

ITEM 921

SANITARY SEWER LINES

- 921.1 Description. This section shall govern the provisions for furnishing all materials, equipment, superintendence, labor and performance of all operations in connection with the installation of all sanitary sewer lines and subsequent backfilling and testing as specified herein.
- 921.2 Related Work Specified Elsewhere.
- A. Manholes shall conform with requirements specified in the Technical Specification "Sanitary Sewer Manhole".
 - B. Trench shoring shall conform with the requirements specified in the Technical Specification "Trench Safety System".
 - C. Testing of sanitary sewer lines shall conform with the requirements specified in the Technical Specification "Sanitary Sewer Line and Manhole Testing".
- 921.3 Materials. Polyvinyl Chloride (PVC) Pipe: All PVC pipe provided for gravity sewer line shall be new and shall conform to the requirements of ASTM Specification D3034 and shall have a minimum standard dimensional ratio of SDR26. All PVC pipe provided for force main application shall conform to the requirements of ASTM Specification D2241 and shall have a minimum standard dimensional ratio of SDR26. The size shall conform to that as indicated on the drawings and in the proposal. All PVC pipe shall have factory applied, integral bell gasketed joints, material conforming to ASTM Specification D3139 and F477.
- 921.4 Construction Methods.
- General: All pipe delivered to the job site, the contractor shall exercise precautions in unloading, handling, and storing of such pipes as per instructions of the Manufacturer's recommendations.
- All material furnished by the contractor shall be delivered and distributed at the job site opposite or near the place where it is to be laid in the trench. Pipe shall be unloaded by use of mechanical equipment in such a manner as to prevent damage to the pipe. The pipe materials having cracks or flaws or other defects will be rejected and shall be promptly removed from the site.
- Trench Condition: Trench excavation shall consist of removal of material necessary to excavate the pipe trench in locations and depths indicated on the plans.
- Where sides of trenches are unstable or of soft material or 5 feet or more in depth, the trench shall be shored, sheeted, braced, sloped, or otherwise supported by means of sufficient strength to protect the employees working

within them. Minimum requirements for trench timbering shall be in accordance with the Technical Specification "Trench Safety System".

Pipe shall not be laid in water or when trench or weather conditions are unsuitable for such work. It shall be the contractor's full responsibility for the diversion of drainage and dewatering of trenches during construction operations of this project. Any infiltration of water from any source which enters trench during excavation and installation of pipe shall be removed.

Alignment and Grade: Construction work shall conform to the lines and grades as shown on the plans. No deviations shall be made from these lines and grades except with written consent of the Engineer. The use of batter boards, or laser, will be required to fine grade the trench and each length of pipe for its grade and alignment. Variance in grades as much as one-half inch will be cause for rejection of work. When pipe laying is not in progress, the open ends shall be plugged by approved methods.

In any case where the trench has been inadvertently over-excavated more than 6" below the bottom of the pipe or where the subgrade is soft and, in the opinion of the Engineer, will not adequately support the pipe, the trench bottom shall be corrected with thoroughly compacted materials, such as aggregate bedding material or cement stabilized sand, to the required pipe foundation grade at the contractor's expense.

All unsuitable materials shall be removed from the trench, and the trench bottom shall be made flat and cut true and even to grade so as to provide continuous contact of trench bottom with pipe. Bell holes shall be dug in trench bottom prior to lowering the pipe into the trench. These bell holes shall be large enough to allow proper connection of pipe joints and prevent bells from resting on the bottom of the holes.

Pipe Placement: All pipe laying shall begin at a manhole and proceed upgrade to the next manhole. Bell ends of the pipe shall point upstream. All pipe shall be laid directly on the trench bottom with the pipe ends lying in the bell holes so that the bells or couplings do not carry the weight of the pipe and backfill.

Proper implements, tools and equipment shall be used for placement of the pipe in the trench to prevent damage. Under no circumstances should the pipe or accessories be dropped into the trench. All foreign matter or dirt shall be removed from the pipe interior.

Lubricant of the pipe joints shall be applied as specified by the pipe manufacturer. Use only the lubricant supplied by the pipe manufacturers. Always thoroughly clean bell interior and spigot surface with a rag or a brush before applying the lubricant.

After lubrication, the pipe is ready to be joined. Good alignment of the pipe is essential for ease of assembly. Align the spigot to the bell and insert the

spigot into the bell until it contacts the gasket uniformly. Apply firm steady pressure either by hand or by bar and block assembly until the spigot easily slips through the gasket. Often a slight twisting motion applied by hand or with a strap wrench lessens the initial insertion force required to make up the joint.

