7.0 Bedding Plants, Shrubs and Sod Specifications

Whether at a business, home or public space landscaping, is important because it contributes to the quality of life. For the City of Dallas, landscaping and trees can impact increases in tourism, new businesses moving to the area and attracting new residents.

This section will provide practices and information to assist in creating the best landscape for your property. It all starts with the soil, then continues with the proper way to plant, seed and sod.

For more information on the trees within your landscape, see Section 4.

For more information on your existing soils, see Section 5.

7.1 Specifications for Soil Preparation

All successful landscapes begin with healthy soil. In urban areas it is extremely rare to find natural undisturbed topsoil that is suitable for planting with no preparation. Most urban soils have been disturbed, compacted, depleted of organic material, and sometimes contaminated with construction debris or artificial chemicals.

If natural topsoil has been lost or severely damaged, it may be necessary to completely replace it. Less severely damaged soils may be repaired by various types of soil preparation. The base line goal of soil replacement or preparation is to restore the characteristics of a natural forest top soil, as described in Section 5. Briefly restated, natural forest topsoil is composed of 46% inorganic mineral soil components, 25% air or pore space, 25% water, and 5% decomposed organic material.

If complete soil replacement is necessary, the following method should be used.

Grading: Grades on the area(s) to be top soiled, which have been previously established in conformance with the drawing and/or other applicable specifications, shall be maintained in a true and even grade. The topsoil shall be uniformly distributed on the designated area(s) and it shall be a minimum of 3 inches (75mm) deep after firming. Spreading shall be performed in such a manner that sod installation can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from top soiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed for turf grass sod installation.

Low pH Correction: pH of natural soils in North Central Texas rarely falls below 6.5. If subsoil is highly acid, chemical contamination is suspected. Soil shall be tested by a reputable laboratory and a pH correction material shall be spread at a rate sufficient to correct the pH to a range of 6.0 to 7.0. The material shall be distributed uniformly over the designated area(s) and worked into the soil in conjunction with an expanded tillage operation as described below.

High pH Correction: pH of natural soils in North Central Texas rarely rises above 7.8. If subsoil is highly basic (alkaline) or saline, chemical contamination may have occurred. Saline and basic soils may require special amendments or management. In areas where these soil characteristics may occur, subsoil samples shall be tested by a reputable laboratory and subsequent recommendations, to include a possible delay in topsoil addition, shall be followed.

Note**:** If the pH of soil falls in the natural range for our region, (6.5 to 7.8) it is very difficult to permanently change it, and undesirable to try. Instead, plant species adapted to the natural pH should be selected for the landscape.

Tilling: After the area(s) to be top soiled have been brought to grade, compacted where necessary and immediately prior to the dumping and spreading of topsoil, the subgrade shall be loosened by disking or by scarifying to a depth of at least 2 inches (50 mm) to permit bonding of the topsoil to the subsoil.

Materials: Topsoil shall be a loamy sand, clay loam, loam, silt loam, sandy clay loam and other soil approved by the architect. It shall not have mixture of subsoil and shall contain no slag, cinders, stones, lumps of soil, sticks, roots, and trash or other extraneous materials larger than 1.5 inches (40 mm) in diameter.

Topsoil must also be free of viable plants or plant parts of common bermudagrass, quackgrass, Johnson grass, nutsedge, poison ivy, Canada thistle, or other invasive exotic species. All topsoil shall be tested by a reputable laboratory for pH and soluble salts. If needed, pH correction material shall be applied at a rate sufficient to correct the pH to a natural range of 6.5 to 7.8. Soluble salts shall not be higher than 500 parts per million.

No turfgrass sod shall be placed on soil, which has been chemically treated until sufficient time has elapsed to permit dissipation of all toxic materials. The general contractor shall assume full responsibility for and loss or damage to turfgrass sod arising from improper use of chemicals or due to his failure to allow sufficient time to permit dissipation of toxic residues, whether or not such materials are specified herein. This method of top soil replacement is suitable for lawn areas and general tree planting.

7.2 Bedding plants and shrubs

Where shrubs, perennials, ground covers and annual plants are grouped in planting beds, more intensive soil preparation will give superior results.

