



ADDENDUM NO. 1

DATE: September 10, 2020

PROJECT: Lake Ouachita Water Supply Project
Contract A – Finished Water Transmission Pipeline
Hot Springs, Arkansas

BID DATE: September 15th, 2020 at 2:00 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.

Item No. 1. Bid Form – C-410 (Attached and to be used for Bidding)

- a. Added Deductive Alternate No. 1 to remove zinc coating from all ductile iron pipe.
- b. Added Deductive Alternate No. 2 to remove zinc coating and use alternate bedding detail.
- c. Added sub-section as follows:

5.04 The Owner reserves the right to select the base bid or alternate bid it so chooses.

Item No. 2. Specifications – Section 312300 – Trench Excavation, Backfill, and Compacting

- a. Add paragraph 1.1.B.1 with the following:

1.1.B.1. The area of bedding within the pipe zone, as defined above, is clarified in the details of the plans. Refer to section 2.2 Backfill and Bedding for information regarding materials that are acceptable for backfill and bedding.

Item No. 3. Specifications – Section 331100 – Water Pipe and Fittings

- a. Replace paragraph 1.4.D. in its entirety with the following:

1.4.D. All Ductile Iron Pipe and Fittings shall be domestic made. Non-domestic components will be accepted.

Item No. 4. Drawing Sheet 17

- a. Revised “Water Line Bedding” Detail
-

END OF ITEMS

All other provisions of the Contract Documents remain unchanged. Acknowledge receipt of this addendum on the Bid Form. Bids must be received at Hot Springs Finance Department, 324 Malvern Avenue, Hot Springs, Arkansas 71901 up until 1:00 PM on September 15th, 2020. After 1:00 PM they should be delivered to Hot Springs City Hall, 133 Convention Blvd, Hot Springs, 71901 by 2:00 PM on September 15th, 2020.



9/10/20

Kelly D. Vanlandingham, PE (Crist Engineers, Inc.)

Date

BID FORM

**CITY OF HOT SPRINGS UTILITIES DEPARTMENT
HOT SPRINGS, ARKANSAS**

**Finished Water Transmission Pipeline Contract A:
NEW WATER TREATMENT PLANT TO HWY. 7**

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

**City of Hot Springs
Purchasing Department
324 Malvern Avenue
Hot Springs, Arkansas 71901**

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or

adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
"coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

- 5.01 Bidder will refer to Section 010250 Measurement and Payments prior to preparing the bid schedule.
- 5.02 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):
- A.

BID SCHEDULE – BASE BID FINISHED WATER TRANSMISSION PIPELINE CONTRACT A: NEW WATER TREATMENT PLANT TO HWY. 7 City of Hot Springs, Arkansas					
Item No.	Description	Units	QTY	Unit Price	Item Total
1	36-inch Ductile Iron Pipe, 200 Class, Unrestrained Joint, Finished Water Transmission Line	LF	8,020	\$	\$
2	36-inch Ductile Iron Pipe, 250 Class, Unrestrained Joint, Finished Water Transmission Line	LF	1,822	\$	\$
3	36-inch Ductile Iron Pipe, 200 Class, Restrained Joint, Finished Water Transmission Line	LF	1,660	\$	\$

Item No.	Description	Units	QTY	Unit Price	Item Total
4	36-inch Ductile Iron Pipe, 250 Class, Restrained Joint, Finished Water Transmission Line	LF	1,039	\$	\$
5	24-inch Ductile Iron Pipe, 200 Class, Unrestrained Joint, Finished Water Transmission Line	LF	2,745	\$	\$
6	24-inch Ductile Iron Pipe, 250 Class, Unrestrained Joint, Finished Water Transmission Line	LF	99	\$	\$
7	24-inch Ductile Iron Pipe, 200 Class, Restrained Joint, Finished Water Transmission Line	LF	895	\$	\$
8	24-inch Ductile Iron Pipe, 250 Class, Restrained Joint, Finished Water Transmission Line	LF	380	\$	\$
9	12-inch Ductile Iron Pipe, Restrained Joint, Finished Water Transmission Line	LF	369	\$	\$
10	12-inch Ductile Iron Pipe, Unrestrained Joint, Finished Water Transmission Line	LF	440	\$	\$
11	8-inch Ductile Iron Pipe, Restrained Joint, Finished Water Transmission Line	LF	60	\$	\$
SUB-TOTAL BASE BID FOR ITEMS 1 THRU 11 (TO BE USED FOR THE DEDUCTIVE ALTERNATE CALCULATIONS)					\$
12	6-inch PVC Water Pipe for Connection to Existing Main	LF	40	\$	\$
13	36-inch MJ Gate Valve	Each	4	\$	\$
14	24-inch MJ Gate Valve	Each	4	\$	\$
15	12-inch MJ Gate Valve	Each	3	\$	\$
16	Fire Hydrant Assemblies	Each	7	\$	\$
17	Post Hydrant Assemblies	Each	4	\$	\$

Item No.	Description	Units	QTY	Unit Price	Item Total
18	Air Release Valve	Each	3	\$	\$
19	12-inch Tapping Sleeve and Valve	Each	1	\$	\$
20	8-inch Tapping Sleeve and Valve	Each	2	\$	\$
21	6-inch Tapping Sleeve and Valve	Each	1	\$	\$
22	Rock Excavation (As Directed)	CY	1,500	\$	\$
23	Road Asphalt Pavement (2")	SY	700	\$	\$
24	Jack and Bore	LUMP SUM		\$	\$
25	Highway Open Cut and Repair	LUMP SUM		\$	\$
26	Bonds and Insurance	LUMP SUM		\$	\$
27	Mobilization & Demobilization	LUMP SUM		\$	\$
28	Clearing & Grubbing	LUMP SUM		\$	\$
29	Seeding, Mulching, Final Cleanup	LUMP SUM		\$	\$
30	Storm Water Permit & S.W.P.P.P.	LUMP SUM		\$	\$
31	Maintenance of Traffic	LUMP SUM		\$	\$
32	Excavation and Trench Safety System	LUMP SUM		\$	\$
33	Miscellaneous & Incidental Work	LUMP SUM		\$	\$
TOTAL BASE BID					\$
_____ Dollars					

BID SCHEDULE – DEDUCTIVE ALTERNATE NO. 1

FINISHED WATER TRANSMISSION PIPELINE CONTRACT A:

NEW WATER TREATMENT PLANT TO HWY. 7

City of Hot Springs, Arkansas

The purpose of this deductive alternate bid is to provide a price reduction to the Owner to install all ductile iron pipe water line **without the zinc coating** that is shown in the specifications for the pipe instead of the zinc coated ductile water line as shown on the Drawings and priced in the Base Bid. All other requirements are unchanged. Bidder should provide the unit pricing below and total in "Line B". Bidder should translate the subtotal from the Base Bid for these items to 'Line A' below. The total for this deductive alternate is Line A minus Line B.

