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ADDENDUM NO. 1

DATE: December 11, 2020

PROJECT: Gum Springs Water System Improvements – Contract 4
Water Line Improvements
Arkadelphia, Arkansas

BID DATE: December 17, 2020, 1:00 PM

This Addendum forms a part of the Contract Documents and modifies the original documents provided to Bidders, as noted below. Acknowledge receipt of this Addendum in the space provided in the BID FORM. Failure to do so may subject the Bidder to disqualification.

The Contract Documents for the above Project are hereby amended as follows:

ITEM #1: Contract Documents – Special Note

As a point of emphasis, Bidder is reminded of the Bid Requirement that coordination will be required with the Meter Supplier from Contract 2 and Owner. Details for the extent of the coordination are included in Item #4 below.

ITEM #2: Contract Documents - (D) Bid Form

The bid schedule has been modified to include a deductive alternate for the PVC pipe material. Replace (D) - Bid with the revised (D) - Bid, attached hereto.

ITEM #3: Specifications – Section 331113 – Water Line Pipe and Fittings

Replace specification section 331113 – Water Line Pipe and Fittings with the revised section, attached hereto.

ITEM #4: Specifications – Section 331913 – Water Meter Installation Requirements

The attached specification section 331913 – Water Meter Installation is hereby added.

ITEM #5: Plans – Plans Sheets 5 – 13

Modify note 5 as shown on plan sheets 5 – 13 as follows:

5. New water line shall be ~~AWWA C900 PVC PRESSURE CLASS 200/DR 14~~ in accordance with specification 331113.

Attachments:

- 1: Contract Documents - D - Bid Form
- 2: Section 331113 – Water Line Pipe and Fittings
- 3: Section 331913 – Water Meter Installation

END OF ITEMS

All other provisions of the Contract Documents remain unchanged. Acknowledge receipt of this Addendum on the BID FORM.

CRIST ENGINEERS, INC.



Matthew D. Dunn, P.E.
President

BID

Proposal of _____ (hereinafter called "Bidder"),
organized and existing under the laws of the State of _____
doing business as _____. (*Insert "a corporation", "a
partnership", or "an individual" as applicable.) To the City of Arkadelphia (hereinafter called "Owner").

In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all Work
for the construction of Water Line Improvements in strict accordance with the Contract
Documents, within the time set forth therein, and at the prices stated below.

The Contractor's Act of Assurance Form must be included in the bid proposal. The
DBE/MBE/WBE Compliance Evaluation Forms must be supplied after the Low Bidder is
confirmed.

By submission of this Bid, each Bidder certifies, and in the case of a joint Bid each party thereto
certifies as to its own organization, that this Bid has been arrived at independently, without
consultation, communication, or agreement as to any matter relating to this Bid with any other
Bidder or with any competitor.

Bidder hereby agrees to commence Work under this contract on or before a date to be specified
in the Notice to Proceed and to fully complete the Project within **180** consecutive calendar days
thereafter. Bidder further agrees to pay as liquidated damages, the sum of **\$500** for each
consecutive calendar day thereafter as provided in the Supplemental Conditions.

Bidder acknowledges receipt of the following Addendum:

Bidder agrees to perform all the work described in the Contract Documents for the following unit
prices or lump sum:

Bid Schedule

NOTE: BIDS shall include sales tax and all other applicable taxes and fees.

Alternate A – Bid Schedule – C900 PVC Pipe					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Bid Price
1	Insurance, Bonds, Mobilization, Demobilization	Lump Sum			\$
2	8" PVC Water Line – C900	LF	360	\$	\$
3	6" PVC Water Line – C900	LF	15,000	\$	\$
4	6" PVC Water Line – C900, Restrained Joint	LF	950	\$	\$
5	3" PVC Water Line – SDR 21	LF	4,600	\$	\$
6	12" Steel Encasement Pipe, Bored	LF	650	\$	\$
7	6-inch Slick Bore	LF	350	\$	\$
8	3-inch Slick Bore	LF	200	\$	\$
9	Connect to Tank Line with 8" Solid Sleeve	EA	1	\$	\$
10	Connect to Existing Line with 6" Solid Sleeve	EA	4	\$	\$
11	Connect to Existing Line with 3" Solid Sleeve	EA	1	\$	\$
12	8" MJ Gate Valve and Box	EA	1	\$	\$
13	6" MJ Gate Valve and Box	EA	30	\$	\$
14	3" MJ Gate Valve and Box	EA	8	\$	\$
15	Fire Hydrant Assembly	EA	12	\$	\$

