

PRIMARY USE: Used to provide a suitable growth medium for vegetation.
ADDITIONAL USES: Used to enhance infiltration characteristics.

TOPSOILING

What is it? Salvaging, storing, and using topsoil to enhance final site stabilization with vegetation.

Purpose

To provide a suitable growth medium for vegetation and to enhance the characteristics of infiltration.



**Topsoiling
Perspective View**

Limitations

Do not apply topsoil to slopes steeper than 2:1 (to avoid slippage) or to a subsoil of highly contrasting texture. Sandy topsoil over clay subsoil is a particularly poor combination especially on steep slopes. Water may creep along the junction between the soil layers and cause the topsoil to slough. Also, in some cases, handling costs may be too high to make topsoiling beneficial. In site planning, compare the option of topsoiling with that of preparing a suitable seedbed in the existing subsoil.

Materials

Topsoil that has been moved and stockpiled from the site or purchased from local source.

Installation

Installation considerations should include areas where a sufficient supply of quality topsoil is available, high quality turf or ornamental plants are desired, and slopes are 2:1 or flatter.

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Installation guidelines continued:

The subsoil or areas of existing surface soil may present the following problems which indicate the use of this practice:

1. The structure, pH, or nutrient balance of the available soil cannot be amended by reasonable means to provide an adequate growth medium for the desired vegetation.
2. The soil is too shallow to provide adequate rooting depth or will not supply necessary moisture and nutrients for growth of desired vegetation.
3. The soil contains substances toxic to the desired vegetation.

Planning Considerations

Topsoil should be stockpiled for final site preparation and stabilization and used wherever practical for establishing permanent vegetation. The topsoil stockpile should be surrounded by a silt fence. Topsoiling is a common practice where ornamental plants or high maintenance turf will be grown. It may also be required to establish vegetation on shallow soils, soils containing potentially toxic materials, very stony areas, and soils of critically low pH.

Topsoil is the surface layer of the soil profile, generally characterized as darker than the subsoil due to enrichment with organic matter. It is the major zone of root development and biological activity. Microorganisms that enhance plant growth thrive in this layer. Topsoil can usually be differentiated from subsoil by texture as well as color. Clay content usually increases in the subsoil. Where subsoils are often high in clay, the topsoil layer may be significantly coarser in texture. The depth of topsoil may be quite variable. On severely eroded sites it may be gone entirely.

Advantages of topsoil include its high organic matter content and friable consistence (soil aggregates can be crushed with only moderate pressure), and its available water-holding capacity and nutrient content. Most often it is superior to subsoil in these characteristics. The texture and friability of topsoil are usually much more conducive to seedling emergency and root growth.

In addition to being a better growth medium, topsoil is often less erodible than subsoils, and the coarser texture of topsoil increases infiltration capacity and reduces runoff.

Although topsoil may provide an improved growth medium, there may be some disadvantages. Stripping, stockpiling, hauling, and spreading topsoil (importing topsoil), may not be cost-effective. Handling may be difficult if large amounts of branches or rocks are present, or if the terrain is too rough. Most topsoil contains weed seeds, which compete with desirable species.

In site planning, compare the options of topsoiling with preparing a seedbed in the available subsoil. The clay content of many subsoils retains moisture. When properly limed and moderately fertilized, subsoils may provide a satisfactory growth medium, which is generally free of weed seeds.

Topsoiling is normally recommended where ornamental plants or high-maintenance turf will be grown. It may also be required to establish vegetation on shallow soils, soils containing potentially toxic materials, stony soils, and soils of critically low pH (high acidity).

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If topsoiling is to be used, consider the following:

1. quality and amount of topsoil available and needed,
2. location for a stabilized stockpile that will not erode, block drainage, or interfere with work on the site.

Bonding

If a topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly, and it will be difficult to establish vegetation.

Plans and Specifications

Plans for installing land grading shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve the intended purpose.

Specifications for salvaging, storing, and using topsoil shall use or be in conformance with the following: (Any variation from these specifications shall be approved by an engineer or landscape architect).