Item No.	Description	Units	QTY	Unit Price	Item Total
1	36-inch Ductile Iron Pipe, 200 Class, Unrestrained Joint, Finished Water Transmission Line – No Zinc Coating	LF	8,020	\$	\$
2	36-inch Ductile Iron Pipe, 250 Class, Unrestrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	1,822	\$	\$
3	36-inch Ductile Iron Pipe, 200 Class, Restrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	1,660	\$	\$
4	36-inch Ductile Iron Pipe, 250 Class, Restrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	1,039	\$	\$
5	24-inch Ductile Iron Pipe, 200 Class, Unrestrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	2,745	\$	\$
6	24-inch Ductile Iron Pipe, 250 Class, Unrestrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	99	\$	\$
7	24-inch Ductile Iron Pipe, 200 Class, Restrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	895	\$	\$

Item No.	Description	Units	QTY	Unit Price	Item Total
8	24-inch Ductile Iron Pipe, 250 Class, Restrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	380	\$	\$
9	12-inch Ductile Iron Pipe, Restrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	369	\$	\$
10	12-inch Ductile Iron Pipe, Unrestrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	440	\$	\$
11	8-inch Ductile Iron Pipe, Restrained Joint, Finished Water Transmission Line– No Zinc Coating	LF	60	\$	\$
B - TOTAL BID FOR THESE ITEMS FOR DEDUCTIVE ALTERNATE BID #1					\$
A - TOTAL BASE BID FOR ITEMS 1 THRU 11 (From Base Bid)					\$
TOTAL DEDUCTION FOR DEDUCTIVE ALTERNATE #1 Line A (Base Bid Pricing) – Line B (Alternate Bid Pricing)					\$
_____ Dollars					
<u>BASE BID (Page 5) LESS DEDUCTIVE ALTERNATE #1:</u>					\$
_____ Dollars					

BID SCHEDULE – DEDUCTIVE ALTERNATE NO. 2
FINISHED WATER TRANSMISSION PIPELINE CONTRACT A:
NEW WATER TREATMENT PLANT TO HWY. 7
City of Hot Springs, Arkansas

The purpose of this deductive alternate bid is to provide a price reduction to the Owner to install all ductile iron pipe water line **without the zinc coating using an alternate pipe bedding detail as added to sheet no. 17** of the Drawings and priced in the Base Bid. This deductive alternate also includes the use of an alternate pipe bedding detail for all ductile iron pipe. All other requirements are unchanged. Bidder should provide the unit pricing below and total in "Line B". Bidder should translate the subtotal from the Base Bid for these items to 'Line A' below. The total for this deductive alternate is Line A minus Line B.

Item No.	Description	Units	QTY	Unit Price	Item Total
1	36-inch Ductile Iron Pipe, 200 Class, Unrestrained Joint, Finished Water Transmission Line – No Zinc Coating with alternate pipe bedding	LF	8,020	\$	\$
2	36-inch Ductile Iron Pipe, 250 Class, Unrestrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	1,822	\$	\$
3	36-inch Ductile Iron Pipe, 200 Class, Restrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	1,660	\$	\$
4	36-inch Ductile Iron Pipe, 250 Class, Restrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	1,039	\$	\$
5	24-inch Ductile Iron Pipe, 200 Class, Unrestrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	2,745	\$	\$

Item No.	Description	Units	QTY	Unit Price	Item Total
6	24-inch Ductile Iron Pipe, 250 Class, Unrestrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	99	\$	\$
7	24-inch Ductile Iron Pipe, 200 Class, Restrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	895	\$	\$
8	24-inch Ductile Iron Pipe, 250 Class, Restrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	380	\$	\$
9	12-inch Ductile Iron Pipe, Restrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	369	\$	\$
10	12-inch Ductile Iron Pipe, Unrestrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	440	\$	\$
11	8-inch Ductile Iron Pipe, Restrained Joint, Finished Water Transmission Line– No Zinc Coating with alternate pipe bedding	LF	60	\$	\$
B - TOTAL BID FOR THESE ITEMS FOR DEDUCTIVE ALTERNATE BID #2					\$
A - TOTAL BASE BID FOR ITEMS 1 THRU 11 (From Base Bid)					\$
TOTAL DEDUCTION FOR DEDUCTIVE ALTERNATE #2 Line A (Base Bid Pricing) – Line B (Alternate Bid Pricing)					\$
_____ Dollars					
<u>BASE BID (Page 5) LESS DEDUCTIVE ALTERNATE #2:</u>					\$
_____ Dollars					

5.03 The pipe supplier for Ductile Iron pipe that was used as the basis for this bid is

5.04 The Owner reserves the right to select the base bid or alternate bid it so chooses.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete within **180 calendar days** after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **210 calendar days** after the date when the Contract Times commence to run.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

- A. List of Proposed Subcontractors.
- B. Bid Bond.
- C. Copy of current Contractors License.
- D. Statement of Compliance.
- E. Statement of Insurance Requirements Compliance.

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

By: _____

[Signature] _____

[Printed name] _____

(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: *[Signature]* _____

[Printed name]

Title:

Submittal Date:

Address for giving notices:

Telephone Number:

Contact Name and e-mail address:

Bidder's License No.:

SECTION 312300

TRENCH EXCAVATION, BACKFILL, AND COMPACTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
1. Excavating trenches for water line.
 2. Crushed granular stone backfill required by over-excavation or for trench stabilization.
 3. Pipe zone embedment material.
 4. Trench settlement repair, including roadway surfacing, sidewalks, or other structures.
 5. Replacing damaged culverts.
 6. Trench excavation and safety requirements
- B. Pipe zone includes full width of excavated trench from 6 inches below bottom of pipe to a point 6 inches above top outside surface of pipe barrel.
1. ***The area of bedding within the pipe zone, as defined above, is clarified in the details of the plans. Refer to section 2.2 Backfill and Bedding for information regarding materials that are acceptable for backfill and bedding.***
- C. Conform to federal, state, and local codes governing safe loading of trenches with excavated material. Refer to appendix for copy of Trench Excavation Safety Rules and Recommendations as required by Arkansas Act 291 of 1993.
- D. The right is reserved to modify the use, location, and quantities of the various types of backfill during construction as Engineer considers being in the best interest of Owner.
- E. The Contractor is responsible for excess excavated material disposal off-site.

1.2 RELATED SECTIONS

- A. City of Hot Springs "Water and Wastewater Standards and Specifications Policies and Procedures Code" except as modified or augmented herein.
- B. Section 312333 - Trench and Excavation Safety System.

1.3 REFERENCES

- A. Arkansas Highway and Transportation Department, P.O. Box 2261, Little Rock, Arkansas 72203.
1. AHTD 303 - Aggregate Base Course.
- B. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.
1. ASTM D448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
 2. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft.- lbf/m^3 (600 $KN-m/m^3$)).

3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 4. ASTM D2487- Standard Classification of Soils for Engineering Purposes.
 5. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- C. American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.
1. M41 - Ductile Iron Pipe and Fittings; Laying Conditions Type 2 and Type 3
- D. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P - Excavations.
- E. The Contractor shall be solely responsible for trench and excavation safety systems in accordance with Act 291 of 1993.

PART 2 - PRODUCTS

2.1 FOUNDATION STABILIZATION MATERIAL

- A. Coarse natural gravel or crushed quarry rock (sandstone or granite), angular or rounded.
- B. Foundation stabilization material will be free from dirt, clay balls, or organic material.
- C. Uniformly graded from 6 inches to approximately 1 inch and no more than 10 percent by weight passing the #200 sieve size.
- D. Similar or equal to "B" stone as defined by ASTM (or certain quarry nomenclature) or Stone Backfill as defined by the AHTD in Section 207.02 of the 2014 Standard Specifications.
- E. Used to bridge over unacceptably soft and yielding soils through granular interlocking and friction forces between the particles. Not intended for direct contact with the pipe. Cover with pipe zone material as defined below.

2.2 BACKFILL AND BEDDING

- A. Backfill is to comply with City of Hot Springs Standards, Article II Sections 22 and 23, except as modified or augmented herein.
- B. Pipe zone embedment material shall be in accordance with ASTM D 2487, latest edition and shall conform to class 1A embedment materials in accordance with ASTM D 2321, latest edition. Material shall meet the gradation requirements of ASTM C 33, gradation 57, commonly referred to as ASTM #57, or gradation 67, commonly referred to as ASTM #67. Maximum aggregate size shall be 3/4 inch. This includes materials such as crushed stone or rock.

