

## 5.11 SOIL AMENDMENT

### DEFINITION OF SOIL AMENDMENT AND CONSERVATION LANDSCAPING CREDITS

A credit is given when lawns and landscape areas within the development utilize the Soil Amendment or Conservation Landscaping guidance in this section. The benefit of these designs over more traditional lawns is the placement of sufficient soil depth and appropriate vegetation that promotes infiltration and less stormwater runoff.

The Soil Amendment Credit relies on native soils, appropriate soil depths, and low maintenance turf grasses to reduce the runoff volume. The stormwater credit for Soil Amendment is the reduction of project impervious cover by 2%.

The Conservation Landscaping Credit is based upon planting a reduced turf area and incorporating native plants, shrubs, trees and perennials to retain stormwater on site and require minimal chemicals to sustain a native and colorful landscape. The stormwater credit for Conservation Landscaping is the reduction of impervious cover by 5%.

These credits can be used to gain compliance with the Low Impact Development approach or reduce the stormwater basin water quality volume.

$$Ar = AD * 0.02$$

Where: Ar = Allowable reduction in impervious cover

AD = Area of development

### RESTRICTIONS ON THE CREDIT

The soil amendment credit is subject to the following restrictions:

- Home-builders coordinate with the jurisdictional stormwater authority during soil placement. This coordination will be identified as a permit condition and will allow inspection of the soil depth and quality prior to grass placement.
- The soil amendment requirement shall be noted on the plat and included in the development deed restrictions.

**Example calculation:** the required water quality volume before the credit for a ten (10) acre site with 30 single family lots would be:

Impervious cover = 3 acres = 30%

1.5-inch storm runoff volume = 0.48 inches based on Equation 4.9

Water quality volume = (0.48 inches) \* (10 acres) \* (43,560/12) = 17,424 cubic- feet.

Applying the credit, the developer and home-builders agree to place grass and soil per the soil amendment specifications. Thus, the project impervious cover is reduced by 2%.

In this example, Ar = (10 acres) \* (0.02) = 0.2 acres

Effective impervious cover = (3 acres) – (0.2 acres) = 2.8 acres = 2.8/10 = 28%

1-year Runoff Volume = 0.45 inches based on Equation 4.9

Water Quality Volume = (0.45 inches) \* (10 acres) \* (43,560/12) = 16,444 cubic-feet.

The BMP water quality volume is reduced by 5% in this example.

This option is intended to provide builders and homeowners with a well-designed and resource efficient landscape.

## DESCRIPTION

Naturally occurring undisturbed soil and vegetation provide important stormwater functions including: water infiltration; nutrient, sediment, and pollutant adsorption; sediment and pollutant biofiltration; water interflow, storage and transmission; and pollutant decomposition. These functions are largely lost when development strips away native soil and vegetation and replaces it with minimal topsoil and sod. Not only are these important stormwater functions lost, but such landscapes themselves become pollution-generating pervious surfaces due to the increased use of pesticides, fertilizers and other landscaping and household/ industrial chemicals, the concentration of pet wastes, and added pollutants that accompany roadside litter.

Establishing soil quality and depth regains greater stormwater functions in the post development landscape, provides increased treatment of pollutants and sediments that result from development and habitation, and minimizes landscaping chemical need. As a result, these preventative measures effectively reduce pollution. Soil amendment and the usage of appropriate turf provide a practical and cost-effective mechanism to mitigate stormwater runoff pollution and treatment.

Establishing a minimum soil quality and depth will provide improved on-site management of stormwater flow and water quality. Soil organic matter can be attained through materials such as composted herbaceous and woody material, biosolids, and forest product residuals. It is important that the materials used to meet the soil quality and depth requirements are appropriate and beneficial to the establishment of plant cover. Likewise, imported topsoil should improve conditions and avoid excessive percentages of clay fines.

## DESIGN GUIDELINES

The soil amendment credit is subject to the following guidelines and restrictions:

1. **Stockpile Topsoil:** Salvaged topsoil from the site should be used whenever possible. In any areas requiring grading, remove and stockpile topsoil on site in a designated controlled area to be reapplied to other portions of the site where feasible. Stockpiled soils must be protected from erosion with appropriate temporary erosion controls and cannot be placed adjacent to surface waters, within the buffer zones or in areas with concentrated flow.
2. **Soil Depth:** All newly planted turf areas will have a minimum soil depth of 6 to 8 inches. Builders and owners will import soil if needed to achieve sufficient soil depth. Soil in these areas may be either native soil from the site or imported, improved soil.
3. **Import Soil:** Topsoil must be weed free, contain a minimum of 20% compost by volume, contain less than 20% clay, and be free of stones, stumps, roots or other similar objects larger than one (1) inch. If on-site soils do not meet these specifications, topsoil per the above specs must be added. Sandy loam is not an approved soil and caliche is not considered a soil.
4. **Import Soil Application:** Topsoil that is added to the site shall be incorporated in a 2 to 3- inch scarified transition layer to improve drainage. Do not scarify within a drip line of existing trees to be retained.
5. **Soil Inspection:** Home-builders should coordinate with the jurisdictional stormwater authority after topsoil has been spread on the site immediately prior to laying sod.
6. **Turf:** Turf is required and shall be Bermuda, buffalo, or zoysia sod.
7. **Slope Limitation:** The soil amendment cannot be used on slopes greater than 20%, in areas subject to concentrated flows or any sensitive areas to minimize potential discharge of soil to waterways.
8. **Roadside Revegetation:** Utilizing native seed in revegetation of roadsides and other areas helps preserve ecosystem integrity. Native grasses and wildflowers are well adapted to the environment and provide a low maintenance, resilient long-term landscape. A recent study conducted by the Landscape Restoration Program at the Lady Bird Johnson Wildflower Center demonstrated that commercial grass mixes consisting of native plant species seeds performed as well or better than mixes containing Bermuda grass, a popular and widely used invasive grass species.

