

ADDENDUM # 1
KINGSBURY CREEK UTILITY RELOCATIONS
AT GRAND AVENUE
City of Duluth
Bid No. 14-014-0306
Bid Opening: 2:00 P.M. June 11, 2014

NOTICE TO ALL BIDDERS:

The addendum is issued to modify, explain or correct the original drawings, specification and/or previous addendums and is hereby made a part of the Contract Documents. Please attach this Addendum to the specifications in your possession and note receipt of this Addendum on page 2 of the Request for Bid.

The above entitled contract documents are hereby revised as follows:

Construction Standards 2013, for the City of Duluth, Minnesota, February 1, 2013 Edition

The attached Appendix B shall supersede the following sections within the 2013 Construction Standards documents:

- APPENDIX A, Section 14: Material Requirements for HP Gas Pipelines
- APPENDIX A, Section 15: General Construction Requirements for HP Gas Pipelines

Project Specifications

ADD the following paragraph to the special provisions section of the specification:

SP-4.6 RESTRICTED WORK DAYS

No Construction activities will be permitted on Saturdays that follow an observed Holiday during the regular work week, which includes September 6th and November 15th, 2014.

Work will not be permitted on October 11th and October 18th to accommodate Boo-In-The Zoo events. Construction within the Zoo shall be demobilized and work space prepared for Boo-In-The-Zoo activities.

ADD the following paragraphs to the special provisions section of the specification:

SP-10.1 For the installation of the 24" HDPE water main only, the following requirements shall supersede the Construction Standards regarding pipe cleaning prior to testing as described in the 2013 Construction Standards Section 2504, Part B-19.a.

The interior of the 24" water main shall be visual inspected when practical after each fuse for the presence of debris, dirt, and HDPE chips, curls, or shavings. The Contractor shall remove any identified debris to the satisfaction of the project engineer.

SP-10.2 Pertaining to the 24" water main only, the 90 degree bend fittings identified on Sheet 16 of the Construction Drawings at stations 1+26 and 4+85 shall be mechanical joint ductile iron fittings for constructability purposes. Connections to these fittings with the pipe shall be made with HDPE MJ transition ends. Each fitting shall be provided with a cast in place concrete thrust restraint.

ADD the following sentence to the special provisions section SP-16 of the specifications:

6. The Department shall survey the alignment of the proposed gas and water mains where they will not be replacing the existing utilities in the same location.

ADD the following paragraph to the special provisions section of the specification:

SP-23 COOPERATION WITH DULUTH TRANSIT AUTHORITY

The Duluth Transit Authority (DTA) has bus service in the project area which will be affected by this construction. The Contractor shall notify the DTA representative, Phil Torgerson, Director of Operations, at (218) 722-4426 prior to the start of the project.

At a minimum the Contractor is required to protect an existing bus stop shelter from damage incidental to the gas main installation. The shelter is located on Grand Avenue near station 11+25 and will likely require removal and re-installation during gas main construction. The expense of protecting or removal and re-installation shall be incidental to the project.

Contract Drawings

CHANGE note 15 on Sheet 2 of the Construction Drawings to read:

"Tree species shall be Sugar Maples, location as directed by the Engineer"

ADD the following note to the GRAND AVE REPAIR SECTION detail on Sheet 6 of the Construction Drawings as described below:

"Notes:

1. The existing road section in Grand Avenue consists of bituminous pavement varying from 1.5" to 3.5" thick, concrete pavement varying from 7" to 9" in thickness, and 3" of class aggregate. "

MODIFY the GRAND AVE REPAIR SECTION detail on Sheet 6 of the Construction Drawings as described below:

“ 2.5” Bituminous Wearing Course Mix ” shall now read “ 3.5” Bituminous Wearing Course Mix in Two Lifts “

“ 7” Concrete Base “ shall now read “ 8 ½” Reinforced Concrete Pavement “

“ 3” Aggregate Base CV “ shall now read “ 12” Select Granular Borrow “

Pre-Bid Meeting Notes

Attached for your use and reference are the following documents from the Pre-Bid Meeting conducted June 3, 2014.

- Meeting Agenda with Notes
- Meeting Attendance List

END OF ADDENDUM

Appendix B

Standard Construction Specifications Appendix A

Section 14: Material Requirements for HP Gas Pipelines and Section 15: General Construction Requirements for HP Gas Pipelines

GAS OPERATION & MAINTENANCE MANUAL

SECTION 14: MATERIAL REQUIREMENTS FOR HP GAS PIPELINES

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14.01 General

This section of the Standard Specifications establishes requirements and policies for the materials of construction of high pressure gas distribution systems operating at pressures ranging from 1 psig to 275 psig and a transmission line which operates at a pressure ranging from 550 psig to 974 psig. Low pressure gas mains and services, the remaining systems of which were abandoned in 1992, are only specified to the extent of involvement with high pressure construction, such as conflicts in location, abandonments, etc.

All excavation, backfilling and restoration and horizontal direction drilling required for the construction of high pressure gas distribution systems shall be performed in accordance with the City of Duluth, Minnesota Public Works & Utilities Department – Engineering Division, Standard Construction Specifications, most current edition.

For contracted projects, these specifications also establish responsibilities between the Contractor and the Department for supplying materials and providing labor and equipment for installations. The Plans and Special Provisions may change these responsibilities for particular projects; therefore, it is essential that those parts of the documents be carefully reviewed for each project, since they take precedence over this Standard Specification.

14.02 General Material Requirements

All materials required for this work shall be new material conforming to requirements of the referenced specifications for the class, kind, type, size, grade, and other details indicated in the Contract. Unless otherwise indicated, all required materials shall be furnished by the Contractor. If any options are provided for as to type, grade, or design of the material, the choice shall be limited as may be stipulated in the Plans, Proposal, or Special Provisions.

All manufactured products shall conform in detail to such standard design drawings as may be referenced or furnished in the Plans. Otherwise, the Department may require advance approval of material suppliers, product design, or other unspecified details as it deems desirable for maintaining adopted standards.

14.03 High Pressure Gas Pipe

All pipe furnished for gas main and branch line installation shall be of the type, kind, size, and class indicated for each particular line segment as shown in the Plans and designated in the Contract Items.

Normal pressure range is 10 psig to 275 psig for distribution and 550 to 974 psig for transmission.

Minimum number of samples taken for acceptance/rejections testing by the Department will be based on the current Military Standard 105 D entitled SAMPLING PROCEDURES AND TABLES FOR INSPECTION BY ATTRIBUTES. The sampling plan consists of: General Inspection Level II, Single Sampling, Normal Inspection, and an Acceptable Quality level of 2.5; failure to pass this inspection is the minimum basis for rejection of lot. Rejected material shall be returned to supplier at supplier's expense.

Supplier shall certify with each shipment that the material shipped has been inspected by the supplier and conforms to the Material Specification.

14.03.01 Steel Gas Main Pipe (2"-16") and Fittings

Steel gas main pipe shall be class 1; grade B, X42, or X52; seamless, electric weld or submerged-arc weld steel pipe, conforming to the 42nd Edition of API Standard 5 L Specifications for Line Pipe and as specified herein.

Pipe shall be in double random lengths. Ends beveled 30°, +5°, -0° for butt weld joining.