2.3 COMPACTION EQUIPMENT

- A. Compaction wheel for bucket, or compaction bucket for compacting trench. Suitable type and adequate, as determined by the Engineer, to obtain the amount of compaction specified.
- B. Operate in strict accordance with manufacturer's instructions and recommendations and maintain conditions so that it delivers manufacturer's rated compacted effort.

2.4 IMPORTED SURFACE MATERIAL

- A. Suitable sandy loam from an approved source.
- B. Possess friability and a high degree of fertility.
- C. Free of clods, roots, gravel, rocks, and other inert material.
- D. Free of quackgrass, horsetail, and other noxious vegetation and seed.
- E. Acidity range (pH) of 5.5 to 7.5.
- F. Minimum of 4 percent and maximum of 50 percent organic matter.

PART 3 - EXECUTION

3.1 STRIPPING AND STOCKPILING OF SURFACE MATERIAL

- A. In areas of maintained lawns, remove surface material to a depth of 6 inches for full width of disturbed areas and stockpile or finish grading. Imported topsoil may be substituted for stockpiling and replacing of surface material.

3.2 TRENCH WIDTH

- A. Width of trench shall be adequate for the installation of the pipe and make-up joints, but in no case shall the width of the trench at the top of the pipe be wider than the outside diameter of the pipe plus two (2) feet. The minimum clear width of an unsupported or supported trench measured at the centerline of the pipe shall be at least 18-inches or the pipe outside diameter plus 12-inches, whichever is greater. Where embedment compaction is required, the trench shall be wide enough to accommodate the compaction equipment.
- B. Maximum width at top of trench shall be limited, especially where excess width of excavation would cause damage to adjacent structures or property or cause undue stresses on the pipe.
- C. Confine trench widths to dedicated rights-of-way or construction easements, unless special written agreements have been made with affected property owner.

3.3 EXCAVATION

- A. All pipe shall be laid in trenches of such depth as to provide 36 inches of minimum cover over the top of the pipe barrel unless otherwise shown on the Drawings.
- B. Classification:
 - 1. Rock excavation is defined as all solid rock formation that, in the opinion of the Engineer, cannot be excavated by using power shovels or other power excavators which are of recognized manufacturer and design, of adequate size and operated by qualified operations without continuous and systematic blasting or breaking up with a power-operated tool. No soft or disintegrated rock or slag which can be removed with a power-operated excavator or shovel equipped with bucket mounted rippers; no loose, shaken, or previously blasted rock or broken stone in rock fillings or elsewhere; and no rock exterior to the maximum limits of

measurement allowed, which may fall into the excavation, will be measured or allowed. It shall include boulders or pieces of detached rock exceeding one (1) cubic yard in volume or solid rock formations which are interspersed with strata of clay or other material, provided that the solid rock constitutes at least seventy five (75) percent of the total volume of the particular formation. The Contractor is reminded that blasting before an attempt to excavate is made does not necessarily qualify the material to be excavated as "rock excavation" and no payment for "rock excavation" will be made unless the material excavated can conform to the above definition.

2. All other excavation shall be unclassified regardless of the nature of materials encountered.
- C. Depth shall be increased as necessary for crossing other pipe lines, to provide for proper connection to existing lines and structures, and to provide required cover for valves and valve boxes. Depth shall be increased so as not to exceed the maximum permissible deflection joint as recommended by the pipe manufacturer.
- D. Excavate trench to lines and grades shown on the Drawings, or as established by Engineer, with proper allowance for pipe bells. The bottom of the trench shall be graded so that the pipe will be in continuous and uniform contact with and have a uniform bearing for the full length of the pipe.
- E. Trench preparation should proceed in advance of the pipe installation only as far as can be backfilled in the same day. The excavation of trenches shall not advance more than 100 feet ahead of the completed pipe work and backfill. All trenches and areas disturbed by construction activity shall be backfilled, settled, and the ground restored to its original condition as soon as possible after the pipe is installed. Any unnecessary delay in restoring trenches to their original condition shall constitute just cause for stopping all other work until the trenches are so restored.
- F. If trench is excavated below required grade whether due to instability of soils or other reason, the Contractor shall excavate below the lower extremity of the pipe as directed by the Engineer, and place a foundation stabilization material thoroughly in place to receive the pipe.
- G. Remove hard spots that would prevent a uniform thickness of bedding.
- H. Engineer may, if requested, allow changes in the trench alignment to avoid major unforeseen obstructions, if such alignment changes can be made within the easement or right-of-way without adversely affecting the future operation and maintenance of the pipeline.
- I. Any excavation which remains open overnight shall be properly barricaded and lighted in accordance with OSHA standards to avoid injury to persons and property.

3.4 SHORING, SHEETING, AND BRACING OF TRENCHES

- A. Conform to safety requirements of federal, state, or local public agency having jurisdiction for sheeting, shoring, and bracing of trenches; the most stringent of these requirements shall apply. Refer to the guidance provided in the Appendix.

3.5 REMOVAL OF WATER

- A. Provide and maintain ample means and devices to promptly remove and dispose of water entering trench during time trench is being prepared for pipe laying, during laying of pipe, and until backfill at pipe zone is completed.

- B. Dispose of water in a manner to prevent damage to adjacent property.
- C. Drainage of trench water through the pipeline under construction is prohibited.

3.6 FOUNDATION STABILIZATION

- A. If trench is excavated below required grade whether due to instability of soils or other reason, the Contractor shall excavate below the lower extremity of the pipe as directed by the Engineer, and place foundation stabilization material thoroughly in place to receive the pipe.
- B. Backfill trench to subgrade of pipe base with foundation stabilization material.
- C. Place foundation stabilization material over the full width of trench and compact in layers not exceeding 6 inches deep to required grade by making passes with a vibratory compactor (or equivalent).
- D. Material shall be considered unsuitable when it contains more than 5 percent organic material by volumetric sampling or when it will not support a reading of 1.5 on a hand penetrometer or if deemed by the Engineer unable to adequately support the pipe.
- E. In areas where trench stabilization material is directed to be placed by the Engineer (or his representative) place a thin layer of pipe zone material on top to cushion the pipe and to prevent point bearing of the pipe on the trench stabilization material which may have sharp points.

3.7 ROCK IN TRENCH

- A. Do not allow pipe to be subjected to point bearing on rock anywhere along its length.
- B. No part of any bell or coupling shall be in contact with the trench bottom or trench walls when the pipe is jointed.
- C. Minimum Bedding Thickness: 6 inches.

3.8 PIPE ZONE BACKFILL

- A. Pipe zone backfill shall be in full accordance with details on the Drawings.
- B. Particular attention shall be given to area of pipe zone from flow line to centerline of pipe to ensure firm support is obtained to prevent lateral movement of pipe during final backfilling of pipe zone.
- C. Backfill from bottom of pipe to horizontal centerline (springline) of pipe by hand-placing material around pipe in 4-inch layers.
- D. Achieve continuous support beneath pipe haunches by "walking in" and slicing with shovel. Lightly compact.(defined as 70 to 80 percent of standard proctor density).
- E. Backfill from horizontal centerline (springline) to 6 inches above crown of pipe with pipe zone material. Lightly compact.
- F. Pipe zone material shall be approved by the Engineer, and shall be free of trash, lumber, or other debris deemed unacceptable by the Engineer.
- G. Special attention shall be given to compactive efforts near ponds to prevent leakage from

ponds.