- Kill unwanted plants in all new planting areas before beginning other work. This shall be accomplished by at least two applications of glyphosate herbicide, and/or by mechanical removal, as required by weather conditions and plant type.
- In all planting areas, examine existing soil for compaction and construction debris. Correct compaction and remove debris before doing any other soil preparation. Notify landscape architect if condition of existing soil cannot be corrected with normal clean up and tilling.
- In planting beds, soil preparation shall be 4" layer of finished compost or a 4" layer of equal parts finished compost and expanded shale, tilled to 6" depth.
- Mulch planting beds with 3" of fine cut hardwood mulch after planting.

Quality of Plants: The successful vendor must provide plants of the highest quality, fully warranted against disease, insects, mold, and poor appearance. Blooming plants shall be at least 30% showing color upon delivery.

All plant containers must be labelled detailing the plant name and variety. All plants must be hardy and in active growth, free from physical damage and from signs of mineral or nutrient deficiency. They will not display signs of virus or toxicity.

All dead, damaged and diseased leaves, stems flowers and roots will be removed prior to delivery. All plants must be true to form, fully hardened-off, free from weeds and clearly labelled. Where appropriate plants must be adequately staked and tied.

Plant root systems must be well developed, fibrous, healthy, and damage free with clear evidence of proper establishment. Plants must not be root-bound and have adequate root systems for size of pot or container.

The grower will ensure that all plants are uniform in habit, spread and height. No plant shall show signs of distress from incorrect hardening-off. Plants must not have been cut back to achieve the required heights.

Pests and Diseases: The Contractor shall abide by all plant health regulations and orders and will be held responsible for the loss of all plant material and associated costs in complying with any notices served due to a failure to abide by the regulations and orders. All plants supplied shall be clean, sound and free from pests and diseases.

https://content.ces.ncsu.edu/planting-techniques-for-trees-and-shrubs

Planting Procedures: Correct planting technique begins with the loading of the plant at the nursery or garden center. Home gardeners and landscapers should be very careful with plant material. Always protect the roots, stems and foliage during transport. The plant tops should be shielded from winds. Never pick up a plant by the trunk. Lift plants from underneath the root ball with the appropriate equipment. Container-grown plants should be handled by the container and never by the tops of the plant. If plants must be held or stored on the landscape site, it is best to place them in a location protected from the wind and sun. Do not let the roots freeze or dry out during this time. If the delay in planting is more than a few days, one should "heel in" B&B material by covering the roots with bark or some other mulch. Supplemental irrigation is critical for the nursery stock during the growing season.

The Planting Hole:
A current trend in landscape design is to plant shrubs in large beds. When this design concept is followed, preparation of the entire plant bed area and not just individual holes is recommended. In many urban areas, gardeners will find that the soils are compacted and sometimes poorly drained. In these situations one should create a good root zone by amending the beds with a sandy-loam topsoil and aerifying the soil as deep as possible. The addition of organic matter provides little or no advantage to the planting hole in good soils. Backfill should, in most cases, be the soil removed from the planting hole: "what comes out...goes back in." This is especially important for B&B material and bare-root planting stock. An exception to this would be where entire beds can be amended to create a homogeneous root-zone. The organic matter, e.g. compost or composted pine bark, is uniformly mixed with the soil. This makes room for future growth and increases aeration to the backfill.

In very poorly drained soils, drain tile under the beds is necessary. If a French drain or tile drain is installed, be sure that it drains downhill at a 2% minimum slope and there is an outlet on the downhill side. When setting plants, be certain to plant them high. If the poor drainage condition cannot be corrected, don't plant a shrub in the area, unless it can tolerate these conditions.

If the soil is sandy and moisture is difficult to hold, a heavier topsoil can be added. Organic matter in this situation will be valuable as it improves the water-holding capacity of the sandy soil. After planting, add a 3- to 4-inch layer of organic mulch on the soil surface around the plant. This will conserve moisture, discourage weeds and moderate soil temperatures. Also, be sure to consider the aesthetics and advantages of the mulch (Figure 1).

The most important consideration in planting shrubs is the planting depth. Don't plant too deep. It is better to plant in a raised manner so the roots will not drown or suffocate.