Wall thickness shall conform to the following table unless specifically specified otherwise (see O&M Section 03.04(A) for other wall thicknesses):

Nominal Size Inches)	OD (Inches)	Least Nominal Wall Thickness (Inches)
2	2.375	0.154
3	3.500	0.154
4	4.500	0.188
6	6.625	0.188
8	8.625	0.188
10	10.750	0.219
12	12.750	0.250
16	16.000	0.250

Exterior pipe coating shall be factory applied thin film epoxy or fusion bonded epoxy (FBE). Thin film epoxy shall be from manufacturer's chart below. Thin film epoxy shall be applied according to the manufacturer's standards and recommendations, and conforming to the National Association of Pipe Coating Applicator's Specification 12-78-90. Coating thickness shall be 12 mils with a maximum tolerance of minus 2 mils.

Any pipe installed by directional drilling shall be coated with a sacrificial or abrasive top coat. The top coat is required to be minimum thickness of 0.030" (30 mils). Coating shall be factory applied unless approved by Engineer. This coating shall be from manufacturer's chart below.

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Manufacturer	Base FBE	Abrasive Top Coat
Lilly Industries	2000	2040
3M Scotchkote	206N or 6233	6352
NapGuard	2500	2610
Power Lone Star		Powercrete

For field applied coatings and sleeve information see 14.06.04 & 14.06.05.

Exterior coating shall be cutback on pipe ends as follows:

For nominal sizes thru 12" - 2" cutbacks

Markings indicating the standard to which the pipe was manufactured shall be applied to the coated pipe.

Manufacturer, when requested, shall furnish ladle and check analysis of all heats used to make this pipe. For butt weld Class I pipe, supplier shall certify that the material furnished has been analyzed and meets the chemical requirements of API STD 5 L.

Steel Pipe for Gas Plumbing. Pipe 2" and less in diameter shall be black or galvanized, standard weight, Schedule 40, conforming to the requirements of ASTM A106 or A53, and manufactured by a domestic supplier.

14.03.02 Polyethylene Pipe (1/2", 1", 2", 3") and Fittings

Polyethylene pipe shall be made from Phillips TR-418, "Gulf" HID 9300-T, or Plexco P23BC resins (orange or yellow). Materials shall conform to ASTM D-2513, PE2708 or PE2406. Pipe and fittings shall conform to ASTM Specification D-2513 "Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings."

Pipe weights and thicknesses shall be as follows:

Size	OD	SDR No.	Minimum Wall Thickness	Lbs/Ft
1/2" CTS	0.625"	7	0.090"	0.06
1" CTS	1.125"	11.5	0.099"	0.14
1" CTS	1.125"	9.3	0.121"	0.17
2" IPS	2.375"	11.0	0.216"	0.63
3" IPS	3.500"	11.5	0.304"	1.33
4" IPS	4.500"	11.5	0.391"	2.20

Pipe shall be marked as shown in the current ASTM D-2513 standard; and in addition, the resin manufacturer's material designation shall be marked on the pipe. If any data marked on the pipe is coded, the supplier shall furnish the code key. Pipe shall be new

or stored for a period of time that does not exceed the manufacturer's recommended maximum period of exposure, regardless of the method of storage.

Polyethylene fittings shall be the socket fusion type conforming to the current ASTM D-2683 Specification "Socket Polyethylene Fittings for SDR 11 Polyethylene Pipe, or Butt Fusion pipe conforming to the current ASTM D-3261 specification." A mechanical type fitting may be substituted for 1/2" CTS only. This fitting shall be a "Continental Con-Stab Type 52,53 or 56" or a "lycofit by RW Lyle" for 1/2" diameter pipe, or for 1/2" PE to steel or copper, Chicago fitting M785DCZ3S090 shall be permitted for temporary services.

An electrofusion type coupling or saddle fitting may be substituted upon approval of the Engineer. This fitting shall be electrofusion type by Central Plastics or Lycofuse.

Polyethylene service tee fittings shall be saddle fusion type or electrofusion type by Central Plastics or Lycofuse conforming to the current ASTM D-2513 standard.

Cutter punch size for 1" CTS service taps shall be 11/16" or larger.

Straight lengths of 2" or 3" pipe will only be permitted when specified or with approval of the Engineer, where it is determined to be most suitable for a particular installation.

Coiled pipe or tubing delivered to the work site shall have the ends capped.

Pipe Size	Minimum Coil ID	Maximum Coil OD	Maximum Coil Width
1/2"	30"	44"	6"
1"	44"	48"	12"
2"	48"	78"	41"
3"	70"	102"	44"
4"	70"	-	45"

Pipe strapping shall be made of plastic or other non-metal material. Coils shall have strapping around the interior portions of the coil to prevent partial coils from collapsing, as well as a sufficient number of straps around the completed coil. Polyethylene pipe and fitting shall be Driscoplex, Continental or Phillips or approved equal.

14.03.03 Polyethylene Pipe (4, 6, & 8") and Fittings

Polyethylene pipe shall be made from "Phillips TR-418" (orange or yellow), "Gulf HID 9300-T" (orange or yellow), or "Plexco P23BC" (orange or yellow) resins. Material shall conform to ASTM D-2513, PE2708 or PE2406. Pipe and fittings shall conform to ASTM Specification D-2513 "Standard Specification for Thermo-plastic Gas Pressure Pipe, Tubing and Fittings".

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Pipe weights and thicknesses shall be as follows:

Size	OD	SDR No.	Minimum Wall Thickness	Lbs/Ft
6"	6.625±.011	11.5	0.581"	4.7
8"	8.625±.011	11.5	0.750"	7.99

Pipe shall be marked as shown in the current ASTM D-2513 standard, and, in addition, the resin manufacturer's material designation shall be marked on the pipe. If any data marked on the pipe is coded, the supplier shall furnish the code key. Pipe shall be new or stored for a period of time that does not exceed the manufacturer's recommended maximum period of exposure. Pipe older than the maximum period of exposure will still be accepted if the manufacturer or supplier submits written documentation that the pipe was stored inside under conditions not exposed to UV light. The written documentation must include the location where the pipe was stored and the corresponding dates it was stored there.

Polyethylene fittings shall be the butt fusion type conforming to the current ASTM D-3261 Specification "Butt Heat Fusion (PE) Plastic Fittings for (PE) Plastic Pipe and Fittings". Electrofusion fittings are an acceptable alternative.

Pipe shall be furnished in straight lengths. Length shall be in a minimum of 40 foot lengths. Straight lengths shall have plain ends without couplings unless otherwise specified.

Straight lengths of pipe shall be strapped with a sufficient number of non-metallic straps so the bundle will remain intact during shipping and warehousing.

Only with the Engineer's approval, pipe may be furnished by the contractor in coils. Contractor shall be responsible for the straightening of the pipe according to the manufacturer's instructions.

14.03.04 Polyethylene Pipe (12") and Fittings

Polyethylene pipe shall be Yellowstripe 8300. Materials used for manufacture of polyethylene pipe shall be PE3408/PE4710-PE100 high density polyethylene. Pipe and fittings shall conform to ASTM Specification D2513 "Standard Specification for Thermo-plastic Gas Pressure Pipe, Tubing and Fittings".

Pipe weights and thicknesses shall be as follows:

Size	OD	SDR No.	Minimum Wall Thickness	Lbs/Ft
12"	12.750±.017	13.5	1.109"	17.44

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Pipe shall be marked as shown in the current ASTM D-2513 standard, and, in addition, the resin manufacturer's material designation shall be marked on the pipe. If any data marked on the pipe is coded, the supplier shall furnish the code key. Pipe shall be new or stored for a period of time that does not exceed the manufacturer's recommended maximum period of exposure, regardless of the method of storage.

