

ITEM 503 EXCAVATION FOR STRUCTURES

- 503.01 Description**
- 503.02 Classification**
- 503.03 Cofferdams and Excavation Bracing**
- 503.04 Protection for Excavation**
- 503.05 Footings in Rock**
- 503.06 Approval of Foundations**
- 503.07 Disposal of Excavated Material**
- 503.08 Backfill**
- 503.09 Method of Measurement**
- 503.10 Basis of Payment**

503.01 Description. This work consists of designing cofferdams and excavation bracing, and excavating materials not removed under other items of work that must be removed to enable construction of bridges, and other structures. Included in this work are:

- A. constructing, maintaining, and subsequently removing cofferdams and excavation bracing;
- B. dewatering and backfilling the excavation;
- C. protecting the excavation against collapse; and
- D. disposing of materials not required or suitable for backfill.

503.02 Classification. Excavation is classified as unclassified excavation, unclassified excavation including rock (or shale), or rock (or shale) excavation.

503.03 Cofferdams and Excavation Bracing. This item includes the preparation of a working drawing according to 501.05 for all cofferdams and excavation bracing and the construction, maintenance, and subsequent removal of all cofferdams and excavation bracing. A cofferdam is an enclosure within a water environment constructed to allow dewatering for the purpose of creating a dry work environment. Excavation bracing is that required to safely support the sides of excavations, embankments, adjacent buildings, tracks, or other premises.

Construct cofferdams and excavation bracing such that support members clear the top of the footings by at least 1 foot (0.3 m). If this is not practical, support members shall be structural steel and left in place. If bracing is to be left in place and the ends would not be visible when the structure is completed, burn off the steel ends flush with the concrete surface. If ends would be visible, form a 6 inch (150 mm) deep recess around the steel embedment and remove the external portion of the embedment to provide at least 3 inches (75 mm) of clearance to the finished concrete face. Completely fill the resulting recess with concrete.

Where water is not encountered, the Contractor may place excavation bracing at the plan dimension of the footing and use it as formwork for footing concrete. Leave this sheeting in place at least to the top of the footing, or properly separate it from the footing concrete so that it may be removed without damaging the concrete.

Where water is encountered, and cofferdams are necessary, construct them practically watertight before excavating below water level. Make provisions outside the footing to

503.04

drain, collect, and remove water. When placing concrete, keep the excavation dewatered until the concrete is above the prevailing water level. Effectively protect footing concrete from erosion. If using a concrete seal to stop the flow upward from the bottom of a cofferdam, place the seal below the planned footing and consider it as a part of the cofferdam. The City will not pay for a seal unless it is shown on the plans.

Unless otherwise shown in the plans, design and construct cofferdams to accommodate a water elevation 3 feet (1.0 m) above the ordinary high water mark shown on the plans. If the actual water elevation exceeds 3 feet (1.0 m) above the stated ordinary high water mark, the City will reimburse the Contractor for any resulting damage to the work protected by the cofferdam provided the Contractor has exercised normal due diligence. If the actual water elevation exceeds 3 feet (1.0 m) above the ordinary high water mark and causes a delay to the project, the City will grant the Contractor an excusable, non-compensable delay in accordance with 108.06.B.

Establish a monument upstream of all proposed cofferdams to visually monitor the water elevation in the waterway. Maintain the monument throughout the project. Provide a visual mark on the monument that identifies the required high water elevation as defined above. Ensure that the monument can be read from the bank of the waterway. Have this elevation set and certified by an Ohio Registered Surveyor.

Cofferdams may be designed and constructed to accommodate a lower water elevation; however, the City will not reimburse the Contractor for repairs to work damaged nor grant additional time unless the water elevation exceeds 3 feet (1.0 m) above the ordinary high water mark shown on the plan.

Submit any request for reimbursement for repair to work damaged or for delay to the Engineer with information substantiating that the water elevation was more than 3 feet (1.0 m) above the ordinary high water mark shown on the plans.

503.04 Protection for Excavation. Protect all excavations from caving. Do not disturb the material below the bottom of footings. Perform blasting in a manner that avoids damage to the material supporting the structure vertically or laterally and that avoids subsequent slides that damage the structure, road, or adjacent property. If the material below the bottom of footings not supported by piles is disturbed, remove it and fill the entire space with concrete at no expense to the City. Under footings supported on piles, replace and compact the over-excavated or disturbed material as the Engineer directs. If backfilling is necessary to correct caving or slides, backfill according to 503.08.

Excavation adjacent to railroad tracks are subject to the supervision of the involved railway company. Provide sufficient bracing to ensure the proper support of the roadbed and tracks.

503.05 Footings in Rock. Where rock or shale excavation is a separate pay item, fill the portion of the excavation into rock or shale that is below the top of footing with concrete.

If removing rock or shale as part of Unclassified Excavation and the footing is designed to be keyed into the bedrock, confine the excavation into bedrock for the minimum specified depth of keying within the area bounded by the outer edge of the footing. Fill excavation outside these limits and within and below the keyed depth with concrete.