Dig planting holes 2 to 3 times wider than the root ball and the same depth. Locate the root ball on solid soil and not loose backfill. Wire baskets do not need to be completely removed from large field grown shrubs. Cut and fold down the top half of the basket, fold back the burlap to expose the sides of the root ball, and don't forget to remove all nylon strings or ties from the trunk/stems or root ball. Be sure to remove plastic liners or synthetic burlap type materials.

For the most efficient use of water, construct an earthen dam 4 to 6 inches high around the drip zone area of the plant after planting. Water will have the ability to collect in this saucer and move slowly down into the planting hole. Plants are grown by various production methods, e.g. bare-root, balled and burlapped, fabric container and plastic container.

Figure 1. Shrub planting
Illustration provided by NC State Extension, Planting Techniques for Trees and Shrubs
Author, Kim Powell, Spec (Commercial Landscaping), Horticultural Science

7.3 Sod

Time Limitations: Sod shall be transplanted/installed within a period of 24 hours following harvesting, unless a suitable preservation method is approved prior to delivery. Sod not transplanted within this period shall be inspected and approved by the inspecting officer or his representative prior to its installation.

Material Specifications: Thickness of Cut: Sod shall be machine cut at uniform soil thickness of 0.60 inch (15 mm), plus or minus 0.25 inch (6 mm), at the time of cutting. Measurement for thickness shall exclude top growth and thatch.

Moisture Content: Turfgrass sod shall not be harvested or transplanted when its moisture content (excessively dry or wet) may adversely affect its survival.

Mowing Height: Before harvesting, the turfgrass shall be mowed uniformly at a height of 1 to 2.5 inches (25 to 60 mm).

Thatch: Turfgrass sod shall be relatively free of thatch, up to 0.5 inch (15 mm) allowable (uncompressed).

Diseases, Nematodes and Insects: Turfgrass sod shall be reasonably free of diseases, nematodes and soil-borne insects. Specific nursery and/or plant materials laws may require that all sod entering inter-state commerce be inspected and approved for sale. The inspections and approval must be made by the appropriate government representative of the agriculture department or office of entomologist.

Sod Installation:

Moistening the Soil: During periods of higher than optimal temperature for some species and after all unevenness in the soil surface has been corrected, the soil shall be lightly moistened immediately prior to installation of the turfgrass sod.

Starter Strip: The first row of sod shall be laid in a straight line, with subsequent rows placed parallel to and tightly against each other. Lateral joints shall be staggered to promote more uniform growth and strength. Care shall be exercised to insure that the pieces are not stretched or overlapped and that all joints are butted tightly to prevent voids that would cause air drying of the roots.

Sloping Surfaces**:** On 3:1 greater slopes, traditional size (1 sq yd/1sq m) turf grass sod shall be laid across the angle of the slope (perpendicular), with staggered joints and secured by tampering, pegging, stapling or other approved methods of temporarily securing each piece. Large-roll turfgrass sod shall be laid in the direction of the slope, with temporary securing being at the discretion of the installation contractor.

Swales and Intermittent Waterways**:** The installation of sod within drain ways or intermittent waterways shall be determined after considering maximum channel velocities for storms of a designated intensity. Tradition size sod shall be laid perpendicular to the direction of flow and pegged to resist washout during the establishment period, while large-roll pieces shall be laid in the direction of the flow.

Watering and Rolling: The installation contractor shall water the turfgrass sod immediately after transplanting to prevent excessive drying during progress of the work. As sodding is completed in any one section, the entire area shall be lightly rolled. It shall then be thoroughly watered to a depth sufficient that the underside of the new sod pad and soil immediately below the pad are thoroughly wet.

The single-most important factor in the successful rooting of newly installed turfgrass sod is adequate, regular watering. Watering should begin immediately after installation. The amount of water required will vary depending upon season, weather, temperature, wind, slope, and turfgrass variety. The general contractor shall designate the party responsible to ensure adequate water supply and application.

Mowing: The first mowing shall not be attempted until the turfgrass sod is firmly rooted and securely in place. Not more than 30 percent of the grass leaf shall be removed by the initial or subsequent mowing. Care shall be taken to assure cutting blades are maintained in a sharp condition.

