |           |      |    |             | 1   | 04/30/14 |                | RE-ISSUED FOR CONSTRUCTION |

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

DATE: 04/14/14  
DATE: 04/20/14  
DATE: 04/20/14

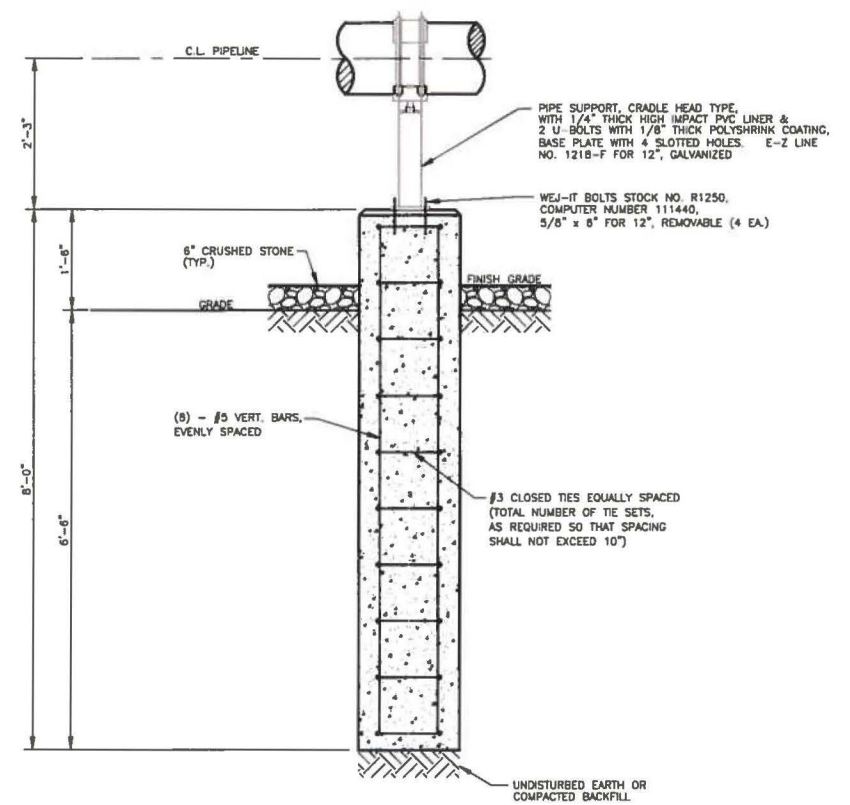
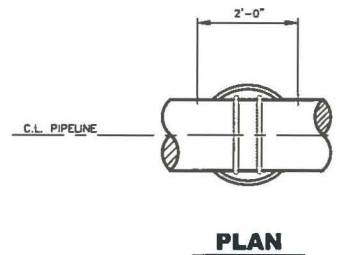
5898

**LGE KU**  
PPL companies  
ENGINEERING  
CORPORATE OFFICE:  
100 WILSON DRIVE  
P.O. BOX 1007  
VERMILION, KY 40389  
TEL: (606) 673-0976 • FAX: (606) 673-0972

BRANCH OFFICES:  
HOUSTON, TX • DETROIT, MI • BAYTOWN, TX  
CHARLESTON, WV • PITTSBURGH, PA  
www.emeeng.com

**BALLARDSVILLE LINE PIGGABILITY**  
ZORN AVENUE FOUNDATION LOCATION  
JEFFERSON COUNTY, KY

NO. 58988103  
REV. 1



**ELEVATION**  
**DETAIL 7**  
58988103

**CONCRETE PIPE SUPPORT DETAIL FOR 12" DIA. PIPE**

**CONCRETE NOTES:**

1. MATERIALS, CONSTRUCTION, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE ACI 318 BUILDING CODE.
2. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS AND SHALL CONFORM TO THE LATEST EDITION OF ASTM C150 FOR TYPE II PORTLAND CEMENT AND ASTM C33 FOR AGGREGATE.
3. GROUTING MATERIAL SHALL BE FURNISHED BY CONTRACTOR PER GENERAL SPECIFICATIONS.
4. IN PLACEMENT OF CONCRETE INTO FORMS A VERTICAL DROP OF THREE FEET SHALL NOT BE EXCEEDED.
5. ALL SOIL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D698 PRIOR TO PLACING CONCRETE.
6. ALL EXCESS CONCRETE AND CHUTE CLEAN UP SHALL BE DEPOSITED AT A SITE DESIGNATED BY THE COMPANY REPRESENTATIVE. COUNTY ROADS OR BORROW DITCHES SHALL NOT BE USED FOR THIS PURPOSE.
7. CONCRETE MIX SHALL INCLUDE 3-4% AIR ENTRAINMENT IN SOUTH CAROLINA AND MORE SOUTHERLY STATES AND 5-7% IN NORTH CAROLINA AND MORE NORTHERLY STATES. NO ADMIXTURES SHALL BE PERMITTED WITHOUT PRIOR APPROVAL FROM COMPANY REPRESENTATIVE.

**REINFORCING STEEL NOTES:**

1. ALL STEEL REINFORCING BARS SHALL CONFORM TO ASTM A615-78 (GRADE 60), DEFORMED BARS.
2. THERE SHALL BE A 3" MINIMUM CONCRETE COVER AROUND ALL REINFORCING BARS UNLESS OTHERWISE NOTED.
3. HEAT SHALL NOT BE USED TO CUT, JOIN, OR BEND REBAR.
4. ALL BAR SPLICES SHALL HAVE A MINIMUM LAP DIMENSION OF 36 BAR DIAMETERS OR 12", WHICHEVER IS GREATER AND STAGGERED 24".
5. REINFORCING STEEL SHALL BE SUPPORTED OFF OF THE GROUND BY EPOXY COATED CHAIRS OR OTHER SUITABLE MATERIAL.
6. ALL REBAR SHALL BE CLEAN AND FREE OF RUST AND FOREIGN MATERIALS.
7. TIE BARS WITH WIRE @ ALL INTERSECTIONS.
8. CONTRACTOR SHALL FURNISH ENOUGH TIE BARS TO BE IN COMPLIANCE WITH ACI 318-99, SECTION 7.10.5. FOR ALL CONCRETE COLUMNS (HEIGHT COLUMN > 3\* LEAST LATERAL DISTANCE), ALL PEDESTALS (HEIGHT OF COLUMN < 3\* LEAST LATERAL DISTANCE) SHALL BE TREATED AS COLUMNS.
9. COLD DRAWN WELDED WIRE FABRIC SHALL CONFORM TO THE LATEST EDITION OF ASTM A185 "SPECIFICATIONS FOR WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT".

**GENERAL NOTES:**

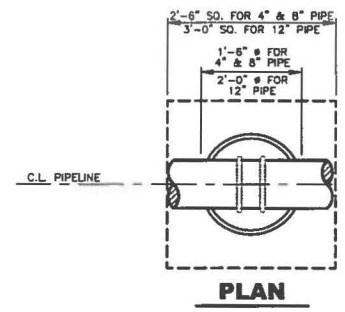
1. ALL CRUSHED STONE PLACED UNDER CONCRETE SHALL BE PLACED AND COMPACTED IN 6" LIFTS.
2. FINISHED GRADE IS ASSUMED TO BE 6" ABOVE GRADE.
3. ALL BACKFILL PLACED ON CONCRETE SHALL BE COMPACTED W/ A HAND TAMPER.
4. NO BACKFILL SHALL BE PLACED ON CONCRETE WITHOUT PRIOR APPROVAL FROM COMPANY REPRESENTATIVE.
5. BOTTOM OF ALL NEW CONCRETE SUPPORT FOUNDATIONS SHALL BE PLACED ON SOLID FOOTINGS.
6. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" @ 45° TO 6" BELOW FINISHED GRADE.
7. ALL SPREAD FOOTING FOUNDATIONS ON ROCK SHALL BE EXCAVATED TO A DEPTH SUCH THAT THE FOOTING IS PLACED ON A LEVEL SURFACE.
8. ALL SONOTUBE FOUNDATIONS LOCATED IN ROCK SHALL BE DRILLED TO THE DEPTH SHOWN ON THE FOUNDATION DRAWINGS.
9. ALL FOUNDATIONS PLACED PARTIALLY IN ROCK AND SOIL SHALL BE OVER EXCAVATED TO A SUITABLE DEPTH DEFINED BY A COMPANY REPRESENTATIVE AND BACKFILLED WITH SUITABLE MATERIAL APPROVED BY COMPANY REPRESENTATIVE.

Z:\58988 - LCAE - Ballardsville\6000-Structural\58988203.dwg Plotdate: Apr 29, 2014 - 8:30am by sddm

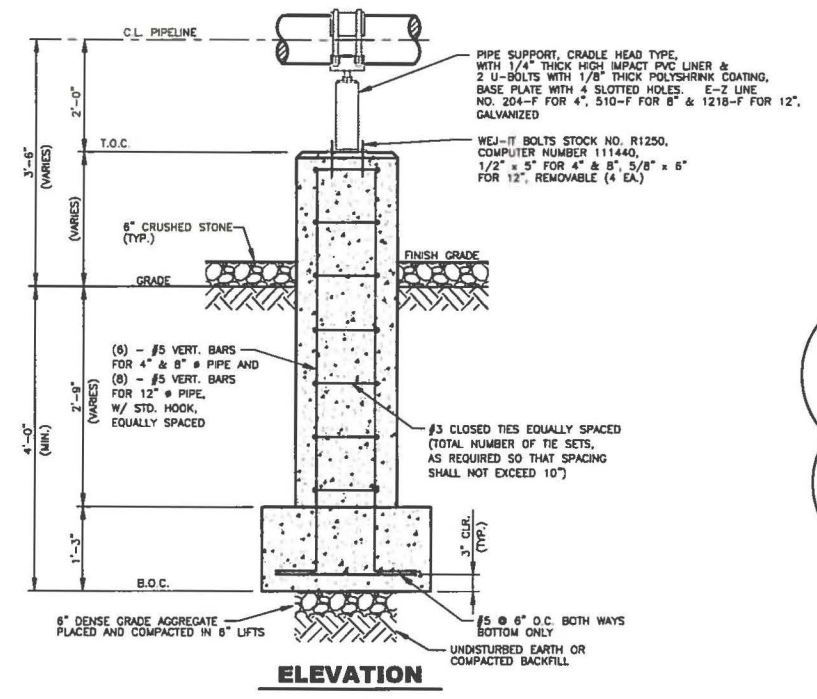
**ISSUED FOR CONSTRUCTION 04/28/14**

| GENERAL NOTES |             | REFERENCE DRAWINGS |      |    | REVISIONS   |     |      | REVISIONS |             |     | DRAWING STATUS |                          | SCALE: Enter Scale |      | CORPORATE OFFICE:   |  | BRANCH OFFICES: |      |  |
|---------------|-------------|--------------------|------|----|-------------|-----|------|-----------|-------------|-----|----------------|--------------------------|--------------------|------|---|--|-----------------|------|--|
| DWG. NO.      | DESCRIPTION | NO.                | DATE | BY | DESCRIPTION | NO. | DATE | BY        | DESCRIPTION | NO. | DATE           | DESCRIPTION              | NO.                | DATE | 100 WILSON DRIVE<br>P.O. BOX 1007<br>VERMILION, KY 40381<br>TEL: (606) 873-0275 • FAX: (606) 873-0272 | HOUSTON, TX • MEMPHIS, TN • BALTIMORE, MD<br>CHARLESTON, WV • PITTSBURGH, PA | NO.             | REV. |  |
|               |             |                    |      |    |             |     |      |           |             | A   | 04/17/14       | ISSUED FOR CLIENT REVIEW |                    |      |   |  |                 |      |  |
|               |             |                    |      |    |             |     |      |           |             | 0   | 04/25/14       | ISSUED FOR CONSTRUCTION  |                    |      |   |  |                 |      |  |

**IG&KU**  
PPL companies  
STRUCTURAL  
BALLARDSVILLE LINE PIGGABILITY  
ZORN AVE. PIPE SUPPORT FND. & DTLS.  
OLDHAM COUNTY, KY  
NO. 58988203  
REV. 0



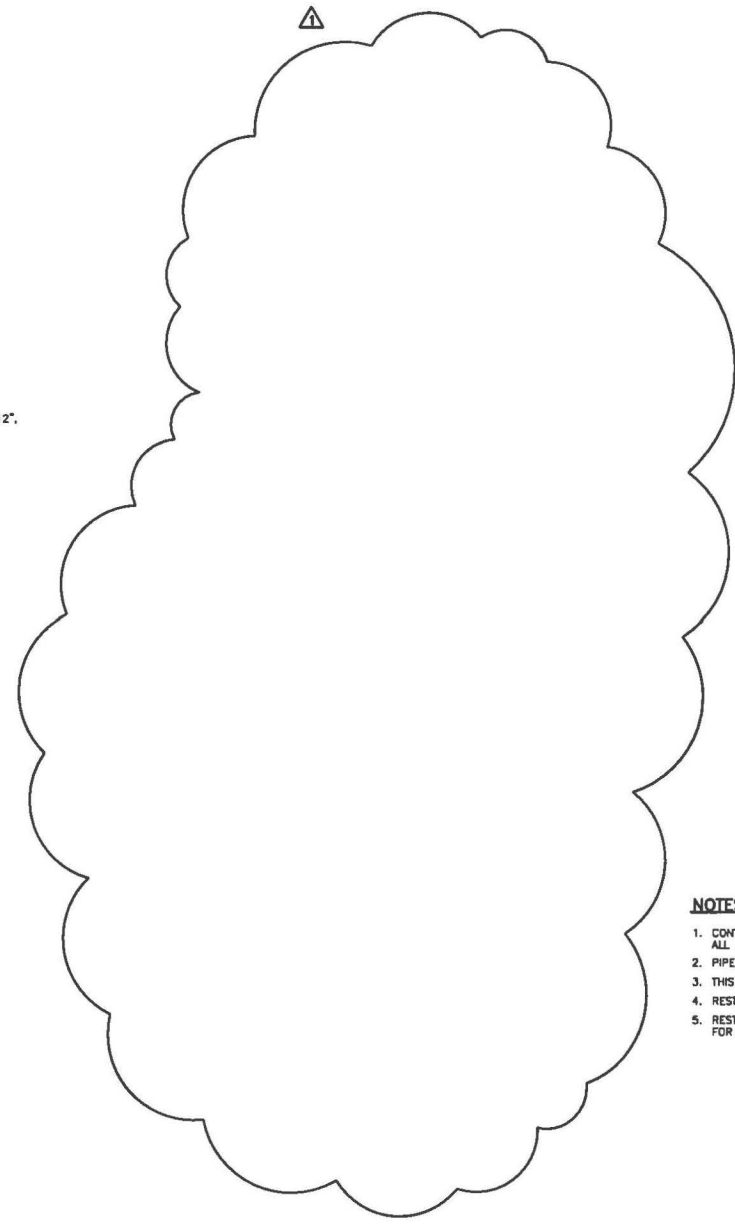
**PLAN**



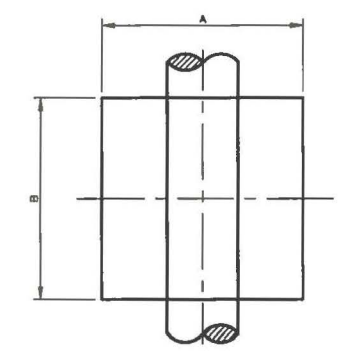
**ELEVATION**

|               |          |
|---------------|----------|
| <b>DETAIL</b> | <b>4</b> |
| NTS           | 58988101 |

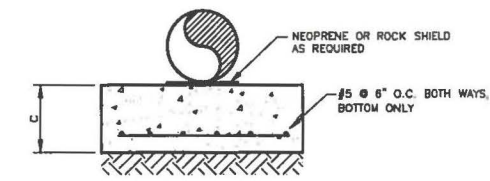
**CONCRETE PIPE SUPPORT DETAIL FOR 4", 8" & 12" DIA. PIPE**



| <b>REST BLOCK SCHEDULE</b> |       |       |     |
|----------------------------|-------|-------|-----|
| PIPE SIZE                  | A     | B     | C   |
| 4" OR SMALLER              | 1'-0" | 1'-0" | 6"  |
| 8" THRU 8"                 | 1'-6" | 1'-6" | 9"  |
| 10" THRU 16"               | 2'-0" | 2'-0" | 12" |



**PLAN**



**ELEVATION**

**NOTES:**

- CONTRACTOR SHALL INSTALL SUPPORTS UNDER PIPE WHERE DIRECTIONAL CHANGES OCCUR AND AT ALL BRANCH CONNECTIONS.
- PIPE AND FITTINGS TO BE WRAPPED W/NEOPRENE OR ROCK SHIELD TO PROTECT APPLIED COATINGS.
- THIS SUPPORT IS NOT DESIGNED OR INTENDED FOR USE AS A THRUST BLOCK.
- REST BLOCKS SHALL BE PLACED A MINIMUM OF 6" FROM ALL WELDS.
- REST BLOCKS SHALL BE PLACED NO GREATER THAN 20 FEET CENTER TO CENTER DISTANCE FOR STRAIGHT RUNS OF PIPE.

|               |          |
|---------------|----------|
| <b>DETAIL</b> | <b>6</b> |
| NTS           | 58988101 |
|               | 58988102 |
|               | 58988103 |

**REST BLOCK DETAIL**

**CONCRETE NOTES:**

- MATERIALS, CONSTRUCTION, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE ACI 318 BUILDING CODE.
- CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS AND SHALL CONFORM TO THE LATEST EDITION OF ASTM C150 FOR TYPE II PORTLAND CEMENT AND ASTM C33 FOR AGGREGATE.
- GROUTING MATERIAL SHALL BE FURNISHED BY CONTRACTOR PER GENERAL SPECIFICATIONS.
- IN PLACEMENT OF CONCRETE INTO FORMS A VERTICAL DROP OF THREE FEET SHALL NOT BE EXCEEDED.
- ALL SOIL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D998 PRIOR TO PLACING CONCRETE.
- ALL EXCESS CONCRETE AND CHUTE CLEAN UP SHALL BE DEPOSITED AT A SITE DESIGNATED BY THE COMPANY REPRESENTATIVE. COUNTY ROADS OR BORROW DITCHES SHALL NOT BE USED FOR THIS PURPOSE.
- CONCRETE MIX SHALL INCLUDE 3-4% AIR ENTRAINMENT IN SOUTH CAROLINA AND MORE SOUTHERLY STATES AND 5-7% IN NORTH CAROLINA AND MORE NORTHERLY STATES. NO ADMIXTURES SHALL BE PERMITTED WITHOUT PRIOR APPROVAL FROM COMPANY REPRESENTATIVE.

**REINFORCING STEEL NOTES:**

- ALL STEEL REINFORCING BARS SHALL CONFORM TO ASTM A615-76 (GRADE 60), DEFORMED BARS.
- THERE SHALL BE A 3" MINIMUM CONCRETE COVER AROUND ALL REINFORCING BARS UNLESS OTHERWISE NOTED.
- HEAT SHALL NOT BE USED TO CUT, JOIN, OR BEND REBAR.
- ALL BAR SPLICES SHALL HAVE A MINIMUM LAP DIMENSION OF 38 BAR DIAMETERS OR 12", WHICHEVER IS GREATER AND STAGGERED 24".
- REINFORCING STEEL SHALL BE SUPPORTED OFF OF THE GROUND BY EPOXY COATED CHAIRS OR OTHER SUITABLE MATERIAL.
- ALL REBAR SHALL BE CLEAN AND FREE OF RUST AND FOREIGN MATERIALS.
- THE BARS WITH WIRE @ ALL INTERSECTIONS.
- CONTRACTOR SHALL FURNISH ENOUGH TIE BARS TO BE IN COMPLIANCE WITH ACI 318-99, SECTION 7.10.5. FOR ALL CONCRETE COLUMNS (HEIGHT COLUMN > 3' LEAST LATERAL DISTANCE). ALL PEDESTALS (HEIGHT OF COLUMN < 3' LEAST LATERAL DISTANCE) SHALL BE TREATED AS COLUMNS.
- COLD DRAWN WELDED WIRE FABRIC SHALL CONFORM TO THE LATEST EDITION OF ASTM A185 "SPECIFICATIONS FOR WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT".

**GENERAL NOTES:**

- ALL CRUSHED STONE PLACED UNDER CONCRETE SHALL BE PLACED AND COMPACTED IN 6" LIFTS.
- FINISHED GRADE IS ASSUMED TO BE 6" ABOVE GRADE.
- ALL BACKFILL PLACED ON CONCRETE SHALL BE COMPACTED W/ A HAND TAMPER.
- NO BACKFILL SHALL BE PLACED ON CONCRETE WITHOUT PRIOR APPROVAL FROM COMPANY REPRESENTATIVE.
- BOTTOM OF ALL NEW CONCRETE SUPPORT FOUNDATIONS SHALL BE PLACED ON SOLID FOOTINGS.
- ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" @ 45° TO 6" BELOW FINISHED GRADE.
- ALL SPREAD FOOTING FOUNDATIONS ON ROCK SHALL BE EXCAVATED TO A DEPTH SUCH THAT THE FOOTING IS PLACED ON A LEVEL SURFACE.
- ALL SONOTUBE FOUNDATIONS LOCATED IN ROCK SHALL BE DRILLED TO THE DEPTH SHOWN ON THE FOUNDATION DRAWINGS.
- ALL FOUNDATIONS PLACED PARTIALLY IN ROCK AND SOIL SHALL BE OVER EXCAVATED TO A SUITABLE DEPTH DEFINED BY A COMPANY REPRESENTATIVE AND BACKFILLED WITH SUITABLE MATERIAL APPROVED BY COMPANY REPRESENTATIVE.

**RE-ISSUED FOR CONSTRUCTION 04/30/14**

Z:\58988 - LC&E - Ballardsville\9000-Structure\58988202.dwg, Apr 29, 2014, 12:45pm by adkins

| GENERAL NOTES |             | REFERENCE DRAWINGS |      |    | REVISIONS   |     |      | REVISIONS |             |     | DRAWING STATUS |                            | SCALE:         | <br>CORPORATE OFFICE:<br>100 FRESHWATER DRIVE<br>VERMILION, KY 40383<br>TEL: (606) 873-0275 • FAX: (606) 873-8872<br>BRANCH OFFICES:<br>HOUSTON, TX • BECKLEY, WV • BAYTOWN, TX<br>CHARLESTON, WV • PITTSBURGH, PA<br>www.pandh.com | <br>PPL companies<br>STRUCTURAL<br>BALLARDSVILLE LINE PIGGABILITY<br>PIPE SUPPORT ELEVATIONS & DETAILS<br>OLDHAM COUNTY, KY | NO. 58988202 | REV. 1 |
|---------------|-------------|--------------------|------|----|-------------|-----|------|-----------|-------------|-----|----------------|----------------------------|----------------|---|---|--------------|--------|
| DWG. NO.      | DESCRIPTION | NO.                | DATE | BY | DESCRIPTION | NO. | DATE | BY        | DESCRIPTION | NO. | DATE           | DESCRIPTION                | 3/4" = 1'-0"   |   |   |              |        |
|               |             |                    |      |    |             |     |      |           |             | A   | 04/17/14       | ISSUED FOR CLIENT REVIEW   | DATE: 03/24/14 |   |   |              |        |
|               |             |                    |      |    |             |     |      |           |             | 0   | 04/25/14       | ISSUED FOR CONSTRUCTION    | DATE: 04/20/14 |   |   |              |        |
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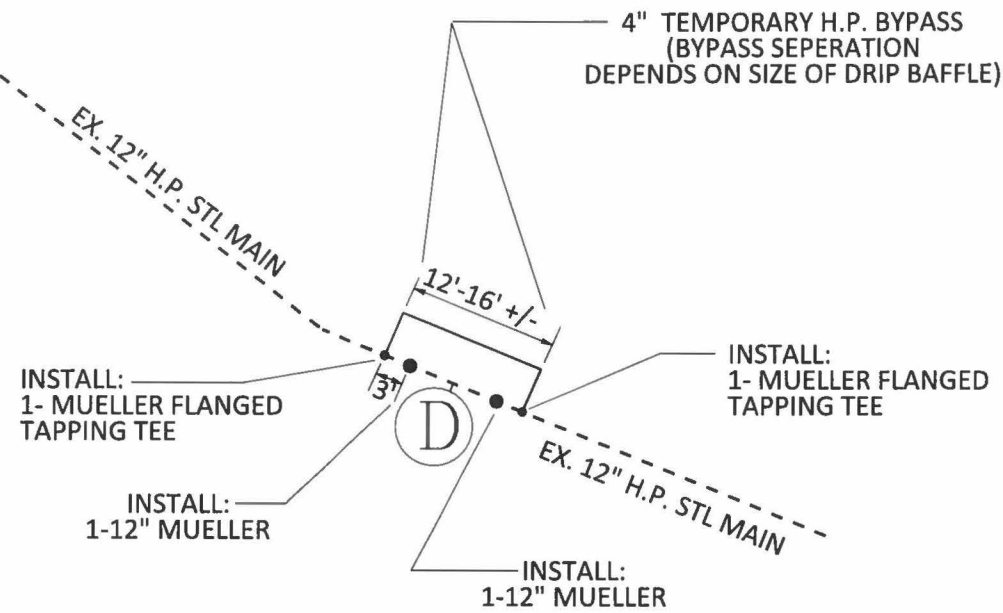
FOX TRAIL AND DEER RUN

DUEL MUELLERS WITH GAS BYPASS  
REQUIRED FOR CUT OUT

REMOVE EXISTING DRIP

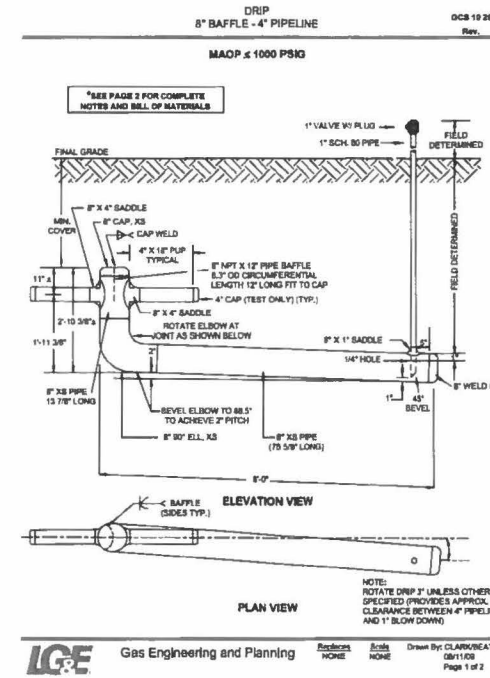
SITE 10: DRIP AT  
FOX TRAIL AND DEER RUN

PLAN VIEW

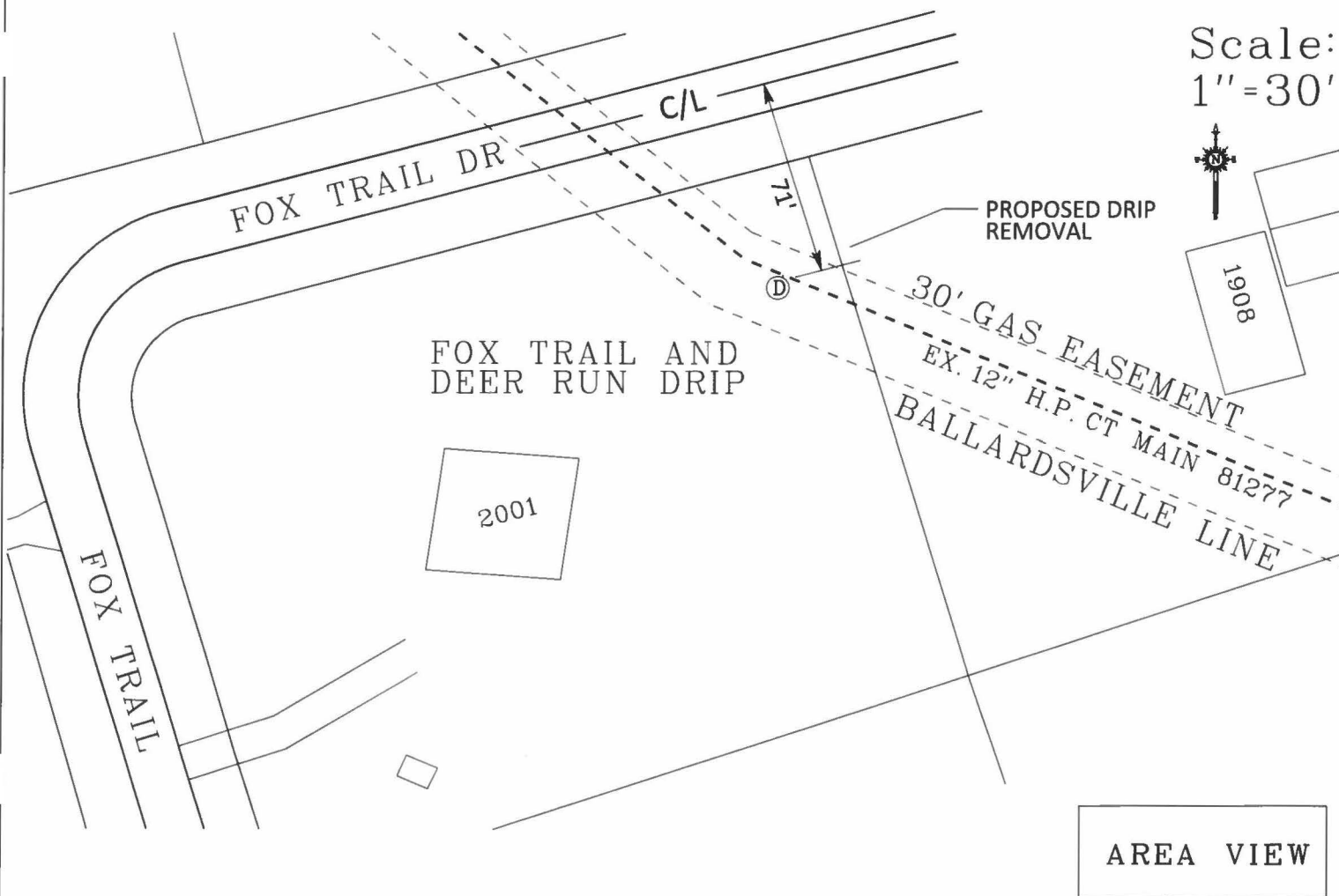


Scale:  
1" = 10'

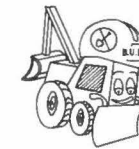
TYPICAL DRIP  
LAYOUT



NOTES:  
LENGTH IS UNKNOWN  
DIAMETER IS UNKNOWN



Scale:  
1" = 30'



BEFORE "U" DIG  
CALL 811  
FOR BURIED LINE/  
CABLE LOCATIONS.

DRIP MAY CONTAIN ENVIRONMENTALLY  
HAZARDOUS MATERIALS. USE CAUTION.

IN CASE OF SPILL, NOTIFY  
PAUL PUCKETT IMMEDIATELY.

GAS LEGEND

- EXISTING GAS MAIN
- ===== PROPOSED GAS MAIN
- EXISTING WATER MAIN
- +++++++ EXISTING SEWER MAIN

LOUISVILLE GAS AND ELECTRIC COMPANY  
6900 ENTERPRISE DR  
Louisville, Kentucky 40214

**LGE** GAS & ELECTRIC ENGINEERING

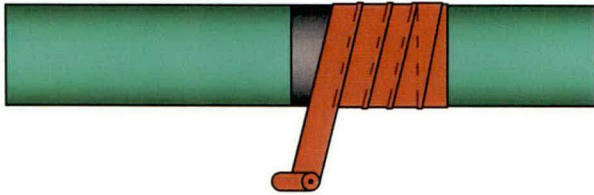
Title  
**BALLARDSVILLE LINE  
PIGGABILITY PROJECT**

| REVISIONS |    | Date:   | Gas Design: |
|-----------|----|---------|-------------|
| DATE      | BY | 4/24/14 | ROBISON     |
|           |    |         |             |
|           |    |         |             |
|           |    |         |             |
|           |    |         |             |
|           |    |         |             |
|           |    |         |             |

Scale: VARIES Date: 4/24/14 Gas Design: ROBISON  
PROJECT: 138033 TASK: FOXTRAILDRIP GAS-D-023151

PIPE COATING  
WAX-TAPE AND OUTER WRAP APPLICATION

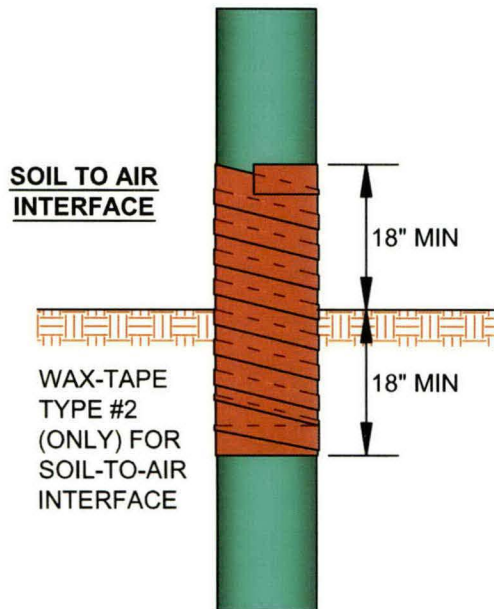
GCS 50 10 602  
Rev. B



APPLICATION

TRENTON WAX-TAPE APPLICATION

- START WITH A FULL WRAP AT END WITH A 4"-6" OVERLAP PAST PIPE COATING.
- FOR BELOW GROUND APPLICATION USE A SPIRAL WRAP WITH A 1" OVERLAP PER PASS.
- FOR SOIL-TO-AIR INTERFACE APPLICATION USE A SPIRAL WRAP WITH A 50% OVERLAP PER PASS WORKING FROM THE BOTTOM TO THE TOP.
- MOLD WAX TAPE TO PIPE AND FITTING TO REMOVE ALL AIR POCKETS.
- END THE WRAP WITH A FULL WRAP WITH 4-6" OVERLAP PAST PIPE COATING.