Materials

Determine whether the quality and quantity of available topsoil justifies selective handling. Quality topsoil has the following characteristics:

- a. *Texture*— loam, sandy loam, and silt loam are best; sandy clay loam, silty clay loam, clay loam, and loamy sand are fair. Do not use heavy clay and organic soils such as peat or muck as topsoil.
- a. *Organic matter content*—(sometimes referred to as “humic matter”) should be greater than 1.0 percent by weight, but never more than 30 % of total contact.
- c. *Acidity*— pH should be greater than 3.6 before liming, and liming is required if the pH is less than 6.0.

The depth of material meeting the above qualifications should be at least 2 in (51 mm). Soil factors such as rock fragments, slope, depth to water table, and layer thickness affect the ease of excavation and spreading of topsoil.

Generally, the upper part of the soil, which is richest in organic matter, is most desirable; however, material excavated from deeper layers may be worth storing if it meets the other criteria listed above.

Organic soils such as mucks and peats do not make good topsoil. They can be identified by their extremely light weight when dry.

Stripping

Strip topsoil only from those areas that will be disturbed by excavation, filling, road building, or compaction by equipment. A 4-6 in (102-152 mm) stripping depth is common, but depth varies depending on the site. Determine depth of stripping by taking soil cores at several locations within each area to be stripped. Topsoil depth generally varies along a gradient from hilltop to toe of slope. Put sediment basins, diversions, and other controls into place before stripping.

Stockpiling

Select stockpile location to avoid slopes and natural drainageways, avoiding traffic routes. On large sites, re-spreading is easier and more economical when topsoil is stockpiled in small piles located near areas where they will be used.

Sediment Barriers

Use sediment fences or other barriers where necessary to retain sediment.

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Temporary seeding

Protect topsoil stockpiles by temporarily seeding as soon as possible, no more than 30 days after the formation of the stockpile. Use annual rye grass, winter wheat, or other fast-growing cover crop that will not become a problem plant.

Permanent vegetation

If stockpiles will not be used within 12 months they must be stabilized with permanent vegetation to control erosion and weed growth.

Site Preparation

Before spreading topsoil, establish erosion and sedimentation control practices such as diversions, berms, dikes, waterways, and sediment basins.

Grading

Maintain grades on the areas to be topsoiled according to the approved plan. Adjust grades and elevations for receipt of topsoil.

Liming of subsoil

Where the pH of the existing subsoil is 6.0 or less, or the soil is composed of heavy clays, incorporate agricultural limestone in amounts recommended by soil tests or specified for the seeding mixture to be used. Incorporate lime to a depth of at least 2 in (51 mm) by disking.

Roughening

Immediately prior to spreading the topsoil, loosen the subgrade by disking or scarifying to a depth of at least 4 in (102 mm), to ensure bonding of the topsoil and subsoil. If no amendments have been incorporated, loosen the soil to a depth of at least 6 in (15.2 mm) before spreading topsoil.

Spreading Topsoil

Uniformly distribute topsoil to a minimum compacted depth of 2 in (51 mm) on 3:1 slopes and 4 in (102 mm) on flatter slopes. To determine the volume of topsoil required for application to various depths, use the following Table:

Table: Volume of Topsoil Requires for Application to Various Depths

Depth		Volume		Volume	
Inches	Millimeters	Cu. Yards Per 1,000 Sq. Ft	Cu. Meters per 100 Sq. Meters	Cu. Yards per Acre	Cu. Meters per Hectare
1	25	3.1	2.5	134	253
2	51	6.2	5.1	268	506
3	76	9.3	7.6	403	761
4	102	12.4	10.1	536	1013
5	127	15.5	12.7	670	1266
6	152	18.6	15.2	804	1519

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Additional Considerations:

Do not spread topsoil while it is frozen or muddy or when the subgrade is wet or frozen. Correct any irregularities in the surface that result from topsoiling or other operations to prevent the formation of depressions or water pockets.

Compact the topsoil enough to ensure good contact with the underlying soil, but avoid excessive compaction, as it increases runoff and inhibits seed germination. Light packing with a roller is recommended where high maintenance turf is to be established.

On slopes and areas that will not be mowed, the surface may be left rough after spreading topsoil. A disk may be used to promote bonding at the interface between the topsoil and subsoil.

After topsoil application, follow procedures for temporary or permanent seeding, taking care to avoid excessive mixing of topsoil into the subsoil.