

**OCTOBER 27, 2017**

**REHABILITATION OF BRIDGE NO. 00722  
ON WEST ROCKS ROAD OVER ROUTE 15**

**STATE PROJECT NO. 102-356**

**CITY OF NORWALK**

**ADDENDUM NO. 1**

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

Question and Answer Nos. 1, 3 and 7

**SPECIAL PROVISIONS**

**REVISED SPECIAL PROVISIONS**

The following Special Provisions are hereby deleted in their entirety and replaced with the attached like-named Special Provisions:

- ITEM NO. 0949049A – TWO TUBE BRIDGE RAIL
- ITEM NO. 1301019A – TEMPORARY RELOCATION OF WATERMAIN
- ITEM NO. 1301765A – FURNISHING AND INSTALLING 12” WATERMAIN
- ITEM NO. 1301768A - FURNISHING AND INSTALLING 12” WATERMAIN  
ON BRIDGE

**CONTRACT ITEMS**

**REVISED CONTRACT ITEMS**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ORIGINAL QUANTITY</u>	<u>REVISED QUANTITY</u>
<u>0601201A</u>	<u>CLASS “F” CONCRETE</u>	<u>196 CY</u>	<u>215 CY</u>
<u>0921001</u>	<u>CONCRETE SIDEWALK</u>	<u>1,185 SF</u>	<u>240 SF</u>

**PLAN**

**REVISED PLAN**

The following Plan Sheet is hereby deleted and replaced with the like-numbered Plan Sheet:

02.01.A1

04.24.A1

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

The Detailed Estimate Sheets do 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 #0904049A – TWO TUBE BRIDGE RAIL**

**Description:** Work under this item shall consist of the furnishing, fabrication, hot-dip galvanizing, and installation of steel two-tube retrofit bridge rail system as shown on the plans, as directed by the Engineer and in accordance with these provisions.

### **Materials:**

#### **1. Structural Steel:**

(a): The structural-tube railing including splice and expansion sleeves shall be made from structural tubing in accordance with ASTM A500, Grade B or ASTM A501. Tube sections shall be hot-dip galvanized after fabrication in accordance with the requirements of ASTM A123.

(1): Charpy V-Notch Impact Testing: Structural steel comprising the two-tube retrofit bridge rail shall meet the Charpy V-Notch impact requirements of ASTM A370.

(b): The posts and any other shapes and/or plates shall be made from structural steel in accordance with ASTM A709 Grade 36. The posts shall be galvanized in accordance with ASTM A123.

**2. Rail Post Anchor Rods:** Rail Post Anchor Rods shall be fully threaded rods and shall conform to the requirements of ASTM A449, 120 ksi minimum tensile strength. Nuts shall conform to ASTM A563, Grade DH hex, washers shall conform to ASTM F436. Anchor rods, nuts and washers shall be hot-dip galvanized in accordance with ASTM A153.

**3. Other Bolts and Nuts:** All other bolts and nuts shall conform to the requirements of ASTM A307. Nuts shall conform to ASTM A563, Grade DH hex, washers shall conform to ASTM F436. Bolts, nuts and washers shall be hot-dip galvanized in accordance with ASTM A153.

**4. Molded Pads:** Molded pads shall be manufactured from new unvulcanized elastomer and unused synthetic fibers, with a weight proportion of fiber content equal to approximately one-half of the total weight of the pad. The pads shall be formed into single sheets of 1/8" minimum thickness, with a tolerance of plus or minus 10 percent. Pads shall have a Shore A Durometer hardness within the range of 70 to 90.

The Contractor shall furnish a Materials Certificate in conformance with the requirements of Article 1.06.07 for the following materials: rails, rail sleeves, support brackets, post connections devices, rail splices, preset anchorages, bolts, washers and molded pads.

### **Construction Methods:**

**1. General fabrication requirements:** The two-tube bridge rail system shall be fabricated and assembled in accordance with Sections 6.03.03-3 through 6.03.03-4. The cost of

inspection of shop welds shall be considered included in the cost per linear foot of the subject item.

All welds shall be accomplished before any component is galvanized. Any welding after galvanizing will be cause for rejection of that particular component.

Tubular components, rail posts, and other shapes and/or plates shall be hot-dip galvanized in accordance with ASTM A123 following fabrication.

The railings shall be accurately fabricated and installed as shown on the plans. Lengths of rail elements shall be continuous over a minimum of four rail posts wherever possible and in no case less than two. Welding of two or more rails to form an element will not be allowed. Rail splices shall be located between the support brackets. Splice bars shall have a sliding fit in the rail sections.

2. **Welding requirements:** Steel welding shall be in accordance with the American Welding Society “Structural Welding Code-Steel, ANSI/AWS D1.1-2006.
3. **Shop Plans:** Shop plans shall be submitted to the Engineer in accordance with the requirements of Article 1.05.02-3, prior to the fabrication of any material. The drawings shall include material lists, and material designations.
4. **Fabrication Initiation – Notice to Engineer:** The Contractor shall provide the Engineer a minimum of two (2) weeks prior notice to the structural fabrication of the two-tube retrofit bridge rail and galvanizing. Work shall not be initiated until the Engineer has been notified and their representative is on-site.
5. **Installation:** The two-tube bridge rail shall be carefully adjusted prior to fixing in place to insure proper matching at abutting joints and correct alignment throughout its length. All bolts shall be securely tightened. Bolts, nuts and washers shall receive touch-up galvanizing where necessary after final tensioning. Careful attention shall be given to bolted connections to insure that all bolts, nuts and washers are fully galvanized and that no gaps are left uncoated.
6. **Touch-up:** Touch-up for damaged areas that extend back to the steel surface of the galvanized bridge rail, (such as scratches, gouges or nicks) shall conform to the requirements of ASTM A780.

The open ends of the bridge rail shall be closed using end caps.

**Method of Measurement:** This work will be measured for payment by the number of linear feet of two-tube bridge rail, completed and accepted.

