SECTION 15345

NATURAL GAS POLYETHYLENE SERVICE LINE INSTALLATION

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PART 1 GENERAL

1.1 The work to be performed herein shall consist of the installation of new, reconnected, or replacement medium density polyethylene (MDPE or PE) iron pipe size (IPS) service lines operating at or below a maximum allowable operating pressure (MAOP) of 60 pounds per square inch gauge (psig), which includes, but not limited to PE pipe and all appurtenances related to the construction of the service. All work shall be performed in accordance with this Section in conjunction with all additional project drawings and standards and specifications that may or may not be referred to in this Section.

1.2 KUB Standards and Specifications for Natural Gas Polyethylene Service Line Installation are intended to meet or exceed the Code of Federal Regulations title 49 Part 192 – Transportation of Natural and Other Gases by Pipeline: Minimum Federal Safety Standards (hereafter referred to as "MFSS").

1.3 DEFINITIONS:

1.3.1 **Branched Service** means a service line that has been tapped, teed, or split to feed two separate customers.

1.3.2 **Butt Fusion** means the method of joining polyethylene pipe where two pipe ends are heated to a molten state and rapidly brought together under pressure to form a homogeneous bond.

1.3.3 **Depth** means the distance from the top of the distribution line to finished grade.

1.3.4 **Distribution Line** is a pipeline other than a gathering or transmission line.

1.3.5 **IPS** means Iron Pipe Size (for PE pipe nominal inside diameters).

1.3.6 **Main** means a distribution line that serves as a common source of supply for more than one service line.

1.3.7 **New Service** means a service line to a customer that is newly installed.

1.3.8 **NGUS** means Natural Gas Utility Sheet: A document to be filled out by the person(s) responsible for: any work performed to a natural gas service line, work on a natural gas main that is 50 feet or less in length, a temporary bypass, or a test station.

1.3.9 **Reconnected Service Line** means an existing service line that has been disconnected from a main and reconnected to the same or different gas main for purposes of pressure testing.

1.3.10 **RPR** means the Gas Systems Engineering Representative(s) assigned to the site.

1.3.11 **SDR** means Standard Dimension Ratio (for PE pipe outside diameter divided by the minimum pipe wall thickness).

1.3.12 **Service Line** means a distribution line that transports gas from a common source of supply to an individual customer. A service line starts at the point of connection to the main and ends at the outlet of the customer meter or at the connection to a customer's piping, whichever is further downstream.

1.3.13 **Socket Fusion** means the method of joining PE pipe using a coupling with an inside diameter sized to the outside diameter of the pipe. A short length of outside surface of the pipe and the inside surface of the coupling are heated to a molten state. The pipe is then pressed into the opening of the coupling.

PART 2 SAFETY

2.1 Refer to General Conditions 00700, 6.13. In addition to conditions noted in Section 00700, FR PPE is required during purging activities. All ignition sources shall be removed from the area during purging activities.

PART 3 EXECUTION

3.1 GENERAL SERVICE LINE INSTALLATION

3.1.1 Service lines shall not be installed under buildings, permanent structures, or future/proposed structures.

3.1.2 Service lines shall be installed below ground.

3.1.3 Service lines shall be installed in the most direct or shortest path feasible between the gas main and the meter location and in accordance with the project drawings. Where possible, the service line should be installed perpendicular to the main.

3.1.4 Materials not supplied through KUB Storerooms shall be submitted for approval for use to KUB Gas Systems Engineering prior to construction of the pipeline.

3.1.5 All pipe fusion connections shall be allowed to cool as required by the pipe manufacturers' joining procedures for socket, saddle, and butt fusion prior to lowering the pipe into the trench and/or excavation to eliminate stress on the fused connections.

3.1.6 Installation methods placing a tensile load on the PE pipe shall be done in accordance with ASTM F1804, Standard Practice for Determining Allowable Tensile Load for Polyethylene (PE) Gas Pipe During Pull-in Installation.

3.1.7 Each service line should be installed with at least 12 inches of clearance from any other utility or existing or proposed above ground structure including but not limited to buildings, retaining walls, and any below grade footing and/or foundation(s). If 12 inches of clearance cannot be obtained, protection from potential damage is required and shall be approved by the RPR, and additional protection shall be documented on the NGUS.

3.1.8 A detailed design stamped by a Tennessee Licensed Professional Engineer, reviewed by OWNER, is required when crossing a heat source, including but not limited to a steam line.

3.1.9 All PE to PE pipe connections shall be made by socket, saddle, or butt fusion. Butt fusion shall be acceptable only for pipe larger than 2 inch nominal diameter. All electrofusion fittings not specified in the project drawings shall be approved for use, by the RPR, prior to installation.

3.1.10 Only IPS PE pipe shall be installed for natural gas service lines, unless approved by RPR.

3.1.11 New service lines shall not be connected to any existing service lines. If a branched service line is discovered, it shall be split into two separate service lines, unless both service lines are on one property with one owner.

3.1.12 Prior to connecting a service line to a main, the depth of the main shall be confirmed to meet the MFSS minimum depth of 24 inches. If the natural gas main does not meet the MFSS minimum depth requirements, RPR shall be contacted prior to connecting the service line to the main as additional measures may be required to protect the connection.

3.1.13 All service lines with a nominal diameter of 2 inches or larger and 50 feet in length or longer shall be pigged prior to pressure testing and introducing natural gas to the service line.

3.1.14 Service lines larger than 2 inch nominal diameter shall be installed to Section 15720 standards and specifications, with exception to pressure testing times and project drawings for that specific service line.

3.1.15 All service lines shall be locatable by tracer wire. Only service lines that are locatable by the installed tracer wire will be accepted.

3.1.16 All equipment shall be properly calibrated per the manufacturer's guidelines.

3.1.17 Service lines that do not have meters installed upon completion of installation shall have a lock (KUB Item #585971) installed on the meter valve.

3.2 HANDLING OF MATERIALS

3.2.1 PE pipe and components must be stored to prevent damage from ultraviolet (UV) rays. PE pipe and components with a print line dating back further than 729 calendar days shall not be installed.

3.2.2 For multiyear projects, CONTRACTOR shall submit, for approval, a pipe storage and protection plan to the OWNER. The pipe storage and protection plan shall address long term storage (greater that 729 calendar days) including how to protect pipe from UV degradation.

3.2.3 PE pipe may be stored by stacking, but only permitted if stacked pipe is lying flat.

3.2.4 When PE pipe is transported, it must be loaded, transported, and unloaded in a manner to prevent damage.

3.2.5 PE pipe shall be stored with manufacturer end caps in place.

3.2.6 When transporting pipe segments, pipe shall not be dragged across any type of hard surface such as pavement or rocks without protection from damage. RPR reserves the right to reject any pipe dragged across any type of pavement, rocks, or other hard surfaces.

3.2.7 A self-performed, thorough inspection of the pipe and components shall be conducted to guarantee quality assurance prior to installation and backfilling. Any damages to the pipe shall be communicated to the RPR for review prior to installation. If found after installation, damages shall be reported immediately to the RPR. Natural gas shall not be introduced into the pipe without the RPR's approval after review of the damages. In the event damage (e.g., scratches, gouges, and deformation from stressing the pipe) is present and the pipe wall thickness is compromised greater than 10%, the damaged section shall be cut out and not used. RPR reserves the right to fail segments or sections of damaged pipe or components. These damaged sections shall be replaced with no additional cost to the OWNER.

3.2.8 CONTRACTOR shall not perform any repairs to existing pipe or new pipe that has been placed into service.

3.3 INSTALLATION METHODS

3.3.1 Open Trench

3.3.1.1 Service lines shall be laid and continuously supported on undisturbed or well-compacted soil. At a minimum, well compacted soil is defined as machine tamped. PE piping shall not be laid on blocks, rocks, or large dirt clods. Refer to **3.12 BACKFILL** for defined backfill requirements.

3.3.1.2 Service lines shall be installed along the bottom of the trench to accommodate for expansion and contraction. (PE pipe will contract 1 inch per 10 degrees F temperature drop for every 100 feet of unrestrained PE pipe.)

3.3.1.3 When fusing coil pipe to coil pipe, join the coils so the curvature of one coils is directly opposite to the curvature of the other coil to minimize bending stresses at the joint.

3.3.1.4 Prior to backfilling, the trench shall be examined to ensure the service line is continuously supported at all points. #12 gauge solid copper tracer wire (KUB Item #383448) shall be installed directly above and within 6 inches of the service line. Refer to Section 15105 for tracer wire requirements.

3.3.1.5 Warning tape (KUB Item #371534) shall be installed 6 to 12 inches below existing or proposed final grade directly above the PE service line.

3.3.1.6 The trench width shall be wide enough to allow for inspection once pipe is lowered into the trench as well as for compaction around the pipe to prevent trench settlement. The minimum requirements for trench width are in **TABLE 1: Minimum Trench Width**.

TABLE 1: Minimum Trench Width

	Trench Width (inches)	
Pipe Size (inches)	Soil (minimum)	Rock (minimum)
½ - 1	4	6
1 ¼ - 2	4	6

3.3.1.7 When lowering pipe and/or components into the trench and/or excavations, the pipe shall not be subjected to excessive twisting and/or bending stresses. At lower temperatures, flexibility of the pipe is greatly reduced and could potentially be damaged by excessive force. RPR reserves the right to reject any and all pipe and/or components that may have been compromised due to excessive stresses.

3.3.2 **Horizontal Directional Drilling (Boring)**

3.3.2.1 PE pipe installed by horizontal directional drilling shall have #12 gauge copper-clad steel tracer wire (KUB #363069) pulled back with the pipe. Multiple tracer wires (no less than 2) can be pulled together in the event a tracer wire breaks during installation ensuring the natural gas service line is locatable after installation. Refer to Section 15105 for tracer wire requirements.

3.3.2.2 A frac-out plan shall be provided to RPR for review prior to boring. All materials and equipment to mitigate a frac-out, as stated in the frac-out plan, shall be readily available on site prior to beginning the bore. If a frac-out occurs, the frac-out plan shall be immediately implemented, followed by immediate notification to the RPR.

3.3.2.3 When pulling the pipeline back through reamed borehole, the tensile loads in **TABLE 2: Maximum Allowable Tensile Loads** below shall not be exceeded. RPR shall be notified prior to pull back operations and may require on-site presence during pull back operations. Pressure gauges shall be used and calibrated per manufacture's recommendation and/or a weak link shall be used.

TABLE 2: Maximum Allowable Tensile Loads

Nominal Pipe Size (inches)	Allowable Tensile Load (pounds)
½	181
1	444
1 ¼	770
2	1441

3.3.3 **Plowing**

3.3.3.1 PE pipe installed by plowing shall not be larger than 1 inch nominal diameter and shall have #12-gauge copper-clad steel tracer wire (KUB Item #363069) installed with the pipe. Refer to Section 15105 for tracer wire requirements.

3.3.3.2 When plowing in the service line, the tensile loads in **TABLE 2: Maximum Allowable Tensile Loads** shall not be exceeded. To prevent exceeding the maximum allowable tensile loads, a weak link shall be utilized.