3.9 TRENCH BACKFILL ABOVE PIPE ZONE

- A. From a plane 6-inches above the crown of the pipe to the ground surface as shown on the Drawings.
- B. Backfill shall be placed in a manner to avoid pipe damage. Do not push backfill into trench in a way to permit free fall of material until at least 2 feet of cover is provided over top of pipe.
- C. Under no circumstances allow sharp, heavy pieces of material to drop directly onto pipe or tamped material around pipe.
- D. Do not use backfill material of consolidated masses larger than 2 cubic foot.
- E. Use compaction equipment to obtain approximately 80 percent of standard proctor density on the backfill above the pipe zone up to the ground surface.
- F. Backfill of trenches shall be uniformly graded, conforming to adjacent natural ground or to required finished grade. In untraveled areas on private or public street or road rights-of-way, leave trench with backfill material neatly mounded not more than 6 inches above existing ground for entire width of trench. In lawn or garden areas, backfill trench and maintain it level with existing adjacent grade.
- G. Replace surface soil in top 6 inches.
- H. Excess or deficiency of backfill material which becomes apparent after settlement and within warranty period shall be corrected by regrading, disposal of excess material, and adding additional material where required.
- I. Remove rocks larger than 2 inches from upper 6 inches of backfill.
- J. Remove trash, construction debris, materials, brush, and other foreign objects.
- K. For trenches crossing paved streets, parking lots, and driveways:
 - 1. Backfill trench above pipe zone with granular backfill material as specified in lifts not exceeding 8 inches loose depth.
 - 2. Compact each lift with mechanical vibrating or impact tampers.
 - 3. Maintain surface of backfilled trench level with existing grade with granular backfill material until entire Project is accepted by Owner.
 - 4. Subsequent settlement of finished surfacing during warranty period shall be considered to be a result of improper or insufficient compaction and shall be promptly repaired.
- L. Special attention shall be given to compactive efforts near ponds to prevent leakage from ponds.

3.10 EXCESS EXCAVATED MATERIAL

- A. Dispose of excess or unsuitable excavated material off project site in an approved area. Do not leave rocks from excavation on ground surface.
- B. Broken concrete, asphalt, and other debris resulting from pavement or sidewalk removal, excavated rock in excess of the amount permitted to be installed in trench backfill above the pipe zone, debris encountered in excavation work and other similar waste materials

shall be suitably disposed of away from the site of the Work.

- C. If acceptable to the Owner (and the property owner from whom the easement for this pipeline has been obtained), excess earth from the excavation may be distributed directly over the trench and within the temporary easement to a maximum depth of 6 inches above the original ground surface elevation at or across the trench and sloping uniformly each way.
- D. Material thus wasted shall be carefully finished with a drag, blade machine, or other suitable tool to a smooth, uniform surface without obstructing drainage as mentioned in subsequent articles of this specification.
- E. Wasting of excess material in the above manner will not be permitted where the line of trench crosses or is within a railroad, public road, or highway right of way or is within some other utilities pre-existing easement.
- F. The disposal of waste and excess excavated materials, including hauling, handling, grading, and surfacing, shall be incidental to the cost of the pipeline and no separate payment will be made therefore.

3.11 TEMPORARY CLEAN UP

- A. Contractor shall not leave trenches open overnight without approval of the Engineer. Contractor shall install temporary fencing around excavation at pipe end, at end of workday.
- B. Backfilling shall be a continuous operation. Contractor shall not have more than 100 feet of trench open at any given time.
- C. Clean-up shall be a continuous operation. If the Engineer determines clean-up activities are not proceeding in a timely manner, the Contractor shall suspend other work and devote his entire effort to clean up until the Engineer determines that clean-up work has been caught up.

3.12 DRAINAGE MAINTENANCE AND RESTORATION

- A. Bridges and other temporary structures required to maintain traffic across such unfilled trenches shall be constructed and maintained by the Contractor.
- B. Backfilling shall be done so that water will not accumulate in unfilled or partially filled trenches. All material deposited in roadway ditches or other watercourses crossed by the line of trench shall be removed immediately after backfilling is completed and the original section, grades, and contours of ditches or watercourses shall be restored. Surface drainage shall not be obstructed any longer than necessary and shall by no means be left obstructed overnight or for the weekend.
- C. Where indicated on Drawings, provide rip rap on ditch banks.

3.13 SETTLEMENT

- A. The Contractor shall be responsible for all settlement of backfills, fills, and embankments which may occur during the warranty period (one year) stipulated in the General Conditions.
- B. The Contractor shall refill trenches as often as necessary to bring them back to original grade.

- C. Where settlement occurs in streets, driveways, roads, parking areas, or other paved surfaces, the Contractor shall refill them frequently enough to maintain traffic without hazard at all times.
- D. The Contractor shall make or cause to be made, all repairs or replacements made necessary by the settlement within 7 days after notice by the Engineer or Owner.

END OF SECTION

SECTION 331100

WATER PIPE AND FITTINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This specification includes Ductile iron and PVC water pipeline, valves, valve boxes, blocking, fittings, and other appurtenances, outside building limits.

1.2 REFERENCES

- A. City of Hot Springs Engineering Standard Specifications and standard terms and conditions for Water and Wastewater Projects.
1. All products and executed work must meet or exceed the City of Hot Springs Standard Specifications, except as modified or augmented herein.
- B. Ductile Iron Pipe Research Association (DIPRA), Birmingham, AL
1. Handbook of Ductile Iron Pipe, Sixth Edition
- C. American Society for Testing and Materials (ASTM), Philadelphia, PA
1. ASTM A53 - Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless.
 2. ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 3. ASTM A307 - Carbon Steel Bolts and Studs 60,000 psi Tensile.
 4. ASTM A536 - Ductile Iron Castings.
 5. ASTM D1784 - Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds.
 6. ASTM D1785 - PVC Plastic Pipe, Schedules 40, 80, and 120.153
 7. ASTM D2241 - PVC Plastic Pipe (SDR-PR).
 8. ASTM D2466 - PVC Plastic Pipe Fittings, Schedule 40.
 9. ASTM D2564 - Solvent Cement for PVC Plastic Pipe and Fittings.
 10. ASTM D2737 - Polyethylene (PE) Plastic Tubing.
 11. ASTM D2855 - Making Solvent-Cemented Joints with PVC Pipe and Fittings.
 12. ASTM D3139 - Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 13. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- D. American Water Works Association (AWWA)
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-in through 24-in and 54-in through 64-in for Water Service
 9. AWWA C500 - Gate Valves for Water and Sewerage Systems
 10. AWWA C502 - Dry Barrel Fire Hydrants

11. AWWA C509 - Resilient-Seated Gate Valves
12. AWWA C510 - Standard for Double Check Valve Backflow-Prevention Assembly
13. AWWA C511 - Standard for Pressure-Reducing Principle Backflow-Prevention Assembly
14. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
15. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
16. AWWA C651 - Standard for Disinfecting Water Mains
17. AWWA C900 - Standard for PVC Pressure Pipe, 4 Inch through 12 Inch
18. AWWA C905 - Standard for PVC Water Transmission Pipe, Nominal Diameters 14 Inch through 36 Inch.

E. American Welding Society

1. AWS D11.2 Guide for Welding Iron Casting

F. Manufacturers Standardization Society (MSS)

1. MSS SP-60- Connecting Flange Joint between Tapping Sleeves and Tapping Valves
2. MSS SP-111- Gray Iron and Ductile Iron Tapping Sleeves

1.3 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Shop Drawings: The Contractor shall submit catalog cuts of pipe and fittings in accordance with the requirements of this Section.

1. Certified dimensional drawings of all valves, fittings, and appurtenances.
2. Certified dimensional drawings of joints, showing the manufacturer=s allowable deflections.
3. Copies of the manufacturer=s approved installation instructions for the types of joints being used.

C. Certificate of Compliance: Submit Certificates of Compliance attesting that materials provided are in compliance with referenced standards.