**Basis of Payment:** The work will be paid for at the contract unit price per linear foot for “Two Tube Bridge Rail” complete in place which price shall include all material, equipment, tools and labor incidental thereto.

Pay Unit  
Two Tube Bridge Rail

Pay Item  
l.f.

**ITEM #1301019A – TEMPORARY RELOCATION OF WATERMAIN**

**ITEM #1301765A – FURNISHING AND INSTALLING 12” WATERMAIN**

**ITEM #1301768A – FURNISHING AND INSTALLING 12” WATERMAIN ON BRIDGE**

**Description:** The Contractor shall install high density polyethylene pipe, of the sizes indicated, and all the fittings and appurtenances to the lines and grades shown on the Contract Drawings, complete as shown, specified or directed, including but not limited to; pressure reducing valves, vaults, bends, restraint, blow off assemblies, gate/butterfly valves, air valves, sterilization fittings, watermain support system, tapping sleeves, tapping gates, RCP sleeve, gate boxes, tees, thrust blocks and anchors, polystyrene, transporting materials, digging test pits, the clearing, trenching, disposing of unused excavated materials, removing and disposing of sections of the present water mains and concrete anchors, furnishing installing and field testing the pipelines complete with lacings and harnessing, concrete anchor/thrust blocks and utility identification tape, all trenching, rock removal, refilling trenches, filter fabric, furnishing additional material for refilling, trench compaction/testing, temporary and permanent surface restoration, miscellaneous grading, sheeting, bracing, pumping and all incidental work where required, to the specifications and details of the District, except as otherwise herein provided for.

Reference to “FTDWD” in this Item refers to “First Taxing District Water Department”.

**Materials:** All materials used shall be from manufacturers and models as specified in the FTDWD “Approved Materials List for Water Main Installations” unless otherwise approved by the Engineer.

The FTDWD will furnish to the Contractor all pipeline materials for the proposed work including the insulated and non-insulated High Density Polyethylene Pipe, tapping sleeves, gate valves, air valve, insertion valves, curb boxes, blow-off assembly, line stops and any other water appurtenances shown detailed on the drawings. Material descriptions are provided for Contractor reference, and shall be specified in any shop drawings prepared by the Contractor, noting the material to be provided by FTDWD. Contractor shall coordinate work and pickup of materials with NFDWD, and shall be responsible of materials upon receipt, noting to properly ship and store the materials at the construction site until installation.

High Density Polyethylene Pipe - Submittals: Six (6) sets of the manufacturer's literature and/or shop drawings for the materials of this section shall be submitted for approval. The Contractor shall furnish detailed drawings as follows and no work shall be fabricated until they have been approved by the Engineer:

1. Dimensions and general details for typical length of pipe.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

2. Detail of joint between pipes for welded and restrained joints together with installation instructions.
3. Dimensions and general details for all fittings including joint details for both butt-fused and restrained joints.
4. Location plans or lists showing number of pipes and fittings and other such information as needed for installation.

Prior to pipe-laying, the Contractor shall dig test pits where the new pipe connects to the present water main to ascertain the location, elevation and cross-sectional dimensions of the present mains.

Pipe Specifications: All high-density polyethylene (HDPE) pipe shall be manufactured from virgin polyethylene resin, PE 3408 and shall conform to ASTM D3350. All HDPE pipe and fitting shall be DR 17 rated at 100 psi.

AWWA C960-90/ASTM D1248/ASTM D2837/ASTM F714, furnished Polyethylene PE Pressure Pipe and fitting for water distribution, for polyethylene plastic molding and extrusions, method for obtaining hydrostatic design basis for thermoplastic pipe materials, for Polyethylene plastic pipe based on outside diameter per AWWA C960-90/ASTM D1248/ASTM D2838/ASTM F714

HDPE pipe shall be homogeneous throughout, free from voids, cracks, and other defect; as uniform as commercially practical in color density and other physical properties. Pipe surfaces shall be free of nicks, scratches, and other blemishes. The joint surfaces of pipe shall be free from gouges and imperfections that could cause leakage at joints.

The Contractor shall submit to the Engineer a certified statement that the inspection and all of the specified tests have been made and met.

Where shown, specified or ordered, the pipe shall be joined by butt-fusion methods, having a complete uniform and monolithic pipe interior according to the fusion joining procedures as instructed by the manufacture. Each individual performing fusion joining shall have a minimum of one year of experience in the use of the fusion procedure.

Each pipe shall have cast or stamped on it the maker's name or mark, the year in which the pipe is cast, and the letters "HDPE" as required by the American National Standards Institute Specifications. The weight and thickness class shall be painted on each pipe, as required by the American National Standards Institute Specifications, and a record of weight for each pipe before the application of a lining or coating shall be submitted to the Engineer.

The pipes will be pre-insulated by URECON or approved equal, including the 6" diameter HDPE pipe used for the temporary watermain.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

Unless otherwise shown, specified or ordered, all fittings shall be butt-fused joint (BJ).

Joint Accessories: All joint accessories shall be furnished with each pipe and fitting and shall be plainly identified as to pipe size. A certified statement that all required tests on the joint accessories have been made and met as specified shall be submitted to the Engineer.

The Contractor shall submit to the Engineer a certified statement that the inspection and all of the specified tests have been made and met.

THE FOLLOWING ARE ACCEPTABLE PIPE MANUFACTURERS:

ISCO Industries  
ENDOT Industries  
Performance Pipe

Inspection: All pipe and fittings shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the FTDWD.

Retainer glands for mechanical joints shall conform to ANSI/AWWA C111/A21.11 and the following additional requirements:

1. All retainer glands shall be ductile iron and all retaining devices shall be heat treated ductile iron.
2. All retainer glands shall have a minimum rated working pressure of 250 psi.

The retainer glands shall be Megalug Series 2000PV as manufactured by EBAA Iron Sales, Inc. Eastland, Texas or approved equal.