## Conservation Landscaping

$$Ar = AD * 0.05$$

Where: Ar = Allowable reduction in impervious cover

AD = Area of development

### RESTRICTIONS ON THE CREDIT

The conservation landscaping credit is subject to the following restrictions:

- Home-builders coordinate with the jurisdictional stormwater authority during landscape installation. This coordination will be identified as a permit condition and will allow inspection of soil depth and quality prior to grass placement.
- The soil amendment requirement shall be noted on the plat and included in the development deed restrictions.

**Example calculation:** the required water quality volume before the credit for a ten (10) acre site with 30 single family lots would be:

Impervious cover = 3 acres = 30%

1-year runoff volume = 0.48 inches based on Equation 4.9

Water quality volume = (0.48 inches) \* (10 acres) \* (43,560/12) = 17,424 cubic- feet.

Applying the credit, the developer and home-builders agree to install conservation landscaping per the specifications. Thus, the project impervious cover is reduced by 5%.

In this example,  $Ar = (10 \text{ acres}) * (0.05) = 0.5 \text{ acres}$

Effective impervious cover = (3 acres) – (0.5 acres) = 2.5 acres =  $2.5/10 = 25\%$

1-year Runoff Volume = 0.41 inches based on Equation 4.9

Water Quality Volume = (0.41 inches) \* (10 acres) \* (43,560/12) = 14,974 cubic-feet.

The BMP water quality volume is reduced by 14% in this example.

### DESCRIPTION

Native vegetation is best suited to local climate and soils. Existing native vegetation should be conserved and protected where possible. Where new planting is required, the use of native plants will increase plant survival and decrease the cost of subsequent plant replacement. Reapplication of organic compost or mulch every few years may be necessary to maintain positive soil infiltration characteristics. The initial costs of native plants, trees, shrubs, and soil amendments are recouped through significant reductions in water, fertilizer and pesticide use, as well as increased plant survival within the first few years after planting.

Conservation landscaping and native vegetation are equally appropriate in large-scale landscapes, such as parks, schools, commercial sites, parking lots, apartment complexes and in small residential landscapes.

Four major components that increase landscape sustainability are: adequate quantity of high- quality soil, implementation of efficient irrigation, appropriate turf and plant choice, and installation. Along with obtaining a stormwater credit and protecting water quality, this landscape option will save the homeowner time and money through reduced lawn watering requirements and mowing needs. Below is a sample design comparison between a conservation landscape design and a conventional landscape design for a lot with a front yard measuring 70 feet wide and 50 feet deep. The conservation option is composed of shrubs, perennials and ground covers that are watered every 14 days and turf that is watered once a week. The conventional lot front yard is comprised mainly of turf and a few shrubs watered three times a week.

**Figure 5-28:** Sample Costs Over 10 years (Actual Costs Will Vary)

	Soil Amendment Landscape	Conventional Landscape
Installation Cost	\$3,293	\$2,440
Yard Care Time	425 hours	615 hours
Water Cost	\$360	\$1,440
Treatment Cost	\$50	\$500
<b>Total Time and Cost</b>	<b>\$3,703</b>	<b>\$4,380</b>

As shown above, the conservation option costs \$677 less and requires 190 hours less yard care and maintenance.

Source: LCRA, Texas Hill Country Landscape Option, 2005

## DESIGN GUIDELINES

The soil amendment credit is subject to the following guidelines and restrictions:

- 1. Stockpile Topsoil:** Salvaged topsoil from the site should be used whenever possible. In any areas requiring grading, remove and stockpile topsoil on site in a designated controlled area to be reapplied to other portions of the site where feasible. Stockpiled soils must be protected from erosion with appropriate temporary erosion controls and cannot be placed adjacent to surface waters, within the buffer zones or in areas with concentrated flow.
- 2. Soil Depth:** All newly planted turf areas will have a minimum soil depth of 6 to 8 inches. Builders and owners will import soil if needed to achieve sufficient soil depth. Soil in these areas may be either native soil from the site or imported, improved soil.
- 3. Import Soil:** Topsoil for turf areas must be weed free, contain a minimum of 20% compost by volume, contain less than 20% clay, and be free of stones, stumps, roots or other similar objects larger than one (1) inch. If on-site soils do not meet these specifications, topsoil per the above specs must be added. Sandy loam is not an approved soil and caliche is not considered a soil.
- 4. Import Soil Application:** Topsoil that is added to the site shall be incorporated in a 2 to 3- inch scarified transition layer to improve drainage. Do not scarify within a drip line of existing trees to be retained.
- 5. Soil Inspection:** Home-builders should coordinate with jurisdictional stormwater authority after topsoil has been spread on the site immediately prior to laying sod.
- 6. Turf:** Turf shall be Bermuda, buffalo, or zoysia sod. A maximum 30% of the lot can be covered in turf. The remainder of the lot will follow the Hill Country Landscape Option that relies on native trees, shrubs, and perennials.
- 7. Irrigation:** Spray irrigation shall be limited to 2.5 times the foundation footprint with a maximum of 12,000 square feet. The footprint may include the house and garage but not the driveway or patio.
- 8. Undisturbed Area Requirement:** For lots greater than 15,000 square feet, no less than 25% of the lot shall remain in a natural condition (no grading, planting sod, etc.). Removal of scrub brush and other invasive species can be performed by hand clearing methods to restore native vegetation and grasses. This area shall not be irrigated. Deed restrictions and plat notes will be necessary to ensure natural area preservation.