Virginia State University Tree Care Plan

Justification and Introduction:

Trees and shrubs are an extraordinarily valuable asset to the Virginia State University community. Benefits include energy efficiency of buildings near trees, improved air quality, reduced stormwater impact, and other environmental benefits.

Perhaps even more importantly, trees provide a sense of community and aesthetic appeal. One might rightly ask, "How many students would want to attend a campus without trees?" Trees bring life and vitality. Research has also shown social benefits such as reduced stress, improved mental vigor, and even reduced crime in areas with well-maintained trees and shrubs.

In order to achieve and maximize those benefits, it is necessary to have a healthy and well-maintained campus forest. Trees can be remarkably resilient, and this is often an excuse to avoid proper tree care. However, poor care can cause a tree to go into decline and die after a relatively long period of 3-10 years; so many people do not associate the short construction or other activity with the subsequent decline. When considering the large costs of subsequent tree removal and re-planting and the loss of benefits for a period while a new tree becomes re-established, the short-term costs of proper care and protection of the existing asset are relatively small.

Purpose: The overall purpose is to provide an aesthetic, safe, and sustainable campus urban forest that maximizes benefits to the University community. The specific objectives are:

- Ensure proper plant selection for the site.
- Ensure proper location with respect to buildings and other infrastructure.
- Ensure proper plant age diversity, by proper maintenance of the mature trees along with the maintenance of the younger trees.
- Encourage forest health with proper plant diversity.
- Protect existing assets through tree protection in construction site and staging area.
- Establish a response plan for the safe and timely cleanup of tree debris following a sudden weather event.
- Ensure the replacement of a tree when it has died or displaced due to pest infestation, construction activity, or weather.

Responsible Department: The Virginia State University Capital Outlay and Facilities Management Department is responsible for the implementation of tree care plan. Cooperative Extension Department will provide technical advice and guidance.

The Campus Tree Advisory Committee

A Campus Tree Advisory Committee will be convened at least twice per year (during Fall and Spring semesters) and chaired by Assoc. V.P.of Capital Outlay and Facilities Management or her designee. The committee consists of the following representatives:

- Student Body Representatives (2-3) – upon recommendation by Faculty
- Faculty Representatives (2-3)
- Community Representatives such as County Forester / Local Government Official (2-3)
- Capital Outlay and Facilities Management Reps.(2-3)
- Relevant Contractors
- Campus Security Representative
- Other staff as appropriate

   The advisory committee will meet twice a year and the members term will be at least one year, and then they may resign after a replacement is installed.

Campus Arboriculture Practices

1. Preface

Current woody plant management emphasizes the need to look at plants in a holistic manner. With this approach, one considers all three organs (roots, stems, foliage) and how they need to work in unison so the plant is able to reach its full potential and reach its normal live span. Woody plants have a juvenile, mature, and over-mature life stage, and each period requires different maintenance procedures. For woody plants to obtain their full potential, proper handling in the juvenile stage is very critical. Following is an outline of arboricultural practices that will enhance woody plants ability to reach its full potential.

Industry best management practices for installation and maintenance of trees shall be used by VSU. These standards are contained in ANSI A300 parts 1-9[1] (standards for tree care practices) and ANSI Z60 (standards for nursery stock) standards along with ISA's best management practices (BMPs). All Campus Facilities personnel shall comply with those standards. All future grounds-keeping, construction, and other contracts that potentially could affect the health and well-being of campus trees shall reference the standards above as a requirement for the contract.

Those standards provide a comprehensive description of tree care practices, but a few issues are highlighted below.

2. Plant Selection

The physical and cultural needs of a plant should fit the site parameters. By selecting the proper plant for the site, the maintenance is reduced and a healthier landscape is achieved. See CPTED attachment in appendix.

When selecting the plant, the following site parameters should be considered:

- Proximity to buildings and other overhead infrastructure that will interact with trunk and limbs.
- Proximity to roads, sidewalks, parking lot and other surface infrastructure that will interact with roots.
- Proximity to below-ground infrastructure.
- Proximity to and potential for blocking lights or security cameras.

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[1] Available via Tree Care Industry Assoc. (603-314-5380)

- Soil compaction and aeration.
- Soil pH, fertility, drainage.
- Availability of irrigation.
- Feasibility of future on-site tree maintenance.
- Species, genus, and family of nearby trees.

These site parameters should be compared to the characteristics of the proposed tree species:

- Mature height, crown width, and root zone.
- Drought tolerance.
- Tolerance of low soil air levels and compacted soils.
- pH and fertility requirements.
- Likelihood of pruning and other maintenance needs.