Trench Refill: Trench refill materials shall meet the following requirements:

Native Backfill: Native backfill shall consist of granular soil excavated on site meeting the approval of the Engineer. Materials shall be of such a nature that they will form a stable dense fill. Materials shall not contain stones larger than 6-inch, vegetation, masses of roots, individual roots more than 12-feet long or more than ½-inch in diameter, trash, clays, or plastic fines. Organic matter shall not exceed two percent (2%). Non-plastic fines (silts) shall not exceed 20 percent (20%).

Bank Gravel: Bank gravel shall conform to the requirements of Article M.02.01-2, CDOT Form 816.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A



Crushed Stone: Crushed stone shall conform to the requirements of Article M.02.01-1 Grading A, CDOT Form 816 and Sub Article M.02.02-2(a), CDOT Form 816, for loss on abrasion.

Granular Base: Granular base shall conform to the requirements of Article M.02.03, Grading “C”, CTDOT Form 816.

Sand: Sand shall conform to the requirements of Sub article M.11.04c, CDOT Form 816.

Utility Identification Tape: Utility identification tape shall be 4-inch wide non-detectable, designed to withstand extended underground exposure, colored blue and be durably imprinted with an appropriate warning indicating the presence of the buried pipe.

Ductile Iron Pipe and Fittings: Refer to the “Ductile Iron Pipe (Water Main)” specification.

Gate Valve, Extension Stem and Gate Box: Refer to FTDWD Detail.

Concrete anchor/ Thrust blocks: Anchors and thrust blocks shall be Class “A” concrete conforming to Article M.03.01.

Harnessing: Refer to FTDWD Detail.

Filter fabric: Fabric shall conform to Article M.08.01-26.

Expansion fittings shall be as manufactured by EBAA Iron EX-TEND 200 or approved equal

The Water Main Support System shall conform to the material requirements detailed in the drawings and components shall conform to the following, and all Water Main Support System items and materials shall be furnished by the Contractor:

Pipe Roller with sockets shall be cast iron and steel axle conforming to Federal Specification WW-H-171E & A-A-1192A, Type 42 and shall be electro-galvanized.

Threaded Rods shall conform to ASTM A575 and with washers and shall be hot dip galvanized.

Structural Steel hardware shall conform to ASTM A992, Grade 50 and be hot dip galvanized.

Steel pipe clamp at support locations shall conform to Federal Specifications WW-H-171-E (Type 4) and shall be electro-galvanized.

Bearing plates at support locations shall be 18 gage steel plate to the dimensions shown on the plans and be hot dip galvanized.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

Pipe U-bolts, where required, shall be type 304 Stainless Steel.

**Construction Methods:**

Transporting and Distributing Pipe: The Contractor shall transport the pipe and fittings from NFDWD, shall secure all permits which may be necessary, and comply with the requirements of the Connecticut Bureau of Highways, Cities and Towns, concerning heavy transporting over State, City and Town highways.

During loading, transportation and unloading, more than ordinary care shall be taken to prevent injury to the pipes. Such work shall be done with each section of the pipe under full control at all times and under no condition shall a pipe be dropped on the ground. Pipes shall be placed on sand beds or other methods may be employed to avoid chances of pipe being frozen to the ground surface.

In distributing the pipe in the field, as permitted, each piece shall be placed as near as possible to the point where it is to be installed and faced in the proper direction. In case any pipe received damage from handling or other cause and made unacceptable to the Engineer, it shall be replaced with a new pipe at the expense of the Contractor. The Contractor is cautioned that State, City, or Town authorities may not permit storing pipe, etc., within street or highway limits.

Clearing Trees and Bushes: No trees within streets and highways, or adjacent to the normal trench therein, shall be damaged or removed. In streets and highways where there is no permanent paving, the Contractor shall, unless otherwise directed, remove and dispose of only those trees, bushes or shrubs required for construction and approved by the Engineer. The unlimited removal of trees and brush will generally not be required or permitted. All trees, bushes or shrubs which are not to be removed shall be preserved and protected by the Contractor. Should any trees, bushes or shrubs, which are to be preserved and protected, become damaged by the conduct of the work, the Contractor shall replace them at his own expense. Brush, small branches, trash, large trunks, stumps and all other surplus material and debris shall be removed from the site of the work.

Trenching: Prior to any excavation, the Contractor shall notify all affected utilities in accord with Public Act 77-350 (CALL BEFORE YOU DIG 1-800-922-4455).

The trench for the pipe shall be 18-inches beyond the outside of the barrel of the pipe on each side, the top of the barrel of the pipe shall be as shown on the Contract Drawings or as directed by the Engineer; and the bottom of the trench shall be at the bottom of the pipe. The Contractor alone shall be responsible for the stability and safety of the trenches and adjacent structures, and shall use such trench support and bracing as necessary without additional payment therefor. Pavement cuts shall be made with the edges reasonably smooth and without cracking or damage to the pavement outside the limits of the portion excavated. The methods used and the location of such cuts shall conform to the requirements and specifications of the City or State. Repairs to pavement shall be made in accordance with the requirements and specifications of the City/Town or State.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

In any area to receive fill, no pipe trench shall be excavated until the fill has been placed and compacted to a level at least 3-feet above the top of the pipe to be installed.

The Contractor may be required to excavate locally to determine the location and depth of existing underground structures on the lines of the pipe well in advance of the pipe laying. There will be no additional payment for this work, including backfilling and temporary surfacing.

Sheeting, Bracing and Pumping: The Contractor shall furnish and put in place such sheeting and bracing as may be necessary, to support the sides of the excavation, to prevent undermining of the pavement or to protect from possible injury any pipes, sewers, ducts, poles, conduits or other structures existing in the streets, or highways, and shall remove such sheeting and bracing as the trench is refilled unless the Engineer shall order it left in place.

The Contractor shall maintain all excavations in proper condition for carrying on the work, and to this end shall do all bailing, draining, or pumping which may be necessary to keep the trenches or other excavations free of water. No direct payment will be made for this work but the cost thereof will be considered as having been included in the price bid per linear feet of pipe.