3.3.4 **Insertion (Sleeving)**

3.3.4.1 Installing PE pipe by insertion will only be permitted if the casing pipe has a minimum of 1 inch nominal diameter and is no shallower than 12 inches deep at any location.

3.3.4.2 IPS pipe shall be used on all new service lines installed by insertion.

3.3.4.3 Prior to inserting the new PE pipe into the existing pipe, all sharp edges of the casing pipe shall be dulled.

3.3.4.4 After fully inserting the PE pipe into the casing pipe, 50 Grit Emery Cloth (KUB Item #370023) shall be installed between the carrier pipe ends and the casing pipe with the smooth side facing the carrier pipe and the rough side facing the casing pipe and taped in place with Tapecoat H50 Gray Tape (KUB Item #360671 or #360682) to seal the casing ends and prevent damage during expansion and contraction of the PE service line.

3.3.4.5 All inserted service lines shall be made locatable by cad welding tracer wire to the metallic casing pipe.

3.3.4.6 Unlocatable inserted service lines will not be accepted by OWNER.

3.4 DEPTH

3.4.1 Service lines shall be installed within the depths illustrated in **TABLE 3: Service Line Installation Depths**.

TABLE 3: Service Line Installation Depths

Nominal Pipe Size (inches)	City/County/State Right-of-Way		Customer Property/KUB Easement	
	Minimum	Maximum	Minimum	Maximum
½-1	36 inches	60 inches	18 inches	60 inches
1-¼ - 2	36 inches	60 inches	24 inches	60 inches

3.4.2 If depth requirements cannot be met, approval shall be obtained from RPR on an individual service line basis, prior to installation. Service lines installed shallower than the depth specified may be required to have additional protective measures.

3.4.3 Service lines installed shallower than the minimum or deeper than the maximum depth shall be noted on the Natural Gas Utility Sheet.

3.5 SERVICE LINE TAP

3.5.1 The critical stress area for PE service lines is at the tapping tee. This section of pipe shall be protected for all services lines by using the support sleeve included with the tapping tee for PE mains. The support sleeve shall be installed on all service lines without a shut off valve.

3.5.2 If the tapping tee assembly does not have a support sleeve with it, a 2 inch diameter, 12 to 18 inches long PE pipe shall be used as a support sleeve for ½ inch and 1 inch service lines.

3.5.3 Backfill shall be well compacted around the tapping tee to provide sufficient support and special care taken not to damage the tapping tee and pipe during compaction.

3.5.4 If the new PE service line is to be installed on steel main, KUB's Underground Construction shall install the tapping tee and perform the main tap.

3.5.5 Service line connections to PE main, by use of tapping tees, shall be located on top of the main.

3.5.6 Service line connections to PE mains must be allowed to completely cool before pressure testing the service line or tapping the main if the service line and main are pressure tested together.

3.5.7 Tapping tee caps shall be tightened according to the manufacturer's recommendations.

3.6 SERVICE LINE SHUT OFF VALVE

3.6.1 Service line shut off valves shall be installed on all residential services larger than 1 inch nominal diameter, for all service lines with a 10 psig MAOP, and all commercial services.

3.6.2 The service line shut off valve shall be installed at the tapping tee, unless approved by RPR.

3.6.3 Service line shut off valves shall not be installed in existing or proposed pavement, unless stated in project drawings or approved by RPR.

3.6.4 When installing a service line shut off valve, the valve box shall be installed per **3.17 VALVE BOXES**.

3.7 EXCESS FLOW VALVE

3.7.1 Excess flow valves (EFV) shall be installed with 26 inches of pipe from the outlet of the tapping tee to the fused on EFV connection on all residential natural gas service lines including but not limited to, single family homes, duplex homes, and quadplex homes, as well as all small commercial natural gas service lines. A small commercial natural gas service line is defined as a commercial service line with a total connected load less than or equal to 1,000 standard cubic feet per hour.

3.7.2 EFV size shall be determined by Gas Systems Engineering and is defined in the project drawings. If the existing site conditions have changed between the time the project drawings were developed and the work is to be performed, the installer shall cease work and notify the RPR for clarification prior to continuing work.

3.7.3 If the project drawings do not reflect EFV size, installer shall use appropriate tables below when installing an EFV for residential (**TABLE 4**) or small commercial (**TABLE 5**) service lines. If the parameters for the service requiring the EFV are not covered in **TABLE 4** or **TABLE 5**, contact Gas Systems Engineering to determine appropriately sized EFV.

TABLE 4: EFV's For Residential Service Lines (60 PSIG MAOP)

Service Line Length (feet)	Total Connected Load (Standard Cubic Feet Per Hour)			
	0-350	351-600	601-1600	1601-2300
0-325	½ inch – 400	½ inch – 800	1 inch – 1800	1-1/4 inch – 2600
326-630	½ inch – 400	1 inch – 800	1 inch – 1800	1-1/4 inch – 2600
631-1000	½ inch – 400	1 inch – 800	1-1/4 inch – 1800	2 inch – 2600

TABLE 5: EFV's For Small Commercial Service Lines (60 PSIG MAOP)

Service Line Length (feet)	Total Connected Load (Standard Cubic Feet Per Hour)	
	0-600	601-1000
0-500	1 inch – 800	1 inch – 1800

3.7.4 The EFV nominal diameter shall match the nominal diameter for the entire service line. Mismatching nominal diameters between the EFV and service line shall not be permitted unless instructed to do so by Gas Systems Engineering on a case by case basis.

3.7.5 EFV's shall not be installed on services operating at or below 10 psig.

3.7.6 Only heat fused EFVs shall be installed.

3.7.7 All service lines with an EFV installed shall have a tag or other OWNER approved EFV label attached to the riser. The tag or label shall be visible in plain sight for field verification of the EFVs presence.

3.7.8 The diameter and flow rating of the EFV installed shall be recorded on the NGUS.

3.7.9 Service lines taken out of service (disconnected from the gas main) and reconnected to a gas main shall have a new EFV installed or documented verification of existing EFV, even if the service line is not replaced.

3.8 ANODELESS RISER

3.8.1 Only anodeless risers shall be installed on PE service lines.

3.8.2 Anodeless risers shall not be installed on any metallic service lines.

3.8.3 Reconnected PE service lines shall not be placed back into service with a steel riser.

3.8.4 Risers shall be installed according to the project drawings, job package, or job site markings. Conditions may change on site in between project planning and construction. Risers shall not be installed in proposed locations not in compliance with this Section. If site conditions have changed, RPR shall be notified and will provide installer with instructions on how to proceed.

3.8.5 Risers shall be installed in a readily accessible, outdoor, ventilated, and aboveground location to ensure proper venting of the relief assembly. The location should be free of trees, shrubs, and any other items that will prevent accessibility for maintenance activities.

3.8.6 Risers shall be installed to allow gas to readily ventilate. Locations to avoid installation include, but are not limited to, areas directly below roof valleys, roof downspouts, decks, or building overhangs.

3.8.7 Risers shall not be installed such that the relief assembly will be located within 3 feet from any opening that could allow escaping natural gas to enter a structure without RPR approval. Openings include, but are not limited to, dryer, furnace, or foundation vents and fresh air intakes.

3.8.8 Risers shall not be installed under or immediately in front of first floor operable windows.

3.8.9 Risers shall not be installed such that the relief assembly will be located within 3 feet of any ignition sources including, but not limited to, air conditioners, furnaces, electrical circuits, breaker boxes, meters, and receptacles.

3.8.10 Risers shall not be installed within 10 feet of fire department connection (FDC), under stairways or other structure openings that may be utilized as emergency exits.

3.8.11 Risers should not be installed near any type of driveway or location where it is likely to be struck by a motor vehicle. If a riser is installed near a driveway or such location, protective bollards shall be installed. See **3.18 BOLLARDS** for bollard installation.

3.8.12 Manufacturer bent anodeless risers shall be installed for riser sizes less than 2 inch nominal diameter.

3.8.13 When installing the riser, do so in a manner where the riser and fuel line piping (not the PE service line) supports the weight of the meter.

3.8.14 Risers requiring cathodic protection shall not be installed unless instructed to do so by Gas Systems Engineering.

3.8.15 Risers shall be installed in relation to the fuel line and building according to **TABLE 6: Location For Riser Installation**.

TABLE 6: Location For Riser Installation

Riser Size	Distance To Building Wall	Distance To Fuel Line
¾ inch	12-18 inches	18 inches
1 ¼ inch	18-24 inches	36 inches
2 inch	30 inches	36 inches

3.8.16 Risers shall be installed through a PVC, MDPE or HDPE pipe as a protective sleeve that is a minimum of 4 inches long installed 2 inches below the transition on the riser. See the **TABLE 7: Protective Sleeve Sizes For Risers** for appropriately sized protective sleeves.

TABLE 7: Protective Sleeve Sizes For Risers

Riser Size	Protective Sleeve Size
¾ inch	2 inch Diameter
1 ¼ inch	4 inch Diameter
2 inch	4 inch Diameter

3.8.17 Anodeless risers are marked with the correct burial depth, noted as “GROUND LEVEL HERE.” Anodeless risers installed at a depth where the marking is not visible shall be raised for OWNER acceptance.

3.8.18 The riser shall be installed to be vertically plumb.

3.9 METER VALVE

3.9.1 The meter valve (meter cock) shall be installed in the field. Meter valves installed on the riser by the manufacturer are not permitted.

3.9.2 The operating nut for the meter valve shall be on the outside of the proposed meter set.

3.9.3 Threaded connections shall be tightened according to manufacturer’s installation procedures with a sealing compound containing Teflon (KUB Item #360800). For consistent sealing, threads must

be sealed with solid, liquid, paste, or tape sealants. Threaded connections shall be soap-tested for leaks during the pressure test.

3.10 BACKFILL

3.10.1 Backfill shall be free from any material that could cause damage to the pipe including, but not limited to: refuse, large rocks, sharp rocks, large dirt clods, and/or any construction debris or trash.

3.10.2 In rocky excavation zones, a minimum of 6 inches of clean and compacted fill material shall be installed prior to the pipe being lowered into the trench. The pipe is then installed and side filled to the required trench width with clean and compacted fill material. Pipe shall be covered with a minimum of 6 inches of clean and compacted fill material prior to final backfill.

3.10.3 Clean backfill is defined as native materials, manufactured fill and/or delivered soil containing a maximum particle size of ½ inch diameter.

3.10.4 Backfill shall be free from contaminants. If native material has smell, sheen, discoloration, debris or any uncommon substances, work shall stop immediately and RPR notified. All native materials shall be held on site in a manner to limit cross contamination.

3.10.5 Backfill and side fill shall be well compacted around all PE pipe and components with special care taken not to damage the service line during compaction. At a minimum, well compacted soil is defined as machine tamped.

3.10.6 Backfill shall be installed in manner that protects the pipe service line from damages including but not limited to bends, crushing, gouges, and punctures.

3.10.7 Large rock is defined as having a diameter greater than 2 inch. If large rock is discovered during the excavation process, installer shall use clean backfill as defined in 3.10.3.

