

**SECTION 31 05 13 - SOILS FOR EARTHWORK****PART 1 – GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Subsoil materials.
  - 2. Topsoil materials.
  
- B. Related Sections:
  - 1. Section 31 05 16 - Aggregates for Earthwork.
  - 2. Section 31 22 13 - Rough Grading.
  - 3. Section 31 23 23 - Fill.
  - 4. Section 32 91 19 - Landscape Grading.
  - 5. Section 32 92 19 - Seeding
  - 6. Section 32 93 00 - Plants.

**1.02 REFERENCES**

- A. Pennsylvania Department of Transportation (PennDOT)
  - 1. Publication 408 - Specifications, latest edition, as amended.
  
- B. American Association of State Highway and Transportation Officials:
  - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
  
- C. ASTM International:
  - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  - 3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
  - 4. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

**1.03 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
  
- B. Materials Source: Submit name of imported materials suppliers.
  
- C. Certificates: Furnish certification from soil producer attesting that materials conform to requirements of Specifications.

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## 1.04 QUALITY ASSURANCE

- A. Furnish each soil material from single source throughout the Work
- B. Material Test
  - 1. Conduct material quality tests in accordance with requirements of appropriate Referenced Standard for such material.

## PART 2 – PRODUCTS

### 2.01 SUBSOIL MATERIALS

- A. Suitable Backfill and Embankment Material: Material of maximum size that can be readily placed in loose, 8-inch layers; conforming to the requirements below. Frozen material shall not be utilized.
  - 1. Soil. Includes earth material with the following physical characteristics:
    - a. Gradation—More than 35% passing No. 200 sieve.
    - b. Minimum dry mass density—95 pounds per cubic foot determined according to PennDOT PTM No. 106, Method B.
    - c. Maximum liquid limit—65, determined according to AASHTO T 89.
    - d. Plasticity index—Not less than liquid limit minus 30, determined according to AASHTO T 90 for soils with liquid limits of 41 to 65.
  - 2. Granular Material. Includes natural or synthetic mineral aggregates having 35% or less passing the No. 200 sieve.
  - 3. Shale. Includes rock-like material formed by natural consolidation of mud, clay, silt, and fine sand; usually thinly laminated, comparatively soft, and easily split.
  - 4. Rock. Includes natural material that cannot be excavated without blasting or using rippers; also boulders and detached stones of a size that cannot be readily placed and compacted in loose, 8-inch layers and having insufficient soil to fill the voids in each layer.
  - 5. Random Material. Includes any accepted combination of the above classifications and may include concrete, brick, stone, or masonry units from demolition.
  - 6. Suitable Material. Reasonably free of organic matter, coal or coal blossom, or other objectionable matter. Wet, dry, or frozen material may be suitable when dried, wetted, or thawed, respectively.
- B. Clean Fill: Fill material consisting of soil, rock, stone, dredged material, used asphalt, and brick, block or concrete from construction and demolition activities. The evaluation of fill materials shall be in accordance with DEP’s “Clean Fill” regulations and procedures for determining whether material is clean or regulated.

### 2.02 TOPSOIL

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots. Friable loam, sand loam, or clay loam which will hold a ball when squeezed with

the hand, but which will crumble shortly after being released.

- B. Having a pH of between 6.0 and 7.0; containing not less than 1.5% nor more than 10% organic matter as determined by AASHTO T194; magnesium to exceed 100 units; phosphorus to exceed 150 units; potassium to exceed 120 units; soluble salts/conductivity not to exceed 900 ppm/0.9 mmhos/cm in soil.
- C. Free of clods, grass, roots, or other debris harmful to plant growth.
- D. Free of pests, pest larvae, and matter toxic to plants.

#### 2.03 SOURCE QUALITY CONTROL

- A. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D698 and ASTM D1557.
- B. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D2487 and ASTM D4318.
- C. When tests indicate materials do not meet specified requirements, change material and retest.
- D. Furnish materials of each type from same source throughout the Work.

#### **PART 3 – EXECUTION – Not Used**

**END OF SECTION**