Polyethylene fittings shall be the butt fusion type conforming to the current ASTM D-3261 Specification "Butt Heat Fusion (PE) Plastic Fittings for (PE) Plastic Pipe and Fittings". Electrofusion fittings are an acceptable alternative.

Pipe shall be furnished in straight lengths. Length shall be in a minimum of 40 foot lengths. Straight lengths shall have plain ends without couplings unless otherwise specified.

Straight lengths of pipe shall be strapped with a sufficient number of non-metallic straps so the bundle will remain intact during shipping and warehousing.

Pipe shall be black with a minimum of 4 yellow stripes.

14.04 Valves

14.04.01 Steel Gate Valves

Valve shall be a non-lubricating full port, steel body valve with a single disc which, when closing, results in a wedging action against the double seats, or compression of an elastomer against the seating area. Valve shall have a non-rising stainless steel stem, and the following features:

Pressure Rating:	275 WOG
Ends:	150# ANSI Flat Face Flanges (except when specified otherwise)
Operator:	2" Square and open Counter-clockwise
Coating:	"Scotchkote" #306 resin - 9 mils min.

Each valve shall have attached label indicating brand name or manufacturer, model number, pressure rating, and standard by which it was manufactured, such API #, MSS-SP#, ANSI#, etc.

Valve shall be Kerotest Model M-1, 1F2, or Kerotest Model EV-11, or approved equal.

When specified, locking devices (not including the lock) shall be provided by the valve manufacturer and shall consist of a two-part unit, a cap and a swivel nut which fits onto the stem and over the operating nut. Device shall be equal or similar to Kerotest's Model 1 Locking Device.

14.04.02 Steel Ball Valves

- A. Steel Valves – Trunnion Mounted Ball Valves. Valves shall be non-lubricating with emergency sealant ports, full port, double block and bleed, steel body, non-rising carbon steel nickel plated stem and the following features:

Pressure rating:	ANSI 150,300,600
Ends:	150#, 300#, 600# ANSI raised face flanges
Operator:	2"–4" valves to be lever operated except when specified otherwise (2" square operating nut) 6" and larger valves to be gear operated with hand wheel except when specified otherwise (2" operating nut)
Coating:	Below ground valves to be tar-set coated-30 mils thick.

Each valve shall have attached label indicating manufacturer, model & serial number, pressure rating and standard by which it was manufactured. Valves shall be Broen Ballomax, Cooper Cameron type 41 or 31 or Grove B4-D, B-5 or approved by the engineer.

- B. Steel Valves – Floating Ball Valves. Valves shall be non-lubricating, full port, steel body, non-rising stem and the following features:

Pressure rating:	ANSI 150#-Flat face flanges (except when specified otherwise)
Operator:	2"-4" to be lever operated with locking plate (open or close) 6" and larger to be gear box operated

Each valve shall have attached label indicating manufacturer, model number, pressure rating. Valve shall be Balon series "F" (Valve System, Inc., VSI 111 is no longer used).

14.04.03 Polyethylene Valves

Valves shall be Nordstrom, Kerotest, Lyco by R. W. Lyall, Perfection Corporation, Broen (1-inch to 3-inch) or approved equal, with PE2406 (orange or yellow) polyethylene body, and 2-inch square operator conforming to the following requirements.

All valves shall be fully ported unless approved otherwise by the Chief Engineer of Utilities. Size 4-inch shall have a bore of at least 3.5" diameter. Size 6-inch shall have a bore of at least 4.75" diameter. Size 8-inch shall have a bore of at least 6.6" diameter. Ends shall be sufficiently long to fit into fusion machines for butt fusion to SDR 11.5 (6-inch and 8-inch) pipe.

Sizes 1", 2" and 3" shall be ball type with ends for socket fusion to SDR 9.3 or 11.5 (1" CTS), SDR 11 (2" IPS) and SDR 11.5 (3" IPS) pipe. Connecting end shall be straight pipe not less than 3.25 or more than 6 inches long.

Each valve shall be clearly marked or labeled to show: the standard such as B16.40 to which it was manufactured; the manufacturer's name or trademark; the size; the pressure rating; SDR number and material standard, i.e. PE2306, 2406 of connecting end material.

14.04.04 Excess Flow Valves

Excess flow valves shall meet or exceed all requirements of CFR Title 49 Part 192.381, ASTM F 2138, and MSS-115. Excess flow valves shall be designed for operating pressures of 5 – 125 psig, flow capacities of 475 CFH and bleed-by flow rates less than 20 SCFH at a line pressure of 10 psig. Excess flow valves shall be LYCO EFV I Series 475 by R.W. Lyall for 1/2" CTS (0.090" wall thickness) or 1" CTS (0.099" wall thickness).

14.04.05 Meter Stop Valves (3/4" and 1" sizes)

Meter stop valves shall be 175 psi, black iron body, brass or bronze key, stem nut and stem washer, tamperproof, lubricating type, lockwing with 1/2" hole. Inlet and outlet to have iron pipe inside threads. Outlet to have insulated union. Valves shall be one of or an approved equal to Eclipse PNP-203, McDonald 6276B, or Mueller E-11179.

14.04.06 Plug Valves

Plug valves shall be rated for minimum WOG 175, with high strength cast iron body conforming to ASTM A 126-42, Class B. Valve shall have a lubricating fitting centered on top of the stem where lubricant will travel through the stem, a double ball check, and to sealant grooves to the well at the base of the plug.

Valves shall be short pattern with 125# ANSI flanges and have a 2-inch square operating nut. Valve shall be Walworth 1797F, Nordstrom 143, Homestead 602 or 612, or an approved equal.

14.04.07 Meter Stop Valves for Multiple Meters

Meter stop valves shall be 175 psi, black iron body, brass or bronze key, stem nut and stem washer, tamperproof, lubricating type, lockwing with 1/2" hole. Inlet and outlet to have iron pipe inside threads. Valves shall be one of or an approved equal to Eclipse PNP-201, McDonald 560-B, Mueller H-11175, or Dresser Style 275.

14.04.08 Miscellaneous Transmission Valves

These valves are located at the Pig Launch, Pig Receiver, and GL Regulator Station, 1/2", 3/4", and 1". The design of the ball valve shall meet or exceed all requirements of ASME B16.34, MSS SP-110, and the end connections shall meet or exceed all requirements of ASME B1.20.1. The ball valves shall be either 3000# WOG black iron body type or 1000# WOG Stainless Steel, Grade CF8M/316SS, threaded NPT end, full port, two piece FNW Figure 200A.

14.05 Miscellaneous Fittings and Materials

14.05.01 Locating Wire and Connectors

Locating (tracer) wire shall be #12 solid copper with "HMWPE" 30 mil yellow insulation. Wire shall be supplied on spools of not less than 500 feet. If main and locate wire are to be placed by horizontal directionally drilling, tracer wire shall be #6 hard drawn copper (ASTM B-1) or annealed 49-strand braided 302 alloy stainless steel. The conductors shall be insulated with 45 mil yellow high-density polyethylene (HDPE) jacketing. The wire shall be tested in accordance with ASTM B-1 and D-1248 and spark tested at 7500 VAC. The breaking strength of the wire shall be at least 1280 pounds.

Splices in the copper tracer wire should be made with solder, split bolt type connectors or other type approved by the Engineer. Splices in the stainless steel tracer wire should be made with split bolt type connectors or other type approved by the Engineer. Wire nuts or clip type connectors shall not be used. All connections shall be protected to make them watertight. Waterproofing material shall be 3M 2200 pads or equal.