If the Contractor installs and operates wellpoints on any section of the work, the expense of the same shall be borne by the Contractor.

Protection of Pipes, Drains, Culverts, etc.: All existing gas pipes, water pipes, sewers, drains, manholes, catch basins, culverts, electrical conduits, telephone ducts, utility poles or other structures which are uncovered by the excavation, and which do not, in the opinion of the Engineer, require to be changed in location, shall be carefully supported and protected from injury by the Contractor; and in case of damage, they shall be restored by him without compensation; therefore, to as good condition as that in which they were found and shall be kept in repair during the existence of this Contract.

Laying HDPE Pipe: Proper and suitable tools and appliances for safe and convenient handling and laying of pipe shall be used, and care shall be taken to prevent the coating of the pipe from being damaged, particularly on the inside of the pipes. The Contractor shall not start any pipe work until he has satisfied the Engineer that he has on hand and available the following minimum equipment:

1. Wheel pipe cutters, hydraulic pipe cutter or a pipe saw for the sizes of pipe to be laid;
2. Ratchet type socket wrenches for mechanical joint bolts and nuts;
3. At least two expandable pipe stops of the proper size for closing the end of the pipe being laid when not actually laying pipe.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

All pipes shall be carefully examined for defects and no pipe shall be laid which is known to be defective, and should any defective pipe or other casting be discovered after being laid, it shall be removed and replaced with a sound casting at the expense of the Contractor.

Pipe located on the bridges shall be carefully cut to length and carefully installed to insure proper positioning of joints between pipe support assemblies.

The pipe shall be laid upon sound soil, cut true and even so that the barrel of the pipe will have a bearing for its full length. In the event the trench is excavated below the grade of the bottom of the pipe, the trench will be brought up to grade with acceptable crushed stone or processed gravel, pneumatically tamped, at the expense of the Contractor, before the pipe is laid.

The utility identification tape shall be placed approximately two (2) feet above the top of the pipe.

When not actually laying pipe (e.g. overnight, weekends, holidays, etc.) the open ends of the pipe shall be kept plugged with approved watertight night caps furnished by the Contractor.

The Contractor shall take all necessary precautions to prevent water from entering the pipe during installation of the pipeline.

Unless shown otherwise on the Contract Drawings or directed otherwise by the Engineer, the pipeline shall be installed a minimum of four (4) feet - six (6) inches below finished grade. The pipeline shall also be installed to provide at least eighteen (18) inches of vertical clearance between the water pipe and storm drains or sanitary sewers.

Cutting Pipe: Whenever the pipes require cutting, an approved saw, wheel, or hydraulic type cutter shall be used. This work shall be done by the Contractor without extra compensation, in a manner satisfactory to the Engineer, and only experienced men shall be engaged thereon.

Joints: HDPE pipe joints shall be joined by butt-fusion, having a complete uniform and monolithic pipe interior according to the fusion joining procedure as instructed by the manufacturer, unless noted otherwise on the plans or directed by the engineer.

On fittings, butterfly and gate valves with mechanical joints, the follower ring and rubber gaskets shall be placed on the plain end of the pipe being (or previously) laid and entered into the socket of the fitting. The gasket shall then be evenly seated in the socket, the follower ring moved up to the face of the gasket and the "T" bolts inserted and made finger tight. The "T" bolts shall then be tightened with a ratchet or torque wrench to between 60 and 80 foot-pounds. See U-03 for additional joint requirements.

Joint Restraints: Where and as shown on the Contract Drawings, or as directed by the Engineer, retaining glands or eye bolts and lacing rods shall be installed with the standard lacing details shown for mechanical joint pipe or fittings.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

The retaining glands shall be installed in lieu of the standard mechanical joint gland. The “T” bolts shall be tightened with a ratchet or torque wrench to between 60 and 80 foot-pounds. Only then shall the set screws be tightened to a maximum of 70 foot-pounds, tightening 180 degrees apart and making a final check with the wrench to ascertain that all set screws have 70 foot-pounds. The joint is then complete. Torque settings shall be done with the pipe laid in the trench in place.

Retaining glands shall also be installed adjacent to the pipe bells. No “T” bolts will be installed; however, the set screws will be installed as above.

The standard mechanical joint gland placed behind the pipe shall be installed snugly against the back of the bell to preclude movement. No “T” bolts will be installed on this gland.

Other special lacing or harnessing, if shown on the Contract Drawings, or directed by the Engineer shall be installed by the Contractor to the satisfaction of the Engineer.

Refilling Trenches: As soon as practicable after the pipes have been laid, the trenches shall be refilled at least to a level 2-feet above the top of the pipe with approved sand, deposited in layers no more than 6-inches in depth and satisfactorily compacted with pneumatic hand tampers, each layer to be leveled and thoroughly compacted to the satisfaction of the Engineer before the next layer is deposited. There will be no additional payment for necessary borrow to refill to this level. Special care shall be taken to consolidate the gravel under the pipes and the whole work of refilling shall be done in a manner which will prevent subsequent settlement and injury to the pipe. Above this level except for the surfacing material, the Contractor may use approved material from the trench excavation.

Trench Backfill: Backfill above the 24-inch level will comply with and be paid for under the appropriate items included in this Contract.

Frost in Trench or Refill: Every effort shall be extended to eliminate the presence of frost in the bottom and sides of the trench and refill material. The Contractor shall cover and heat the trench or take such other means as necessary to eliminate the frost and chance of subsequent pipe settlement.

Water Main Support System: The water main support system on the bridge shall be installed such that, under all conditions of operation, it will allow free expansion and contraction of the water main, and will prevent the introduction of excessive stresses on the water main. The Contractor shall install the support system so that the water main is uniformly supported on the support hangers and the HDPE casing and insulation are not crushed or pinched by the pipe clamps. The Contractor shall provide for vertical adjustments after erection, where feasible, to ensure the insulated pipe is at design elevation and slope.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

The Contractor shall fabricate and assemble the support system, base plates, support hangars and 21 - inch sleeves as detailed on the drawings and as applicable in ANSI/ASME B31.1, ANSI/ASME B31.3, and ANSI/ASME B31.9. Support components shall be used for intended design purpose only. They shall not be used for rigging or erection purposes.