For the health of the urban forest, it is important to ensure sufficient biological diversity of the trees. When selecting new tree species to be planted, the current campus tree inventory should be reviewed. Any species that comprises or is close to 10% or more of existing campus trees, genus that comprises 20%, or family that comprises 30% (Santamore rule) should not be considered for future planting. Furthermore, when planting, tree species in the immediate surroundings of the planting site should be observed and significantly over-represented species should be avoided.

When selecting trees from a nursery, saplings selected should be of proper architecture, without codominant stems and the only pruning done at planting is to remove broken limbs and deadwood.

The plant should meet CPTED guidelines. (See attached sheet from CPTED training manual)

3. Planting

See ANSI A300.2 and 6, and see VCE attachment Tree and Shrub Planting Guidelines in appendix.

Proper installation of woody plants is perhaps the most important aspect for perpetuating a healthy campus urban forest.

The site the plants are installed into should be tested for pH, and fertility, and drainage.

Balled and burlap plants must meet ANSI Z60[1] standards (proper size ball for caliper of tree). Container stock must not have girdling roots. Whenever possible, planting should occur in the fall planting season. In the fall, the media should be washed off (bare root installation). If the fall planting is not achieved or not possible, tree should be planted in the early spring while still dormant. In the spring, the media should not be removed, but should be loosened before planting.

The installation of the plants will follow ISA BMP's. All top burlap removed, the top two sections of wire baskets cut off, along with any rope or twine, the planting hole dug per diagram, (see attached VCE publication), and the collar of the plant positioned no more than 2" above grade.

The excavated hole filled in half way and then PUDDLED in. Once water filters down the hole is filled and that soil PUDDLED in. (no stomping in of the back fill, this creates compaction). The plant should be planted straight so no staking is needed in most situations. The written specs will determine where skating is needed.

Specs should be written into the contract to follow ISA BMP standards for installation.

4. <u>Pruning</u>

See ANSI A300.1

Schedule of pruning will be defined by the plant's location, age, and genus. The type of pruning to be performed will be written into the contract following ISA's BMP's.

A trees first pruning, post installation, will be done at least three years after the tree has established itself and the pruning confined to structural pruning.

Trees 7-20 years old should receive structural pruning every 3-6 years. (Early structural pruning reduces pruning needs as the tree ages).

Trees of all ages near roadways, signs, overhead lights will be inspected annually for infrastructure conflicts, and pruned correctly to medigate conflict.

Pruning Practices; to enhance a safe and healthy campus urban forest the following guidelines should be followed.

    a. General
- All pruning shall be done to achieve a specific goal.
- Safety primary goal of pruning. (ANSI Z133.1 followed by all performing the pruning)
- Natural target pruning done and all cuts made to promote proper regrowth and encourage tree health. (exception, heading cuts may be done during storm damage clean up).
- When medium or large limbs are removed they shall be "roped" out to prevent damage to the growth under the removed limbs.
- The following four pruning terms (classifications) will be written into the bid invitations to ensure the trees are pruned to achieve the desired goal.
    b. Cleaning
- Removal of dead, dying, diseased, and defective limbs. This pruning is designed to reduce hazards, promote health, and improve appearance of the tree.
    c. Thinning
- General reduction of the density of branches, this will increase light penetration, decrease wind load, and improve visibility.
- Removal of weakly attached branches .Those branches with sharp V-shaped angles and / or included bark, and any branches that rub one another.
- Based on the age of the tree to be pruned, 10% live growth may be removed from mature trees. While up to 25% live growth may be removed from immature trees in one growing season.
- Trees should not be pruned while the leafs are developing, but done once the leafs are fully developed.
- Thinning should be performed on maturing trees and this practice will enhance the safety and aesthetics of the campus trees by preventing minor problems from becoming major problems. Also, pruning younger trees is much less expensive.
    d. Raising
- This pruning is performed to provide vertical clearance from lighting, signage, and buildings.

