Section 206. EXCAVATION AND BACKFILL FOR STRUCTURES

206.01. Description. This work consists of clearing, removing old structures or parts of structures, removing materials required for constructing structures, disposing of excess or unsuitable material in accordance with subsection 205.03.P, and backfilling completed structures.

206.02. Materials. Provide materials in accordance with the following:

Sound Earth	205
Granular Material Class II	902
Aggregate, 6A	902
Geosynthetics	910

A. **Bridges, Pump Stations, Retaining Walls and Culverts (other than pipe).** Provide granular material Class II for backfilling bridges, pump stations, retaining walls, and culverts other than pipe.

B. **Miscellaneous Structures.** Unless otherwise required, provide sound earth to backfill miscellaneous structures. Miscellaneous structures are structures other than bridges, pump stations, retaining walls, and culverts other than pipe.

206.03. Construction.

A. **Foundation Excavation, and Rock Foundation Excavation.** Excavate to allow for foundation unit construction. If shown on the plans or approved by the Engineer, trim the footing excavation to the exact size of the footing and omit the footing forms. For concrete placed on or against an excavated surface other than rock, do not disturb the bottom and side surfaces of the excavation before placing concrete. Excavate to the required grade immediately before concrete placement.

Before placing concrete, check the excavation depth and secure the Engineer's approval of the foundation support material. Place concrete in the absence of free-standing water. Change the elevations for the bottom of footings, as directed by the Engineer to ensure a stable foundation.

If directed by the Engineer, remove and replace unsound material under proposed structures, and replace with Department-approved material. Remove loose fragments, clean, and cut rock surface, or other hard material before placing concrete on required surface. Level, step, or serrate the surface, as directed by the Engineer.

1. **Foundation Excavation.** Excavate materials, including portions of the existing structures, within the foundation excavation limits shown on the plans, except rock foundation excavation.

2. **Rock Foundation Excavation.** Excavate boulders measuring at least ½ cubic yard and rock or cemented soil in accordance with subsection 205.03.B.

B. **Backfill Placement and Compaction.** Place and compact backfill around completed structures.

1. **Placing Backfill.** Provide material for the type of structure requiring backfill in accordance with subsection 206.02.

   If soil, excavated from the site, meets material requirements, in accordance with subsection 206.02, the Contractor may use it to backfill around completed structures.

   Do not place backfill against the concrete structure until completion of the required curing, surface finishing, and waterproofing, and the Engineer approves. Cover the inlet of each weep hole with geotextile blanket. Immediately after the Engineer approves the structure, place backfill to protect the structure.

   Place backfill evenly around the structure to equalize horizontal loadings. Backfill voids with sound earth, or another Department-approved material.

2. **Compacting Backfill.**

   a. **Bridges, Pump Stations, Retaining Walls and Culverts (other than pipe).** For bridges, pump stations, retaining walls, and culverts, other than pipe culverts, place backfill material in 6-inch layers. Compact each layer to 100 percent of the maximum unit weight in the load bearing area. The load bearing area is the area within the 1:1 slope, down and away from the outer limits of the bottom of the footing to the bottom of the excavation.

      Place backfill behind and around substructure units, between the outer limits of the bottom of the footing and the surface elevation, in layers no greater than 6 inches deep. Compact backfill to at least 95 percent of the maximum unit weight.

      Place backfill between the bottom of footing elevation and the bottom of slope paving subbase, in layers no greater than 6 inches deep. Compact to at least 95 percent of the maximum unit weight.

Compact granular material with a moisture content below saturation, as determined by the One Point Cone Chart in the *Density Testing and Inspection Manual*. If the material contains excess moisture, dry to the required moisture content before compacting.

b. **Miscellaneous Structures.** For miscellaneous structures, place backfill in 6-inch layers, and compact to at least 95 percent of the maximum unit weight.

The Engineer may approve an increase in the thickness of layers if the Contractor obtains the required compaction results.

206.04. Measurement and Payment.

Pay Item	**Pay Unit**
Excavation, Fdn	Cubic Yard
Excavation, Rock Fdn	Cubic Yard
Backfill, Structure, CIP	Cubic Yard
Backfill, Structure, LM	Cubic Yard
Aggregate, 6A	Cubic Yard

A. **Excavation.** The Department does not consider excavation to include removal of ice, water, or liquids. Unless otherwise required, the cost of sheeting, shoring, and dewatering is included in the unit prices for related structure excavation pay items.

1. **Excavation, Foundation.** The Engineer will base payment for **Excavation, Fdn** on plan quantity, in accordance with subsection 109.01.A. Unless otherwise shown on the plans, the Engineer will determine the plan quantities using the space bounded by the existing ground surface or exposed portions of the existing substructure, the elevation of the bottom of the foundation, and the 1:1 slopes extending outward and upward from points 18 inches outside the bottom of the footing.

   If not shown on the plans, the Department will pay for removal of piling below the bottom of footing elevations, encountered during structure excavation, as extra work.

2. **Excavation, Rock Foundation.** The Engineer will measure **Excavation, Rock Fdn** in its original position for the amount of rock excavated within vertical planes through the footing neat lines. The Engineer will make allowance for overbreak if the Engineer determines it is impractical to excavate to the neat lines of the footing. The Engineer will measure the amount of overbreak by actual cross sections of the footing excavation. Overbreak

allowance is limited to vertical planes 6 inches outside and parallel to the neat lines of the footing, and to a depth of 3 inches below the elevation of the bottom of the footing, as shown on the plans.

Rock foundation excavation does not include removal of portions of existing structures.

B. **Backfill.**

1. **Backfill, Structure, CIP.** The Engineer will base payment for **Backfill, Structure, CIP** on plan quantity, in accordance with subsection 109.01.A, regardless of the foundation excavation slope. The Engineer will not measure material placed outside the maximum pay limits shown on the plans.

   The Department will pay for granular material Class II used to backfill bridges, pump stations, retaining walls, and culverts other than pipe, as **Backfill, Structure, CIP**.

2. **Sound Earth.** The cost of sound earth used as backfill material for miscellaneous structures is included in the unit prices for related pay items.

3. **Aggregate, 6A.** The Engineer will measure **Aggregate, 6A** by volume, loose measure. The unit price for **Aggregate, 6A** includes the cost of providing, hauling, and placing material at locations directed by the Engineer.