14.05.02 Service Riser (3" and larger services)

Riser shall be welded steel, length 30" vertical x 12" horizontal, 150# flange on top, coated up to flange per Specs., Sec. 14.13.07(E) and provisions made for anode attachment. Steel pipe shall be in conformance ASTM A106, ASTM 53, or API 5L, all Grade B.

Risers 3" in size may also be anodeless angle type with Phillips TR-418 plastic carrier pipe encased in a galvanized or a fusion bonded epoxy coated metal casing. Vertical rise shall be 30 inches of which the top 15 inches shall be centered in the casing so that air or a heat resistant material occupies the space between. Carrier pipe to casing shall be sealed in the upper end by means of insert stiffener and compressed O-Rings or rubber seals. Horizontal leg shall be steel casing a minimum of 12 inches and a maximum of 20 inches plus a 12" pigtail of plastic pipe not encased. Below grade, end of casing shall be effectively sealed against water intrusion. The 3" anodeless riser may be installed in a 66 PSI system and shall have a carrier pipe wall of 0.304" and a top connection of 3" 150# welded flange. Riser shall be one of or an approved equal to Central Plastics, Perfection, Dresser, or R W Lyall and Company.

14.05.03 Service Risers (1/2" CTS x 3/4" IPS and 1" CTS x 1" IPS and 2" IPS)

Riser shall be anodeless angle type with Phillips TR-418 plastic carrier pipe encased in a galvanized or a fusion bonded epoxy coated metal casing.

Vertical rise shall be 30 inches of which the top 15 inches shall be centered in the casing so that air or a heat resistant material occupies the space between. Carrier pipe to casing shall be sealed in the upper end by means of insert stiffener and compressed O-Rings or rubber seals. Horizontal leg shall be steel casing a minimum of 12 inches and a maximum of 20 inches plus a 12" pigtail of plastic pipe not encased. Below grade, end of casing shall be effectively sealed against water intrusion. The 2" anodeless riser may be installed in a 66 PSI system.

An approved alternate service riser for 1/2" CTS x 3/4" IPS and 1" CTS x 1" IPS is a Central Plastics anodeless flex service riser or an approved equal. Riser shall be anodeless angle type with Phillips TR-418 plastic carrier pipe encased in a galvanized or a fusion bonded epoxy coated metal casing and sunlight resistant flex tubing. Vertical rise shall be 30 inches of which the top 18 inches shall be centered in the casing so that air or a heat resistant material occupies the space between. Carrier pipe to casing shall be sealed in the upper end by means of insert stiffener and compressed O-Rings or rubber seals. Horizontal leg shall be sunlight resistant flex tubing a minimum of 24 inches long plus a 12" pigtail of plastic pipe not encased. Below grade, end of casing shall be effectively sealed against water intrusion.

	1/2 CTS x 3/4 IPS	1" CTS x 1" IPS	2" IPS
Carrier Pipe Wall	0.090"	0.099"	0.216"
Top Connection	3/4" IP outside	1" IP outside	2" I.P. threads

Riser shall be one of or an approved equal to Central Plastics, Perfection, Dresser, or R W Lyle and Company.

14.05.04 Transition Fittings (PE to Steel)

Transitions shall be resin coated Schedule 40 steel pipe connected to the polyethylene pipe with a factory-made permanent type compression joint meeting the requirements of ASTM D-2513 and ANSI B-31.8. Steel end shall be for weld type connection. Plastic portion shall conform to the minimum requirements for PE pipe as indicated below.

Size	Wall	Material	Type of Connection
1" CTS	SDR 9.3	Phillips or Gulf	Socket
2" IPS	SDR 11.0	Phillips or Gulf	Socket
3" IPS	SDR 11.5	Phillips or Gulf	Socket
4" IPS	SDR 11.5	Phillips or Gulf	Butt
6" IPS	SDR 11.5	Phillips or Gulf	Butt
8" IPS	SDR 11.5	Phillips or Gulf	Butt
12" IPS	SDR 13.5	Phillips or Gulf	Butt

14.05.05 Valve Box

Box shall be two section, screw type with a cast iron top section and a plastic bottom section with a 5-1/4 inch ID, threaded shaft integral with a 9 inch diameter bonnet or bell. Heights of the sections shall be selected to fit the installation depth when the base is over the operating nut, but not closer than 2 inches to the valve flange. Plastic may be sawed off as required. Refer to Detail Drawing G-5 in the Appendix.

Cover shall be the stay-put type cast iron having 2 recessed lift holes. The identification "GAS" shall be cast into the cover.

14.05.06 Casing Seals

For PE carrier pipe, casing seals shall be the pull-on "S" or "U" type made of oil and water resistant rubber, complete with stainless steel thumb screw clamps. Casing seals shall be P.S.I., Type S, F.H. Maloney Multiflex, T.D. Williamson U-Seal or approval equal.

For steel carrier pipe, casing seal shall be link seal type similar or equal to Link-Seal manufactured by Thunderline Corp., Wayne, MI.

14.05.07 Strainers

Strainers shall be self-cleaning "Y" type, ductile iron or cast-steel body-125# ASA rating with screwed ends for up to 2 inch sizes and 150# ANSI flanged ends for sizes 2 inch and larger. Screen shall be monel or stainless steel wire, 30 mesh, with openings 1/50". Effective screen ratio shall be at least 2:1 or greater. Screen access cover shall be tapped FI PT for blowoff. Strainer for transmission is a 6" with 600# ANSI flanges and body, 100 mesh liner, simplex style. Strainer for the Stora Enso Flow Control regulator is an 8" 150# Ansi body, 100 mesh, simplex style (tee).

14.05.08 Bolt-Type Couplings

Use was discontinued by or before 1993. Couplings no longer used on gas systems include Dresser Style 39-62, Style 38, Style 40, Style 711 and CS1 CLa Maxi-Grip.

14.05.09 Steel Weld Flanges

Flanges shall be either welding neck or slip-on, flat face unless specified otherwise, 150# or 300# ANSI B16.5, and conforming to the ASTM Specification A181, except for transmission which are 600# ANSI, raised face.

14.05.10 Gaskets

Gaskets for Flanged Connections shall be PSI Linebacker Sealing gasket with phenolic retainer and nitrile sealing element or non asbestos that are in stock (phasing out). Transmission line gaskets shall be 600# Flexitallic, PSI Linebacker Sealing gasket with G-10 retainer and Teflon or Viton sealing element or approved equal.

14.05.11 Bolts

Bolts for flanged connections shall be ASTM449 medium carbon steel, SAE Grade 5, medium carbon quenched-tempered and the head marked with a "Y" to indicate grade. B7 stud is an acceptable alternative when bolts do not fit the application. Bolts for transmissions will be ASTM A193 B7 grade, 600# ANSI.

BOLTS FOR FLANGED CONNECTIONS (150# CLASS)

Size	No of Bolts Per Flange	Diameter of Bolts*	Bolt Length*	Stud Length	ID and OD Inches	Suggested Torque Ft-Lbs **
2"	4	5/8"	2-1/4"	3-1/2"	2" x 4-1/8"	80
3"	4	5/8"	2-1/2"	3-3/4"	3" x 5-3/8"	110
4"	8	5/8"	2-3/4"	3-3/4"	4" x 6-7/8"	100
6"	8	3/4"	3-1/4"	4-1/4"	6" x 8-3/4"	130
8"	8	3/4"	3-1/2"	4-1/2"	8" x 11"	130
10"	12	7/8"	3-3/4"	5-0"	10" x 13-3/8"	215
12"	12	7/8"	3-3/4"	5-0"	12" x 16-1/8"	220
16"	16	1"	4-1/2"	5-7/8"	16" x 20-1/4"	320

* Use bolts or studs 1/2" longer with insulating flanges. No stud or bolt shall have less than two (2) exposed threads on the nut end.