3.10.8 Backfilling a trench/excavation in a non-paved area shall be well compacted in a manner to prevent future below grade settling. At a minimum, well compacted soil is defined as machine tamped in 12 inch lifts.

3.10.9 Backfilling in a paved area shall be in compliance with TDOT, City of Knoxville, and Knox County requirements as noted in the project drawings.

3.10.10 Warning tape should be installed as stated in 3.3.1.5 in all open trench/excavation areas 6-12 inches below existing or proposed final grade directly above the PE service line.

3.11 PIGGING

3.11.1 Service lines with a nominal diameter of 2 inch or larger and longer than 50 feet shall be pigged until proven to be clean and dry. Based on the last pig run, there shall be no loose debris and no free liquids. RPR reserves the right to require additional pigging. RPR may require additional pigs to be new and unused.

3.11.2 RPR shall be notified, at a minimum, the business day prior to pigging a service line.

3.11.3 Pig shall be caught as it exits pipe in a manner that ensures prevention of injury to employees and the public.

3.11.4 The inside of the service line shall remain clean and dry after pigging is complete.

3.11.5 If a service line is not connected to the main immediately, a fused on end cap shall be installed to assure the service line stays clean of debris and liquids.

3.12 PRESSURE TESTING

3.12.1 Pressure testing shall be performed for every service line and its components after installation, including the service line connection to the main, whether the service line is newly installed or being tied over to a newly installed natural gas main.

3.12.2 If a service line is disconnected from the main, it shall pass a pressure test before having natural gas reintroduced.

3.12.3 Pipe and its components being pressure tested shall be restrained against possible movement. Backfill can be an appropriate restraint.

3.12.4 Every service line shall be pressure tested with inert gas or air free of contaminants to a minimum of 92 psig and a maximum of 96 psig. The pressure test shall establish an MAOP of 60 psig and detect any potentially hazardous leaks.

3.12.5 Pressure testing shall be performed with a Kuhlman Unit or RPR approved device.

3.12.6 Kuhlman unit or equivalent shall be labeled with last calibration date in a readily visible area. Units shall be calibrated within 365 calendar days from last calibration date unless required earlier by the manufacturer. Calibration verification shall be maintained for a minimum of 1 year.

3.12.7 Pressure testing durations vary depending upon nominal pipe size and length. For pressure testing time requirements, follow **TABLE 8: Pressure Testing Times for Service Lines**.

TABLE 8: Pressure Testing Times for Service Lines

	Nominal Pipe Size (inch)		
Service Line Length (feet)	**½**	**1**	**2**
0-50	15 minutes	15 minutes	15 minutes
51-250	15 minutes	15 minutes	15 minutes
251-500	15 minutes	15 minutes	30 minutes
501-1000	15 minutes	15 minutes	1 hour

1. If the pipe size being tested is not included in this table, but in between ½ inch and 2 inch pipe, use the test times for the next largest size pipe.
2. If the pipe length being tested is not included in this table, the pressure test time must be approved by Gas Systems Engineering.
3. Pressure testing times for service lines differ from pressure testing times for mains due to closer proximity to structures.

3.12.8 Pressure tests shall not be conducted against active valves or squeeze-off tools.

3.12.9 The pressure test shall be performed on the same day the service line is put into service or a fused cap must be installed to seal the pipe, and air or inert gas at 60 psig shall remain within service line prior to introducing natural gas to the pipe.

3.12.10 Service lines may be pressure tested with the main only in situations where the service line being pressure tested is fully installed. Service lines may not be installed and pressure tested in a manner to where the service line has multiple pressure test records (i.e. tap with active service

stub and service line with riser). The pressure test for the service line shall cover the service line from tap to riser unless approved by RPR.

3.12.11 During the pressure test, the meter valve shall also be soap tested to confirm there are no leaks.

3.12.12 If connecting to existing piping, final connection point shall be soap tested at service line's operating pressure.

3.12.13 A signed print out documenting a successful pressure test shall be attached to the NGUS for the service line. The service line shall not be placed into service without signed documentation of a successful pressure test. OWNER will not accept service line without signed documentation of a successful pressure test.

3.13 PURGING NATURAL GAS INTO A SERVICE LINE

3.13.1 A manned fire extinguisher shall be positioned, upwind if possible, from the purge point at all times during purging.

3.13.2 Natural gas shall be vented in a manner that is directed away from all ignition sources and done so to prevent natural gas from entering a structure

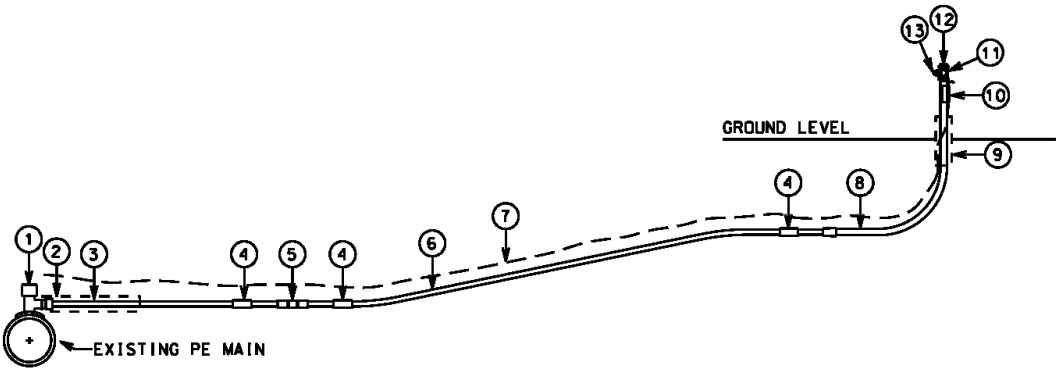
3.13.3 During purging, the riser shall be grounded to the soil with a minimum of #12 gauge solid copper tracer wire or jumper cable, along with a grounding rod. Attach ground wire to meter valve or purge stack to ensure proper grounding.

3.13.4 If the service line has an EFV, confirm the EFV is operating properly during the purge.

3.14 RESIDENTIAL SERVICES (60 PSIG MAOP)

3.14.1 PE Residential Service Lines (60 PSIG MAOP)

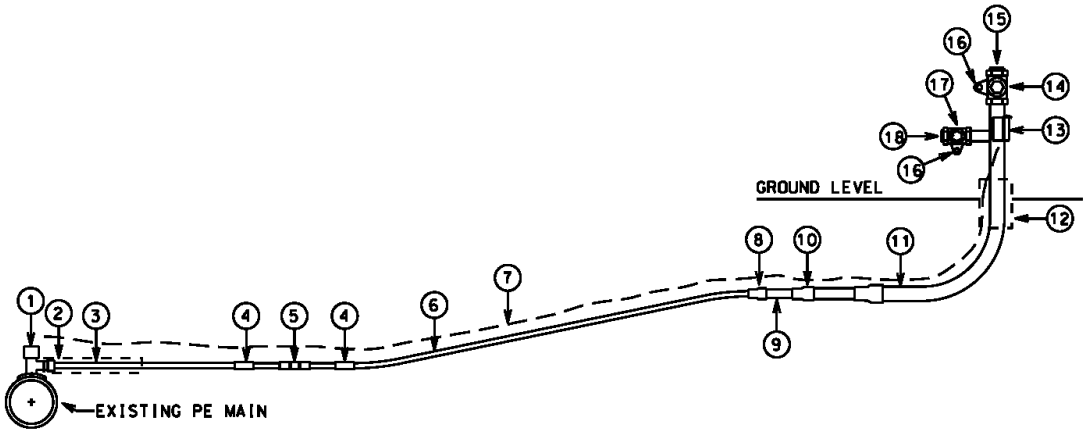
a. ½ inch PE Residential Service Line with a ¾ inch Riser – Figure 15345-A



Material List for Figure 15345-A

Item	Quantity	KUB Item #	Description
1	1	386029	1-¼ inch x ½ inch PE Tapping Tee
		384115	2 inch x ½ inch PE Tapping Tee
		380972	4 inch x ½ inch PE Tapping Tee
		386771	6 inch x ½ inch PE Tapping Tee
		374850	8 inch x ½ inch PE Tapping Tee
		360924	12 inch x ½ inch PE Tapping Tee
2	1	-	Protective Sleeve
3	26 inches	381558	½ inch PE Pipe
4	3	383828	½ inch PE Socket Fusion Coupling
5	1	361386	½ inch 400 PE Excess Flow Valve
		362013	½ inch 800 PE Excess Flow Valve
6	1-Lot	381558	½ inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	360022	¾ inch x ½ inch PE Anodeless Riser
9	1	-	Protective Sleeve
10	1	361980	¾ inch Tracer Wire Clip
11	1	362167	¾ inch Meter Valve
12	1	360354	¾ inch Plug
13	1	585971	Meter Valve Lock

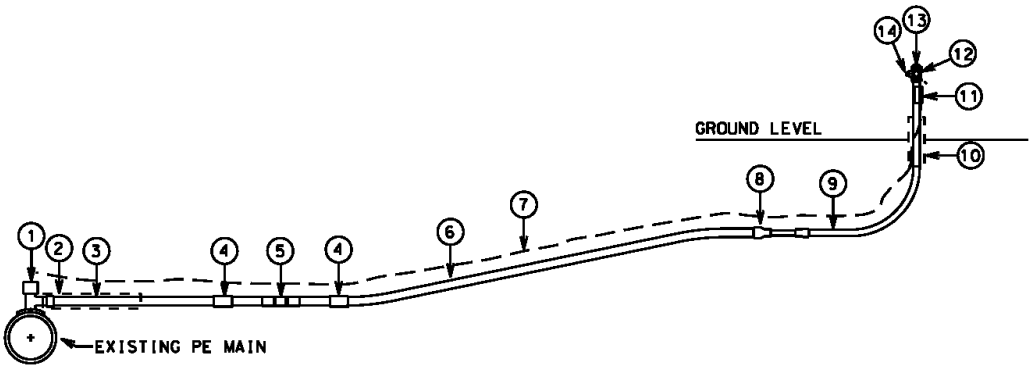
b. ½ inch PE Residential Service Line with a 1 ¼ inch Riser – Figure 15345-B



Material List for Figure 15345-B

Item	Quantity	KUB Item #	Description
1	1	386029	1-¼ inch x ½ inch PE Tapping Tee
		384115	2 inch x ½ inch PE Tapping Tee
		380972	4 inch x ½ inch PE Tapping Tee
		386771	6 inch x ½ inch PE Tapping Tee
		374850	8 inch x ½ inch PE Tapping Tee
		360924	12 inch x ½ inch PE Tapping Tee
2	1	-	Protective Sleeve
3	26 inches	381558	½ inch PE Pipe
4	2	383828	½ inch PE Socket Fusion Coupling
5	1	362013	½ inch 800 PE Excess Flow Valve
6	1-Lot	381558	½ inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	380931	1 inch x ½ inch PE Reducer
9	12 inches	386060	1 inch PE Pipe
10	1	382598	1-¼ inch x 1 inch PE Reducer
11	1	360627	1-¼ inch PE Anodeless Riser with Bypass
12	1	-	Protective Sleeve
13	1	362112	1-¼ inch Tracer Wire Clip
14	1	362189	1-¼ inch Meter Valve
15	1	363846	1-¼ inch Plug
16	2	585971	Meter Valve Lock
17	1	362178	1 inch Bypass Meter Valve
18	1	362814	1 inch Plug