16	Blow off Assembly	EA	8	\$	\$
17	Reconnect Existing Service Line	EA	5	\$	\$
18	Water Meter and Box Replacement, Existing Water Line	EA	282	\$	\$
19	Water Meter and Box Replacement, New Water Line	EA	96	\$	\$
20	Service Tubing	LF	600	\$	\$
21	Service Tubing, Slick Bored	LF	2,000	\$	\$
22	Concrete Highway Repair	LF	24	\$	\$
23	Gravel Highway Repair	LF	17	\$	\$
24	Asphalt Replacement	LF	281	\$	\$
25	Concrete Replacement	LF	50	\$	\$
26	Gravel Surface Repair	LF	1,300	\$	\$
27	Maintenance of Traffic	Lump Sum			\$
28	Clearing and Grubbing	Lump Sum			\$
29	Seeding, Mulching, and Final Cleanup	Lump Sum			\$
30	Trench and Excavation Safety Systems (OSHA), 29 CFR 1926, Subpart P	Lump Sum			\$
TOTAL BID PRICE FOR ALTERNATE A _____DOLLARS					\$

Alternate B - Bid Schedule – SDR-21 PVC Pipe					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Bid Price
1	Insurance, Bonds, Mobilization, Demobilization	Lump Sum			\$
2	8" PVC Water Line – SDR 21	LF	360	\$	\$
3	6" PVC Water Line – SDR 21	LF	15,000	\$	\$
4	6" PVC Water Line – C900, Restrained Joint	LF	950	\$	\$
5	3" PVC Water Line – SDR 21	LF	4,600	\$	\$
6	12" Steel Encasement Pipe, Bored	LF	650	\$	\$
7	6-inch Slick Bore	LF	350	\$	\$
8	3-inch Slick Bore	LF	200	\$	\$
9	Connect to Tank Line with 8" Solid Sleeve	EA	1	\$	\$
10	Connect to Existing Line with 6" Solid Sleeve	EA	4	\$	\$
11	Connect to Existing Line with 3" Solid Sleeve	EA	1	\$	\$
12	8" MJ Gate Valve and Box	EA	1	\$	\$
13	6" MJ Gate Valve and Box	EA	30	\$	\$
14	3" MJ Gate Valve and Box	EA	8	\$	\$
15	Fire Hydrant Assembly	EA	12	\$	\$

16	Blow off Assembly	EA	8	\$	\$
17	Reconnect Existing Service Line	EA	5	\$	\$
18	Water Meter and Box Replacement, Existing Water Line	EA	282	\$	\$
19	Water Meter and Box Replacement, New Water Line	EA	96	\$	\$
20	Service Tubing	LF	600	\$	\$
21	Service Tubing, Slick Bored	LF	2,000	\$	\$
22	Concrete Highway Repair	LF	24	\$	\$
23	Gravel Highway Repair	LF	17	\$	\$
24	Asphalt Replacement	LF	281	\$	\$
25	Concrete Replacement	LF	50	\$	\$
26	Gravel Surface Repair	LF	1,300	\$	\$
27	Maintenance of Traffic	Lump Sum			\$
28	Clearing and Grubbing	Lump Sum			\$
29	Seeding, Mulching, and Final Cleanup	Lump Sum			\$
30	Trench and Excavation Safety Systems (OSHA), 29 CFR 1926, Subpart P	Lump Sum			\$
TOTAL BID PRICE FOR ALTERNATE B _____DOLLARS					\$

Respectfully submitted:

_____ Signature	_____ Address
_____ Title	_____ Date
License Number (if applicable)	_____

SEAL - (if BID is by a Corporation)

SECTION 331113

WATER LINE PIPE AND FITTINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish and install water line pipe and all appurtenances, complete in place, all in accordance with the requirements of the Drawings and Specifications. Where standards, specifications or methods are cited without dates, the reference shall be construed to apply to the latest revision in effect at the time of Contract.

1.2 REFERENCES

- A. Uni-Bell PVC Pipe Association, 2655 Villa Creek Drive, Suite 155, Dallas, TX.
 - 1. Handbook of PVC Pipe, Latest Edition.
- B. American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.
 - 1. ASTM A126 - Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 2. ASTM B61 - Specification for Steam of Valve Bronze Castings.
 - 3. ASTM D1784 – Specification for Rigid (Poly Vinyl Chloride) (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds.
 - 4. ASTM D2241 – Specification for Rigid Poly (Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR-Series).
 - 5. ASTM D3139 – Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 - 6. ASTM F477 – Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 - 7. ASTM C150 - Specification for Portland Cement.
- C. American Water Works Association (AWWA), 6666 West Quincy Avenue, Denver, CO 80235.
 - 1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
 - 2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
 - 3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3-in through 48-in for Water and Other Liquids.
 - 4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
 - 5. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
 - 6. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
 - 7. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds.
 - 8. AWWA C153 – Ductile-Iron Compact Fittings, 3-inch through 24-inch and 54-inch through 64-inch for Water Service.
 - 9. AWWA C500 – Gate Valves for Water and Sewerage Systems.
 - 10. AWWA C509 – Resilient-Seated Gate Valves for Water and Sewerage Systems.
 - 11. AWWA C511 – Standard for Pressure-Reducing Principle Backflow-Prevention Assembly.