**Torque is based on lubricated bolt and bolt stress of 45 ksi.

On Transmission system, Engineering must be contacted prior to work for approval of diameters, length, number, and recommended torque.

14.05.12 Amp-Fit Couplings (no longer used)

Amp-Fit Transition Couplings (1/2" CTS PE to 5/8" OD Copper). Fitting was designed to connect 1/2" CTS - .09" wall polyethylene to 5/8" OD - Type K Copper. Fitting was Amp-Fit Part No. 332643-1.

Amp-Fit Repair Coupling (1/2" CTS, 1" CTS, 2" IPS - PE to PE). Fitting was designed to connect the following polyethylene pipe sizes:

- 1/2" CTS PE - .09" wall - SDR 7 - Part No. 332629-2
- 1" CTS PE - .121" wall - SDR 9.3 - Part No. 561414-1
- 2" IPS PE - .216" wall - SDR 11 - Part No. 561124-2

14.05.13 Mechanical Plastic Pipe Coupling (1/2")

Coupling shall have a plastic body with plastic end sleeves designed to compress the pipe over plastic barbed ends with a metal stiffener that extend the length of the coupling or couplings shall have a plastic body with two internal seals, a fixed stiffener, self-locking gripper and a moisture lip. Couplings shall be tested to conform to ASTM D2513. Coupling shall be labeled to indicate a pipe size and wall thickness as follows:

1/2" CTS - 0.09" Wall - SDR 7

Coupling shall be "Lycofit" by RW Lyall Pipeline Products, "Con-Stab Type 52, 53 or 56" by Continental Industries or approved equal.

14.05.14 Electrofusion Plastic Pipe Coupling (1", 2", 3", 4", 6", 8", 12")

Couplings shall be compatible with an approved electrofusion unit. Electrofuse coupling shall be Lycofuse or Central Plastics designed to connect all PE 2306 or 2406 (orange or yellow or tan) medium density plastic pipe of the following sizes:

1" CTS PE pipe
 2" IPS PE pipe
 3" IPS PE pipe
 4" IPS PE pipe
 6" IPS PE pipe
 8" IPS PE pipe
 10" IPS PE pipe
 12" IPS PE pipe

14.05.15 Service Tees for 3-inch & Smaller PE Services on Steel Mains

Service tee shall be steel, designed for at least 100 psi working pressure with a weld-on inlet end, incorporate an internally-contained tap, and have an outlet designed to connect polyethylene pipe, PE2306 or PE2406. The connection to the polyethylene pipe shall be designed so that the pullout resistance exceeds the strength of the pipe in accordance with D.O.T. Pipeline Safety Regulations, Part 192.283(b). An insert stiffener shall be attached to each compression end.....

Service Tee for 1/2-inch and 1-inch services shall be equal or similar to the table below:

Compression Outlet	Weld Inlet	Tap Size	Model
1/2" CTS PE, 0.090" Wall	3/4-inch	3/8-inch	Mueller 18702 Mueller 18104
1/2" CTS PE, 0.090" Wall *	1/2-inch	3/8-inch	Mueller 18198 Mueller 18104
1" CTS PE, 0.121" Wall	3/4-inch	1/2-inch	Dresser 501 Mueller 18104

GAS OPERATION & MAINTENANCE MANUAL
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* For connection on steel mains sizes 2-inch and smaller.

Service Tee for 2-inch and 3-inch services shall be equal or similar to the table below:

Weld Outlet	Weld Inlet	Tap Size	Model
2-inch	2-inch	1-1/2 inch	Mueller H-17650

14.05.16 Expansion Joints

Expansion Joint-Bellows Type. Joint used for special application, for pipelines unrestricted by surrounding earth, and where expansion/contraction exceeds limits of the Bolt Type Joint. Must not be direct buried.

Bellows type shall be stainless steel expansion, with pressure rating of not less than 50 psi, with weld ends.

Joints shall be similar or equal to "Flexonics" Free-Flexing Expansion Joint standard low pressure unit or a Badger Standard Service Rated Type W.

14.05.17 Steel Extrude or Copper to P.E. Coupling - 5/8" OD

Coupling shall be designed to connect either 5/8" OD steel or copper tube to 1/2" (5/8" OD) - 0.090" wall or SDR7 polyethylene tube. Coupling shall be brass or bronze and have a built-in stiffener in one end. The connecting ends must be designed so that the P.E. pipe will fail before the pipes could be pulled out of either end of fitting.

Markings on coupling shall show manufacturer, OD of connecting pipes, and wall thickness for P.E. connection.

Coupling shall be Chicago fitting, Part No. M785DC23S090 or approved equal.

14.05.18 Rock Shield

Rock shield will be three eighths (3/8") inches thick and double wrapped around pipe. "Tuff N Nuff" or approved equal.

14.05.19 Weather Caps

Weather caps shall be a non-toxic blend of PVC, plasticizer and ultraviolet inhibitors designed to seal out rain, ices snow sand salt spray, insects and birds. Weather caps shall remove with minimal backpressure.

14.05.20 Pipe Thread Sealants

Acceptable pipe thread sealants are Gasoil manufactured by Federal Process Corporation (preferred), Megaloc by Hercules Chemical, Teflon tape, or approved equal. If anti-seize is utilized, it shall be Permatex Anti-Seize lubricants.

14.05.21 Mechanical Pressure Gauges

Mechanical Pressure Gauges shall be 2 ½" diameter, silicone or glycol filled, stainless steel case and base, and spiral tube with a polycarbonate lens. Piping connection shall be ¼" NPT male pipe connection and must be installed downstream of an isolation valve. Gauge shall display units in PSI from 0 to 120 or 160 and shall have intermediate increments of 2 PSI.

14.05.22 Pipe Supports

Acceptable pipe supports shall be manufactured by E-Z Line Pipe Support Co. or approved equal. Pipe supports shall have a nylon or neoprene shoe that contacts the supported pipe, all other materials shall be hot-dip galvanized steel. The pipe support collar shall have an adjustable height with a threaded column and securing nuts. Typically the support will be supplied with a base plate containing slotted holes for anchoring to a floor or concrete support column.

14.06 Cathodic Protection Materials

14.06.01 Anodes

Anodes for gas main and structure protection shall be the packaged type consisting of a cast magnesium anode having a silver soldered #12 TW lead wire at least 10 feet long attached to a steel core. Anode shall be encased with cloth bag containing a prepared backfill mixture of: hydrated gypsum, bentonite, and sodium sulphate. Weight of magnesium anode shall be as specified.

Anodes, when specified to protect service risers or isolated fittings, shall be magnesium weighing at least one pound with at least 5 feet copper THNN wire. Anode shall be effectively attached to the protected material with a stainless steel base clamp.

Anodes shall be similar or equal to Galvomag by Harco or Maxmag by Federal Metals.

14.06.02 Test Terminal Box

Grade mounted box for use in nonpaved locations shall be ABS or PVC plastic, at least 17 inches long with slight flare at the base. Inside diameter shall be at least 2-3/8 inches. Cap shall be of the same material as the box with a rim which extends over the top of the box to prevent entry of foreign materials. Cap shall lock by a wedging action when the center steel bolt is turned. Bolt shall be magnetic for easy locating. Attached to the inside of cap shall be a 5 bolt terminal block which will bring the wires out of the

box with the cap. Cap shall be impressed with the letters "TEST STATION". Box shall be "Handley Industries" Model TP-5B, "Flush Fink" by Cott Industries, or an approved equal.

