

APRIL 23, 2018

REPLACEMENT OF BRIDGE NO. 01081

ROUTE 71 OVER SODOM BROOK
FEDERAL AID PROJECT NO. 0071(112)
STATE PROJECT NO. 79-229

TOWN OF MERIDEN

ADDENDUM NO. 2

This Addendum addresses the following questions and answers contained on the “CT DOT QUESTIONS AND ANSWERS WEBSITE FOR ADVERTISED CONSTRUCTION PROJECTS”:

Question and Answer No.16.

REVISED SPECIAL PROVISIONS

The following Special Provision is hereby deleted in its entirety and replaced with the attached like-named Special Provision:

- ITEM # 1301081A – 6” DUCTILE IRON PIPE (WATER MAIN)
- ITEM # 1301085A – 16” DUCTILE IRON PIPE (WATER MAIN)
- ITEM # 1301089A – 24” DUCTILE IRON PIPE (WATER MAIN)
- ITEM #1302183A – 16” DUCTILE IRON PRE-INSULATED PIPE (WATER MAIN)
- ITEM #1301656A – 16” DUCTILE IRON PIPE INSTALLED ON BRIDGE (WATER MAIN)
- ITEM #1303389A – CONNECTION TO EXISTING 16” WATER MAIN
- ITEM #1303390A – CONNECTION TO EXISTING 24” WATER MAIN
- ITEM #1302025A – 16” BUTTERFLY VALVE
- ITEM #1302028A – 24” BUTTERFLY VALVE
- ITEM #1301880A – MISCELLANEOUS FITTINGS (WATER MAIN)
- ITEM #1302901A – AIR RELIEF VALVE
- ITEM #1303204A –HYDRANT ASSEMBLY
- ITEM #1302139A – CUT AND CAP (WATER MAIN)
- ITEM #1303396A – SERVICE CONNECTION (WATER MAIN)

REVISED CONTRACT ITEMS

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ORIGINAL QUANTITY</u>	<u>REVISED QUANTITY</u>
<u>1301085A</u>	<u>16" DUCTILE IRON PIPE (WATER MAIN)</u>	<u>500 L.F.</u>	<u>300 L.F.</u>
<u>1302183A</u>	<u>16" DUCTILE IRON PRE-INSULATED PIPE</u>	<u>175 L.F.</u>	<u>100 L.F.</u>

The Bid Proposal Form has been revised to reflect these changes.

The Detailed Estimate Sheet does not reflect these changes.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.

ITEM # 1301081A – 6” DUCTILE IRON PIPE (WATER MAIN)

ITEM # 1301085A – 16” DUCTILE IRON PIPE (WATER MAIN)

ITEM # 1301089A – 24” DUCTILE IRON PIPE (WATER MAIN)

ITEM #1302183A – 16” DUCTILE IRON PRE-INSULATED PIPE (WATER MAIN)

ITEM #1301656A – 16” DUCTILE IRON PIPE INSTALLED ON BRIDGE (WATER MAIN)

ITEM #1303389A – CONNECTION TO EXISTING 16” WATER MAIN

ITEM #1303390A – CONNECTION TO EXISTING 24” WATER MAIN

ITEM #1302025A – 16” BUTTERFLY VALVE

ITEM #1302028A – 24” BUTTERFLY VALVE

ITEM #1301880A – MISCELLANEOUS FITTINGS (WATER MAIN)

ITEM #1302901A – AIR RELIEF VALVE

ITEM #1303204A –HYDRANT ASSEMBLY

ITEM #1302139A – CUT AND CAP (WATER MAIN)

ITEM #1303396A – SERVICE CONNECTION (WATER MAIN)

Description:

- A. Work of this Section covers the furnishing of all materials, equipment, appurtenances and incidentals required; and the complete installation, ready for operation, of various size water distribution mains, as shown on the Contract Drawings and specified herein, including piping of the various joint types as shown on the drawings, fittings, valves, pipe plugs, flexible couplings, specials, connections to existing water mains, pipe insulation, spool pieces, field installed joint restraint, field cutting of pipe, pipe marking tape, structural steel and appurtenances for pipe supports and connection to bridge structural steel members, trench excavation and backfill, pipe bedding, trench dewatering, saw cutting of the existing pavement, test pits, abandoning existing pipelines, installing new fire hydrants, and appurtenances of the various types specified, complete in place and accepted, in accordance with the drawings and specifications and as directed by the Engineer.

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- B. Work and materials covered under this Section of the specifications shall be in strict compliance with **City of Meriden's** Standards.
- C. Connection to the existing water main system, at the locations indicated on the Contract Drawings, shall be made in strict accordance with the **City of Meriden's** requirements and only with the prior approval of the **City of Meriden**.
- D. Under no circumstance shall the completed water main construction be placed into active service until written approval has been obtained from the State of Connecticut Department of Public Health.
- E. All standards, codes, specifications, etc., referred to herein shall be the latest issue.
- F. It is not intended that the Contract Drawings shall show every pipe, fitting, valve, special or appurtenance but the Contractor shall furnish and install all material necessary to complete the Work in accordance with the best practice and the intent of the Contract Drawings and these Specifications.