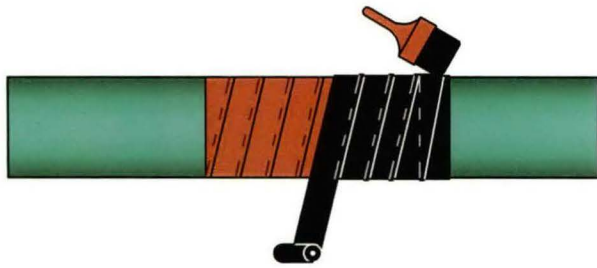
WAX-TAPE TYPE #1 FOR BELOW GROUND

BELOW GRADE



PIPE COATING  
WAX-TAPE AND OUTER WRAP APPLICATION

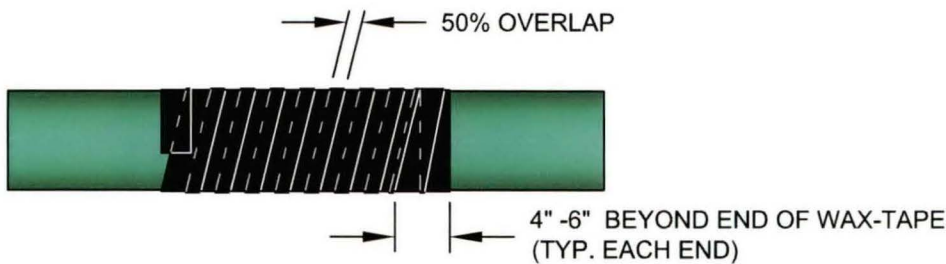
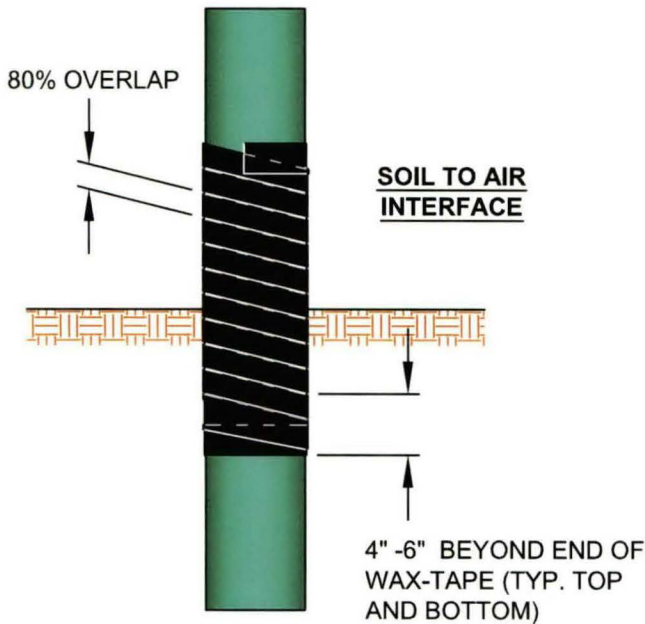
GCS 50 10 602  
Rev. B



**APPLICATION**

**TRENTON OUTER WRAP APPLICATION**

- START WITH A FULL WRAP AT END WITH A 4-6" OVERLAP PAST WAX-TAPE COATING.
- FOR BELOW GRADE APPLICATION USE A SPIRAL WRAP WITH A 50% OVERLAP PER PASS.
- FOR SOIL-TO-AIR INTERFACE APPLICATION USE A SPIRAL WRAP WITH A 80% OVERLAP PER PASS WORKING FROM THE BOTTOM TO THE TOP.
- END THE WRAP WITH A FULL WRAP WITH 4-6" OVERLAP PAST WAX-TAPE COATING.
- APPLY TRENTON END ADHESIVE TO END OF WRAP TO SECURE END OF ROLL.
- IT IS RECOMMENDED TO MATCH WAX-TAPE SIZE WITH OUTER WRAP SIZE (I.E. 4" OUTER WRAP ON 4" WAX-TAPE).



**BELOW GRADE**



**PIPE COATING  
WAX-TAPE AND OUTER WRAP APPLICATION**

**GCS 50 10 602  
Rev. B**

| DESCRIPTION   | LG&E<br>INVENTORY<br>NO. (IIN) | ROLLS OF TAPE PER FOOT PER PIPE NPS |                                |                                |                                |                               |                               |                                |                                |                                |                                 |
|---|--------------------------------|-------------------------------------|--------------------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|
|   |                                | 1"                                  | 2"                             | 4"                             | 6"                             | 8"                            | 12"                           | 16"                            | 20"                            | 22"                            | 24"                             |
| WAX-TAPE #1<br>4" X 9 FT LONG ROLLS, TRENTON,<br>FOR BELOW GROUND<br>APPLICATION, 24/CASE.                          | 0513778                        | 0.2<br>(1")                         | 0.3<br>(1")                    | 0.6<br>(1")                    | 0.9<br>(1")                    | 1.1<br>(1")                   | NR                            | NR                             | NR                             | NR                             | NR                              |
| WAX-TAPE #1<br>6" X 9 FT LONG ROLLS, TRENTON,<br>FOR BELOW GROUND<br>APPLICATION, 16/CASE.                          | 0513786                        | NR                                  | NR                             | NR                             | NR                             | NR                            | 1<br>(1")                     | 1.2<br>(1")                    | 1.5<br>(1")                    | 1.7<br>(1")                    | 1.8<br>(1")                     |
| WAX-TAPE #2<br>4" X 9 FT LONG ROLLS, TRENTON,<br>FOR ABOVE GROUND APPLICATION,<br>24/CASE                           | 0513760                        | 0.2<br>(55%)                        | 0.5<br>(55%)                   | 1<br>(55%)                     | 1.4<br>(55%)                   | 1.8<br>(55%)                  | NR                            | NR                             | NR                             | NR                             | NR                              |
| WAX-TAPE #2<br>6" X 9 FT LONG ROLLS, TRENTON,<br>FOR ABOVE GROUND APPLICATION,<br>16/CASE                           | 0513751                        | NR                                  | NR                             | NR                             | NR                             | NR                            | 1.8<br>(55%)                  | 2.2<br>(55%)                   | 2.8<br>(55%)                   | 3.1<br>(55%)                   | 3.4<br>(55%)                    |
| PRIMER<br>FOR WAX-TAPE #1 AND #2,<br>TRENTON, 1 GALLON CANS   | 0513743                        | 0.25<br>*                           | 0.5<br>*                       | 1<br>*                         | 1.5<br>*                       | 2<br>*                        | 3.25<br>*                     | 4.25<br>*                      | 5.25<br>*                      | 5.75<br>*                      | 6.25<br>*                       |
| OUTER WRAP<br>4" X 27' LONG ROLLS, TRENTON FOR<br>ABOVE AND BELOW GROUND<br>APPLICATION (INCLUDES END<br>ADHESIVE)  | SPECIAL<br>ORDER               | 0.1<br>(50%)<br>0.2<br>(80%)        | 0.14<br>(50%)<br>0.35<br>(80%) | 0.26<br>(50%)<br>0.66<br>(80%) | 0.39<br>(50%)<br>0.96<br>(80%) | 0.5<br>(50%)<br>1.26<br>(80%) | NR                            | NR                             | NR                             | NR                             | NR                              |
| OUTER WRAP<br>6" X 27' LONG ROLLS, TRENTON,<br>FOR ABOVE AND BELOW GROUND<br>APPLICATION (INCLUDES END<br>ADHESIVE) | SPECIAL<br>ORDER               | NR                                  | NR                             | NR                             | NR                             | NR                            | 0.5<br>(50%)<br>1.24<br>(80%) | 0.62<br>(50%)<br>1.55<br>(80%) | 0.78<br>(50%)<br>1.94<br>(80%) | 0.85<br>(50%)<br>2.13<br>(80%) | 0.93<br>(50%)<br>2.328<br>(80%) |

**NOTES:**

- 1. PERCENTAGE OF OVERLAP SHOWN IN PARENTHESES.
- NR = NOT RECOMMENDED BY TRENTON.
- \* PRIMER IS GIVEN IN CANS PER 100 FEET



## **Pipe Coating - Rock Shield**

### **1.0 Scope**

- 1.1 This standard covers installation of rock shield for coating protection where pipeline coatings are subjected to rocky terrain, mountain handling, excessive abrasion and damaging backfills.

### **2.0 References**

#### **2.1 Company Standards**

##### **2.1.1 Gas Construction Standards**

- 2.1.1.1 GCS – Pipe Coating – Rock Shield Application

##### **2.1.2 Technical Modules**

- 2.1.2.1 None

#### **2.2 Manufacturer's Application Instructions**

- 2.2.1 If a conflict exists between the requirements of manufacturer's application instructions and this standard, the requirements of this standard shall prevail.

### **3.0 Material**

- 3.1 Rock shield shall be mesh rolls as specified by Louisville Gas & Electric Company (LG&E).

- 3.1.1 Tapecoat TC 2025-1

### **4.0 Equipment**

- 4.1 Nonmetallic Banding

### **5.0 Application**

- 5.1 Wrapping of Pipes with a Smaller Circumference (i.e., at least six (6) inches less) Than the Roll Width

- 5.1.1 Unroll the rock shield parallel to the pipe which is to be protected.

- 5.1.2 Place the rock shield below the pipe with the edges at the 6 o'clock position of the pipe.

- 5.1.3 Overlap the edges by a minimum of six (6) inches.

- 5.1.4 Secured the rock shield with nonmetallic banding material (e.g., plastic straps or tape) approximately every 30 inches.

- 5.2 Wrapping of Pipes with a Larger Circumference Than the Roll Width

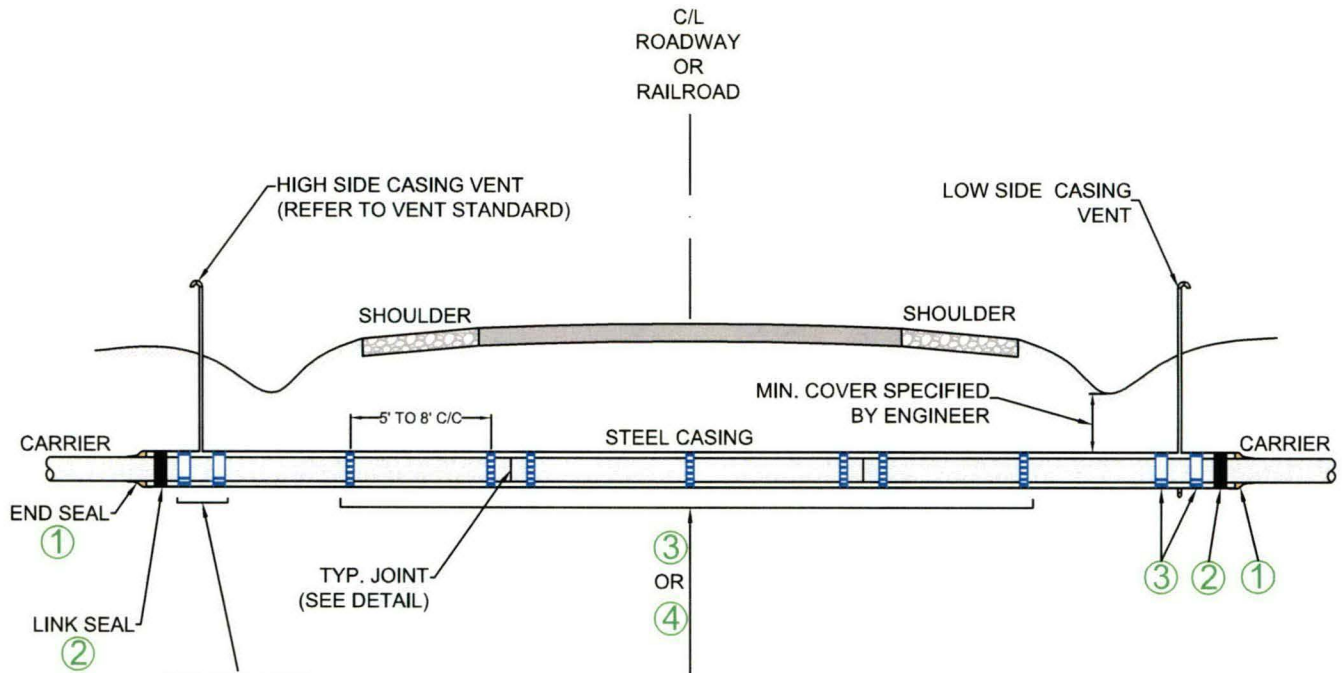
- 5.2.1 Cut the rock shield into strips with each strip having a minimum of six (6) inches more than the circumference of the pipe.
- 5.2.2 Place the rock shield below the pipe with the edges at the 6 o'clock position of the pipe.
- 5.2.3 Overlap the edges by a minimum of six (6) inches.
- 5.2.4 Overlap the next adjacent strip by a minimum of six (6) inches.
- 5.2.5 Secured the rock shield with two nonmetallic banding material (e.g., plastic straps or tape) on each strip.

## **6.0 Safety**

- 6.1 Wear appropriate PPE while performing coating application.

# CASING STEEL CASING / STEEL CARRIER

GCS 10 20 750  
Rev.B

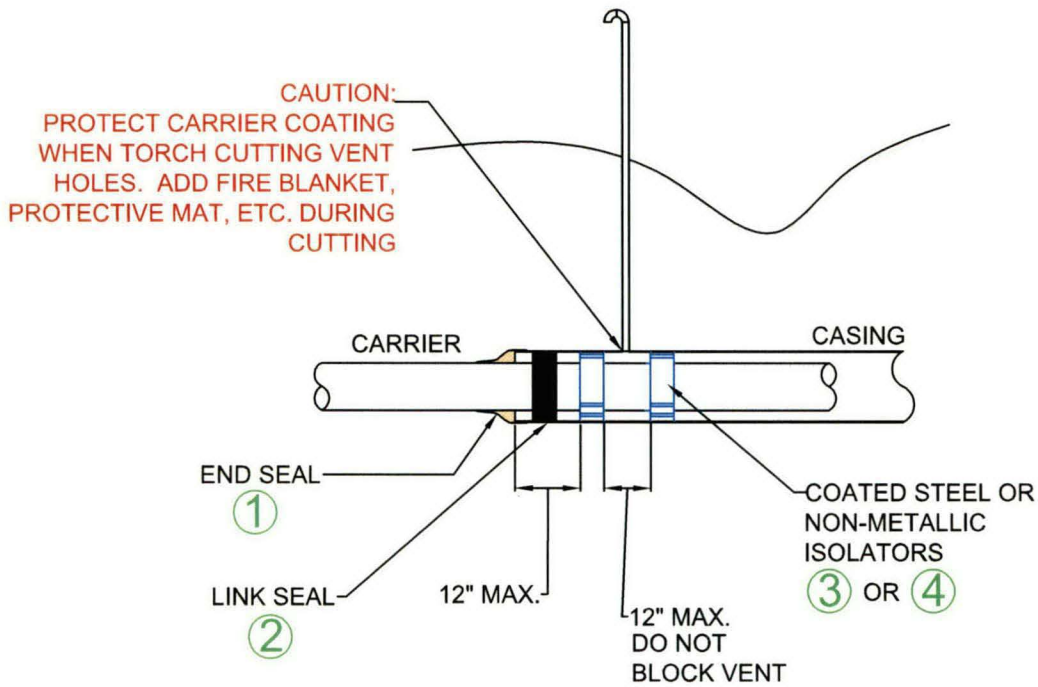


### INTERIOR ISOLATORS

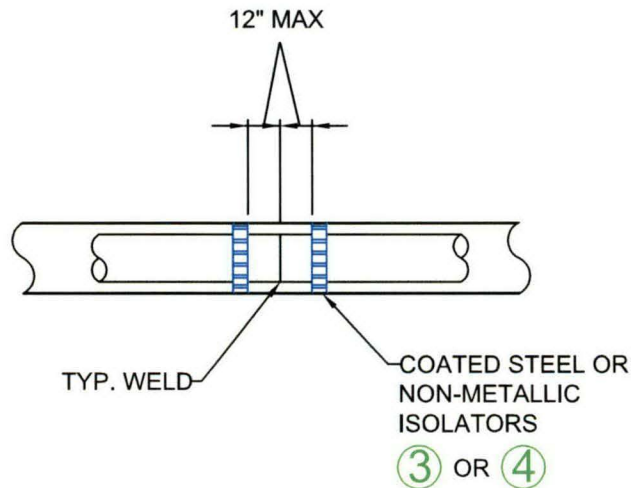
| CASING                              | INTERIOR SPACER |     |
|-------------------------------------|-----------------|-----|
| CASING > 300 FT LONG                | COATED STEEL    | (3) |
| CASING ≤ 300 FT LONG                | NON-METALLIC    | (4) |
| CASING > 16" NPS<br>(OF ANY LENGTH) | COATED STEEL    | (3) |

## TYPICAL CASING DETAIL





**TYPICAL END DETAIL**



**TYPICAL WELD DETAIL**



**CASING  
STEEL CASING / STEEL CARRIER**

**GCS 10 20 750  
Rev. B**

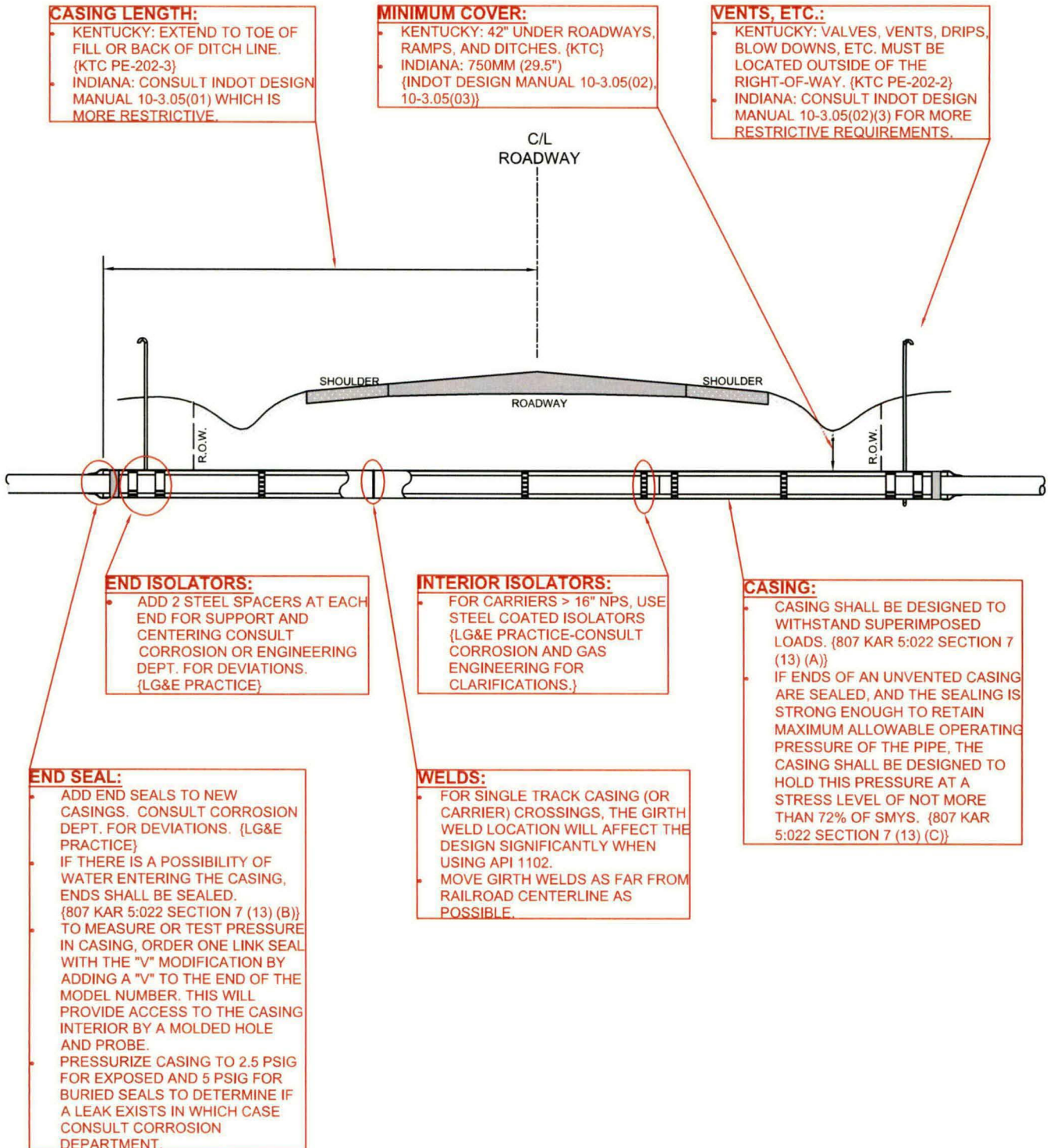
**CASING MATERIALS**

| CARRIER<br>(NPS) | CASING<br>(NPS) | END SEAL<br><br>①      | LINK SEAL<br><br>②       | ISOLATOR  |  |  |
|------------------|-----------------|------------------------|--------------------------|---|--|--|
|                  |                 |                        |                          | STEEL<br><br>③  | NON-METALLIC<br><br>④                                |  |
| 4"               | 8"              | PSI MODEL<br>S 4 X 8   | PSI MODEL<br>LS-475-C-7  | PIPELINE SEAL AND INSULATOR (PSI)<br>C12GN-2 4.5 X 7.98-TPE LINER-CR<br>(CENTERED FOR LINK SEAL MODULAR<br>SEAL)    | PSI MODEL<br>RANGER II MINI<br>28-7<br>(PREFERRED)   | PSI MODEL<br>HT 4 X 8<br>(ALTERNATE)       |
| 6"               | 10"             | PSI MODEL<br>S 6 X 10  | PSI MODEL<br>LS-475-C-10 | PIPELINE SEAL AND INSULATOR (PSI)<br>C12GN-2 6.625 X 10.01-TPE LINER-CR<br>(CENTERED FOR LINK SEAL MODULAR<br>SEAL) | PSI MODEL<br>RANGER II MIDI<br>28-4<br>(PREFERRED)   | PSI MODEL<br>HT 6 X 10<br>(ALTERNATE)      |
| 8"               | 12"             | PSI MODEL<br>S 8 X 12  | PSI MODEL<br>LS-475-C-12 | PIPELINE SEAL AND INSULATOR (PSI)<br>C12GN-2 8.625 X 12-TPE LINER-CR<br>(CENTERED FOR LINK SEAL MODULAR<br>SEAL)    | PSI MODEL<br>RANGER II MIDI<br>28-5<br>(PREFERRED)   | PSI MODEL<br>HT 8 X 12<br>(ALTERNATE)      |
| 10"              | 16"             | PSI MODEL<br>S 10 X 16 | PSI MODEL<br>LS-525-C-10 | PIPELINE SEAL AND INSULATOR (PSI)<br>C12GN-2 10.75 X 15.25-TPE LINER-CR<br>(CENTERED FOR LINK SEAL MODULAR<br>SEAL) | PSI MODEL<br>RANGER II MIDI<br>44-7<br>(PREFERRED)   | PSI MODEL<br>HT 10 X 16<br>(ALTERNATE)     |
| 12"              | 16"             | PSI MODEL<br>S 12 X 16 | PSI MODEL<br>LS-425-C-12 | PIPELINE SEAL AND INSULATOR (PSI)<br>C12GN-2 12.75 X 15.25-TPE LINER-CR<br>(CENTERED FOR LINK SEAL MODULAR<br>SEAL) | PSI MODEL<br>RANGER II MIDI<br>16.5-7<br>(PREFERRED) | PSI MODEL<br>HT 12 X 16<br>(ALTERNATE)     |
| 16"              | 20"             | PSI MODEL<br>C 16 X 20 | PSI MODEL<br>LS-475-C-21 | PIPELINE SEAL AND INSULATOR (PSI)<br>C12GN-2 16 X 19.25-TPE LINER-CR<br>(CENTERED FOR LINK SEAL MODULAR<br>SEAL)    | PSI MODEL<br>RANGER II MIDI<br>28-10<br>(PREFERRED)  | NOT AVAILABLE<br>USE STEEL OR<br>RANGER II |
| 20"              | 24"             | PSI MODEL<br>C 20 X 24 | PSI MODEL<br>LS-475-C-26 | PIPELINE SEAL AND INSULATOR (PSI)<br>C12GN-2 20 X 23.25-TPE LINER-CR<br>(CENTERED FOR LINK SEAL MODULAR<br>SEAL)    | PSI MODEL<br>RANGER II MEDI<br>28-4<br>(PREFERRED)   | NOT AVAILABLE<br>USE STEEL OR<br>RANGER II |
| 24"              | 30"             | PSI MODEL<br>C 24 X 30 | PSI MODEL<br>LS-500-C-21 | PIPELINE SEAL AND INSULATOR (PSI)<br>C12GN-2 24 X 29.25-TPE LINER-CR<br>(CENTERED FOR LINK SEAL MODULAR<br>SEAL)    | PSI MODEL<br>RANGER II MEDI<br>50-5<br>(PREFERRED)   | NOT AVAILABLE<br>USE STEEL OR<br>RANGER II |

NOTE: CONSULT WITH CORROSION AND GAS ENGINEERING DEPARTMENTS FOR MATERIAL SUBSTITUTIONS.



**HIGHWAY DESIGN  
ENGINEERING NOTES**



**CASING LENGTH:**

- KENTUCKY: EXTEND TO TOE OF FILL OR BACK OF DITCH LINE. {KTC PE-202-3}
- INDIANA: CONSULT INDOT DESIGN MANUAL 10-3.05(01) WHICH IS MORE RESTRICTIVE.

**MINIMUM COVER:**

- KENTUCKY: 42" UNDER ROADWAYS, RAMPS, AND DITCHES. {KTC}
- INDIANA: 750MM (29.5") {INDOT DESIGN MANUAL 10-3.05(02), 10-3.05(03)}

**VENTS, ETC.:**

- KENTUCKY: VALVES, VENTS, DRIPS, BLOW DOWNS, ETC. MUST BE LOCATED OUTSIDE OF THE RIGHT-OF-WAY. {KTC PE-202-2}
- INDIANA: CONSULT INDOT DESIGN MANUAL 10-3.05(02)(3) FOR MORE RESTRICTIVE REQUIREMENTS.

**END ISOLATORS:**

- ADD 2 STEEL SPACERS AT EACH END FOR SUPPORT AND CENTERING CONSULT CORROSION OR ENGINEERING DEPT. FOR DEVIATIONS. {LG&E PRACTICE}

**INTERIOR ISOLATORS:**

- FOR CARRIERS > 16" NPS, USE STEEL COATED ISOLATORS {LG&E PRACTICE-CONSULT CORROSION AND GAS ENGINEERING FOR CLARIFICATIONS.}

**CASING:**

- CASING SHALL BE DESIGNED TO WITHSTAND SUPERIMPOSED LOADS. {807 KAR 5:022 SECTION 7 (13) (A)}
- IF ENDS OF AN UNVENTED CASING ARE SEALED, AND THE SEALING IS STRONG ENOUGH TO RETAIN MAXIMUM ALLOWABLE OPERATING PRESSURE OF THE PIPE, THE CASING SHALL BE DESIGNED TO HOLD THIS PRESSURE AT A STRESS LEVEL OF NOT MORE THAN 72% OF SMYS. {807 KAR 5:022 SECTION 7 (13) (C)}

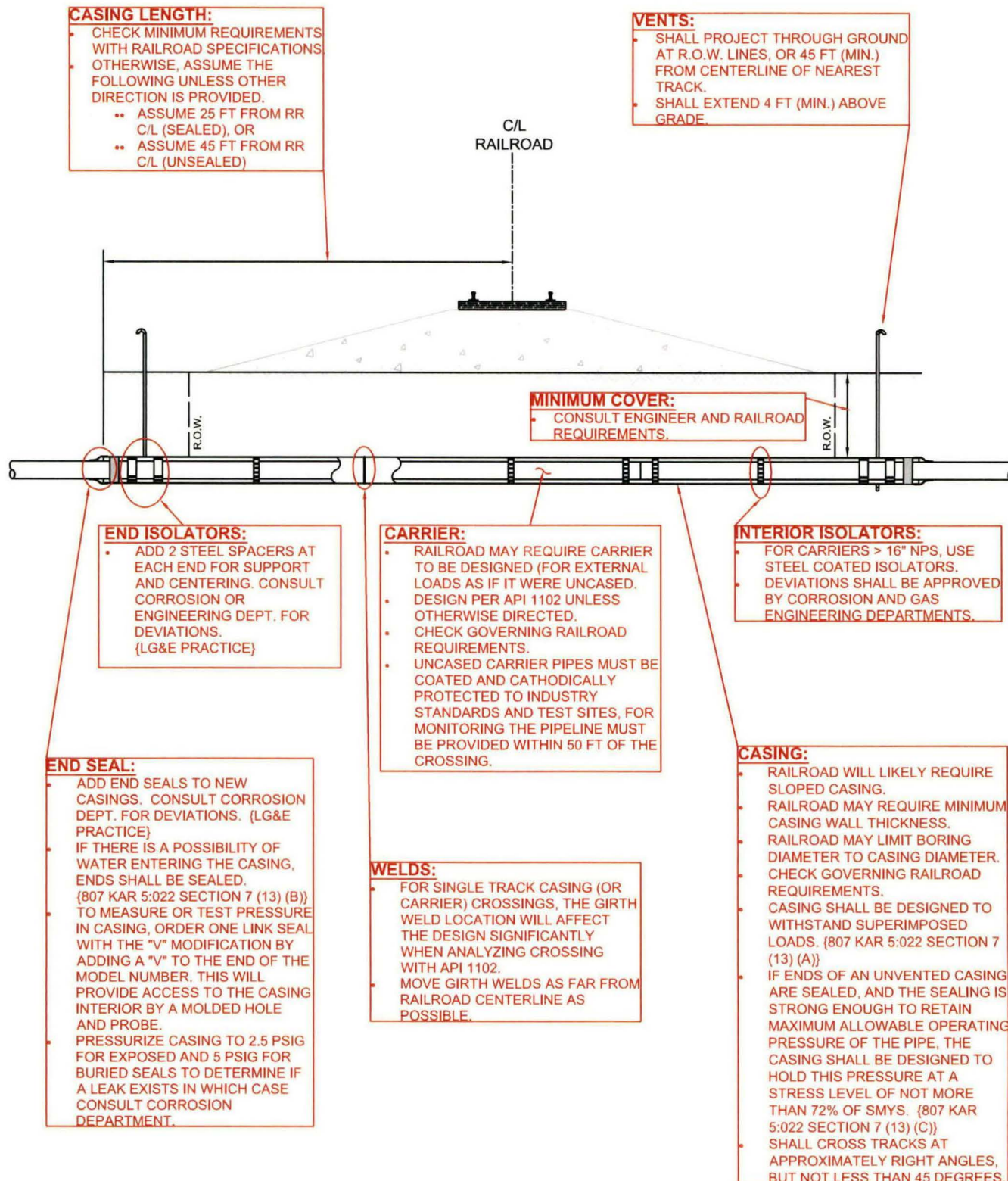
**END SEAL:**

- ADD END SEALS TO NEW CASINGS. CONSULT CORROSION DEPT. FOR DEVIATIONS. {LG&E PRACTICE}
- IF THERE IS A POSSIBILITY OF WATER ENTERING THE CASING, ENDS SHALL BE SEALED. {807 KAR 5:022 SECTION 7 (13) (B)}
- TO MEASURE OR TEST PRESSURE IN CASING, ORDER ONE LINK SEAL WITH THE "V" MODIFICATION BY ADDING A "V" TO THE END OF THE MODEL NUMBER. THIS WILL PROVIDE ACCESS TO THE CASING INTERIOR BY A MOLDED HOLE AND PROBE.
- PRESSURIZE CASING TO 2.5 PSIG FOR EXPOSED AND 5 PSIG FOR BURIED SEALS TO DETERMINE IF A LEAK EXISTS IN WHICH CASE CONSULT CORROSION DEPARTMENT.

**WELDS:**

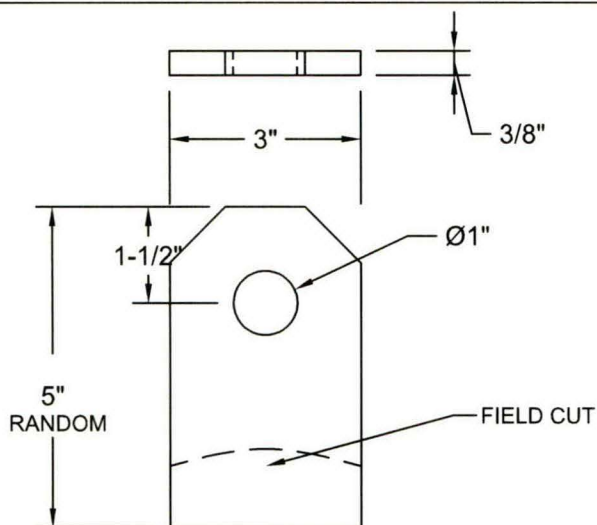
- FOR SINGLE TRACK CASING (OR CARRIER) CROSSINGS, THE GIRTH WELD LOCATION WILL AFFECT THE DESIGN SIGNIFICANTLY WHEN USING API 1102.
- MOVE GIRTH WELDS AS FAR FROM RAILROAD CENTERLINE AS POSSIBLE.