7.4 Seed Specifications

The seed shall be in full compliance with the federal seed act; each container shall be so marked. All seed shall be tested and shipped with appropriate tags.

The seed shall be free from all growth and/or germination inhibitors. Wet, moldy and/or otherwise contaminated seed will not be acceptable. All seed must be certified (blue tag).

1. Bermuda grass seed shall be hulled. The seed shall be shining star, morning star rivera, princess, or wind star variety. I've never heard of any of these cultivars.

Pure seed: minimum 90%
Weed seed: less than 1%
Other crop seed: less than 1%
Inert matter: less than 7.5%
Noxious weed seed: 0%
Germination rate: minimum 85%

2. 3 Variety Perennial Rye Grass Blend.

At least two varieties of ryegrass seed in this blend must have been included in the NTEP tests (from 2001 to present), and scored 5.7 mean average or higher. This ryegrass must be able to be maintained at 1/8 inch to ½ inch. This item must contain a three- (3) blend mix consisting of 31% to 33% ratio for each variety. The seed must be certified and Blue tagged. The seed must be treated with Apron Fungicide at the full rate of 1.5 ounces per 100 pounds.

Pure seed: minimum 98%
Weed seed: less than 1%
Other crop seed: less than 1%
Inert matter: less than 1%
Noxious weed seed: 0%
Germination rate: minimum 90%

3. 2 Variety Perennial Rye Grass Blend.

The ryegrass seed in the blend must have been included in the NTEP tests (from 2001 to present), and scored 5.7 mean average or higher. This ryegrass must be able to be maintained at 1/8 inch to ½ inch. This item must contain a two- (2) blend mix consisting of a one (1) to one (1) ratio for each variety. The seed must be certified and Blue tagged. The seed must be treated with Apron Fungicide at the full rate of 1.5 ounces per 100 pounds.

Pure seed: minimum 98%
Weed seed: less than 1%
Other crop seed: less than 1%
Inert matter: less than 1%
Noxious weed seed: 0%
Germination rate: minimum 90%

4. Perennial Rye Grass (monostand).

The ryegrass seed must have been included in the NTEP tests (from 2001 to present), and scored 5.8 mean average or higher. This ryegrass must be able to be maintained at 1/8 inch to ½ inch. The seed must be certified and Blue tagged. The seed must be treated with Apron Fungicide at the full rate of 1.5 ounces per 100 pounds.

Pure seed: minimum 98%
Weed seed: less than 1%
Other crop seed: less than 1%
Inert matter: less than 1%
Noxious weed seed: 0%
Germination rate: minimum 90%

5. Annual Winter Rye Grass

Pure seed: Minimum 98%
Weed seed: less than .5%
Other crop seed: less than .5%
Inert matter: Less than .5%
Noxious weed seed: 0%
Germination rate: minimum 90%

6. Tall Fescue

The tall fescue seed in the blend must have been included in the NTEP tests (from 2001 to present), and scored 5.7 mean average or higher. This fescue must be able to be

maintained at 1 inch to 3.5 inches. This item must contain a three- (3) blend mix consisting of 31% to 33% ratio for each variety. The seed must be certified and Blue tagged.

Pure seed: Minimum 90%
Weed seed: 0%
Other crop seed: less than 1%
Inert matter: less than 1%
Noxious weed seed: 0%
Germination rate: minimum 85%

7.5 Native Herbaceous Seeding

Deciding when to plant a native herbaceous stand is a challenge. Some species establish better when spring planted, other species establish better when fall planted, and some species are hard to establish whenever they are planted. Seeding rates of some species may need to be increased depending on when and how they are planted.
Native seed can be planted by broadcast seeding, hydroseeding and drill seeding. Regardless of the seeding method used, it is essential that seed be planted at the proper depth and with good seed-to-soil contact.
https://efotg.sc.egov.usda.gov/references/public/GA/327ConservationCoverHerbaceousSeedingJobSheet2016_10_01.pdf

Seeding Time: Native plants exhibit a wide range of growth characteristics. With adequate soil moisture, cool-season grasses and many forbs germinate in early spring when minimum soil temperatures are between 39° to 45° F (3° to 7° C), while warm-season grasses germinate in late spring when soil temperatures reach 50° to 56° F (10° to 13° C) (Smith et al. 1998. Native seed mixes often contain both cool and warm-season species, and there is no single best time to plant. However, choosing a planting time to maximize germination and establishment depends upon the species selected and their contribution to the seed mix. A seed mix with a strong forb component (50 percent or greater forb seed) should be dormant seeded. By contrast, a seed mix of mostly warm-season grasses (70 percent or greater grass seed) should be spring seeded.