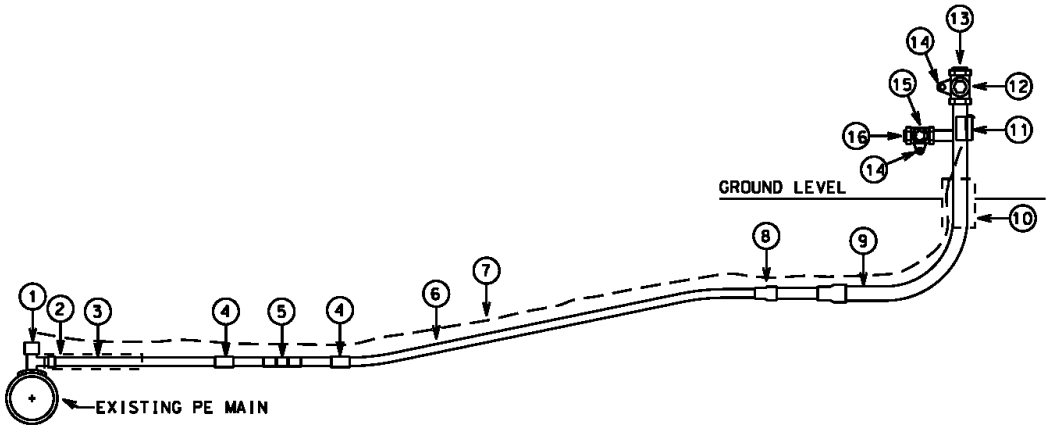
c. 1 inch PE Residential Service Line with a ¾ inch Riser – Figure 15345-C



Material List for Figure 15345-C

Item	Quantity	KUB Item #	Description
1	1	386052	1-¼ inch x 1 inch PE Tapping Tee
		380949	2 inch x 1 inch PE Tapping Tee
		380964	4 inch x 1 inch PE Tapping Tee
		386789	6 inch x 1 inch PE Tapping Tee
		374876	8 inch x 1 inch PE Tapping Tee
		360902	12 inch x 1 inch PE Tapping Tee
2	1	-	Protective Sleeve
3	26 inches	386060	1 inch PE Pipe
4	2	374124	1 inch PE Socket Fusion Coupling
5	1	362057	1 inch 800 PE Excess Flow Valve
6	1-Lot	386060	1 inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	380931	1 inch x ½ inch PE Reducer
9	1	360022	¾ inch x ½ inch PE Anodeless Riser
10	1	-	Protective Sleeve
11	1	361980	¾ inch Tracer Wire Clip
12	1	362167	¾ inch Meter Valve
13	1	360354	¾ inch Plug
14	1	585971	Meter Valve Lock

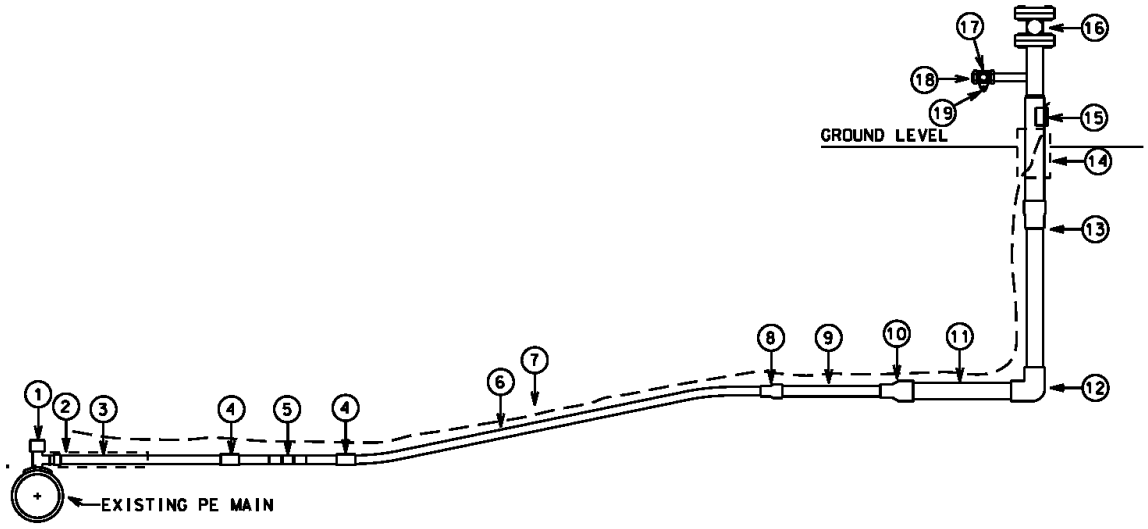
d. 1 inch PE Residential Service Line with a 1 ¼ inch Riser – Figures 15345-D



Material List for Figure 15345-D

Item	Quantity	KUB Item #	Description
1	1	386052	1-¼ inch x 1 inch PE Tapping Tee
		380949	2 inch x 1 inch PE Tapping Tee
		380964	4 inch x 1 inch PE Tapping Tee
		386789	6 inch x 1 inch PE Tapping Tee
		374876	8 inch x 1 inch PE Tapping Tee
		360902	12 inch x 1 inch PE Tapping Tee
2	1	-	Protective Sleeve
3	26 inches	386060	1 inch PE Pipe
4	2	374124	1 inch PE Socket Fusion Coupling
5	1	362057	1 inch 800 PE Excess Flow Valve
	1	362068	1 inch 1800 PE Excess Flow Valve
6	1-Lot	386060	1 inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	382598	1-¼ inch x 1 inch PE Reducer
9	1	360627	1-¼ inch PE Anodeless Riser with Bypass
10	1	-	Protective Sleeve
11	1	362112	1-¼ inch Tracer Wire Clip
12	1	362189	1-¼ inch Meter Valve
13	1	363846	1-¼ inch Plug
14	2	585971	Meter Valve Lock
15	1	362178	1 inch Bypass Meter Valve
16	1	362814	1 inch Plug

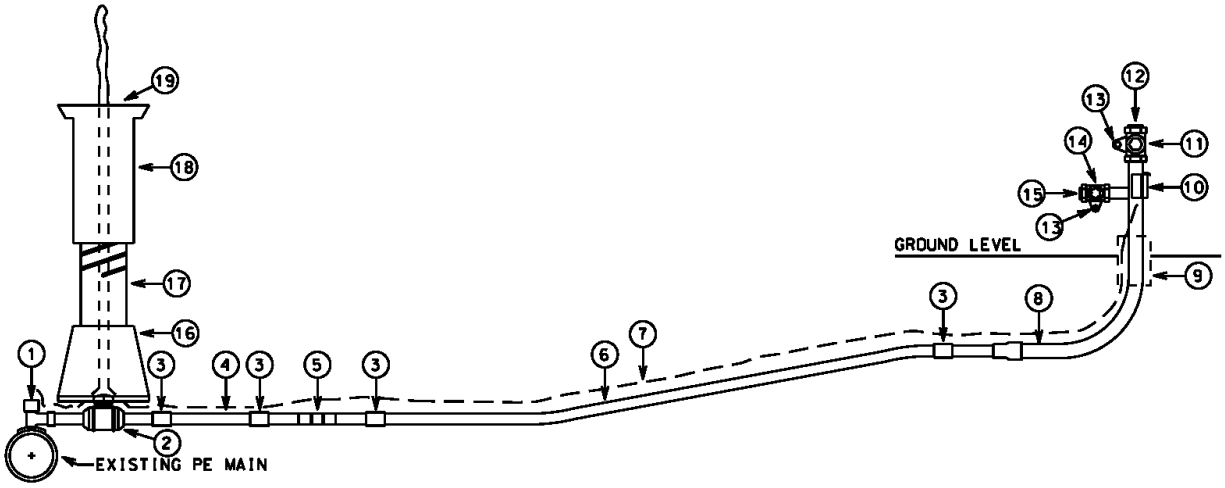
e. 1 inch PE Residential Service Line with a 2 inch Riser – Figure 15345-E



Material List for Figure 15345-E

Item	Quantity	KUB Item #	Description
1	1	386052	1-¼ inch x 1 inch PE Tapping Tee
		380949	2 inch x 1 inch PE Tapping Tee
		380964	4 inch x 1 inch PE Tapping Tee
		386789	6 inch x 1 inch PE Tapping Tee
		374876	8 inch x 1 inch PE Tapping Tee
		360902	12 inch x 1 inch PE Tapping Tee
2	1	-	Protective Sleeve
3	26 inches	386060	1 inch PE Pipe
4	2	374124	1 inch PE Socket Fusion Coupling
5	1	362068	1 inch 1800 PE Excess Flow Valve
6	1-Lot	386060	1 inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	382598	1-¼ inch x 1 inch PE Reducer
9	12 inches	386003	1-¼ inch PE Pipe
10	1	382689	2 inch x 1-¼ inch PE Reducer
11	12 inches	381160	2 inch PE Pipe
12	1	382952	2 inch PE 90 Degree Bend
13	1	360616	2 inch PE Anodeless Riser with Bypass
14	1	-	Protective Sleeve
15	1	362123	2 inch Tracer Wire Clip
16	1	383471	2 inch Flange Valve
17	1	362189	1-¼ inch Meter Valve
18	1	363846	1-¼ inch Plug
19	1	585971	Meter Valve Lock

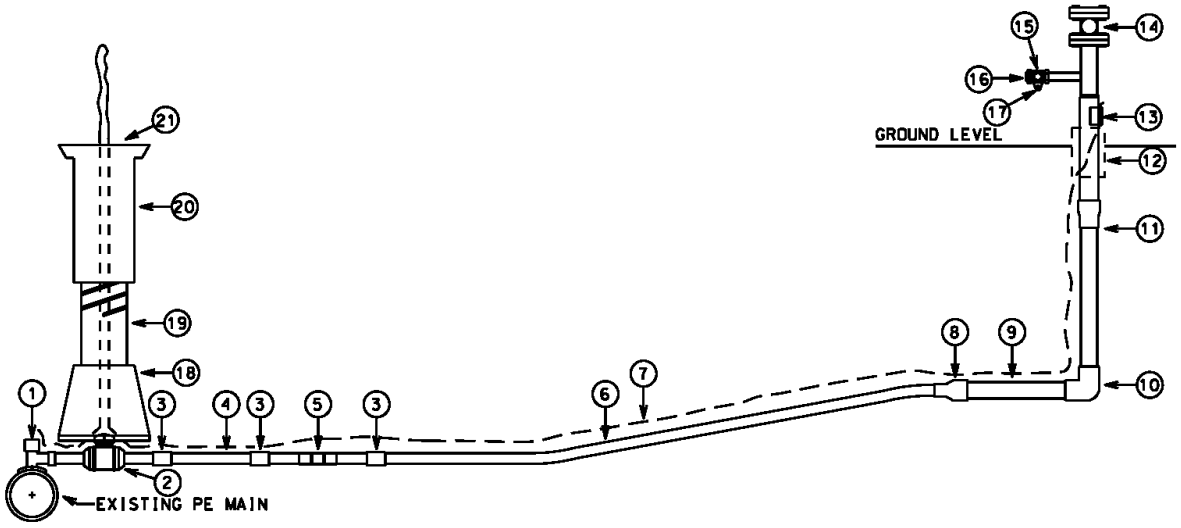
f. 1 ¼ inch PE Residential Service Line with a 1 ¼ inch Riser – Figure 15345-F