**RAILROAD DESIGN  
ENGINEERING NOTES**



# LIFTING LUG BLIND FLANGE

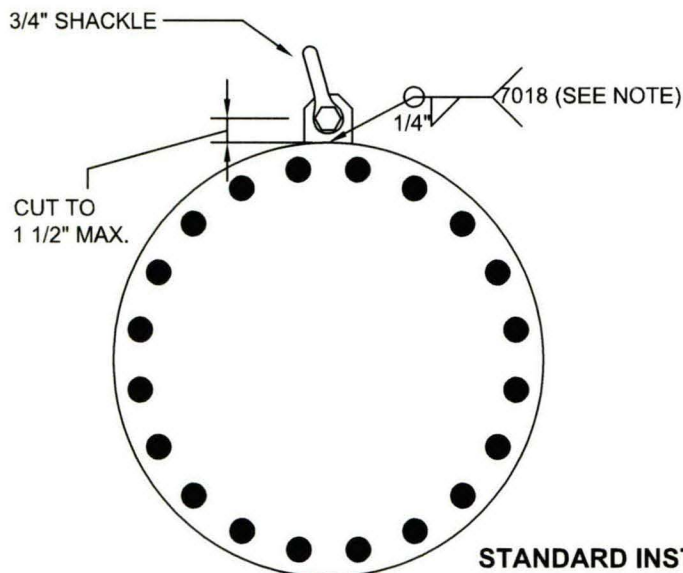
GCS 10 20 800  
Rev.



## DESIGN

### LUG NOTES

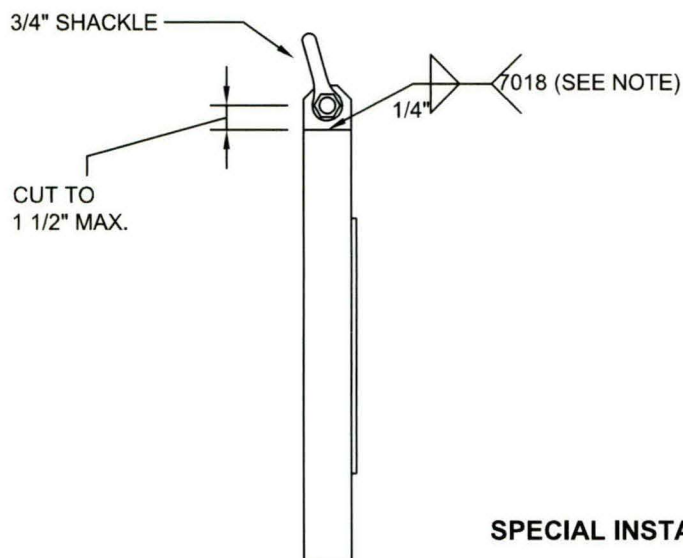
- ASTM A36 OR A514 GR. 70
- REMOVE ALL SHARP EDGES
- NO FLAME/PLASMA CUTTING OF HOLE



## STANDARD INSTALLATION

### APPLICATION NOTES

- **USE ONLY UNDER THE DIRECTION OF A QUALIFIED ENGINEER.**
- LIMITED TO  $\leq 50\%$  SMYS ONLY { REF.: 807 KAR 5:022 SECTION 4, 12 (D) }
- DO NOT SUBSTITUTE E7018 WITHOUT APPROVAL. GMAW-SS NOT ALLOWED
- $\leq 600$  LB WEIGHT LIMIT



## SPECIAL INSTALLATION

### APPLICATION NOTES

- **USE ONLY UNDER THE DIRECTION OF A QUALIFIED ENGINEER.**
- LIMITED TO  $\leq 50\%$  SMYS ONLY { REF.: 807 KAR 5:022 SECTION 4, 12 (D) }
- DO NOT SUBSTITUTE E7018 WITHOUT APPROVAL. GMAW-SS NOT ALLOWED
- $\leq 680$  LB WEIGHT LIMIT
- USE SPECIAL INSTALLATION FOR 3" MINIMUM WIDTH FLANGES

**PIPELINE DESIGN  
MINIMUM COVER**

GCS 10 10 001

Rev. A

| SYSTEM       | LOCATION  | MINIMUM COVER (INCHES) |       | REFERENCE  |
|--------------|---|------------------------|-------|--|
|              |   | SOIL                   | ROCK  |  |
| HOUSE LINES  | STANDARD  | 12*                    |       | NFPA 54 7.1.2.1 (2009)   |
|              | WHERE DAMAGE IS LIKELY  | 18                     |       | NFPA 54 7.1.2.1 (2009)   |
| SERVICES     | PRIVATE PROPERTY  | 18**                   |       | LG&E CUSTOMER HANDBOOK 3.9.1 [SUPERCEDES 12"* PER DOT 192.361(a) AND 807 KAR 5:022 SECTION 9 (6)(a)] |
|              | STREETS AND ROADS   | 18**                   |       | DOT 192.361(a)<br>807 KAR 5:022 SECTION 9 (6)(a)<br>LG&E CUSTOMER HANDBOOK 3.9.1 (c).                |
|              | IN ROCK   |                        | 12    | LG&E CUSTOMER HANDBOOK 3.9.1 (c).  |
|              | IN ROCK WITH CASING BELOW ROCK LINE   |                        | 9     | LG&E CUSTOMER HANDBOOK 3.9.1 (c).  |
|              | RAILWAY   | SEE PAGE 2             |       |  |
|              | KENTUCKY HIGHWAYS   | SEE PAGE 3             |       |  |
|              | INDIANA HIGHWAYS  | SEE PAGE 4             |       |  |
| MAINS        | STEEL   | 30 RECOM.<br>24***     |       | DOT 192.327(b)<br>807 KAR 5:022 SECTION 7(15)(b)   |
|              | PLASTIC   | 30 RECOM.<br>24***     |       | DOT 192.327(b)<br>807 KAR 5:022 SECTION 7(12)  |
|              | NAVIGABLE RIVER, STREAM OR HARBOR   | 48                     | 24*** | DOT 192.327(e)<br>807 KAR 5:022 SECTION 7(15)(d)   |
|              | RAILWAY   | SEE PAGE 2             |       |  |
|              | KENTUCKY HIGHWAYS   | SEE PAGE 3             |       |  |
|              | INDIANA HIGHWAYS  | SEE PAGE 4             |       |  |
| TRANSMISSION | CLASS 1   | 30                     | 18    | DOT 192.327(a)   |
|              | CLASS 2, 3, OR 4  | 36                     | 24    | DOT 192.327(a)   |
|              | DRAINAGE DITCHES AND RAILROAD CROSSINGS (SEE PAGE TWO FOR MORE RESTRICTIVE COVER) | 36                     | 24    | DOT 192.327(a)   |
|              | NAVIGABLE RIVER, STREAM OR HARBOR   | 48                     | 24    | DOT 192.327(e)<br>807 KAR 5:022 SECTION 7(15)(d)   |
|              | RAILWAY   | SEE PAGE 2             |       |  |
|              | KENTUCKY HIGHWAYS   | SEE PAGE 3             |       |  |
|              | INDIANA HIGHWAYS  | SEE PAGE 4             |       |  |

- \* UNLESS INSERTED WITHIN CONDUIT OR SHIELDED [NFPA 7.1.2.1(B)]
- \*\* UNLESS OTHERWISE PROTECTED TO WITHSTAND ANY ANTICIPATED LOADS [DOT 192.361(a) AND 807 KAR 5:022 SECTION 9(6)(a)]
- \*\*\* UNLESS OTHERWISE PROTECTED TO WITHSTAND EXTERNAL LOADS [807 KAR 5:022 SECTION 7 (15)(c)]



**PIPELINE DESIGN  
MINIMUM COVER**

GCS 10 10 001

Rev. A

| SYSTEM              | LOCATION   | MINIMUM COVER (INCHES) | REFERENCE  |
|---------------------|--|------------------------|--|
| CSX RR              | CASING PIPES, UNDER TRACKS                                     | 5.5 FT †               | CSXT DESIGN STANDARDS (09-15-03) GENERAL REQUIREMENTS, SECTION Cii a |
|                     | CASING PIPES, OTHER AREAS                                      | 3 FT † ◊               | CSXT DESIGN STANDARDS (09-15-03) GENERAL REQUIREMENTS, SECTION Cii a |
|                     | LONGITUDINAL PIPE ≤ 50 FT FROM C/L OF TRACK                    | 6 FT ♣                 | CSXT DESIGN STANDARDS (09-15-03) GENERAL REQUIREMENTS, SECTION Cii b |
|                     | LONGITUDINAL PIPE > 50 FT FROM C/L OF TRACK                    | 5 FT ♣                 | CSXT DESIGN STANDARDS (09-15-03) GENERAL REQUIREMENTS, SECTION Cii b |
| NORFOLK SOUTHERN RR | CASING PIPES, UNDER TRACKS                                     | 5.5 FT †               | NSCE-8 (5-16-01) SECTION 2.3.2                                       |
|                     | CASING PIPES, AT SIDINGS OR INDUSTRY TRACKS (WITH NS APPROVAL) | 4.5 FT †               | NSCE-8 (5-16-01) SECTION 2.3.2                                       |
|                     | CASING PIPES, OTHER AREAS                                      | 4 FT †                 | NSCE-8 (5-16-01) SECTION 2.3.2                                       |
|                     | UNCASED PIPE, UNDER TRACKS                                     | 10 FT † ♣              | NSCE-8 (5-16-01) SECTION 2.3.2                                       |
|                     | UNCASED PIPE, OTHER AREAS                                      | 6 FT ♣                 | NSCE-8 (5-16-01) SECTION 2.3.3                                       |
|                     | LONGITUDINAL PIPE ≤ 50 FT FROM C/L OF TRACK                    | 6 FT ♣                 | NSCE-8 (5-16-01) SECTION 2.3.2                                       |
|                     | LONGITUDINAL PIPE > 50 FT FROM C/L OF TRACK                    | 5 FT ♣                 | NSCE-8 (5-16-01) SECTION 2.3.2                                       |
| OTHER RR            | PADUCAH AND LOUISVILLE RR                                      | CONSULT WITH RAILROAD  |  |
|                     | RJ CORMAN RR   | CONSULT WITH RAILROAD  |  |
|                     | OTHER  | CONSULT WITH RAILROAD  |  |

**NOTE: CONFIRM WITH RAILWAY THAT REFERENCED COVER IS CURRENT REQUIREMENT.**

† AS MEASURED FROM BASE OF RAIL TO TOP OF PIPE.

◊ CASING PIPES, OTHER AREAS AT BOTTOM OF DITCH. IF 3 FT DEPTH CANNOT BE MAINTAINED, 6" TH. CONCRETE CAN BE PLACED OVER THE PIPELINE.

♣ REFER TO RAILROAD DESIGN MANUALS FOR STRINGENT CASING REQUIREMENTS.



**PIPELINE DESIGN  
MINIMUM COVER**

GCS 10 10 001

Rev. A

| SYSTEM                                 | LOCATION  | MINIMUM COVER (INCHES) | REFERENCE  |
|--|---|------------------------|--|
| KTC<br>(KENTUCKY<br>TRANS.<br>CABINET) | FULLY CONTROLLED ACCESS HIGHWAYS - UNDER ROADWAYS, RAMPS, AND DITCHES   | 42                     | KTC PERMITS MANUAL PE-202-2 (10-27-04)<br>SEE EXCEPTIONS TO ENCASEMENT                             |
|  | FULLY CONTROLLED ACCESS HIGHWAYS - OTHER AREAS  | 30                     | KTC PERMITS MANUAL PE-202-2 (10-27-04)   |
|  | NON-FULLY CONTROLLED ACCESS HIGHWAYS-LONGITUDINAL PIPELINES   | 30                     | KTC PERMITS MANUAL PE-202-3 (9-9-99 AND REVISED BY MEMORANDUM ON 10-27-04)                         |
|  | NON-FULLY CONTROLLED ACCESS HIGHWAYS-UNCASED CROSSINGS (2" AND UNDER).  | 42                     | KTC PERMITS MANUAL PE-202-3 ENCASEMENT OF UTILITIES (9-9-99 AND REVISED BY MEMORANDUM ON 10-27-04) |
|  | NON-FULLY CONTROLLED ACCESS HIGHWAYS-UNCASED CROSSINGS (LARGER THAN 2").  | 42                     | BASED UPON DISCUSSIONS WITH KTC  |
|  | NON-FULLY CONTROLLED ACCESS HIGHWAYS-CASED CROSSINGS  | 42                     | BASED UPON DISCUSSIONS WITH KTC  |
|  | <b>EXCEPTIONS:</b> CHIEF DISTRICT ENGINEER CAN GRANT AN EXCEPTIONS WHERE IT IS IMPRACTICAL TO ACHIEVE SPECIFIED COVER AND A LESSER DEPTH WILL NOT INTERFERE WITH KTC MAINTENANCE, SAFETY, AND AESTHETICS. |                        | KTC MEMORANDUM ON PERMITS MANUAL CHANGES (10-27-04)  |
|  |   |                        |  |

CASING EXCEPTIONS (NON-FULLY CONTROLLED ACCESS HIGHWAYS):

- CATHODICALLY PROTECTED PIPE THAT IS OVERSIZED FROM THE PIPE OUTSIDE OF THE RIGHT-OF-WAY.
- COATED CATHODICALLY PROTECTED PIPE WITH EXTRA WALL THICKNESS DESIGNED PER ASME B31.8.
- CROSSINGS WITH BORED HOLES WITH SAME SIZE AS THE PIPELINE AND DESIGNED TO DOT 192.
- A COPY OF DESIGN CRITERION FOR UNENCASED PIPEING MUST ACCOMPANY PERMIT APPLICATION.



**PIPELINE DESIGN  
MINIMUM COVER**

GCS 10 10 001

Rev. A

| SYSTEM                                | LOCATION   | MINIMUM COVER (INCHES) | REFERENCE  |
|---------------------------------------|--|------------------------|--|
| INDOT<br>(INDIANA DEPT.<br>OF TRANS.) | NOT UNDER ROADWAY;<br><u>AND</u> NOT WITHIN 1.5 M (59 IN.) OF<br>ROADWAY; <u>AND</u> CASED   | 29.5 (750 MM)          | INDOT DESIGN MANUAL 10-3.05(02)<br>PARA. 1 AND 10-3.05(03) PARA. 1   |
|                                       | NOT UNDER ROADWAY;<br><u>AND</u> NOT WITHIN 1.5 M (59 IN.) OF<br>ROADWAY; <u>AND</u> UNCASD  | 35.4 (900 MM)          | INDOT DESIGN MANUAL 10-3.05(02)<br>PARA. 1 AND 2; AND 10-3.05(03) PARA.<br>1 AND 2.  |
|                                       | UNDER ROADWAY;<br><u>OR</u> WITHIN 1.5 M (59 IN.) OF<br>ROADWAY;<br><u>AND</u> CASED   | 29.5 (750 MM)          | INDOT DESIGN MANUAL 10-3.05(02)<br>PARA. 1 AND 2; AND 10-3.05(03) PARA.<br>1 AND 2.<br><br>NOTE: PIPE MUST BE 450 MM (17.7<br>INCHES) OR 1/2 THE DIAMETER OF<br>THE PIPE OR CASING BENEATH THE<br>PAVEMENT, WHICHEVER GREATER. |
|                                       | UNDER ROADWAY;<br><u>OR</u> WITHIN 1.5 M (59 IN.) OF<br>ROADWAY;<br><u>AND</u> UNCASD  | 47.2 (1.2 M)<br>‡      | INDOT DESIGN MANUAL 10-3.05(02)<br>PARA. 1 AND 2; AND 10-3.05(03) PARA.<br>1 AND 2.<br><br>NOTE: PIPE MUST BE 450 MM (17.7<br>INCHES) OR 1/2 THE DIAMETER OF<br>THE PIPE OR CASING BENEATH THE<br>PAVEMENT, WHICHEVER GREATER. |
|                                       | UNDER DITCHES  | 47.2 (1.2 M)           | INDOT DESIGN MANUAL 10-3.05(02)<br>PARA. 2 AND 10-3.05(03) PARA. 2.  |
|                                       | EXISTING HIGH PRESSURE<br>PIPELINES (>415 KPA OR 60 PSIG)<br>MAY RECEIVE AN EXCEPTION FOR A<br>REDUCTION OF 5.9 INCHES (150<br>MM) FROM COVER SPECIFIED.                           |                        | INDOT DESIGN MANUAL 10-3.02 AND<br>10-3.05(02) PARA. 2   |
|                                       | EXISTING HIGH PRESSURE<br>PIPELINES (>415 KPA OR 60 PSIG)<br>MAY RECEIVE AN EXCEPTION FROM<br>COVER SPECIFIED FOR PIPELINES<br>PROTECTED BY REINFORCED<br>CONCRETE. SEE DETAILS IN |                        | INDOT DESIGN MANUAL 10-3.02 AND<br>10-3.05(02) PARA. 2   |
|                                       | EXISTING LOW PRESSURE<br>PIPELINES (<415 KPA OR 60 PSIG)<br>WHICH ARE LONGITUDINAL MAY<br>REMAIN IN PLACE IF THEY MEET<br>THE CRITERIA FOUND UNDER 10-<br>3.05(03) PARA. 6.        |                        | INDOT DESIGN MANUAL 10-3.02 AND<br>10-3.05(03) PARA. 6   |
|                                       | LOW PRESSURE PLASTIC LINES<br>MUST NOT EXCEED 200 MM (8<br>INCHES) WITHOUT A METALIC<br>CASING.  |                        | INDOT DESIGN MANUAL 10-3.05(03)<br>PARA. 5   |
|                                       | EXCEPTIONS MAY BE APPROVED<br>BY INDOT CHIEF ENGINEER.   |                        | INDOT DESIGN MANUAL 10-3.01(05).   |

**NOTES:**

**ALWAYS CONFIRM REFERENCES ARE LATEST VERSION.**

- ‡ UNCASD CROSSINGS MUST BE WELDED STEEL CONSTRUCTION WITH ADEQUATE CORROSION PROTECTION. FOR LOW PRESSURE, PLASTIC LINES WITHOUT JOINTS WITHIN 1.5 M OF ROADWAY IS ALSO ALLOWED. (INDOT DESIGN MANUAL 10-3.05(02) PARA. 2 AND 10-3.05(03) PARA. 2.)





PURGE/BLOWDOWN  
VENTILATION EQUIPMENT

GCS 80 30 020

Rev.

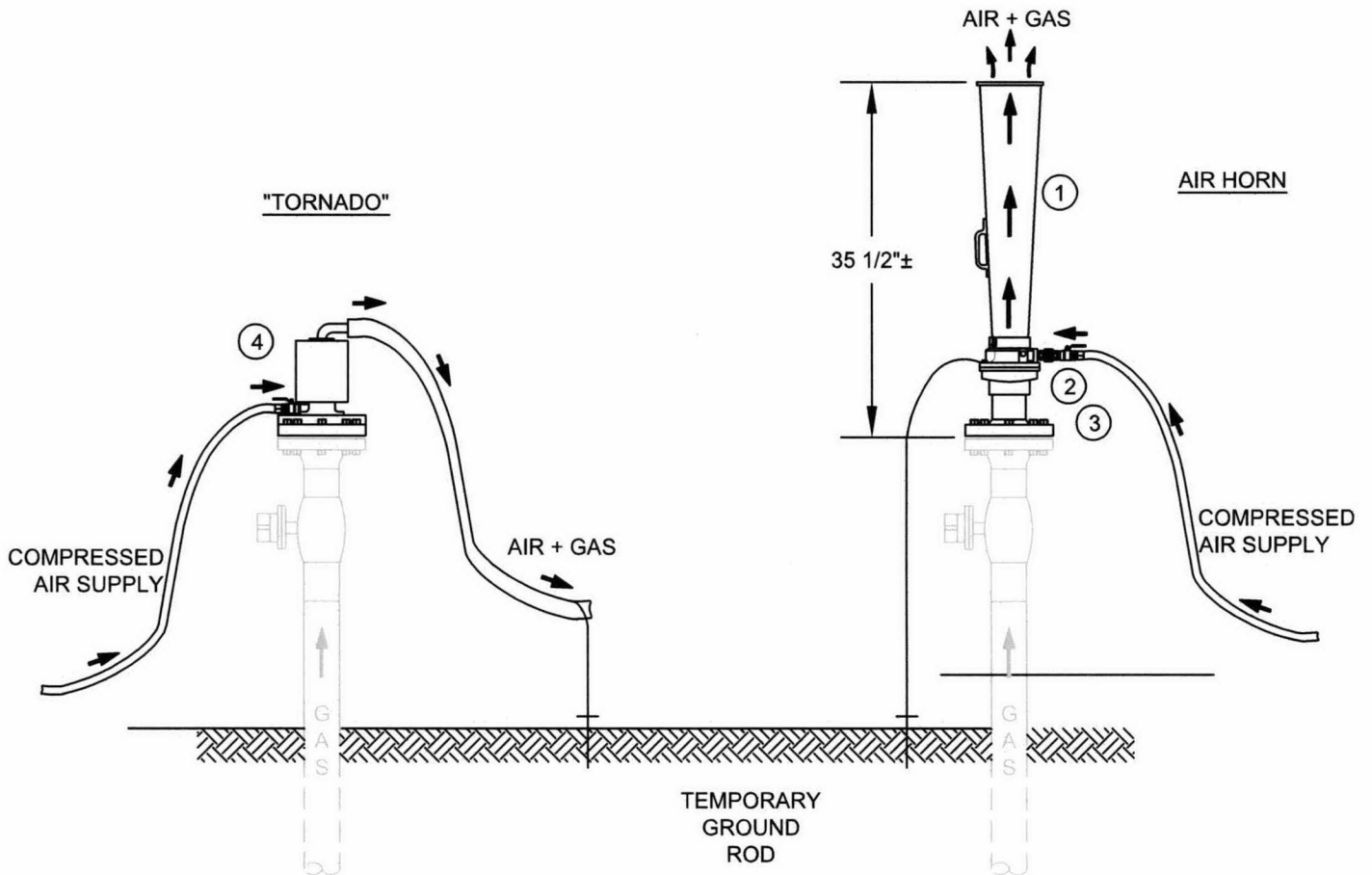
"TORNADO"

|                          | COMPRESSED AIR SUPPLY |         |         |
|--------------------------|-----------------------|---------|---------|
|                          | 30 PSIG               | 60 PSIG | 90 PSIG |
| TOTAL AIR/GAS FLOW (CFM) | 81                    | 83      | 79      |
| AIR CONSUMED (CFM)       | 18.5                  | 32      | 47      |

\* NOTE: USING  $\frac{3}{16}$ " JET AND 2" VACUUM HOSE

AIR HORN

|                          | COMPRESSED AIR SUPPLY |         |         |
|--------------------------|-----------------------|---------|---------|
|                          | 50 PSIG               | 70 PSIG | 90 PSIG |
| TOTAL AIR/GAS FLOW (CFM) | 1211                  | 1429    | 1580    |
| AIR CONSUMED (CFM)       | 38                    | 53      | 64      |



BILL OF MATERIAL

| ITEM NO. | DESCRIPTION   | QTY | LG&E INVENTOR Y NO. |
|----------|---|-----|---------------------|
| 4        | AIR MOVER, MILLER BAR HOLE PURGER #1660 1900, WITH $\frac{3}{16}$ " JET | 1   | SPECIAL ORDER       |

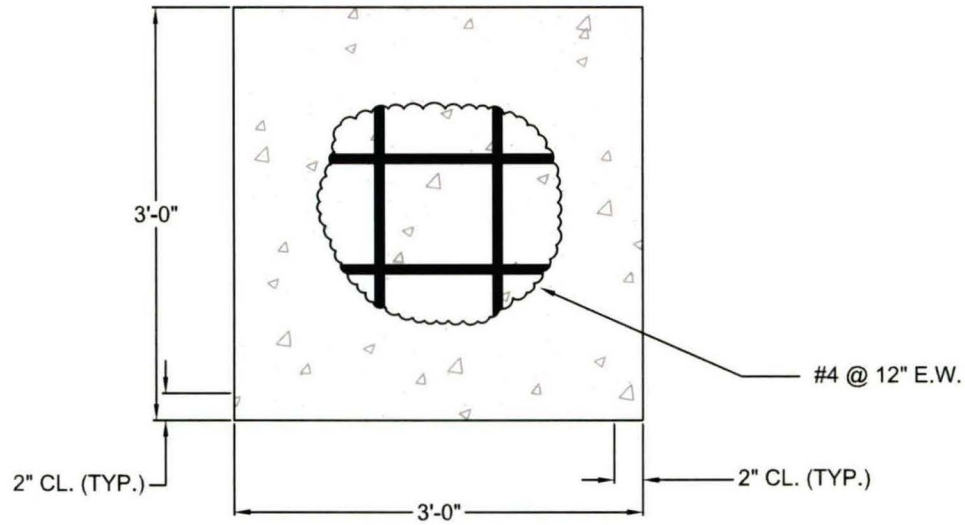
BILL OF MATERIAL

| ITEM NO. | DESCRIPTION  | QTY | LG&E INVENTOR Y NO. |
|----------|--|-----|---------------------|
| 1        | AIR MOVER, AIR SYSTEMS INTERNATIONAL, ASI-1200, VENTURI BLOWER                       | 1   | SPECIAL ORDER       |
| 2        | ADAPTER, AIR SYSTEM INTERNATIONAL, PETRO-VENT P/N ASI-12ADPT, FOR A 4" THREADED PIPE | 1   | SPECIAL ORDER       |
| 3        | FLANGE, 4", CL. 300, RF, THREADED, ASTM A105   | 1   | SPECIAL ORDER       |

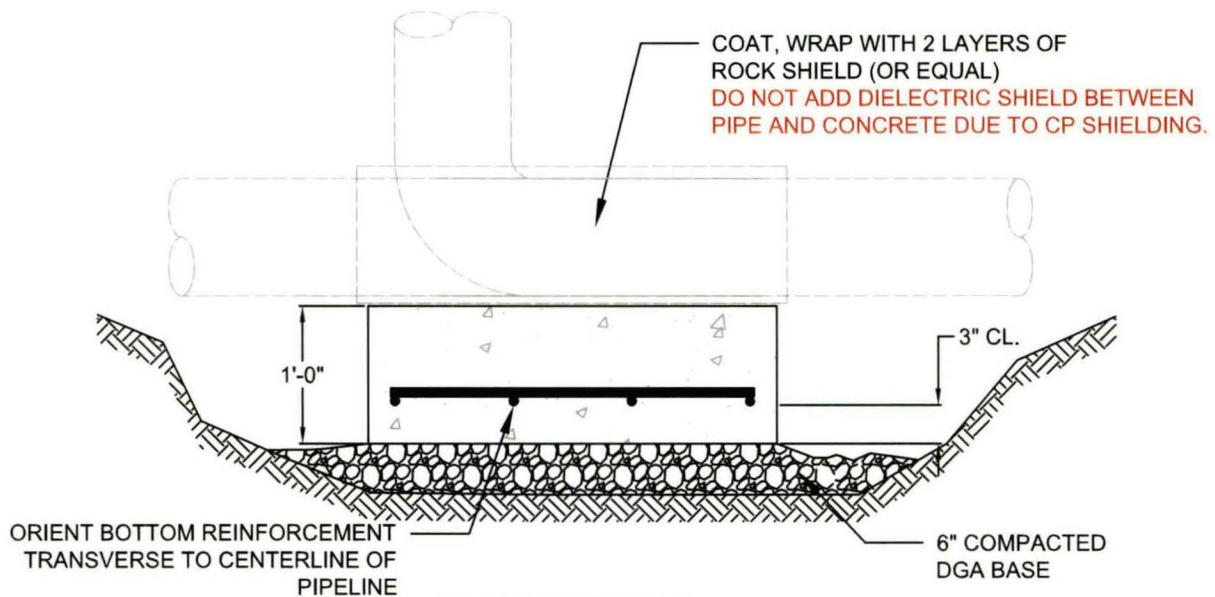
FOUNDATION  
PILLOW PIPE SUPPORT (3 FT X 3 FT)

GCS 80 20 360

Rev. A



**PLAN**





**ELEVATION**

**NOTES:**

1. WARNING: ONLY USE DESIGN UNDER DIRECTION OF GAS ENGINEERING.
2. DESIGN ASSUMPTIONS
  - A. CODE: ACI 318-02
  - B. SOIL BEARING STRENGTH: 1000 PSF ASSUMED
  - C. CONCRETE STRENGTH: 3000 PSI WITH HIGH - EARLY ADMIXTURE
  - D. REINFORCEMENT: ASTM 615 GRADE 60
  - E. MAX. LOAD: 9000 LBS
3. CONSTRUCTION:
  - A. BASE: SUBSTITUTION OF DENSE GRADE AGGREGATE WITH MANUFACTURED SAND OR OTHER AGGREGATE SHALL ONLY BE ALLOWED WITH THE APPROVAL OF GAS ENGINEERING.
  - B. CONCRETE PLACEMENT: CONCRETE MAY BE PLACED AFTER PIPELINE CONSTRUCTION IF TEMPORARILY SUPPORTED.
  - C. FORMS: FORMWORK MAY BE LEFT IN PLACE AND BURIED WITH APPROVAL FROM GAS ENGINEERING.



|   |                                       |   |  |   |
|---|---------------------------------------|---|--|---|
|  |                                       | <h1 style="color: green;">AOP</h1> <p style="color: green;">GAS APPROVED OPERATING POLICIES</p> |  |  <p><b>Distribution<br/>Operations</b></p> |
| Subject:<br><b>PIPELINE OPERATIONS</b>  | AOP Number:<br><b>GAOP – PO – 001</b> | Effective Date:<br><b>October 7, 2002</b>   |  |   |
| Policy:<br><b>HAZARDOUS ENERGY CONTROL - LOCKOUT/TAGOUT</b>                       |                                       |   |  |   |

## SECTION 1 - PURPOSE

- 1.1 To describe the minimum requirements for the control of hazardous energy during operation, maintenance and inspection of equipment, machines, and/or pipeline facilities within the natural gas transmission, storage, and distribution systems.

## SECTION 2 - SCOPE

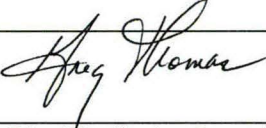


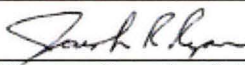
- 2.1 Applies to all natural gas machines, equipment, and pipeline facilities under the jurisdiction of the Louisville Gas and Electric Company (LG&E) in accordance with OSHA minimum safety standards, and in supplement to applicable safety rules as prescribed by the LG&E Safety Program.

## SECTION 3 – REFERENCES

- 3.1 State and Federal Regulations
- 3.1.1 Title 29 CFR Part 1910.147, “The Control of Hazardous Energy (Lockout/Tagout)”
  - 3.1.2 Title 29 CFR Subpart S-Electrical
  - 3.1.3 Title 29 CFR Part 1910.269, “Electric Power Generation, Transmission and Distribution”
  - 3.1.4 803 KAR 2:309, “The Control of Hazardous Energy (Lockout/Tagout)”
- 3.2 LG&E Internal Procedures
- 3.2.1 Gas Operating, Maintenance, and Inspection Procedures 4.0 “Education and Training of Employees”
  - 3.2.2 LG&E Lockout Program, “Hazardous Energy Control, Written Program for Non-generating Equipment.”
  - 3.2.3 Gas Approved Operating Policies, GAOP – PO – 002, “Hazardous Energy Control – Valve Operations”

## SECTION 4 – RESPONSIBILITIES

- 4.1 Asset Management
- 4.1.1 Asset Management’s Operating Policy and Standards section shall have the responsibility for revising the requirements of this procedure. Revisions to this procedure shall be reviewed and approved by the directors of Asset Management and Distribution Operations and by the Manager of Operating Policy and Standards.

|   |  |                               |
|---|--|-------------------------------|
|  |  |                               |
| Dir., Distribution Operations   | Dir., Distribution Operations  | Dir., Distribution Operations |
|  |   |                               |
| Dir., Asset Management  | Manager, Operating Policy  |                               |

#### 4.2 Gas Control

Gas Control shall be responsible for the following:

- 4.2.1 Logging all notices received for lockout/tagout placements and removals in a permanent logbook within their office. Notices received will generally be pertaining to lockout or tagout of valves on high pressure distribution lines or transmission lines that are not within the storage fields or internal to the compressor stations.
- 4.2.2 Logging lockout/tagout activities for System Regulation and Operations (SR&O) and Instrumentation, Measurement and Electronics (IM&E) sections.
- 4.2.3 Implementing features incorporated in the SCADA system to disable remote operation and indicate status of valves on lockout or tagout status.

#### 4.3 Gas Storage

Gas Storage or their delegates shall be responsible for the following:

- 4.3.1 Complying with lockout/tagout procedures whenever applicable to operation and maintenance activities within their facilities.
- 4.3.2 Notifying Gas Control upon placement or removal of lockout/tagout on valves directly affecting delivery of gas to or from the transmission and storage systems or appurtenances thereof.
- 4.3.3 Maintaining a valve operating log or other effective record keeping system for valves within its control. The log record shall include lockout/tagout placement on valves by gas storage personnel, Instrumentation, Measurement and Electronics (IM&E) or other work groups.

#### 4.4 System Regulation and Operation

System Regulation and Operations (SR&O) and Instrumentation, Measurement and Electronics (IM&E) or their delegates shall be responsible for the following:

- 4.4.1 Complying with lockout/tagout procedures whenever applicable to operation and maintenance activities within their facilities.
- 4.4.2 Notifying Gas Control upon placement or removal of lockout/tagout on valves or controls directly affecting delivery of gas within the transmission and high pressure distribution systems or appurtenances thereof, such as regulator and meter stations, pits or assemblies.

