

SECTION 2.05 TRENCH EXCAVATION

2.05.01--Description: Trench excavation shall consist of the removal and satisfactory disposal of all materials, the removal of which is necessary for the proper completion of the work, to the dimensions shown on the plans or as ordered, and backfilling, all in accordance with these specifications for the following:

- 1) the construction of pipe culverts, endwalls, catch basins, drop inlets, manholes, underdrains and outlets, sewers, service pipes,
- 2) the removal of drainage structures and appurtenances beyond the limits of roadway and structure excavation,
- 3) the removal of miscellaneous items such as abandoned underground tanks, pipelines, etc.

Classification: (1)--**Trench excavation** will be allowed only for the construction of the structures and the removals definitely specified above; and no compensation will be made for any other class of excavation, as specified elsewhere herein, that may be necessary for construction or removal.

(2)--**Rock in Trench:** Rock, insofar as it applies to trench excavation, shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures, portland cement concrete pavement or base, of 0.5 m³ or more in volume, removed as indicated or directed from within the payment lines for trench excavation.

2.05.03--Construction Methods: Trench excavation shall be made in conformity with the requirements of the plans or as ordered. The Contractor shall furnish and employ such shores, braces, pumps, etc., as may be necessary for the protection of property, proper completion of the work and the safety of the public and employees of the Contractor and the Department. All bracing, etc., shall be removed when no longer required for the construction or safety of the work.

When a drainage structure is to be eliminated, it shall be completely removed and all pipes plugged with cement masonry or removed completely.

Where the plans or contract documents show that a drainage structure is to be abandoned, the structure shall be removed to a depth 600 mm below the subgrade or to the depth shown on the plan. The floor of the structure shall be broken and all pipes shall be plugged with cement masonry.

After the excavation is completed, the Contractor shall notify the Engineer; and no masonry, pipe or other material shall be placed in the excavated area until the Engineer has approved the depth of excavation and the character of the foundation material.

When backfilling is required, the material used shall be of a quality satisfactory to the Engineer and shall be free from large or frozen lumps, wood and other extraneous material. All backfill shall be placed in layers of not more than 150 mm in depth after compaction and shall be thoroughly compacted by means of mechanical rammers or vibrators or by pneumatic tampers. Hand tampers shall be used only upon written permission of the Engineer. Unless otherwise ordered by the Engineer, the backfill shall be brought to the surface of the surrounding ground and neatly graded.

All suitable material removed in making the excavation shall be used for backfill if required. All surplus or unsuitable material shall be removed and disposed of as directed. Should additional material be required for backfilling, it may be obtained from the roadway excavation or from borrow pits, gravel pits, or elsewhere as the Engineer may direct.

Each layer of backfill shall be compacted to optimum moisture content. No subsequent layer shall be placed until the specified compaction is obtained for the previous layer.

Fill placed around pipes shall be deposited on both sides to approximately the same elevation at the same time. Rock fill or stones larger than 50 mm shall not be placed closer than 600 mm from the pipes on the sides as well as the top.

No backfill shall be placed against any structure until permission shall have been given by the Engineer.

2.05.04--Method of Measurement: Except as noted below, trench excavation will be measured in its original position by taking the difference between the ground surface at the time the trench is excavated and that after the excavations are complete. Before starting any excavation, the Contractor shall notify the Engineer so that elevations and measurements of the work may be obtained. Any work done prior to such notification will not be paid for.

Trench excavation in roadway cuts shall include only that portion outside of the limits of roadway excavation and will not include open ditches.

Payment limits shall be as described hereinafter.

There will be no measurement for payment for the cost of plugging existing pipes.

Horizontal Payment Limits: Except as noted below for installations of pipe and pipe arches, fabricated from structural plates, payment lines shall be vertical for pipe culverts, pipe-arches, sewers, and service pipes, and shall be the width to which the material is actually removed, except that in no case, even though the actual excavation is wider, shall the width between payment lines be more than the following:

(a) 600 mm greater than the nominal inside diameter of circular pipe, or nominal inside span of elliptical pipe or pipe-arch for such diameters or spans of less than 750 mm.

(b) 900 mm greater than the nominal inside diameter of circular pipe or the nominal inside span of elliptical pipe or pipe-arch for such diameters or spans that are 750 mm or greater.

For pipes and pipe-arches, fabricated from structural plates specified in Subarticle M.08.01-5, payment lines shall be vertical and between the actual horizontal limits to which the material is removed except that in no case shall the width between payment lines be more than 1.2 m greater than the nominal inside diameter or nominal horizontal inside span.

For endwalls, manholes, drop inlets and catch basins, payment lines shall be vertical and 600 mm outside of the neat lines of the foundations in each direction horizontally.

In case it is necessary to excavate to a greater width than that specified above on account of the removal of existing structures, such additional excavation will be considered as trench excavation and will be measured and paid for as such.

For the removal of underground obstructions such as pipelines, tanks, drainage structures, etc., payment lines shall be vertical and 600 mm outside of the underground item measured horizontally in each direction.

