

SECTION 3

SANITARY SEWER CONSTRUCTION

GRAVITY MAINS AND FORCE MAINS

EARTHWORK

1. GENERAL: This section shall include all excavation, shoring, de-watering, filling, back-filling, and compacting as indicated on the drawings, and specified herein, and directed by the District. Provisions of this section shall apply to all pipe work within streets or public rights-of-way, and any pipe work that will be added to the District's sewer system.
2. CHARACTER OF EXCAVATION MATERIAL: Since soils vary widely within the project area, the Contractor shall satisfy himself as to the nature of material that will be encountered during the course of the project. **All excavation shall be considered unclassified regardless of the material encountered.**
3. EXISTING UNDERGROUND UTILITIES: The Contractor shall be responsible for locating all underground utilities and structures along the pipe lines to be installed in order to avoid conflict and costly repair of such utilities.
4. CONFLICTS: Where it is impossible to avoid conflict with existing utilities, the new construction shall be performed in a manner that will cause the least amount of disturbance to the existing facility. Any damage to existing facilities shall be repaired immediately according to the directions of the owner of such facilities.
5. TEMPORARY DRAINAGE: Pumping equipment shall be provided and employed to promptly remove any water that accumulates in the excavation. The area of excavation shall be limited to that which can properly be de-watered by the equipment in use. The excavation shall be maintained in a dry condition while construction is in progress. Surface water shall be diverted from the excavation by sloping the ground away from the ditch.
 - A. Disposal of Water: The water from the excavation shall be disposed of in such a manner that the natural drainage of the area shall not be disturbed. All gutters, drains, sewers, and culverts shall be kept clean for surface drainage.
6. SHORING: Shoring will be provided by the Contractor when the excavation will endanger existing structures, utilities, pavements and banks, and when necessary to protect workmen. The shoring shall be constructed of adequate size members and the arrangement of members shall be suitable to withstand the earth pressure expected. Shoring, sheeting, and bracing that is utilized above the invert of the pipe shall be removed carefully during the back-filling process in order to prevent caving that might displace the pipe from the correct line and grade. When and where directed by the Engineer, sheeting may be left in place in the backfill with adequate braces to

provide lateral support. The Contractor shall follow all Federal Occupational Safety and Health Act requirements for any shoring.

7. EXCAVATION (General): Trenches shall be excavated by open cut to the line and grade given by the Engineer. Vertical cuts shall be used whenever possible, but in unstable soils, trenches may be sloped from the top of the excavation to a point 3.0 feet above the top of the pipe with the width of the trench from this depth to the bottom of the ditch governed by A below. The bottom 4" of the excavation shall be excavated by hand. Bell holes shall be excavated by hand to insure that the pipe is properly supported for its entire length. The Contractor shall follow all Federal Occupational Safety and Health Act requirements for any excavation.

A. Trench Width: The maximum width of the trench shall be 24" plus the outside diameter of the pipe. This width shall also apply to sloped trenches for the last 3' above the top of the proposed pipe.

B. Excavated Material: Material excavated from the ditch shall be placed (whenever possible) in piles along the side of the trench. When it is necessary to stockpile excavated material, it shall be the Contractor's responsibility to secure the stockpile areas. No excavated material shall be placed on private property without the consent of the property owner.

C. **All excavation shall be considered unclassified regardless of nature of material encountered.**

D. Whenever the bottom of the trench is unstable and does not afford a good foundation, the Contractor shall remove such part as may be necessary and replace with suitable material from the surface to make a good foundation without extra compensation.

E. Under exceptional conditions where ground water and unstable soil are such that it is not possible to obtain a suitable foundation with material on the trench bank, the Engineer will determine the method to be followed and the Contractor will be compensated for extra foundation material delivered on the trench. On account of the difficulty in determining extra labor involved, no extra compensation will be allowed for placing it, but it will be held to be included in the unit price bid per linear foot of pipe.

F. Excavation for manholes and other appurtenances shall be sufficiently large to leave at least 12" clear between their outer surfaces and in the line of the excavation or supporting timber.

G. Any unauthorized excavation below the pipe or structure shall be filled with sand, gravel, or concrete at the expense of the Contractor.

H. Where sheathing or bracing is used, no extra compensation will be allowed, except where the Engineer directs that it be left in place, in which case the Contractor will be allowed \$300 per thousand board feet measure for material so left.

I. The Contractor shall include in the unit price for laying pipe all necessary pumping and well pointing.

8. **BACKFILLING:** Back-filling shall progress as rapidly as the pipe laying and testing permits. The trench shall be back-filled with approved material free from large clods or stones. The initial backfill shall be carefully placed on both sides of the pipe at the same time and thoroughly tamped around the barrel of the pipe until enough material has been placed to provide 2' of cover above the top of the pipe. The remainder of the backfill shall be placed in well compacted, one foot layers using approved mechanical tampers. In no case shall the backfill material be placed in unequal layers on one side of the pipe that might cause pipe displacement. In existing streets, roads or alleys and under sewer lift station buildings, the backfill shall be compacted to a density of 95% as determined by ASTM A-695 using approved mechanical tampers in 6" layers to the top of the trench. The top elevation of the trench shall be graded to the original grade that existed before excavation. In no case shall material such as old pavement, curbs, bricks or blocks be placed in the backfill. Compaction shall be attained by the use of mechanical tamps only. Heavy rollers, vehicles, or other equipment shall not be used for compacting pipeline and structure backfill nor allowed to cross over completed work except at points adjudged capable of adequately protecting the pipeline. Pneumatic tamps, gasoline ram type tamps or vibrating tamps with sheepsfoot rollers will be required to meet the specifications of "Mechanical Tamp". The Contractor is responsible for having all compaction tests carried out and delivering to the District a copy of the tests results.

A. **De-watering:** De-watering, when required, shall be continued during construction including the pipe laying and the back-filling process. Adequate equipment shall be used and maintained by the Contractor to insure a dry trench.

B. **Rock Cut:** If rock is encountered in excavation, rock shall be removed to a depth of 8" below the bottom of the pipe. This 8" shall be refilled with select material.

C. **Muck:** Muck may be used in the backfill after at least 2.0 feet of approved material has been placed above the bell of the pipe. Muck shall not be used in the backfill in any street, road or alley. When it is encountered, approved backfill material shall be hauled in by the Contractor at the Contractor's expense.

D. **Sheeting:** When sheeting is removed from the backfill, all cavities shall be properly filled.

9. **EXCESS MATERIAL:** Excess material and material that is suitable for backfill shall be disposed of at sites obtained by the Contractor at the Contractor's expense.

10. **BORROW:** When the material excavated is not sufficient to meet the requirements for fill material, borrow shall be obtained by the Contractor at the Contractor's expense. Borrow material shall be approved by the District prior to placement. Borrow shall be paid for under this bid item for Select Material.