12. AWWA C605 – Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
 13. AWWA C651 - Standard for Disinfecting Water Mains.
 14. AWWA C900 – Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch, for Water Distribution.
- D. American Welding Society (AWS), 8669 North West 36 Street, Number 130, Miami, Florida 33166.
1. AWS D11.2 Guide for Welding Iron Casting.
- 1.3 SUBMITTALS
- A. Submit in accordance with Section 013300 – Submittal Procedures.
- 1.4 QUALITY ASSURANCE
- A. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with requirements as applicable.
- B. Third Party Inspection: All pipe material suppliers shall be ISO 9001 or 9002 registered or provide the services of an independent inspection agency. Prior to the start of manufacturing, any manufacturer not meeting the ISO registration requirements shall submit to the Engineer the name of an independent inspection agency for approval. The independent inspection agency shall be responsible for sample monitoring of chemical and mechanical test, sample visual inspection of quality assurance tests performed on in-process pipe and fittings, and a sample visual and dimensional inspection on finished product for this project. A certified inspection report from the independent inspection agency of all witnessed tests shall be supplied to the Engineer within ten (10) days of completion of pipe manufacturing. Chemical samples shall be taken from each ladle of iron and the Manufacturers' chemical control limits shall be maintained for at least the following elements: carbon, sulfur, phosphorus, silicon, magnesium, chromium, manganese, tin, aluminum, cerium, copper, and lead. When chemical values fall outside the Manufacturers' control limits, additional mechanical property test shall be performed to assure minimum mechanical properties are met. All this shall be done at the Owner's discretion.
- C. Field Quality Assurance: Every effort shall be taken to assure the pipe is undamaged before installation. The contractor shall carefully unload pipe from the trucks when stringing alongside the trench. Use only slings or harness made of webbing or other material which will not damage the outside or the inside of the pipe. Do not use fork lifts that may damage the lining of the pipe or fittings.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All pipe shall be of the same specification and furnished by the same manufacturer.
- B. All pipe and other materials shall be new.
- C. All fittings / restraints comprised of iron or metal are subject to "Buy America" (BA) requirements.

2.2 C900 PVC PIPE

- A. General: PVC pressure pipe with gasket joints and integral bell and restrained joint for buried water piping.
- B. Manufactured to meet requirements of AWWA C900.
 - 1. For all pipe 4 inch through 36 inch in diameter:
 - a. Pressure Class 235 psi.
 - b. DR-18.
 - c. 20 ft laying lengths.
 - d. Outside diameter of ductile iron pipe.
 - e. Diamond Plastic Corporation, JM eagle or approved equal.
- C. PVC pipe shall be PVC C900 pressure pipe made from class 12454 material as defined by ASTM D 1784. All joints shall meet the requirements of ASTM D3139. All gaskets shall be reinforced elastomeric seal meeting the requirements of ASTM F477. PVC compounds shall be treated and certified as suitable for potable water products by the National Sanitation Foundation (NSF) Testing Laboratory.
 - 1. Unless otherwise indicated, all pipe shall be bedded in 6 inches of uniform crushed granular material (Type 5 Laying Conditions) that conforms to AASHTO No. 57 or pre-approved equivalent gradation type bedding consolidated to a minimum of 90% standard proctor density to 6 inches above the top of the pipe. Compacted native backfill shall be compacted to 90% of max density standard proctor. When placed under foundations, bedding and backfilling shall be consolidated to 95% of max density standard proctor. Backfilling under foundations or slabs or other areas as identified by the Engineer shall require bedding to be fully wrapped in geotextile (8 oz nonwoven) with at least 95% max density standard proctor. Bedding and backfilling under streets, driveways, parking lots, sidewalks or other areas as identified by the Engineer shall require at least 95% max density standard proctor. Geotextile (8 oz nonwoven) may be necessary when placed in muck or other unsuitable soil or as directed by the Engineer. Bedding and backfill shall not be placed on soil that is muddy, frozen or contain frost. The trench shall be free of standing water prior to placement of bedding and/ or backfill material. All bedding material and backfill shall be within 2 % of optimal moisture. No rocks larger than 4 inches shall be backfilled into the trench. Unless otherwise approved, no backfilling lift shall exceed 6 inches.
- D. Pipe shall be permanently marked at 5-foot intervals with the following information:
 - 1. Nominal size.
 - 2. Material code designation.
 - 3. Manufacturer's name or trademark and production record code.
 - 4. ASTM or AWWA certification.
 - 5. NSF Certification.
 - 6. DR designation.
- E. Warranty:
 - 1. Manufacturer of the pipe shall warrant product for a period of not less than one (1) year.
 - 2. Forward copies of warranty to the Owner.
 - 3. Replaced defective materials at no extra cost to the Owner.

- F. Joints:
 - 1. Buried Pipe: Push on joint and integral bell complying with AWWA C11/A21.11.