G. REFERENCES

1. The publications listed below form a part of this specification to the extent referenced. The following publications are referred to in the text by the basic designation only:

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)

ANSI A21.4	Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water
ANSI A21.11	Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
ANSI A21.51	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Moles, for Water or Other Liquids
ANSI B18.2.2	Square and Hex Nuts
ANSI B18.5	Round Head Bolts

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A-48	Gray Iron Castings
ASTM A-536	Ductile Iron Castings
ASTM A-563	Carbon and Alloy Steel Nuts

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AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C-104	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C-110	Ductile-Iron and Gray-Iron Fittings, 3 in through 48 in., for Water and Other Liquids
AWWA C-111	Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
AWWA C-151	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-lined Molds, for Water or Other Liquids
AWWA C-153	Ductile-Iron Compact Fittings, (3 in through 12 in), for Water and Other Liquids
AWWA C-504	Butterfly Valves
AWWA C-600	Installation of Ductile Iron Water Mains and Appurtenances

H. QUALITY ASSURANCE

1. The Contractor shall furnish to the Engineer manufacturer's notarized test reports and methods of test to show compliance with all specification requirements, and notarized certificates of conformance stating that all materials to be furnished under this Section of the Specifications conform with all specification requirements, and each shipment of pipe, fittings, joints and gaskets and accessories meet all requirements of the Specifications.
2. The Contractor shall furnish to the Owner manufacturer's written transcripts in accordance with Section 51-14 of AWWA Standard C151, latest revision.
3. Qualifications of the Installer: Only thoroughly trained and experienced personnel who are completely familiar with the requirements for this work shall be involved with the work. Personnel must be capable of carrying out the recommendations of the manufacturer of the piping, valves, fittings, specials, and appurtenances for the proper installation procedures.
4. Comply with State and local controlling authority requirements for materials, installation, testing, disinfection and connection to existing water mains.

I. SUBMITTALS

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1. Submittals shall be made for the following items in accordance with the provisions of these Specifications and shall include the following:
 - a. Manufacturer's Catalog Data and Standard Drawings for pipe and fittings.
 - b. Manufacturer's Catalog Data and Standard Drawings for joints and couplings.
 - c. Manufacturer's Catalog Data and Standard Drawings for mechanical sleeves and seals.
 - d. Manufacturer's Catalog Data and Standard Drawings for butterfly valves, gate valves, air release valves, and valve boxes.
 - e. Manufacturer's Catalog Data and Standard Drawings for joint restraint.
 - f. Manufacturer's Catalog Data and Standard Drawings for fire hydrants.
 - g. Manufacturer's Catalog Data and Standard Drawings for service connections, water service pipe, corporations stops, curb stops, curb boxes, and appurtenances.
 - h. Manufacturer's Catalog Data and Standard Drawings for pipe insulation.
 - i. Manufacturer's Catalog Data and Standard Drawings for modular mechanical rubber seal rings.
 - j. Manufacturer's Catalog Data and Standard Drawings for structural steel and appurtenances for pipe supports, and connection to bridge structural steel members.
 - k. Manufacturer's Instructions for installation procedures for water pipe, fittings, and appurtenances.
 - l. Certificates of Compliance for pipe and fittings.
 - m. Certificates of Compliance for shop-applied linings and coatings.
 - n. Certificates of Compliance for pipe joint materials.
 - o. Certificates shall attest that tests set forth in each applicable referenced publication have been performed, whether specified in that publication to

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be mandatory or otherwise and that production control tests have been performed at the intervals or frequency specified in the publication. Other tests shall have been performed within three (3) years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

- p. Contractor shall have the pipe supplier prepare and shall submit to the Engineer a "LAYING SCHEDULE" and "SEQUENCE OF CONSTRUCTION" of all pipe and accessories to be furnished and installed under this Contract. No work shall be undertaken until the laying schedule has been reviewed and approved by the Engineer.

J. DELIVERY, STORAGE AND HANDLING

- 1. Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.
- 2. Handle pipe, fittings, and other accessories in a manner to ensure delivery to the site in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings and make satisfactory repairs if coatings or linings are damaged. Carry, do not drag, pipe. Store jointing materials and rubber gaskets that are not to be installed promptly, under cover out of direct sunlight.

K. PROJECT CONDITIONS

- 1. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service in the project area.
- 2. Verify that water main piping may be installed to comply with original design and referenced standards.
- 3. All necessary operations of existing valves required for the work of this contract will be made by the **City of Meriden** at its own expense. The Contractor shall be responsible for notifying the **City of Meriden** a minimum of 48 hours in advance of any desired valve operations.

L. SEQUENCING AND SCHEDULING

- 1. Coordinate connection to existing water mains with the **City of Meriden**.

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2. Coordinate connection of existing water service lines to new water service lines with the **City of Meriden**.
3. Coordinate with bridge construction work sequencing.
4. Coordinate with other utility work.

Materials:

A. DUCTILE IRON PIPE

1. Pipe shall be of ductile iron. Ductile iron pipe shall conform in all respects, except for ends, to ANSI A21.51 (AWWA C151), latest editions. Pipe ends shall conform to ANSI A21.11 (AWWA C111). Affidavit and drawings shall be furnished as specified in Section 6.3 of AWWA C111. Ductile iron pipe shall be thickness Class 52, except for pipe installed on the utility bridge, which shall be thickness Class 53.
2. All ductile iron pipe shall be manufactured by U.S. Pipe Co., McWane Ductile, American Cast Iron Company, or approved equal.
3. The manufacturer's certifications specified in Sections 5.1.1 and 5.4 of Specification AWWA C151 shall be furnished for ductile iron pipe. A statement shall also be furnished stating that the coating and lining have been installed in accordance with AWWA C104.
4. All pipe shall be furnished with a bituminous sealcoat, double thickness cement mortar lining in accordance with ANSI A21.4 (AWWA C104), latest revision, and an exterior bituminous coating. Materials used for interior pipe surfaces shall be approved by NSF and the State of Connecticut Department of Public Health for use in a potable drinking water supply.
5. Each piece of pipe and each fitting shall be plainly marked at the foundry with class number and weight.
6. Pipe joints may be either mechanical joint or push-on joint. Restrained joints shall be used where shown on the Contract Drawings. Buried pipe joints shall be restrained using ductile iron mechanical joint fittings with multiple wedging action thrust restraint glands such as EBAA Iron, Inc. MEGALUG or approved equal. Push-on joint pipe may be restrained using EBAA Iron, Inc. restraint

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harnesses, or approved equal. Pipe on the bridge shall be restrained using US Pipe TR Flex or approved equal restrained joint pipe.