Dormant Seeding (After December 15th when soil temperatures are below 55° F): A dormant seeding is defined as planting seed during a time when there is the least chance of germination and seed will lie dormant for several months. For most of Georgia, dormant seeding can begin in mid-December. Early onset of very cold

weather in the fall, or cold weather into late winter can extend the calendar times for dormant seeding. The benefits of dormant seeding are twofold. First, seeding when soil temperatures are below 52° F ensures that there is no germination of the natives until the following spring when environmental conditions are suitable for germination and growth. Second, dormant seeding benefits forbs by permitting stratification which improves germination. We recommend that dormant seeding be done only if the seed can be planted into the soil (1/8 to 1/4 inch deep) and packed. Seed broadcasted onto ice or frozen ground is not recommended as it will expose the seed to wind erosion and predation. Dormant planting mimics the natural process of seed ripening and autumn/winter dispersal of many herbaceous species. However, dormant seeding of most native grasses, except switchgrass (Panicum virgatum), increases seed mortality (Meyer and Gaynor 2002). If the seed mix contains 50:50 forb seed to grass seed or greater, dormant seeding should be considered. Grass seed should be increased by 25 percent if dormant seeded to compensate for seed loss (Henderson and Kern 1999).

Spring Seeding (March to Mid-May): The specific time of year the site is seeded will determine which species are favored in the seed mix. Early spring seeding favors cool-season grasses, sedges and some forbs. The window for germination of cool-season plants diminishes as soil temperatures increase throughout spring. A late spring seeding favors warm-season grasses and some forbs. Spring seeding may not permit adequate stratification for some forbs to break dormancy. Non-germinated seed will remain in the soil until conditions are appropriate for germination.

Summer Seeding (late May to mid-December): Planting after mid-May is risky business. New germinates exposed to excessive heat and drought will perish. In addition, many herbaceous species require 2–6 weeks to germinate. By the end of the growing season, it is likely that seedlings may be too small to survive the winter. Seeding natives during this time is not recommended.
If the site is prone to erosion, sow oats (up to 1 bushel per acre) with the herbaceous seed and/ or a mulch should be applied and crimped into the soil to keep the seed in place.

Seeding Methods: Planting seed at the proper depth with good seed-to-soil contact is essential. Seed planted too deep will not emerge resulting in poor stand establishment. Likewise, seed not covered by soil can germinate, desiccate and die. It's the responsibility of the person(s) actually doing the seeding to ensure that seed is planted correctly. This requires periodic checking of the planted seed and the equipment during seeding.

Broadcast Seeding: Broadcast seeders range from tractor and ATV mounted implements to hand-held seeders or simple hand broadcast seeding. This method can be a low cost way to seed your native stand. An inexpensive hand held fertilizer spreader, available at your local hardware store can be used for seeding.
To assure that the seed is evenly distributed and dispersed over the planting site, the seed must be properly mixed and the seeding rate carefully calculated. Because of improvements in seed cleaning, the volume of native seed needed to plant a smaller site (1 acre or less) may not fill a 5-gallon bucket. The seed should be mixed in equal parts with inert material termed "carrier", such as vermiculite, cracked corn or kitty litter. This will increase the volume of the seed, Mixing any of these carriers with the native seed will improve the seed flow through the seeder and will make calculating the seeding rate much easier. Seed can be mixed in a plastic tub by hand or on a concrete slab using a flat shovel. If you use a mechanical seeder, calibrate the equipment before sowing seed and follow the calibration procedure as listed in the owner's manual. If seed is hand broadcasted, divide seed by half and sow each half over the entire site so the site is seeded twice. This will ensure even seed dispersal and distribution over the site. After seeding, seed should be incorporated into the soil to improve seed-to-soil contact. Incorporating seed into the soil can be done by dragging a piece of heavy chain, or a piece of chain link fencing, or using a drag harrow, or raking seed in with a garden rake. Drag, harrow, or rake until the seed disappears. Finally, pack the soil with a cultipacker or lawn roller.