2.3 SDR-21 PVC PIPE

- A. General: PVC pressure pipe with gasket joints and integral bell for buried water piping.
- B. Manufactured to meet requirements of ASTM D2241.
 - 1. Pressure rating of 200 psi.
 - 2. SDR-21 / DR 21
 - 3. Outside diameter of steel pipe.
- C. PVC pipe shall be PVC 1120 pressure pipe made from class 12454-A or 12454-B material as defined by ASTM D1784. PVC compounds shall be treated and certified as suitable for potable water products by the National Science Foundation (NSF) Testing Laboratory.
- D. Pipe shall be permanently marked at 5-foot intervals with the following information:
 - 1. Nominal size.
 - 2. Material code designation
 - 3. Manufacturer's name or trademark and production record code.
 - 4. ASTM or AWWA certification
 - 5. SDR designation
- E. Pipe shall have push-on rubber gasketed joints designed in accordance with ASTM D3139 and rubber gaskets complying with ASTM F-477.

2.4 RESTRAINED JOINT PVC PIPE

- A. General: Products delivered shall be manufactured only from water distribution pipe and couplings conforming to AWWA C900. The restrained joint pipe system shall also meet all short and long-term pressure test requirements of AWWA C900. Pipe, couplings, and locking splines shall be completely non-metallic to eliminate corrosion problems.
- B. Pipe and couplings shall be made from unplasticized PVC compounds having a minimum cell classification of 12454, as defined by ASTM D1784. The compound shall qualify for a Hydrostatic Design Basis (HDB) of 4000 psi for water at 73.4°F, in accordance with the requirements of ASTM D2837.
- C. Pipe shall be joined using non-metallic couplings to form an integral system for maximum reliability and interchangeability. High-strength, flexible thermoplastic splines shall be inserted into mating, precision machined grooves in the pipe and coupling to provide full 360° restraint with evenly distributed loading.
- D. Couplings shall be designed for use at or above the pressure class of the pipe with which they are utilized, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F477. Joints shall be designed to meet the zero leakage test requirements of ASTM F3139.
- E. Pipe and couplings shall be homogenous throughout and free from voids, cracks, inclusions and other defects, and shall be as uniform as commercially practicable in color, density and other physical characteristics.
- F. Restrained joint pipe shall be used for all pipe installed in bores and encasements.

2.5 DUCTILE IRON FITTINGS

- A. General: Unless otherwise noted on the Drawings, fittings shall be ductile iron compact fittings in accordance with AWWA C153, latest revision. Glands and rubber gaskets shall be furnished with fittings.
- B. Cement Lining: Fittings shall be internally lined with cement mortar and internally lined with asphaltic seal coat in accordance with AWWA C104. The cement lining thicknesses shall be equal to or greater than those for comparable size pipe.
- C. Joints: Fittings shall be furnished as follows unless otherwise noted on the Drawings.
 - 1. Buried Pipe: Mechanical Joint (MJ) complying with AWWA C153 and AWWA C111.
 - 2. Exposed Pipe: 125 lb flanged joint complying with ANSI/AWWA C153 and ANSI B16.1.
- D. Coatings:
 - 1. Buried pipe shall be furnished with standard bitumastic coating per AWWA standard.
 - 2. Exposed pipe shall be coated with Tnemec 140-1211 primer or equal coating.
- E. Fittings 2-inches and Larger: Where taps are shown on fittings, tapping bosses shall be provided.
- F. Fittings shall have distinctly cast on them the manufacturer's identification, pressure rating, nominal diameter of openings, and the number of degrees or fraction of the circle on bends.
- G. All MJ fittings shall be furnished with restraining glands (Megalugs) in accordance with these specifications.

2.6 POLYETHYLENE ENCASEMENT

- A. Polyethylene (PE) material for the encasement of ductile pipe, fittings, taps, sleeves, valves, etc. shall conform to ANSI A21.5 (AWWA C-105), and shall be installed as per the Polyethylene Encasement Installation Guide published by DIPRA. Polyethylene encasement shall be a tube or in the form of flat sheet or rolls. Adhesive tape (duct tape or other approved tape) or plastic tie straps shall be used to secure the PE material folds and overlaps as directed in the Installation Guide.
- B. Polyethylene encasement shall be used on all ductile iron fittings.
- C. Tape for field tapping of polywrapped pipe, fittings, etc. or field repair of missing polyethylene encasement material shall be Polyken #900, Scotchrap #50 or equal, at least 2-inches wide, and installed as per the Polyethylene Encasement Installation Guide published by DIPRA. Tape shall be provided with polyethylene encasement.

2.7 THREADED PIPE AND FITTINGS

- A. Threaded pipe and fittings shall be Schedule 80 PVC or as noted on the Drawings.

