

ITEM W34

WATER LINE CONSTRUCTION

1.0 DESCRIPTION. This work shall consist of the construction of a potable water pipeline in accordance with these specifications and in reasonably close conformity to the line and grades indicated on the plans or as established by the Engineer. This work shall include excavating for pipe, fittings, valves, joint restraints, and other appurtenances, clearing and grubbing and the removal of all materials necessary for placing the pipe, except removals listed separately; furnishing and placing granular or concrete bedding and granular backfill as required, constructing and subsequently removing all necessary cofferdams, cribs, and sheeting, pumping and dewatering, making all pipe joints as required, installing all necessary pipe, joining to existing and proposed appurtenances as required, performing leakage tests as specified, disinfecting and restoration of disturbed facilities and surfaces. Arrangement for and the performance of the adequate and satisfactory disposal of all test and disinfection waters shall be the Contractor's responsibility. The Contractor shall chlorinate the water main as often as necessary to achieve an approved potable water test.

2.0 SUBMITTALS. The contractor shall submit the following information:

A. Reference Standards.

1. Refer to applicable Specification sections:
 - a. W11 Ductile Iron Pipe and Fittings.
 - b. W14 PVC Pipe.
2. AWWA C651.

B. Shop Drawings.

1. Refer to applicable Specification sections:
 - a. W11, Ductile Iron Pipe and Fittings.
 - b. W11, PVC Pipe.
 - c. W15, Open-Cut Pipe Installation.
 - d. W18, Horizontal Directional Drill Installation.

C. Calculations.

1. Refer to applicable Specification sections.

D. Certifications.

1. Refer to applicable Specification sections:
 - a. W14, PVC Pipe.
 - b. W18, Horizontal Directional Drill Installation.

2.0 MATERIALS. Only materials approved by the Stark County Metropolitan Sewer District may be used for this project.

A. Pipe.

1. Ductile iron pipe shall follow Item W11, Ductile Iron Pipe and Fittings.
2. PVC pipe shall follow Item W14 PVC Pipe.

B. Fittings.

1. All fittings shall be standard ductile iron mechanical joint fittings, following Item W11 Ductile Iron Pipe and Fittings.

C. Mechanical Joint Restraint System.

1. Mechanical joint restraint system shall follow Item W-11 Ductile Iron Pipe and Fittings.
2. Mechanical joints shall be provided within the required lengths of each main line fitting as indicated on the detailed Drawings.
 - a. If during construction, there is a need to revise the locations of main line fittings, then the Contractor shall request adjusted restrained joint lengths from the engineer.
 - b. It is understood that this requirement is satisfied when using a combination of either Fusible PVC pipe, TR Flex DIP, or Flexring DIP and the mechanical joint restraints listed above.

3.0 EXECUTION. The Contractor shall provide all laborer, materials, equipment, and tools necessary to provide and install the water main and fittings in the locations as shown on all detailed Drawings and specified as below. **The Contractor has the discretion to install the water main by open-cut, horizontal directional drilling, or a combination thereof, unless otherwise noted.**

A. Open Cut Installation.

1. Follow Item W15 Open-Cut Pipe Installation.

B. Horizontal Directional Drilling.

1. Follow Item W18 Horizontal Directional Drill Installation.

C. Watermains Relative to Sewers.

1. When the horizontal separation, measured edge to edge, of the watermain and sewer line (storm or sanitary) is less than 10 feet, the vertical separation between the top (crown) of the sewer line and the bottom (invert) of the watermain shall be at least 18 inches.

D. Maintenance of Existing Ditches and Pavement.

1. The contractor shall use the utmost care in maintaining ditches and other waterways, and, if either bottoms or banks of such ditches are disturbed, they shall be promptly restored and maintained for the life of the guaranty period.
2. Similar care shall be used in preventing damage to existing paving by caving of trench walls and undermining such paving.
3. If paving is damaged, the Contractor shall repair same at his own expense.

E. Clearing Site and Restoration.

1. Upon completion of the backfill work, the contractor shall immediately remove and dispose of all surplus materials including dirt and rubbish.
2. Unless otherwise called for on the plans, the Contractor shall replace all pavement, sidewalks, sod, or other surfaces disturbed to a condition equal to that existing before the work was started, furnishing all materials, labor, equipment, etc., at no additional cost to the Owner.
3. All restoration of lawns shall be performed in accordance with these specifications as a part of performing the work as specified herein.
4. All restoration of driveways, sidewalks, roadways, and shoulders (berms) shall be in accordance with these specifications as a part of performing the work as specified herein.
5. Upon completion of the foregoing work, all tools, equipment, and other property belonging to the Contractor shall be removed, and the site shall be left in at least as similar condition as what preceded the start of construction.