D. Contract Closeout Submittals: Submit documents in accordance with Section 01700. Accurately record installed location of valves, piping, and accessories.

1.4 QUALITY ASSURANCE

A. Water line installation shall be in accordance with manufacturer's recommendations and as supplemented by these Specifications.

B. Pipe shall be kept clean of all foreign matter.

1. At temporary termination of pipe laying, provide suitable cover to close open end until burying operations are resumed.

C. Jointing shall be by trained employees.

D. All Ductile Iron Pipe and Fittings shall be domestic made. Non-domestic components will be accepted.

PART 2 - PRODUCTS

2.1 STEEL PIPE

- A. Steel pipe for water transmission pipeline must comply with requirements in Section 331102.

2.2 DUCTILE IRON PIPE

- A. General: Ductile iron pipe (DIP) shall conform to AWWA C151, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents, and all specials and fittings shall be provided as required under the Contract Documents.
- B. All Ductile Iron Pipe shall be manufactured in an ISO 9001 Certified Plant. Contractor shall provide documentation from the Pipe and Fitting Manufacturer of ISO 9001 Certification prior to ordering Ductile Iron Pipe and Fittings.
- C. Laying Lengths: Pipe laying lengths shall be provided in 18 or 20-foot nominal lengths with allowable trim pipe lengths in accordance with AWWA C151 and special shorter lengths provided as required by the Drawings.
- D. Design Parameters: All ductile iron pipe shall be designed and manufactured in accordance with AWWA C150 and AWWA C151, respectively, for the following minimum operating conditions:
 - 1. The minimum internal design pressure shall be 150 psi with a 100-psi surge allowance, with a safety factor of 2, for a total internal design pressure of 500 psi. No reduction of safety factor for transient pressures shall be allowed.
 - 2. The external loads design criteria shall be a minimum of 4-foot depth of cover at 120 pounds per cubic feet soil weight and live load based on one AASHTO H-20 truck load. The thickness design of ductile iron pipe shall be in accordance with AWWA C150.
 - 3. The horizontal deflection of cement-mortar lined ductile iron pipe resulting from external load conditions shall not exceed 3 percent of the pipe diameter.
 - 4. The pipe trench, per AWWA C150, for design purposes only shall be:
 - a. Laying Condition Type 2- Flat Bottom Trench with Backfill Lightly consolidated (roughly 70 to 80% of standard proctor density) to centerline of pipe. As a minimum. For pipe installed in rock trenches the Laying Condition increases to Type 3 which is pipe bedded in 4 inches of loose soil (or trench bottom raked with bucket teeth to the equivalent depth) and backfill lightly consolidated to the top of the pipe. Actual pipe laying conditions are shown in the details of the plans.
- E. Polyethylene Encasement: All ductile iron pipe shall be installed with polyethylene encasement in accordance with AWWA C105.
- F. Pipe Class: All pipe shall have a minimum pressure rating as indicated below, or higher ratings as indicated on the drawings.

<u>Pipe Sizes (inch)</u>	<u>Pressure Class (psi)</u>
4-12	350
14-20	250
24-64	200
30-64	150

G. Joint Design: Ductile iron pipe and fittings shall be furnished with push-on joints (non-restrained or restrained), mechanical joints (MJ), or flanged joints as detailed on the Drawings.

1. Push-on Joints: Any ductile iron pipe joint not specifically noted on the Drawings to be otherwise shall be considered to be push-on joint. Unless otherwise specified, gasket material shall be standard styrene butadiene copolymer (SBR). Non-restrained push-on joints shall be Fastite, as manufactured by American Ductile Iron Pipe, or approved equal. The pressure rating for push-on joints shall be a minimum of 350 psi or the specified pressure rating of the pipe, whichever is less.
2. Mechanical Joints: Mechanical joints shall conform to AWWA C111. Bolts shall be high-strength, low-alloy steel per AWWA C111. Unless otherwise specified, gasket material shall be standard styrene butadiene copolymer (SBR) per this standard.
3. Welded-on Thrust Collars: Welded-on thrust collars, for wall pipe and pipe thrust restraint, shall be welded steel collars designed for the thrust generated by 250 psi working pressure with a safety factor of at least two (2.0) against failure. Welded-on thrust collars shall be as manufactured by American Ductile Iron Pipe or pre-approved equal. The manufacturer shall qualify all welding procedures and welders per the requirements of a documented quality assurance system based on ANSI/AWS D11.2.
4. Restrained push-on joint pipe shall meet the requirements in section 2.5.

H. Cement Mortar Lining

1. General: Ductile iron pipe shall be internally lined with cement-mortar lining in accordance with AWWA C104, by a high speed, centrifugal process. The quality system of the manufacturer shall be registered to an ISO 9000 quality standard by an accredited registrar. Grinding of linings shall not be allowed. The finished cement lining shall be uniformly smooth. In addition to complying with AWWA C104, the linings shall also comply with the following additional requirements:
2. Material: The cement used shall be a Portland Cement. Sand shall consist of inert, hard, strong, and durable silica grains. The water used in the cement mortar shall be potable, and free from injurious quantities of organic matter, alkali, salt or other impurities that might reduce the strength, durability, or other desirable qualities of the lining. All material in contact with water shall be certified to meet the requirements of ANSI/NSF Standard 61. The cement mortar shall contain not less than one part of cement to two parts of sand by volume.
3. Lining Thickness: Cement lining thicknesses shall be per AWWA C104 either single or double thickness and as shown in Table below:

<u>Nominal Pipe Diameter</u>	<u>Minimum Lining Thickness</u>
3-12"	1/16"
14-24"	3/32"
30-64"	1/8"

4. Surface Preparation: All surfaces to be mortar lined shall be cleaned as necessary to remove foreign matter that could interfere with the adherence of the cement mortar or protrude through the lining.
5. Repairs: All repairs of handling or other damage shall be made in accordance with the recommendations of the manufacturer and shall be reasonably smooth and may not project into the waterway.

I. Exterior Coating:

1. All ductile iron shall have an external 200 g/m² (0.65 oz/ft²) or arc sprayed zinc base coat per ISO 8179 and shall have a manufacture mark indicating zinc

application. All buried and below-floor DIP shall be furnished and installed with standard asphaltic top coating one mil thick in accordance with AWWAC151, AWWA C110 and AWWA C153.

2. All ductile iron pipe that will not be buried or encased in concrete shall have a shop applied primer. Primer shall be a bluish-grey color, single component moisture-cured urethane containing among other ingredients, micaceous iron oxide (MIO) pigments and zinc. Primer shall be specifically formulated and evaluated for use on ductile iron pipe and fittings, suitable for immersed and non-immersed applications. The primer must be compatible with metallic zinc coating, acrylic, coal tar, catalyzed epoxy, polyurethane, moisture-cure urethane and asphalt-based topcoats. The shop applied primer shall be MC-FerroCladJ Primer, manufactured by Wasser High Tech Coatings, Tnemec Series 1 Omnithane, or approved equal.
 - a. Surface Preparation & Application: Follow carefully manufacturer=s published surface preparation requirements for ductile iron pipe. Primer shall be applied per manufacturer=s recommendations to achieve a minimum dry film thickness of 3.5 mils as measured per Steel Structures Painting Council SSPC-PA2, Paint Application Specification No. 2, Measurement of Dry Paint Thickness with Magnetic Gages.