2.8 RESTRAINING GLANDS (MEGALUGS)

- A. Restraining glands designed to use radially oriented cupped screws that indent the pipe barrel with points are not allowed.
- B. Restraining glands shall be made in the USA.
- C. For ductile iron pipe, mechanical joint restraining glands provide 1100 Series MEGALUG® restraints by EBAA Iron of Eastland, TX, or equal.
 - 1. Restraint devices shall consist of multiple gripping wedges incorporated into a follower gland meeting the requirements of ANSI/AWWA C110/A21.10.
 - 2. The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings shall be for water pressure and shall include a minimum safety factor of 2 to 1 in all sizes.
 - 3. Gland body, wedges, and wedge actuating components shall be cast from ductile iron in accordance with ASTM A536.
 - 4. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
 - 5. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.
 - 6. All wedge assemblies and related parts shall be processed through a phosphate wash, rinse, and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid fluoropolymer coating with heat cure to follow each coat. All casting bodies shall be surfaced pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact, and UV resistance.
- D. For PVC pipe, provide 2000 PV Series MEGALUG® restraints by EBAA Iron of Eastland, TX, or equal.
 - 1. Restraint devices shall consist of multiple gripping wedges incorporated into a follower gland meeting the requirements of ANSI/AWWA C110/A21.10.
 - 2. Gland body, wedges, and wedge actuating components shall be cast from ductile iron in accordance with ASTM A536
 - 3. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
 - 4. Proper actuation of the gripping wedges shall be ensured by torque limiting twist off nuts.
 - 5. All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid fluoropolymer coating with heat cure to follow each coat. All casting bodies shall be surfaced pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact, and UV resistance.
- E. For restrained flanged ductile iron fittings, provide MEGAFLANGE® restraining glands by EBAA Iron of Eastland, TX, or equal.
 - 1. Flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C110/A21.10.
 - 2. Restraining for the flange adapter shall consist of individual actuating gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to ensure proper initial set of gripping wedges.

3. The flange adapter shall be capable of deflection during assembly or permit lengths of pipe to be field cut, to allow a minimum of 0.6-inch gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
4. For ductile iron pipe, the flange adapter shall have a safety factor of 2:1 minimum.

2.9 LOCATING TAPE

- A. Water line locating tape shall be blue in color and include words "Water Line Below" in black print.
- B. Water line locating tape shall be Terra Tape "Extra Stretch", or equal.

2.10 TRACE WIRE

- A. Trace wire shall be 12-gauge insulated copper, with fittings, splice kits, and accessories as required.
- B. Wire shall be new and shall have the size, grade of insulation, voltage, and manufacturer's name permanently marked on outer covering at regular intervals. Insulation shall be type THHN, THWN, or XHHW and rated 600 volts, 75 degrees C or higher for wet locations.
- C. Splicer repair kits shall be 3M™ Model DBY-6 electrical/telephone direct bury splice kit or equal.
- D. Trace wire splice caps shall be Carsonite Model LCTS1508.
- E. Trace wire splice poles shall be Carsonite Model CTP307201.

2.11 TEMPORARY PIPE PLUGS

- A. Non-pressure polyethylene plugs with handles sized to fit bells or spigots or sizes 3" to 60" shall be Taylor Made Plastics or equal.

2.12 CONCRETE THRUST BLOCKING AND CONCRETE ENCASEMENT

- A. Concrete thrust blocking shall be ready mixed concrete conforming to ASTM C94. Concrete used for thrust blocking and concrete encasement shall be Class "B" concrete containing not more than 7 gallons of water per sack of cement, including the water in the aggregate, and not less than 5 sacks of cement per cubic yard of concrete.
- B. Cement: Portland Cement conforming to ASTM C150, Type 1
- C. Water used shall be clean and free from injurious amounts of oil, acids, alkalis, salt, organic matter, or other deleterious substances.
- D. Compressive Strength: 3,000 psi at 28 days.
- E. The concrete shall be delivered and placed within 45 minutes after all materials including mixing water have been placed in the mixing drum.
- F. Bagged concrete mix shall not be permitted.

2.13 SERVICE LINES

- A. Service lines shall be 1" or 3/4" HDPE, or PVC.

2.14 METERS, METER SETTERS, METER BOXES

- A. Meters shall be 5/8"x1/2", provided by Arkadelphia.
- B. Meter setters shall be 3/4"x1/2".
- C. Meter boxes shall be provided by Arkadelphia.

2.15 CORP STOP

- A. Corp stops shall be Ford with cc threads.

PART 3 - EXECUTION

3.1 STRINGING THE PIPE

- A. The Contractor shall properly and safely chock the strung pipe so that it cannot roll loose and strike personnel, livestock, or property.
- B. Do not place anything inside pipe for the purpose of handling.

3.2 HANDLING AND LAYING PIPE AND FITTINGS

- A. Trench and backfill shall be in accordance with Section 312300 - Trench Excavation, Backfill, and Compacting.
- B. Water line pipe shall be transported, unloaded, stored, stacked, cut, handled, and installed in accordance with the pipe manufacturer's recommendations. Do not place anything, such as forklift fork, inside pipe for the purpose of handling. Use only equipment recommended by the manufacturer, Uni-Bell, or DIPRA for safe handling of the pipe.
- C. Each joint of pipe shall be inspected immediately before laying and any pipe found to be faulty or damaged shall be marked in an obvious and permanent manner and removed from site. A faulty or damaged joint of pipe may be used in the Work if the fault or damaged area is removed by cutting the pipe leaving a shortened section of sound pipe.
- D. Pipe joints shall be assembled in accordance with procedures recommended by the pipe manufacturer, using proper gaskets, lubricants, tools, and jointing techniques. All surfaces of the joint including the socket and bell of the pipe or fitting shall be cleaned before the pipe is laid and the joint started. Use clean rags for this purpose.
- E. No gasket loops or bulges protrude into the path of the pipe when it enters.
- F. Apply lubricant to both the spigot end and to the gasket. Use a clean applicator brush.
- G. Each spigot shall be properly centered in the bell of the preceding pipe and that the entire length of each pipe section is solidly bedded so as to prevent displacement during subsequent backfill and settlement.
- H. Deflections from a straight line or grade, as required by horizontal or vertical curves shall not exceed limits as recommended by the pipe manufacturer. If pipe alignment requires deflection in excess of the recommended limits, standard bend fittings or a sufficient number of shorter lengths of pipe shall be installed to provide angular deflections.