- Always maintain live branches on at least two-thirds of the total vertical tree height. This is termed proper live crown ratio. This growth pattern encourages tree stability.
    e. Reduction
- This pruning is done to decrease the height of a tree or decrease the length of an individual limb.
- The reduction pruning cuts must be made to a lateral limb that is at least one-third the diameter of the limb removed
- Thin the growth above the reduced limb to prevent die back due to shading from above.
- If half a limb needs removal the whole limb should be removed

5. <u>Cultural Practices</u>
    a. Mulching

Proper mulching will moderate soil temperature, prevent mower damage, encourage beneficial microbial development. It is important to prevent piling of mulch against the trunk of the tree as this becomes a vector for pathogens as well as stem-girdling roots. The "root flare" at the base of the trunk should be visible above the mulch line. Individual trees and beds should be no deeper then thee inches in depth. Where possible, mulch should be placed to the tree's canopy edge without digging an edge. (the dug edge cuts absorbing roots and damages the root system) If possible, chips and grindings (wood waste) from campus operations are stock piled and used for mulch.

    b. Irrigation

Trees and shrubs, if properly mulched, do not need constant irrigation. They need irrigation during periods of drought.

    c. Fertilization and Pest Management

Campus trees do not need a regular fertilization program, but only on a case by case situation should trees be fertilized. A soil test will be performed prior fertilization to determine the pH and what nutrients are needed .Pest management; periodic visual (quarterly) inspection of the campus forest will be performed by Urban Forestry Exten. and the results recorded in a management file. In the event a catastrophic pest (disease or insect) out break occurs on the campus the pest will be treated as soon as detected by the recommended method. The method used will be approved by the Virginia Cooperative Extension, and followed by periodic monitoring.

6. <u>Removals</u>

Live trees should be removed only when it is a safety concern, are detracting from the quality of the landscape, or when absolutely necessary for new construction projects. In the case of construction, consideration should be given to ways to leave as many trees as possible intact. The services of a Certified Arborist should be engaged during the planning stage to aid in the determination as to which tree(s) are salvageable and what procedures are needed to reduce the impact on the trees to be left.

The removal will be done following consensus approval by the campus tree advisory committee, and based on the Certified Arborists report. Removal of tree(s) in a non-construction site should be considered by the committee, except when the trees possess a emanate safety concern that cannot

be mitigated be a support system, or pruning. In the case of a tree being an emanate hazard (a tree which may fail at any time) the facility dept. will exercise its authority to remove the tree for safety considerations.

With constant observation of the campus forest and appropriate maintenance removals will be kept to a minimum.

Storm recovery and response first obligation is to remove debris that blocks roadways and access to buildings or is posing a hazard to the campus community. Once these needs are addressed a prioritized plan is begun to remove trees rendered unsalvageable and salvageable trees are pruned to aid in their restoration. As the budget allows trees lost are replanted to restore the campus urban forest. A predetermined outside contractor will be under contract to facilitate storm recovery if the damage is beyond the scope VSU's facilities capabilities.

7. Protection and Preservation

See ANSI A300 parts 5 and 9

To enhance tree survival due to construction activity a TRAQ (qualified assessor) consulted at the DESIGN stage. This follows ANSI A300 (part9) standards and ISA BMPs. Not all trees are savable but those that are can be identified, and the impact reduced.

On survey map tree whose root systems are likely to be impacted by construction activity or equipment will be identified and protected if the trees are deemed worthy of saving.

Tree Protection Zones will be fenced off by galvanized metal fencing (four feet in height) and anchored by metal stakes. The fencing will be erected before any construction activity begins. No plastic or wooden stakes are to be used. The fencing will have signage designating this area as a tree preservation site and no entry allowed, and no modification of the fencing permitted without approval of the arborist in charge. The fencing will extend a distance from the trunk of 1.50 feet per inch of trunk diameter measured 4.5 feet off the ground (DBH).

The area within the tree protection zone (TPZ) will have undesirable growth killed and mulched to a depth of 4" maximum.

The TPZ fencing will remain intact for the duration of the project and will be removed upon the facilities direction.

There is no activity permitted with the TPZ without the permission of VSU's facilities department. If a contractor damages the TPZ or causes compaction of the soil within the TPZ they may be required to pay for tree replacement and or soil remediation within the TPZ.

These measures may seem unusual but they are tried and true methods for preserving trees in a construction area.

Tree preservation increases the cost of construction, but in the long run it saves by not having to remove the tree post construction and by not losing the ecological benefits the mature tree provides.

8. <u>Goals and Targets</u>
- Tree inventory
- Tree canopy survey
- Landscape Master plan
- Increase in campus tree cover to XX%
- Reduction in number of tree removals needed
- Reduction in number of treatments needed and dollars spent for tree health issues.

9. <u>Tree Damage Assessment, Enforcement and Penalties</u>

This refers to contractors doing damage to trees/plantings during their activity, vandalism and other damage to vegetation.