All insulated water main pipe, fittings and appurtenances shall be assembled and installed within the support system as detailed and directed, and in full accordance with AWWA C600, manufacturer's recommendations, and accepted best practice – with the below listed qualifications and clarifications. The methods employed in performing the work and all equipment, tools and machinery used in handling the material and executing any part of the work shall be subject to the approval of the RWA before the work shall be started and, whenever found unsatisfactory, shall be changed and improved as required by the RWA.

**Cleaning:** Prior to the installation of the pipeline, the Contractor shall clean the interior of the pipelines to the satisfaction of the Engineer, by such means as the Engineer approves.

**Filling, Sterilizing and Flushing:** At the location(s) as shown on the Contract Drawings or as ordered by the Engineer, the Contractor shall install an appropriately sized chlorination inlet, chlorination blow-off and sterilization sampling connection point on the crown of the pipe for sterilization testing. All costs for providing and installing said fittings shall be included in the unit price bid per foot of pipe or pipeline installed. As soon as practicable after the Contractor has completed installation of the pipeline to include a successful leakage and hydrostatic test, the FTDWD will fill, and flush the pipeline. The Contractor shall supply labor to assist the FTDWD in filling and flushing the pipeline. If the pipeline is not connected to an existing operating water main, the Contractor shall furnish all labor, materials, equipment, at no extra cost to the District or State, to temporarily connect a FTDWD water main to the pipeline to be tested. The Contractor will not be charged for the FTDWD water used in this operation. The Contractor shall be responsible for labor, equipment and material necessary for erosion control.

Subsequent to sterilizing and flushing the water main(s), the FTDWD will test the water in accord with required state regulations. Should the water fail to pass the required tests and it is determined that the failure was caused by the Contractor's operations, all costs for re-sterilization, re-flushing, re-testing, etc., shall be borne by the Contractor.

The Contractor will attempt to minimize any damage to the road work that may occur during the flushing operation; however, he shall repair any such minor damage and the cost thereof will be considered as included in the price bid per linear feet of pipe.

**Disinfecting and Flushing Water Mains Continuous Hypochlorite Feed Method**

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

The work specified in this section describes continuous feed method of disinfecting newly constructed potable-water mains. The Contractor installing water mains and appurtenances such as pipe, valves, fittings and accessories within the FTDWD service area is responsible for disinfecting the water main and pipe sections. The FTDWD requires the Contractor to adhere to the strict standards stipulated in latest edition of AWWA C651, "Standard for Disinfecting Water Mains" when performing disinfection procedures. The standards represent the physical, chemical and bacteriological parameters that must be satisfied prior to determining if newly installed water mains can be placed into service.

The Contractor installing water mains and appurtenances within the FTDWD service area is responsible for all operations related to disinfecting water mains and pipe sections except working on the existing water distribution system. The gates within the existing water distribution system shall be operated only by the FTDWD.

The Contractor shall be required to issue a submittal for the subcontractor that will be performing the chlorine injection. The submittal shall include a minimum of three disinfection jobs of equal size and scope within the last two years and three references with contact information to establish the minimum level of required experience to perform the chlorine injection on the project. The Contractor shall be allowed to proceed with the implementation of this Section only if the submittal has been approved by the FTDWD.

After flushing and subsequent to performing the disinfection operation, the FTDWD will collect and analyze two complete sets of water samples. The two sets of water samples will be collected approximately twenty-four hours apart from each other. The first sample will be taken 2 hours after flushing and the second sample 24 hours after the first sample. Anticipate approximately two business days for sampling and test results. The FTDWD will compare the results from the water samples collected to the maximum allowable limits for each parameter. If all parameters are satisfactory then the water main is considered to have passed and can now be opened for service. It is important to note that if any one parameter fails then two additional water samples will be collected twenty-four hours apart from each other. The parameters used to compare to the water sample results are listed in Table 1.

Use of FTDWD supplied water for flushing purposes may be limited during periods of high demand or when temperatures exceed 95 degrees Fahrenheit.

#### Submittals

The Contractor shall be responsible for developing a detailed plan that discusses at a minimum the scouring full pipe diameter flushing, methods for handling the volume of water from the flushing operation, disinfecting procedure with liquid sodium hypochlorite solution, de-chlorination procedure and sampling for each section of new water main to be tested. The Contractor shall provide a detailed submittal to the Engineer and FTDWD that outlines the specifics of the proposed procedures for each location.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

**SODIUM HYPOCHLORITE SOLUTION.** Sodium hypochlorite conforming to ANSI/AWWA B300 is available in liquid form in glass, rubber-lined or plastic containers typically ranging in size from 1 quart to 5 gallons. Sodium hypochlorite contains approximately 5% to 15% available chlorine, and the storage conditions and time must be controlled to minimize its deterioration.

The sanitary handling of materials, the practices during construction, and the continual inspection of the work are the primary means for ensuring the sanitary condition of the water main. The effectiveness of disinfection depends on maintaining clean pipes and avoiding major contamination during construction activities.

**PREVENTATIVE AND CORRECTIVE MEASURES DURING CONSTRUCTION.** Heavy particles generally harbor bacteria and prevent elevated chlorine concentrations from contacting and killing these organisms. The procedures of this specification must be observed to assure that a water main and its appurtenances have been thoroughly cleaned for the final disinfection by chlorination. Also, any connection of a new water main to the active distribution system prior to the receipt of satisfactory physical and bacteriological sample results may constitute a cross-connection. Therefore, new water mains must be isolated until physical and bacteriological tests, immediately after and 24 hours following flushing of the water main, are satisfactorily completed and meeting FTDWD specifications.

