SECTION 2.03
STRUCTURE EXCAVATION

2.03.01--Description: With the exceptions noted below, structure excavation shall include the removal of all material of whatever nature, the removal of which is necessary for the construction of foundations of bridges, box culverts, retaining walls outside the earth excavation payment limits, and other structures shown on the plans; the placing of all necessary fill with the exception of pervious structure backfill hereinafter specified; and the wasting of excavated material which is not required for backfilling or embankment, or which is unsuitable for that purpose.

This item shall also include dewatering; the design and construction of all cofferdams and related environmental controls used in dewatering operations required for the execution of the work; the repair, reconstruction and removal of cofferdams and related environmental controls used in dewatering operations; and the removal of all obstructions necessary for the construction of cofferdams. However, dewatering and the construction of a cofferdam will not be required under any structure excavation item for any foundation or structure that has an item for "Cofferdam and Dewatering" shown on the plans and in the proposal estimate for a given location. In such instances, the provisions of Section 2.04 shall govern for the items described in 2.03.05 (b) below.

"Structure Excavation--Earth" or "Structure Excavation--Rock" are defined as follows:

1--"Structure Excavation--Earth" shall include removal of all materials, other than water or "Structure Excavation--Rock."

2--"Structure Excavation--Rock" shall include the removal of rock in definite ledge formation; boulders or portions of boulders that have a volume of 1 m^3 or greater; and masonry structures of 1 m^3 or more in volume, except retaining walls and bridge substructures, the removal of which is covered by Section 9.74.

2.03.03--Construction Methods:

1--Dimensions and Elevations of Footings: The elevations of the bottom of footings, as shown on the plans, shall be considered as approximate only; and the Engineer may order, in writing, such changes in dimensions or elevations of footings as may be necessary to secure a satisfactory foundation.

2--Preparation of Foundations: All rock or other suitable foundation material shall be cleared of all overlying material, cleaned and cut to a firm surface, either level, stepped or serrated, as directed by the Engineer. All seams shall be cleaned out and filled with concrete, mortar or grout. Any over-breakage in rock more than 150 mm below the plan grade for the bottom of the footing not authorized by the Engineer shall be replaced by the Contractor with Class "A" concrete at the Contractor's expense.

When the structure is to rest on a material other than rock, special care shall be taken not to disturb the material below the bottom of the excavation; and the final removal of the foundation material to grade shall not be made until just before the forms for concrete or masonry are placed. Any foundation material disturbed below plan grade or revised plan grade shall be dressed and compacted at the Contractor's expense. This shall not apply, however, when a granular fill foundation course is required.

3--Cofferdams: If a cofferdam is required under this item, it will be designed and constructed in accordance with the provisions of 2.04.03--1 and 3.

4--Dewatering: If a cofferdam is required under this item, dewatering will be performed in accordance with the provisions of Subarticle 2.04.03--2.

5--Inspection: After each excavation is completed, the Contractor shall notify the Engineer; and no construction shall be started until the Engineer has approved the depth of the excavation and the character of the foundation material.

6--Fill Adjacent to Structures: All spaces excavated and not occupied by the abutments, piers, other permanent work or pervious structure backfill shall be filled to the surface of the surrounding ground with suitable material. Such backfill shall be thoroughly compacted and neatly graded.

Fill placed around arches, rigid frames, box culverts and piers shall be deposited on both sides of the structure to approximately the same elevation at the same time.

Each layer of backfill shall be spread to a thickness not exceeding 150 mm in depth after compaction and shall be thoroughly compacted by the use of power rollers or other motorized vehicular equipment, by tamping with mechanical rammers or vibrators, or by pneumatic tampers. Any equipment not principally manufactured for compaction purposes or which is not in proper working order in all respects shall not be used within the area described above.

Special attention shall be given to compaction in places close to walls where motorized vehicular compaction equipment cannot reach. Within 1 m of the back face of walls and within a greater distance at angle points of walls, each layer of backfill shall be compacted by mechanical rammers, vibrators or pneumatic tampers.

The dry density of each layer of backfill after compaction shall not be less than 95 percent of the dry density for that material when tested in accordance with AASHTO T180, Method D. In conducting this test, material retained on the 19 mm sieve size shall be replaced with material retained on the 4.75 mm sieve, as noted as an option in the specifications for this test.

Adequate provision shall be made for the drainage of all fill in accordance with the provisions of the plans, or as ordered by the Engineer.