503.06 Approval of Foundations. Notify the Engineer when the excavation is to be completed to the depth shown on the plans. Do not place footings until the Engineer has approved the subfoundation.

503.07 Disposal of Excavated Material. Dispose of excavated material not needed or not suitable according to 105.16 and 105.17. Use other suitable excavation material for backfill.

503.08 Backfill. Backfill all excavations made under this item with materials conforming to 203.02.R., except behind abutments and below the approach slabs use materials conforming to Item 203 Granular Material Type B. Place and compact the backfill materials according to 203.06 and 203.07, except as modified by this subsection.

Do not place backfill material against any structural element until the Engineer has approved the element.

In bridge abutment areas compact backfill material to meet the compaction requirements in 203.07. Elsewhere, compact backfill material to 95 percent of the maximum laboratory dry density.

When a test section method is used for compaction acceptance: Use compaction equipment with a total weight or a centrifugal force of least 1 ton (0.9 metric tons). Supply the manufacturers' information to verify this information. Use at least six passes to construct the production areas. Use at least 97 percent of the test section maximum dry density for acceptance of the production areas.

The Contractor does not have to place backfill material around piers that are not within the embankment area or adjacent to a roadway or a railway in thin layers or compact it, but should leave the backfill material in a neat condition with a compensating allowance made for settlement.

Backfill in front of abutments and around piers to the ground lines shown on the plans.

Backfill all structural foundation units as soon as practical after the required conditions of this subsection are met to avoid the ponding of surface water and the accumulation of debris. Simultaneously backfill in front of and behind abutments, piers, wing walls, and retaining walls.

Carefully backfill against waterproofed surfaces to avoid damage to the waterproofing material.

503.09 Method of Measurement. After the requirements of Items 201, 202, and 203 have been met, the City will measure excavation on a lump sum basis or by the number of cubic yards (cubic meters) as follows:

A. Bounded on the bottom. Bounded bottom plane of the footing, crossbeam, or wall.

B. Bounded on the top.

1. In cut sections, by the surface of the remaining ground.
2. In fill sections:

503.10

a. If excavation is performed before embankment is placed, by the surface of the original ground.

b. If excavation is performed after embankment is placed, by the surface of the embankment.

C. Bounded on the sides.

1. For Unclassified Excavation, 1 foot (0.3 m) outside the outer edge of the footing, crossbeam, or wall.

2. For Rock Excavation or Shale Excavation:

a. If Rock Excavation is included in the Contract, by the outer edge of the footing or wall.

b. If rock or shale is removed as part of Unclassified Excavation Including Rock and/or Shale:

(1) Above the minimum specified depth of keying, the same as described in 503.09.C.1.

(2) For the remainder of the excavation, the same as described in 503.09.C.2.a.

For keys below footings, the City will determine the volume of keys by the number of cubic yards (cubic meters) shown on the plans.

The City will measure Cofferdams and Excavation Bracing on a lump sum basis.

503.10 Basis of Payment.

If an Item for Cofferdams and Excavation Bracing is not included in the Contract for payment, perform work according to 503.03 and the City will pay for Cofferdams and Excavation Bracing under the contract unit price for excavation.

The elevations shown on the plans for the bottoms of footings are considered as approximate. When excavation below plan elevation for footings is required, the City will pay for the 3 feet (0.9 m) immediately below the plan elevation within the lateral limits described in 503.09.C.1 at the unit price bid for the class of excavation.

The City will consider additional excavation to a maximum depth of 1 foot (0.3 m) within the lateral limits described in 503.09 as incidental to the lump sum price. Excavation deeper than 1 foot (0.3 m) below plan elevation may be provided for as Extra Work, as described in 109.05.

If Cofferdams and Excavation Bracing is a separate pay item, the lump sum price includes any extra cost involved for cofferdams for additional depth up to 3 feet (0.9 m) below plan elevation. Excavation deeper than 3 feet (0.9 m) below plan elevation and the additional cofferdams necessitated by this excavation may be provided for as Extra Work, as described in 109.05. The Contractor shall provide additional fill material and subsequent excavation to provide the minimum cover over culverts to accommodate heavy earth moving equipment at no expense to the City.

The City will pay for accepted quantities at the contract prices as follows:

Item	Unit	Description
503	Lump Sum	Cofferdams and Excavation Bracing
503	Cubic Yard (Cubic Meter)	Unclassified Excavation
503	Lump Sum	Unclassified Excavation
503	Cubic Yard (Cubic Meter)	Unclassified Excavation Including Rock
503	Cubic Yard (Cubic Meter)	Unclassified Excavation Including Shale
503	Cubic Yard (Cubic Meter)	Unclassified Excavation Including Rock and/or Shale
503	Cubic Yard (Cubic Meter)	Rock Excavation
503	Cubic Yard (Cubic Meter)	Shale Excavation