If rock is encountered, the Contractor shall strip it of sufficient overlying material to allow for proper measurement and shall then notify the Engineer that the rock surface is ready for measurement. If the Contractor shall fail to give such notice, the Engineer shall presume that the measurements taken at the time he first saw the material in question will give the true quantity of excavation.

Vertical Payment Limits: Where pipe bedding is used, the lower vertical payment limit shall be as shown on the plans. There will be no direct payment for the excavation necessitated by the shaping of the bedding, but the cost shall be included in the cost per meter for the pipe culvert specified.

The upper vertical payment limit shall be that prescribed below; except, when in the opinion of the Engineer, roadway excavation cannot be made prior to or simultaneously with the trench excavation, then the upper vertical payment limit will be the surface existing at the time the trench excavation is made.

Vertical Payment Limits Other Than in Fills ; Payment lines will extend vertically from the bottom of the trench to the bottom of the roadway excavation.

If trench excavation is not located within the limits of roadway excavation, payment lines will extend vertically from the bottom of the trench to the existing ground surface.

Vertical Payment Limits in Fills : For the various drainage installations, the vertical payment lines shall extend from the bottom of the completed and accepted trench to the lowest of the following upper limits:

- a. Bottom of subbase.
- b. In the case of culverts, 300 mm above the top of the pipe.
- c. In the case of drainage structure other than culverts, 300 mm above the top of the uppermost culvert pipe placed in the structure.
- d. In the case of culvert installations transverse to the roadway extending down fill slopes, the vertical payment limit will be the depth below bottom of loam or embankment surface, as the case may be, and measured perpendicular to the bottom of the trench.

Vertical payment limits shall be as described above except that in no case shall the depth measurement used for payment be greater than that actually excavated.

If gravel fill or borrow are used for trench backfill, they will be measured in place within the payment limits described herein.

Trench excavation will not be measured for payment for resetting manholes, catch basins, drop inlets, junction boxes or utility structures and appurtenances, but the cost will be included in the payment for the specified reset item.

2.05.05--Basis of Payment: This work will be paid for at the contract unit price per cubic meter for "Trench Excavation 0 - 1.2 m Deep," "Trench Excavation 0 - 3 m Deep," "Trench Excavation 0 - 4.5 m Deep" or "Trench Excavation 0 - 6 m Deep," as the case may be.

When rock, conforming to the description given under Article 2.05.01 is encountered within the payment lines for trench excavation, its removal will be classified and paid for at the contract unit price per cubic meter for "Rock in Trench Excavation 0 - 1.2 m Deep," "Rock in Trench Excavation 0 - 3 m Deep," "Rock in Trench Excavation 0 - 4.5 m Deep," or "Rock in Trench Excavation 0 - 6 m Deep," as the case may be.

Those portions of trench excavation classified and paid for as "Rock in Trench Excavation" of the various depths will be the actual volumes of rock excavated within the payment lines at the applicable bottom depth price. Those portions of trench excavation above the rock will be the actual volume of earth excavated within the payment lines at the applicable bottom depth for rock in trench.

Where no item or items for "Rock in Trench Excavation" of applicable depth appear in the proposal and rock is encountered in trench excavation, its removal will be paid for as follows:

In trench excavation 0 - 1.2 m deep, at 500 percent of the contract unit price for "Trench Excavation 0 - 1.2 m Deep."

In trench excavation 0 - 3 m deep, at 400 percent of the contract unit price for "Trench Excavation 0 - 3 m Deep."

In trench excavation 0 - 4.5 m deep, at 300 percent of the contract unit price for "Trench Excavation 0 - 4.5 m Deep."

In trench excavation 0 to 6 m deep at 150 percent of the contract unit price for "Trench Excavation 0 - 6 m Deep."

When payment is made for trench excavation in fill, no such excavation will be classified as "Rock in Trench."

Excavation necessary for the removal of pipe culverts, or other installations, described herein, will be paid for as trench excavation at the applicable depth.

The above prices shall include all materials, tools, equipment and labor necessary to complete the excavation in conformity with the plans or as ordered. They shall also include backfilling where required and the disposal of surplus material. No additional payment will be made for shoring, bracing, pumping, bailing or for material or equipment necessary for the satisfactory completion of the work. When it becomes necessary, in the opinion of the Engineer, to install sheet piling for the support of existing facilities, pavement, utilities, or for other constraints, the sheeting items will be paid for in accordance with Section 7.13, 7.14 or 7.15.

If gravel fill or borrow are used for trench backfill, payment will be made at their respective contract unit prices, or in the absence of such items in the contract, as extra work.

There will be no direct Payment for the plugging of existing pipes, or for the breaking up of floors in drainage structures being abandoned, but the cost thereof shall be included in the contract unit prices of the drainage and excavation items.

Pay Item	Pay Unit
Trench Excavation 0-1.2 m Deep	m ³
Trench Excavation 0-3 m Deep	m ³
Trench Excavation 0-4.5 m Deep	m ³
Trench Excavation 0-6 m Deep	m ³
Rock-in-Trench Excavation 0-1.2 m Deep	m ³
Rock-in-Trench Excavation 0-3 m Deep	m ³
Rock-in-Trench Excavation 0-4.5 m Deep	m ³
Rock-in-Trench Excavation 0-6 m Deep	m ³