Material List for Figure 15345-F

Item	Quantity	KUB Item #	Description
1	1	373878	1-¼ inch x 1-¼ inch PE Tapping Tee
		380980	2 inch x 1-¼ inch PE Tapping Tee
		380956	4 inch x 1-¼ inch PE Tapping Tee
		386797	6 inch x 1-¼ inch PE Tapping Tee
		374892	8 inch x 1-¼ inch PE Tapping Tee
		360913	12 inch x 1-¼ inch PE Tapping Tee
2	1	371724	1-¼ inch PE Valve
3	3	384032	1-¼ inch PE Socket Fusion Coupling
4	12 inches	386003	1-¼ inch PE Pipe
5	1	362070	1-¼ inch 1800 PE Excess Flow Valve
6	1-Lot	386003	1-¼ inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	360627	1-¼ inch PE Anodeless Riser with Bypass
9	1	-	Protective Sleeve
10	1	362112	1-¼ inch Tracer Wire Clip
11	1	362189	1-¼ inch Meter Valve
12	1	363846	1-¼ inch Plug
13	2	585971	Meter Valve Lock
14	1	362178	1 inch Bypass Meter Valve
15	1	362814	1 inch Plug
16	1	294074	Valve Box Base Section
17	1	360440	Valve Box Middle Section
18	1	360451	Valve Box Top Section
19	1	383398	Valve Box Lid

g. 1 ¼ inch PE Residential Service Line with a 2 inch Riser – Figure 15345-G

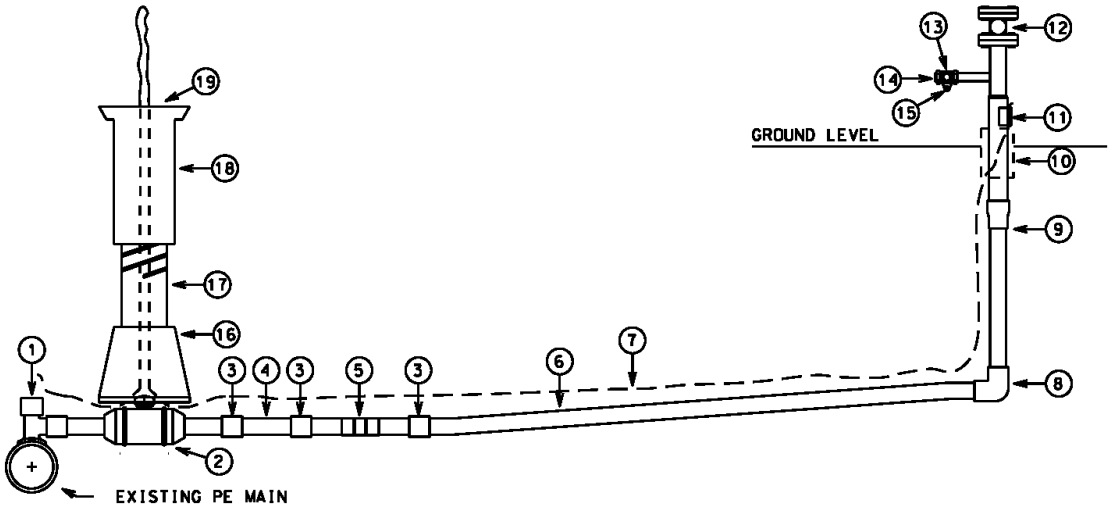


Material List for Figure 15345-G

Item	Quantity	KUB Item #	Description
1	1	373878	1-¼ inch x 1-¼ inch PE Tapping Tee
		380980	2 inch x 1-¼ inch PE Tapping Tee
		380956	4 inch x 1-¼ inch PE Tapping Tee
		386797	6 inch x 1-¼ inch PE Tapping Tee
		374892	8 inch x 1-¼ inch PE Tapping Tee
		360913	12 inch x 1-¼ inch PE Tapping Tee
2	1	371724	1-¼ inch PE Valve
3	3	384032	1-¼ inch PE Socket Fusion Coupling
4	12 inches	386003	1-¼ inch PE Pipe
5	1	362070	1-¼ inch 1800 PE Excess Flow Valve
		362076	1-¼ inch 2600 PE Excess Flow Valve
6	1-Lot	386003	1-¼ inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	382689	2 inch x 1-¼ inch PE Reducer
9	12 inches	381160	2 inch PE Pipe
10	1	382952	2 inch PE 90 Degree Bend
11	1	360616	2 inch PE Anodeless Riser with Bypass
12	1	-	Protective Sleeve
13	1	362123	2 inch Tracer Wire Clip
14	1	383471	2 inch Flange Valve
15	1	362189	1-¼ inch Meter Valve
16	1	363846	1-¼ inch Plug
17	1	585971	Meter Valve Lock
18	1	294074	Valve Box Base Section
19	1	360440	Valve Box Middle Section

20	1	360451	Valve Box Top Section
21	1	383398	Valve Box Lid

h. 2 inch PE Residential Service Line with a 2 inch Riser – Figure 15345-H



Material List for Figure 15345-H

Item	Quantity	KUB Item #	Description
1	1	372193	2 inch x 2 inch PE Tapping Tee
		380311	4 inch x 2 inch PE Tapping Tee
		380840	6 inch x 2 inch PE Tapping Tee
		374835	8 inch x 2 inch PE Tapping Tee
		360891	12 inch x 2 inch PE Tapping Tee
2	1	371740	2 inch PE Valve
3	3	383810	2 inch PE Socket Fusion Coupling
4	12 inches	381160	2 inch PE Pipe
5	1	362080	2 inch 2600 PE Excess Flow Valve
6	1-Lot	381160	2 inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	382952	2 inch PE 90 Degree Bend
9	1	360616	2 inch PE Anodeless Riser with Bypass
10	1	-	Protective Sleeve
11	1	362123	2 inch Tracer Wire Clip
12	1	383471	2 inch Flange Valve
13	1	362189	1-¼ inch Meter Valve
14	1	363846	1-¼ inch Plug
15	1	585971	Meter Valve Lock
16	1	294074	Valve Box Base Section
17	1	360440	Valve Box Middle Section
18	1	360451	Valve Box Top Section
19	1	383398	Valve Box Lid

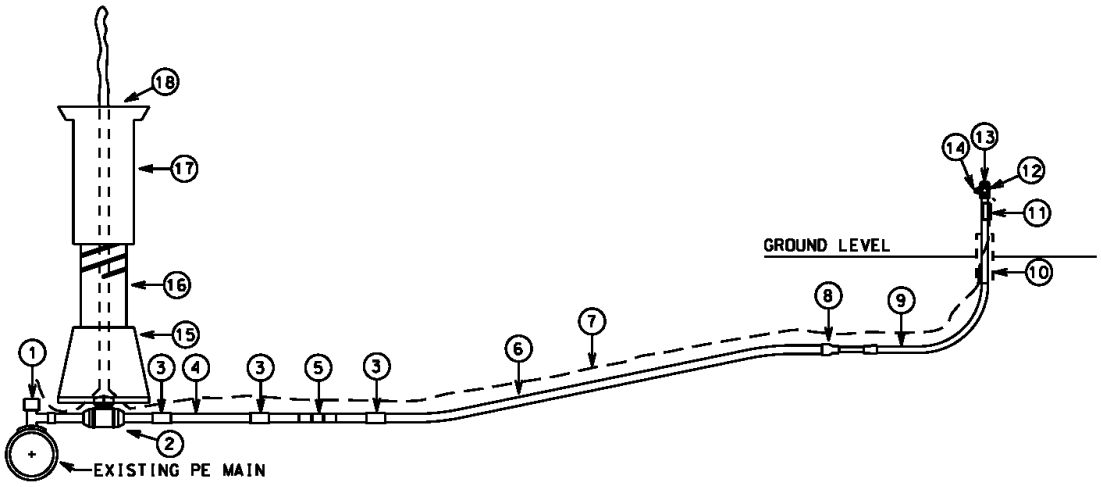
3.15 SMALL COMMERCIAL SERVICES (60 PSIG MAOP)

3.15.1 New commercial service lines shall have a minimum nominal diameter of 1 inch.

3.15.2 All commercial service lines shall have a shut-off valve of matching nominal diameter installed at the tapping tee.

3.15.3 **PE Small Commercial Service Lines (60 PSIG MAOP)**

a. 1 inch PE Small Commercial Service Line with a ¾ inch Riser – Figure 15345-I

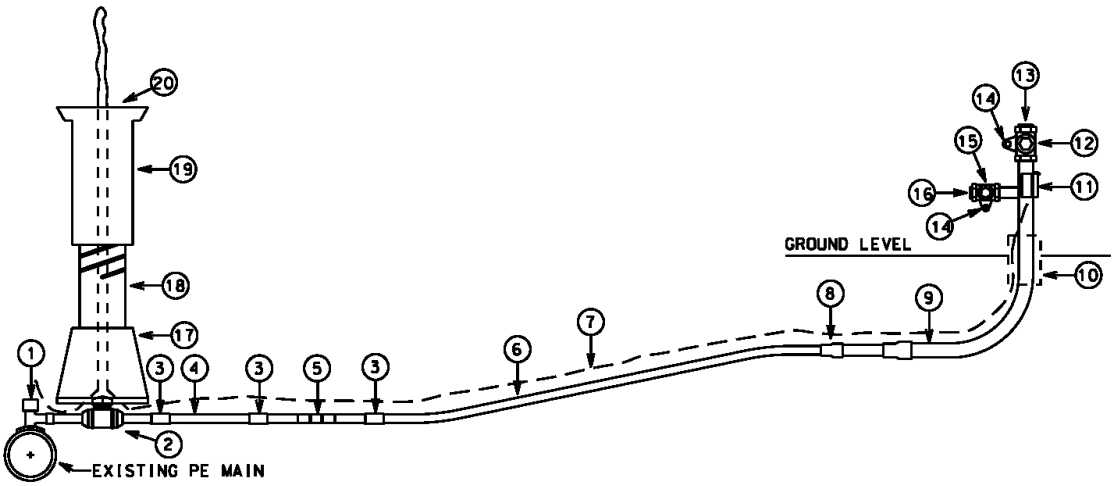


Material List for Figure 15345-I

Item	Quantity	KUB Item #	Description
1	1	386052	1-¼ inch x 1 inch PE Tapping Tee
		380949	2 inch x 1 inch PE Tapping Tee
		380964	4 inch x 1 inch PE Tapping Tee
		386789	6 inch x 1 inch PE Tapping Tee
		374876	8 inch x 1 inch PE Tapping Tee
		360902	12 inch x 1 inch PE Tapping Tee
2	1	371708	1 inch PE Valve
3	1	374124	1 inch PE Socket Fusion Coupling
4	12 inches	386060	1 inch PE Pipe
5	1	362057	1 inch 800 PE Excess Flow Valve
6	1-Lot	386060	1 inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	380931	1 inch x ½ inch PE Reducer
9	1	360022	¾ inch x ½ inch PE Anodeless Riser
10	1	-	Protective Sleeve
11	1	361980	¾ inch Tracer Wire Clip
12	1	362167	¾ inch Meter Valve
13	1	360354	¾ inch Plug
14	1	585971	Meter Valve Lock
15	1	294074	Valve Box Base Section

