

STANDARDS FOR LANDSCAPE DESIGNS

These Standards are part of the requirements to be used by A/E, Landscape Architects and Montgomery College (MC) expert staff as they prepare Landscape Plans (LsP) for Montgomery College (MC). Other documents that these design consultants shall utilize are the MC: ***Site/Campus Specific Landscape Plan Directives; PART 4: OWNER'S SITE STANDARDS; Facilities Master Plan (FMP) and the Conceptual Landscape Master Plan (CLMP)*** for hierarchy and vocabulary of the landscape elements on the campus. In addition to these MC resources, City and County regulations will need to be incorporated where appropriate. The American National Standards Institute (ANSI), specifically ***ANSI Z60.1*** shall be utilized to define standard terms and numerical relationships amount the tree parts.

Plant Specifications: Explicitly-written nursery stock specifications will define the characteristics of the plants to avoid poor plant quality that can lead to unstable plants, unthrifty growth or plant mortality. The plant specifications are the vehicle utilized to define the plant stock so that MC will receive stock that is in good condition.

- a. **Source of plant stock:** deciduous and conifers trees shall be received on-site as *balled and burlapped (B&B)* or in a *container*. Shrubs and perennials shall be received in *containers*. Bare root plants, for trees, shrubs or perennials, are not acceptable. Some trees may arrive in wire cages around the root systems, instead of B&B. These are acceptable as long as the root ball is wrapped, kept moist and protected from breakage. *Removal of one hundred (100) percent of all synthetic burlap off of the root ball is mandatory at the time of planting. Removal of ½ of the basket/burlap from the sides and top of the root ball is required. Half of the lower portion of the cage or basket/burlap shall remain to keep the root ball intact.*
 - All Plants shall be zone appropriate and grown in a region of a similar zone.
 - Species and cultivar shall be specified and substitutions *with cause* can only be approved in written form. Plant specific digging times will not be an acceptable cause because coordination over the project timeline can accommodate these issues.
 - All plants shall be inspected prior to planting for size and quality. Plants shall be tagged, showing species and cultivar.
 - Each tree's root ball shall be kept moist throughout and the crown shall not show signs of moisture stress. Protection from exposure to temperature extremes is critical.
- b. **Root characteristics:** each plant shall have fibrous roots sufficiently developed in the root mass to retain its shape. This is verified at the time of planting. A plant with a good root mass will hold together when being handled at planting time.
 - The main root of a deciduous tree, otherwise known as the topmost root, shall emerge visibly from the trunk, at or slightly above the surface. *The root flare, the area where*

roots emerge from the trunk, shall be planted level with or a maximum of 1 inch above the final grade.

- Root deformities will seriously affect the growth and survival of the plant. Root defects that shall be rejected are:
 - **Kinked roots** – roots having a sharp bend of 90 degrees or more in the main roots and less than 20% of the root system originating above the kink. Inspection of the roots at the soil surface should reveal this condition.
 - Invasive inspection of the roots, washing away the soil, will void the warranty and shall not be done. *If plant survival is suspicious then this condition can be confirmed upon removal and the plant supplier shall replace this plant during the first five years of planting.*
 - **Circling roots** – roots that circle 80 percent or more of the root system by 360 degrees or more in the *trunk-surfaceⁱ* or the *centerⁱⁱ*. Circling roots may be seen when within the trunk-surface root zone, but hard to see within the center zone without washing away the soil; a technic not be utilized.
 - Peripheral roots that are circling, as see when removed from the *container*, can be corrected by cutting the root mass as the container is cut away. However, if there is a large mass of entwined roots at the bottom and around the root ball then the plant has been in the container too long and will not be a vigorous grower and may be rejected.
- c. **Height-to-Caliper Ratio:** *ANSI Z60.1* shall be utilized as the bases of defining the acceptable numerical relationships between the tree height to the caliper ratio. These are nursery stock standards for healthy plants and they shall be specified unless species specific conditions override these standards; which will be a case by case condition submitted in writing for approval.
- d. **Tree Crown Configuration:** About two-thirds of the total height of a tree shall have branching. This is the ideal branch distribution that would center the wind load, thus promoting healthy plant growth over time. One-half or more of the foliage should be on branches originating on the lower two-thirds of the trunk; and one-half or less shall originate on the upper one-third of the trunk.
- e. **Trunk:** A single straight trunk, with no double leaders (codominant stems), shall be specified with the exception of multiple stem species.

Planting Methods: Planting methods include above and below grade standards that shall be followed during planting as described below. Equally important is the way that plants are handled and cared for prior to planting. *Plants shall not be dropped or drugged to avoid root injuries. Plant stock shall also be kept moist throughout the root ball to avoid canopy stress.*

- f. **Planting Soil:** The single biggest factor to plant success is the soil. Bid Specifications shall require *current* soil testing because soils are dynamic and evolving; therefore, a soil test will need to be conducted for the Soil Submittal. *The Specifications shall establish the acceptable soil mixture for planting.* Half of the volume of soil is composed of solid matter, mostly mineral particles with some organic matter; and the other half consists of pore spaces of water and air. There are three soil characteristics that affect plant growth and well-being.
 - **Soil Texture:** The size distribution of particles affects the permeability of the soil. The composition of the solid material in soil is mostly sand, silt and clay particles; with the dominate particular size determining which category the soil is classified.