B. DUCTILE IRON FITTINGS

1. Ductile Iron Fittings: Ductile iron fittings shall be domestic fittings as manufactured by U.S. Pipe Co., McWane Ductile, American Cast Iron Company, or approved equal. Mechanical joint fittings shall be furnished with mechanical joint thrust restraint glands as specified in this Division.
2. Fittings shall be ductile iron and shall conform to ANSI A21.10 (AWWA C110) and ANSI A21.11 (AWWA C111), or to ANSI A 21.53 (AWWA C153) latest edition for compact fittings.
3. All pipe and fittings shall be furnished with a bituminous sealcoat, double thickness cement mortar lining in accordance with ANSI A21.4 (AWWA C104), latest revision, and an exterior bituminous coating. Materials used for interior pipe surfaces shall be approved by NSF and the State of Connecticut Department of Public Health for use in a potable drinking water supply.
4. Each piece of pipe and each fitting shall be plainly marked at the foundry with class number and weight

C. PRE-INSULATED DUCTILE IRON PIPE

1. Ductile iron pipe for the bridge crossing, and shallow burial areas near the bridge abutments to the limits shown on the Contract Drawings, shall be pre-insulated at the pipe insulation factory.
2. Pipe shall be fabricated to the lengths shown on the Contract Drawings prior to insulating the pipe.
3. Insulation: Insulation shall be rigid polyurethane foam 2-inches thick having a maximum thermal conductivity, k, value of 0.19 Btu x in./ft² x hr x oF.
4. Pre-insulated pipe shall be sleeved in a factory applied, 75 mil thick extruded black high density polyethylene copolymer, UV inhibited or an approved equal. Insulated pipe joints shall be sealed with a 6-inch wide heat shrink sleeve or butyl mastic tape
5. Pipe insulation for the bridge crossing and shallow burial areas shall be Urecon U.I.P. as manufactured by Urecon, Ltd., or approved equal.

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D. VALVES

1. Hand Operated Air Release Valves: Air release valves shall be 1-inch air release valves, length as required including a valve box as manufactured by Wedge Manufacturing Bethlehem, CT, or approved equal.
2. Butterfly Valves: Butterfly valves shall be of the rubber seated, tight-closing type. The valves shall meet or exceed all strength and performance requirements of AWWA Specification C504, latest revision. Valves shall be "Groundhog" butterfly valves with a working pressure of 150 psi. All valves shall be suitable for buried service, have the seat in the body and be manufactured by Henry Pratt Company, or approved equal. Valves shall open right (clockwise).
 - a. Valves shall be the short, laying length type with mechanical joint ends. Mechanical joint ends shall have multiple wedge mechanical joint thrust restraint glands as manufactured by EBBA Iron, Inc., or approved equal. Valves shall be close-grained cast iron with integrally cast hubs for shaft bearings. Discs shall be cast iron, ductile iron, or alloy cast iron, conforming to AWWA C504. Discs must be able to open fully when connected to Class 52 ductile iron pipe with double thickness cement mortar lining.
 - b. Seats shall be natural or synthetic rubber mounted in the valve body. Mating seats shall be bronze, stainless steel or Nichrome. Valves shall be designed to provide tight shut-off at a differential pressure of 150 psi, and shall be pressure tested from both sides.
 - c. The valves shall be equipped with a mechanical stop-limiting device to prevent the disc from rotating through the opened and closed positions. Valve shafts shall be two-piece stub-type shaft made of Type 304, 18-8 stainless steel securely attached to the valve disc. Diameter of the valve shafts and the connection to the valve disc shall be suitable for the service conditions specified. Shaft bearings shall be of the self-lubricating sleeve type. Thrust bearings shall keep the disc centered regardless of valve position. Shaft seals shall be standard self-adjusting-V type packing, standard "O" ring seals or pull-down packing gland, complying with the requirements of AWWA C504.
 - d. The valve operator shall open right (clockwise), shall conform to AWWA Standard C504 and shall be designed to hold the valve in any intermediate position between fully opened and fully closed without creeping or

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fluttering. Valves shall be provided with 2-inch square operating nut and short operating rod. The stem shall be squared for the entire length of its insertion into a fully squared female portion of the operating nut.

- e. Operator's rated torque capability shall be sufficient to close, seat, unseat and open and rigidly hold in any intermediate position between fully open and fully closed the valve disc it controls under flow and pressure conditions stated herein. Operators shall be designed to produce the required torque with a maximum input of 150 ft-lb on the operating nut. All operator components between the input and these stops shall be able to withstand, without damage, an input torque of 300 ft-lbs. Operators shall be totally enclosed, worm gear, or traveling nut type. Adjustable stops shall be built into the operator to prevent over-travel in either direction.
 - f. Interior and exterior surfaces of valves shall be coated with a fusion bonded epoxy in accordance with AWWA Standard C550 latest revision applied with a minimum thickness of 8 mils. The manufacturer shall certify that the coating is suitable for use in a potable water system, and that the interior coating is holiday free.
 - g. The valves shall be a product of a manufacturer having units of similar type, size, and service requirements successfully operating in a municipal waterworks project for a period of not less than five (5) years.
3. Gate Valves: Gate valves shall be AWWA Standard C509, resilient seat, non-rising stem, gate valves manufactured in the United States or Canada. Valve body and bonnet shall be of thick wall ductile iron. Valves meeting the requirements of AWWA C515 Standard for Reduced-Wall gate valves are not acceptable. The valves shall open right (clockwise), and be of the non-rising stem type with standard operating nuts and accessories. All exposed bolts and nuts shall be of stainless steel.
- a. Gate valves shall have mechanical joint ends. Mechanical joint ends shall have multiple wedge action restraint glands as in this Section.
 - b. The wedge disc shall be of ductile iron and completely covered with rubber.
 - c. Interior and exterior surfaces of valves shall be coated with a fusion bonded epoxy in accordance with AWWA Standard C550 latest revision applied with a minimum thickness of 8 mils. The manufacturer shall

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certify that the coating is suitable for use in a potable water system, and that the interior coating is holiday free.