16	1	360440	Valve Box Middle Section
17	1	360451	Valve Box Top Section
18	1	383398	Valve Box Lid

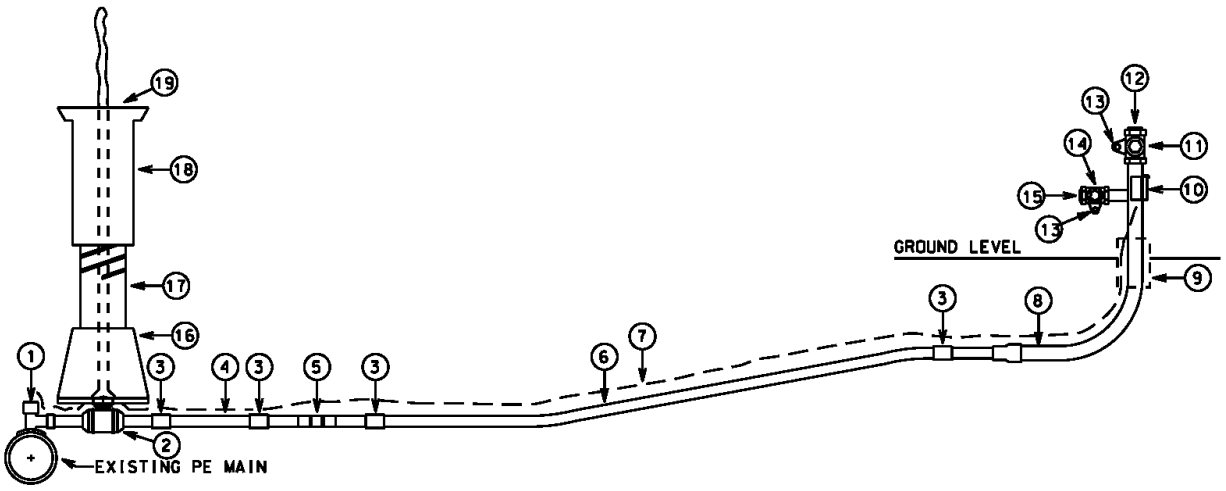
b. 1 inch PE Small Commercial Service Line with a 1 ¼ inch Riser – Figure 15345-J



Material List for Figure 15345-J

Item	Quantity	KUB Item #	Description
1	1	386052	1-¼ inch x 1 inch PE Tapping Tee
		380949	2 inch x 1 inch PE Tapping Tee
		380964	4 inch x 1 inch PE Tapping Tee
		386789	6 inch x 1 inch PE Tapping Tee
		374876	8 inch x 1 inch PE Tapping Tee
		360902	12 inch x 1 inch PE Tapping Tee
2	1	371708	1 inch PE Valve
3	1	374124	1 inch PE Socket Fusion Coupling
4	12 inches	386060	1 inch PE Pipe
5	1	362057	1 inch 800 PE Excess Flow Valve
6	1-Lot	386060	1 inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	382598	1-¼ inch x 1 inch PE Reducer
9	1	360627	1-¼ inch PE Anodeless Riser with Bypass
10	1	-	Protective Sleeve
11	1	362112	1-¼ inch Tracer Wire Clip
12	1	362189	1-¼ inch Meter Valve
13	1	363846	1-¼ inch Plug
14	2	585971	Meter Valve Lock
15	1	362178	1 inch Bypass Meter Valve
16	1	362814	1 inch Plug
17	1	294074	Valve Box Base Section
18	1	360440	Valve Box Middle Section
19	1	360451	Valve Box Top Section
20	1	383398	Valve Box Lid

c. 1 ¼ inch PE Small Commercial Service Line with a 1 ¼ inch Riser – Figure 15345-K



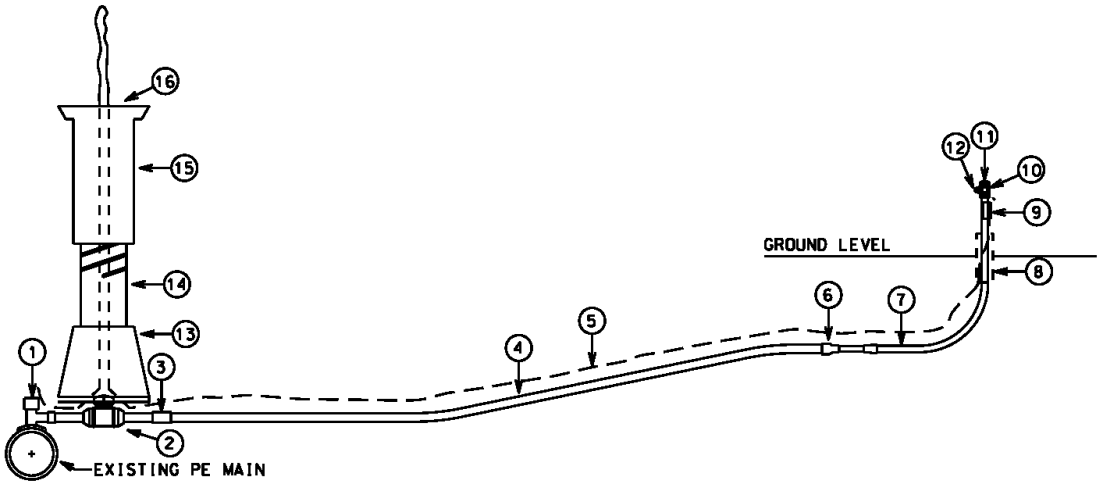
Material List for Figure 15345-K

Item	Quantity	KUB Item #	Description
1	1	373878	1-¼ inch x 1-¼ inch PE Tapping Tee
		380980	2 inch x 1-¼ inch PE Tapping Tee
		380956	4 inch x 1-¼ inch PE Tapping Tee
		386797	6 inch x 1-¼ inch PE Tapping Tee
		374892	8 inch x 1-¼ inch PE Tapping Tee
		360913	12 inch x 1-¼ inch PE Tapping Tee
2	1	371724	1-¼ inch PE Valve
3	3	384032	1-¼ inch PE Socket Fusion Coupling
4	12 inches	386003	1-¼ inch PE Pipe
5	1	362070	1-¼ inch 1800 PE Excess Flow Valve
6	1-Lot	386003	1-¼ inch PE Pipe
7	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
8	1	360627	1-¼ inch PE Anodeless Riser with Bypass
9	1	-	Protective Sleeve
10	1	362112	1-¼ inch Tracer Wire Clip
11	1	362189	1-¼ inch Meter Valve
12	1	363846	1-¼ inch Plug
13	2	585971	Meter Valve Lock
14	1	362178	1 inch Bypass Meter Valve
15	1	362814	1 inch Plug
16	1	294074	Valve Box Base Section
17	1	360440	Valve Box Middle Section
18	1	360451	Valve Box Top Section
19	1	383398	Valve Box Lid

3.16 DOWNTOWN (10 PSIG MAOP) AND LARGE COMMERCIAL SERVICES

3.16.1 PE Downtown (10 PSIG MAOP) and Large Commercial Service Lines

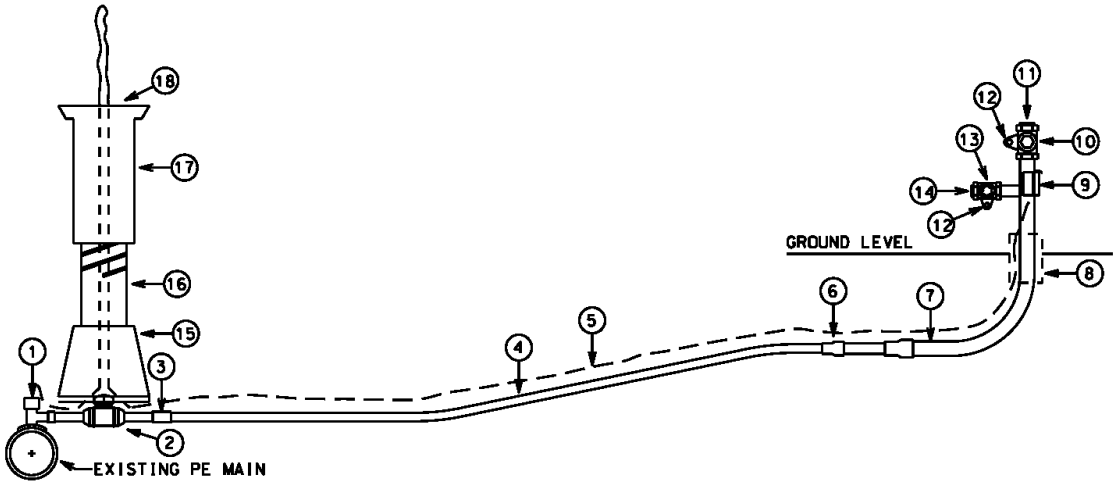
a. 1 inch PE Downtown Service Line with a ¾ inch Riser – Figure 15345-L



Material List for Figure 15345-L

Item	Quantity	KUB Item #	Description
1	1	386052	1-¼ inch x 1 inch PE Tapping Tee
		380949	2 inch x 1 inch PE Tapping Tee
		380964	4 inch x 1 inch PE Tapping Tee
		386789	6 inch x 1 inch PE Tapping Tee
		374876	8 inch x 1 inch PE Tapping Tee
		360902	12 inch x 1 inch PE Tapping Tee
2	1	371708	1 inch PE Valve
3	1	374124	1 inch PE Socket Fusion Coupling
4	1-Lot	386060	1 inch PE Pipe
5	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
6	1	380931	1 inch x ½ inch PE Reducer
7	1	360022	¾ inch x ½ inch PE Anodeless Riser
8	1	-	Protective Sleeve
9	1	361980	¾ inch Tracer Wire Clip
10	1	362167	¾ inch Meter Valve
11	1	360354	¾ inch Plug
12	1	585971	Meter Valve Lock
13	1	294074	Valve Box Base Section
14	1	360440	Valve Box Middle Section
15	1	360451	Valve Box Top Section
16	1	383398	Valve Box Lid