#### 4.5 Operations Centers

Operations Centers shall be responsible for the following:

- 4.5.1 Complying with lockout/tagout procedures whenever applicable to operation and maintenance activities within their facilities. Lockout/tagout procedures are applicable to valves on gas mains and pipelines of all pressures whenever unintended operation would result in release gas in a manner that could result in injury to a worker.
- 4.5.2 Notifying Gas Control upon placement or removal of lockout/tagout on valves directly affecting delivery of gas within the transmission and high pressure distribution systems or appurtenances thereof.
- 4.5.3 Maintaining a valve operating log or other effective record keeping system for valves within its control. The log record shall include lockout/tagout placement on valves.

#### 4.6 Employees

- 4.6.1 Employees who operate, maintain or inspect equipment, machines, and/or pipeline facilities shall be responsible for complying with the lockout/tagout procedures that are specified in this policy.

4.6.2 Each employee shall be responsible for placement and removal of his/her lockout/tagout devices.

## **SECTION 5 –DISCUSSION**

### **5.1 OSHA Compliance**

- 5.1.1 Title 29 CFR 1910.147 of the OSHA regulation, “Control of Hazardous Energy”, addresses specific requirements for protecting workers against harm that may result from an unexpected release of hazardous energy. OSHA regulations are designed solely to protect workers and are not directly applicable to protection of customers or the general public from harm.
- 5.1.2 An unexpected and sudden release of natural gas is considered by OSHA to constitute a release of hazardous energy. The OSHA regulation requires energy controlling devices to be locked out and tagged by each worker that would be subject to harm if the devices were inadvertently operated. If an energy controlling device is not capable of being locked, a tagout system must be used.
- 5.1.3 The lockout/tagout procedures within this policy are designed to comply with the OSHA requirements and to provide a high level of protection to workers.

### **5.2 Deviations from Policy**

Operating situations or circumstances may arise such that the application of all the procedures within this policy is not practical. However, any deviations must provide an acceptable level of safety to workers and the public and must conform to the minimum standards prescribed by federal, state, and local authorities. Deviations are subject to the approval of a member of management or supervision that has been trained with respect to this policy and is qualified through experience and/or training and education to approve or subscribe such changes.

### **5.3 Lockout Locks and Tagout Card Material**

- 5.3.1 Locks used for lockout devices shall be durable padlocks and be able to withstand the environment to which they will be exposed for the maximum period of time that the exposure is expected. The devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools. Lockout padlocks shall be painted or banded with a unique color for easy identification, and shall be used only to comply with Lockout/Tagout requirements specified in section 6.3. Each padlock shall be singularly identifiable by user’s name, employee identification number or other positive identification, which shall be applied directly on the lock or by affixing a personalized tag onto the lock. Locks shall be individually keyed so that only the authorized employee’s key is able to open the lock.
- 5.3.2 Tagout cards shall have a one piece, all-environment-tolerant nylon cable tie for affixing purposes. The tag element of the device and the identifying tags used for lockout shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or cause the message on the tag to become illegible. The tagout card shall be substantial enough to prevent inadvertent or accidental removal. Each tagout card shall contain the heading “DANGER” or similar wording, followed by a message in bold print to the effect that “This energy source has been locked out” and a warning prohibiting unauthorized removal of the lock or tag, followed by blank lines for remarks, and employee identification. An example of a typical tagout card is displayed in Appendix 10.1.

### **5.4 Lockout Device and Tagout Card Installation**

- 5.4.1 Lockout devices (e.g., padlock, hasp, lockbox, blank flanges, etc.) and tagout cards shall be affixed to an energy isolating device by authorized employees, as dictated by requirements listed under section 6.3. Lockout devices shall be affixed in a manner that will hold the energy isolating device in the “off” or “safe” position. Tagout cards shall be attached directly to energy isolating devices, or as close as safely possible to the device in a position that will be immediately obvious to anyone attempting to operate the device, in such a manner as will clearly indicate that the operation or movement of the energy isolating device(s) from the “safe” or “off” position is strictly prohibited.

- 5.4.2 A padlock shall be used for lockout when one lock is required. Each authorized employee shall install his/her personal lock.
- 5.4.3 A multiple or "group" lockout device (hasp) shall be used to accommodate multiple locks for projects when more than one lock is required. All authorized employees shall install their personal locks in the hasp. When the number of locks required to achieve lockout exceeds the capacity of the hasp, a lockbox shall be used.
- 5.4.4 Lockboxes shall be used when a hasp can not be used for a group lockout. When utilizing a lockbox, each energy isolating device shall be locked out by an approved lockout device and the key shall be placed in the lockbox. Authorized employees shall install their personal locks on the lockbox so that the lockbox can not be opened until all locks are removed. The lockbox shall be placed in the area under protection while maintenance and/or inspection is being performed.
- 5.4.5 Whenever a lockout device or tagout card can not be affixed directly to an energy isolating device, other protective devices may be used to aid in the prevention of unexpected or unintentional release of energy. These protective devices include, but are not limited to, chains, blind plates, valve plugs, and blocks. Where chains are utilized, the chains should be snubbed or mounted with the fewest possible links and be routed through the straightest runs allowable. When utilizing blind plates, valve plugs, bags, and blocks, tagout cards must accompany the protective devices.
- 5.4.6 Tagout cards shall be affixed to lockout and protective devices for the ease of identifying who is responsible for the placement and removal of the lockout or protective device.

## 5.5 Valve Operations

Before operating valves on transmission lines or distribution mains, including certain pipelines located within storage fields or compressor stations it may be necessary to initiate and distribute for approval a Request for ShutDown/Operations (RSO). See Gas Approved Operating Policies, GAOP -PO - 002, "Hazardous Energy Control."

## SECTION 6 -PROCEDURES

### 6.1 Definitions

The following definitions are applicable to this policy. Definitions that are quoted directly or based upon state or federal regulations are referenced accordingly.

- 6.1.1 **Affected Employee:** An employee whose job requires operating or using a machine or equipment on which servicing or maintenance is being performed, or whose job requires working in an area in which servicing or maintenance is being performed, which shall require use of lockout or tagout as specified in this procedure. (OSHA, 29 CFR 1910.147)
- 6.1.2 **Authorized Employee:** An employee who is performing servicing or maintenance, not within the normal scheme of operations, on machinery or equipment. (OSHA, 29 CFR 1910.147)
- 6.1.3 **Energy Isolating Device:** A mechanical apparatus specifically designed to prevent the transmission or release of energy. Manually operated circuit breakers, line valves, and disconnect switches are examples. (OSHA, 29 CFR 1910.147)
- 6.1.4 **Energy Source:** Any origination of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy. (OSHA, 29 CFR 1910.147)
- 6.1.5 **Exclusive Control:** As an example, in the case of electrical cords, a plug is in the exclusive control of an employee if it is physically in the possession of the employee, or in arm's reach and in line of sight of the employee.
- 6.1.6 **Facilities:** Any new and existing pipeline, rights-of-way, and any equipment, facility or building used in the transportation of gas or in the treatment of gas during the course of transportation.
- 6.1.7 **Hot Tap:** A procedure used in repair, maintenance and service activities which involves welding or fusing a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. This procedure is commonly used to replace or add sections of pipeline without interruption of gas service. (OSHA, 29 CFR 1910.147)
- 6.1.8 **KOSH - Kentucky Occupational Safety and Health:** A division of the Kentucky Department of Labor responsible for enforcement of occupational safety and health standards. KOSH adopts federal OSHA standards and provides a supplement describing additional Kentucky requirements.
- 6.1.9 **Lockbox:** A sturdy metal box with a hinged lid and a hasp to allow locking the lid in a closed position.

- 6.1.10 **Lockout:** The placement of a lockout device on an energy isolating device ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed. Lockout is required where applicable to comply with OSHA standards. (OSHA, 29 CFR 1910.147)
- 6.1.11 **Lockout Device:** A device that utilizes a positive means such as a lock either key or combination type, to hold an energy isolating device in a safe position and prevent the unexpected energization of machine or equipment. Included are blank flanges and bolted slip blinds. (OSHA, 29 CFR 1910.147)
- 6.1.12 **Normal Operations:** The utilization of a machine, of equipment, or of pipeline facilities to perform its intended production function.
- 6.1.13 **OSHA – Occupational Safety and Health Administration:** For the purposes of this procedure, in reference to 29 CFR 1910.147 and 803 KAR 2:309, the Control of Hazardous Energy (Lockout/Tagout).
- 6.1.14 **Pipeline:** Any part of those physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenances attached to the pipe, compressor units, metering stations, regulator stations, delivery stations, and fabricated assemblies. (DOT, 49 CFR 192.3)
- 6.1.15 **Servicing and/or Maintenance:** Work place activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines, equipment, or pipeline facilities. (OSHA, 29 CFR 1910.147)
- 6.1.16 **Tag:** A device attached to a lockout device which can be written on to identify the authorized person responsible for the placement and removal of the lockout device. (Figure 1.0, page 9) (OSHA, 29 CFR 1910.147)
- 6.1.17 **Tagout:** The placement of a warning label on an energy isolating device to indicate that the energy isolating device and the equipment it controls shall not be operated, due to servicing and maintenance being performed on said equipment, until operation is deemed safe by the authorized employee who consequently removes the label. Tagout is a part of the program required by OSHA to control the release of hazardous energy. (OSHA, 29 CFR 1910.147)
- 6.1.18 **Tagout Device:** A prominent warning label, such as a tag with means of attachment, which can be securely fastened to an energy isolating device to indicate that the energy isolating device and the equipment it controls shall not be operated. (OSHA, 29 CFR 1910.147)

## 6.2 Lockout/Tagout – General

- 6.2.1 Prior to any maintenance, inspection, cleaning, adjusting or servicing that requires entrance into or potential contact by personnel:
  - a. All equipment, pipelines, or other natural gas facilities such as compressors, purifiers, dehydrators, or sections of station and plant piping shall be isolated and have all affected energy sources locked and/or tagged out by each authorized employee.
  - b. Supply gas, electric power, or other energy sources used to operate remotely controlled valves and equipment shall be locked off or otherwise disabled and tagged by each authorized employee.
  - c. All machinery, where unplanned motion can cause injury, i.e., compressor flywheel, shall be blocked against movement and be tagged out by each authorized employee.
  - d. Each locking device shall be accompanied by a tagout by each authorized employee. This tagout requirement may be satisfied by permanent marking on the lock and/or a tag inserted in a pocket attached to the lock, or by use of a tagout card.
  - e. Tagout without lockout is prohibited when equipment/machinery is capable of being locked out.
- 6.2.2 Lockout and Tagout are not required during:
  - a. Servicing and maintenance activities where employees are not exposed to the unexpected release of energy.
  - b. Normal operations, involving the gas transmission, storage, or distribution system.
  - c. Hot tap operations when specialized equipment designed for that purpose is used following procedures detailed in appropriate sections of the Gas OM&I.
  - d. Work on 120/220-volt cord and plug connected to electric equipment when the hazard is removed by unplugging the equipment and the plug is under the exclusive control of the employee performing the servicing or maintenance.
  - e. Drilling and servicing of natural gas wells.

6.2.3 Anytime any machine, piece of equipment, or pipeline facility is locked out or tagged out, proper notification shall be given to all affected personnel.

### 6.3 Lockout/Tagout Procedures

6.3.1 A lockout/tagout procedure/checklist shall be developed for each piece/type of equipment (gas or electrical), machinery, or pipeline facility. Each operating center (e.g., gas storage, operations center, SR&O, IM&E, etc.) shall maintain a file of applicable procedures.

6.3.2 Each procedure/checklist shall contain at least the following information:

- a. Location and identification of machine, equipment or pipeline facility involved.
- b. Name(s) of authorized employee(s).
- c. Type(s) and location(s) of energy isolating devices.
- d. Specific steps for the isolation and lockout/tagout of hazardous energy sources.
- e. Specific procedure for release and verification of release of any stored energy.
- f. Specific procedure for the verification of lockout/tagout.
- g. Schematic piping diagram, map, or other drawings if necessary to add clarity to the procedure.

6.3.3 Prior to any maintenance, inspection, cleaning, adjusting or servicing that requires entrance into or potential contact by personnel with machines (gas or electrical), equipment, or pipeline facilities, the appropriate procedure/checklist shall be implemented by the authorized employees.

6.3.4 If two or more authorized employees are going to be working on the same piece of equipment, a group lockout procedure from the following options below shall be followed:

- a. Option #1 – Appendix 10.3, Type B: One authorized employee shall use the appropriate procedure to isolate all energy sources and lock them out. This employee then shall place all the keys from those lockout devices into a lockbox and place his/her personal lock on that. Each subsequent authorized employee, after confirming for themselves that the equipment has indeed been properly locked out, shall place his/her personal lock on the lockbox.
- b. Option #2 – Appendix 10.3, Type A: If the equipment has few energy sources, or few authorized employees will be working on the equipment, then one authorized employee shall use the appropriate lockout procedure and place group hasps on each energy isolating device. This employee shall place his/her personal lock on the hasp. Each subsequent employee shall place a personal lock on each hasp as they confirm the lockout of the energy source.

Each employee is responsible for removing his/her lock from the hasp or lockbox when his/her work is complete.

6.3.5 Prior to starting work on machines, equipment, or pipeline facilities that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization has been accomplished. Verification procedures should include but not be limited to actually attempting to restart a machine or piece of equipment. Every precaution should be taken to ensure that no other employees are currently working in or around the machine or equipment in question when attempting to restart. Each employee has the right to verify the isolation of energy sources except that once initial electrical isolation testing has been completed and the first lock applied no additional line to load side testing shall be permitted.

6.3.6 Each authorized employee is responsible for the removal of his/her lock(s) at the appropriate time. Except in extreme circumstances, lockout/tagout devices shall only be removed by the authorized employee responsible for placing the devices.

- a. Management personnel of “higher authority” in their line of progression may remove or order the removal of their lock or tag. Before removing or ordering the removal of locks, management personnel shall:
  1. Attempt to contact the unavailable authorized employee to gain permission to remove his/her lock or tag.
  2. Satisfy themselves by whatever checks they can make of the appropriateness of such an order to remove the lock or tag.



3. Ensure that the person is notified that their lock or tag has been released as soon as possible but not later than the initiation of work on the person's next scheduled workday.
  4. ENSURE that no authorized or affected employee's safety is jeopardized.
- b. Each authorized employee shall remove his/her lockout device(s) before leaving the property. Exception: If there is absolute certainty that no one will operate or perform maintenance on the equipment in the authorized employee's absence and said employee is absolutely returning to that task upon his/her return, then the equipment could be left locked out.
  - c. Locks used to protect equipment can and should be left in place until equipment is ready to be used when repairs are complete. Locks used to protect equipment are not required to be individually keyed but should be tagged similar to lockout locks to assist in safe and efficient operation.
- 6.3.7 Notification shall be given to all affected employees that lockouts or tagouts have been removed and that a piece of equipment can return to normal operation. Notification can be in the form of group e-mail, notation on the equipment board, internal memo, etc.
- 6.3.8 In circumstances where there may be a possibility of reaccumulation of stored energy to a hazardous level, verification of the release of the energy shall be continued until the possibility of reaccumulation no longer exists or until the work has been completed.

## **SECTION 7 – SAFETY**

- 7.1 All applicable provisions of the LG&E Safety Program shall be observed.

## **SECTION 8 – ENVIRONMENTAL**

- 8.1 Not applicable to this policy.

## **SECTION 9 – TRAINING**

### **9.1 General**

- 9.1.1 This section establishes minimum requirements for educating and training employees in hazardous energy control.
- 9.1.2 Each manager and/or supervisor shall take appropriate steps to ensure that their authorized and affected employees are properly trained to comply with the energy control program outlined in this policy.
- 9.1.3 Additionally, when outside personnel, such as contractors and employees from other departments, engage in work activities covered by this policy, the respective energy control procedures shall be explained them. These procedures must be followed by all personnel who operate, maintain, or inspect LG&E's equipment, machines, and/or pipeline facilities.

### **9.2 Lockout and Tagout**

- 9.2.1 Each manager and/or supervisor(s) shall ensure that all their authorized and affected employees receive initial training on lockout/tagout procedures and receive refresher training as necessary but not less than annually. Those performing electrical hazardous energy isolation shall receive annual refresher training compliant with the generation, transmission and distribution training requirements specific to their work activities. The purpose and function of lockout/tagout is to be understood by all authorized and affected employees. In addition, each authorized and/or affected employee is required to have the knowledge and skills required for the safe application, usage, and removal of energy controls. The training shall include:
- a. Information on the energy sources and types, the magnitude of the energy available in the workplace, and the method and means for energy isolation and control.
  - b. The purpose and use of hazardous energy control procedures.
  - c. A short test to indicate comprehension on the purpose and use of lockout/tagout.

9.2.2 Retraining shall be provided for all authorized and affected employees whenever the following occurs:

- a. A change in job assignments or machines,
- b. New equipment or operations that presents a hazard, or
- c. A change to the Lockout/Tagout specifications listed within this procedure.

Additional training shall be conducted in the event that inspections reveal inadequacies in employees' knowledge of lockout/tagout requirements.

## **SECTION 10 – EQUIPMENT**

10.1 Lockout/tag equipment required by this policy.

10.1.1 Lockout devices (e.g., padlock, hasp, lockbox, etc.).

10.1.2 Tagout cards.

## **SECTION 11- RECORDKEEPING**

11.1 Lockout/Tagout Records

11.1.1 Each functional operating center (e.g., gas storage, operations center, SR&O, IM&E, etc.) that is responsible for operation of gas distribution or gas transmission valves or controls to associated pipeline components, or a delegate thereof, shall maintain a valve operating log or other record of lockout/tagout operations.

11.1.2 The valve operating log or records system must retain sufficient information to demonstrate compliance with the energy control requirements of OSHA, Title 29 CFR 1910.147. An example of a valve operating card log is displayed in Appendix 10.4. The record keeping system may utilize more than one record format, at the discretion of the operating center.

11.1.3 Each valve operating log or record system shall record logout/tagout activities for valves, including electric or pneumatic controllers to valves or components, for which the respective operating center is responsible.

11.1.4 For routine maintenance and operation activities requiring lockout, generally of straight forward nature and short time duration, a notation on the work report indicating lockout was performed will satisfy record keeping requirements.

11.1.5 The log or record system at each operating center (e.g., gas storage, operations center, SR&O, IM&E, etc.) shall include records for valve operations originating by that operating center, including those operations that are reported to other operating centers.

11.1.6 The log at each operating center (e.g., gas storage, operations center, SR&O, IM&E, etc.) shall include records for valve operations of interest that are originated and reported by another operating center.

11.1.7 Valve operating log or records system shall be maintained by each operating center (e.g., gas storage, operations center, SR&O, IM&E, etc.), or the center's delegate for a minimum of five years beyond the end of the calendar year in which the recorded activities took place.

11.2 Energy Control Inspections

11.2.1 Documented inspections shall be conducted by supervisor(s) whose responsibilities include compliance with the hazardous energy control program outlined in this policy.

11.2.2 Inspections shall occur at least annually to ensure that the policy is being followed and to determine whether deviations or inadequacies exist. Each inspection shall include a review, between the inspector and each employee, of that employee's responsibilities under the energy control program.

11.2.3 Inspections shall be documented on an Energy Control Inspection form, which is displayed in Appendix 10.2. Records shall be maintained at each employee's reporting location.

11.3 Energy Control Training

All energy control training shall be documented using standard gas training forms. Original signed forms shall be forwarded to Safety and Technical Training for filing and recording.

**SECTION 12 – APPENDIX**

12.1 Typical Lockout/Tagout Card (page 10)

12.2 Energy Control Inspection Form (page 11)

12.3 Group Lockout Options (page 12)

12.4 Typical Valve Operating Card Log (pages 13 and 14)

Appendix 10.1 - Typical Lockout/Tagout Card

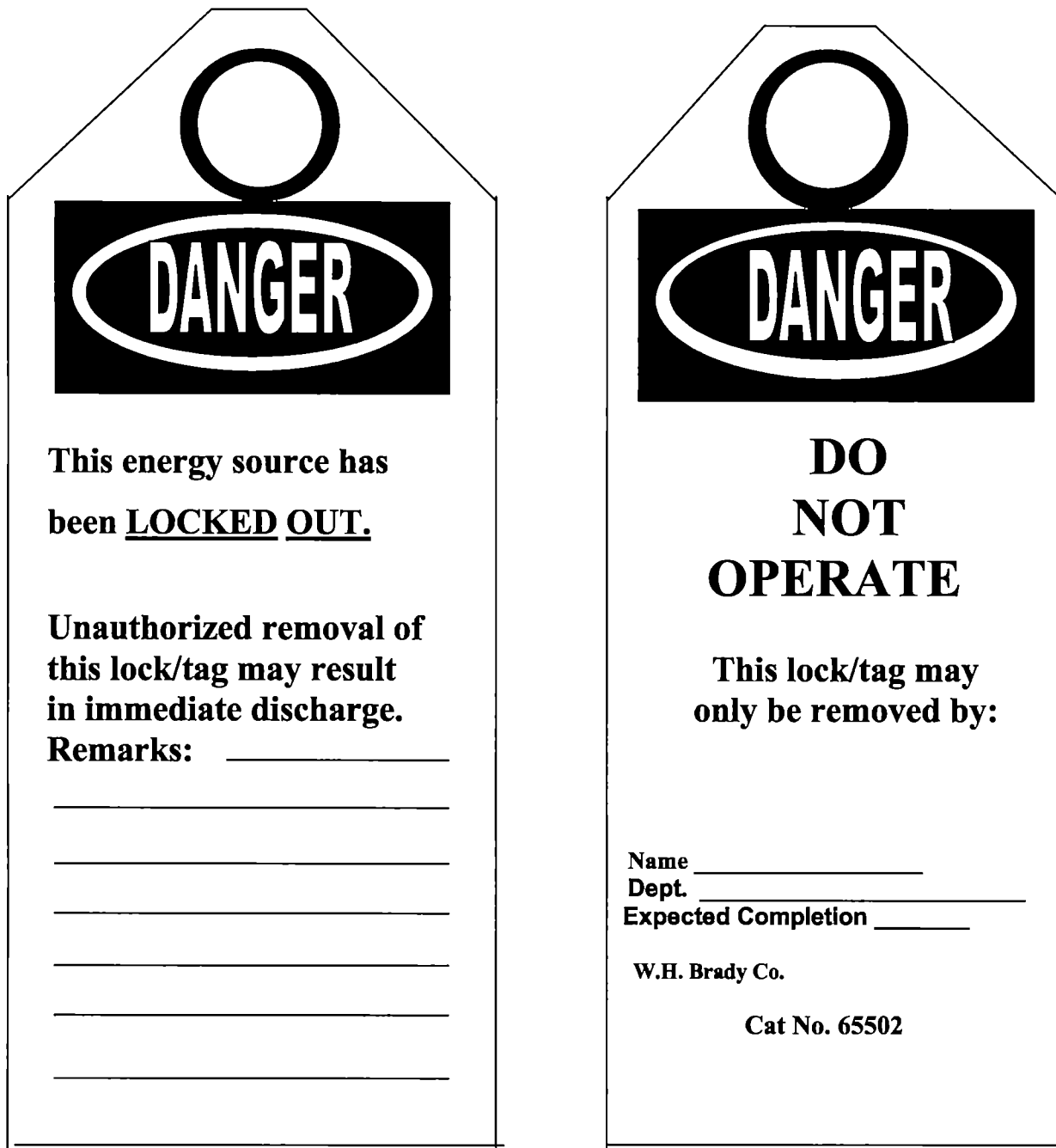


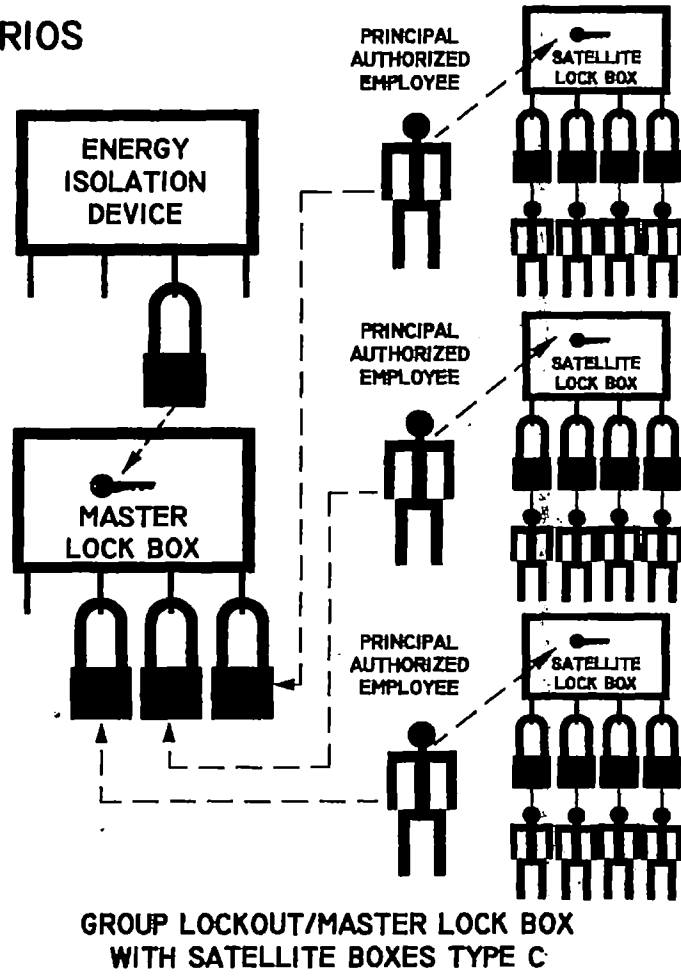
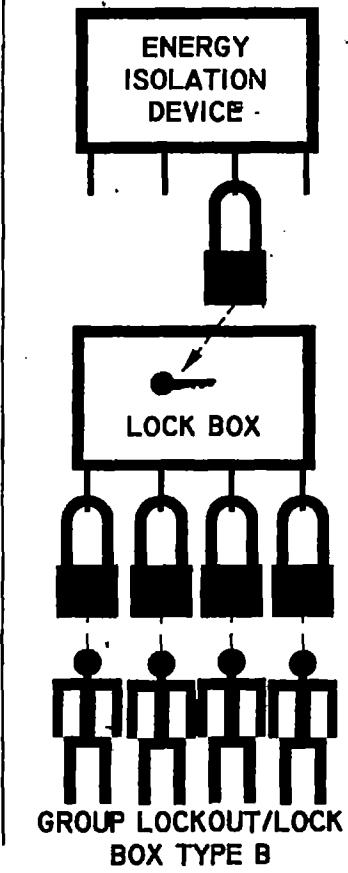
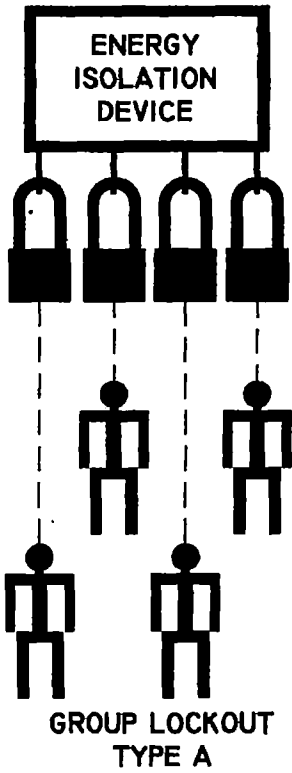
Figure 1.0 Standard Tagout Device  
(Typical - details may vary)

**Appendix 10.2 - Energy Control (Lockout/Tagout) Inspection Form**

| <b>HAZARDOUS ENERGY CONTROL (LOCKOUT/TAGOUT) INSPECTION</b>            |                               |
|--|-------------------------------|
| <b>Location:</b> _____   | <b>Inspection Date:</b> _____ |
| Maintenance /Servicing Being Performed: _____                          |                               |
| Equipment: _____   |                               |
| Types and Magnitudes of Energy and Hazards: _____                      |                               |
| Types and Locations of Energy Isolating Means: _____                   |                               |
| Energy Control Methods Being Utilized: _____                           |                               |
| Equipment Not Under Control: _____                                     |                               |
| Authorized Employees: _____  |                               |
| Authorized Employees Not Under Protection: _____                       |                               |
| Affected Employees: _____  |                               |
| Notes: _____   |                               |
| Inspector: _____   |                               |
| Title: _____   |                               |
| Signature: _____   |                               |
| * Note: Records of inspections shall be kept on file at work location. |                               |

Appendix 10.3 - Group Lockout Options

### LOCK/KEY CONTROL SCENARIOS





**Appendix 10.4 - Typical Valve Operating Card Log (Continued)**

Instructions for use of Valve Operating Card Log

- A. This log may be used to record temporary placement and removal of valve cards, tagout cards, and locks on valves or their controls. Records shall be maintained for such activities concerning valves and components for which the operating center maintaining the log is either responsible or directly affected, whether originated by that center or originated and reported by another operating center.
- B. Instruction for individual fields

| VALVE OPERATING CARD LOG |      |        |         |      |                       |                |         |            |      |      |         |
|--------------------------|------|--------|---------|------|-----------------------|----------------|---------|------------|------|------|---------|
| INSTALLATION             |      |        |         | SIZE | ID NO AND/OR LOCATION | REASON/COMMENT | REMOVAL | Field      |      |      |         |
| Date                     | Time | Status | Log by: |      |                       |                |         | Notice to: | Date | Time | Log by: |
| 1                        | 2    | 3      | 4       | 5    | 6                     | 7              | 8       | 9          | 10   | 11   | 12      |

1. **Installation Date** – Show date of placement of Valve Card, Tagout tag, and/or locking device.
2. **Installation Time** – Show time of placement of Valve Card, Tagout, and/or locking device.
3. **Installation Status** – Indicate Lockout/Tagout by LOTO, tagout without placement of lock by TO, and valve card by VC.
4. **Log by:** - Initials or other indication of identity of the person making the entry into the log.
5. **Size:** - Show nominal size of valve being operated. Indicate NA or leave blank if not applicable for component other than valve.
6. **ID No And/or Location** – Show valve number and or descriptive location as needed to clarify identity of the valve or component being operated. Use a separate line for each valve or component.
7. **Reason/comment** – Brief description of purpose for valve or component operation. More than one line may be used if necessary. Use a vertical bracket line to show tie between all line entries for project.
8. **Notice to:** Indicate other operating centers notified such as SRO for System Regulation and Operation, overlap into comment space if necessary.
9. **Removal Date** – Show date of removal of Valve Card, Tagout and/or locking device.
10. **Removal Time** – Show time of removal of Valve Card, Tagout and/or locking device.
11. **Log by:** - Initials or other indication of identity of person making entry into log.
12. **Field Personnel:** - List names of persons placing Valve Cards, Tagout tags and/or locking devices. Enter comment if removal is by other than installer.



# BARRICADE PIPE BOLLARD

GCS 80 20 510

Rev.

**NOTES:**

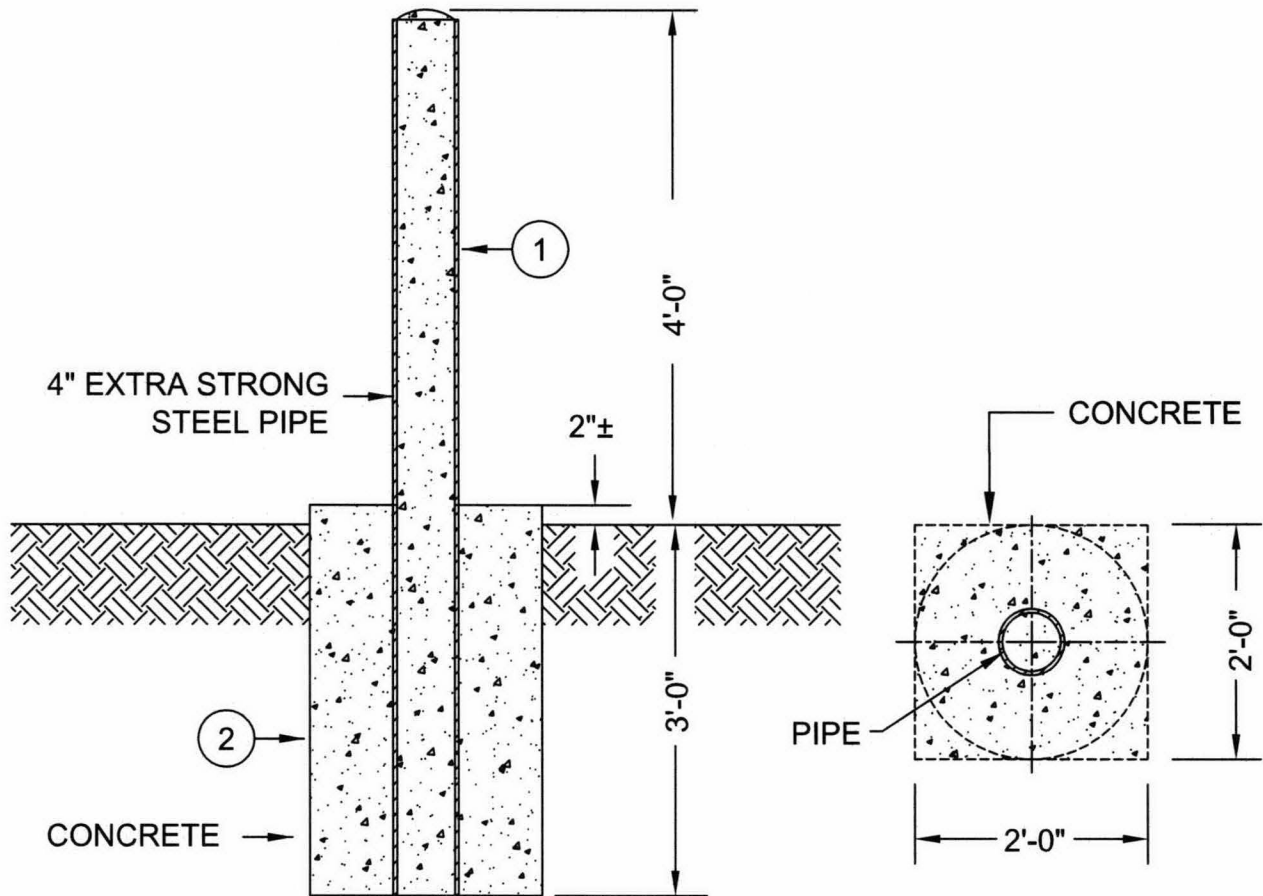
**1. GENERAL:**

- A. HOLE FOR STEEL PIPE MAY BE DUG ROUND OR SQUARE 2' - 0" WIDE AND 3' - 0" DEEP.
- B. PIPE TO BE FILLED WITH CONCRETE AND ROUNDED OFF AT THE TOP TO SHED WATER.