- Sandy soil contains more than 45 percent of sand. This soil type contains the smallest size of particle.
- Silt soil contains at least 40 percent silt.
- Clay soil only needs 20 percent clay to be classified as clay soil. This soil is the least water absorbent soil.

The best soil classification for plants are loam soils. Since loam soils are a composition of soils, they provide ideal growth conditions for a larger variety of plants. An example of loam is 40%40%-20%, a composition of sand-silt-clay, respectfully. *Specifications shall define the soil texture for planting.*

- **Soil Structure:** The ease of root growth through soil is influenced by water and air movement which is determined by pore size, not soil particle size. Soil particles are grouped into aggregates or granules that each act as a large particle for water and air movement through the soil. Particles are held together by a combination of electrical and chemical bonds, materials produced by plant roots and microorganisms, and iron and aluminum hydroxides. Soil aggregation is a slow process and it can be destroyed quickly. *The degree to which soil particles are aggregated is the soil structure. Desirable soil structure for plants are the soils with more aggregates. Desired soil structure shall be defined in the Specifications.*
 - **Soil Compaction:** The bulk density is a measurement of the porosity of soil measured in lb/ft. sq.. The greater the bulk density of the soil the greater the root restriction for plants. Compaction decreases total pore space as the pores are compressed, thus restricting root penetration. Compaction results in slow water infiltration, poor aeration (lack of air in the soil), reduced drainage, impaired root growth, increased erosion and greater susceptibility to root rots. *Soil compaction jeopardizes the plant's well-being and is the reason for specifying a minimum planting pit horizontal width of 2x the diameter of the root ball up to 5x the diameter, pending the species requirements.*
- g. **Planting Detail:** A graphic of the planting details shall accompany the Construction Documents (CD). Key planting requirements shall be included in a planning detail(s) in the CD set:
- Expose root flare shall be *level with* or 1" above the final grade.
 - Root ball shall rest on compacted soil for stability of the tree planting.
 - Never place soil over the root ball. The root ball shall be covered with mulch.
 - 3-4" of hardwood mulch shall top off the planting pit EXCEPT for the a 3" area around the trunk.
 - Wire basket/burlap shall be removed from the top ½ of the root ball; top and sides.
 - All synthetic burlap shall be removed completed from the root ball.
 - Planting pit must be a minimum of 2x up to 5x the diameter of the root ball; pending on the plant species.
 - Planting pit shall have scarified sides that slope in from the top to the bottom of the pit.
 - Trees shall only be staked for 6 months to 12 months' maximum, or/and through the first winter months after being planted. The long term effects of stakes on a tree is that they can produce a weak root system.
 - When staking a tree allow for the truck to move ½-1 "so as to encourage a strong root system with the tree's movement in the weather. Stakes should be located at the far outside edge the planting pit.
 - Nylon, polypropylene or similar ¾"-1" wide woven cloth tree straps shall be utilized to stake trees.

Maintenance Influences:

- h. Irrigation:** Shall NOT be included to any new landscaping projects due to the high probability of damage of underground irrigation elements over time. Establishment of each new plant is the critical watering demands, in addition to the hot summer drought weeks. All plants will need special watering care during their establishment time, but once this special need is over plants should be generally able to live with the typical rainfall and zone conditions. *For this reason, plant specifications should include a majority of plants that are drought tolerant and/or at least regionally adaptive.*
- i. Low-Maintenance:** Each new landscape design adds required maintenance to the already highly demanding tasks that Campus Facilities is responsible for on each campus. Perennial beds require hand weeding and are labor intensive. Color can be added within shrub beds with blooming shrubs and seasonally foliage changes to reduce the need for perennial beds. *For this reason, perennial beds shall be minimized in each new landscape design plan. Specifically, grasses shall be specified sparingly due to the difficulty of keeping these areas free of weeds.*
- j. Site Specifics:** Winter safety requires the use of saline products to keep walking and driving surfaces safe for travel. *For this reason, site locations of planting beds that are adjacent to hardscape walking and driving surfaces shall utilize salt tolerant plants at the edges of the plant beds or within the entire plant beds.* Other site specifics that need to be taken into account when specifying plants are:
- **Soil conditions – special needs require more labor**
 - **Sun and shade requirements of plants – a site condition that cannot be changed**
 - **Campus safety – plantings shall not promote ‘blind spots’ for pedestrians**
 - **Tree planting locations – to avoid future identified building or hard surface sites**
- k. Invasive plant species:** Plants that are considered invasive shall *only* be used in small controlled plant beds that are surrounded by hardscape to contain the spread of the plant beyond a limited area. Limiting the spread of an invasive plant is a demand on labor and maintenance funds. *For this reason, invasive plants must be strategically specified if utilized at all on campus.*

ⁱ The trunk-surface root zone is within 3 inches of the soil surface and 2 inches from the trunk of a plant.

ⁱⁱ The center root zone is within the root ball outside the trunk-surface root zone but not in the periphery of the root ball. The periphery root zone is at the edge and bottom of the root ball.