Free standing test stations/markers shall be "Carsonite Perma-Post" test stations or an approved equal.

Pole mounted test stations shall be Crouse-Hines conduit E-27 with 3/4" threaded outlet attached to a minimum 24 inches of 3/4" galvanized conduit with plastic end protector.

Face plate shall be Crouse-Hines No. 2770, terminal plate supplied with No. E type of terminal connection as specified. The grade mounted, pole mounted, and free standing test stations to be supplied by Public Works & Utilities Department, Utility Operations, 520 Garfield Avenue, unless otherwise specified.

14.06.03 Insulators

Flange insulators for ANSI 150# through 300# full face flanges shall be phenolic retainers with nitrile sealing elements, complete with full length Mylar sleeves and glass clad phenolic washers for insulating bolts on one side of flange. Flange insulators for ANSI 600# full face flanges shall be G-10 retainers with Teflon or Viton sealing elements, complete with full length G-10 sleeves and G-10 washers for insulating bolts on one side of flange. Gasket shall be Type E faced, 1/8 inch thick, for ANSI 150# through 600# full face flanges, as manufactured by Pipe Seal and Insulator Company (PSI), Central Plastics Company, or an approved equal.

Casing insulators shall be two or more segments of molded polyethylene bolted together so the segments fit tightly around the carrier pipe. Insulator shall be "Pipeline Seal and Insulator" Model PE, F H Mahoney Pipeline Products, Model 60, or T D Williamson, Inc., Model N-2, or approved equal.

Pipe support insulators shall be molded fiberglass shaped to conform to fit over specified pipe sizes, one or two pieces as specified, complete with epoxy seam sealer which fills all voids between pipe and insulator. Pipe support insulators shall be similar or equal to "Glas Mesh Type 180, Type 240, or Type 220/240.

Pipeline insulators for electrically isolating sections of steel gas lines shall be one piece weld end spools, fabricated with API 5L Grade B Steel, rated for ANSI 150# or 300#, coated internally and externally with epoxy resin coating except for weld end cutbacks. Dielectric materials shall be compatible with natural gas.

Size (OD)	Wall Thickness	Size (OD)	Minimum Wall Thickness
4.500"	0.188"	10.75"	0.219"

6.625"	0.188"	12.75"	0.250"
8.625"	0.188"	16.00"	0.250"

Pipeline insulators shall be "IsoJoint" by Advance Products & Systems, Inc.; "PSI Electro-Stop Isolators" by Pipeline Seal & Insulator Inc.; Kerotest "Zunt" Type 1-A, or pre-approved equal.

14.06.04 Field Coatings (Below Grade)

See Section 25.06 for appropriate application.

A. Cold Type Applications. Cold applied coatings shall be one of the following approved commercial types or approved equals:

- Polyken 930-35 mill tape with #927 brush primer or #935 spray primer
- Tapecoat H-35G mill tape.
- Scotchkote Corrosion Protection Tape #50 with Scotchrap pipe primer.
- Royston Greenline Tape with 747 Primer
- T C Mastic
- Wax Tape by Trenton Corporation or approved equal for irregular fittings.
- Fusion bonded epoxy only by Engineering approval.

B. Hot Type Applications. Hot applied coatings shall be one of the following tape-prime combinations or approved equal:

- Tapecoat 20 with T C Omniprime.
- Thermofit (shrink) pipe sleeves by Raychem (Ultratec Division) or T C Omniprime
- Holidays less than two square inches in the epoxy pipe coating may be repaired using hot melt patch sticks, Scotchkote 226P or equivalent.

C. Directional boring pipe (shrink) sleeves shall be Dirax (by Raychem)

14.06.05 Field Coatings (Above Grade)

See Section 25.07 for appropriate application.

A. Rust-O-Leum Primer #678 or 769, Rustex, Derusto, shall be used when specified in Section 15.08(F). Color shall be gray unless otherwise specified.

B. Polyamide epoxy, high build, two part, one coat, similar or equal to Pittsburgh "Pit Guard" DTR or Rust-O-Leum High Performance Epoxy 9100V shall be used when specified. Color shall be gray unless otherwise specified.

- C. Acrylic Urethane enamel with a compatible primer similar or equal to Pitthane Acrylic Urethane enamel with Medalhide 1001 inorganic zinc rich primer, or Aquapon Polymide-epoxy organic primer shall be used when specified. Color shall be gray unless otherwise specified. An approved equal is Devthane 379 Top Coat with Devoe Bar Rust 235. Primer shall be Devoe.
- D. Tape coating, when specified for above grade applications, shall be similar or equal to Tapecoat H35 grey. Tapecoat H50 grey shall be used where abrasion from street grit is evident. System shall be resistant to ultraviolet light, shrinkage, ambient temperature changes.

Wax Tape by Raychem (Ultatec Divison) or Polymide epoxy, (see 2 above) in color white, shall be applied to irregular fittings when tape coating is not practical.

- E. Soil to air interfaces shall be coated with Polyken 930-35 mill tape with #927 brush primer or #935 spray primer or Tapecoat H-35G mill tape. Above grade the pipe shall be double wrapped with rock shield.

**SECTION 15: GENERAL CONSTRUCTION REQUIREMENTS FOR HP GAS
PIPELINES**

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SECTION 15: GENERAL CONSTRUCTION REQUIREMENTS FOR HP GAS PIPELINES

15.01 General

This section of the Standard Specifications establishes requirements and policies for the installation of high pressure gas distribution systems operating at pressures ranging from 1 psig to 275 psig and a transmission line which operates at a pressure ranging from 550 psig to 974 psig. Low pressure gas mains and services, the remaining systems of which were abandoned in 1992, are only specified to the extent of involvement with high pressure construction, such as conflicts in location, abandonments, etc.

All excavation, backfilling and restoration and horizontal direction drilling required for the construction of high pressure gas distribution systems shall be performed in accordance with the City of Duluth, Minnesota Public Works & Utilities Department – Engineering Division, Standard Construction Specifications, most current edition.

For contracted projects, these specifications also establish responsibilities between the Contractor and the Department for providing labor and equipment for installations. The Plans and Special Provisions may change these responsibilities for particular projects; therefore, it is essential that those parts of the documents be carefully reviewed for each project, since they take precedence over this Standard Specification.

15.02 Excavation and Backfill Standards

Requirements for site clearing, excavation, preparing trench, backfilling, compaction and restoration are contained in the City of Duluth Public Works and Utilities Department – Engineering Division Standard Construction Specifications book, most current edition, and any addendums or supplements, and shall govern the execution of work where they are not in conflict with more specific requirements contained in the Plans, the Special Provisions, or in this section.

15.03 Clearance Requirements

- A. Clearance requirements between underground gas mains and non-associated mains, utilities, structures, or rock shall be maintained at least as follows:

General Clearance -	6" - for rock, non-metallic pipe, structures, etc.
Special Clearances -	12" - for metallic pipe, structures, electrical conductor wires, etc
	30" - between plastic gas pipe and steam lines

Where these clearances cannot be maintained, the Contractor shall notify the Engineer, who will determine the method or materials required to protect the gas main.

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B. Preventing Sewer Service Lateral Cross Bores

Acceptable installation practices and documentation requirements when installing gas mains and services shall be as follows. Gas pipelines must be installed using one or more of the following methods. Every individual sewer service lateral must be protected by use of one of these methods. Each description below includes documentation requirements.