- d. The gate valves shall be AWWA resilient seat Gate Valves, with a minimum design working pressure of 250 psi, and a minimum test pressure of 500 psi. The pressure rating shall be cast on the outside of the valve.
 - e. The "O" ring stem shall be replaceable with the valve under pressure in the full open position.
4. Valve Accessories: The Contractor shall furnish for each valve the necessary restraint glands, nuts, bolts and gaskets. All bolts, nuts, and studs for valves shall be stainless steel.
5. Valve boxes: Valve boxes shall be furnished and installed by the Contractor and shall be Buffalo style cast iron, three piece, 5-1/4" shaft, adjustable screw type iron-body with close fitting; dirt tight covers and shall be manufactured in the United States or Canada. Covers shall be cast iron and shall have "WATER" cast on them. Bottom sections shall be cast with external threads on the top portion; top sections shall be cast with internal threads on the bottom portion. Welded threads are not acceptable. Valve boxes shall be as manufactured by Bibby Ste. Croix or an approved equal.

E. HYDRANT

- 1. Hydrants shall be "dry barrel fire hydrant" post, compression shut-off type and shall conform to AWWA Specification C502, latest revision and to the additional requirements specified herein.
- 2. Hydrants shall conform to the following specifications:
 - a. Type of hydrant: Traffic type
 - b. Open **RIGHT**
 - c. Number of hose and pumper outlets:
 - 1. Two – 2-1/2" hose outlets
 - 2. One – 4-1/2" pumper outlet
 - d. Type of outlet nozzle threads:
 - 2-1/2" hose nozzle with National Standard Thread
 - 4-1/2" streamer nozzle with the following thread specifications
 - O.D. Thread 5.420"
 - Pitch Diameter 5.276"

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Root Diameter 5.132”

6 Threads per inch

- e. Size of hydrant (nominal diameter of main valve opening): 5-1/4”
- f. Size of inlet connection: 6”
- g. Type of inlet connection; Mechanical joint with retainer gland
- h. Direction of operating nut opening rotation: Right
- i. Size of operating nut: national standard 1-1/2” Pentagon
- j. Dry top construction
- k. Break-away flange and couplings
- l. Bronze to Bronze valve and valve seat
- m. 5 1/4 A Valve opening
- n. Red Base, Yellow Bonnet
- o. NSF 61 Certified
- p. Steam seal type: O-ring
- q. Nozzles shall be furnished with caps and chains

- 3. Hydrants shall conform to the torque requirements specified in AWWA Specification C502, latest revision, regardless of bury length.
- 4. The opening between the wrench nut and top of hydrant bonnet shall be protected from rain and dirt by an acceptable means (dry top construction).
- 5. Hydrant top section shall receive two shop coats of primer conforming to the requirements of Section 4.2 of AWWA Specification C502, latest revision. Second primer coat is to be red in color. Hydrants shall receive two field coats of red paint meeting the acceptance of the **City of Meriden**.
- 6. For purposes of standardization, hydrants shall be Model No. B-62B as manufactured by American Darling valve, Birmingham, Alabama; Super 200, Model No. A423, as manufactured by Mueller Company, Decatur, Illinois; or Guardian Model K-81A as manufactured by Kennedy.

F. WATER SERVICES

- 1. Copper Tubing: Type K seamless copper water tube conforming to ASTM B88. The name of the manufacturer or trademark and the grade shall be stamped at intervals along the length of the pipe. Tubing diameter shall match that of the existing service, but shall not be less than 1” in diameter.
- 2. Corporation Stops and Curb Stops: Mueller Type 300, or approved equal.

G. PIPE SUPPORTS AND BRIDGE WORK

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1. Pipe Roll Stands shall be Figure 271 as manufactured by Anvil International or approved equal. The pipe roll stand shall be constructed of cast iron and be hot dipped galvanized after fabrication.
2. Modular Mechanical Seals shall be Link Seal Model S-316 or approved equal.

H. WARNING TAPE

1. Warning Tape: Conductively traceable warning tape shall be Type D Warning Tape as manufactured by Terra Tape, or approved equal.

Construction Methods:

A. PRODUCT HANDLING

The pipe and specials shall be handled and protected during loading, transporting, and unloading operations in such manner as to avoid damage. Pipe and specials shall be unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall they be dropped nor shall they be permitted to roll against pipe already on the ground. Insofar as practicable, each piece of pipe shall be delivered and unloaded near the place where it is to be installed and where it will not interfere with excavation operations, traffic, or adjacent property owners and may be readily inspected by the Engineer. All damaged pipe and specials will be rejected, and such rejected pipe and specials shall be removed from the site. In the event of slight damage to the coating or lining, the Engineer may permit the damage to be repaired on the site.

The insides of the pipes and specials shall be thoroughly cleaned before laying and shall be kept clean until accepted in the completed work. Whenever the work is interrupted, all open ends of pipe shall be temporarily closed by watertight plugs. No trench water shall be permitted to enter the pipe. All pipe and special castings shall be carefully examined for defects and no pipe or special casting shall be laid which is known to be defective. If any such pipe or casting is discovered to be defective after placement, it shall be brought to the attention of the Owner and removed and replaced with a sound pipe or casting by the Contractor.

Coating that is damaged during shipment or placement shall be touched up in the field with two (2) coats of an asphaltic coating fully resistant to water and chemicals. Materials used for interior surfaces shall be NSF and the State of Connecticut Department of Public Health approved for use in a potable drinking water supply.

B. INSTALLATION

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1. Pipe Installation: All pipe installation shall conform to AWWA Standard C600, latest revision, unless otherwise modified by these Specifications.

Restrained joints shall be used at all bends or as indicated by the Engineer. Restraint glands and restrained joint pipe shall be installed in strict accordance with the manufacturer's instructions.

Ductile iron pipe shall be laid and assembled strictly in accordance with manufacturer's instructions and shall be laid true to the lines and grades shown. There shall be a minimum 6" base of sand under the pipe. The material shall be spread in layers and shall be compacted in place at the proper grade to provide a solid, uniform bed for the pipe or structure for the full width of the bottom of the excavation. The sand bedding shall extend 6" up the pipe or as directed by the Engineer. Bell holes shall be carefully dug at the ends of the pipe to provide ample room for properly making and checking of joints and providing room for 6" of compacted bedding material under the bell. If the Contractor excavates below the required limit, the trench bottom shall be brought to the required grade with an approved backfill of gravel or crushed stone at the Contractor's expense.

