

**SECTION 32 91 13
SOIL PREPARATION**

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. C33, Standard Specification for Concrete Aggregates.
 - b. C602, Standard Specification for Agricultural Liming Materials.
2. U.S. Bureau of Reclamation (USBR):
 - a. 514.4.4, Reclamation Instructions, Series 510—Land Classification Techniques and Standards, Part 514—Laboratory Procedures, Chapter 4—Particle-Size Analyses.
 - b. 514.8.7, Reclamation Instructions, Series 510—Land Classification Techniques and Standards, Part 514—Laboratory Procedures, Chapter 8—Soil Chemical Tests.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Product labels/data sheets.
2. Samples:
 - a. Representative of stockpiled or imported topsoil.

B. Informational Submittals:

1. Certified Topsoil Analysis Reports:
 - a. Indicate quantities of materials necessary to bring topsoil into compliance with textural/gradation requirements.
 - b. Indicate quantity of lime, and quantity and analysis of fertilizer.

1.03 SEQUENCING AND SCHEDULING

A. Rough grade areas to be planted or seeded prior to performing Work specified under this section.

PART 2 PRODUCTS

2.01 TOPSOIL

- A. General: Natural, friable, sandy loam, obtained from well-drained areas, free from objects larger than 1-1/2 inches maximum dimension, and free of subsoil, roots, grass, other foreign matter, hazardous or toxic substances, and deleterious material that may be harmful to plant growth or may hinder grading, planting, or maintenance.
- B. Composition: As determined in accordance with USBR 514.4.4:
 - 1. Gravel-Sized Fraction: Maximum 15 percent by weight retained on a No. 10 sieve.
 - 2. Sand-Sized Fraction: Maximum 65 percent passing No. 10 sieve and retained on No. 270 sieve.
 - 3. Silt-Sized Fraction: Maximum 50 percent passing No. 270 sieve and larger than 0.002 millimeter.
 - 4. Clay-Sized Fraction: Maximum 25 percent smaller than 0.002 millimeter.
- C. Organic Matter: Minimum 1.5 percent by dry weight as determined in accordance with USBR 514.8.7.
- D. pH: Range 6.0 to 7.2.
- E. Textural Amendments: Amend as necessary to conform to required composition by incorporating sand, peat, manure, or sawdust.
- F. Source: Stockpile material onsite, in accordance with Section 31 10 00, Site Clearing. Import topsoil if onsite material fails to meet specified requirements or is insufficient in quantity.

2.02 LIME

- A. Composition: Ground limestone with not less than 85 percent total carbonates, ASTM C602.
- B. Gradation:
 - 1. Minimum 50 percent passing No. 100 sieve.
 - 2. Minimum 90 percent passing No. 20 sieve.
 - 3. Coarser material acceptable provided rates of application are increased proportionately on basis of quantities passing No. 100 sieve.

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2.03 SAWDUST OR GROUND BARK

- A. Nontoxic, of uniform texture, and subject to slow decomposition when mixed with soil. Nitrogen-treated, or if untreated mix with minimum 0.15 pound of ammonium nitrate or 0.25 pound of ammonium sulfate per cubic foot of loose material.

2.04 PEAT

- A. Composition: Natural residue formed by decomposition of reeds, sedges, or mosses in a freshwater environment, free from lumps, roots, and stones.
 - 1. Organic Matter: Not less than 90 percent on a dry weight basis as determined by USBR 514.8.7.
 - 2. Moisture Content: Maximum 65 percent by weight at time of delivery.

2.05 FERTILIZER

- A. See Section 32 92 00, Turf and Grasses.

2.06 SAND

- A. Fine Aggregate: Clean, coarse, well-graded, ASTM C33.

2.07 SOURCE QUALITY CONTROL

- A. Imported Topsoil Analysis/Testing: Performed by county or state soil testing service or approved certified independent testing laboratory.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

- A. Apply Dolomitic Lime at the rate of 50 pounds per 1,000 square feet to subgrade before tilling.
- B. Scarify subgrade to minimum depth of 6 inches where topsoil is to be placed.
- C. Remove stones over 2-1/2 inches in any dimension, sticks, roots, rubbish, and other extraneous material.
- D. Limit preparation to areas which will receive topsoil within 2 days after preparation.

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3.02 TOPSOIL PLACEMENT

- A. Do not place topsoil when subsoil or topsoil is frozen, excessively wet, or otherwise detrimental to the Work.
- B. Mix soil amendments, lime, and fertilizer with topsoil before placement or spread on topsoil surface and mix thoroughly into entire depth of topsoil before planting or seeding. Delay mixing of fertilizer if planting or seeding will not occur within 3 days.
- C. Place 1/2 of total depth of topsoil and work into top 4 inches of subgrade soil to create a transition layer. Place remainder of topsoil to depth as shown after compacting to 75 percent where seeding and planting are scheduled. Minimum topsoil depth shall be 6 inches.
- D. Uniformly distribute to within 1/2 inch of final grades. Fine grade topsoil eliminating rough or low areas and maintaining levels, profiles, and contours of subgrade.
- E. Remove stones exceeding 1-1/2 inches, roots, sticks, debris, and foreign matter during and after topsoil placement.
- F. Remove surplus subsoil and topsoil from Site. Grade stockpile area as necessary and place in condition acceptable for planting or seeding.

END OF SECTION