

SECTION 207 EXCAVATION AND BACKFILLING FOR STRUCTURES

207.01 Description. This work consists of the excavation, removal, and replacement or disposal of all materials necessary for the construction of box and pipe culverts, pipe headwalls, bridge structures, bridge approach slabs, and other structures. This work also consists of placing and compacting backfill material; furnishing and placing of shoring, sheeting, bracing, and cofferdams; and dewatering of these areas, unless otherwise specified.

CONSTRUCTION METHODS.

207.02 Foundation Pits. Foundation pits shall be excavated to the depths shown on the Plans, or to such depth as required to ensure the stability of the structure to be erected, or as directed by the Engineer.

207.03 Excavation. Excavation shall be sufficient in volume to place the full widths, thicknesses, and lengths of footings. Undercutting of edges, ends, corners, and other surfaces will not be permitted. If a sump area is required to keep the excavation dry during construction, it shall be outside the footing line.

All suitable materials removed during excavation shall be used, as far as practicable, in the formation of roadway embankments, or as structure backfill if it meets the requirements of [Subsection 207.05](#). No excavated material shall be wasted without permission. Boulders, logs, structure remnants, or other obstructions shall be considered unsuitable materials. All unsuitable and excess material shall be disposed of as specified in [Subsection 106.09](#), or as directed.

When the excavation is completed, the Engineer will make an inspection of the footing area. No concrete shall be placed until the depth and character of the foundation material are approved.

207.04 Cofferdams. All sheeting and bracing shall be carried to sufficient depth to obtain, as nearly as possible, a watertight cofferdam. The cofferdam shall have ample clearance to allow inspection of the forms for the finished structure and to provide sump areas. The forms for concrete shall not be braced against the cofferdam, unless approved.

Cofferdams shall be constructed to protect new concrete against damage from flooding. Cofferdams shall be dewatered in a manner that prevents the loss of concrete materials.

Unless otherwise approved, cofferdams and cribs, including all sheeting and bracing, shall be removed by the Contractor after the completion of the substructure. No timber shall remain in finished concrete structures. Care shall be taken to avoid disturbing or damaging the finished structure during removal operations.

The Contractor shall submit detailed layout, working drawings, and calculations sealed by a Professional Engineer registered in Delaware, showing the proposed method of cofferdam construction. These drawings shall be approved before cofferdam construction begins. Approval of the Contractor's drawings will not relieve the Contractor of any responsibility for the adequacy and safety of the cofferdam construction.

207.05 Backfilling. All backfilling of structures shall conform to the requirements of [Subsection 202.05](#) (c), (d), and (e). Unless otherwise specified, all backfilling around and over structures shall be performed with material conforming to the requirements of [Subsection 209.04](#), Borrow Type C. Backfill material shall be compacted to 95% or more of the maximum density according to the requirements of [Subsection 202.05](#) (f). When backfilling next to bridges, culverts, or other structures, no heavy mechanical compacting equipment will be permitted over the structure until a minimum of 18" (450 mm) of cover has been placed.

Backfill adjacent to rigid frames, arches, timber structures, and other similar structures shall be brought up simultaneously at each abutment, so that no unbalanced stresses are introduced.

207.06 Method of Measurement. The quantity of excavation and backfilling for structures, excluding rock excavation, will be measured in cubic yards (cubic meters) based on field measurements. The volume will be computed by taking the difference in elevation between the existing ground surface, or the bottom of roadway excavation, or the bottom of channel excavation, whichever is lower, and the surface of the completed structure excavation at plan grade or at an approved revised plan grade.

Volume measurements will include, between the upper and lower limits defined above, the volume contained inside vertical planes located 18" (450 mm) outside of the neat line perimeter of the vertical faces of the footing or structural unit for which the excavation is made. Borrow Type C backfill material placed outside the 18" (450 mm) vertical planes just described will not be measured. For inclined footings or unusual foundation conditions, the method of measurement will be as described in the Contract.

The Contractor shall notify the Engineer sufficiently in advance of beginning excavation for structures, so that cross-section measurements of the existing undisturbed ground may be taken. Any material removed by the Contractor before these measurements have been taken will not be measured.

207.07 Basis of Payment. The quantity of excavation and backfilling for structures will be paid for at the Contract unit price per cubic yard (cubic meter). Price and payment will constitute full compensation for excavating suitable and unsuitable material; for hauling, storing, and final disposal of excavated material; for placing and compacting backfill; for placing sheeting and shoring; for constructing cribs and cofferdams; for dewatering; and for all labor, equipment, tools, and incidentals required to complete the work.

If directed to leave cofferdam bracing and sheeting in place, the actual cost of the materials left in place will be paid.

Borrow material for backfill will be paid for under [Section 210](#).

No payment will be made for Borrow Type C backfill material placed outside vertical planes located 18" (450 mm) outside the neat line perimeter of the vertical faces of the footing or structural unit.

Additional structure excavation, directed by the Engineer to establish the foundation below the elevation indicated on the Plans, will be paid for at the Contract unit price per cubic yard (cubic meter) plus an additional percentage corresponding to the total depth lowered, as indicated in the following table:

TABLE 207-A

Depth Lowered		Additional Percent
More Than	Not Over	
0.0ft (0.0m)	5.0ft (1.5m)	25.0
5.0ft (1.5m)	8.0ft (2.5m)	60.0
8.0ft (2.5m)	10.0ft (3.0m)	100.0

The Contract unit price plus the additional percentage shown in [Table 207-A](#) shall be accepted by the Contractor as full compensation as defined in this Subsection for excavating to depths below those shown on the Plans.