- I. If the joint is incorrectly made disassemble it and correct the problem. Do not attempt to pressure test a joint that is improperly put together.
- J. Contractor shall keep the interior of the pipe free from dirt, rocks, and other debris during construction.
- K. Pipe shall not be left unattended with an open end. Plug the open end with a temporary plastic plug.

3.3 JOINTING MECHANICAL JOINT FITTINGS

- A. Pipe joints shall be assembled in accordance with procedures recommended by the pipe manufacturer, using proper gaskets, lubricants, tools, and jointing techniques. All surfaces of the joint including the socket and bell of the pipe or fitting shall be cleaned before the pipe is laid and the joint started. Use clean rags for this purpose.
- B. Joints shall be made tightly by advancing the nuts with wrench 180 degrees apart until a tight joint is made.
- C. Fittings including glands and bolts shall be encased in polyethylene material.

3.4 INSTALLATION OF POLYETHEYLENE PROTECTION MATERIAL

- A. Polyethylene material, either in tubing form or in the form of flat sheet or rolls shall be placed around all mechanical joints of pipe and fittings, all valves, sleeves and couplings, saddles, and any other appurtenances with exposed bolts.
- B. Fittings and appurtenances shall be completely encased in polyethylene material. It is not the intent that the material forms an enclosure that is absolutely air and water tight, but to prevent pipe to soil contact.
- C. Polyethylene material shall be applied to pipe, fittings and appurtenances by one of the following methods:
 - 1. Method A – Cut polyethylene tubing material to a length approximately 2 feet longer than the length of pipe section. Slip the tube around the pipe centering it to provide a one foot overlap on each adjacent pipe section, and bunching it accordion fashion lengthwise until it clears the pipe ends. Lower the pipe section into the trench and make up the pipe joint with the proceeding section of pipe. A shallow bell hole must be made at joints to facilitate installation of the polyethylene tube. After assembling the pipe joint, take bunched polyethylene from the preceding length of pipe, slip it over the end of the new length of pipe and secure in place. Then slip the end of the polyethylene from the new pipe section of the at the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe. Secure the overlap in place. Take up the slack width to make snug, but not tight, fit along the barrel of the pipe, securing the fold at quarter points with tape.
 - 2. Method B – Cut polyethylene tube to a length approximately 1 foot shorter than the length of the pipe section. Slip the tube around the pipe, centering it to provide 6 inches of bare pipe at each end. Make polyethylene snug, but not tight and secure the ends. Before making up a joint, slip a 3-foot length of polyethylene tube over the end of the preceding pipe section, bunching it accordion fashion lengthwise. After completing the joint, pull the 3-foot length of polyethylene over the joint, overlapping the polyethylene previously installed on each adjacent section of pipe by at least 1 foot; make snug and secure each end.

- D. Pipe shaped appurtenances such as bends, reducers, offsets and other pipe shaped appurtenances shall be covered with polyethylene in the same manner as pipe.
- E. Odd shaped appurtenances such as valves, tees, crosses, and other odd shaped pieces which cannot practically be wrapped in a tube, shall be wrapped with a flat sheet or split length of polyethylene tube. The sheet shall be passed under the appurtenance and brought up around the body. Seams shall be made by bringing the edges together, folding over twice, and taping down. Slack width and overlaps at joints shall be handled as described above. Tape polyethylene securely in place at valve stem and other penetrations.
- F. Openings in tubing material for branches, service taps, blow-offs, air valves, and similar appurtenances shall be made by making an x-shaped cut in the polyethylene and temporarily folding the film back. After the appurtenance is installed, tape the slack securely to the appurtenance and repair the cut, as well as any other damaged areas in the polyethylene with tape.
- G. At junctions between wrapped and unwrapped pipe – Where polyethylene wrapped pipe joins a pipe which is not wrapped, extend the polyethylene tube to cover the unwrapped pipe a distance of at least 2 feet and secure the end.
- H. The polyethylene material shall be secured around the pipe and appurtenances by at least three circumferential wraps of tape.
- I. All tongs, cables, or chains that are used for lifting pipe and appurtenances that have been encased in polyethylene material shall be adequately padded to prevent damage to the material.
- J. Repair any rips, punctures, or other damage to the polyethylene with tape or a short length of polyethylene tube cut open and wrapped around the pipe or appurtenance and secured in place.
- K. Polyethylene material shall be stored on the project site in such a manner that is not exposed to direct sunlight. Exposure during installation shall not exceed 48 hours.
- L. Backfill material shall be the same as specified and shown on the Drawings for pipe or appurtenances without polyethylene wrapping. Special care shall be taken to prevent damage to the polyethylene wrapping when placing backfill.