2.3 DUCTILE IRON FITTINGS

- A. General: Fittings shall be ductile iron in accordance with City of Hot Springs Standard Specifications.
- B. All Ductile Iron Fittings shall be manufactured in an ISO 9001 Certified Plant. Contractor shall provide documentation from the Pipe and Fitting Manufacturer of ISO 9001 Certification prior to ordering Ductile Iron Pipe and Fittings.
- C. 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.
- D. Flanged Fittings: Flange fittings shall be ductile iron in accordance with AWWA C110 or AWWA C153, not ANSI B16.1. Bolt circle and bolt holes match those of ANSI B16.1 class 125 and ANSI B16.5 class 150 flanges. The flanges shall be rated for at least 250 psi working pressure. Bolts, gaskets and installation shall be in accordance with AWWA C110 or AWWA C115, Appendix A. Flanged gaskets for all water applications shall be NSF 61 certified 1/8" thick Toruseal gaskets as manufactured by American Ductile Iron Pipe. Gaskets shall be full face NSF 61 certified Toruseal design. Gaskets for flanged ductile iron pipe fittings must not have the larger inside diameters provided by the requirements of ANSI B16.21. Flange facing shall be smooth or with shallow serrations per AWWA C110 or AWWA C153, no raised face flanges.
- E. Fittings 2 Inches and Larger: Where taps are shown on fittings, tapping bosses shall be provided.
 1. Flanged Joint: ANSI/AWWA C153 and ANSI B16.1, faced and drilled 125-pound ANSI standard.
 2. Mechanical Joint Megalugs: AWWA C153 (ANSI A21.53) and AWWA C110 (ANSI A21.10).
 3. Push-on Joint: American Fastite, or US Pipe Tyton ANSI/AWWA C153 or equal. Restrained push-on joint pipe shall meet the requirements in section 2.5.
- F. Exterior Coating:
 1. All buried and below-floor DIP shall be furnished and installed with standard

asphaltic top coating one mil thick in accordance with AWWAC151, AWWA C110 and AWWA C153.

2. All ductile iron pipe fittings that will not be buried or encased in concrete shall have a shop applied primer. Primer shall be a bluish-grey color, single component moisture-cured urethane containing among other ingredients, micaceous iron oxide (MIO) pigments and zinc. Primer shall be specifically formulated and evaluated for use on ductile iron pipe and fittings, suitable for immersed and non-immersed applications. The primer must be compatible with metallic zinc coatings, acrylic, coal tar, catalyzed epoxy, polyurethane, moisture-cure urethane and asphalt-based topcoats. The shop applied primer shall be MC-FerroClad Primer, manufactured by Wasser High Tech Coatings or approved equal.
 - a. Surface Preparation & Application: Follow carefully manufacturer's published surface preparation requirements for ductile iron pipe. Primer shall be applied per manufacturer's recommendations to achieve a minimum dry film thickness of 3.5 mils as measured per Steel Structures Painting Council SSPC-PA2, Paint Application Specification No. 2, Measurement of Dry Paint Thickness with Magnetic Gages.

2.4 RESTRAINING JOINT PIPE / FITTINGS

- A. Use EBAA 1100 MEGALUG or approved equal for all mechanically restrained DIP fittings. Restraint harnesses EBAA MEGALUG 1700 Series or approved equal for DIP waterlines rated for a minimum of 250 PSI to restrain the identified bell/spigot pipe lengths. Split bell restraint harness with a rating less than 250 PSI shall not be allowed. All mechanical restrained DIP fittings shall include the EBAA Seal Improvement Mechanical Joint Gasket or approved equal. All mechanical restraints and harnesses shall be coated with a factory applied fusion bonded epoxy coating to no less than 3 mils in thickness. All bolts, washes, rods or any other incidental hardware shall be coated with a factory applied two (2) coat fluoropolymer coating to no less than 0.7 mils in thickness.
- B. Restrained joint with a precast or cast in place thrust block may be used, where appropriate, if pre-approved in writing by the engineer, in lieu of restraint harnesses. Use EBAA MEGALUG 1100 series or approved equal where all thrust blocks are approved for use. The Contractor must submit detailed thrust block calculations, dimensions and reinforcement with a site-specific geotechnical investigation demonstrating the minimum allowable bearing pressure. All thrust restraint calculations shall have a minimum safety factor of 2 to 1. All thrust blocks shall use rebar (mesh is not allowed) with a minimum of 3000 PSI concrete meeting all ACI codes for design and placement of reinforced concrete. All calculations shall be sealed by a licensed State of Arkansas Professional Engineer.
- C. Where restraining of mechanical joint fittings and/ or restraint harnesses is required or identified on the plans, the Contractor may use propriety restrained joint pipe/ fittings (equivalent restrained length) that is American Cast Iron Pipe Company FLEX-RING by American Cast Iron Pipe Company of Birmingham, AL or TR FLEX by U.S. Pipe of Birmingham, AL or TR Flex by McWane Ductile of Birmingham, AL. Written pre-approval from the engineer is required for all use of all other propriety restrained joint pipe/ fittings. Pre-approval must be obtained at least 15 days prior to the open of the bid. All proprietary restrained joint pipe shall be ductile iron pipe and conform to the requirements described in Section 2.2.

2.5 LOCATING TAPE

- A. Terra Tape "Extra Stretch", or equal.
- B. Blue in color and including the words AWater Line Below@ in black print.

2.6 TEMPORARY PIPE PLUGS

- A. Non-pressure polyethylene plugs with handles sized to fit bells or spigots or sizes 6" to 60" shall be Taylor Made Plastics or equal.

2.7 CONCRETE FOR THRUST BLOCKS AND ANCHOR COLLARS

- A. Concrete for thrust blocks and anchor collars shall conform to City of Hot Springs Standard Specifications Section 19, Article II.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION

- A. Pipe Installation shall conform to the City of Hot Springs Standard Specifications, except as modified or augmented herein.

3.2 LOCATING TAPE

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

3.3 TESTING

- A. Pressure lines shall be hydrostatically tested at the pressures listed in Section 331400.
- B. Engineer and Owner shall observe and document tests.
- C. Use pipe-locating equipment to test continuity of trace wire.

3.4 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 similar or equal to American Table 5-18 or 5-19 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.

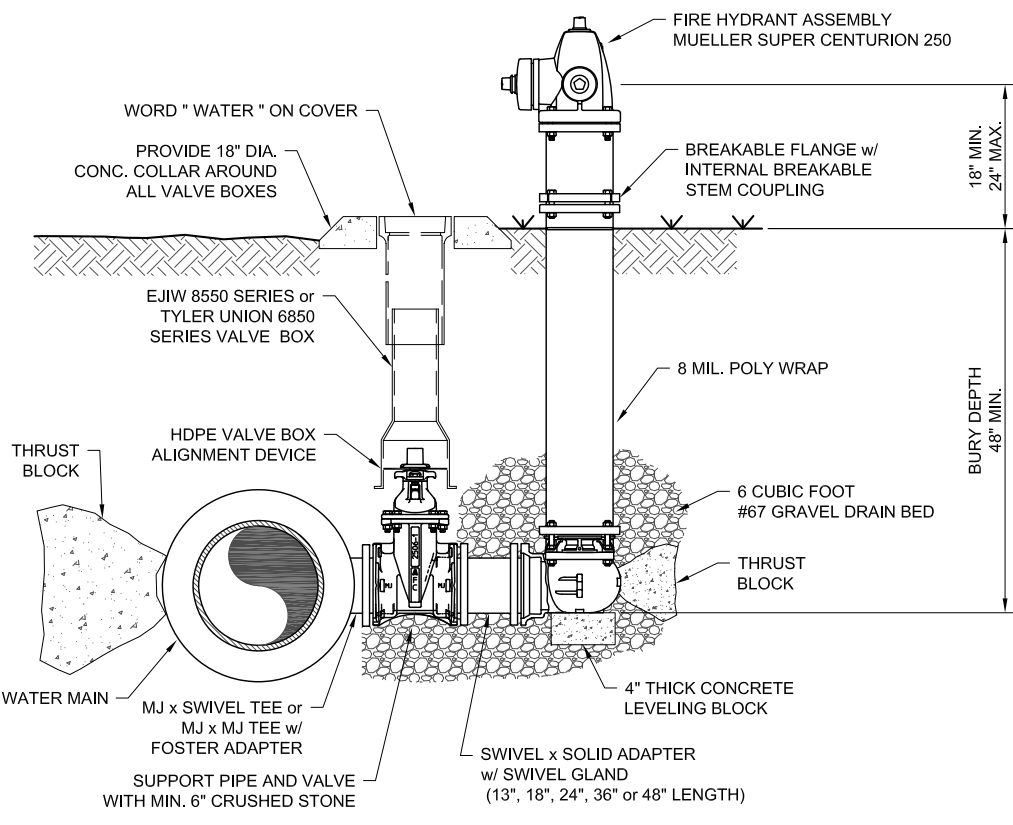
3.5 INSPECTION

- 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.

