

CHAPTER 3.06 EXCAVATION AND BACKFILL FOR PIPELINES

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3.06.005 GENERAL. The work covered by this Chapter consists of furnishing all labor, tools, materials, equipment, and in performing all operations in connection with the Excavation, Trenching, and Backfilling for underground pipelines and appurtenances.

3.06.010 CONTROL OF GROUNDWATER. Trenches shall be kept free from water during excavation, fine grading, pipe laying and jointing, and pipe embedment operations in an adequate and acceptable manner. Where the trench bottom is mucky or otherwise unstable because of the presence of groundwater, and in all cases where the static groundwater elevation is above the bottom of any trench or bell hole excavation, such groundwater shall be lowered to the extent necessary to keep the trench free from water and the trench bottom stable when the work within the trench is in progress. The discharge from trench dewatering shall be conducted to natural drainage channels, gutters, or drains. Surface water shall be prevented from entering trenches.

3.06.015 EXCAVATION FOR PIPELINES. Excavation for pipelines shall follow lines parallel to and equidistant from the location of the pipe centerline. Trenches shall be excavated to the depths and widths required to accommodate the construction of the pipelines, as follows:

A. Except in ledge rock, cobble rock, stones, or water-saturated earth, mechanical excavation of trenches shall not extend below an elevation four (4) inches above the bottom of the pipe after placement in its final position. All additional excavation necessary for preparation of the trench bottom shall be made manually. Excavation shall not be carried below the grade shown on the Drawings. Any unauthorized excavation made below grade for any reason shall be backfilled in accordance with these Specifications.

B. Excavation for trenches in ledge rock, cobble rock, stones, mud, or other material unsatisfactory for pipe foundation shall extend to a depth of at least four (4) inches below the bottom of the pipe. A bedding of special material shall be placed and thoroughly compacted with pneumatic tampers in four (4) inch lifts to provide a smooth, stable foundation. Special foundation material shall consist of suitable earth materials free from roots, sod, or organic matter. Trench bottoms shall be hand-shaped as specified in paragraph (A) above. Where unstable earth or muck is encountered in the excavation at the grade of the pipe, a minimum of twelve (12) inches below grade will be removed and backfilled with crushed rock or gravel to provide a stable sub grade.

C. The maximum width of trench, measured at the top of the pipe, shall be as narrow as possible but not wider than twelve (12) inches on each side of sewer pipe or drainage pipe and fifteen (15) inches on each side of water pipe.

D. Excavation for pipelines under existing curb and gutter, concrete slabs or sidewalks, shall be open cut. In no case shall tunneling be allowed. At the option of the City Engineer, jacking under permanent facilities may be allowed based on his direction. Backfill of open cut areas shall be restored as specified in Section 3.06.035.

3.06.020 GRAVEL FOUNDATION FOR PIPE. Wherever the sub grade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, where water must be drained to maintain a dry trench bottom for pipe installation, and at other locations as previously defined, the sub grade shall be excavated to the specified depth and replaced with crushed rock or gravel. Gravel for pipe foundation shall be clean crushed rock or gravel conforming to the following gradation:

For all piping materials other than PVC.

<u>Screen</u>	<u>% Passing</u>
1½"	100
No. 4	5

For all PVC piping.

<u>Screen</u>	<u>% Passing</u>
1"	100
No. 4	5

A. The gravel material shall be deposited over the entire trench width in six (6) inch maximum layers; each layer shall be compacted by tamping, rolling, vibrating, spading, slicing, rodding, or by a combination of two (2) or more of these methods. In addition, the material shall be graded to produce a uniform and continuous support for the installed pipe.

3.06.025 BLASTING. Blasting will not be allowed except by special permission of the City Engineer. When the use of blasting is necessary, the Contractor shall use utmost care not to endanger life or property. The Contractor shall comply with all laws, Ordinances, and applicable safety code requirements and regulations relative to the handling, storage, and use of explosives and protection of life and property, and he/she shall be fully responsible for all damage attributable to blasting operations. Signals warning persons of danger shall be given before any blast. Suitable weighted plank coverings of timber mats shall be provided to confine all materials lifted by blasting within the limits of the excavation or trench.

A. Excessive blasting or overshooting will not be permitted, and any material outside the authorized cross section which may be shattered or loosened by blasting shall be removed at the Contractor's expense. The City Engineer shall have authority to order any method of blasting discontinued which leads to overshooting or is dangerous to the public or destructive to property or to natural features.

3.06.030 SHEETING, BRACING, AND SHORING OF EXCAVATIONS. Excavation shall be sheeted, braced, and shored as required to support the walls of the excavations to eliminate sliding and settling and as may be otherwise required to protect the workmen and existing utilities, structures, and improvements. All such sheeting, bracing, and shoring and side slopes shall comply with the requirements of the Utah State Industrial Commission and OSHA.

A. All damage resulting from lack of adequate sheeting, bracing and shoring shall be the responsibility of the Contractor, and the Contractor shall accomplish all necessary repairs or reconstruction resulting from such damage.

3.06.035 BACKFILLING. Backfill shall be carefully placed around and over pipes and shall not be permitted to fall directly on a pipe from such a height or in such a manner as to cause damage. In these specifications the process of preparing the trench bottom to receive the pipe and the backfilling on each side of the pipe to a level over the top of the pipe is defined as bedding. Bedding requirements are as defined on the Tremonton City Standard Drawings and in the Specifications for each pipe type.

A. Trench backfilling above the level of the pipe bedding shall be accomplished with imported materials and shall be free from rocks larger than eight (8) inches in diameter.

3.06.040 COMPACTION OF BACKFILL. Compacted backfill shall be placed by means of pneumatic tire rollers, or other mechanical tampers of a size and type approved by the City Engineer.

A. The backfill in all utility trenches shall be either compacted or consolidated according to the requirements of the materials being placed. Under pavements or other surface improvements the in-place density shall be a minimum of ninety (90) percent of laboratory standard maximum dry density, as determined by AASHTO T-99. In shoulders and other areas the in-place density shall be a minimum of eighty five (85) percent of laboratory standard maximum dry density, as determined by the same laboratory method.

B. Where compaction methods are used, the material shall be placed at a moisture content such that after compaction the required relative densities will be produced; also, the material shall be placed in lifts which, prior to compaction, shall not exceed twelve (12) inches.

C. Prior to compaction each layer shall be evenly spread and moistened as approved by the City Engineer.

D. Approval of equipment, thickness of layers, moisture content, and compactive effort shall not be deemed to relieve the Contractor of the responsibility for attaining the specified minimum relative densities. The Contractor, in planning his work, shall allow sufficient time for the Contractor to make tests for relative densities for the approval of the City Engineer.