**2. PAINT:**

- A. BARRICADES SHALL BE PRIMED AND PAINTED.
- B. FINISH COLOR: SAFETY YELLOW UNLESS OTHERWISE SPECIFIED. (AGA 49 WILL BE ALLOWED FOR REGULATION FACILITIES)

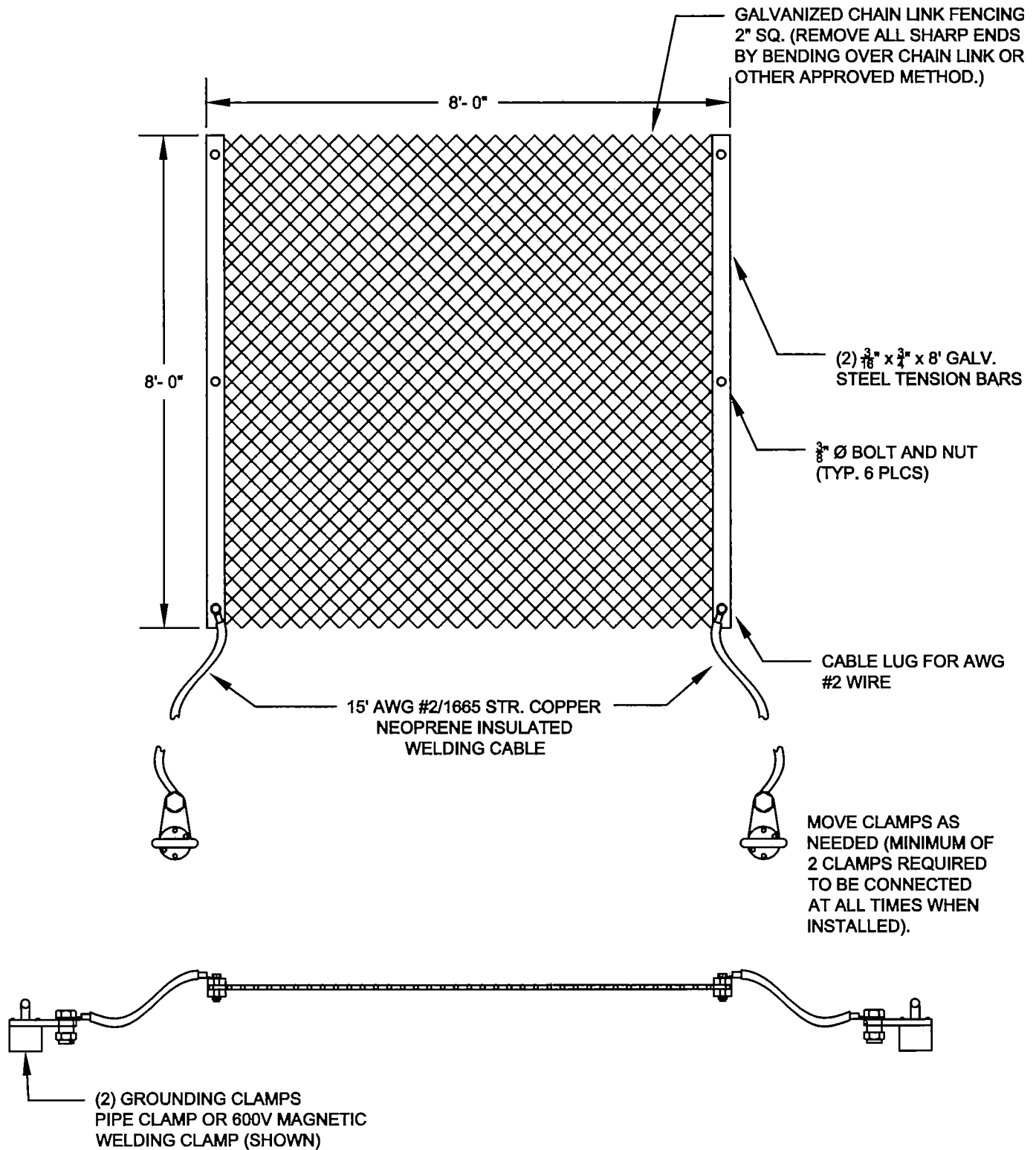
| ITEM NO. | DESCRIPTION  | QUANTITY | LG&E INVENTORY NO. (IIN) |
|----------|--|----------|--------------------------|
| 1        | PIPE, 4", XS, ASTM A 106 B                         | 7 FT     | 0121051                  |
| 1A       | <b>ALTERNATIVE:</b><br>PIPE, 6", STD, ASTM A 106 B | 7 FT     | 0178035                  |
| 2        | CONCRETE, 80 LB. BAG, 3000 PSI MINIMUM             | TBD      | SPECIAL ORDER            |



GRADIENT CONTROL MAT  
TEMPORARY MAT

GCS 50 30 850

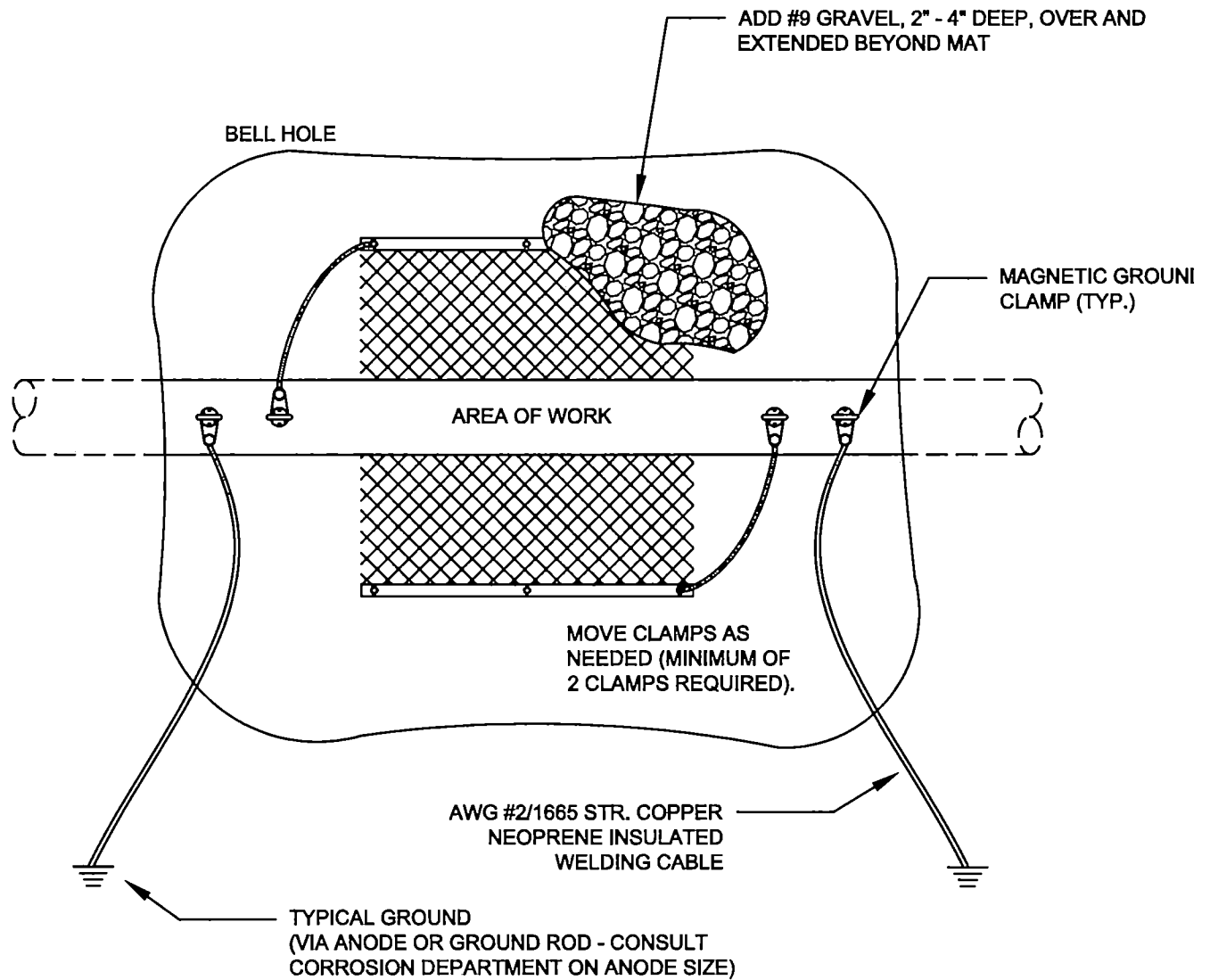
Rev.



NOTES:

1. REFERENCE: CAN/CSA-C22.3 NO. 6-M91. SECTION 5.7.1 FIGURE 3

INSTALLATION PROCEDURES

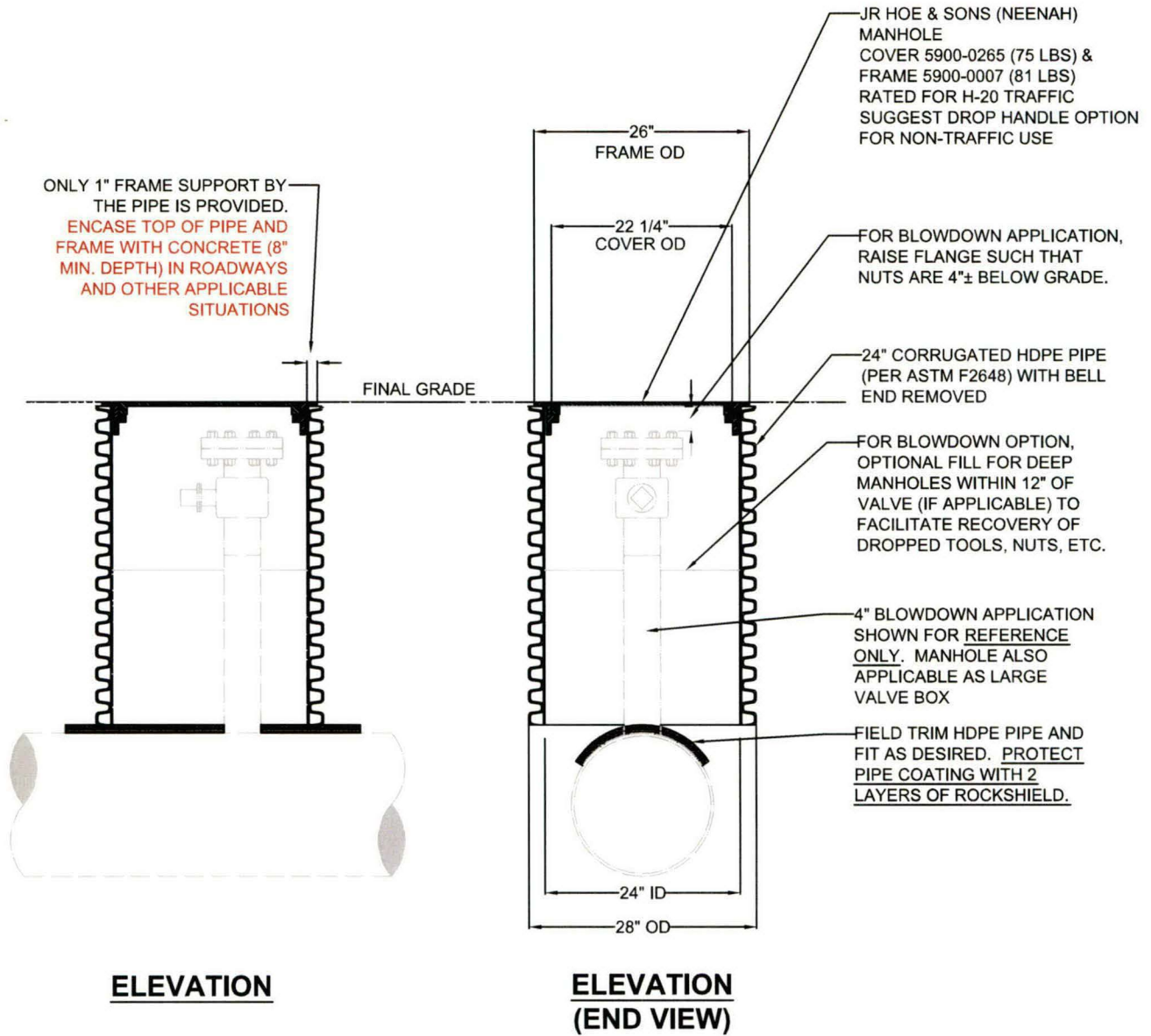


NOTES:

1. LENGTH AND WIDTH OF MAT MUST EXTEND 3 FEET BEYOND WORK AREA
2. BONDING PROCEDURE ARE MANDATORY DURING CUTOUTS AND TIE INS.

VALVE BOX  
24" HDPE PIPE STYLE

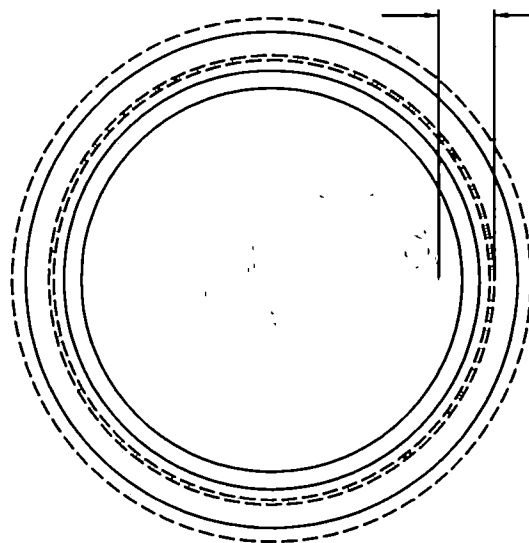
GCS 80 20 020  
Rev. A



**NOTES:**

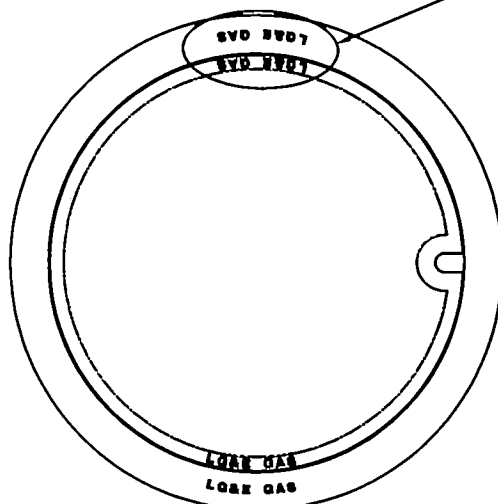
- APPLICATION: THIS MANHOLE HAS THE ADVANTAGE OF A SMALLER PROFILE AND MUCH LIGHTER LID THAN THE 30" MANHOLE. CONSIDER THE APPLICABILITY OF THIS DESIGN WHEN USED WITHIN A ROADWAY OR IF THE TIGHT OPERATING AND MAINTENANCE CLEARANCES ARE NOT DESIRABLE.





FOR VERTICAL BLOWDOWN APPLICATION,  
SUGGEST OFFSETTING HDPE PIPE FROM  
CENTERLINE TO MAXIMIZE VALVE  
OPERATION  
(FOR 4" CL. 300 FLANGE SHOWN, THE  
EDGE IS 3" FROM HDPE PIPE ID.)

**FRAME PLAN VIEW**  
(LID REMOVED FOR CLARITY)



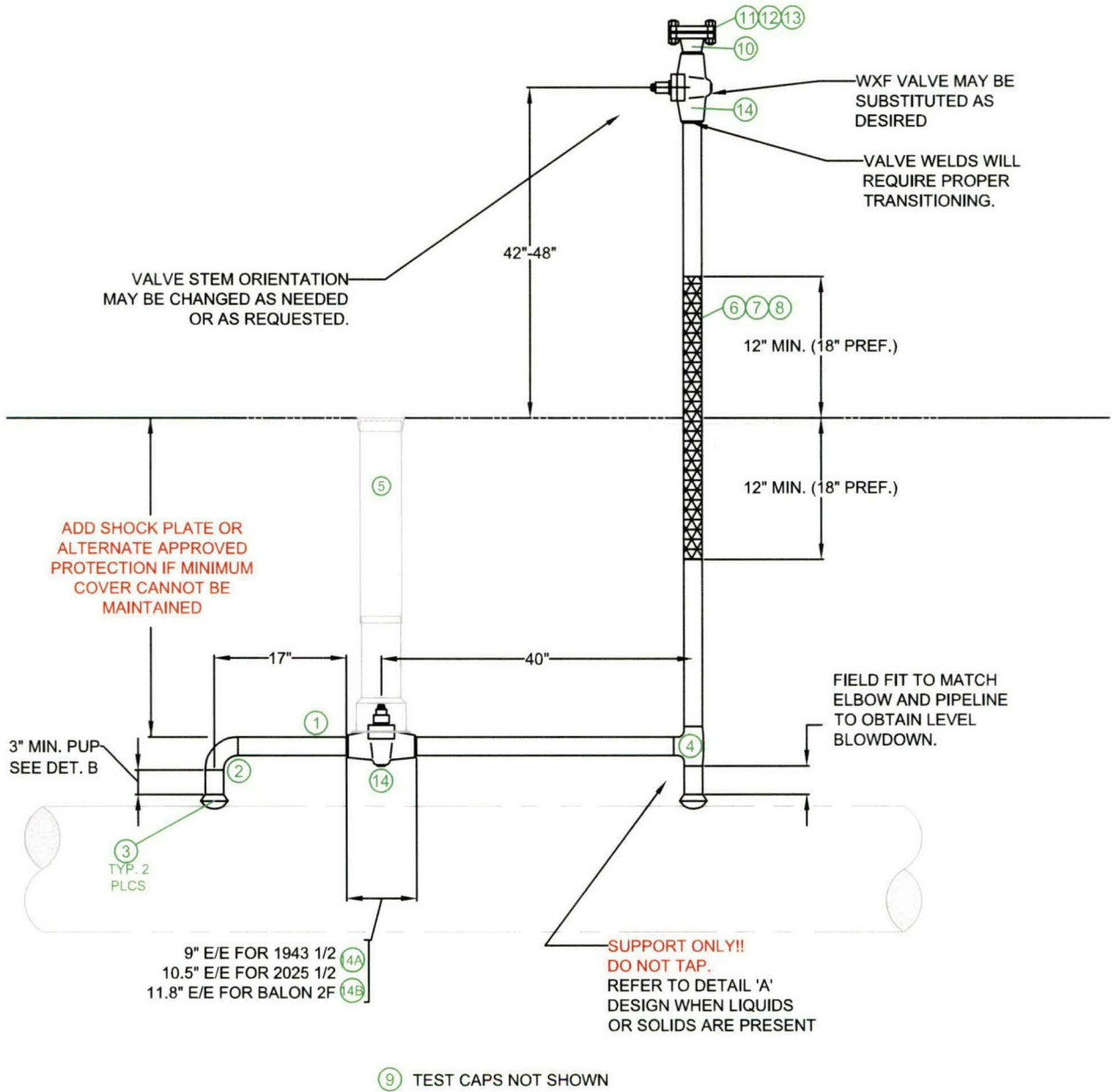
RECOMMENDED:  
ENGRAVE "L&E" IN 2 LOCATIONS ON  
LID OR FRAME WITH CNC MACHINE.  
FOR LID: 1/8" OR 3/16" STROKE; 1/2" HIGH  
FOR FRAME: 1/4" STROKE; 1/2" HIGH

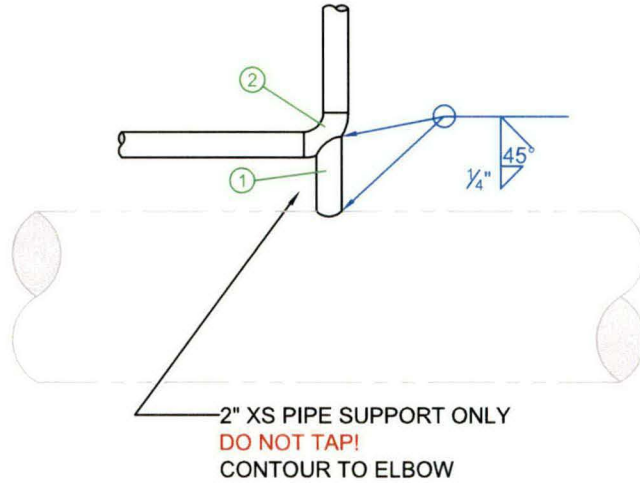
**FRAME ENGRAVING  
DETAIL**

PURGE/BLOWDOWN  
2" CL. 150/300 (NEW CONSTRUCTION)

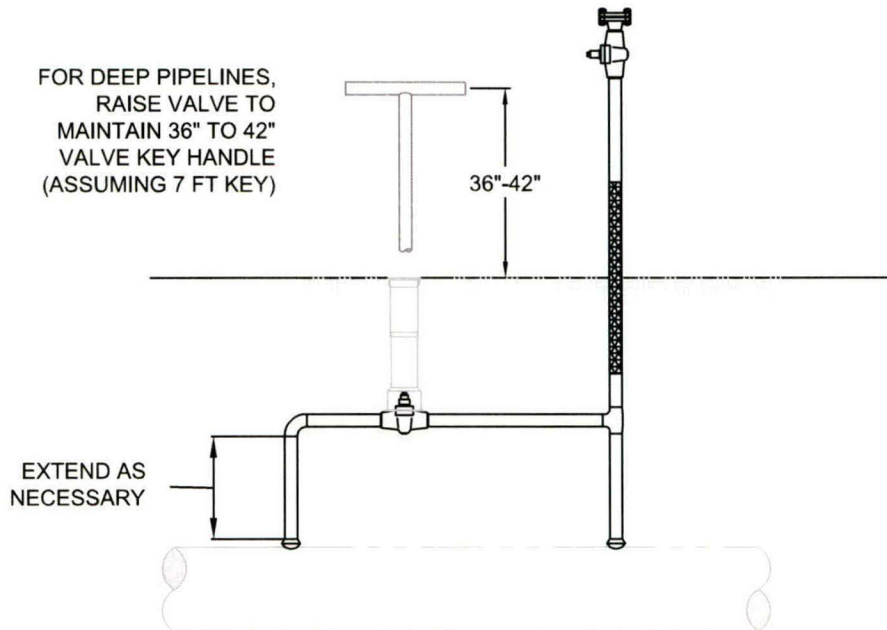
GCS 10 20 700  
Rev. A

MAOP = VARIES (SEE BILL OF MATERIAL)

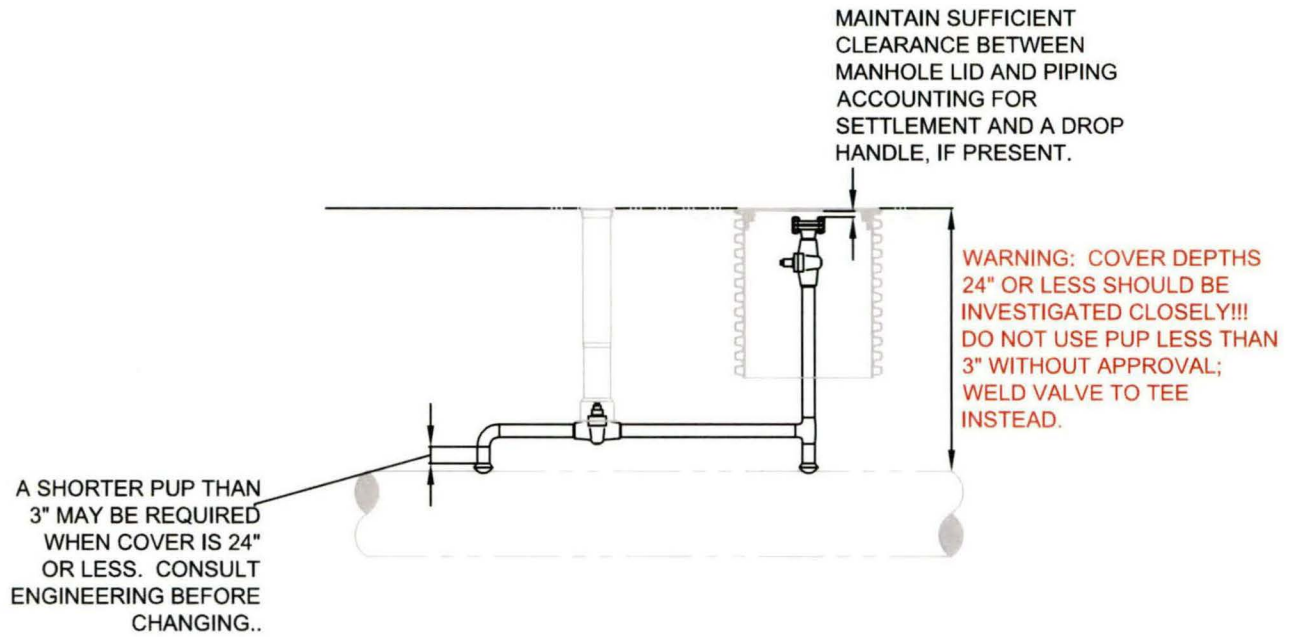




**DETAIL A  
SUPPORT DESIGN ALTERNATIVE**



**DETAIL B  
DEEP COVER ALTERNATIVE**



**DETAIL C**  
**BELOW GRADE ALTERNATIVE**



## NOTES:

### 1. GENERAL:

A. **THIS DESIGN IS A GUIDELINE ONLY.** CONSULT GAS ENGINEERING WITH QUESTIONS OR REQUESTED CHANGES.

### 2. WELDING:

- A. RADIOGRAPH 100% OF ALL BUTT WELDS UNLESS OTHERWISE SPECIFIED BY THE GAS ENGINEER.
- B. MAGNETIC PARTICLE INSPECT 100% OF WELDOLETS (OR OTHER FILLET WELDS) UNLESS OTHERWISE SPECIFIED.

### 3. TEST PRESSURE:

- A. TEST PRESSURE (PIPE): AS SPECIFIED BY GAS ENGINEER
- B. **WARNING: DO NOT EXCEED MAXIMUM TEST PRESSURE OF VALVES!**

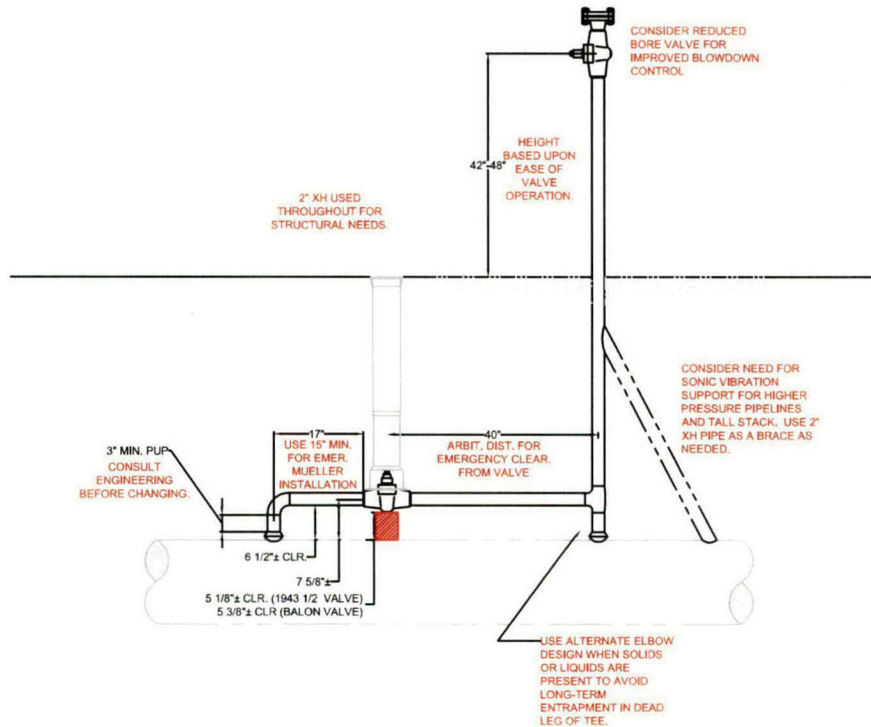
### 4. CORROSION:

- A. CONSULT WITH CORROSION DEPARTMENT ON BELOW GRADE COATING (E.G. WAX TAPE VS. EPOXY) AND ABOVE GRADE COATING.

### 5. BARRICADES:

- A. BARRICADES ARE RECOMMENDED FOR ALL ABOVE GRADE PIPING IF RISK OF DAMAGE EXISTS.
- B. BARRICADES SHALL BE PRIMED AND PAINTED SIMILAR TO THE PIPING. CONSULT CORROSION DEPARTMENT.

## DESIGN NOTES



**BILL OF MATERIAL**

| ITEM NO.  | DESCRIPTION   | QUANTITY  | LG&E INVENTORY NO. (IIN) |
|---|---|-----------|--------------------------|
| 1   | PIPE, 2", XH, A106 GR. B/X42, SRL   | AS NEEDED | 0178143                  |
| 2   | ELBOW, PIPE, 2", 90 DEG, XH, LR, BW, A234 GR. B   | 1         | SPECIAL ORDER            |
| 3   | WELDOLET, 2" X TBD, XS, CL. 3000, A105 OR MSS-SP-97   | 2         | SPECIAL ORDER            |
| 4   | TEE, PIPE, 2", XH, A234 WPB   | 1         | SPECIAL ORDER            |
| 5   | BOX, VALVE, 5-1/4" SHAFT, CAST IRON RIM AND DROP LID, B&T P5562-S/105                           | 1         | 0439478                  |
| 6   | TAPE, WAX, 4" X 9', TRENTON #2, FOR ABOVE GRADE   | 3         | 0513760                  |
| 7   | TAPE, OUTERWRAP, 4" X 27', TRENTON MC OUTERWRAP W/END ADHESIVE                                  | 2         | SPECIAL ORDER            |
| 8   | TAPE, PRIMER, FOR WAX-TAPE #1 AND #2, TRENTON, 1 GALLON CAN                                     | AS NEEDED | 0512743                  |
| 9   | CAP, 2", STD., BW, A234 WPB (FOR PREFABRICATION TESTING ONLY, AS NEEDED)                        | AS NEEDED | 1165186                  |
| <b>MAOP = 200 OR 275 PSIG MAX. (DEPENDING UPON VALVE)</b> |   |           |                          |
| 10  | FLANGE, PIPE, 2", CL. 150, STD. BORE, RFWN, A105<br><b>(NEEDED ONLY IF W X W VALVE IS USED)</b> | AS NEEDED | 0369919                  |
| 11  | FLANGE, PIPE, 2", CL. 150, BLIND, RF, A105  | 1         | 1167851                  |
| 12  | 5/8 X 3-1/2" (3 1/4" FTF) XYLAN SC-1 STUD BOLT A193-B7 W/2 HEX NUTS A194-2H                     | 4         | SPECIAL ORDER            |
| 13A   | GASKET, 2" CL. 150, 1/16" THICK, NON-ASBESTOS   | 1         | 1168178                  |
| 13B   | <b>ALTERNATIVE:</b> GASKET, 2" CL. 150, SPIRAL WOUND, SS WINDINGS, GRAPHITE FILLER.             | AS NEEDED | SPECIAL ORDER            |
| 14A   | VALVE, PLUG, 2", 200 WOG, WXW, W/ 2" KEY ADAPTER, NORDSTROM FIG. 1943 1/2                       | 2         | 1173060                  |
| 14B   | <b>ALTERNATIVE:</b> VALVE, BALL, 2" CL. 150, WXW, W/ 2" KEY ADAPTER, BALON 2F-US13-BW.          | AS NEEDED | SPECIAL ORDER            |
| <b>MAOP = 720 PSIG MAX.</b>                               |   |           |                          |
| 10  | FLANGE, PIPE, 2", CL. 300, STD. BORE, RFWN, A105<br><b>(NEEDED ONLY IF W X W VALVE IS USED)</b> | AS NEEDED | 1168078                  |
| 11  | FLANGE, PIPE, 2", CL. 300, BLIND, RF, A105  | 1         | 1167901                  |
| 12  | 5/8 X 3-3/4" (3 1/2" FTF) XYLAN SC-1 STUD BOLT A193-B7 W/2 HEX NUTS A194-2H                     | 8         | SPECIAL ORDER            |
| 13A   | GASKET, 2" CL. 300, 1/16" THICK, NON-ASBESTOS   | 1         | 1168186                  |
| 13B   | <b>ALTERNATIVE:</b> GASKET, 2" CL. 300, SPIRAL WOUND, SS WINDINGS, GRAPHITE FILLER.             | AS NEEDED | SPECIAL ORDER            |
| 14A   | VALVE, PLUG, 2", CL. 300, WXW, W/ 2" KEY ADAPTER, NORDSTROM FIG. 2025.                          | 2         | 1173086                  |
| 14B   | <b>ALTERNATIVE:</b> VALVE, BALL, 2" CL. 300, WXW, W/ 2" KEY ADAPTER, BALON 2F-US33-BW.          | AS NEEDED | SPECIAL ORDER            |



PURGE/BLOWDOWN  
4" CL. 300 FLANGE TEE (RETROFIT)

GCS 10 20 704

Rev. D

**MAOP  $\leq$  720 PSIG**

**NOTES:** 

**1. GENERAL:**

- A. ADD ELBOWS TO RAISE VALVE IF DEPTH OF BLOWDOWN PIPING IS BEYOND NORMAL VALVE KEY DEPTH.
- B. CONSULT BRANCH REINFORCEMENT STANDARD IF A GRADE B SADDLE IS DESIRED.
- C. **WARNING: CONSULT BRANCH REINFORCEMENT STANDARD FOR THE FLANGED TEE. IMPROPER REINFORCEMENT DESIGN WILL LIMIT THE MAOP.**
- D. **WARNING: PIPELINE PRESSURE DURING FLANGED TEE TAPPING MAY NEED TO BE REDUCED. CONSULT MUELLER TECHNICAL DATA TO CONFIRM 250 PSIG MAXIMUM TAPPING PRESSURE USING LG&E EQUIPMENT.**

**2. WELDING:**

- A. WELDING SHALL BE IN ACCORDANCE WITH API 1104, LATEST EDITION.
- B. RADIOGRAPH 100% OF ALL BUTT WELDS UNLESS OTHERWISE SPECIFIED BY THE GAS ENGINEER.
- C. MAGNETIC PARTICLE INSPECT 100% OF FLANGED TEE AND SADDLE UNLESS OTHERWISE SPECIFIED BY THE GAS ENGINEER.