All pipe and fittings shall be lowered carefully into the trench by means of mechanical equipment in such a manner as to prevent them from being damaged. The insides of all bells and outsides of spigots shall be wire brushed and wiped clean and dry and shall be free from oil or grease. During the laying of the pipe, extra care shall be taken to see that no dirt, debris, lumber, tools, clothing, or other illicit materials are allowed to be left in the pipeline.

After the pipe is laid in the trench, the spigot end shall be centered in the bell and forced home. Under no circumstances shall pipe be laid where there is water in the trench. The Contractor shall install and joint the pipe in accordance with the manufacturer's instructions.

When the pipe has been bedded satisfactorily and the joint made, the recess under the bell shall be refilled and tamped on each side of the pipe to hold it securely in place, care being taken not to disturb the position of the pipe during the process, and in such a manner that the bearing is distributed evenly over the entire length of pipe.

The grooves in the bells of push-on joint pipe shall be carefully cleaned of all dirt and debris before inserting the gaskets. After applying a thin film of special nontoxic gasket lubricant to the gasket, the spigot end of the pipe is pushed into the bell of the pipe. The joint shall be kept straight while pushing and any

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deflection made after the joint is home. Joint deflection shall not exceed 75% of the recommended maximum deflection. When the pipe is cut in the field the spigot end shall be beveled with a heavy file or a grinder to remove all sharp edges.

On mechanical joints, the follower ring and rubber gasket shall be placed on the plain end of the pipe being laid. The gasket shall then be evenly seated in the socket, the follower ring moved up to the face of the gasket and the bolts inserted and made finger-tight. The bolts shall then be tightened with a torque wrench to the required torque.

When necessary to cut pipe in the field, the cutting shall be done such that neither the pipe nor the lining shall be damaged and such that a smooth, right angle to axis cut is made. A machine designed for this purpose shall be used for the cutting. The ends of cut pipe shall be beveled.

Sand shall be placed as backfill around and above the pipe to a minimum compacted depth of 6" over the pipe. Selected material from excavations shall be used for backfilling trenches above the sand backfill. The Contractor shall store suitable material from excess excavation and from other portions of the work for use as backfill. It shall be carefully deposited in uniform layers not exceeding 6" in depth, and unless otherwise permitted, each layer shall be carefully and solidly tamped with appropriate tools in such a manner as to avoid disturbing the completed work. Backfilling for the remainder of trenches and excavations shall be approved material free from organic matter. No large stones shall be used in the trench until there is at least 4' of fill over the top of the pipe or around the structure and, in depositing stone, care must be taken not to injure the pipe or structure. Stones which are used in backfilling shall be so distributed through the mass that all interstices are filled with fine material. Trench backfill shall be placed in layers not exceeding 12 inches and compacted to a minimum density equal to 95% of Modified Proctor maximum dry density as determined by the standard procedure of AASHTO Specification T-180 method D, latest revision.

Rock and miscellaneous materials from trenches and excavations may be used in the fill, provided individual pieces are not larger than one-half cubic foot in volume and that they are placed so that voids are filled with sand, gravel, and earth.

All new underground pipe shall be marked with conductively traceable warning tape in accordance with State of Connecticut Public Act 16-345 and DPUC Regulations.

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2. Other Utilities and Structures: All known surface and underground structures, except electric and telephone service connections, and water, gas and sewer service pipes, on or immediately adjacent to the work, are shown on the Contract Drawings. Sewer, drainage, water, and gas pipes, manholes, and similar structures, located in or adjacent to the location of the structures included in this Contract, are shown on the Contract Drawings. This information is shown for the convenience of the Contractor in accordance with the best information available, but is not guaranteed to be correct or complete. The Contractor shall explore the route ahead of trenching and shall uncover all obstructing pipes sufficiently to determine their location. Necessary changes in the alignment of the water main may be made by the Engineer to avoid obstructions.

Wherever water or gas mains, electric or telephone ducts, or electric or telephone poles are encountered and may be in any way interfered with, the Contractor shall keep the utility company involved and fully informed in advance. The Contractor shall cooperate with the utility company in the protection, removal, relocation, and replacement of such structures.

The Contractor shall, at his own expense, sustain in their places and protect from direct or indirect injury all utilities, pipes, poles, conduits, walls, buildings, and other structures and property in the vicinity of his work. Such sustaining and protecting shall be done carefully by the Contractor and as required by the party owning or controlling the structure. Before proceeding with such work, the Contractor shall satisfy the Engineer that the methods and procedures to be used have been approved by the party owning said structure. The Contractor shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, buildings, wires or other structures, utilities, and property in the vicinity of his work, and he shall be responsible for all damage and assume all expense for direct or indirect injury caused by his work to any of them or any person or property by reason of injury to them.

The Contractor shall be responsible for repairing and/or replacing any traffic loop detectors or associated equipment damaged during construction of the water transmission mains, to the satisfaction of the State of Connecticut Department of Transportation. The Contractor shall also be responsible for replacing any line stripping that is lost due to the installation of the water main or permanent pavement restoration.

Guard rails, posts, guard cables, signs, poles, markers, mailboxes, fences, walls and stone walls, etc., which are temporarily removed to facilitate installation of

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the pipeline, shall be replaced and restored in their original condition to the satisfaction of the owner and the Engineer.

3. Pipe Roller Assemblies: The Contractor shall install the pipes and pipe roller assemblies as shown on the Contract Drawings.
4. Water Main on Bridge: Pre-insulated pipe shall be installed in strict accordance with the manufacturer's requirements. Water main shall be set on the pipe rollers as shown. Care shall be taken to properly align the pipe during installation. Adjustments shall be made during installation to provide the required alignment and clearances between pipe and bridge members. The horizontal and vertical alignment of the water main shall be within $\pm 1/4$ " of the horizontal and vertical alignment shown on the Contract Drawings.