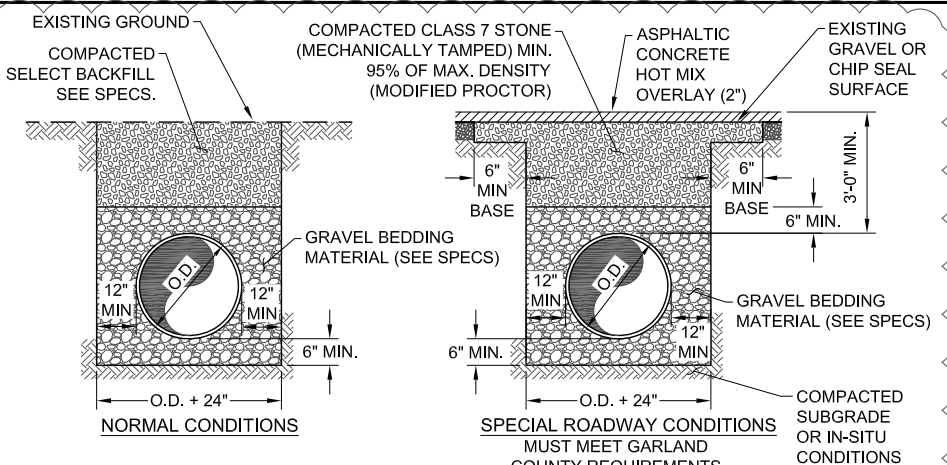
END OF SECTION

PROJECT: 1926 - CHS Lake Ouachita Water Supply - Raw & Finished Lines 10 - Finished Water Transmission Pipeline - Contract A06 - CADD05 - FINISHED WATER TRANSMISSION PIPELINE - CONTRACT A - DETAILS - add 1.dwg 9/31/2020 10:41:53 AM
 COPYRIGHT © 2019 CRIST ENGINEERS, INC.

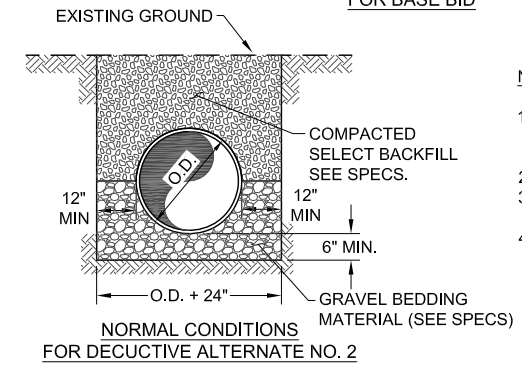
- NOTES:**
1. THE 6" GATE VALVE SHALL BE POSITIVELY RESTRAINED TO THE MAIN BY THE USE OF EITHER A SWIVEL TEE OR FOSTER ADAPTER.
 2. FIRE HYDRANTS SHALL BE DESIGNED FOR A MINIMUM 48" BURY.
 3. BURY LINE OF HYDRANT SHALL BE NO LESS THAN THE PROPOSED FINISHED ELEVATION OF BACK OF CURB, OR SIDEWALK, WHICHEVER IS GREATER.
 4. NO MORE THAN ONE EXTENSION PER HYDRANT.
 5. IF SIDEWALK IS PRESENT, HYDRANT SHALL BE INSTALLED 2' MINIMUM BEHIND THE BACK OF THE SIDEWALK OR CURB. VALVES SHALL BE INSTALLED 1' MINIMUM BEHIND THE BACK OF THE SIDEWALK OR CURB.
 6. DO NOT COVER UP WEEP HOLE WITH CONCRETE.
 7. MJ RETAINER GLANDS ARE REQUIRED FOR ALL FITTINGS.
 8. 6" DUCTILE IRON PIPE IS REQUIRED FOR ALL FIRE HYDRANT LEADS GREATER THAN 48-INCHES FROM THE MAIN VALVE.
 9. AN ADDITIONAL GUARDIAN VALVE IS REQUIRED FOR ALL FIRE HYDRANT LEADS GREATER THAN 30 FEET IN LENGTH.



FIRE HYDRANT ASSEMBLY (A)
N.T.S.

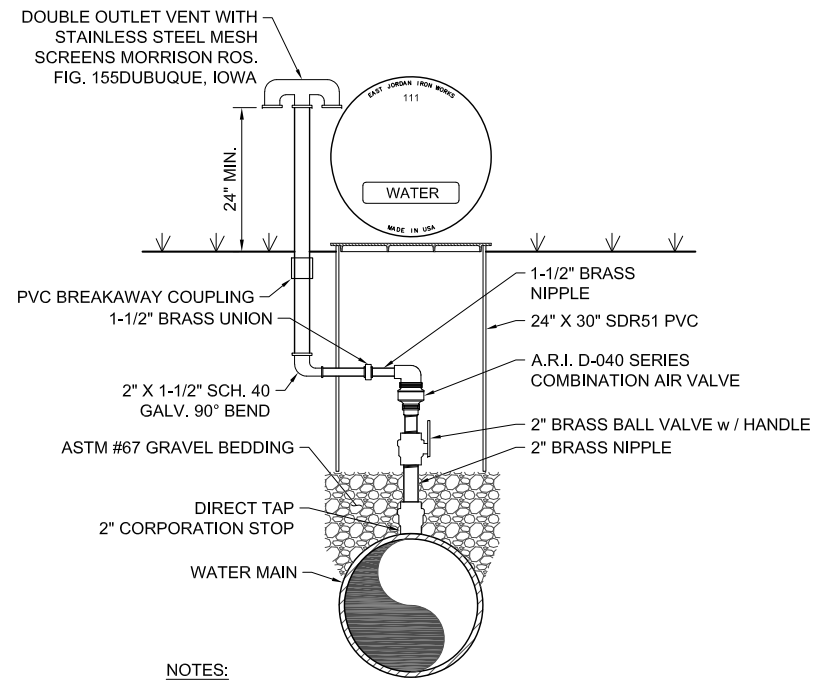


FOR BASE BID



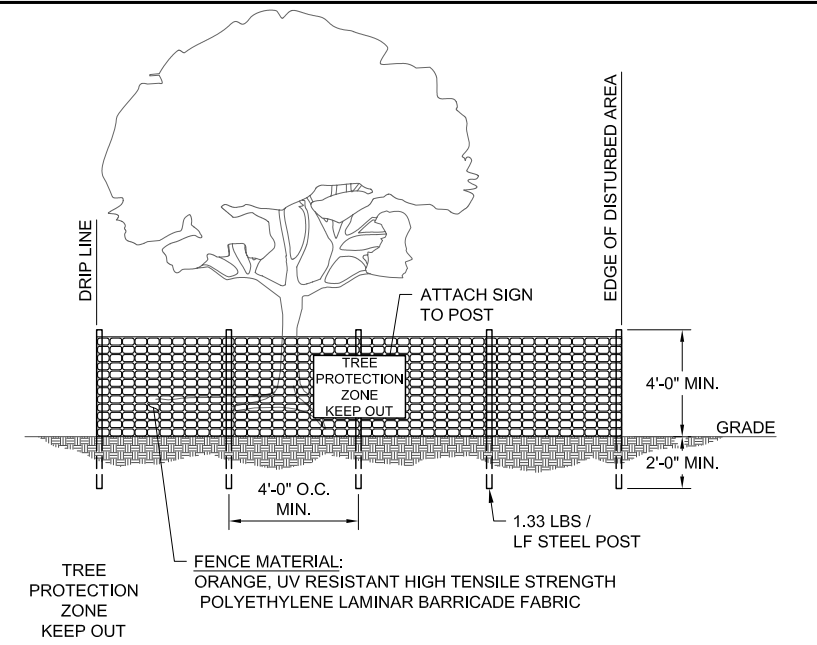
WATER LINE BEDDING (B)
N.T.S.