10. <u>Prohibited Practices</u>

Bike locking to trees, Destruction of trees (Va. Code title18.2 chp.5, sec18.2)

11. <u>Communication Strategy</u>

Once adopted the Campus Tree Care Plan will be used by the University Architect, and Landscape Architect and will be included with invitation to bid, and the project manager will see to it that tree preservation guidelines are included in the project specifications. Upon adoption of the VSU tree care plan the plan will be placed on the web with links from the Office of the University Architect, and Planning, Design and Construction web sites.

<u>Revision Policy</u>

The campus tree care policy should be revised by the committee every 2 years or as needed. The revisions will be to update the various procedures and allow the plan to evolve.

<u>Appendix</u> Tech. Reference

ISA BMPs   ANSI A300 parts 1-9 (arboricultural standards)

ANSI Z133.1 (safety procedures) ANSI Z60 (nursery standards)
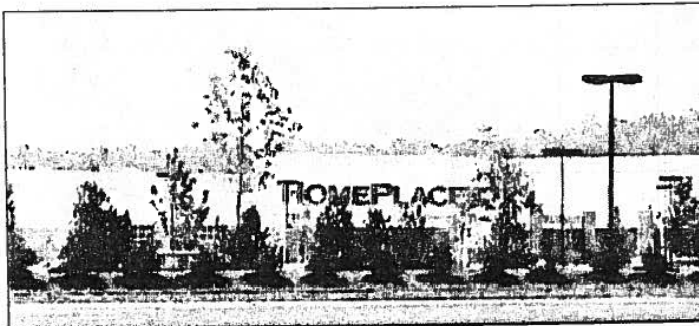

CPTED attachment:

LANDSCAPING

Landscapes can be particularly useful, as stated in the landscape ordinances of many communities, because properly designed and maintained, they "... facilitate the creation of a convenient, attractive and harmonious community; to conserve and protect natural resources, including air and water quality; to enhance property values; to preserve the unique character of an area; and to encourage the appropriate use of land."

Landscapes can work for CPTED by supporting the core components: Natural Surveillance, Natural Access Control and Territoriality. In order to create a landscape that aids in CPTED, it is critical to select appropriate plants and landscape materials, install them in fitting locations and stick to rigorous maintenance. Plants that "fit" in a landscape will be able to reach maturity and provide the maximum environmental benefits to the local community. Landscape materials, like stone, water, benches, gravel, fences, concrete, brick, bike racks, earth, lighting and plant materials, need to be selected to suit the space, the activities intended for the space and for the long term benefits each provides in creating a safe and aesthetically pleasing environment.

Landscaping is used to control the direction of movement both visually and physically. Landscaping and screening (to include walls, fences, etc.) is often required to buffer and protect the homeowner. Safety and security need to also be considered and addressed in every development. One goal may be to deny access to an area while providing opportunities for surveillance.

DESIGN STRATEGIES:

- Planting and selection of landscape materials should be such that sight lines remain open and clear and places of concealment are not fostered.
- Keep shrubs trimmed to a maximum of 3 feet, or at least below windowsills, when safety is an issue.
- Tree canopies should have a natural growth height of at least 4 feet from the ground when located around entrances, parking areas, walkways, etc.
- Elevate tree canopies to a height that provides adequate Natural Surveillance. If young trees are 'limbed up' too soon, it shortens their life and makes them more prone to failure.
- Choose plants that will naturally grow to the desired form or height to reduce maintenance, etc.
- If graffiti is a known problem in the area, specify thorny landscape plants as a natural barrier to deter unwanted entry.
- Specify vines or planted wall coverings to deter graffiti. Avoid blank spaces, which may be an invitation to graffiti vandals.
- Provide landscape and fencing that do not create hiding places for criminals.
- Consider creative solutions to fencing schemes that work aesthetically and functionally, while providing visibility to and from a site.
- Use lighting in the landscaping, both for security and aesthetics.

Above is an example in Henrico County, VA where an 'overlay district' requires a continuous hedge. What visibility to the business and parking lot is being allowed?

VCE attachment Tree and Shrub Planting Guidelines:

Virginia Cooperative Extension

Tree and Shrub Planting Guidelines

Bonnie Lee Appleton, Extension Specialist
Susan French, Extension Technician, AREC, Hampton Roads; Virginia Tech

Plant and Site Selection

Select trees and shrubs well-adapted to conditions of individual planting sites. Poorly-sited plants are doomed from the start, no matter how carefully they're planted.