Removable sections of insulation shall be provided to protect all pipe joints as shown on the Contract Drawings.

5. Bridge Abutment Installation: The water main shall be installed within sleeves at each abutment backwall. Modular mechanical seals shall be furnished and installed around the pipe at each wall sleeve in accordance with manufacturer installation instructions to provide a watertight seal as shown on the Contract Drawings.
6. Valve Installation: All valves shall be installed in a neat and workmanlike manner and in accordance with the manufacturer's instructions. Heavy units shall be handled with suitable mechanical equipment. Valves which are dropped or otherwise mishandled or damaged prior to the Engineer's final certification shall be checked by a representative of the manufacturer, and repaired or replaced, if necessary, at the Contractor's expense.

All valves shall be built into their respective pipelines as shown on the Contract Drawings. They shall be cleaned and manually operated before installation. Valves shall be set vertically and in a closed position and shall be kept closed until otherwise directed by the Engineer.

Valve boxes for buried valves shall be set carefully, truly vertical and accurately centered over the curb stop or riser pipe with the top set at finished grade.

7. Service Lines: Copper tubing shall be laid on a 6" sand base and covered with 6" of sand before backfill is placed. The completed service connection shall be observed under pressure and any leaks shall be made tight prior to backfilling.

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C. DISINFECTION

1. The Contractor shall disinfect the water main in accordance with the procedure outlined in the AWWA Standard for Disinfecting Water Mains, Designation C651 Section 5.2 using the continuous feed method. Disinfection shall be verified by the bacteriological testing specified in Designation C651 Section 7 of the AWWA Standards. Bacteriological testing shall be performed by the Owner.

To facilitate disinfection, the Contractor shall follow proper preventive procedures during construction. The Contractor shall keep the pipe clean and dry. When pipe laying is not in progress, all openings in the pipeline shall be closed by watertight plugs. The Contractor shall insure that all packing materials and joint materials are not contaminated. Precautions shall also be taken to protect pipe interiors, fittings, and valves against contamination. As flushing velocities sufficient to remove sand from the main cannot be attained, the Contractor shall take especial care during pipe installation to keep the pipe clean.

If the water main does not meet the requirements of the bacteriological test, water required for subsequent disinfections, disinfection and tests shall be provided by the Owner at the Contractor's expense.

D. HYDROSTATIC TESTING

1. The Contractor shall perform a hydrostatic test on the 16-inch water main and on the 24-inch water main. The Contractor shall furnish all labor, equipment, and materials for testing. Pressure gauge shall have a dial diameter of 4 inches or greater and shall read in increments of 1 psi. Suitable snubbers shall be provided to control needle vibration.

The test pressure shall be 200 psi. The test pressure shall be maintained for at least 6 hours, during which time the leakage shall not exceed the allowable leakage as tabulated in AWWA C600, Section 5. Water for the initial test shall be provided by the Owner free of charge. The hydrostatic test shall be conducted in the presence of the Engineer.

2. All visible leaks shall be made tight and, if the line does not meet the above leakage test, it shall be repaired and retested until the leakage requirement is met.
3. All valves and connections shall be made tight and shall operate properly before the work is accepted. All defective work shall be repaired or replaced at the expense of the Contractor. If the line does not meet the requirements of the

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leakage test, water required for subsequent tests shall be provided by the Owner at the Contractor's expense.

4. All costs for performing the hydrostatic test including pumps, gauges, water and other work and materials required are included under this Section. The above hydrostatic tests shall be conducted in the presence of the Engineer.

E. CUT AND CAP EXISTING WATER MAINS

1. After the new water mains have been placed in service, the Contractor shall close the existing valves and remove the valve boxes at the locations shown on the Contract Drawings. The existing main shall be cut and capped and abandoned in place as shown on the Contract Drawings.

Method of Measurement:

- A. Work and materials required by this Section of the Specifications will be measured for payment, only for those items listed in the bid documents, as listed below.
- B. “6” Ductile Iron Pipe (Water Main)” shall be measured for payment per the horizontal linear foot along the centerline of the pipe, measured through all fittings and valves in the line, and be furnished and installed. Installation of that pipe including joint restraints, shall be measured for payment under Item #1301081A – 6” Ductile Iron Pipe (Water Main), including the cost of trench excavation, earth backfill, bedding material, pipe marking tape, and all other incidental work except those specific items of work separately paid for elsewhere in these Contract Documents. The “per linear foot” price bid for Item #1301081A – 6” Ductile Iron Pipe (Water Main) shall include the installation cost of all incidental work and materials not otherwise separately paid for such as, but not limited to, restrained joints, field cutting of joints, disinfection, and testing. NO separate payment will be made for any of these incidental items of work and/or materials that are inherently required to fulfill the intent of this Contract or required as a result of the Contractor’s construction sequencing.
- B. “16” Ductile Iron Pipe (Water Main)” shall be measured for payment per the horizontal linear foot along the centerline of the pipe, measured through all fittings and valves in the line, and be furnished and installed. Installation of that pipe including joint restraints, shall be measured for payment under Item #1301085A – 16” Ductile Iron Pipe (Water Main), including the cost of trench excavation, earth backfill, bedding material, pipe marking tape, and all other incidental work except those specific items of work separately paid for elsewhere in these Contract Documents. The “per linear foot” price bid for Item #1301085A – 16” Ductile Iron Pipe (Water Main) shall include the installation cost of all incidental work and materials not otherwise separately paid for such as, but not limited to, restrained joints, field cutting of joints, disinfection, and testing. NO separate payment will

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be made for any of these incidental items of work and/or materials that are inherently required to fulfill the intent of this Contract or required as a result of the Contractor's construction sequencing. Furnishing and installing pipe between the left and right bridge abutments shall be measured and paid for under Item #1301656A – 16" Ductile Iron Pipe Installed on Bridge (Water Main). Furnishing and installing pre-insulated pipe shall be measured and paid for under Item #1302183A – 16" Ductile Iron Pre-Insulated Pipe (Water Main).

