

## SECTION 10.0 DRAINAGE EXCAVATION

### 10.01 Scope of Work

This item shall consist of the necessary excavation for the trenches, drainage ditches, and drainage structures.

Excavation directly required for the installation of a storm drainage pipe or structure shall not be included in this item but shall be included in the cost of the appropriate classification of pipe or structure, complete in place.

Excavation for drainage ditches and structures shall include the removal of all material from within the excavation limits. It shall also include the construction (and the removal upon completion) of all necessary bracing, shoring, sheeting, cribbing, cofferdams, and all pumping, bailing, draining, backfilling, disposal of surplus or unsuitable material, and the excavation of stream channels.

### 10.02 Classification of Excavation

All excavation for drainage structures shall be classified as solid rock excavation drainage, unclassified drainage excavation, or unclassified drainage excavation unsuitable materials.

#### (a) Solid Rock Excavation Drainage

Solid rock excavation drainage shall include all hard rock found in place and all ledge rock, hard slate, hard sandstone, or all boulders or fragments of rock greater than one-half cubic yard in volume which, in the opinion of the City Engineer, can only be removed by blasting or by use of heavy machines. The contractor shall secure all required local permits and all blasting operations shall be conducted in strict accordance with existing ordinances and regulations relative to the storage and use of explosives. Blasting shall be done only by experienced men and extreme care and precaution shall be used by the contractor to prevent injury to any existing pipes, mains, wires, poles, drains, buildings or other structures, either above or below the surface of the ground. The contractor shall save the City harmless for any and all claims for damages caused by such blasting.

(G) The contractor shall notify the City Engineer after all the earth has been stripped from the rock surface and prior to any blasting or removal of the rock surface. The contractor shall allow the City time

to take any cross-sections necessary to determine the quantity of rock excavation. Failure to allow sufficient time on the part of the contractor shall result in such excavation being classified as unclassified structural excavation and no extra payment will be allowed for the rock excavation.

Rock shall be excavated six inches (6") below the bottom of the pipe and hubs, and this depth shall be refilled with suitable materials and thoroughly tamped. The contractor in all cases of blasting shall cover the rock with a rope mat or some other suitable material to prevent pieces of rock from getting out of the ditch site.

(G) Solid rock excavation in trenching shall be measured by the average-end area method. Only rock actually excavated will be paid for and no rock which is excavated wider than one (1) foot on each side of the outside diameter of the pipe or brick work will be allowed.

(b) Classified Drainage Excavation - Unsuitable Material

Unclassified drainage excavation - unsuitable materials shall consist of all material within the limits of the drainage construction limits which has been condemned by the City Engineer as being unfit for subgrade or backfill material. This material shall extend from a horizontal plane one foot below the invert elevation of the drainage structure or one foot below the subgrade elevation of the drainage ditch downward to a depth as required by the City Engineer.

(c) Unclassified Drainage Excavation

Unclassified drainage excavation shall be all authorized excavation other than those specified above and other than such excavation directly required for the laying or construction of a drainage structure.

10.03 Preparation of Trench

The trench shall be excavated to the proper depth to permit installation of pipe along the lines and grades shown on the contract drawings. The trench width at the top of the pipe shall be as narrow as possible, but will vary with and depend upon the depth of trench and the nature of the excavated material encountered, but in any case shall be of ample width to permit the pipe to be laid, jointed, and the backfill to be placed and compacted properly.

Unless otherwise permitted by the Engineer, the trench shall have a flat bottom conforming to the grade to which the pipe is to be laid. The pipe shall be laid upon solid soil cut true and even, so that the barrel of the pipe shall have a bearing for its full entire length. A laying square shall be used to insure proper and uniform trench grade. Part of the trench excavated below grade shall be corrected with approved material, thoroughly compacted. The use of blocks for the purpose of supporting pipe and fittings shall not be permitted. Bell holes, where required, of ample dimensions shall be dug in trenches at each joint to permit the joint to be made properly.

Where excavation is in solid rock, the rock shall be removed to a depth of at least six inches (6") below grade. Before laying pipe the trench shall be rebuilt to grade with earth, sand, gravel or other suitable material, firmly compacted to provide proper bedding for the pipe. The contractor shall be responsible for damage to adjoining structures whether or not shown on the plans and special precaution shall be observed whenever blasting is required.

(G) Extra compensation will be allowed for solid rock excavation in open cut trenches as herein specified.

The contractor shall provide at all times safe conditions for trench excavation in accordance to latest OSHA requirements. All slopes and safety devices ( including shoring, trench boxes, ladders, etc. ) shall be as per the latest OSHA requirements. See Section 2.26 for Superintendence and Competent Person requirements.

See, including but not limited to, Section 13.17 and 15.00 for trench requirements.

#### 10.04 Backfilling Pipe Trenches

As the pipe line is laid it shall be firmly bedded with suitable material on each side and thoroughly tamped on each side of and underneath the pipe. As soon as practical after the pipe has been laid and jointed, the trench shall be backfilled with select material and thoroughly tamped in six inch (6") layers to a depth of one foot (1') over the top of the pipe. Extreme care shall be exercised in backfilling and tamping to prevent damage to the newly made pipe joints and to the pipe itself. The trench shall then be backfilled with select materials, free of large stones, in six inch (6") horizontal layers and thoroughly compacted.

When the pipe is located in streets, roads, and driveways, the backfill shall be compacted as specified in Section 6.03, Paragraph (2).

10.05 (G) Payment for Excavation

(G) Payment for rock excavation shall be paid for at the contract unit price for solid rock excavation drainage. Payment shall be based on the actual cubic yards of rock removed as determined by field cross-sections and by the average-end-area method.

(G) Payment for unclassified drainage excavation (unsuitable material) shall be paid for at the appropriate contract unit price, except where such excavation is directly required for the installation of a storm drainage structure or pipe. Such excavation shall be included in the cost per linear foot of the appropriate size pipe or the cost per structure.

10.06 OSHA Requirements

The contractor is expected to conform to and utilize the latest OSHA safety standards. Any conflict with the OSHA standards and those of the City shall be brought to the City Engineer prior to construction and work shall not begin until the difference has been resolved.