**3. TEST PRESSURE:**

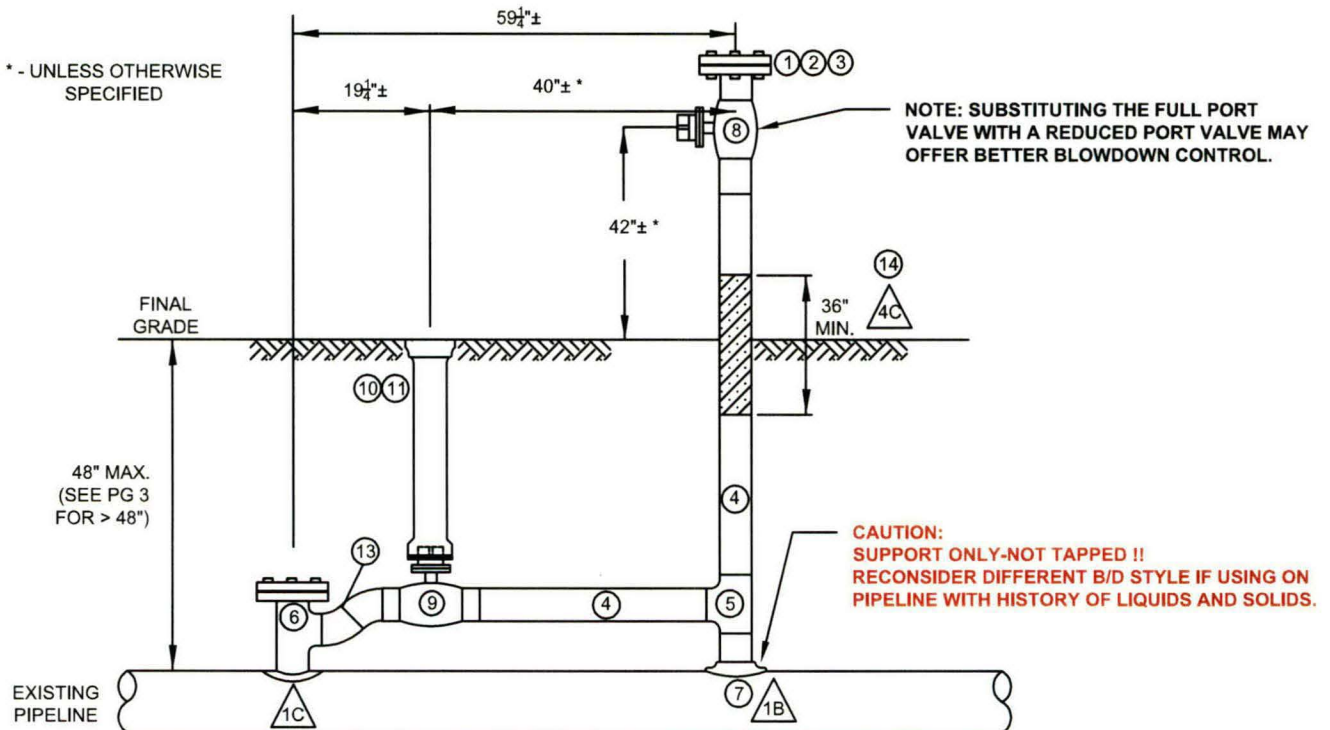
- A. TEST PRESSURE (PIPE): AS SPECIFIED BY GAS ENGINEER OR 1080 PSIG FOR 1 HOUR (ASSUMING A CLASS 3 LOCATION AT MAXIMUM MAOP).
- B. TEST FLANGE TEE PRIOR TO TAPPING.
- C. **WARNING: DO NOT EXCEED MAXIMUM TEST PRESSURE OF VALVES OR FLANGED TEE!**

**4. CORROSION:**

- A. CLEAN ALL ABOVE GRADE PIPING OF ALL DIRT, GREASE, SCALE, AND RUST BY WIRE BRUSHING.
- B. ALL ABOVE GRADE PIPING SHALL BE COATED WITH A PRIMER AND PAINT APPROVED BY THE GAS ENGINEERING OR CORROSION DEPARTMENTS.
- C. WAX TAPE OUTERWRAP SHOULD EXTEND AT LEAST 18" ABOVE AND BELOW GRADE AT THE SOIL INTERFACE ON ABOVE GROUND PIPING
- D. CONSULT WITH CORROSION DEPARTMENT ON WHETHER TO COAT BELOW GRADE PIPE WITH WAX TAPE OR EPOXY.

**5. BARRICADES:**

- A. BARRICADES ARE RECOMMENDED FOR ALL ABOVE GRADE PIPING IF RISK OF DAMAGE EXISTS.
- B. BARRICADES SHALL BE PRIMED AND PAINTED SIMILAR TO THE PIPING.



Gas Engineering and Planning

REPLACES  
GCS 10 20 704 C

SCALE  
NONE

DRAWN BY:  
DESIGNED BY:  
DATE:  
PAGE 1 OF 3

MCGUIRE  
BEATTY  
07/06/12

**BILL OF MATERIAL**

| ITEM NO. | DESCRIPTION  | QUANTITY           | LG&E INVENTORY NO.                    |
|----------|--|--------------------|---------------------------------------|
| 1        | BOLTS, STUD, 3/4" X 4-3/4 (4 1/2" FTF) XYLAN SC-1 A193-B7 W/2 HEX NUTS A194-2H   | 8                  | SPECIAL ORDER<br>MCJ P/N<br>2472-0281 |
| 2        | FLANGE, PIPE, 4", CL. 300, BLIND, RF, A105   | 1                  | 1167919                               |
| 3        | GASKET, FLANGE, 4", CL. 300, SPIRAL WOUND, 304SS, GRAPHITE, NON-ASBESTOS   | 2<br>(INCL. SPARE) | SPECIAL ORDER                         |
| 3A       | <b>ALTERNATE</b><br>GASKET, FLANGE, 4", CL. 300, 1/16"THK, RING, NON-ASBESTOS  | 2<br>(INCL. SPARE) | 1168201                               |
| 4        | PIPE, 4", STD., A106 GR B, SRL   | 10                 | 0178027                               |
| 5        | TEE, PIPE, 4", STD., A234 WPB  | 1                  | 0958127                               |
| 6        | FLANGED TEE, 4" CL. 300, A105, MUELLER NO-BLO H-17506, NO CONTOUR OR BEVEL ON INLET, P/N H1750600-740.   | 1                  | SPECIAL ORDER                         |
| 7        | SADDLE, 4" X 8", A234 WPB <b>WARNING: SEE NOTE 1.</b>  | AS NEEDED          | 1171335                               |
| 7A       | <b>ALTERNATE AS NEEDED</b><br>SADDLE, 4" X 12", A234 WPB   | AS NEEDED          | 1171343                               |
| 7B       | <b>ALTERNATE AS NEEDED</b><br>SADDLE, 4" X 16", A234 WPB   | AS NEEDED          | 1171386                               |
| 7C       | <b>ALTERNATE AS NEEDED</b><br>SADDLE, 4" X 20", A234 WPB   | AS NEEDED          | 1171401                               |
| 7D       | <b>ALTERNATE AS NEEDED</b><br>WELDOLET, 4", STD  | AS NEEDED          | SPECIAL ORDER                         |
| 8        | VALVE, BALL, 4", CL. 300, WELD X FLANGE, FULL PORT, LOCKING, KEROTEST 4WBFP740-WF-SB, BALON 4R-US33-WF, OR BALON 4F-US33-WF (OR APPROVED EQUAL).                 | 1                  | SPECIAL ORDER                         |
| 8A       | <b>ALTERNATE</b><br>SEE ITEM 9A WITH A 4" CL. 300 RFWN.  |                    | 1173219<br>1168086                    |
| 8B       | <b>ALTERNATE</b><br>VALVE, BALL, 4", CL. 300, WELD X WELD, FULL PORT, LOCKING, KEROTEST 4WBFP740-W OR BALON 4F-US33-BW OR APPROVED EQUAL WITH A 4" CL. 300 RFWN. |                    | SPECIAL ORDER<br>W/ 1168087           |
| 9        | VALVE, BALL, 4", CL. 300, WELD X WELD, FULL PORT, LOCKING, BALON 4WBFP740-W (OR APPROVED EQUAL)  |                    | SPECIAL ORDER                         |
| 9A       | <b>ALTERNATE</b><br>VALVE, PLUG, 4", CL. 300, WELD X WELD, NORDSTROM 2025 1/2 (OR APPROVED EQUAL) <b>WARNING: DIMENSIONS FROM PAGE 3 TABLE WILL NOT APPLY!</b>   |                    | 1173219                               |
| 10       | BOX, VALVE, 5 1/4" ID, CAST IRON RIM, DROP IN LID, 3/8" VENT, 26"-42" BELL EXTENSION   | 1                  | 1164878                               |
| 11       | BOX, VALVE, 24" EXTENSION  | AS NEEDED          | 0943586                               |
| 12       | FUTURE   |                    |                                       |
| 13       | ELBOW, 45 DEG., 4", STD. LR, BW ASTM A234 WPB.   | 2                  | 1167078                               |
| 14A      | TAPE, PROTECTIVE, 4" X 18 FT, TRENTON MC OUTERWRAP   | 1                  | SPECIAL ORDER                         |
| 14B      | TAPE, WAX, 4" X 9 FT LONG ROLLS, TRENTON #2, BROWN, FOR ABOVE GROUND   | 2                  | 0513760                               |
| 14C      | TAPE, WAX, 4" X 9 FT LONG ROLLS, TRENTON #1, BROWN, FOR BELOW GROUND   | 8<br>(IF NEEDED)   | 0513778                               |
| 14D      | PRIMER, BRUSH-ON, FOR TRENTON WAX TAPE, ONE GALLON CANS  | 1<br>(AS NEEDED)   | 0513743                               |

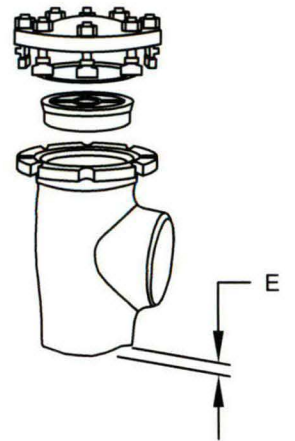


**ALTERNATE DESIGN DIMENSIONS  
(FOR PIPELINES WITH COVER  $\geq$  48")  
(KEROTEST/BALON VALVES ONLY)**

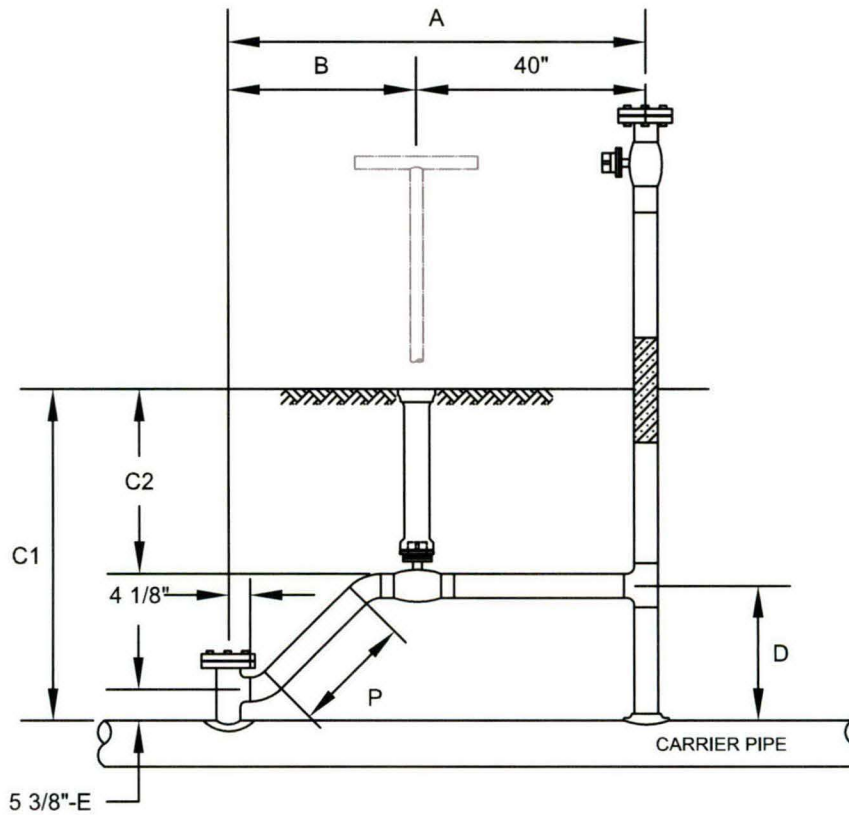
**FLANGE TEE  
CONTOUR**

| PIPELINE COVER C1 (IN) | BLOW DOWN COVER C2 (IN) | PUP P (IN)<br>*       | B (IN) | A (IN) | D (IN)  | E                      |
|------------------------|-------------------------|-----------------------|--------|--------|---------|------------------------|
| 48.23                  | 37-E                    | 0.000                 | 19.198 | 59.198 | 9-E     | REFER TO CONTOUR TABLE |
| 48                     | 37-E                    | AVOID-WELDS TOO CLOSE |        |        |         |                        |
| 48.5                   | 37-E                    | 0.380                 | 19.489 | 59.489 | 9.25-E  |                        |
| 50                     | 37-E                    | 2.595                 | 21     | 61     | 10.75-E |                        |
| 55                     | 37-E                    | 9.666                 | 26     | 66     | 15.75-E |                        |
| 60                     | 37-E                    | 16.737                | 31     | 71     | 20.75-E |                        |
| 65                     | 37-E                    | 23.808                | 36     | 76     | 25.75-E |                        |
| 70                     | 37-E                    | 30.879                | 41     | 81     | 30.75-E |                        |
| 75                     | 37-E                    | 37.950                | 46     | 86     | 35.75-E |                        |
| 80                     | 37-E                    | 45.021                | 51     | 91     | 40.75-E |                        |
| 85                     | 37-E                    | 52.093                | 56     | 96     | 45.75-E |                        |

| CARRIER PIPE (NPS) | CONTOUR E (IN) |
|--------------------|----------------|
| 4"                 | 1.0625"        |
| 6"                 | 0.5625"        |
| 8"                 | 0.4375"        |
| 12"                | 0.25"          |
| 16"                | 0.1875"        |
| 20"                | 0.125"         |



\* - MEASURED FROM CENTERLINE OF WELDS.

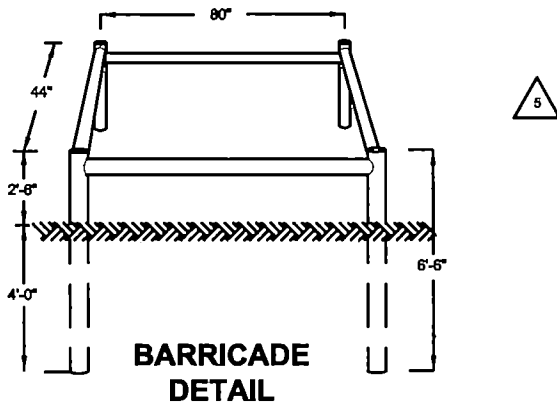
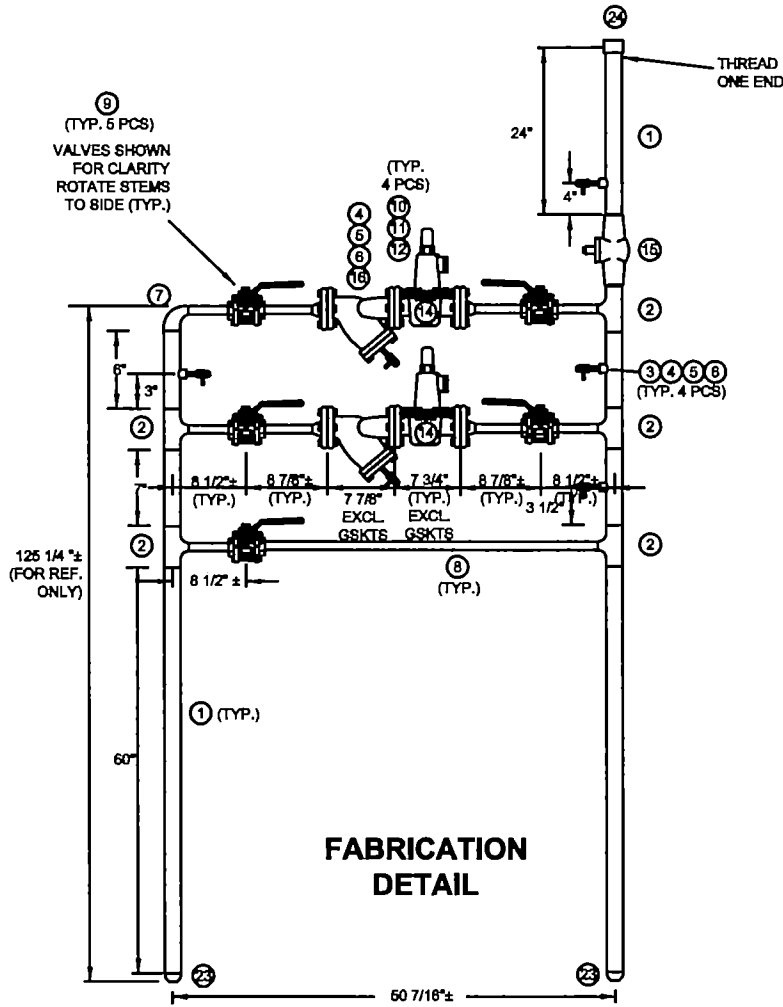


**REGULATOR STATION  
FISHER 627/1808A ASSEMBLY W/ STRAINER**

**GCS 40 20 402**

**Rev. C**

INLET MAOP  $\leq$  720 PSIG  
OUTLET MAOP  $\leq$  60 PSIG



**Gas Engineering and Planning**

REPLACES  
GCS 40 20 402 B

SCALE  
NONE

DRAWN BY:  
DESIGNED BY:  
DATE:  
PAGE 1 OF 3

CLARK  
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06/28/10

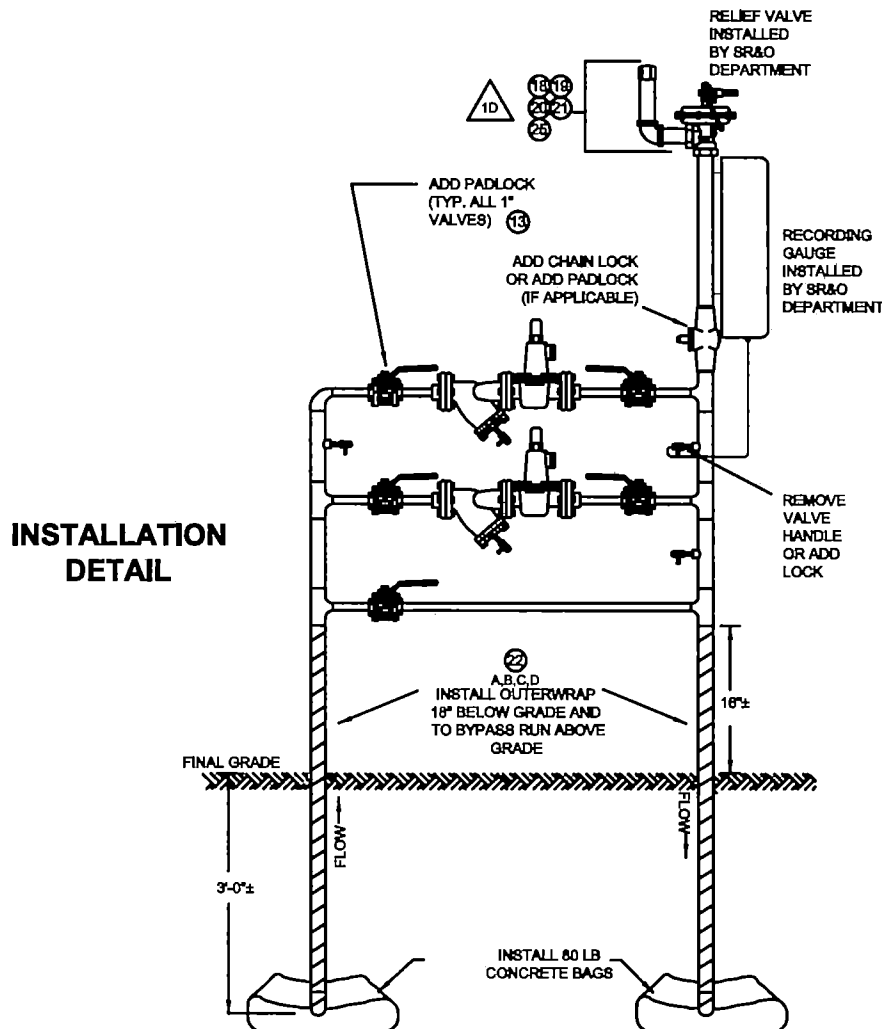
**REGULATOR STATION  
FISHER 627/1808A ASSEMBLY W/ STRAINER**

**GCS 40 20 402**

**Rev. C**

**NOTES:**

1. **REGULATORS/RELIEF VALVE/ RECORDING CHART:**
  - A. THE FISHER 627 REGULATORS SHALL BE SET TO 35 PSIG DELIVERY PRESSURE UNLESS OTHERWISE NOTED BY GAS ENGINEERING.
  - B. RELIEF VALVE SET POINTS (ABOVE REGULATOR SET POINT):
    - I. MAOP  $\geq$  60 PSIG.....+10%
    - II. 12  $\leq$  MAOP < 60 PSIG....+6 PSIG
    - III. MAOP < 12 PSIG.....+50%
  - C. INSTALL A VENT CAP ON THE RELIEF VALVE TO PREVENT WATER, BUGS, AND OTHER DEBRIS FROM OBSTRUCTING THE RELIEF VALVE VENT.
  - D. DRILL A 3/8" DIAMETER HOLE IN THE BOTTOM OF THE VENT ELBOW.
  - E. A RECORDING GAUGE SHALL BE INSTALLED IF THIS FACILITY SERVES 10 OR MORE CUSTOMERS. THE RECORDING GAUGE AND ASSOCIATED INSTRUMENTATION SHALL BE INSTALLED BY THE SYSTEM REGULATION AND OPERATIONS DEPARTMENT.
2. **WELDING:**
  - A. ALL WELDING SHALL BE IN ACCORDANCE WITH API 1104.
  - B. NON-DESTRUCTIVE TESTING: TEST 5 RANDOM BUTT WELDS UNLESS PROVIDED OTHER INSTRUCTIONS BY THE GAS ENGINEER.
3. **TEST PRESSURE:**
  - A. TEST PRESSURE = 700 PSIG FOR 1 HOUR (UNLESS OTHERWISE SPECIFIED).
  - B. PIPELINES WITH MAOP GREATER THAN 460 PSIG, WILL RECEIVE A SECOND TEST AS DIRECTED BY THE GAS ENGINEER.
  - C. DO NOT PRESSURIZE REGULATORS DURING TEST.
4. **CORROSION:**
  - A. ALL ABOVE GRADE PIPING SHALL BE COATED WITH A PRIMER AND PAINT APPROVED THE CORROSION DEPARTMENT.
  - B. WAX TAPE AND OUTER WRAP SHOULD EXTEND AT LEAST 18" ABOVE AND BELOW GRADE AT INLET AND OUTLET PIPING.
5. **BARRICADES.**
  - A. BARRICADES ARE REQUIRED FOR ALL ABOVE GRADE ASSEMBLIES UNLESS SPECIFIED OTHERWISE.
  - B. BARRICADES SHALL BE PRIMED AND PAINTED SIMILAR TO THE REGULATOR ASSEMBLY.
  - C. BARRICADES SHALL BE CONSTRUCTED FROM 4" DIAMETER PIPE, 4" SQUARE TUBULAR STEEL (A500 GR. B, 1/8" TH./11 GA.), OR OTHER APPROVED MATERIAL.



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REGULATOR STATION  
FISHER 627/1808A ASSEMBLY W/ STRAINER

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Rev. C

**BILL OF MATERIAL**

| ITEM NO. | DESCRIPTION  | QUANTITY | LG&E INVENTORY NO. |
|----------|--|----------|--------------------|
| 1        | PIPE, 2", STD. WT., A106 GR. B/X42, SRL  | 12 FT    | 0177994            |
| 2        | TEE, PIPE, 2" X 1", REDUCING, STD. WT, BW, ASTM A234 WPB.  | 5        | 3001058            |
| 3        | THREAOLET, 1/2" FOR 2"-2 1/2" PIPE, CL. 3000, FS, ASTM A105  | 4        | 3001060            |
| 4        | NIPPLE, PIPE, 1/2" X 2 1/2", SCH. 80, ASTM A106 GR. B  | 6        | 1169760            |
| 5        | VALVE, BALL, 1/2", 2000 MWP, SCRD., CS., CONTROMATICS C7000-SS-M3 OR EQUIV.  | 6        | 3001054            |
| 6        | PLUG, PIPE, 1/2", CL. 3000, SQ. HD, ASTM A105  | 5        | 1170160            |
| 7        | ELBOW, 2" X 1", REDUCING, STD., BW, ASTM A234 GR. WPB.   | 1        | 3001055            |
| 8        | PIPE, 1", SCH. 80, ASTM A106 B.  | 10 FT    | 0178119            |
| 9        | VALVE, BALL, 1", 1000 PSIG WOG, CS, SW, THREE PIECE FULL PORT, SWING OUT DESIGN.   | 5        | 3000614            |
| 10       | FLANGE, PIPE, 1", CL. 300, XH, RFWN, ASTM A105.  | 4        | 0918078            |
| 11       | GASKET, PIPE, 1", CL. 300, SEMI-RIGID, RING, 1/16" THICK   | 6        | 0918086            |
| 12       | BOLT, STUD, 5/8" X 3 1/4", ASTM A193 GR. B7, TEFLON COATED ZINC, WITH 2 HEX NUTS, ASTM A194 GR. 2H. MCJUNKIN PN: 2472-0173.  | 24       | SPECIAL ORDER      |
| 13       | LOCK, PADLOCK, 7/8" SHANK, WILSON BOHANNAN (WB)  | 6        | 1180994            |
| 14       | REGULATOR, 1", CL. 300, RF, FISHER 627, 15-40 PSIG SPRING RANGE, 1/8" ORIFICE, NITRILE DIAPHRAGM. EMERSON (C/O CORNERSTONE) PN 15861267.                                     | 2        | SPECIAL ORDER      |
| 15       | VALVE, PLUG, 2", CL. 300, WE, CS, NORDSTROM FIG. 2025 1/2.   | 1        | 1173086            |
| 15A      | <b>ALTERNATIVE:</b><br>VALVE, BALL, 2", CL. 300, WE X WE, CS, FULL PORT  | 1        | SPECIAL ORDER      |
| 16       | STRAINER, "Y", 1", CL. 300, CS, FLANGED, 28 GA. 304SS SCREEN, KECKLEY SA-7 OR EQUAL. NOTE: A DIFFERENT STRAINER MAY CHANGE THE ASSEMBLY WIDTH.                               | 2        | SPECIAL ORDER      |
| 17       | RESERVED FOR FUTURE.   |          |                    |
| 18       | RELIEF VALVE, 2", FISHER 1808A, 6358B PILOT, SS TUBING/FITTINGS, 35-125 PSIG SPRING. CONTACT SR&O / GAS ENGINEERING FOR DETAILS EMERSON (C/O CORNERSTONE) PN 1808-1050-11325 | 1        | SPECIAL ORDER      |
| 19       | NIPPLE, PIPE, 2" X 6", SCH. 40, ASTM A106 GR. B  | 1        | 1169551            |
| 20       | NIPPLE, PIPE, 2" X 4", SCH. 40, ASTM A106 GR. B  | 1        | 1169543            |
| 21       | ELBOW, 2", CL. 2000, 90 DEG., FS, SCRD., A105  | 1        | 0021835            |
| 22A      | TAPE, WAX #1, BROWN, 4" X 9 FT ROLL, FOR GAS DISTRIBUTION BELOW GROUND CORROSION PROTECTION.   | 2        | 0513778            |
| 22B      | TAPE, WAX #2, BROWN, 4" X 9 FT ROLL, FOR GAS DISTRIBUTION ABOVE GROUND CORROSION PROTECTION.   | 2        | 0513760            |
| 22C      | PRIMER, FOR WAX TAPE, BRUSH ON, ONE GALLON   | 1        | 0513743            |
| 22D      | OUTER WRAP, 4" X 27' LONG ROLLS, TRENTON FOR ABOVE AND BELOW GROUND APPLICATION (INCLUDES END ADHESIVE)  | 1        | SPECIAL ORDER      |
| 23       | CAP, 2", STD., CS, BW, ASTM A234 GR. WPB. (FOR PREFABRICATION PRESSURE TEST ONLY)  | 2        | 1165186            |
| 24       | CAP, 2", CL. 2000, CS, SCRD., ASTM A105 (FOR PREFABRICATION TEST ONLY)   | 1        | 0022251            |
| 25       | RAIN CAP, 2", W/ INDICATOR FLAG, ALUMINUM.   | 1        | SPECIAL ORDER-SR&O |



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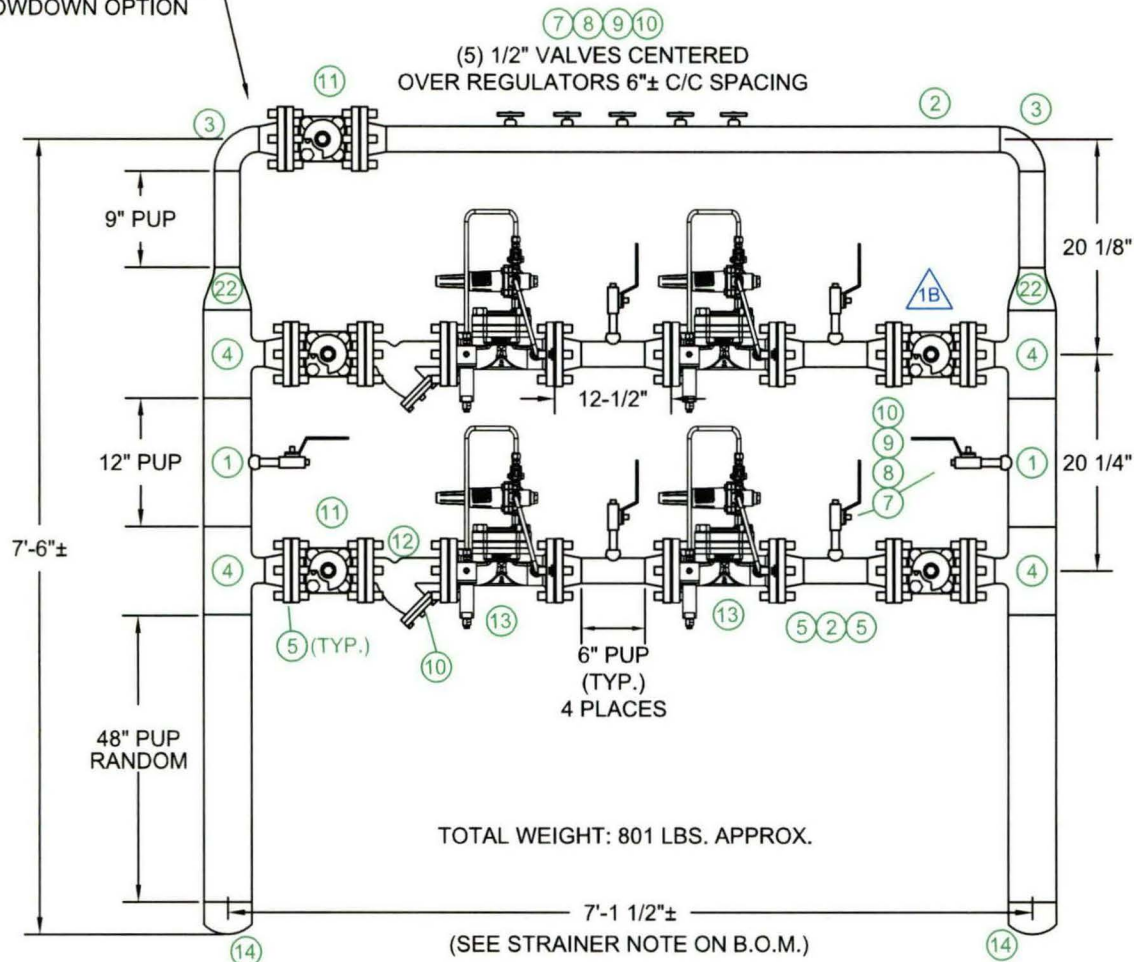


**REGULATOR STATION  
2" CL. 300 MOONEY MONITOR ASSEMBLY**

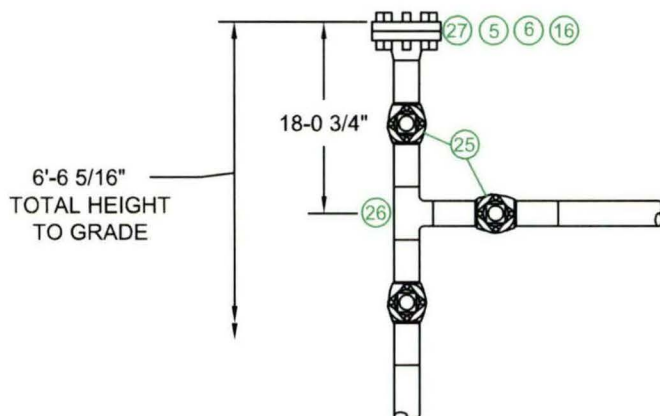
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SEE DETAIL FOR  
BLOWDOWN OPTION



**FABRICATION DETAIL**



**BLOWDOWN OPTION DETAIL**



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**REGULATOR STATION**  
**2" CL. 300 MOONEY MONITOR ASSEMBLY**

**GCS 40 20 405**  
**Rev. B**

**MAOP ≤ 720 PSIG**

**NOTES:**

**1. GENERAL:**

- A. THIS STANDARD IS INTENDED TO BE A GUIDELINE ONLY. DIFFERENT SITUATIONS MAY WARRANT CHANGES. CONSULT WITH GAS ENGINEERING BEFORE CHANGING THIS DESIGN.
- B. ROTATE VALVES WITH STEMS ORIENTED TOWARD THE SIDE.