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

No fill shall be placed against any structure until the Engineer has given permission to do so, and in no case until after the permitted time for removal of forms.

2.03.04--Method of Measurement: The Contractor shall notify the Engineer before starting any excavation, so that elevations and the measurements of the excavation area may first be obtained. When ledge rock is encountered, the Contractor shall notify the Engineer and shall strip or expose the rock to such an extent that in the Engineer's opinion the necessary measurements can be taken for "Structure Excavation--Rock." If the Contractor fails to give such notice or notices, or removes any material prior to the taking of measurements, the Engineer may presume that measurements taken at the time he first saw the material in question indicates the true quantity of excavation.

Vertical payment limits will be measured for payment as follows:

1--Structure Excavation--Earth will be measured in place by taking the difference in elevation between the existing ground surface or the bottom of roadway excavation or channel excavation, whichever is lower, and the surface of the completed structure excavation at plan grade or approved revised plan grade.

Structure excavation in roadway cuts, or embankment areas where the removal of unsuitable material is indicated on the plans, shall include only the portion below the bottom of the unsuitable material or subbase, if any, or the subgrade, shoulder foundation or cut slope lines, as the case may be or as may be more specifically shown on the plans.

2--Structure Excavation--Rock will be measured in place by taking the difference in elevation between the existing ledge rock or bottom of roadway excavation or channel excavation, whichever is lower, and the bottom of the actual completed and accepted structure excavation, except that any excavation to a depth greater than 150 mm below the plan grade or revised plan grade, will not be measured for payment.

Horizontal payment limits for "Structure Excavation--Earth" and "Structure Excavation--Rock" will be measured between plumb lines 600 mm outside of the neat lines of the original foundations only, unless otherwise shown on the plans and unless the size of the footing is increased more than 600 mm in length or width (or both), in which case the area of the excavation that extends beyond the original contract payment limits, will be used for determining the additional amount of excavation.

2.03.05--Basis of Payment: Payment for this work will be made at the Contract unit price per cubic meter for:

(a) Structure Excavation--Earth (complete) or "Structure Excavation--Rock (complete)," whichever applies, in whole or in part, which price shall include all materials, tools, and equipment; all work related to cofferdams, including their design construction, dewatering, repair, removal of obstructions, and any required reconstruction; all labor necessary to complete the excavation in conformity with the requirements of the plans or as ordered by the Engineer; the preparation of foundations as described under Article 2.03.03; all necessary filling, except as otherwise provided in the Contract; and the removal of all surplus or unsuitable material resulting from the excavations. Any suitable surplus material shall be placed in the embankments, if so ordered by the Engineer, without additional compensation.

(b) "Structure Excavation--Earth (excluding Cofferdam and Dewatering)" or "Structure Excavation--Rock (excluding Cofferdam and Dewatering)," whichever applies in whole or in part, which price shall include all materials, tools, equipment and labor necessary to complete the excavations in conformity with the requirements of the plans or as ordered by the Engineer. It shall also include the preparation of foundations as described under Article 2.03.03, the necessary filling, except as otherwise provided in the Contract, and the removal of all surplus or unsuitable material resulting from the excavations. Any suitable surplus material shall be placed in the embankments, if so ordered by the Engineer, without additional compensation.

Should it become necessary to change the dimensions of the footings from those shown on the plans or to excavate below the elevation shown on the plans, payment will be made in accordance with the following provisions:

1--The length or width (or both) may be increased horizontally not more than 600 mm and the depth of excavation increase not more than 600 mm without change in the unit price as specified above.

2--If the depth of the excavation is increased more than 600 mm but not more than 3 m below the original plan grade, payment for excavation below an elevation 600 mm below the elevation shown on the plans and within the horizontal payment limits as specified above, will be at the contract unit price plus 100 percent thereof.

3--When the size of the footing is increased horizontally more than 600 mm in length or width, or both, excavation actually required outside the horizontal payment limits defined above will be paid for at the contract unit price plus l00 percent thereof.

4--In the event the depth of the excavation has to be increased to a depth greater than 3 m below the original plan elevation, the excavation actually made below the 3 m limit will be considered extra work and will be paid for in accordance with Article l.04.05.

Pay Item	Pay Unit
Structure Excavation--Earth (complete)	m^3
Structure Excavation--Rock (complete)	m^3
Structure Excavation--Earth (excluding Cofferdam and Dewatering)	m^3
Structure Excavation--Rock (excluding Cofferdam and Dewatering)	m^3