

Section 600

Trench Excavation and Backfill for Utilities

601.0 DESCRIPTION

Trench excavation and backfill for utilities shall be performed in accordance with the provisions of the latest published edition of the MnDOT Standard Specifications and the City Engineers Association of Minnesota Standard Specifications, 2023 Edition, except as modified herein.

602.0 MATERIALS

602.1 GRANULAR MATERIALS

Recycled material shall not be used within six (12) inches of pipe.

602.2 INSULATION

Insulation shall be equal to Dow Chemical Company STYROFOAM HI brand plastic foam installed in accordance with the manufacturer's recommendations and at a minimum of four (4) inches total thickness.

603.0 CONSTRUCTION REQUIREMENTS

603.1 TRENCH EXCAVATION

When excavation is encountered that is unsuitable for backfill, it shall be removed as directed by the Engineer.

Braced and sheeted trenches shall be put in place and maintained as may be required to support the side of the excavated trench and to prevent any movement that may in any way endanger personnel or delay the work or endanger adjacent buildings or other structures. Where sheeting and bracing are used, the trench width shall be increased accordingly. Trench sheeting shall remain in place until pipe has been laid, tested for defects and repaired if necessary, and the earth around it compacted to a depth of 12 inches over the top of the pipe. It shall be the Contractor's responsibility for compliance therein.

Faulty grade of the trench below grade lines shall be corrected with approved material thoroughly compacted without additional compensation to the Contractor.

Loose rock excavation shall include all stratified rock, sandstone, cemented gravel, shale and boulders not otherwise defined as solid rock, regardless of how removed.

Trench water shall be drained or pumped from the trench into natural drainage channels or storm sewers and shall be considered incidental to construction. All water discharged to a natural drainage channel or storm sewer must not contain sediment or it must have pretreatment to remove the sediment prior to discharge. Draining trench water into sanitary sewers will not be permitted without a dewatering permit from the City and from the Metropolitan Council.

Unless otherwise specified on the plans, all pipes will be placed in a flat-bottom trench with tamped backfill. The sides of the trench shall slope back to provide a stable slope for the particular type of soil in the trench.

603.2 PREPARATION OF SOIL DURING PIPE LAYING

Construction debris, such as concrete curb and bituminous, shall not be deposited into the trench.

At the time of pipe placement, the bedding conditions shall be such as to provide uniform and continuous support for the pipe between bell holes. Bell holes shall be excavated as necessary to make the joint connections, but they shall be no larger than would be adequate. No pipe material shall be laid in water or when the trench or bedding conditions are otherwise unsuitable or improper.

If trench bottom conditions are encountered that appear to require stabilization, the Engineer shall be informed. The trench conditions shall be examined by the Engineer to determine the nature of such instability, employing the services of a testing laboratory if necessary. If it is determined that the trench bottom cannot support the pipe, a further depth and/or width shall be excavated and refilled to the pipe foundation grade with granular foundation material and thoroughly compacted.

If the examination by the Engineer reveals that the previously described conditions are caused by the Contractor's manipulation of the soils in the presence of excessive moisture or lack of proper dewatering, the Contractor shall take such steps as are necessary to stabilize the trench bottom, including the use of pipe support material and improved dewatering methods. In such case, the cost of measures necessary shall be borne by the Contractor.

Granular bedding material will be placed below the midpoint of the pipe, prior to pipe installation, to facilitate proper shaping and achieve uniform pipe support, using hand compaction methods.

Backfilling shall not take place at any time unless approved compaction equipment is available at the site.

Ledge rock, boulders and large stones shall be removed to provide a clearance of at least 6 inches below outside barrel of the pipe, or fittings, and to a clear width of 6 inches on each side of all pipe and appurtenances for pipe 16 inches or less in diameter; for pipes larger than 16 inches, a clearance of nine (9) inches below and clear width of nine (9) inches on each side of inside diameter of pipe shall be provided. Adequate clearance for properly jointing pipe laid in rock trenches shall be provided at bell holes.

Excavations below subgrade in rock or in boulders shall be refilled to subgrade with material approved by the Engineer or his representative and thoroughly compacted.

Where trench excavation is encountered which is unsuitable for backfill, such material shall be replaced with granular backfill to be supplied by the Contractor at the direction of the Engineer.

Where pipes are of sufficient size to create an excess of backfill material, the excess shall become property of the Contractor. Hauling, grading, and removal of the excess backfill will be considered incidental to the project.

Any deficiency in the quantity of material necessary for backfilling trenches and depressions caused by settlement shall be supplied by the Contractor with no extra compensation allowed. Any settlement that occurs within one year after final acceptance shall be refilled by the Contractor with material supplied at the Contractor's expense and with material approved by the Engineer.

Backfill in trenches on streets shall be placed to an elevation that will permit the placement of base material and surfacing material.

603.3 COMPACTION OF BACKFILL

All backfill shall be compacted as required by the specified density method. All trenches shall be compacted in maximum 12 inch lifts. The required density of trench backfill shall be 95% of Standard Proctor except that the top three (3) feet shall be compacted to 100% of Standard Proctor.

603.4 DISPOSAL OF EXCESS MATERIAL

All excess subgrade material not wanted by the City will be the property of the Contractor, and the Contractor shall be responsible for removal and disposal. Removal of excess or deleterious materials shall be incidental to Excavation with no compensation except as specified in the Bid.

603.5 INSULATION

Insulation shall be placed between storm sewer or storm sewer structures and the watermain or service pipe as shown on the Drawings or as directed by Engineer. Prior to placement of the insulation, Granular Material (MnDOT 3149) shall be leveled and compacted until there is no further visual evidence of increased consolidation or the density of the compacted layer conforms to the density requirements specified in the Special Conditions, then leveled and lightly scarified to a depth of one-half (1/2) inch. Granular material placed above and below the insulation shall be free of rock or stone fragments measuring 1 1/2 inches or greater.

The insulation shall be placed in two layers, each layer 2 inches thick, with the joints in the upper layer offset one-half (1/2) board width from the lower layer. The insulation shall be held in place to prevent movement during backfill. Boards shall be placed with tight joints. No continuous joints or seams shall be placed directly over the pipe.

Construct one layer of one-half (1/2) inch CDX plywood over insulation prior to backfilling.

The first layer of material placed over the insulation shall be 6 inches in depth, free of rock or stone fragments measuring 1 1/2 inches or greater. The material shall be placed in such a manner that construction equipment does not operate directly on the insulation and shall be compacted with equipment that exerts a contract pressure of less than 80 psi. The first layer shall be compacted to conform to the density requirements specified in Section 603.

The actual depth, thickness, width and length to be insulated shall be determined in the field by the Engineer, Project Representative or as noted in the Drawings.

603.6 TESTING

All testing of materials and densities in this section as directed by the Engineer shall be taken by the Engineer or an independent testing laboratory. Cost of these tests shall be paid by the Owner, except that any retesting of areas that fail to meet specifications shall be paid by the Contractor.

604.0 METHOD OF MEASUREMENT

All items will be measured separately according to design designation as indicated in the pay item name and as may be detailed and defined in the Drawings, Specifications, or Special Conditions.

604.1 GRANULAR MATERIALS

Unless otherwise specified, volume will be determined by compacted volume.

605.0 BASIS OF PAYMENT

All costs of excavating to foundation grade, preparing the foundation, placing and compacting backfill materials, and other work necessary for prosecution and completion of the work as specified, shall be included for payment as part of the pipe and pipe appurtenance items without any direct compensation being made.