A successful disinfection process begins at the early stages of construction. The Contractor must protect piping systems from contamination including interiors of pipes, fittings and valves. Pipe and appurtenances delivered for construction shall be capped or bagged to minimize the entrance of foreign material. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods. Rodent-proof plugs may be used when watertight plugs are not practicable and when thorough cleaning will be performed by flushing or other means. The sanitary handling of materials, the practices during construction, and the continual inspection of the work are the primary means for ensuring the sanitary condition of the water main.

Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipe laying, the lower the risk of contamination.

**JOINTS.** Joints of all pipes in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

**SEALING MATERIALS.** No contaminated material or any material capable of supporting prolific growth of microorganisms shall be used for sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water and approved by the pipe manufacturer, and not contribute odors. It shall be delivered to the job in closed containers and shall be kept clean and applied with dedicated, clean applicator brushes.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A



**CLEANING AND SWABBING.** Each pipe section that is being readied for assembly in the field and just prior to installation, shall have the interior pipe surface swabbed with a 1% to 5% hypochlorite disinfecting solution using mechanical means like pulling a chlorine soaked mop or pigging device through the pipe or by power washing . If in the opinion of the Engineer, any dirt enters the pipe while being installed, the pipe will be swabbed again with 1% to 5%. The cleaning method used shall not force mud or debris into the interior pipe-joint spaces and shall be acceptable to the Engineer.

**WET TRENCH CONSTRUCTION.** If it is not possible to keep the pipe and fittings dry during installation, the water that may enter the pipe-joint spaces shall contain an available chlorine concentration of approximately 25 mg/L. This may be accomplished by adding calcium hypochlorite granules or tablets to each length of the pipe before it is lowered into a wet trench or by treating the trench water with hypochlorite tablets.

**FLOODING BY STORM OR ACCIDENT DURING CONSTRUCTION.** If the main is flooded during construction, it shall be cleared of the floodwater by draining and flushing with potable water until the main is clean. The section exposed to the floodwater shall then be filled with chlorinated potable water that, at the end of a 24-hour holding period, will have a free chlorine residual of not less than 25 mg/L. The chlorinated water may then be drained or flushed from the main.

**PREFLUSHING OF SOURCE WATER.** The source water used for disinfection and pressure testing shall be flushed prior to its use to ensure that normally occurring contaminants or debris are not introduced into the new water main pipe. The FTDWD will be responsible for operating gate valves in the street as necessary. Adequate drainage must be provided during flushing, away from the construction area. The contractor shall be responsible for constructing temporary discharge piping and/or materials as necessary, at no additional cost to the FTDWD.

**CONTINUOUS FEED METHOD OF CHLORINATION.** Hypo-chlorination utilizes a concentrated dose of chlorine solution, usually 25 ppm for a 24 hour period, to eradicate bacterial contamination. This is a critical operation that requires skilled personnel and therefore the FTDWD reserves his right to request the replacement of any Contractor / Subcontractor's personnel for lack of skills performing these tests The Contractor shall not be compensated for the replacement of his Subcontractor or its personnel if requested by the FTDWD as a result of lack of skills in performing these tests. The FTDWD has developed safe and effective hypo-chlorination procedures. These procedures allow for disinfecting a new section of the FTDWD water distribution system, minimizing the risk to the field crews, to customers and to the environment. These procedures are to be followed when disinfecting all new pipelines which utilize the injection of sodium hypochlorite.

**FINAL FLUSHING.** After the applicable retention period of 24 hours, heavily chlorinated water should not remain in prolonged contact with the pipe. In order to prevent damage to the pipe lining or to prevent corrosion damage to the pipe itself, the heavily chlorinated water shall be

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

flushed from the main, fittings, valves and branches until chlorine measurements show that the concentration in the main is no higher than that generally prevailing in the distribution system.

The Contractor shall make arrangements with the FTDWD to flush the new water main following disinfection. FTDWD forces shall be responsible for operating the gate valves in the street as necessary. It is important to note here that the new water main shall be kept isolated from the active distribution system using a physical separation until disinfectant has been flushed and satisfactory bacteriological, physical and VOC testing has been completed. Operation of all valves used in filling and flushing the line shall be performed by FTDWD personnel.

The Contractor shall be responsible for supplying necessary materials, equipment and appurtenances for neutralizing the chlorine and to perform all flushing operations except the operating of gate valves within the existing water distribution system. The minimum materials and equipment required to flush and neutralize the water main are:

- Five 3-inch x 20-foot rubber hoses, each with 3-inch male x female Camlock Couplings.
- Dechlorination device, model 3M-CLA, manufactured by Measurement Technologies, Sammamish WA or approved equal.
- Standard hydrant wrench.
- 90-degree ductile iron elbow with retaining gland, either 4 or 6-inch depending on blow off size.
- Customized 4 or 6-inch, 3/8-inch thick metal plate that bolts on to the 90-degree ductile iron elbow with 2-1/2-inch male fire connection (NST) thread. 4 or 6-inch depends on the blow off size.
- Ascorbic acid powder supplied by Bran NU Labs in Meriden CT or approved equal.

The Contractor shall also be responsible for determining where the water will drain during the flushing operation so as not to cause localized flooding or cause damage to property or the environment. The environment to which the chlorinated water is to be discharged shall be inspected. Following neutralization of the chlorinated water, the level of chlorine shall be between 0.1 and 0.8 mg/l and in no case higher than the chlorine level in the distribution system. It is important to note that during the summer months water mains tend to take longer to disinfect due to higher ambient temperatures increasing the bacterial count. Usually, additional flushing will result in successfully disinfecting the water main.

**DISINFECTION TESTS.** Following disinfection and flushing, FTDWD forces will collect and analyze water samples from the new main utilizing a copper sterilization sampling fitting located no more than every 1,200 feet along the newly constructed water main. One set of water samples will be collected: approximately 2 hours following the flushing operation. The results are available approximately two business days following collection. The analytical results for the samples will be compared to the maximum allowable limits for each parameter as established by the FTDWD shown in Table 1. If the parameters are satisfactory for the water sample, then the water main is considered passing and can be opened for service.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

To ensure the water sample integrity, the FTDWD requires the person taking the sample to complete a “Chain of Custody” form, see attachment. This form must accompany the water sample when transporting to the FTDWD’s laboratory prior to analyzing.