The spigot end of the pipe is marked by the manufacturer to indicate the proper depth of insertion. Always make certain that this full insertion mark is within 3/8-inch of the end of the bell assembly. If undue resistance to insertion of the pipe end is encountered or the reference mark does not position properly, disassemble the joint and check the position of the gasket. If gasket is twisted or pushed out of its seat, inspect components, repair or replace damaged items, clean the components and repeat the assembly steps.

On all PVC sewer pipe, ends at manhole must have a resilient connector at each pipe entering and exiting sanitary sewer manholes in accordance with manufacturer's instructions.

When PVC pipe is installed in casings or bore holes, skids must be used to prevent damage to pipe and bell joints during installation and to provide proper long-term line support. Installation of skids shall be in compliance with the manufacturer's recommendations.

Where placement of sewer line falls within nine feet (9') of an existing water main, the sanitary sewer shall be constructed of pressure type pipe with watertight joints equivalent to those used in water main construction and as per the details as shown on the plans.

Backfill of Pipe Trenches: Backfilling of pipe trenches shall not be completed until pipe joints have been inspected and approved, and the required pressure tests have been performed. Shoring, sheeting, and bracing, if used, shall be removed before backfilling of trench.

Place and consolidate the material under the pipe haunch to provide adequate side support while avoiding both vertical and lateral displacement of the pipe. Backfill material shall be free of large lumps, clods or debris which might result in improper bedding of pipe. Backfill on each side of the pipe shall be maintained at approximately the same level as the backfilling progresses.

The backfill shall be deposited in 6-inch layers to facilitate compaction, and each layer shall be thoroughly and carefully tamped by mechanical means until the pipe has a cover of one foot. The remaining of the backfill above the one foot cover shall be applied in one (1) foot layers and mechanically tamped or by employment of flooding, jetting, or puddling for compaction.

Where sections of trench are located in improved roadways, roadway shoulders, driveway, etc., that are being used for automobile or similar traffic, or in any proposed roadways, the sewer pipe shall be backfilled to a

point within one (1) foot of the pavement subgrade with cement stabilized sand and mechanically tamped.

921.5 Testing of Lines.

General: The contractor shall provide all necessary equipment gauges and measuring devices and perform all work necessary to test installed lines in accordance with the Technical Specification "Sanitary Sewer Line and Manhole Testing". Water for tests may be obtained from Owner's water line located in the area of the job site, but it is the contractor's responsibility to make arrangements for obtaining the water and making any necessary connections at his own expense.

Deflection Test: All PVC sanitary sewer lines shall be tested for deflection after being installed for 30 days which will give ample time for the soil to consolidate around the pipe. At no time shall the deflection test be conducted sooner than 30 days or not later than 12 months after the pipe installation.

Contractor shall test all PVC sanitary sewer lines for deflection by use of a deflectometer, calibrated television, photography, or by use of a proper sized "GO, NO-GO" mandrel or sewer ball. The maximum allowable pipe deflection (reduction in vertical inside diameter) shall not exceed five (5) percent. The sewer lines must be thoroughly cleaned prior to testing.

At all locations on the sewer line that have excessive deflection greater than five (5) percent, the contractor shall uncover the sewer line and make the necessary repair to the pipe by re-bedding or replacement of the pipe. After the repair, the section shall be retested.

921.6 Measurement.

Sanitary sewer lines will be measured by the linear foot along the horizontal alignment of the pipe measured along the horizontal centerline of the trench. Measurement will be made from centerline of manhole to centerline of manhole, exclusive of pipe jacked in bored hole.

Pipe jacked in bore hole will be measured as the linear foot and size of the installed sewer in bore hole as shown on the plans.

921.7 Payment.

Sanitary sewer line will be paid for at the unit price bid per linear foot for the size of the sewer constructed at all depths which payment shall be full compensation for furnishing all materials, labor, superintendence, equipment, excavating, preparation and shaping of pipe beds, placing and adjoining of pipe, backfilling, testing, clean-up, and all incidentals necessary to complete the work in accordance with the plans and specifications.

Pipe jacked in bore hole will be paid for at the unit price bid per linear foot at the depth indicated on the plans, which payment shall be full compensation for furnishing all material, labor, superintendence, equipment, jacking of

sanitary sewer pipe in bore hole, road bore, and all incidentals necessary to complete the work in accordance with the plans and specifications.

Wye service connection will be paid for at the unit bid price per each at the depth indicated on the plans, which payment shall be full compensation for furnishing all materials, labor, superintendence, equipment, cement stabilized sand backfill, and all incidentals necessary to complete the work in accordance with the plans and specifications.

Sewer stack service connection will be paid for at the unit bid price per each at the depth indicated on the plans, which payment shall be full compensation for furnishing all materials, labor, superintendence, equipment, cement stabilized sand backfill, and all incidentals necessary to complete the work in accordance with the plans and specifications.

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