- NOTES:**
1. USE ROADWAY CONDITIONS WHEN INSTALLING PIPE IN AREAS SUBJECT TO TRAFFIC LOADS.
 2. SEE BEDDING SPECS.
 3. NO ROCKS LARGER THAN 4" DIAMETER IN BACKFILL.
 4. CONTRACTOR TO CONSTRUCT TRENCH USING METHODS ALLOWED BY LOCAL, STATE, OR FEDERAL REQUIREMENTS TO MAINTAIN A SAFE WORKING CONDITION.



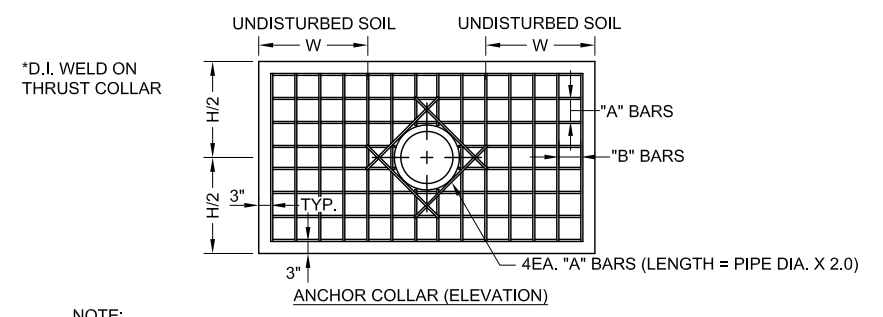
- NOTES:**
1. AIR VALVES SHALL HAVE NPT INLET AND OUTLETS
 2. TOP OF AIR VALVE SHALL BE MIN. 12" BELOW GROUND.
 3. SEAL WALL PENETRATIONS WITH BUTYL SEALANT.

AIR RELEASE VALVE (E)
N.T.S.



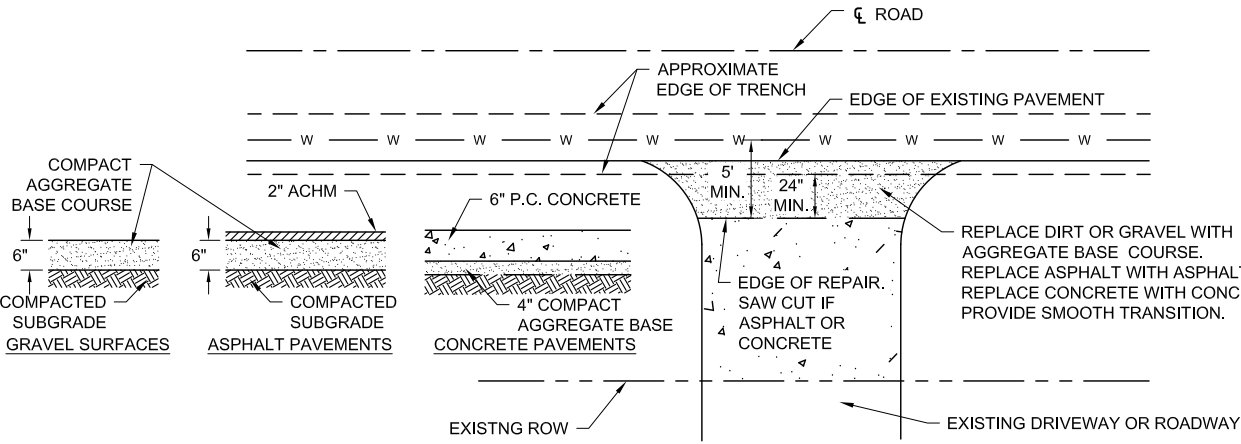
TREE PROTECTION FENCE (C)
N.T.S.

ANCHOR COLLAR SCHEDULE						
PIPE SIZE	* MINIMUM DIMENSIONS *				REINFORCING BARS	
	W	H	T	THRUST COLLAR	"A" BARS	"B" BARS
6"	1.5'	2.0'	1.0'	M.J. RETAINER GLAND	#6 @ 6"	#6 @ 6"
8"	1.5'	2.5'	1.0'	M.J. RETAINER GLAND	#6 @ 6"	#6 @ 6"
12"	2.0'	4.0'	1.5'	M.J. RETAINER GLAND	#6 @ 6"	#6 @ 6"
16"	3.0'	4.5'	1.5'	M.J. RETAINER GLAND	#6 @ 6"	#6 @ 6"
20"	3.0'	5.0'	2.0'	M.J. RETAINER GLAND	#6 @ 6"	#6 @ 6"
24"	3.5'	5.5'	2.0'	M.J. RETAINER GLAND	#7 @ 6"	#7 @ 10"
30"	6.5'	6.0'	2.5'	*4.5" X 1.0" WELD-ON	#8 @ 6"	#8 @ 10"
36"	7.0'	7.0'	2.5'	*4.7" X 1.0" WELD-ON	#8 @ 6"	#8 @ 10"



- NOTE:** PIPE SURFACES SHALL BE CLEANED OF ALL FOREIGN MATERIAL BEFORE CONCRETE COLLAR IS POURED. 72 HOUR CURE BEFORE PRESSURE APPLIED TO PIPE AND COLLAR.
- STEEL ANCHOR RING TO BE SHOP WELDED TO PIPE LARGER THAN 24". USE M.J. RETAINER GLANDS FOR D.I. PIPE 24" AND SMALLER.
- WHEN "T" EXCEEDS 1.5', PLACE SECOND MAT OF REBAR, #6 @ 12" O.C.E.W.

CONCRETE ANCHOR COLLAR (F)
N.T.S.



ASPHALT PAVEMENT OR GRAVEL REPAIR (D)
N.T.S.

- NOTES:**
1. THIS DETAIL IS FOR REPAIR OF EXISTING DRIVEWAYS AND INTERSECTIONS ONLY.

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	8/31/2020	RDW	KDV	ADDENDUM No. 1

DESIGNED: JDH
 DRAFTED: WRC/JDH
 CHECKED: KDV
 DATE: AUG 2020

THIS LINE MEASURES 1" WHEN PLOTTED FULL SIZE

CRIST ENGINEERS, INC.
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GARLAND COUNTY, ARKANSAS
CITY OF HOT SPRINGS UTILITIES DEPARTMENT
LAKE OUACHITA WATER SUPPLY PROJECT
 FINISHED WATER TRANSMISSION PIPELINE
 CONTRACT A - NEW WATER TREATMENT PLANT TO ARKANSAS HIGHWAY 7
 DETAILS

JOB NO.	1926
SHEET NO.	17