1. Open Trench Method

The open trench must extend the full width of the property or the full length of the installation. Document all addresses/locations where the installation was performed by open trench.

2. Map and Record Method (Trenchless)

Maps and records of sewer service laterals may be used to demonstrate that no conflict between the gas pipeline and the sewer service lateral is possible. For example, if the gas service enters the front of a structure and the sewer service exits the back of the same structure, the two utilities will not cross. The excavator's complete confidence in sewer service lateral maps is essential. Document the criteria by which the lack of conflict was established and all addresses/locations where this method was used.

3. Exposed Sewer Method (Trenchless)

Pothole and expose the sewer service lateral at the gas crossing; the cutting head must be visible in the pothole. Document the distance between the drilling head and the sewer service lateral at all addresses/locations where this method was used. Photographic documentation showing both the drilling head and the sewer lateral is optional, but recommended.

4. Sonde Method (Trenchless)

Sewer service lateral location and depth may be determined by a sonde transmitter at the crossed location. If this method is used, the drilling head must be equipped with a sonde, and must be at least three feet from the sewer service lateral. Each sonde must be calibrated daily. Document the sewer service lateral depth and the drilling head depth at each crossed location along with all addresses/locations where this method was used.

5. Relative Elevation Method (Trenchless)

The highest elevation of an individual sewer service lateral may be determined by entering the structure and verifying the sewer drain's elevation as it leaves the structure. The drilling head must be equipped with a sonde, and the drill must at all times be at least three feet above the highest sewer service lateral elevation. The three-foot separation must be maintained across the entire width of the property. The sonde must be calibrated daily. Document the highest sewer

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service lateral elevation relative to the drilling head elevation along with all addresses/locations where this method was used.

6. Televising Method (Trenchless)

Individual sewer service laterals may be televised after the gas pipe has been installed. No gas may be introduced into the new pipeline until the sewer service lateral has been televised. Document with an electronic, visual record of the televising along with a written report. Correlate the sewer lateral connection (wye) location with the street address in written report. Use of this method does not alleviate the excavator's responsibility to obtain all available information regarding the location of sewer service laterals prior to installation of a gas pipeline (maps, drawings, diagrams or other records). Upon request, excavator should be prepared to produce such information at the job site. The Contractor shall coordinate televising with the property owner.

7. Other Trenchless Sewer Service Lateral Verification Methods

With prior approval from the Engineer, other gas pipeline installation methods that demonstrate and document protection of sewer service laterals may be used.

In all methods, documentation must be retained for the life of the pipeline.

These methods do not replace the need to mark and locate sewer service laterals prior to construction.

After installation of new gas pipeline by methods 3 through 7, gas pipeline installers should report to the local sewer operators the verified locations of individual sewer service laterals. These verifications improve location records of sewer operators.

Unacceptable Practices:

1. Listening devices may be used to supplement acceptable practices, but must not be used in lieu of them. Because there is no positive visual verification and no way to accurately document the results, the use of listening devices alone is unacceptable.
2. Any procedure that does not allow for positive documentation of cross bore prevention is unacceptable.

C. Required Procedures to Maintain Clearances When Moling or Horizontal Directional Drilling across Sewers

Sanitary Main, Storm Main, or Storm Inlet Lead

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Remove nearest manhole lid and measure depth to sewer. If the proposed crossing is within 50' to manhole, then inspection of only one manhole is adequate. If the manhole is further than 50' away, the manhole at the other end shall also be inspected.

If sewer is greater than 7' deep, no additional precautions are necessary.

If sewer is between 4.5' to 7' deep, keep track of mole or drill distance. If possible, visually check inside pipe to ensure no damage. After crossing sewer, perform a video inspection.

If sewer is less than 4.5' deep, excavate in street over sewer and mole or drill each way.

15.04 Alignments for mains

Alignments for mains shall be as indicated on the Plans. The Department will establish exact alignment prior to construction, and reserves the right to make minor changes as work progresses at no additional compensation. Major changes may be considered for extra payment only to the extent where: They are major deviations from Plan alignment; the Contractor informs the Department and obtains a written understanding for the basis of payment for extra work prior to construction of that portion. Fittings necessary to fit the Plan, whether indicated on the Plan or not, shall be considered incidental to the pipeline.

15.05 Grade for mains and services

Grade shall be established by the depth of cover, except where indicated on the Plans or specifically established by the Engineer.

Table 15-1 Minimum and Maximum Depth of Cover		
Type	Minimum Cover (inches)	Maximum Cover (inches)
Transmission Main	48	72
Main – general	36	48
Main – rock trench	24	48
Service – less than 2"	18	48
Service – 2" and larger	36	48
Service – under driving surface	36	48
Service – rock trench	12	48

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When these depths cannot be maintained, the Contractor shall notify the Engineer, who will determine the method or material required to protect the main.

15.06 Backfill for trenches

All excavation, backfilling and restoration and horizontal direction drilling required for the construction of high pressure gas distribution systems shall be performed in accordance with the City of Duluth, Minnesota Public Works & Utilities Department – Engineering Division, Standard Construction Specifications, most current edition and any supplements or addenda.

For gas mains and services installed under the following conditions:

- A. Under a driving surface, including graveled shoulders, driveway, parking lots
- B. Under a sidewalk
- C. To provide a base for undercut foreign utilities, curbs, walks, etc.

Class 5 granular material conforming to MnDOT 31328 shall be used.

15.07 Certification of Welders and Fusers

All pipeline welding shall be done by qualified Welders in accordance with Section 27 of these Standards.

All pipeline fusing shall be done by qualified fusers in accordance with Section 28 of these Standards.

15.08 Load Considerations

Special protection shall be provided to avoid direct extraordinary loads or external forces on the pipe. The Engineer will determine if and what kind of special protection shall be provided. A pipeline must be designed and installed so that each joint will sustain longitudinal pullout or thrust forces caused by the contraction or the expansion of the piping or by anticipated external and internal loading.

15.09 Installation of Protective Barriers

The Department or Contractor, when specified, shall install protective barriers to protect gas pipeline facilities from traffic or other hazards.

When above grade gas mains, service risers, regulators, or meter sets meet one of the following conditions, pipe bollards shall be installed in accordance with Detail Drawing G-33:

- A. Where the edge of the travel lane is within 10 feet of a pipeline or meter

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- B. Where a licensed motor vehicle can park or drive by, including driveways and alleys, within 5 feet of an uncurbed pipeline or customer meter. A curb is considered to be adequate if it is continuous and parallel to the direction of normal vehicular travel. The extension of the vehicle's front or rear extremities shall be considered.
- C. At any location that is susceptible to vehicular stresses or forces that have the ability to damage a pipeline or customer meter.

