

## **Section 2516. Removal and Construction of Retaining Walls and Steps**

### **2516.01 DESCRIPTION.**

Remove retaining walls and steps as designated, and construct new PCC retaining walls and steps according to the contract documents and the following provisions.

### **2516.02 MATERIALS.**

For construction of retaining walls and steps, meet the requirements of Division 41 for the respective materials.

### **2516.03 CONSTRUCTION.**

#### **A. Removal of Retaining Walls and Steps.**

When the contract documents indicate that retaining walls and steps are to be removed, break and remove the walls and steps designated by the Engineer according to Article 2510.03, A.

#### **B. Construction of Retaining Walls and Steps.**

Construct walls and steps to the dimensions shown in the contract documents and according to Section 2403. Unless designated otherwise, use Class C concrete as specified in Section 2403. Give exposed vertical surfaces a Class 2, strip down surface finish.

### **2516.04 METHOD OF MEASUREMENT.**

Measurement for walls and steps removed and replaced will be as follows:

#### **A. Removal of Retaining Walls and Steps.**

Cubic yards (cubic meters) shown in the contract documents, without remeasurement.

#### **B. Construction of Walls and Steps.**

Cubic yards (cubic meters) shown in the contract documents. When the quantities of concrete have been modified by direction of the Engineer, the Engineer will compute the cubic yards (cubic meters) of concrete involved in the modification and adjust the quantity accordingly.

### **2516.05 BASIS OF PAYMENT.**

Payment for retaining walls and steps removed and constructed will be the contract unit price as follows:

#### **A. Removal of Retaining Walls and Steps.**

1. Per cubic yard (cubic meters).

2. Payment is full compensation for the cost of all labor and equipment necessary to remove and haul the material according to Article 1104.08.

#### **B. Construction of Retaining Walls and Steps.**

1. Per cubic yard (cubic meter). Includes modifications ordered by the Engineer.

2. Payment is full compensation for furnishing all materials required, including all steel reinforcement specified, and all equipment and labor necessary to construct the walls and steps as specified.

## **Section 2516. Combined Concrete Sidewalk and Retaining Wall**

### **2516.01 DESCRIPTION.**

A. This section was developed in conjunction with [Section 9072 of the SUDAS Standard Specifications](#), with modifications to suit the needs of the Department.

B. Construct combined concrete sidewalk and retaining wall.

### **2516.02 MATERIALS.**

A. **Combined Concrete Sidewalk and Retaining Wall.**

**1. Portland Cement Concrete.**

Comply with [Article 2511.02, A.](#)

**2. Reinforcing Steel.**

Comply with [Section 4151.](#)

**3. Expansion Joint.**

Comply with [Article 4136.02.](#) Use resilient filler when type is not specified.

**B. Subdrain.**

Use minimum 4 inch (100 mm) diameter pipe.

**1. Polyvinyl Chloride Pipe and Fittings (Solid Wall PVC):**

- a. Comply with ASTM D 3034, minimum thickness SDR 35, 46 psi (320 kPa) minimum pipe stiffness.
- b. Use PVC plastic conforming to ASTM D 1784, Cell Classification 12454.
- c. Integral bell and spigot type rubber gasket joint complying with ASTM D 3212 and ASTM F 477.
- d. Slot subdrain pipe according to ASTM F 949 or perforate with four rows of 1/4 to 3/8 inch (6 to 9 mm) diameter holes along the bottom of pipe.

**2. Corrugated Polyvinyl Chloride Pipe and Fittings (Corrugated PVC):**

- a. Use corrugated exterior, smooth interior, PVC.
- b. Comply with ASTM F 949, minimum pipe stiffness, 46 psi (320 kPa).
- c. Use PVC plastic complying with ASTM D 1784, Cell Classification 12454.
- d. Integral bell and spigot type rubber gasket joint complying with ASTM D 3212 and ASTM F 477.
- e. Slot subdrain pipe according to ASTM F 949.

**3. Corrugated Polyethylene Tubing and Fittings (Corrugated PE):**

- a. Comply with [Article 4143.01, B, 1.](#)
- b. Use only fittings supplied or recommended by pipe manufacturer for soil tight service.

**C. Porous Backfill Material for Subdrain:**

**1. Crushed Stone or Processed Gravel.**

Comply with [Section 4131.](#)

**2. Pea Gravel.**

Comply with Gradation No. 20 or 21 of [Section 4109](#) and the quality requirements of [Section 4131.](#)

**D. Suitable Backfill Material.**

Comply with [Article 2102.02, D, 2.](#)

**E. Rodent-Proof Hardware Cloth.**

Comply with [Materials I.M. 443.01.](#)

**2516.03 CONSTRUCTION.**

**A. Excavation and Embankment.**

1. At locations where the wall will be constructed against embankment, compact to a minimum of 90% of maximum Standard Proctor Density prior to beginning wall construction.
2. Excavate to the line and grade specified in the contract documents. Minimize over-excavation. Install sheeting, shoring, or other retention systems as required to ensure the stability of the excavation.

**B. Installation.**

**1. General.**

- a. Forming the back of the wall is not required. Where the back of the wall is not formed and sloughing occurs, remove loose material, and replace with concrete at no additional cost to the Contracting Authority.
- b. Install 3 inch (75 mm) diameter weep holes at 8 foot (2.5 m) intervals. Form weep holes with an approved rustproof device backed with rodent-proof hardware cloth.
- c. Install 8 inch (200 mm) wide trench of porous backfill behind the wall. Install subdrain within porous backfill trench. Ensure positive drainage on subdrain.

**2. Backfill Material Placement.**

- a. Place suitable backfill material with adequate moisture content for compaction in maximum 8 inch (200 mm) lifts, spread, and compact.
- b. Use hand-operated compaction equipment within 3 feet (10 m) of the front of the wall face.

**C. Joints.**

1. Form ED joints in wall at no more than 60 foot (18 m) spacing. Affix expansion material to retaining wall.
2. Form C joints in the wall at no more than 20 foot (6 m) spacing.
3. Form E joints in sidewalk to coincide with ED joints in wall. Form C joints in sidewalk at spacing equal to sidewalk width.
4. Form longitudinal joint in sidewalk when sidewalk width is greater than 8 feet (2.4 m).

**D. Rustication.**

Decorative form liners or inserts may be used when forming the face of the wall with the approval of the Engineer. Form rustications as specified in the contract documents.

**2516.04 METHOD OF MEASUREMENT.**

Measurement for Combined Concrete Sidewalk and Retaining Wall will be cubic yards (cubic meters) shown in the contract documents.

**2516.05 BASIS OF PAYMENT.**

Payment for Combined Concrete Sidewalk and Retaining Wall will be the contract unit price per cubic yard (cubic meter). Payment is full compensation for:

- Excavation and foundation preparation,
- Furnishing and placing concrete and reinforcing steel,
- Joint material,
- Subdrain,
- Porous backfill material,
- Suitable backfill material,
- Finishing disturbed areas, and
- Shoring as necessary.