**2. WELDING:**

- A. CODE: ALL WELDING SHALL BE IN ACCORDANCE WITH API 1104, LATEST EDITION.
- B. NON-DESTRUCTIVE TESTING: TEST 5 RANDOM BUTT WELDS UNLESS PROVIDED OTHER INSTRUCTIONS BY THE GAS ENGINEER.

**3. TEST PRESSURE:**

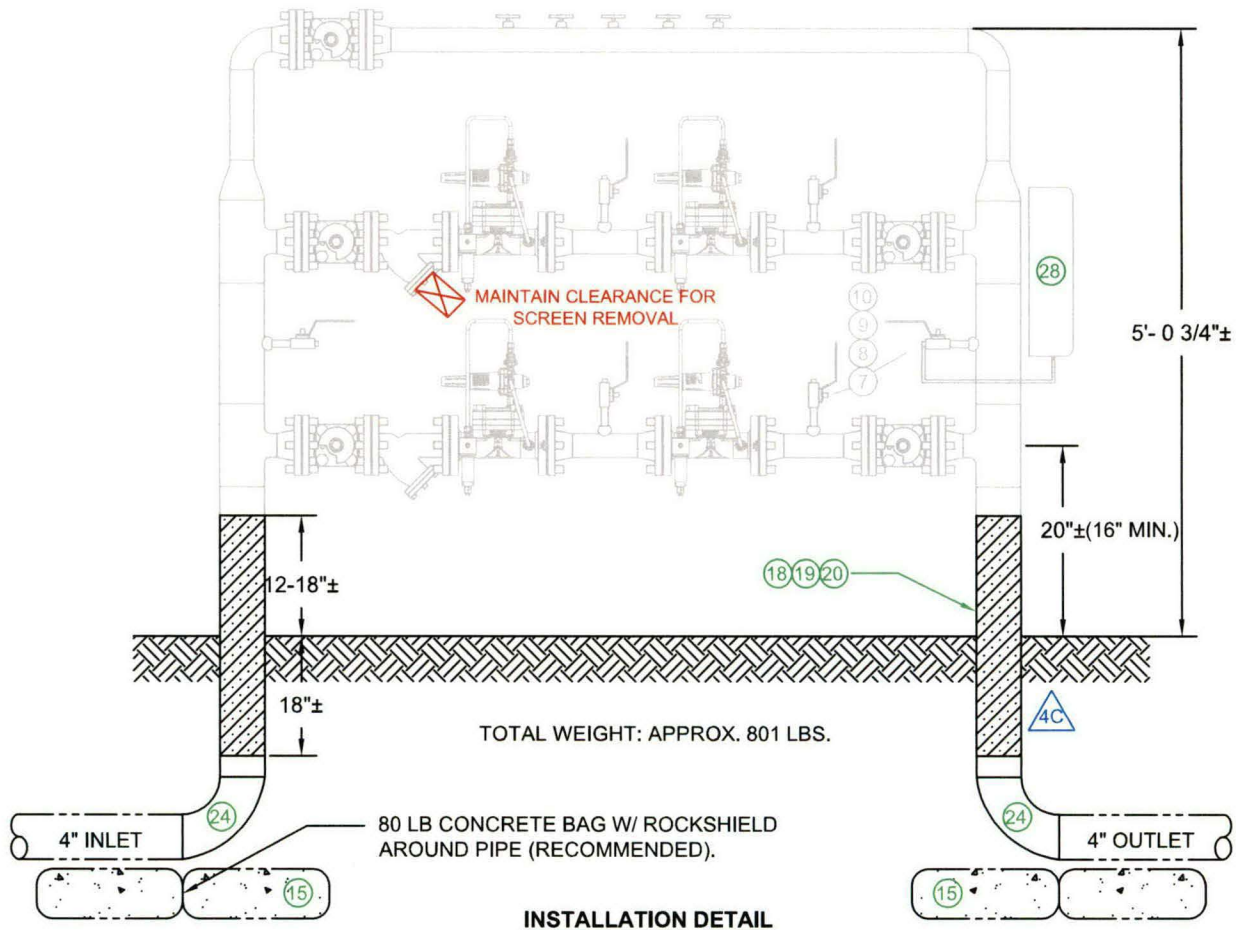
- A. TEST PRESSURE = 1080 PSIG (ASSUMING A CLASS 3 LOCATION AT MAXIMUM MAOP) UNLESS OTHERWISE DIRECTED BY THE GAS ENGINEER. (RAISE PRESSURE TO 100 PSIG, HOLD AND LEAK TEST. THEN, RAISE TO FINAL PRESSURE AND HOLD FOR 1 HOUR MINIMUM FOLLOWED BY ANOTHER LEAK TEST.)
- B. TEST DURATION: 1 HOUR OR 4 HOURS FOR PIPE > 4" NPS.
- C. TEST MEDIUM: AIR, NITROGEN, OR WATER
- D. **WARNING: DO NOT EXCEED MAXIMUM TEST PRESSURE OF VALVES!**

**4. CORROSION:**

- A. CLEAN ALL ABOVE GRADE PIPING OF ALL DIRT, GREASE, SCALE, AND RUST BY WIRE BRUSHING.
- B. ALL ABOVE GRADE PIPING SHALL BE COATED WITH AN INDUSTRIAL OIL-BASED PRIMER AND PAINT UNLESS APPROVED BY THE GAS ENGINEERING OR CORROSION DEPARTMENTS.
- C. WAX TAPE AND OUTERWRAP SHOULD EXTEND AT LEAST 12"-18" ABOVE GRADE AT INLET AND OUTLET PIPING.

**5. BARRICADES:**

- A. BARRICADES ARE REQUIRED FOR ALL ABOVE GRADE ASSEMBLIES.
- B. BARRICADES SHALL BE PRIMED AND PAINTED SIMILAR TO THE REGULATOR ASSEMBLY.



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REGULATOR STATION  
2" CL. 300 MOONEY MONITOR ASSEMBLY

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**BILL OF MATERIAL**

| ITEM NO. | DESCRIPTION  | QTY       | LG&E INVENTORY NO. |
|----------|--|-----------|--------------------|
| 1        | PIPE, 4", SCH 40, ASTM A106B, SMLS, SRL-PE,  | 20 FT     | 0178027            |
| 2        | PIPE, 2", SCH 40, ASTM A106B, SMLS, SRL-PE,  | 20 FT     | 0177994            |
| 3        | ELBOW, PIPE, 2", 90 DEG, STD., LR, BW, ASTM A234 WPB   | 2         | 1167201            |
| 4        | TEE, PIPE, 4 X 4 X 2, REDUCING, WELD, STD, ASTM A234 WPB   | 4         | SPECIAL ORDER      |
| 5        | FLANGE, 2", CL. 300, RF, WN, ASTM A105, RF, STD BORE. <b>NOTE: ADD (1) IF BLOWDOWN IS USED</b>   | 14        | 1168078            |
| 6        | GASKET, FLANGE, 2", 300LB, 1/16" THK, 2-3/8"ID X 4-3/8" OD, NON-ASBESTOS. <b>NOTE: ADD (1) IF BLOWDOWN IS USED</b>   | 18        | 1168186            |
| 7        | THREDOLET, 1/2" X 2 - 2 1/2", CL. 3000, ASTM A105  | 11        | 3001060            |
| 8        | NIPPLE, PIPE, 1/2" X 3", SCH. 80, ASTM A106B, TOE  | 11        | 1169778            |
| 9        | VALVE, BALL, 1/2", THREADED, CS, CLASS 2000, LOCKING HANDLE, KF-CONTROMATICS C7000-SS-M3 OR EQUAL  | 11        | 3001054            |
| 10       | PLUG, PIPE, SQ HD, 1/2", SOLID, CLASS 3000, FS, CARTON/25  | 13        | 1170160            |
| 11       | VALVE, 2", CL. 300, FLANGED, FULL PORT, LOCKING, KEROTEST WB-740. <b>NOTE: ONLY 4 REQUIRED FOR BLOWDOWN OPTION.</b>  | 5         | SPECIAL ORDER      |
| 11A      | ALTERNATIVE: VALVE, PLUG, 2", CL. 300, FLANGED, WRENCH OPERATED, LUBRICATED, NORDSTROM FIG. 2025. <b>NOTE: REQUIRES SR&amp;O PERMISSION AND LOCKING DEVICES</b>                              | 5         | SPECIAL ORDER      |
| 12       | STRAINER, "Y", 2", CL. 300, CS, FLANGED, 1/16 PERF. 316SS SCREEN, BUNA-N GASKETS, KECKLEY SA-7, MUELLER 782 <b>NOTE: ASSEMBLY WIDTH BASED UPON MUELLER, ADD 7/8" FOR KECKLEY</b>             | 2         | SPECIAL ORDER      |
| 13       | REGULATOR, 2", CL. 300, FLANGED, RF, MOONEY, FG 4, SINGLE PORT, SERIES 20 PILOT REGULATOR, SS TUBING. <b>NOTE: VERIFY SPRING RANGE AND DIAPHRAGM DUROMETER W/ SR&amp;O PRIOR TO ORDERING</b> | 4         | SPECIAL ORDER      |
| 14       | CAP, PIPE, 4", BW, ASTM A234 WPB   | 2         | 1165194            |
| 15       | CONCRETE, 80 LB BAG, 3000 PSI MINIMUM  | 2         | SPECIAL ORDER      |
| 16       | BOLT, STUD, 5/8 X 3-3/4 (3 1/2" FTF) XLAN SC-1 A193-B7 W/2 HEX NUTS A194-2H. <b>NOTE: ADD (8) IF BLOWDOWN IS USED</b>  | 144       | SPECIAL ORDER      |
| 17       | TAPE, OUTERWRAP, 4" X 27', TRENTON MC OUTERWRAP WITH END ADHESIVE  | 2         | SPECIAL ORDER      |
| 18       | TAPE, WAX, 4" X 9', TRENTON #1, FOR BELOW GRADE  | 3         | 0513778            |
| 19       | TAPE, WAX, 4" X 9', TRENTON #2 FOR ABOVE GRADE   | 3         | 0513760            |
| 20       | TAPE, PRIMER, FOR WAX-TAPE #1 AND #2, TRENTON, 1 GALLON CANS   | AS NEEDED | 0512743            |
| 21       | LOCK, PAD, WITH 1-1/2" SHANK, BRASS  | 13        | 1181001            |
| 22       | REDUCER, 4" X 2", STD., BW, CONCENTRIC, ASTM A234 WPB  | 2         | 1170843            |
| 23       | ANODE, 17 LB, HIGH POTENTIAL, MAGNESIUM, WITH 10 FT RED 12 GA SOL WIRE   | 1         | 1164835            |
| 24       | ELBOW, PIPE, 4", 90 DEG., STD, LR, BW, A234 WPB  | 2         | 0121443            |
| *25      | VALVE, 2", CL. 300, BALL, WELD, FULL PORT, LOCKING MECHANISM, KEROTEST WELDBALL 2WB740-W OR EQUAL. <b>NOTE: A WE X FLG MAY BE SUBSTITUTED IF DESIRED</b>                                     | 3         | SPECIAL ORDER      |
| *26      | TEE, 2", STD., BW, ASTM A234 WPB   | 1         | 1172494            |
| *27      | FLANGE, 2" CL. 300, BLIND, RF, ASTM A105   | 1         | 1167901            |
| 28       | PRESSURE RECORDER, CONSULT IM&E DEPARTMENT   | 1         | SPECIAL ORDER      |

\* FOR BLOWDOWN OPTION ONLY



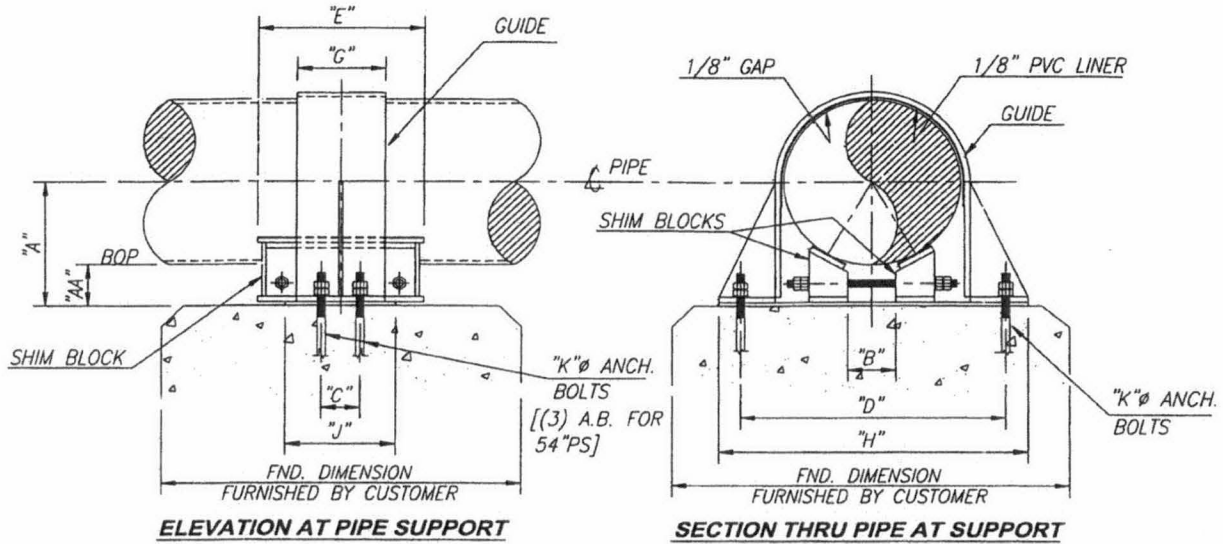
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PIPE GUIDES (1/8" GAP) WITH STEEL SHIM BLOCK,  
 1/8" THICK PVC LINING INSIDE CLAMP & TOP OF SHIM BLOCK

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**Attachment A**  
**GENERAL SERVICES AGREEMENT**  
**LG&E AND KU SERVICES COMPANY AND/OR AFFILIATES**

This "General Services Agreement" is made this 1st day of January, 2011 (the "Effective Date") by and between (i) LG&E and KU Services Company, a Kentucky corporation ("LG&E and KU Services Company") and/or its "Affiliates" (as defined below) and (ii) Southern Pipeline Construction Co. ("Contractor"), a Kentucky Corporation.

WHEREAS, Contractor desires the opportunity to provide goods and/or services to LG&E and KU Services Company from time to time, and LG&E and KU Services Company and/or its Affiliates desire the opportunity to engage Contractor to provide such goods and/or services through the issuance of Purchase Orders and/or Statements of Work; and

WHEREAS, the parties intend that this General Services Agreement sets forth the exclusive terms and conditions which shall govern the performance of the Work by Contractor for LG&E and KU Services Company and/or any of its Affiliates should LG&E and KU Services Company and/or any of its Affiliates engage Contractor to provide Work.

NOW THEREFORE, in consideration of the premises, the mutual covenants contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties do agree as follows:

**ARTICLE 1 DEFINITIONS**

- 1.01 **Affiliate:** "Affiliate" shall mean any entity which, from time to time, in whole or in part, and directly or indirectly, controls, is controlled by, or under common control with LG&E and KU Services Company and shall include, without limitation, Louisville Gas and Electric Company and Kentucky Utilities Company, both Kentucky corporations.
- 1.02 **Agreement:** "Agreement" shall mean this General Services Agreement, along with any "Statements of Work" (as defined below) and/or Purchase Order (as defined below) issued by Company and/or any other documentation as may be executed by the parties in accordance with Article 2, and/or other agreed collateral document pursuant to which the Work is to be performed.
- 1.03 **Applicable Laws:** "Applicable Laws" shall mean any and all applicable federal, state or local laws, regulations, codes, ordinances, administrative rules, court orders, permits or executive orders.
- 1.04 **Contract Price:** "Contract Price" shall mean the aggregate of the particular considerations set forth in one or more Purchase Orders or other Statements of Work or as otherwise agreed upon. Unless otherwise agreed in writing, the Contract Price includes all applicable taxes, duties, fees, and assessments of any nature including, without limitation, all sales and use taxes due to any governmental authority with respect to the Work.
- 1.05 **Contractor:** "Contractor" shall mean the entity designated as the "Contractor" in the opening paragraph of this Agreement.
- 1.06 **Company:** "Company" shall mean LG&E and KU Services Company and/or any of its Affiliates as appropriate based on which entity is the party to the applicable Purchase Order and/or Statements of Work or other binding document. The rights and obligations of LG&E and KU Services Company and/or each of its Affiliates hereunder shall be limited to the extent of such party's proportionate utilization of Contractor's services hereunder.
- 1.07 **LG&E and KU Services Company:** LG&E and KU Services Company shall mean LG&E and KU Services Company, a Kentucky corporation.
- 1.08 **Purchase Order:** Company may, at its discretion, from time to time, issue one or more of its own "Purchase Order Standard Terms and Conditions" and/or "Contractor Purchase Agreement"

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- ("CPA") (collectively referred to as a "Purchase Order") that may supplement, but in no way or manner ever supersede, this Agreement with respect to any conflicting terms and conditions.
- 1.09 **Statements of Work:** "Statements of Work" shall mean any specifications, instructions, drawings, schedules, a Purchase Order, contracts, scopes of Work, and/or descriptions of Work.
- 1.10 **Tools and Equipment:** "Tools and Equipment" shall mean any tools, equipment, rigging and other general supplies on the Company's premises where the Work is being performed that is either owned and/or leased by Company or by any of its Affiliates.
- 1.11 **Work:** "Work" shall include, collectively, those services, goods and/or obligations as set forth in this Agreement.

#### **ARTICLE 2 SCOPE; BINDING EFFECT**

Unless otherwise agreed in a writing executed by each of the parties which evidences a clear intention to supersede this Agreement, the parties intend that this Agreement apply to all transactions which may occur between LG&E and KU Services Company and/or any of its Affiliates and Contractor during the term of this Agreement and which are related to the provision of goods and/or services by Contractor for the benefit of LG&E and KU Services Company and/or any of its Affiliates. Neither LG&E and KU Services Company nor any of its Affiliates makes any commitment to Contractor as to the exclusiveness of this relationship or as to the volume, if any, of business LG&E and KU Services Company and/or its Affiliates will do with Contractor. The parties do, however, anticipate that the parties will agree from time to time for the performance of Work by Contractor. Such agreement for the provision of Work shall be reflected by (a) each of the parties executing a mutually acceptable Statement of Work under this Agreement or (b) Company providing a Purchase Order or other Statement of Work to Contractor and Contractor accepting such Purchase Order or other Statement of Work (including by commencing performance pursuant to such Purchase Order or other Statement of Work). In the event Company provides a Purchase Order or other Statement of Work to Contractor and Contractor commences performance, unless such Purchase Order or other Statement of Work expressly provides otherwise, Contractor hereby agrees to the formation of a binding agreement as described in the Purchase Order or other Statement of Work upon Contractor's commencement of performance, waives any argument that it might otherwise have under Applicable Laws that the Purchase Order should have been executed by each of the parties to be enforceable and further agrees to not contest the enforceability of such Purchase Order or other Statement of Work on those grounds, and agrees to not contest the admissibility of Company's records related to such Purchase Order or other Statement of Work that are kept in the ordinary course by Company. In addition, in no event shall the terms and conditions of any proposal, purchase order or other statement of work, acknowledgement, invoice, or other document unilaterally issued by Contractor be binding upon Company without Company's explicit written acceptance thereof. Any Work performed by Contractor without Company's binding commitment for such Work either via a duly executed or accepted Purchase Order or other Statement of Work under this Agreement shall be at Contractor's sole risk and expense, and Company shall have no obligation to pay for any such Work.

#### **ARTICLE 3 CONDITIONS AND RISKS OF WORK; LABOR HARMONY**

Unless the applicable Purchase Order and/or Statement of Work expressly provides otherwise, Contractor agrees that, before beginning any Work, Contractor shall carefully examine all conditions relevant to such Work and its surroundings and Contractor shall assume the risk of such conditions and shall, regardless of such conditions, the expense, or difficulty of performing the Work, fully complete the Work for the stated Contract Price applicable to such Work without further recourse to Company. Without limiting the foregoing, Contractor specifically recognizes that Company and other parties may be working concurrently at the site. Information on the site of the Work and local conditions at such site furnished by Company in specifications, drawings or otherwise is made without representation or warranty of any nature by Company, is not guaranteed by Company, and is furnished solely for the convenience of Contractor. All drawings and other documents, if any, required to be submitted to Company for review shall be submitted in accordance with the mutually agreed to schedule and, if no schedule applies, such drawings or other documents shall be submitted by Contractor without unreasonable delay. No Work affected by such drawings and other documents shall be started until Contractor is authorized to do so by Company. In case

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of a conflict between or within instructions, specifications, drawings, schedules, Purchase Order(s) and/or other Statements of Work, Company shall resolve such conflict; and Company's resolution shall be binding on Contractor. Contractor agrees that all labor employed by Contractor, its agents or subcontractors for Work on the premises of Company shall be in harmony with all other labor being used by Company or other contractors working on Company's premises. Contractor agrees to give Company immediate notice of any threatened or actual labor dispute and will provide assistance as determined necessary by Company to resolve any such dispute. Contractor, its agents or subcontractors, shall remove from Company's premises any person objected to by Company in association with the Work.

#### **ARTICLE 4 COMPANY CHANGES IN WORK**

The scope of and conditions, specifications and/or quantities ordered applicable to the Work shall be subject to changes by Company from time to time. Such changes shall only be enforceable if documented in a writing executed by Company. Except as otherwise specifically set forth in this Agreement, changes in the scope of or conditions applicable to the Work may result in adjustments in the Contract Price and/or the Work schedule in accordance with this Article 4. If Contractor believes that adjustment of the Contract Price or the Work schedule is justified, whether as a result of a change made pursuant to this Article or as a result of any other circumstance, then Contractor shall (a) give Company written notice of its claim within five (5) business days after receipt of notice of such change or the occurrence of such circumstances and (b) shall supply a written statement supporting Contractor's claim within ten (10) business days after receipt of notice of such change or occurrence of such circumstances, which statement shall include Contractor's detailed estimate of the effect on the Contract Price and/or the Work schedule. Contractor agrees to continue performance of the Work during the time any claim hereunder is pending. Company shall not be bound to any adjustments in the Contract Price or the Work schedule unless expressly agreed to by Company in writing. Company will not be liable for, and Contractor waives, any claims of Contractor that Contractor knew or should have known and that were not reported by Contractor in accordance with the provisions of this Article 4.

#### **ARTICLE 5 FORCE MAJEURE**

Neither party shall be liable to the other for any damages for any failure to perform or for any delays or interruptions beyond that party's reasonable control in performing any of its obligations under this Agreement only due to acts of God, fires, floods, earthquakes, riots, war, acts of terrorism, civil insurrection, acts of the public enemy, or acts or failures to act of civil or military authority, unless the time to perform is expressly guaranteed. Contractor shall advise Company immediately of any anticipated and actual failure, delay or interruption and the cause and estimated duration of such event. Any such failure, delay or interruption, even though existing on the Effective Date or on the date of the start of the Work, shall require Contractor to within five (5) days submit a recovery plan detailing the manner in which the failure, delay, or interruption shall be remedied and the revised schedule. Contractor shall diligently proceed with the Work notwithstanding the occurrence thereof. This Article shall apply only to the part of the Work directly affected by the particular failure, delay or interruption, and shall not apply to the Work as a whole or any other unaffected part thereof.

#### **ARTICLE 6 CONTRACTOR DELAYS**

Time is an important and material consideration in the performance of this Agreement by Contractor. Contractor agrees to cooperate with Company in scheduling the Work so that the project and other activities at Company's site will progress with a minimum of delays. Company shall not be responsible for compensating Contractor for any costs of overtime or other premium time work unless Company has provided separate prior written authorization for additional compensation to Contractor and, if Company provides such written authorization, such additional compensation shall be limited to Contractor's actual cost of the premium portion of wages, craft fringe benefits and payroll burdens (without any mark-ups and/or profit). Contractor shall be liable for all failures, delays and interruptions in performing any of its obligations under this Agreement which are not (a) caused by Company and reported in accordance with Article 4, (b) excused by Article 5, or (c) directed by Company pursuant to Article 7. Contractor shall, without adjustment to completion date or Contract Price, be obligated to make up time lost by such failures,

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delays or interruptions. Company may suspend payments under this Agreement during the period of any such failure, delay or interruption.

#### **ARTICLE 7 COMPANY EXTENSIONS**

Company shall have the right to extend schedules or suspend the Work, in whole or in part, at any time upon written notice to Contractor (except that in an emergency or in the event that Company identifies any safety concerns, Company may require an immediate suspension upon oral or written notice to Contractor). Contractor shall, upon receipt of such notice, immediately suspend or delay the Work. Contractor shall resume any suspended Work when directed by Company. If Contractor follows the requirements of Article 4, a mutually agreed equitable adjustment to the Contract Price or to the schedules for payments and performance of the remaining Work may be made to reflect Company's extension of schedules or suspension of the Work. Contractor will provide Company with all information requested in connection with determining the amount of such equitable adjustment.

#### **ARTICLE 8 INSPECTING, TESTING, AUDITING, AND USE OF TOOLS AND EQUIPMENT:**

**8.01 Right of Inspecting and Testing:** Company reserves the right, but shall not be obligated, to appoint representatives to follow the progress of the Work with authority to suspend any Work not in compliance with this Agreement. The appointment, or absence of an appointment, of such representatives by Company shall not have any affect on warranties. Acceptance or approval by Company's representative shall not be deemed to constitute final acceptance by Company, nor shall Company's inspection relieve Contractor of responsibility for proper performance of the Work. Inspection by Company's representative shall not be deemed to be supervision or direction by Company of Contractor, its agents, servants or employees, but shall be only for the purpose of attempting to ensure that the Work complies with this Agreement. In the event Contractor fails to provide Company with reasonable facilities and access for inspection when advised, and if in the opinion of Company it becomes necessary to dismantle the Work for such inspection, then Contractor shall bear the expenses of such dismantling and reassembly.

**8.02 Right of Auditing:** Contractor shall maintain complete records relating to any cost-based (i.e., Work not covered by firm prices), components of the Work billed under this Agreement, or Work relating to the quantity of units billed under any unit price provisions of this Agreement (all the foregoing hereinafter collectively referred to as "Records") for a minimum of five years following the latest of performance of, delivery to Company of, or payment by Company for, such Work or units. All such Records shall be open to inspection and subject to audit and reproduction during normal working hours, by Company or its authorized representatives, to the extent necessary to adequately permit evaluation and verification of any invoices, payments, time sheets or claims based on Contractor's actual costs incurred in the performance or delivery of Work under this Agreement. For the purpose of evaluating or verifying such actual or claimed costs, Company or its authorized representative shall have access to said Records at any time, including any time after final payment by Company to Contractor pursuant to this Agreement. All non-public information obtained in the course of such audits shall be held in confidence except pursuant to judicial and administrative order. Company or its authorized representative shall have access, during normal working hours, to all necessary Contractor facilities and shall be provided adequate and appropriate work space to conduct audits in compliance with the provisions of this Article. Company shall give Contractor reasonable notice of intended audits. The rights of Company set forth in this paragraph shall survive the termination or expiration of this Agreement.

**8.03 Use of Tools and Equipment:** Company, in its sole discretion, may allow Contractor to use Company's Tools and Equipment for the Work and related activities at designated Company locations. Contractor shall indemnify and hold harmless Company and its Affiliates, including their respective officers, directors, shareholders, agents, managers, members and employees (each an "Indemnified Party"), from and against any and all claims, damages, losses or liabilities arising out of, relating to, or in connection with, the use of Company's Tools and Equipment by Contractor, its agents, servants, employees or subcontractors, and will reimburse each Indemnified Party for all expenses (including in-house and/or outside attorney's fees and expenses) as they are incurred in connection with investigating, preparing or pursuing or defending any

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action, claim, suit or investigation or proceeding related to, arising out of, or in connection with, the use of Company's Tools and Equipment by Contractor, its agents, servants, employees or subcontractors, whether or not threatened or pending and whether or not any Indemnified Party is a party. Contractor, on behalf of itself or its agents, equity owners, affiliates, officers and directors, and all of their predecessors, successors, assigns, heirs, executors and administrators, hereby irrevocably release, discharge, waive, relinquish and covenant not to sue, directly, derivatively or otherwise, Company and/or its Affiliates and each of their respective directors, officers, shareholders, members, managers, partners (general or limited), employees and agents (including, without limitation, its financial advisors, counsel, proxy solicitors, information agents, depositories, consultants and public relations representatives) and all of their predecessors, successors, assigns, heirs, executors or administrators, and all persons acting in concert with any such person, with respect to any and all matters, actions causes of action (whether actually asserted or not), suits, damages, claims or liabilities whatsoever, at law, equity or otherwise, arising out of, relating to, or in connection with the use of Company's Tools and Equipment by Contractor, its agents, servants, employees or subcontractors. Company shall in no event be liable for any claim whatsoever by or through Contractor, its employees, agents and/or subcontractors or by any third party, for any inoperability or failure of the Tools and Equipment to perform as designed or intended, whether such claim is based in warranty, contract, tort (including negligence), strict liability or otherwise and whether for direct, incidental, consequential, special, exemplary or other damages. Contractor shall ensure that its employees, agents, subcontractors or servants shall inspect, exercise the appropriate level of care in the use, maintenance and repair of the Tools and Equipment, so as to minimize the incidence of casualties and injuries occurring in connection therewith.

**ARTICLE 9 COMPLIANCE WITH APPLICABLE LAWS; SAFETY; DRUG AND ALCOHOL TESTING; IMMIGRATION LAWS; NERC RELIABILITY STANDARDS COMPLIANCE**

**9.01 Applicable Laws and Safety:** Contractor agrees to protect its own and its subcontractors' employees and be responsible for their Work until Company's acceptance of the entire project and to protect Company's facilities, property, employees and third parties from damage or injury. Contractor shall at all times be solely responsible for complying with any and all Applicable Laws and facility rules, including without limitation those relating to health and safety, in connection with the Work and for obtaining (but only as approved by Company) all permits and approvals necessary to perform the Work. Without limiting the foregoing, Contractor agrees to strictly abide by and observe all standards of the Occupational Safety & Health Administration (OSHA) which are applicable to the Work being performed now or in the future, as well as Company's Contractor Code of Business Conduct and Company's Contractor/Subcontractor Safety Policy which are both hereby incorporated by reference (Contractor hereby acknowledges receipt of a copy of such Company's Contractor Code of Business Conduct and Company's Contractor/Subcontractor Safety Policy) and any other rules and regulations of the Company, all of which are incorporated herein by reference. Contractor also agrees to be bound to any amendments and/or modifications that may be issued in the future by Company from time to time, with respect to Company's Contractor Code of Business Conduct and/or any of its related policies which are the subject of this Article 9. Contractor shall maintain the Work site in a safe and orderly condition at all times. Company shall have the right, but not the obligation, to review Contractor's compliance with safety and cleanup measures. In the event Contractor fails to keep the work area clean, Company shall have the right to perform such cleanup on behalf of, at the risk of and at the expense of Contractor. In the event Contractor subcontracts any of the Work, Contractor shall notify Company in writing of the identity of the subcontractor before utilizing the subcontractor. Contractor shall require all of its subcontractors to complete the safety and health questionnaire and checklists provided by Company and shall provide a copy of such documents to Company upon request. Contractor shall conduct, and require its subcontractors to conduct, safety audits and job briefings during performance of the Work. In the event a subcontractor has no procedure for conducting safety audits and job briefings, Contractor shall include the subcontractor in its safety audits and job briefings. All safety audits shall be documented in writing by the Contractor and its subcontractors. Contractor shall provide documentation of any and all audits identifying safety deficiencies and concerns and corrective action taken as a result of such audits to Company semi-monthly. Contractor further specifically acknowledges, agrees and warrants that Contractor has complied, and shall at all times during the term of this Agreement, comply in all respects with all laws, rules and regulations relating to the employment authorization of employees

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including, but not limited to, the Immigration Reform and Control Act of 1986, as amended, and the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, as amended, whereby Contractor certifies to Company that Contractor has (a) properly maintained, and shall at all times during the term of this Agreement properly maintain all records required by Immigration and Customs Enforcement, such as the completion and maintenance of the Form I-9 for each of Contractor's employees; (b) that Contractor maintains and follows an established policy to verify the employment authorization of its employees; (c) that Contractor has verified the identity and employment eligibility of all employees in compliance with all applicable laws; and (d) that Contractor is without knowledge of any fact that would render any employee or subcontractor of Contractor ineligible to legally work in the United States. Contractor further acknowledges, agrees and warrants that all of its subcontractors will be required to agree to these same terms as a condition to being awarded any subcontract for such Work.

