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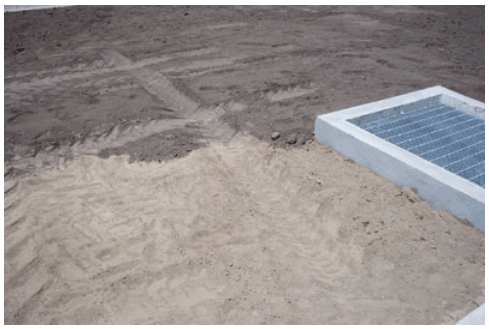

WATER-WISE LANDSCAPING: SOIL PREPARATION AND MANAGEMENT

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Soil is the most important component of the landscape. Many well-designed landscapes have failed because of inadequate soil preparation before planting, and/or soil management after. Proper soil preparation and management also improves landscape water conservation by increasing plant rooting depth and soil water holding capacity, and reducing water runoff and evaporation.

SOIL PREPARATION

New landscapes offer the unique opportunity to make major improvements in the soil before expensive, permanent vegetation is established. It is much easier and less expensive to correct soil problems before vegetation, sprinkler systems and sidewalks are installed than after.

Buy new topsoil or use what is on site? In new developments, topsoil is either imported for the landscape or the resident soil is improved before establishing vegetation. High quality topsoil is expensive and some materials may be of equal or even lower quality than the resident soil on site. Carefully inspect topsoil and consider having it tested to assess quality and compare the material to the resident soil on site. See the Utah State University Extension publication *Topsoil Quality Guidelines for Landscaping* (AG-SO-02) for more information. If quality topsoil is not available or is too expensive, test and amend or improve the resident soil before installing the landscape.

Test the soil. Local Utah State University Cooperative Extension County Offices have information on soil testing. Soil should be tested for pH, salinity (salts), texture and nutrient levels since these represent common soil problems in Utah that should be addressed before planting.

Use appropriate topsoil depth and placement. Generally, the more high quality topsoil the better the conditions for plant growth. A minimum of 6 inches of topsoil is recommended for turf; 12 inches for trees. Deep, uniform topsoil encourages deeper rooting and provides a larger reservoir of water for plant use. If additional soil is brought on the site it should be placed in lifts (layers). Lay the first 1/3 of the new topsoil and thoroughly blend with the native soil on site to create a transitional layer. Place the remaining soil on top of this transitional layer.

Amend the soil with organic matter. Utah soils are inherently low in organic matter. Adding organic matter is the single most important thing that can be done to improve Utah soils. Organic matter improves the water holding capacity, drainage and aeration (gas exchange properties) of soils, and also provides nutrients to plants and improves compaction resistance. If possible, 2 to 3 inches of organic matter should be added to new site developments before planting. Incorporate this organic matter to a depth of 4 to 6 inches with a heavy duty tiller.

Many sources of organic matter are available. Peat moss works well but is expensive and breaks down quickly. Fine bark and wood chips are less expensive and last longer, but "tie up" (immobilize) nitrogen when mixed into soil. To compensate for this immobilization tendency, apply an additional 1 pound of nitrogen per 100 pounds of woody organic material. Animal manures and composts are also good sources of organic matter; however, they often contain high levels of soluble salts. To prevent salt damage on vegetation, apply no more than 1 inch of manure or compost and incorporate this material thoroughly to a depth of 3 to 4 inches in the soil. If more than 1 inch of organic matter is needed combine manure or compost with a low salt material such as peat moss, bark or wood chips to minimize salt problems.

Treat compaction. Compaction is a significant problem in new developments due to the activity of heavy equipment during construction. Compaction problems are often not corrected before topsoil is placed on a site. The buried compacted layer severely limits root growth and water movement, and is extremely difficult to treat once vegetation, sprinkler systems and sidewalks have been installed. Break up compacted soil with a ripper or heavy duty tiller before placing new topsoil and planting.

SOIL MANAGEMENT

Once the landscape is established, various routine practices can help maintain quality soil conditions and conserve water.

Aerate. Aeration is a common practice to improve water infiltration and aeration (gas exchange properties) in soil for turf. Aeration removes small "plugs" of soil, creating air space and pathways for water movement into the root zone. Aeration should be done once a year in either the Spring or Fall in soils with a high clay content, or in situations where turf is exposed to heavy foot traffic.

Amend the soil with organic matter. To maintain soil physical conditions, annual planting areas such as flower beds and gardens should be amended with ½ to 1 inch of new organic matter each year. In perennial areas such as turf and around trees and shrubs, organic matter cannot be incorporated into soil without damaging plants. To amend soils in turf, spread a thin (1/4 inch) layer of organic matter immediately after aerating turf and rake or mow the lawn to move the organic matter into aeration holes. To amend soils around woody plants, maintain a thick layer of organic mulch around these plants. Insects and other soil organisms live and feed in the mulch, incorporating organic matter into the soil beneath the layer.

Mulch. Mulching has many benefits, such as reducing water evaporation from soil, competition between woody plants and turf, and compaction caused by foot traffic, and protecting the trunk of woody vegetation from mower or line trimmer damage. Organic mulches such as wood chips and shredded bark are desirable since the organic material will be incorporated into soil by organisms inhabiting the mulch layer.

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