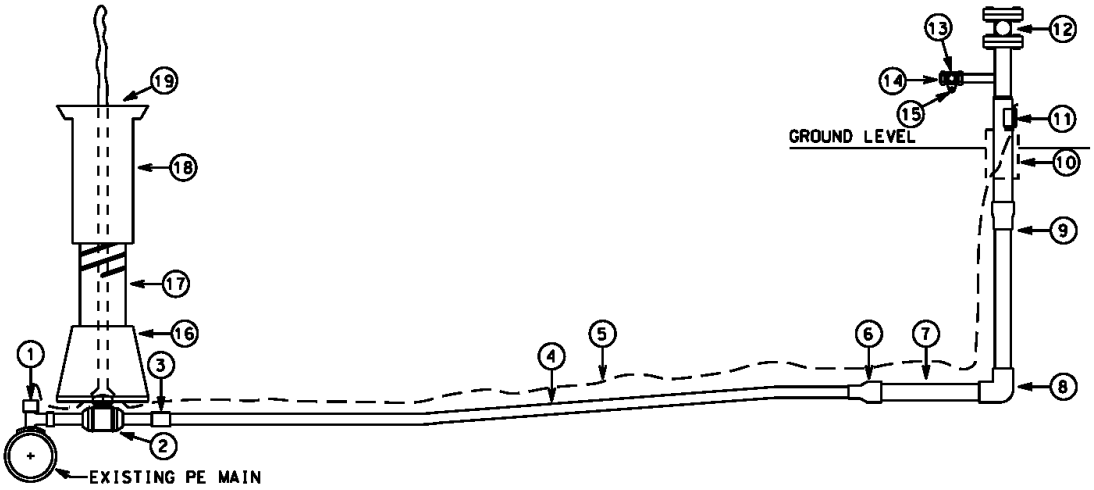
b. 1 inch PE Downtown or Large Commercial Service Line with a 1 ¼ inch Riser – Figure 15345-M



Material List for Figure 15345-M

Item	Quantity	KUB Item #	Description
1	1	386052	1-¼ inch x 1 inch PE Tapping Tee
		380949	2 inch x 1 inch PE Tapping Tee
		380964	4 inch x 1 inch PE Tapping Tee
		386789	6 inch x 1 inch PE Tapping Tee
		374876	8 inch x 1 inch PE Tapping Tee
		360902	12 inch x 1 inch PE Tapping Tee
2	1	371708	1 inch PE Valve
3	1	374124	1 inch PE Socket Fusion Coupling
4	1-Lot	386060	1 inch PE Pipe
5	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
6	1	382598	1-¼ inch x 1 inch PE Reducer
7	1	360627	1-¼ inch PE Anodeless Riser with Bypass
8	1	-	Protective Sleeve
9	1	362112	1-¼ inch Tracer Wire Clip
10	1	362189	1-¼ inch Meter Valve
11	1	363846	1-¼ inch Plug
12	2	585971	Meter Valve Lock
13	1	362178	1 inch Bypass Meter Valve
14	1	362814	1 inch Plug
15	1	294074	Valve Box Base Section
16	1	360440	Valve Box Middle Section
17	1	360451	Valve Box Top Section
18	1	383398	Valve Box Lid

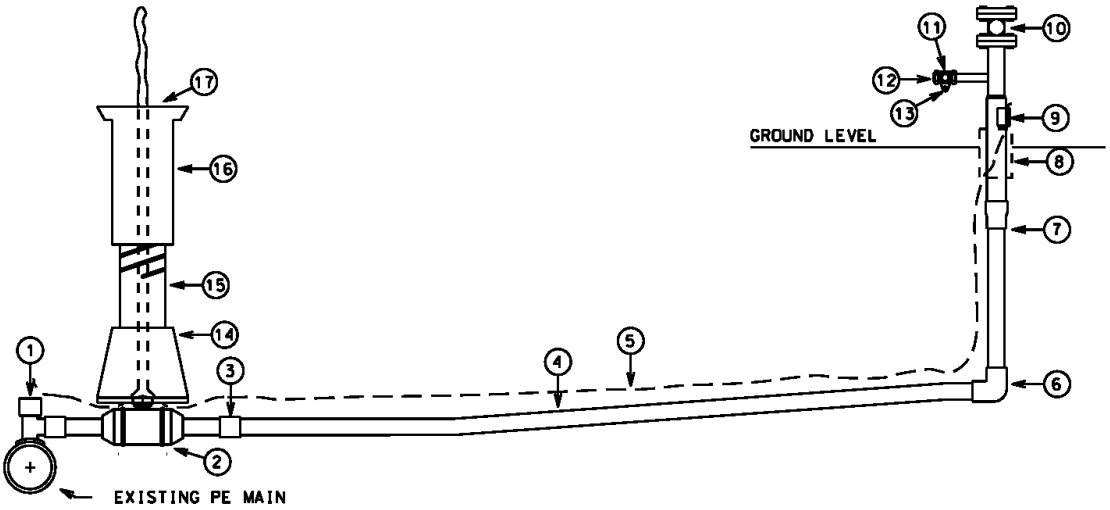
c. 1 ¼ inch PE Downtown or Large Commercial Service Line with a 2 inch Riser – Figure 15345-N



Material List for Figure 15345-N

Item	Quantity	KUB Item #	Description
1	1	373878	1-¼ inch x 1-¼ inch PE Tapping Tee
		380980	2 inch x 1-¼ inch PE Tapping Tee
		380956	4 inch x 1-¼ inch PE Tapping Tee
		386797	6 inch x 1-¼ inch PE Tapping Tee
		374892	8 inch x 1-¼ inch PE Tapping Tee
		360913	12 inch x 1-¼ inch PE Tapping Tee
2	1	371724	1-¼ inch PE Valve
3	1	384032	1-¼ inch PE Socket Fusion Coupling
4	1-Lot	386003	1-¼ inch PE Pipe
5	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
6	1	382689	2 inch x 1-¼ inch PE Reducer
7	12 inches	381160	2 inch PE Pipe
8	1	382952	2 inch PE 90 Degree Bend
9	1	360616	2 inch PE Anodeless Riser with Bypass
10	1	-	Protective Sleeve
11	1	362123	2 inch Tracer Wire Clip
12	1	383471	2 inch Flange Valve
13	1	362189	1-¼ inch Meter Valve
14	1	363846	1-¼ inch Plug
15	1	585971	Meter Valve Lock
16	1	294074	Valve Box Base Section
17	1	360440	Valve Box Middle Section
18	1	360451	Valve Box Top Section
19	1	383398	Valve Box Lid

d. 2 inch PE Downtown or Large Commercial Service Line with a 2 inch Riser – Figure 15345-O



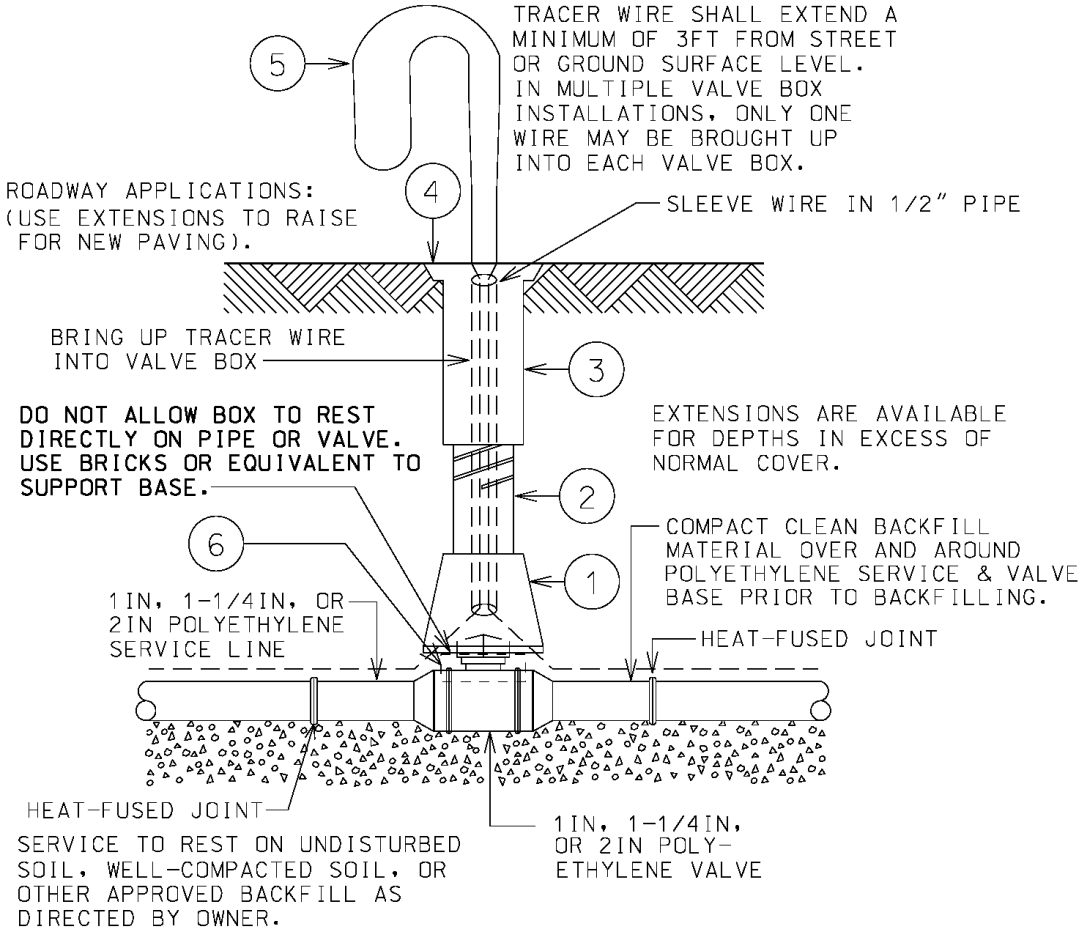
Material List for Figure 15345-O

Item	Quantity	KUB Item #	Description
1	1	372193	2 inch x 2 inch PE Tapping Tee
		380311	4 inch x 2 inch PE Tapping Tee
		380840	6 inch x 2 inch PE Tapping Tee
		374835	8 inch x 2 inch PE Tapping Tee
		360891	12 inch x 2 inch PE Tapping Tee
2	1	371740	2 inch PE Valve
3	1	383810	2 inch PE Socket Fusion Coupling
4	1-Lot	381160	2 inch PE Pipe
5	1-Lot	383448	#12 gauge Solid Copper Tracer Wire
		363069	#12 gauge Steel Copper-Clad Tracer Wire
6	1	382952	2 inch PE 90 Degree Bend
7	1	360616	2 inch PE Anodeless Riser with Bypass
8	1	-	Protective Sleeve
9	1	362123	2 inch Tracer Wire Clip
10	1	383471	2 inch Flange Valve
11	1	362189	1-¼ inch Meter Valve
12	1	363846	1-¼ inch Plug
13	1	585971	Meter Valve Lock
14	1	294074	Valve Box Base Section
15	1	360440	Valve Box Middle Section
16	1	360451	Valve Box Top Section
17	1	383398	Valve Box Lid