15.10 Casings

- A. Casings containing a carrier pipe with the purpose of transporting natural gas shall be classified as one of the following:
 - 1. Highway or Rail Road Crossing Casing is a casing installed under the requirements of a permitting authority with the general purpose of facilitating construction, providing access for future repairs, and providing protection from external loadings or differential movement. This type of casing must be engineered to meet the requirements of 192.323.
 - 2. Insertion Casing is a conduit utilized during construction to simplify the installation process of a new gas main. Commonly the casing will be an existing pipe which has been abandoned from its original purposes.
 - 3. Protective Casing is a conduit which is chosen to be structurally sufficient to protect the carrier pipe from external loadings that have potential of damaging the gas main. Protective casings are commonly installed where minimum cover depth is not satisfied or other buried infrastructure is crossing within close proximity.
- B. Casings which will contain a gas main or service shall be installed subject to the following requirements:
 - 1. The type of material, weight or thickness, grade shall be sufficient to withstand trench load and anticipated live loads, including impact.
 - 2. Casings which will contain steel gas pipes shall have approved end seals that electrically insulate casing from gas pipe and provide a water-tight seal to prevent groundwater from entering the casing annulus.
 - 3. Casings which contain plastic gas pipes shall have special protection such as injected sealant foam or other material where plastic pipe exits the casing to prevent earth backfill load from pressing plastic against the casing. Also, 2" and larger plastic mains shall be provided with anchorage where main exits a casing.

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4. All casings which contain steel gas mains shall be vented. Casings which carry P.E. gas mains shall be reviewed by Engineering for venting requirements if the ends of the casing are sealed with materials other than expanding spray foam insulation such as an open cell polyurethane or similar product.
 5. One or two vents shall be installed on each casing installed under interstate highways, railroads, buildings and runways or taxiways. Vents must terminate in a manner which prevents rain or surface waters from entering the casing. Vents are not required on wall sleeves or short casings used for special (shallow main) protection. Vent to outdoors is required if casing runs through a habitable enclosed space.
 6. Approved casing insulators must be installed when a steel gas line runs through a steel casing.
 7. For plastic gas pipe installed in casings within the 5-foot frost zone, the casings must not exceed the size permitted in 17.05.I.
- C. If existing conduits or pipes are going to be repurposed as a casing, the proposed casing pipe shall be cleaned of debris and obstructions. Then the proposed casing pipe shall be televised to confirm the casing is free of imperfections that could potentially damage the gas main as it is being inserted. Additional cleaning or spot repairs are required until the carrier pipe can be inserted without risk of damage.

15.11 Above Grade Piping Supports

Above grade distribution system piping, regulator stations, town border stations, and services 4" and greater shall be supported with the following practices:

- A. Supports shall be constructed of concrete and steel or other approved metals. Supporting saddles and pipe hoops shall have other isolating materials to protect from metal to metal contact.
- B. Supports must be installed such that expansion and contraction, differential settling, or frost will not induce excessive stresses upon the pipe.

Where pipeline supports have not been designed with the applicable stresses in mind, they shall be fabricated with continuous adjustability.

- C. Supports shall be installed in horizontal piping runs that contain non-welded connections and a mechanical component (such as a valve or regulator) that could potentially be removed, leaving a cantilevered pipe 5 feet or longer. With welded joint connections, pipe supports shall be installed when horizontal runs exceed 14 feet.



City of Duluth

DEPARTMENT OF PUBLIC WORKS/UTILITIES
Engineering Division
211 City Hall • Duluth MN 55802
(218) 730-5200 Fax: (218) 730-5907

PRE-BID MEETING AGENDA *(and notes)*

RE: City Project 0840GS – 8” Gas Main Replacement on 3rd Street

TIME: 2:30 P.M.

DATE: June 3, 2014

LOCATION: City Hall Room 207

ATTENDEES: See Sign in List

-
1. Project Scope Review
 2. Project Schedule
 - a. June 11th at 2:00 P.M.
 - b. To be approved at June 23rd City Council Meeting
 - c. Starting Construction listed in two places, more likely a July 14th.
 - d. DNR permit will likely specify open cut creek crossing completed prior to September 15th.
 - e. Utilities functional and Roads repaired by October 31st.
 3. Addendum Items
 - a. Pavement Restoration section clarifications.
 - b. Appendix B with Natural Gas Utility Standard Construction Updates will be issued.
 - c. Adding a Special Provision about protecting DTA bus stop shelter and temporarily relocating bus stop location.
 - d. Working day restriction Saturday September 6th.
(Will be adding days for “Boo at the Zoo” events.)
 4. Natural Gas Contractor Requirements
 - a. Drug and Alcohol Plan and testing program
 - b. Operator Qualifications Program
 5. Traffic Control (SP-14)
 - a. It was the intent that one of the west bound lanes of Grand will be closed first to allow for the water installations and connections in Grand Avenue. Then traffic control can be shifted over to the east bound lane for installations of the gas main. This was the intent; however we did not specify that both lanes of Grand couldn't be closed at the same time.
 6. Erosion Control
 - a. Erosion Control must be set up prior to surface disturbing tasks
 - b. During construction the inlet protection and silt fence should protect the storm sewers and Kingsbury Creek
 - c. Permanent protection with the erosion blanket and bio rolls is for one season.
 - d. Management and supervision of erosion control practices is incidental to the quantity bid items
 7. Working in the Zoo

*Citizens and Government working together to provide an environment in which
our community can enhance its quality of life and continue prosper*

- a. Fencing is important, the existing fence shall stay in place and be left functional overnight.
 - b. Gates must be closed immediately after passing.
 - c. Only essential construction vehicles should be within the zoo, staging is preferred on the closed areas of Grand Ave or elsewhere.
- 8. Cooperation with Other Contractors
 - a. DNR contract for Kingsbury Creek cleanup is referenced.
 - b. Currently the City also has a contract open for work within the Zoo on Kingsbury Creek but it should be completed by the start of Construction.
- 9. Water Main Construction
 - a. Both mains must be directional drilled under Kingsbury Creek.
 - b. Note that the 24" main relocation must occur first.
 - c. Discuss sequence of 12" valve installations.
(valves are sequenced after the 24" main is installed)
- 10. Natural Gas Construction
 - a. City involvement
 - i. The City will stop the gas main beyond the project limits, weld on the transitions to plastic, and cap the plastic main.
 - ii. The City will connect the Contractor's accepted gas main to existing main, purge the lines and activate the gas main.
 - iii. The City will follow up and make other connections.
(City will reconnect 2" branch main and new service to Tappa-Keg, Contractor will reconnect Little Store Service)
 - b. SP 3.2 item 2 identified to install the gas main across Kingsbury Creek first, this needs more explaining.
 - c. Diverting Flows from Kingsbury Creek during open cut installation
 - d. Installing Gas Main in Casing (SP-15)
- 11. Other Issues
 - a. Working Day Restrictions
 - i. Considering adding Boo at the Zoo restrictions October 11th and 18th.
- 12. Questions
 - 1. *24" pipe pigging will be clarified in the addendum.*
 - 2. *Making final connections on the 24" pipe with electro-fusions or mechanical connections was discussed and will be clarified in the addendum.*
 - 3. *City will be staking piping alignments.*
 - 4. *Tree Species will be specified for bidding purposes.*
 - 5. *No Density or Gradation tests will be required on Grand Avenue, Fremont Street will likely be testing once.*
 - 6. *Discussion regarding metallic pipe anodes, we plan no deviation from Standard Construction Specifications.*

PRE-CONSTRUCTION MEETING ATTENDANCE LIST

City Project: 1078

Date: June 3, 2014

<u>Name</u>	<u>Company</u>	<u>Phone</u>	<u>Email Address</u>
Howard Smith	City of Duluth	218-730-5092	hsmith@duluthmn.gov
Mark Guisfredi	“ “	218-730-5076	mguisfredi@duluthmn.gov
<i>Brandt Swedberg</i>	<i>Hanco Utilities</i>	<i>218 590 6295</i>	<u><i>bswedberg@hancoutilities.com</i></u>
<i>Jim Warren</i>	<i>EBI</i>	<i>218 628 0454</i>	<u><i>ebijim@cpinternet.com</i></u>