Furnishing and installing pre-insulated pipe shall be measured and paid for under Item #1302183A – 16" Ductile Iron Pre-Insulated Pipe (Water Main).

- D. "24" Ductile Iron Pipe (Water Main)" shall be measured for payment per the horizontal linear foot along the centerline of the pipe, measured through all fittings and valves in the line, and be furnished and installed. Installation of that pipe including joint restraints, shall be measured for payment under Item #1301089A – 24" Ductile Iron Pipe (Water Main), including the cost of trench excavation, earth backfill, bedding material, pipe marking tape, and all other incidental work except those specific items of work separately paid for elsewhere in these Contract Documents. The "per linear foot" price bid for Item #1301089A – 24" Ductile Iron Pipe (Water Main) shall include the installation cost of all incidental work and materials not otherwise separately paid for such as, but not limited to, restrained joints, field cutting of joints, disinfection, and testing. NO separate payment will be made for any of these incidental items of work and/or materials that are inherently required to fulfill the intent of this Contract or required as a result of the Contractor's construction sequencing.
- E. "16" Ductile Iron Pre-Insulated Pipe (Water Main)" shall be measured for payment per the horizontal linear foot along the centerline of the pipe, measured through all fittings and valves in the line, and be furnished and installed. Installation of that pipe including joint restraints, shall be measured for payment under Item #1301083A – 16" Ductile Iron Pre-Insulated Pipe (Water Main), including the cost of trench excavation, earth backfill, bedding material, pipe marking tape, and all other incidental work except those specific items of work separately paid for elsewhere in these Contract Documents. The "per linear foot" price bid for Item #1301083A – 16" Ductile Iron Pre-Insulated Pipe (Water Main) shall include the installation cost of all incidental work and materials not otherwise separately paid for such as, but not limited to, transportation and delivery of pipe to the factory and installation of insulation on the pipe, restrained joints, field cutting of joints, disinfection, and testing. NO separate payment will be made for any of these incidental items of work and/or materials that are inherently required to fulfill the intent of this Contract or required as a result of the Contractor's construction sequencing. Furnishing and installing pipe between the left and right bridge abutments shall be measured and paid for under Item #1301656A – 16" Ductile Iron Pipe Installed on Bridge (Water Main).

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- F. “16” Ductile Iron Pipe Installed on Bridge (Water Main)” shall be measured for payment as a lump sum item for installation of pre-insulated 16” water main between the left bridge abutment and the right bridge abutment including transportation and delivery of pipe to the factory and installation of insulation on the pipe, furnishing and installing joint restraints, pipe supports, miscellaneous structural steel, connections, and all other incidental work except those specific to items of work separately paid for elsewhere in these Contract Documents. The ‘lump sum’ price bid for Item #1301656A – 16” Ductile Iron Pipe Installed on Bridge (Water Main) shall include the installation cost of all incidental work and materials not otherwise separately paid for such as, but not limited to, testing and disinfection of the main. NO separate payment will be made for any of these incidental items of work and/or materials that are inherently required to fulfill the intent of this Contract or required as a result of the Contractor’s construction sequencing.
- H. “Connection to Existing 24” Water Main” shall be measured for payment based on the number of locations that the new fully circumferential valves or fittings are installed to connect the new 16” ductile iron water main to the existing 24” water main. Installation of 24” pipe connections shall be measured for payment under Item #1303390A – Connection to Existing 24” Water Main, including the cost of coordination with the City of Meriden, excavation, cutting of the existing pipe, dewatering, backfill, and all other incidental work except those specific to items of work separately paid for elsewhere in these Contract Documents. Measurement for payment shall be based on “EACH” connection furnished and installed.
- I. “16 Butterfly Valve” shall be measured for payment based on the number of new 16” butterfly valves that are furnished and installed per the Contract Documents. Installation of 16” butterfly valves shall be measured for payment under Item #1302025A – 16” Butterfly Valve, including the cost of excavation, joint restraint, bolts, nuts, valve boxes, backfill, and all other incidental work except those specific to items of work separately paid for elsewhere in these Contract Documents. Measurement for payment shall be based on “EACH” 16” butterfly valve furnished and installed.
- J. “24 Butterfly Valve” shall be measured for payment based on the number of new 24” butterfly valves that are furnished and installed per the Contract Documents. Installation of 24” butterfly valves shall be measured for payment under Item #1302028A – 24” Butterfly Valve, including the cost of excavation, joint restraint, bolts, nuts, valve boxes, backfill, and all other incidental work except those specific to items of work separately paid for elsewhere in these Contract Documents. Measurement for payment shall be based on “EACH” 24” butterfly valve furnished and installed.
- K. “Miscellaneous Fittings” shall be shall be measured for payment based on the manufacturer’s weight of new ductile iron fittings that are furnished and installed per the Contract Documents. Installation of Miscellaneous Fittings shall be measured for

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payment under Item #1301880A – Miscellaneous Fittings (Water Main), including the cost of excavation, joint restraint, bolts, nuts, backfill, and all other incidental work except those specific to items of work separately paid for elsewhere in these Contract Documents. Measurement for payment shall be based on the weight in pounds of Miscellaneous Fittings furnished and installed.