3.17 VALVES AND BOXES

3.17.1 Tracer wire shall be looped.

3.17.2 See the following figures and material lists for valve box installation – Figure 15345-P

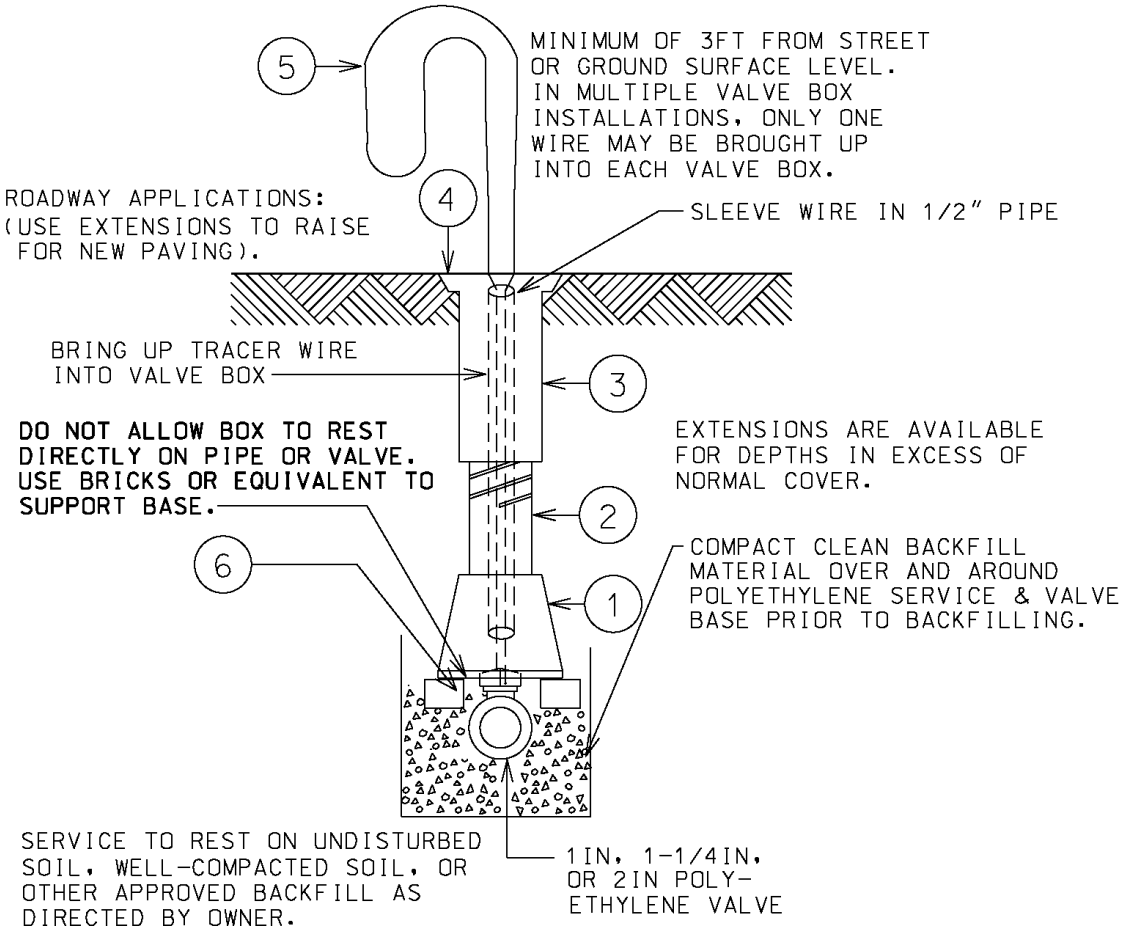


PROFILE VIEW
SINGLE VALVE INSTALLATION

Material List for Figure 15345-P

Item	Quantity	KUB Item #	Description
1	1	294074	Valve Box Base Section
2	1	360440	Valve Box Middle Section
3	1	360451	Valve Box Top Section
4	1	383398	Valve Box Lid
5	1-Lot	383448	Tracer Wire
		363069	Tracer Wire
6	1-Lot	290783	Bricks To Support Valve Box

3.17.3 Figure 15345-Q



CROSS SECTION VIEW
SINGLE VALVE INSTALLATION

Material List for Figure 15345-Q

Item	Quantity	KUB Item #	Description
1	1	294074	Valve Box Base Section
2	1	360440	Valve Box Middle Section
3	1	360451	Valve Box Top Section
4	1	383398	Valve Box Lid
5	1-Lot	383448	Tracer Wire
		363069	Tracer Wire
6	1-Lot	290783	Bricks To Support Valve Box

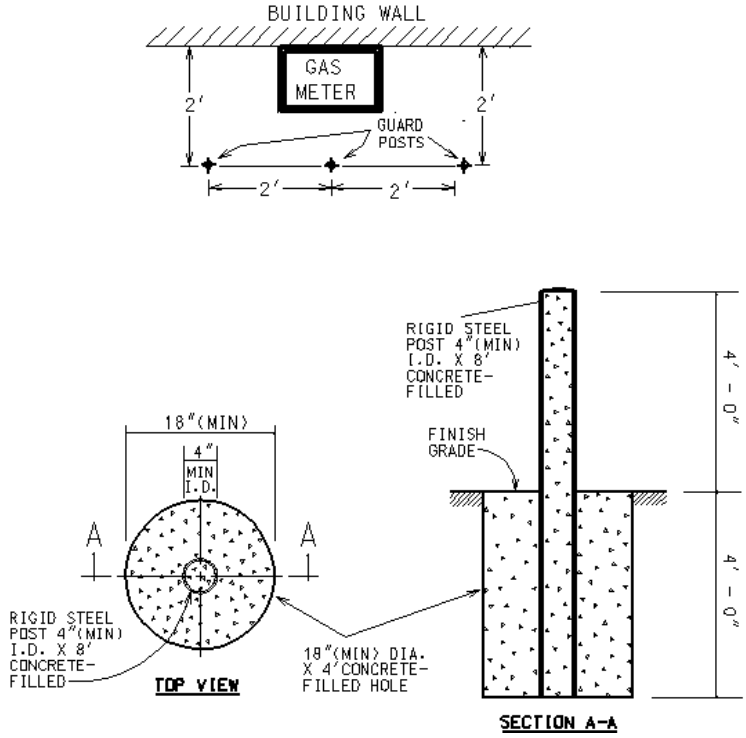
3.18 BOLLARDS

3.18.1 Bollards (protective posts) shall be installed in areas where vehicular damage to a riser or meter may occur.

3.18.2 The quantity and arrangement of bollards shall be based on size of the meter center and shall be installed according to the project drawings or as directed by OWNER.

3.18.3 Bollards shall be concrete filled 4 inch diameter schedule 40 steel, 8 feet long. Each bollard shall be installed 4 feet below grade in an 18 inch diameter concrete filled hole and 4 feet above grade and painted yellow. See Figure 15345-R below for bollard installation.

3.18.4 Figure 15345-R



3.19 CONDEMNATION

3.19.1 Service Lines

3.19.1.1 Service lines shall be condemned in closest proximity to the gas main while in accordance with manufacturers' squeeze off procedures for PE service lines (no less than 26 inches from the outlet of the tee unless a valve is present) and sealed with a cap from **TABLE 9: Approved Caps For Condemning Services Lines**. Condemned service line pipe length (i.e., point of disconnect to the riser location) and pipe length remaining shall be documented on a NGUS..

3.19.1.2 Condemned service line pipe shall be purged of gas from the point of disconnect to the riser with air or inert gas.

3.19.1.3 The riser shall be cut off a minimum of 3 inches below ground and sealed with a hard stopper unless it is in pavement/concrete, then it shall be cut off at grade level and sealed with a hard stopper.

3.19.1.4 Condemned service line pipe shall be sealed at the main end using a cap from **TABLE 9: Approved Caps For Condemning Service Lines** depending on material type.

TABLE 9: Approved Caps For Condemning Service Lines

Service Line Size and Type	KUB Item #	Description
⅞ inch XT Steel	363630	⅞ inch Stainless Steel Swagelock Cap
½ inch CTS PE	362101	½ inch CTS PE Socket Fusion Cap
½ inch IPS PE	383802	½ inch IPS PE Socket Fusion Cap
¾ inch IPS PE	372037	¾ inch IPS PE Socket Fusion Cap
1 inch IPS PE	370115	1 inch IPS PE Socket Fusion Cap
1 ¼ inch IPS PE	386001	1 ¼ inch IPS PE Socket Fusion Cap
2 inch IPS PE	383646	2 inch IPS PE Socket Fusion Cap
¾ inch Steel	372516	¾ inch Steel Companion Lock Cap
1 inch Steel	362681	1 inch Steel Companion Lock Cap
1 ¼ inch Steel	363770	1 ¼ inch Steel Companion Lock Cap
2 inch Steel	364059	2 inch Steel Companion Lock Cap

3.19.1.5 A 3M EMS 4" Extended Range 5 feet Ball Marker – Gas 1405-XR (KUB Item #363718) shall be placed at the end of the active service line remaining unless deeper than 5 feet deep. If active service line is deeper than 5 feet, the Ball Marker shall be placed 5 feet deep directly above the fused cap of the active service line.

3.19.1.6 When steel main is not scheduled to be condemned as part of the project, all steel mains exposed during a service line condemn shall be coated and cathodically protected prior to backfilling. In addition, corrosion observations shall be performed and documented. Refer to Sections 15500 and 15560 for details.

3.19.2 Service Line Valves

3.19.2.1 If condemnation of service line valve is required, service line valves shall be condemned by removing the valve box lid, demolishing or removing the valve box top section and backfilling as required in **3.12 BACKFILL**.

3.20 CLEAN UP AND RESTORATION

3.20.1 Follow clean up and restoration requirements stated in Section 00700 General Conditions and Section 01560 Work In Easements and Right-Of-Ways.

3.21 RECORD KEEPING

3.21.1 **Natural Gas Utility Sheet (NGUS)**

3.21.1.1 A neat and legible NGUS is required for any work performed on a service line.

3.21.1.2 The NGUS for each service line shall be filled out in its entirety as applicable to the work completed. The drawing section of the NGUS shall contain measurements for pipe length, component locations, and using permanent structures to locate the pipe and components for future reference.

3.21.1.3 The NGUS shall be drawn the day the work was performed, reviewed for quality assurance, and submitted to an RPR within 2 business days of the work being completed.

3.21.1.4 All deviations, approved by the RPR, from this Section shall be documented on the NGUS.

3.21.1.5 All pressure test documentation shall be signed by the qualified person responsible for performing the pressure test and attached to the NGUS for each individual service line.

3.21.2 **Boring Profile**

3.21.2.1 When pipe is installed outside of the specified requirements in **3.4 DEPTH**, a final boring profile (electronic is preferred) shall be submitted to RPR within 48 hours of a completed bore. The final boring profile shall consist of, at a minimum, a table illustrating pitch and depth for the length of every other rod.

END OF SECTION