4.0 ELECTRICAL. This section is not applicable.

5.0 QUALITY ASSURANCE. The work covered under this section of the Specification is intended to be the work, materials, labor, and equipment required to install the water main as described above. All material used on this project shall be new and unused unless otherwise specified and all workmanship shall be of the best quality. Only qualified and skilled workmen/women shall be employed for all phases of this project. All workmen/women shall be trained in trench safety.

A. Testing.

1. Hydrostatic leakage testing shall be used to test the waterline.
2. The contractor shall follow all guidelines in Appendix 'D' of this Item.
3. **Under no circumstances shall air testing be performed on plastic pipe or any portion thereof.**

B. Disinfection.

1. Disinfecting water mains shall be in accordance with AWWA C651 Specifications, Disinfecting Water Mains, and as detailed below.

2. The Continuous-Feed Method, AWWA C651, Sec. 5.2, shall be used to disinfect all new water mains, unless approved for other AWWA methods by the Engineer.
 - a. The other methods that can be used with the approval of the Engineer are the Tablet Method, AWWA C651 Sec. 5.1, and the Slug Method, AWWA C651 Sec. 5.3.
3. Continuous-Feed Method: Prior to disinfection, all pipeline construction shall be flushed to remove any foreign material.
 - a. Flushing shall be performed after completion and approval of the leakage tests.
 - b. The minimum requirements for flushing are as follows:

TABLE 1	
NOMINAL DIAMETER (INCHES)	MINIMUM GPM REQUIRED
8"	400
10"	600
12"	900

- c. Flushing at these rates shall be continued for at least five (5) minutes.
 - i. In the event the foregoing requirements cannot be met due to the Owner's facilities being inadequate, alternate rate(s) and duration(s) of flushing shall be as directed by the Engineer.
 - d. The following disinfectants may be used: Calcium hypochlorite (HTH, etc.) Disinfectant shall be applied at one extremity of a pipe section via a corporation stop (installed in the top of the pipe).
 - e. The rate of applying the disinfectant shall provide at least 25 ppm (mg per liter) chloride dose at the outlet end of the line section being treated.
 - f. The disinfecting period shall be twenty-four (24) hours, and, at the end of this period, a chlorine residual of at least 10 mg per liter shall exist at the outlet end of the line.
 - i. In the event of unfavorable or unsanitary conditions of installation, poor packing or high pH, the period of disinfectant may be extended.
 - ii. The shorter periods of disinfection, higher dosages shall be required.
4. If the foregoing disinfection procedure fails to provide thorough disinfection of the line, it shall be repeated as necessary.
5. Tests for adequacy of sterilization shall be made by the Engineer, and repeated sterilization shall be carried out by the Contractor when required.
6. Sterilizing water shall be disposed of in a satisfactory manner by the Contractor.
 - a. No direct discharges of disinfection waters will be allowed to storm sewers or streams without removing the chlorine residual by proper dilution or chemical means.
7. Contractor shall provide all disinfectants and disinfection equipment.
8. The Contractor shall be charged for all water to be used/wasted in conjunction with this project, including but not limited to, water required for sterilization and disinfection flushing.

- a. The contractor shall be charged the current rate for this water.
- b. The minimum weekly charge for water used will be \$100.
- c. All water wasted for disinfection shall be measured using hydrant meters.
- d. The Engineer will supply two (2) meters for use on this project by the Contractor.

C. Observation.

1. SCMSD designated representative will visually observe the work performed. The representative will notify the Engineer of any discrepancies with the contract documents in the course of the contractor performing the work. The progress observations by the SCMSD do not waive any rights or remedies, nor divest the Contractor of any responsibility for contract compliance or liability for damage.

D. Warranty.

1. The Contractor shall guarantee all materials and workmanship for a period of one (1) year from the acceptance of the water main after successfully passing all testing requirements above.
2. The Contractor, at their costs, shall be responsible to repair any defects or failures, due to workmanship reported to the Contractor after the testing procedures and/or within the one (1) year warranty period.
3. All repairs shall be made within one (1) week of notification of said defect/failure.
4. In addition to the one (1) year warranty as specified above the Contractor shall provide a two (2) year maintenance bond on the entire system equal to the amount of the Contract.

6.0 MEASUREMENT. The number of lineal feet of water main to be measured for payment under other items shall be the actual length of water main constructed as measured along the center line of the pipe. Such measurement shall include fittings, valves, tees, etc.

7.0 PAYMENT. The cost for all labor, equipment, tools and any other necessary or incidental work herein shall be included in other applicable material items.

END OF SECTION