- L. “Air Relief Valve” shall be measured for payment based on the number of new hand operated air release valves that are furnished and installed per the Contract Documents. Installation of air release valves shall be measured for payment under Item #1302901A – Air Relief Valve, including the cost of excavation, tapping the main, corporation stops, riser pipe, valve boxes, backfill, and all other incidental work except those specific to items of work separately paid for elsewhere in these Contract Documents. Measurement for payment shall be based on “EACH” air release valve furnished and installed.
- M. “Hydrant Assembly”, shall be measured for payment based on the number of new hydrant assemblies that are furnished and installed per the Contract Documents. Work under this item shall include furnishing and installing the hydrant assembly, gate valve, hydrant extensions, tie rods, retaining glands, hydrant tee, anchoring tees, other jointing materials and accessories, thrust blocks, pipe bedding and drain material, and installation, will be measured for payment as a unit assembly, “EACH”, complete in place and accepted by the Engineer for each new Fire Hydrant installed in a new location. Installation of these items shall be paid for under Item #1303204A – Hydrant Assembly.
- N. “Cut and Cap (Water Main)” shall be measured for payment based on the number of locations that existing water mains are cut and capped prior to abandonment. Cutting and capping of water mains shall be measured for payment under Item #1302139A – Cut and Cap (Water Main), including the cost of coordination with the City of Meriden, excavation, cutting of the existing pipe, dewatering, installation of caps or plugs, backfill, and all other incidental work except those specific to items of work separately paid for elsewhere in these Contract Documents. Measurement for payment shall be based on “EACH” location that existing water mains are cut and capped.
- O. “Service Connection (Water Main)” shall be measured for payment based on the linear feet of new water service connection lines, installed per the Contract Documents. Installation of service connections shall be measured for payment under Item #1303396A – Service Connection (Water Main), including the cost of tapping the water main, furnishing and installing a corporation stop, new copper tubing, new curb box and curb stop, fittings and adaptors shall be measured for payment by each service connection installed from the outside edge of the water main to the location of the connection to the existing service pipe. Measurements shall include lengths through corporation and curb stops. Copper service pipe shall be deleted as directed by the Owner if the service to be replaced is found to be inactive, or if the Owner determines the existing service is in good

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condition. Corporation stops and curb stops shall not be measured for payment. Existing water services abandoned, including plugs, caps, anchors, ties rods, etc., shall not be measured for payment. Providing temporary water service shall not be measured for payment.

Basis of Payment:

- A. The quantity of ductile iron pipe (water mains) measured in place as provided above, will be paid for at the Contract unit price bid per “Linear Feet” as listed in the Bid, which price and payment shall constitute full compensation for furnishing and installing all materials, including piping of the various joint types and classes as shown on the drawings, specials, modular mechanical rubber seal rings, spool pieces, restrained joints, field cutting of pipe, pipe marking tape, trench excavation and backfill, pipe bedding, trench dewatering, saw cutting of the existing pavement, test pits, disinfection and testing, labor, tools and equipment, and the cost of all incidental work and materials not otherwise separately paid for elsewhere in the Contract Documents. No separate payment will be made for any incidental items of work and/or materials that are inherently required to fulfill the intent of this Contract or required as a result of the Contractor’s construction sequencing to complete the work as specified and as indicated.
- B. The quantity of 16” ductile iron pipe insulation, measured in place as provided above, will be paid for the Contract unit price bid per “Linear Feet”, which price shall constitute full compensation for furnishing and installing all materials, complete as shown and specified.
- C. The quantity of connections to existing mains, measured in place as provided above, will be paid for at the contract unit price bid per “Each”, which price shall constitute full compensation for furnishing and installing all materials, complete as shown and specified.
- D. The quantity of butterfly valves, measured in place as provided above, will be paid for at the Contract unit price bid per “Each” as listed in the Bid, which price shall constitute full compensation for furnishing and installing all materials, complete as shown and specified.
- E. The quantity of miscellaneous fittings, will be measured in place as provided above, will be paid for at the Contract unit price bid per “pounds” as listed in the Bid, which price and payment shall constitute full compensation for furnishing all labor, materials, tools and equipment, and for all appurtenant work, complete in place and accepted by the Owner. Mechanical joint thrust restraint glands shall not be measured for payment under this Item, but shall be included in the in the price bid for ductile iron water mains.

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- F. The quantity of air release valves, measured in place as provided above, will be paid for at the Contract unit price bid per “each” as listed in the Bid, which price and payment shall constitute full compensation for furnishing all labor, materials, tools and equipment, and for all appurtenant work, including valve boxes, complete in place and accepted by the Owner.
- G. The quantity of fire hydrants, measured in place as provided above, will be paid for at the Contract unit price bid per “each” as listed in the Bid, which price and payment shall constitute full compensation for furnishing all labor, materials, tools and equipment, and for all appurtenant work, including valve boxes, complete in place and accepted by the Owner.
- H. The quantity of cut and cap, measured in place as provided above, will be paid for at the Contract unit price bid per “each” as listed in the Bid, which price and payment shall constitute full compensation for furnishing all labor, materials, tools and equipment, and for all appurtenant work, complete in place and accepted by the Owner.
- I. The quantity of service connections, measured in place as provided above, will be paid for at the Contract unit price bid per “linear foot” as listed in the Bid, which price and payment shall constitute full compensation for furnishing all material, labor, curb box, corporation stop, including tapping of water main pipe (by Water Division), bedding and all other items necessary to furnish and install the service connection.
- J. No separate payment will be made for temporary water service, curb stops and boxes, corporation stops, tapping fees, abandoning existing water services, including plugs, caps, anchors, tie rods, etc. Compensation for such work as required, shall be considered to be included in the contract prices bid for other water service items.
- K. No separate payment will be made for adjusting existing water curb stop boxes and gates. Compensation for such work shall be considered to be included in the contract prices bid for other items of work elsewhere in the contract.

PAY ITEM	PAY UNIT
Item 1301081A – 6” Ductile Iron Pipe (Water Main)	LF
Item 1301085A – 16” Ductile Iron Pipe (Water Main)	LF
Item 1301089A – 24” Ductile Iron Pipe (Water Main)	LF
Item 1302183A – 16” Ductile Iron Pre-Insulated Pipe (Water Main)	LF
Item 1301656A – 16” Ductile Iron Pipe Installed on Bridge (Water Main)	LS

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Item 1303389A – Connection to Existing 16” Water Main	EA
Item 1303390A – Connection to Existing 24” Water Main	EA
Item 1302025A – 16” Butterfly Valve	EA
Item 1302028A – 24” Butterfly Valve	EA
Item 1301880A – Miscellaneous Fittings (Water Main)	EA
Item 1302901A – Air Relief Valve	EA
Item 1303204A – Hydrant Assembly	EA
Item 1302139A – Cut and Cap (Water Main)	EA
Item 1303396A – Service Connection (Water Main)	LF

END OF SECTION

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