

## SECTION 51

### STRUCTURE EXCAVATION FOR BOX CULVERTS

#### 51.1 DESCRIPTION

##### A. General

This work consists of the necessary foundation excavation for box culverts.

##### B. Related Work

Section 11 Utility Excavation and Backfill  
Section 12 Roadway and Drainage Excavation  
[Section 14 Embankment](#)  
Section 15 Disposal of Surplus Excavation and Waste  
Section 52 Box, Pipe, and Plate Culvert Undercutting

#### 51.2 MATERIALS (Not Specified)

#### 51.3 CONSTRUCTION REQUIREMENTS

##### A. Depth of Excavation

The elevation of the bottoms of footings shown on the plans, are approximate and the Engineer may order in writing such changes in elevations of footings as necessary.

##### B. Treatment of Foundation

Rock or other hard foundation material shall be free of loose material, cleaned and cut to a firm surface, and either level, stepped, or serrated.

Where concrete is to rest on an excavated surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Concrete shall not be placed until the depth of excavation has been checked and the suitability of the foundation material approved by the Engineer.

Foundation excavation may be trimmed to the exact size of the footing and the footing forms omitted, if soil conditions permit and when approved by the Engineer.

Removal of unstable material below the bedding grade of box culverts shall be performed as set forth in Section 52.

Where foundation piles are used, the excavation of each foundation bed shall be completed before the piles are driven. After the pile, driving is completed; loose and

displaced material shall be removed or compacted to a smooth solid bed at or below plan elevation.

#### C. Disposal of Excavation Material

The excavated material shall be used for backfill and embankment, disposed of as indicated on the plans, or directed by the Engineer. Excavated material shall not be placed and left in streambeds, except for the filling of holes and construction of stream control features.

#### D. Preservation of Channels

Unless otherwise specified, excavation shall not be made outside of caissons, cribs, cofferdams, steel piling or sheeting, and the natural streambed adjacent to the structure shall not be disturbed. If any excavation or dredging is done at the site of the structure before caissons, cribs, or cofferdams are in place, the Contractor shall backfill all excavations to the original ground surface or streambed with satisfactory material after the foundation is in place.

#### E. Cofferdams and Cribs

Cofferdams and cribs for foundation construction shall be carried to adequate depths and heights, be safely designed and constructed, and be made as water-tight as necessary for the proper performance of the work which must be done inside them. The interior dimensions of cofferdams and cribs shall give sufficient clearance for the construction of forms and the inspection of their interiors and permit pumping outside of the forms.

Cofferdams or cribs, which are tilted or moved laterally during the process of sinking shall be righted, reset, or enlarged to provide the necessary clearance at the expense of the Contractor.

Cofferdams or cribs shall be constructed to protect fresh concrete against damage from sudden rising of the stream and to prevent damage to the foundation by erosion. Timber or bracing shall not be left in cofferdams or cribs in such a way as to extend into the substructure concrete without written permission from the Engineer.

Cofferdams or cribs, inclusive of all sheeting and bracing, shall be removed after the completion of the substructure without disturbing or otherwise damaging the finished masonry.

#### F. Inspection

The Contractor shall notify the Engineer as soon as each excavation is completed. Concrete or piling shall not be placed until the Engineer has approved the depth and size of the excavation and the foundation material.

#### G. Backfill Above Bedding Grade

Backfill shall be compacted in accordance with the provisions of Section 14 and herein.

Spaces not occupied by abutments, piers or other permanent work shall be backfilled up to the surface of the surrounding ground, with a sufficient allowance for settlement.

Material used for backfill shall be of an acceptable quality and shall be free from large or frozen lumps, wood or other extraneous material. Backfill shall be satisfactorily compacted in horizontal layers not to exceed six (6) inches loose depth.

The slope bounding the excavation for abutments and wing walls shall be stepped or roughened to prevent wedge action of the backfill against the concrete.

Backfill placed around box culverts, walls and piers shall be deposited on both sides to approximately the same elevation at the same time.

### 51.4 METHOD OF MEASUREMENT

#### A. Excavation

Excavation for wood structures and drilled-in foundations will be measured as set forth on the plans.

The removal of water will not be considered a measurable item nor will allowance be made for duplication, sloughed material, or material removed due to mudflows.

Structure excavation will be measured by the cubic yard. The plan shown quantity will be the quantity accepted for payment. Field measurements for Structure Excavation quantities will not be made, unless the City determines that conditions warrant such measurement.

#### B. Structure Excavation, Box Culvert

When a box culvert is constructed at or above the flow line shown on the plans, the plan shown quantity of structure excavation will be the pay quantity. This quantity of excavation will be equal to the volume of concrete below the flow line.

When the Engineer orders the flow line lowered on construction, the material excavated between the plan shown flow line and the as-constructed flow line will be measured for payment as Unclassified Excavation, unless it is unstable material and must be removed by a dragline, backhoe, or similar equipment, and will be measured as "Structure Excavation, Box Culvert" and added to the plan shown quantity.

**51.5 BASIS OF PAYMENT**

When there is an item for "Structure Excavation, Box Culvert", payment will be at the contract unit price per cubic yard for "Structure Excavation, Box Culvert". When no item is provided for "Structure Excavation, Box Culvert", payment for work under this item will be made at the contract unit price per cubic yard for the various excavation items in accordance with Section 11, UTILITY EXCAVATION AND BACKFILL.

Payment will be considered full compensation for furnishing materials, labor, equipment, tools, and incidental necessary to complete the work.

**END OF SECTION**