Table 1  
Physical, Chemical and Bacteriological Parameters for Water Mains

Parameter	Maximum Allowable Limit
pH	6.4 to 10
Color	15 units
Turbidity	1.0 NTU
Odor	2
Hardness	60 ppm.
Specific Conductance	150 microhms at 25 °C
Coliform Bacteria	0 per 100 milliliters
Standard Heterotrophic Plate Count	< 500 per milliliter at 35 °C
Chlorine Residual	<0.1- 0.8 ppm.
Volatile Organic Compounds (VOC)	See attached <b>Procedure</b>

**RESAMPLING**

If the initial disinfection fails to produce satisfactory physical and bacteriological results for the water sample, the new main shall be re-flushed and re-sampled.

If the new water main fails two rounds of sampling, the FTDWD shall determine if re-disinfection is needed or if the new main should only be flushed.

**ATTACHMENT-CHAIN OF CUSTODY FORM**  
**FTDWD - Sample Collection \ Chain of Custody**  
**Distribution Specials**  
**New Mains**

**Project DVW (when applicable to Developer Permit Agreement):** \_\_\_\_\_

**Project Name (for all projects):** \_\_\_\_\_

**Town:** \_\_\_\_\_

Sample I.D.	Location (street)	Size of Main	Length of Main
<b>S1</b>			
<b>S2</b>			

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

<b>S3</b>			
<b>S4</b>			

Is a VOC being submitted?            YES / NO

**Time Collected**

<u><b>S1</b></u>	<u><b>S2</b></u>	<u><b>S3</b></u>	<u><b>S4</b></u>
------------------	------------------	------------------	------------------

**Chlorine residual**

<u><b>S1</b></u>	<u><b>S2</b></u>	<u><b>S3</b></u>	<u><b>S4</b></u>
------------------	------------------	------------------	------------------

Collected by: \_\_\_\_\_

**Any observations that might affect the physical and bacteriological quality of the water should be noted below:**

---



---

Relinquished By:	Date / Time:
Received By:	Date / Time:
Relinquished By:	Date / Time:
Received By:	Date / Time:

**Air Valve Assembly:**

All brass fittings shall be of standard design generally used by water utilities and be in accord with ASTM B62 and ANSI/AWWA C800.

The corporation stops and angle valves shall be of good, tough, composition bronze well-mixed and free from flaws and imperfections. The corporation stops shall be of a type suitable for use in ductile iron mains. The inlet end shall have an inlet taper thread type known as the "Mueller Taper Thread".

Compression fittings, valves, etc. shall be of the design employing the pipe clamp feature.

The gate valve box shall conform to the following requirements:

ITEM #1301765A  
 ITEM #1301768A  
 ITEM #1301019A

1. Cast iron shall conform to ASTM A48, Class 25.
2. Top section shall be of the top flange design and shall have no bead on the bottom.
3. The word "WATER" shall be cast with raised letters in the center of the cover.
4. Base section shall be of the Dwyer design which centers the operating nut for positive access to the valve.
5. For specific gate box details, see the FTDWD Details.

**Inspection Before Installation:** All tubing and fittings shall be carefully examined for defects and no material shall be installed which is known to be defective and should any defective tubing or fitting be discovered after being installed, it shall be removed and replaced with sound material at no additional cost to the FTDWD.

**Installation:** The air valves, chlorination valve and blow-off shall be installed according to the details and to the satisfaction of the Engineer. To properly receive the air valve or other assembly the ductile iron pipe shall be drilled and tapped. All tapped holes for corporation stops shall be tapped Mueller Thread.

All tapped holes in ductile iron pipe shall be cleaned by running the correct size tap into the hole immediately prior to installing the corporation.

Gate valve boxes shall be set plumb and centered on the fitting, etc. Earth fill shall be carefully tamped around the gate box to a distance of 4 feet on all sides of the box or to the undistributed trench face, if less than 4 feet.

Excavation and refill shall conform to the requirements under other applicable Contract Sections.

**12-Inch and Smaller Gate Valves:**

**Quality Assurance:** All gate valves, accessories and gate boxes shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.

A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.

All gate valves, accessories and gate boxes shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the FTDWD.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

In addition the FTDWD reserves the right to have any or all materials inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the FTDWD 's expense.

A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.

Gate Valve: The gate valve shall conform to ANSI/AWWA C500, ANSI/AWWA C509 and the following additional requirements:

1. Valve shall be double disc or resilient seated.
2. Bolts and nuts for connecting O-ring seal plates and bonnet to body shall either be copper-silicon alloy or stainless steel.
3. Valve shall be furnished with O-ring seals utilizing two O-rings, consistent with appropriate specifications.
4. Valve shall have mechanical joint ends, unless otherwise specifically indicated, which shall conform to ANSI/AWWA C111/A21.11. All joint accessories shall be furnished with each valve.
5. Direction to open shall be right-hand.
6. Operating nut shall be 2" square.

Gate Valve Box: The gate valve box shall conform to the following requirements:

1. Cast iron shall conform to ASTM A48, Class 25.
2. Top section shall be of the top flange design and shall have no bead on the bottom.
3. The word "WATER" shall be cast with raised letters in the center of the cover.
4. Base section shall be of the Dwyer design which centers the operating nut for positive access to the valve.
5. For specific gate box details, see the FTDWD Details.

Extension Stem: The extension stem shall be fabricated from steel conforming to ASTM A 36. Galvanizing shall conform to the latest edition of ASTM A 123.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

**Inspection Before Installation:** The gate valve, gate box, etc. shall be subject to a careful inspection before being installed. The valve shall be run through a full open-close cycle to insure proper operation.

**Installation of Gate Valve:** The gate valve shall be installed according to the details shown and to the satisfaction of the Engineer.