**9.02 Hazards and Training:** Contractor shall furnish adequate numbers of trained, qualified, and experienced personnel and appropriate safety and other equipment in first-class condition, suitable for performance of the Work. Such personnel shall be skilled and properly trained to perform the Work and recognize all hazards associated with the Work. Without limiting the foregoing, Contractor shall participate in any safety orientation or other of Company's familiarization initiatives related to safety and shall strictly comply with any monitoring initiatives as determined by Company. Contractor shall accept all equipment, structures and property of Company as found and acknowledges it has inspected the property, has determined the hazards incident to working thereon or thereabouts, and has adopted suitable precautions and methods for the protection and safety of its employees and the property.

**9.03 Drug and Alcohol:** No person will perform any of the Work while under the influence of drugs or alcohol. No alcohol may be consumed within four (4) hours of the start of any person's performance of the Work or anytime during the workday. A person will be deemed under the influence of alcohol if a level of .02 percent blood alcohol or greater is found. In addition to the requirements of the drug testing program, as set forth in Company's rules and regulations, all persons who will perform any of the Work will be subject to drug and alcohol testing under either of the following circumstances: (i) where the person's performance either contributed to an accident or cannot be completely discounted as a contributing factor to an accident which involves off-site medical treatment of any person; and (ii) where Company determines in its sole discretion that there is reasonable cause to believe such person is using drugs or alcohol or may otherwise be unfit for duty. Such persons will not be permitted to perform any Work until the test results are established. Contractor shall be solely responsible for administering and conducting drug and alcohol testing, as set forth herein, at Contractor's sole expense. As applicable, and in addition to any other requirements under this Agreement, Contractor shall develop and strictly comply with any and all drug testing requirements as required by Applicable Laws.

**9.04 NERC Reliability Standards.** The following additional provisions shall apply if Contractor's Work in any way involves areas or assets which are located within physical security perimeters as defined by NERC's Reliability Standards for the Bulk Electric Systems of North America (collectively, the "NERC Standards"), including without limitation any Company data center or control center. Contractor's non-compliance of NERC Standards may result in fines and/or penalties being assessed against the Company that would result in Company seeking indemnification from Contractor as a consequence of Contractor's and/or its subcontractors', agents' and/or representatives' non-compliance of NERC Standards.

A. **Information Protection.** Without compromising the confidentiality provisions in Article 24, Contractor shall at all times comply with the Company's information protection program(s) as defined by CIP-003, R4. Among the information protected by this program are: (i) all operational procedures; (ii) lists of critical cyber assets; (iii) network topology or similar diagrams; (iv) floor plans of computing centers that contain critical cyber assets; (v) equipment layouts of critical cyber assets; (vi) disaster recovery plans; (vii) incident response plans; and (viii) security configuration information. Contractor shall protect this protected information from disclosure consistent with the program.

B. **Access Revocation.** Contractor shall immediately advise appropriate Company's management if any of Contractor's personnel who have key card access to a restricted area or electronic access to a protected system no longer require such access.

C. **Training.** If any Contractor personnel require key card access to a restricted area or electronic access to a protected system, Contractor shall ensure that such personnel complete, and retake as requested, all necessary NERC training as requested by Company.

D. **Personnel Risk Assessment.** If any Contractor personnel require key card access to a restricted area or electronic access to a protected system, Contractor shall ensure that Company receives necessary waivers and information from Contractor's personnel to complete, and repeat as necessary, such background checks as requested by Company.

**Continuing Obligations.** Contractor further acknowledges that its compliance with the NERC Standards is a continuing obligation during and after the Term. Upon written notice to Contractor, Company shall have the absolute right to audit and inspect any and all information regarding Contractor's compliance with this Section 9.04, and/or to require confirmation of the destruction of any documentation received from or regarding Company. Contractor is encouraged to contact Company's Compliance Department pursuant to Section 9.05 to ensure Contractor understands and complies with this Section 9.04.

**9.05 Office of Compliance:** The Company has an Office of Compliance. Should Contractor have actual knowledge of violations of any of the herein stated policies of conduct in this Article 9, or have a reasonable basis to believe that such violations will occur in the future, whether by its own employees, agents, representatives or subcontractors, or by another vendor and/or supplier of the Company and its employees, agents, representatives or subcontractors, or by any employee, agent and/or representative of Company, Contractor has an affirmative obligation to immediately report any such known, perceived and/or anticipated violations to the Company's Office of Compliance in care of Director, Compliance and Ethics, LG&E and KU Services Company, 220 West Main Street, Louisville, Kentucky 40202.

#### **ARTICLE 10 STATUS OF CONTRACTOR**

Company does not reserve any right to control the methods or manner of performance of the Work by Contractor. Contractor, in performing the Work, shall not act as an agent or employee of Company, but shall be and act as an independent contractor and shall be free to perform the Work by such methods and in such manner as Contractor may choose, doing everything necessary to perform such Work properly and safely and having supervision over and responsibility for the safety and actions of its employees and the suitability of its equipment. Contractor's employees and subcontractors shall not be deemed to be employees and/or agents of Company. Contractor agrees that if any portion of Contractor's Work is subcontracted, all such subcontractors shall be bound by and observe the conditions of this Agreement to the same extent as required of Contractor. In such event, Company strongly encourages the use of Minority Business Enterprises, Women Business Enterprises and Disadvantaged Business Enterprises, as defined under federal law and as certified by a certifying agency that Company recognizes as proper.

#### **ARTICLE 11 EQUAL EMPLOYMENT OPPORTUNITY**

To the extent applicable, Contractor shall comply with all of the following provisions, which are incorporated herein by reference: (i) Equal Opportunity regulations set forth in 41 CFR § 60-1.4(b) and (c), prohibiting employment discrimination against any employee or applicant because of race, color, religion, sex, or national origin; (ii) Vietnam Era Veterans Readjustment Assistance Act regulations set forth in 41 CFR § 60-250.4 relating to the employment and advancement of disabled veterans and Vietnam era veterans; (iii) Rehabilitation Act regulations set forth in 41 CFR § 60-741.4 relating to the employment and advancement of qualified disabled employees and applicants for employment; (iv) the clause known as "Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals" set forth in 15 USC § 637(d)(3); and (v) the subcontracting plan requirement set forth in 15 USC § 637(d).

#### **ARTICLE 12 INDEMNITY BY CONTRACTOR**

Contractor shall indemnify, defend, and hold harmless Company, its directors, officers, members, managers, employees and agents, from any and all damage, loss, claim, demand, suit, liability, penalty and/or fine (pursuant to Section 9.04 or otherwise) or forfeiture of every kind and nature, including but not limited to attorneys' fees (for both in-house and/or outside counsel) and expenses and other costs and expenses of defending against the same and payment of any settlement or judgment therefore, by reason of

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(a) bodily and other personal injuries to or deaths of persons, (b) damages to tools or equipment owned or leased by Company, (c) damages to other property, (d) the release or threatened release of a hazardous substance or any pollution or contamination of or other adverse effects on the environment, (e) violations of any Applicable Laws or (f) infringement of patent, copyright, trademark, trade secret or other property right, to the extent resulting or alleged to have resulted from acts or omissions of Contractor, its employees, agents, subcontractors or other representatives or otherwise from performance of this Agreement, whether suffered directly by Company or indirectly by reason of third party claims, demands or suits. This obligation to indemnify, defend and hold harmless shall survive termination or expiration of this Agreement.

#### **ARTICLE 13 ENVIRONMENTAL**

**13.01 Control:** As required under the OSHA Hazard Communication Standard (29 CFR 1910.1200) and certain other Applicable Laws, Contractor or its subcontractors shall provide Material Safety Data Sheets ("MSDS") covering any hazardous substances and materials furnished under or otherwise associated with the Work under this Agreement. Contractor and its subcontractors shall provide Company with either copies of the applicable MSDS or copies of a document certifying that no MSDS are required under any Applicable Laws in effect at the worksite. No asbestos or lead containing materials shall be incorporated into any Work performed by Contractor or otherwise left on the Work site without the prior written approval of Company. Contractor and its subcontractors shall be solely responsible for determining if any chemical or material furnished, used, applied, or stored or Work performed under this Agreement is subject to any Applicable Laws.

**13.02 Labeling:** Contractor and its subcontractors shall label hazardous substances and materials and train their employees in the safe usage and handling of such substances and materials as required under any Applicable Laws.

**13.03 Releases:** Contractor and its subcontractors shall be solely responsible for the management of any petroleum or hazardous substances and materials brought onto the Work site and shall prevent the release of petroleum or hazardous substances and materials into the environment. All petroleum or hazardous substances and materials shall be handled and stored according to Contractor's written Spill Prevention Control and Countermeasures Plan or Best Management Practices Plan as defined under the provisions of the Clean Water Act, as amended, if either such Plan must be maintained pursuant to Applicable Laws. Contractor shall provide secondary containment for the storage of petroleum or hazardous substances and materials. The prompt and proper clean-up of any spills, leaks, or other releases of petroleum or hazardous substances and materials resulting from the performance of the Work under this Agreement and the proper disposal of any residues shall be Contractor's sole responsibility, but Contractor shall give Company immediate notice of any such spills, leaks, or other releases. Contractor shall be solely responsible for the storage, removal, and disposal of any excess or unused quantities of chemicals and materials which Contractor causes to be brought to the Work site.

**13.04 Generated Wastes:** Unless Company and Contractor expressly agree otherwise in writing, Contractor and its subcontractors shall be solely responsible for any wastes generated in the course of the Work, and Contractor shall handle, store, and dispose of such wastes in accordance with any Applicable Laws.

**13.05 Survival:** The obligations set forth in this Article shall survive termination or expiration of this Agreement.

#### **ARTICLE 14 INSURANCE**

**14.01 Contractor's Insurance Obligation:** For the entire duration of the Agreement on a per occurrence basis with respect to any Purchase Order issued under this Agreement, Contractor shall provide and maintain, and shall require any of its subcontractors to provide and maintain, the following insurance (and, except with regard to Workers' Compensation, naming Company as additional insured and waiving rights of subrogation against Company and Company's insurance carrier(s)), and Contractor shall submit evidence of such coverage(s) of Contractor to Company prior to the start of the Work and, furthermore, Contractor shall notify Company, prior to the commencement of any Work pursuant to any Statement of Work and/or Purchase Order, of any threatened, pending and/or paid off claims to third parties, individually

or in the aggregate, which otherwise affects the availability of the limits of such coverage(s) inuring to the benefit of Company as hereinafter specified:

- (a) Workers' Compensation and Employer's Liability Policy, which shall include:
  - 1) Workers' Compensation (Coverage A), with statutory limits, and in accordance with the laws of the state where the Work is performed;
  - 2) Employer's Liability (Coverage B) with minimum limits of One Million Dollars (\$1,000,000) Bodily Injury by Accident, each Accident, \$1,000,000 Bodily Injury by Disease, each Employee;
  - 3) Thirty (30) Day Cancellation Clause; and
  - 4) Broad Form All States Endorsement.
- (b) Commercial General Liability Policy, which shall have minimum limits of One Million Dollars (\$1,000,000) each occurrence; One Million Dollars (\$1,000,000) Products/Completed Operations Aggregate each occurrence; One Million Dollars (\$1,000,000) Personal and Advertising Injury each occurrence, in all cases subject to Two Million Dollars (\$2,000,000) in the General Aggregate for all such claims, and including:
  - 1) Thirty (30) Day Cancellation Clause;
  - 2) Blanket Written Contractual Liability to the extent covered by the policy against liability assumed by Contractor under this Agreement;
  - 3) Broad Form Property Damage; and
  - 4) Insurance for liability arising out of blasting, collapse, and underground damage (deletion of X, C, U Exclusions).
- (c) Commercial Automobile Liability Insurance covering the use of all owned, non-owned, and hired automobiles, with a bodily injury, including death, and property damage combined single minimum limit of One Million Dollars (\$1,000,000) each occurrence with respect to Contractor's vehicles assigned to or used in performance of Work under this Agreement.
- (d) Umbrella/Excess Liability Insurance with minimum limits of Two Million Dollars (\$2,000,000) per occurrence; Two Million Dollars (\$2,000,000) aggregate, to apply to employer's liability, commercial general liability, and automobile liability.
- (e) To the extent applicable, if any fixed wing or rotor craft aircraft will be used by Contractor in performing the Work, Aircraft Public Liability Insurance covering such aircraft whether owned, non-owned, leased, hired or assigned with a combined single minimum limit for bodily injury and property damage of Five Million Dollars (\$5,000,000) including passenger liability coverage.
- (f) To the extent applicable, if engineering or other professional services will be separately provided by Contractor as specified in the Statements of Work, then Professional Liability Insurance with limits of Three Million Dollars (\$3,000,000) per occurrence and Three Million Dollars (\$3,000,000) in the aggregate, which insurance shall be either on an occurrence basis or on a claims made basis (with a retroactive date satisfactory to Company).

**14.02 Quality of Insurance Coverage:** The above policies to be provided by Contractor shall be written by insurance companies which are both licensed to do business in the state where the Work will be performed and either satisfactory to Company or having a Best Rating of not less than "A-". These policies shall not be materially changed or canceled except with thirty (30) days written notice to Company from Contractor and the insurance carrier. Evidence of coverage, notification of cancellation or other changes shall be mailed to: Attention: Manager, Supply Chain, LG&E and KU Services Company, P.O. Box 32020, Louisville, Kentucky 40232.

**14.03 Implication of Insurance:** Company reserves the right to request and receive a summary of coverage of any of the above policies or endorsements; however, Company shall not be obligated to review any of Contractor's certificates of insurance, insurance policies, or endorsements, or to advise Contractor of any deficiencies in such documents. Any receipt of such documents or their review by Company shall not relieve Contractor from or be deemed a waiver of Company's rights to insist on strict fulfillment of Contractor's obligations under this Agreement.

**14.04 Other Notices:** Contractor shall provide notice of any accidents or claims at the Work site to Company's Manager, Risk Management at LG&E and KU Services Company, P.O. Box 32030, Louisville, Kentucky 40232 and Company's site authorized representative.

## **ARTICLE 15 WARRANTIES**

Contractor warrants that:

- (a) the Work will conform to any applicable Statement of Work and/or Purchase Order; and any materials supplied in connection therewith shall be new, unused and free from defect;
- (b) the Work will be suitable for the purposes specified by Company and will conform to each statement, representation and description made by Contractor to Company;
- (c) the Work is not and shall not be subject to any encumbrance, lien, security interest, patent, copyright or trademark claims, infringements, or other defects in title; and
- (d) any labor or services performed pursuant to this Agreement shall be performed in a competent, diligent, and timely manner in accordance with the highest professionally accepted standards.

Contractor shall respond in writing to any warranty claim by Company within five (5) business days of the delivery of notice of such claim to Contractor. All such warranties shall, in no case, be less than 18 months after Company's notice of substantial completion of the Work or 12 months after the commencement of regular use by Company of all components and/or systems comprising the Work, as applicable, whichever occurs first; *provided, however*, that any specific warranties, whether of performance, fitness for any particular purpose or intended purposes, merchantability or otherwise, that are in excess of such time periods, as may be agreed by and between Contractor and Company in any Statement of Work and/or Purchase Order, shall govern notwithstanding any terms to the contrary contained in this Agreement.

## **ARTICLE 16 OWNERSHIP OF INTELLECTUAL PROPERTY: PATENTS**

**16.01 Ownership:** All inventions, discoveries, processes, methods, designs, drawings, blueprints, information, software, works of authorship and know-how, or the like, whether or not patentable or copyrightable (collectively, "Intellectual Property"), which Contractor conceives, develops, or begins to develop, either alone or in conjunction with Company or others, with respect to the Work, shall be "work made for hire" and the sole and exclusive property of Company. Upon request, Contractor shall promptly execute all applications, assignments and other documents that Company shall deem necessary to apply for and obtain letters patent of the United States and/or copyright registration for the Intellectual Property and in order to evidence Company's sole ownership thereof.

**16.02 Royalties and License Fees:** Contractor shall pay all royalties and license fees which may be payable on account of the Work or any part thereof. In case any part of the Work is held in any suit to constitute infringement and its use is enjoined, Contractor within a reasonable time shall, at the election of Company, and in addition to Contractor's obligations under Article 12, either (a) secure for Company the perpetual right to continue the use of such part of the Work by procuring for Company a royalty-free license or such other permission as will enable Contractor to secure the suspension of any injunction, or (b) replace at Contractor's own expense such part of the Work with a non-infringing part or modify it so that it becomes non-infringing (in either case with changes in functionality that are acceptable to Company).

## **ARTICLE 17 RELEASE AND INDEMNITY REGARDING LIENS**

Contractor hereby releases and/or waives for itself and its successors in interest, and for all subcontractors and their successors in interest, any and all claims or right of mechanics or any other type of lien to assert and/or file upon Company's or any other party's property, the Work, or any part thereof as a result of performing the Work. Contractor shall execute and deliver to Company such documents as may be required by Applicable Laws (i.e., partial and/or final waivers of liens and/or affidavits of indemnification) to make this release effective and shall give all required notices to subcontractors with respect to ensuring the effectiveness of the foregoing releases against those parties. Contractor shall secure the removal of any lien that Contractor has agreed to release in this Article within five (5) working days of receipt of written notice from Company to remove such lien. If not timely removed, Company may remove the lien and charge all costs and expenses including legal fees (for inside and/or outside legal counsel) to Contractor including, without limitation, the costs of bonding off such lien. Company, in its sole discretion, expressly reserves the right to off-set and/or retain any reasonable amount due to Contractor from payment of any one or more of Contractor's invoices upon Company having actual knowledge of any threatened and/or filed liens and/or encumbrances that may be asserted and/or filed by any subcontractor, materialman, independent

contractor and/or third party with respect to the Work, with final payment being made by Company only upon verification that such threatened and/or filed liens and/or encumbrances have been irrevocably satisfied, settled, resolved and/or released (as applicable), and/or that any known payment disputes concerning the Work involving Contractor and any of its subcontractors, agents and/or representatives have been resolved so that no actions, liens and/or encumbrances of any kind or nature will be filed against Company and/or Company's property.

#### **ARTICLE 18 ASSIGNMENT OF AGREEMENT; SUBCONTRACTING**

Upon prior written notice given to Company, Contractor shall not, by operation of law or otherwise, assign and/or subcontract any part of the Work or this Agreement without Company's prior written approval. Such approval, if given by Company, shall not relieve Contractor from full responsibility for the fulfillment of any and all obligations under this Agreement. Under any and all circumstances, any permitted assignee of Contractor, whether or not such assignee shall be a division, subsidiary and/or affiliate entity of Contractor, shall also be fully bound by the terms of this Agreement and, furthermore, upon request by Company, each of Contractor and its permitted assignee shall provide sufficient financial information, as determined by Company in its sole discretion, necessary to validate such assignee's credit worthiness and ability to perform under this Agreement.

#### **ARTICLE 19 INVOICES AND EFFECT OF PAYMENTS**

**19.01 Invoices:** Within a reasonable period of time following the end of each calendar month or other agreed period, Contractor shall submit an invoice to Company that complies with this Article 19. Payments shall be made within forty-five (45) days of Company's receipt of Contractor's proper invoice and, in the event that Company's payment is overdue, Contractor shall promptly provide Company with a notice that such payment is overdue. Contractor's invoices shall designate the extent to which LG&E and KU Services Company or any of its Affiliates is the responsible party. Such invoices shall reference the contract number and shall also show labor, material and taxes paid (including without limitation sales and use taxes); retainers to the extent as may be specified in the Purchase Order, Statement of Work and/or other contractual documentation, or otherwise pursuant to Article 17; duties, fees and other assessments imposed by governmental authorities; freight; and all other charges (including without limitation equipment rental) as separate items. All invoices shall be submitted with supporting documentation and in acceptable form and quality to Company's authorized representative. Should Company dispute any invoice for any reason, payment on such invoice shall be made within thirty (30) days after the dispute resolution. Payment of the invoice shall not release Contractor from any of its obligations hereunder including, but not limited to, its warranty and indemnity obligations. Invoices shall not be delivered with goods, but all correspondence and packages related to this Agreement shall reference the contract number assigned by Company.

**19.02 Taxes:** If Company provides Contractor with an exemption certificate demonstrating an exemption from sales or use taxes in Kentucky, then Contractor shall not withhold or pay Kentucky sales or use taxes to the extent such exemption certificate applies to the Work (such exemption does not and shall not apply to any materials consumed by Contractor in performing the Work). Contractor agrees that it shall not rely upon Company's direct pay authorization in not withholding or paying Kentucky sales or use taxes. If Company does not provide Contractor with an exemption certificate demonstrating an exemption from sales or use taxes in Kentucky, Contractor shall be solely responsible for paying all appropriate sales, use, and other taxes and duties to (including without limitation sales or use tax with respect to materials purchased and consumed in connection with the Work), as well as filing appropriate returns with the appropriate authorities. To the extent specifically included in the Contract Price, Contractor shall bill Company for and Company shall pay Contractor all such taxes and duties, but Company shall in no event be obligated for taxes and duties not specifically included in the Contract Price or for interest or penalties arising out of Contractor's failure to comply with its obligations under this Article 19.

**19.03 Billing of Additional Work:** All claims for payments of additions to the Contract Price shall be shown on separate Contractor's invoices and must refer to the specific change order or written authorization issued by Company as a condition to being considered for payment.

**19.04 Effect of Payments/Offset:** No payments shall be considered as evidence of the performance of or acceptance of the Work, either in whole or in part, and all payments are subject to deduction for loss, damage, costs or expenses for which Contractor may be liable under any Purchase Order and/or Statement of Work and are set-off hereunder. In addition to Company's right of off-set for threatened and/or filed liens and/or encumbrances, and/or with respect to payment disputes pursuant to Article 17 or otherwise, Company, without waiver or limitation of any rights or remedies of Company, shall be entitled from time to time to deduct and/or retain from any and all amounts owing by Company to Contractor in connection with this Agreement or with respect to any other contract with Company any and all amounts owed by Contractor to Company in connection with this Agreement or any other contract with Company.

**19.05 Evidence of Payment to Subcontractors:** Contractor shall, if requested by Company, furnish Company with waivers of lien and/or certificates showing names of Contractor's suppliers and subcontractors hereunder, and certifying to Company that said suppliers and subcontractors have been paid in full.

#### **ARTICLE 20 ROUTING OF SHIPMENTS**

Company shall have the option of specifying the routing of shipments. If freight is included in the Contract Price, and such specified routing increases Contractor's shipping costs, Contractor shall immediately so notify Company, and should Company still specify the more expensive routing, then Company shall reimburse Contractor for the increase actually incurred thereby.

#### **ARTICLE 21 TERM AND TERMINATION**

**21.01 Term:** This Agreement shall commence on the Effective Date and shall survive in full force and effect until terminated as set forth below and/or otherwise, solely with respect to any Statement of Work and/or Purchase Order, terminate consistent with the specified expiration date as may be stated in any Statement of Work and/or Purchase Order by and between Contractor and Company notwithstanding any terms and conditions to the contrary in this Agreement. A termination under this Article 21 based on certain Work shall only apply to the Statement of Work and/or Purchase Order that covers such Work. Any Statements of Work and/or Purchase Orders that do not relate to such Work shall not be affected by such a termination.

**21.02 Termination for Contractor's Breach:** If the Work to be done under this Agreement shall be abandoned by Contractor, if this Agreement or any portion thereof shall be assigned by operation of law or otherwise, if the Work or any portion thereof is sublet by Contractor without the permission of Company, if Contractor is placed in bankruptcy, or if a receiver be appointed for its properties and/or assets, if Contractor shall make an assignment for the benefit of creditors, if at any time the necessary progress of Work is not being maintained, or if Contractor is violating any of the conditions or agreements of this Agreement, or has executed this Agreement in bad faith, Company may, without prejudice to any other rights or remedies it may have as a result thereof, notify Contractor to discontinue any or all of the Work and terminate this Agreement in whole or part. In the event that Section 365(a) of the Bankruptcy Code or some successor law gives Contractor as debtor-in-possession the right to either accept or reject this Agreement, then Contractor agrees to file an appropriate motion with the Bankruptcy Court to either accept or reject this Agreement within twenty (20) days of the entry of the Order for Relief in the bankruptcy proceeding. Contractor and Company acknowledge and agree that said twenty (20) day period is reasonable under the circumstances. Contractor and Company also agree that if Company has not received notice that Contractor has filed a motion with the Bankruptcy Court to accept or reject this Agreement within said twenty (20) day period, then Company may file a motion with the Bankruptcy Court asking that this Agreement be accepted or rejected, and Contractor shall not oppose such motion.

**21.03 Effect of Termination for Contractor's Breach:** From the effective date of such termination notice, Contractor and/or its subcontractors shall vacate the site, whereupon Company shall have the right but not the obligation to take possession of the Work wherever located, and Contractor shall cooperate with Company and cause Contractor's subcontractors to cooperate with Company so that Company can effect such possession. In obtaining replacement services, Company shall not be required to request multiple bids or obtain the lowest figures for completing the Work and may make such expenditures as shall best

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accomplish such completion and are reasonable given the circumstances. The expenses of completing the Work in excess of the unpaid portion of the Contract Price, together with any damages suffered by Company, shall be paid by Contractor, and Company shall have the right to set off such amounts from amounts due to Contractor.

**21.04 Termination for Company's Convenience:** Company may terminate this Agreement or one or more Statements of Work in whole or in part for its own convenience by thirty (30) days' written notice at any time. In such event, Company shall pay Contractor all direct labor and material costs incurred on the Work that is subject to such termination prior to such notice, plus any reasonable unavoidable cancellation costs which Contractor may incur as a result of such termination, plus indirect costs or overhead on the portion of the Work completed, computed in accordance with generally accepted accounting principles less salvage value. As an alternative to salvage value reduction, Company shall have the right in its sole discretion to take possession of all or part of the Work.

#### **ARTICLE 22 LIABILITY OF AFFILIATES**

Any and all liabilities of LG&E and KU Services Company and/or its Affiliates under this Agreement shall be several but not joint.

#### **ARTICLE 23 PUBLICITY**

Contractor shall not issue news releases, publicize or issue advertising pertaining to the Work or this Agreement without first obtaining the written approval of Company.

#### **ARTICLE 24 CONFIDENTIAL INFORMATION**

All information relating to the Work or the business of Company including, but not limited to, drawings and specifications relating to the Work, and customer information, shall be held in confidence by Contractor and shall not be used by Contractor for any purpose other than for the performance of the Work or as authorized in writing by Company. In the event that the Contractor assigns the work to one or more subcontractors, a signed confidentiality agreement between the Contractor and each subcontractor(s) will be provided to the Company prior to the provision of any information described in the immediately preceding sentence or the performance of any Work by the subcontractor. All drawings, specifications or documents furnished by Company to Contractor or developed in connection with the Work shall either be destroyed or returned to Company (including any copies thereof) upon request at any time.

#### **ARTICLE 25 MISCELLANEOUS**

**25.01 Waiver:** No waiver by Company of any provision herein or of a breach of any provision shall constitute a waiver of any other breach or of any other provision.

**25.02 Headings:** The headings of Articles, Sections, Paragraphs, and other parts of this Agreement are for convenience only and do not define, limit, or construe the contents thereof.

**25.03 Severability:** If any provision of this Agreement shall be held invalid under law, such invalidity shall not affect any other provision or provisions hereof which are otherwise valid.

**25.04 State Law Governing Agreement; Consent to Jurisdiction:** This Agreement shall be governed by, and construed in accordance with, the laws of the Commonwealth of Kentucky, without regard to its principles of conflicts of laws. The site of any legal actions between the parties shall be held in state and/or federal court in Louisville, Jefferson County, Kentucky.

**25.05 Enforcement of Rights:** Company shall have the right to recover from Contractor all expenses, including but not limited to fees for and expenses of inside and/or outside counsel hired by Company, arising out of Contractor's breach of this Agreement or any other action by Company to enforce or defend Company's rights hereunder.

**25.06 No Third Party Beneficiaries:** Except for Contractor and Company, there are no intended third party beneficiaries of this Agreement and none may rely on this Agreement in making a claim against Company.

**25.07 Notices:** All notices and communications respecting this Agreement shall be in writing, shall be identified by the contract number, shall be designated for LG&E and KU Services Company, or the

appropriate Affiliate, and shall be addressed as follows (which address either party may change upon five (5) days prior notice to the other party).

To Company:  
LG&E and KU Services Company  
Attn: Manager, Supply Chain  
P.O. Box 32020  
Louisville, Kentucky 40232

To Contractor:  
Southern Pipeline Construction Co.  
Attn: Steve Mullins  
1272 Old fern Valley Road  
Louisville, KY 40219  
Fax No. [REDACTED]

IN WITNESS WHEREOF, the parties have entered into this Agreement as of the Effective Date.

COMPANY:

CONTRACTOR:

LG&E AND KU SERVICES COMPANY

SOUTHERN PIPELINE CONSTRUCTION CO.

Authorized Signature



Name (Please Print)

Paul F. Tierney

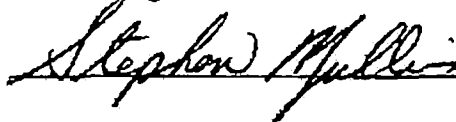
Title

Manager - Supply Chain

Date

1-11-2011

Authorized Signature



Name (Please Print)

STEPHEN MULLINS

Title

C.E.O.

Date

JAN. 5, 2011

ATTACHMENTS: (i) Copy of Company's Contractor/Subcontractor Safety Program; (ii) Drug Testing Program; and (iii) Contractor's Code of Business Conduct

**LOUISVILLE GAS AND COMPANY**

**Response to Commission Staff's Post-Hearing Request for Information  
Dated November 15, 2017**

**Case No. 2017-00119**

**Question No. 4**

**Witness: Lonnie E. Bellar**

- Q-4. Regarding the Southern Pipeline employees who were injured as a result of the failure of the mechanical coupling system on September 17, 2014:
- a. State whether either employee asserted a claim against LG&E for damages sustained as a result of the September 17, 2014 incident.
  - b. If either Southern Pipeline employee asserted a claim for damages against LG&E, state whether LG&E has satisfied or settled any such claims.
  - c. If LG&E has settled or resolved a claim asserted against it by either Southern Pipeline employee, describe the terms upon which the claim was resolved, and provide all agreements or releases relating to such claim.
- A-4.
- a. Neither employee asserted a claim against LG&E.
  - b. Not applicable.
  - c. Not applicable.

**LOUISVILLE GAS AND COMPANY**

**Response to Commission Staff's Post-Hearing Request for Information  
Dated November 15, 2017**

**Case No. 2017-00119**

**Question No. 5**

**Witness: Lonnie E. Bellar**

- Q-5. Describe the policy and procedure by which LG&E inspects welds on transmission pipelines by X-ray, and state when LG&E implemented the policy to X-ray 100 percent of welds on its transmission system.
- A-5. LG&E's General Welding Specification procedure establishes technique and process control requirements which affect the workmanship and quality of welding operations for LG&E's gas system. Specifically section 16 of the document addresses weld inspections. LG&E's Welding Inspection Specification procedure establishes guidelines for the inspection and examination of welds and the surveillance of welding activities.

Both procedures reference 49 CFR 192 Subpart E – Welding of Steel in Pipelines which includes section 192.243 for the non-destructive testing of welds. In practice, LG&E has been requiring 100% radiography for transmission pipeline welds since the early 2000's. LG&E has historically included the 100% radiography requirement in project work scope documents.

LG&E is formalizing its practice of 100% NDE of welds for transmission and high pressure distribution construction in its Guidelines for Inspection and Examination of Welds and Surveillance of Welding Activities Specification procedure.

**LOUISVILLE GAS AND COMPANY**

**Response to Commission Staff's Post-Hearing Request for Information  
Dated November 15, 2017**

**Case No. 2017-00119**

**Question No. 6**

**Witness: Lonnie E. Bellar**

- Q-6. State whether leak surveys indicate a greater occurrence of leaks on pipelines joined by mechanical coupling system versus pipelines joined by welds.
- A-6. Based on experience, LG&E believes mechanical couplings are more prone to leak than welds. However, data is not available to perform a formal analysis. When leaks are found during leak surveys, the surveyor does not know what buried component is leaking. LG&E commonly repairs leaks by replacing a section of piping. The location of the leak itself often does not need to be excavated and therefore the specific component leaking is not determined. In addition, leak data is not in a format that would allow this analysis to be done properly.