

ITEM W15

OPEN-CUT PIPE INSTALLATION

1.0 DESCRIPTION. This specification covers the requirements for furnishing all labor, equipment, and materials associated with the installation of watermain pipe by open-cut method. The watermain pipe may be PVC pipe or ductile iron pipe as specified herein.

2.0 SUBMITTALS. The contractor shall submit the following information:

A. Reference Standards. This section is not applicable.

B. Shop Drawings.

1. All shop drawings submitted electronically for review and approval shall be returned within two weeks either approved or marked up for further design.
2. After examination of such drawings by the Engineer and the return thereof, the Contractor shall make such correction to the shop drawings as have been indicated and shall furnish the Engineer with electronic corrections.
3. Shop drawings shall be complete in details and indicate all materials as specified herein.
4. Manufacturer's catalog or general web-site information will not be sufficient to fulfill shop-drawing requirements.
5. Pipe and appurtenances:
 - a. Refer to material specifications W11- Ductile Iron Pipe and Fittings, or W14- PVC Pipe, for applicable items.
6. Prior to beginning work, the Contractor must submit to the Engineer a general Work Plan outlining the procedure and schedule to be used to execute the project.
 - a. The Plan should document the thoughtful planning required to successfully complete the project.

C. Calculations. This section is not applicable.

D. Certifications. This section is not applicable.

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

A. Pipe and Appurtenances.

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

4.0 EXECUTION. The Contractor shall provide all labor, materials, equipment, and tools necessary to provide and install the water main as shown on all detailed Drawings and specified as below.

A. General Installation.

1. Installation of pipe, fittings, and appurtenances shall be in accordance with the trench excavation and backfill specifications Items 1, 6, and 7 and the details in the contract Drawings.

B. Polyethylene Tape Marker Installation.

1. The Contractor shall install during backfill operation 3" wide printed polyethylene, blue "WATER" tape above the bedding material, three (3) feet above the crown of the pipe.

C. Tracer Wire Installation.

1. Installation of the tracer wire shall be such that it allows for proper access for connecting tracer equipment and proper locating of wire without loss or deterioration of the low frequency (512Hz) signal for distances in excess of 1,000 linear feet, without distortion of signal caused by multiple wires installed in close proximity to one another.
2. The tracer wire and duplicate tracer wire shall be affixed to the top and side of the pipe respectively to assure proper placement and operation during and after the installation.
3. The wire shall be laid flat against the pipe and secured with a non-adhesive water proof silicone tape or tied to the pipe at a maximum of five (5') intervals.
4. No looping or coiling of the tracer wire shall be permitted.
5. All wire, connectors, terminations and access points, splicing, grounding, installation, and testing practices shall be submitted to the engineer for approval.

D. Polyethylene Encasement Installation (for ductile iron).

1. Contractor shall remove all lumps of clay, mud, cinders, etc. on the pipe surface before installation of the polyethylene encasement.
2. During installation, soil or embedment material shall not be trapped between the pipe and the polyethylene.
3. Sufficient slack shall be provided in contouring to prevent stretching the polyethylene where it bridges irregular surfaces, such as bell-spigot interfaces, bolted joints, or fittings and to prevent damage to the polyethylene caused by backfilling operations.
 - a. Overlaps shall be secured with adhesive tape.
4. The initial length of pipe will require the polyethylene tube to be securely attached to the spigot end of the pipe barrel using an appropriate tape.
 - a. The tape should be applied directly, attaching the polyethylene to the barrel of the pipe.
 - b. Several circumferential wraps of tape should be provided to secure the encasement along the length of pipe.

- c. This will help control any tendency for drilling fluids or cuttings to get under the polyethylene tube.
 - d. When applying polyethylene encasement to the assembled joint, the polyethylene overlap should be placed so that the forward pipe's polyethylene tube overlaps the polyethylene installed on the next adjacent pipe.
 - e. This is to ensure that drilling fluid and cuttings are not forced under the polyethylene tube during the pull-back.
5. Installation on ductile iron pipes shall be in accordance with methods A or B as specified in AWWA-C105 and below:
- a. Method A:
 - i. Cut polyethylene tube to a length approximately 2 feet longer than the pipe section.
 - ii. Slip the tube around the pipe, centering it to provide 1-foot overlay on each adjacent pipe section and bunching it accordion-fashion lengthwise until it clears the pipe ends.
 - iii. Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe.
 - iv. A shallow bell hole must be made at the joints to facilitate installation of the polyethylene tube.
 - v. After assembling the pipe joint, make the overlap of the polyethylene tube.
 - vi. Pull the bunched polyethylene from the preceding length of pipe, slip it over the length of the new length of pipe, and secure it in place.
 - vii. Then slip the end of the polyethylene from the new pipe section over the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe.
 - viii. Secure the overlap in place.
 - ix. Take up the slack along the barrel of the pipe, securing the fold at quarter points.
 - x. Proceed to the next section of pipe in the same manner.
 - b. Method B:
 - i. Cut polyethylene tube to a length approximately 1 foot shorter than that of the pipe section.
 - ii. Slip the tube around the pipe, centering it to provide 6-inch of bare pipe at each end.
 - iii. Take up the slack width at the top to the pipe for a snug but not tight fit along the barrel of the pipe securing the fold at quarter points.
 - iv. Secure the ends with polyethylene tape.
 - v. Before making up a joint, slip a 3-foot length of polyethylene tube over the end of the preceding pipe section, bunching it accordion-fashion lengthwise.
 - vi. Alternatively, place a 3-foot length of polyethylene sheet in the trench under the joint to be made.
 - vii. After completing the joint, pull the 3-foot length of polyethylene over or around the joint, overlapping the polyethylene previously installed on each adjacent section of pipe by at least 1-foot.
 - viii. Make each end snug and secure with polyethylene tape.

- ix. A shallow bell hole is necessary and shall be made at joints to facilitate the installation of the polyethylene tube or sheet.
- 6. Care shall be taken when installing backfill to prevent damage to the wrapping.
- 7. Repair cuts, tears, punctures, or damage to polyethylene with adhesive tape or with a short length of polyethylene sheet, or with a tube cut open, wrapped around the pipe to cover the damaged area, and secured in place.
- 8. Where polyethylene wrapped pipe joins an adjacent pipe that is not wrapped, extend the polyethylene wrap to cover the adjacent pipe for a distance of at least 3 foot.
 - a. Secure the end with circumferential turns of adhesive tape.

5.0 ELECTRICAL. This section is not applicable.

6.0 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. Refer to Item W-34, Water Line Construction, for testing and disinfection requirements.
- 2. Upon completion of installation, the trace wire system shall be tested for system integrity.
 - a. Continuity testing in lieu of actual line testing shall not be allowed.
 - b. Contractor shall be responsible to repair or replace any system failures discovered at this time at no additional cost to the County.

B. 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.

C. Warranty.

- 1. Refer to Item W34- Water Line Construction, for warranty requirements.
- 2. Tracer wire manufacturer shall provide a five (5) year corrosion resistant study or a three (3) year material and replacement warranty.

7.0 MEASUREMENT. This section is not applicable.

8.0 PAYMENT. The unit pricing shall be as stipulated in respective material items and shall include all items specified, installed for a complete water main in accordance with all contract requirements.

END OF SECTION