All debris and foreign material shall be cleared from valve openings and seats. All mechanisms shall be checked and all nuts and bolts checked for tightness.

The valve box shall be set plumb and centered directly over the operating nut of the valves. Earth fill shall be carefully tamped around the valve box to a distance of 4 feet on all sides of the box or to the undisturbed trench face, if less than 4 feet.

Where and as shown on the Contract Drawings, or ordered, a valve extension stem shall be installed. An extension stem will be ordered when the valve-operating nut is more than 4.5 feet below finished grade.

Excavation and refill shall conform to the requirements under other applicable Contract Sections.

**Blow-Off Assembly:**

**Quality Assurance:** All blow-off assemblies including gate valves and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.

All blow-off assemblies including valves and fittings shall be subject to inspection by the Engineer after delivery to the job site and may also be subject to inspection at the foundry by a representative of the FTDWD.

In addition, the FTDWD reserves the right to have any or all blow-off assemblies including valves, fittings and special castings inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or the tests shall be at the FTDWD 's expense.

A certified statement that inspection and all of the specified tests have been made and met shall also be submitted.

**Inspection Before Installation:** Blow-off assemblies including gate valves, pipe, fittings, gate boxes, etc. shall be subject to a careful inspection before being installed. Valves shall be run through a full open-close cycle to insure proper operation.

**Installation of Blow-off Assemblies:** Blow-off assemblies including piping, gate valves, fittings, etc. shall be installed according to the details shown and to the satisfaction of the Engineer.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A

All debris and foreign material shall be cleared from valve openings. The blow-off assembly shall be set plumb. Blow-off assemblies and connecting pipe shall have at least the same depth of cover as the distributing main.

Special trench refill shall be placed over the pipe and fittings from the bottom of the trench to 2 feet above the top of the pipe and fittings.

Ductile iron pipe and harnessing shall be installed in accord with the specifications.

The utility identification tape shall be placed approximately two (2) feet above the top of the pipe.

Gate valves and gate boxes shall be installed in accord with the specifications.

Three-quarter inch (3/4") crushed stone, special trench refill and concrete shall be placed in accord with the specifications.

Excavation and refill shall conform to the requirements under other applicable Contract Sections. Temporary and permanent paved and unpaved surface restoration shall conform to the requirements under other applicable Contract Sections.

**Method of Measurement:** This work will be measured for payment as follows:

“Furnishing and Installing 12” Water Main” which is considered to be the portion of the pipe buried within the soil. No Measurement shall be taken as the work shall be paid for on a Lump Sum basis. For payment limits, the change between buried installation and installation on the bridge shall be considered to occur at the back face (roadway approach side) of the concreteback wall. Measurement shall pass through and include all valves, bends, and mainline fittings. Additional measurements shall be taken for branches for Blow-off Assemblies regardless of their diameter.

“Furnishing and Installing 12” Water Main on Bridge” which is considered to be the portion of pipe supported on the bridge. No measurement shall be taken as the work shall be paid for on a Lump Sum basis. For payment limits, the change between buried installation and installation on the bridge shall be considered to occur at the back face (roadway approach side) of the concrete thrust block.

“Temporary Relocation of Water Main” for the temporary 6-inch diameter, non-insulated HDPE pipe, shall be paid for on a lump sum basis and not be measured for payment, but shall include all fittings, bends, tees, gate valves, roller supports, U-bolts, thrust blocks, and appurtenances complete as shown on the plans. Note that the temporary supports of the temporary relocated water main shall be paid for under the item “Temporary Support of Utilities”.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A



Gravel fill from the bottom of the trench to the level 24-inches above the top of the pipe will not be measured for payment, but will be included in the cost of the pipe.

**Basis of Payment:** This work will be paid for at the contract lump sum for “Furnishing and Installing 12” Water Main”, the contract lump sum price for “Furnishing and Installing 12” Water Main on Bridge”, and the contract lump sum price for “Temporary Relocation of Water Main”, complete and in place. The price shall also include the cost of digging test pits; transporting the materials; clearing, trenching; disposing of excavated materials, removing and disposing of the present water pipes and any appurtenances as needed; installing the pipelines complete as shown on plans or as directed, with lacing and harnessing where required, including fittings, pressure reducing valves, vaults, bends, restraint, filter fabric, bank gravel, sand, blow off assemblies, gate/butterfly valves, air valves, sterilization fittings, tapping sleeves, tapping gates, RCP sleeve, gate boxes, tees, thrust blocks, anchors, expansion fittings, polystyrene, utility identification tape refilling trenches; furnishing the additional materials; temporary and permanent resurfacing; grading; sheeting; bracing; pumping and all incidental work, except as otherwise herein provided for. No claim will be allowed because the number of pipes and joints may be greater than estimated by the Contractor. The price shall also include all material (except material provided by FTDWD), transportation, labor, including labor required to assist the FTDWD during the testing, and equipment necessary to construct the pipelines in accord with the Contract Drawings, the Specifications and the requirements of the Engineer there under.

“Temporary Relocation of Water Main shall be paid for at the contract lump sum price for Temporary Relocation of Water Main of the appropriate size, complete in place, inclusive of all fittings, bends, tees, gate valves, roller supports, U-bolts, and appurtenances.

Price shall also include the cost of digging test pits, transporting the material to the worksite from FTDWD and the returning the material supplied by FTDWD after the temporary water main is no longer required.

The cost of all excavation, disposing of excavated material, except that which is suitable for refilling, and furnishing other materials for refilling, unless otherwise specified, will be considered as having been included in the lump sum price.

No direct payment will be made for any work done or materials used in making the pipeline tight.

Pay Item	Pay Unit
TEMPORARY RELOCATION OF WATERMAIN	L.S.
FURNIGHING AND INSTALLING 12” WATERMAIN	L.S.
FURNIGHING AND INSTALLING 12” WATERMAIN ON BRIDGE	L.S.

ITEM #1301765A  
ITEM #1301768A  
ITEM #1301019A