Hydroseeding: Hydroseeding is a unique seeding method where seed is mixed with water, mulch and tackifier to form a slurry that is sprayed directly on the ground. Many county road departments and some landscaping companies use hydroseeding to seed native herbaceous stands. While the USDA is an equal opportunity provider, employer and lender, seeding is restricted to professionals and you may decide to hire a local company to hydroseed your native stand. We recommend that your seeding contractor hydroseed with a two-step process.
The first step is to broadcast the seed (see the Broadcast Seeding subsection). The second step is to spray the hydromulch slurry (without seed) over the seeded area. This two-step process will help insure that the seed is not suspended in the mulch where it can desiccate. Additives can be included in the slurry to reduce soil erosion (Meyermann 2008).

Grass Drills: A grass drill is the best way to plant seed into existing sod or firmly packed bare dirt. Grass drills with no-till attachments can plant seed into grass sod without any pre-tillage. Reduced soil erosion and fewer weeds are advantages of no-till drilling into sod. Grass drills work best if the soil and the vegetation are dry and most of the thatch and standing dead material is removed by burning or haying. When operating

properly, a no-till drill moves the thatch with trash plows, cuts a shallow furrow, meters the seed at the selected rate, plants the seed 1/8 inch – 1/4 inch deep, and presses the seed into the soil. In deep sands, seed may need to be planted ½ to 1 inch in depth to ensure seed is planted in a suitable environment for germination. In some areas, grass drills can be rented from governmental agencies. Check with your local Natural Resources Conservation Service for information on renting a grass drill. Note – A grass drill is a very specialized piece of equipment and should be operated by a person experienced in their operation.

To achieve the best performance and outcome with a grass drill, the seed must be properly mixed and calibrated and the drill must be operated correctly.

Tips on No-Till Seeding — Drill Seeding:

• Add inert material to the seed to increase the volume. Filler should be similar in size to the seed in the mixture. Add scoop-able cat litter to the seed that is to go in the front small seed box. For seed in the fluffy seed box, add an equal part of vermiculite. For seed in the cool season/ grain box add an equal part of cracked corn.
• Calibrate each box separately
• Always operate a grass drill at the recommended ground speed. Excessive ground speed will cause the drill to improperly plant the seed.
• Adjust the drill when operating. Look for seed not planted in the rows and adjust the drill accordingly.
• Inspect the drill while operating. Avoid drilling in wet conditions. Mud buildup on the depth bands can change the seeding depth. A stiff putty knife works well to remove mud on the depth bands.

Periodically squeeze and shake the feeder tubes connected to the fluffy and cool-season boxes. Individual compartments within the small seed box should have similar quantities of seed remaining while drilling. A compartment with more seed than the other compartments may indicate a plugged feeder tube.

Wetland areas: When seeding in wetland areas or along the edge of a body of water, the soil is often too wet to work with; however, if the soil is bare and above the water level, it is possible to broadcast wetland seed. The site should be lightly raked and covered with straw or erosion control blanket after broadcasting if possible. Wetland plants that establish at the water's edge will naturally fill in as the water level changes over time. Wetland seed is very easily smothered by sedimentation. The bottoms of basins that are likely to be flooded and silted in before plants become established should not be seeded. In areas where the water level fluctuates, it is better to establish

wetland plants at the edges and allow them to spread into deeper water or dry pond bottoms on their own.

Cover Crop: An annual cover crop is sometimes planted along with native species in an effort to suppress weed growth and reduce soil erosion. Oats are commonly used in the spring and Winter Wheat is used in the fall. Both should be applied at a rate of 50 – 100 pounds per acre.

Mulching: Mulch can be used to help prevent erosion and to hold moisture in the soil for the germinating seeds. On steep sites, a straw-based erosion control blanket can also be used. On flatter sites, clean, weed-free straw can be used at a rate of two tons per acre. It should be crimped in place with a disc anchor.

https://www.shootingstarnativeseed.com/about-natives/restoration-guidelines/