3.5 MINIMUM DEPTH OF COVER

- A. Pipe shall be installed with a minimum cover of 36 inches over the top of the pipe, unless otherwise shown on the Drawings.

3.6 SEPARATION FROM EXISTING UTILITIES

- A. Maintain 12-inches minimum vertical separation between proposed water main and all existing utilities (except sewer).
- B. Maintain 18-inches minimum vertical separation (water over sewer) and 10-feet minimum horizontal separation between proposed water main and existing sanitary sewer mains.
- C. If minimum separation distances cannot be maintained, construct water main from ductile iron pipe and provide a pressure tested steel encasement around water main using casing spacers inside and end seals.

3.7 THRUST BLOCK

- A. Install 3,000 psi concrete thrust blocks at bends, wyes, tees, tapping sleeves, and other thrust points on pressure pipe.
- B. Thrust blocking shall bear against undisturbed soil.
- C. Size thrust blocking in the field based on actual field conditions, such as estimated allowable soil bearing, and information provided on the Drawings.
- D. Where directed by the Engineers the thrust block shall be formed in order to efficiently transfer the thrust forces to the soil and to conserve room in the trench or easement for future use.

3.8 LOCATING TAPE

- A. Shall be used on all pipe including ductile iron.
- B. Install 12 to 18 inches above the pipe as shown on the Drawings.
- C. The tape shall be in addition to trace wire specified for PVC pipe.

3.9 TRACE WIRE

- A. All PVC pipe shall be installed with copper trace wire.
- B. Trace wire shall be installed on short intermittent segments of ductile iron used at locations such as creek crossings.
- C. Run wire continuous from valve box to valve box, meter box, or other access points. If no access point is available and a splice is required, provide a tracer wire splice pedestal consisting of tracer wire splice pole and cap at a location as approved by the Engineer.
- D. Pipe testing shall include trace wire. Contractor shall replace the trace wire along the pipe route for any areas in which the pipe cannot be located from the original trace wire installation.
- E. Wire breaks shall be repaired with repair kit at no additional expense to the Owner. Repair kits are to be used only to repair wire breaks that occur on tracer wire which has already been backfilled. The splice kit is used because there is not enough slack available in the tracer wire to splice the wire in a tracer wire splice pedestal. If the tracer wire is broken during installation, the Contractor should splice the wire in a tracer wire splice pedestal.

3.10 CONNECTION TO EXISTING LINES

- A. Connection to the existing water distribution system shall be made in the manner as detailed on the Drawings. Contractor shall provide all necessary temporary caps, plugs, and restraints in order to pressure test and disinfect the proposed water lines.
- B. The work shall be so planned and executed so as to minimize the interruption of service to the water distribution system.
- C. Contractor shall notify the Owner 48 hours in advance of any interruption of service.

- D. The Contractor shall not operate any existing valves in the Owner's water distribution system without the approval of the Owner.
- E. If requested, the Contractor shall make connections to the existing water distribution system at a time in which water demands are minimal.
- F. The Contractor shall test and disinfect all sections of new lines which are to be tied directly into the existing system before the tie-ins are made.

3.11 DISINFECTION

- A. Disinfect the pipe per Section 331300: Disinfection of Water Distribution System.

3.12 FENCE RESTORATION

- A. The Contractor shall remove and replace fencing as required for pipe installation.
- B. The Contractor shall be responsible for maintenance of fences during construction. The Contractor shall provide as necessary temporary fencing, gates, etc., as may be required to afford access to the construction site and maintain the full integrity of the fence.
- C. All fences disturbed by construction activity shall be restored to their original condition or better using fencing materials that are of the same size, type (wood or chain link), metal gauge, and character as the original fence.

3.13 TESTING

- A. Pressure lines shall be hydrostatically tested in accordance with Section 331400: Hydrostatic Testing of Water Line.
- B. Engineer and Owner shall observe and document tests.
- C. Use pipe-locating equipment to test continuity of trace wire.

3.14 FIELD REPAIRS

- A. In the event that testing reveals a leak either at the joint or anywhere in between field repairs shall utilize mechanical joint solid sleeves conforming to AWWA C153 and C110 respectively. Leaks originating with improperly installed or defective gaskets shall not be repaired with bell joint leaks clamps or other similar device. Leaks originating from a perforation in the pipe wall shall not be repaired with full circle clamps or similar. Instead the source of the leak shall be cut out and suitable length of new pipe inserted in place of the cut-out section and then coupled together with the solid sleeves.

3.15 INSPECTION

- A. Construction of the water line will be inspected by the Engineer and the Owner. Do not cover any work without approval of Inspector. Work covered prior to inspection will be uncovered and reworked as required at Contractor's expense.

END OF SECTION

SECTION 331913

WATER METER INSTALLATION REQUIREMENTS

PART 1 - WATER METER INSTALLATION

1.1 GENERAL

- A. These specifications set forth the minimum requirements for the installation of water meters. Water meter installation shall include installing water meters and transmitters equipment, data collection of required information, and collecting of GPS coordinates.
- B. Excluding the meter setter, the equipment to be installed shall be furnished by the Owner.
- C. Any equipment damaged prior to the contractor taking possession, will be replaced by the Owner. The contractor will be responsible for the cost of replacing any equipment that is damaged after the contractor takes possession.

1.2 PERFORMANCE REQUIREMENTS

- A. The contractor will be responsible for cleaning any debris from the meters and boxes for the installations, removing the existing meter box and lid, and replacing with new box and lid provided by the Owner.
- B. The existing meter shall be replaced with meters supplied by the Owner.
- C. Installing Contractor or Subcontractor responsible for meter installations will attend meter manufacturer's provided training as required by manufacture prior to installing any meters. The manufacture will also assist and train installing contractor with electronic data management. Information gathered in the field will be in an electronic format.
- D. The following provisions shall be utilized to establish the basic requirements of the endpoint and meter installation provision:
 - a. Installing the equipment in the field under standard conditions
 - b. Data Collection or required information
 - 1. Old Meter Reading
 - 2. New Meter Serial Number
 - 3. New Register Serial Number
 - 4. New Transmitter Serial Number
 - c. Collecting GPS coordinates for each new meter installed
 - d. Data must be delivered to the Owner in an electronic format (Excel, CSV, etc.)
- E. Water leaks caused by changing of a meter shall be repaired as soon as possible by the contractor.
- F. During the change out process, the contractor shall take pictures. There shall be a picture before the change out, one during the change out, and one after the change out is complete. These pictures shall be saved according to address and account number and delivered to the Owner during the contract.
- G. Once each installation is complete, the AMI shall be tested by the manufacturer's representative to verify correct operation.

- H. Once tested and operating correctly, the contractor shall obtain latitude and longitudinal GPS coordinates (NAD83) for each meter. The accuracy of the established GPS coordinates for each meter shall be within 2-5 linear meters of the physical meter location. All information will be delivered to the Owner electronically by the contractor. The electronic data shall be formatted so as to be able to be used with the Owner's existing software.
- I. The contractor shall provide this data daily during the installation or as requested by the Owner or Meter Manufacturer. The Owner must have access to change out information daily to assist with billing and customer service.

1.3 INSTALLATION RESPONSIBILITIES OF THE CONTRACTOR

- A. **Water Shutoffs.** The contractor, including its agents and subcontractors, will be responsible for shutting off the water to each meter serviced as well as notifying each customer of the water shutoff. Some assistance may be required by the Owner with the notification of its customers. The installation team will knock on the doors of residential customers as well as leave notifications on their doors. In the case of large commercial customers such as: schools, hospitals, nursing homes or any other commercial customer, special efforts will be made to ensure minimum disruption to their water needs. In order to prevent any damage from running flush valves or any other plumbing fixtures that are sensitive to water shutoffs, the contractor will schedule replacements with these commercial customers and will notify the maintenance personnel when turning the water back on at these facilities.
- B. **Meter Boxes, Vaults, and Roadways.** The contractor is responsible for repairing any damage it causes to meter boxes or vaults that result from the installation of the Project; the contractor shall not be liable for pre-existing conditions or leaks. The contractor shall install new meter boxes and lids as part of the project. Boxes and lids shall be plastic. Some areas of concrete and other hard surfaces may need to be removed by the contractor in order to gain access to meters. The contractor will restore the affected area, to a condition as close as possible to the condition as it existed prior to installation.
- C. **Disposal.** The contractor shall deliver to the Owner all used meters resulting from the installation of the Project. The Owner will provide a container at a central collection point to the project area for the contractor to deliver used meters. Contractor shall be responsible for coordinating with the Owner. The contractor shall collect all debris from the work area and properly dispose offsite.
- D. **Liability.** The contractor is responsible for any damages that occur within 12" on either side of the water meter resulting from the Project installation. Any damages incurred within this 12" area will be promptly repaired at the expense of the contractor. The contractor is not liable for damages outside the 12" zone, either on the water distribution side or on the customer side incurred from the Project installation including shutoff, temporary outage, and restart of water service. The contractor is not liable for any pre-existing conditions including leaks, faulty workmanship and materials from previous projects or rust. Should such conditions occur (i.e. leaks) the contractor may document them and at the Owner's written request repair them for a negotiated price.
- E. **Non-Covered Work.** Contracted meter change outs contemplate a standard meter change out. In the event that location's conditions require nonstandard work (e.g., move customer structures and items for access, install systems in heavy traffic locations, alleys, parking lots, resize or re-plumb services, etc.), contractor and the Owner will discuss pricing and work may proceed from this point or the Owner may elect to excuse

this work from the project.

END OF SECTION