Test soil drainage before planting. Dig a test hole as deep as your planting hole and fill with water. If water drains at a rate of less than one inch per hour, consider installing drainage to carry water away from the planting hole base, or moving or raising the planting site (berm construction).

Also consider using more water-tolerant species. For trees, try red maple, sycamore, bald cypress, willow oak, or river birch. For shrubs, try inkberry, redtwig dogwood and buttonbush. Avoid dogwoods, azaleas, boxwoods, Japanese hollies, and other plants that don't like "wet feet" where drainage is poor.

Examine soil for compaction before planting. If soils are compacted, consider replacement with a good loam soil, or incorporation of several inches of an organic material such as composted yard waste to a depth of at least 8 inches over the entire planting area. Do not incorporate small quantities of sand - compaction will increase and drainage decrease.

Site Preparation

Dig shallow planting holes two to three times as wide as the root ball. Wide, shallow holes encourage horizontal root growth that trees and shrubs naturally produce.

In well-drained soil, dig holes as deep as the root ball. In poorly-drained heavy clay soil, dig holes one to two inches shallower than the root ball. Cover the exposed root ball top with mulch.

Don't dig holes deeper than root balls or put loose soil beneath roots because loose soil will compact over time, leaving trees and shrubs planted too deep. Widen holes near the soil surface where most root growth occurs. Score walls of machine-dug (auger, backhoe) holes to prevent glazing.

Backfill holes with existing unamended soil. Do not incorporate organic matter such as peatmoss into backfill for individual planting holes. Differences in soil pore sizes will be created causing problems with water movement and root growth between the root ball, planting hole, and surrounding soil.

Backfill half the soil, then water thoroughly to settle out air pockets. Finish backfilling, then water again. Cover any exposed root ball tops with mulch.

Incorporate slow-release granular fertilizers into backfill soil to provide nitrogen, or if a soil test indicates a need for phosphorus or potassium. Avoid using fast-release agronomic fertilizers that can dehydrate tree roots. Use no more than 1# actual nitrogen per 1,000 ft. of planting hole surface. (Example - if using 18-6-12 with a 5' diameter hole, incorporate 0.3 oz. per planting hole.)

Tree and Shrub Preparation

Closely inspect the wrapping around root balls of B&B (balled and burlapped) trees and shrubs. Growers use many synthetic materials, as well as burlap treated to retard degradation, to wrap root balls. Many of these materials will not degrade. To insure root growth into surrounding soil, remove pinning nails or rope lacing, then cut away or drop the wrapping material to the bottom of the planting hole, backfilling over it.

Wire baskets used to protect root balls degrade very slowly underground. Remove the top 8-12 inches of wire to keep equipment from getting caught in wire loops, and surface roots from girdling.

Remove all rope, whether jute or nylon, from trunks. Again, degradation is slow or nonexistent, and ropes can girdle trunks and roots.

Remove plastic containers from container-grown trees and shrubs. For plants in fiber pots, break away the top or remove the pot entirely. Many fiber pots are coated to extend their shelf life, but this slows degradation below ground and retards root extension.

If roots are circling around the root ball exterior, cut through the roots in a few places. Cutting helps prevent circling roots from eventually girdling the trunk. Select trees grown in containers with vertical ribs or a copper-treatment on the interior container wall. These container modifications and treatments minimize circling root formation.

Tree Care After Planting

Remove tags and labels from trees and shrubs to prevent girdling branches and trunks.

Good follow-up watering helps promote root growth. Drip irrigation systems and water reservoir devices can facilitate watering.

Mulch, but don't over mulch newly planted trees and shrubs. Two to three inches of mulch is best - less if a fine material, more if coarse. Use either organic mulches (shredded or chunk pine bark, pine straw, composts) or inorganic mulches (volcanic and river rocks).

Keep mulch from touching tree trunks and shrub stems. This prevents disease and rodent problems if using organic mulches, and bark abrasion if using inorganic mulches.

Don't use black plastic beneath mulch around trees and shrubs because it blocks air and water exchange. For added weed control, use landscape fabrics that resist weed root penetration. Apply only one to two inches of mulch atop fabrics to prevent weeds from growing in the mulch.

Only stake trees with large crowns, or those situated on windy sites or where people may push them over. Stake for a maximum of one year. Allow trees a slight amount of flex rather than holding them rigidly in place. Use guying or attaching material that won't damage the bark. To prevent trunk girdling, remove all guying material after one year.

Most trees should not have their trunks wrapped. Wrapping often increases insect, disease, and water damage to trunks. Thin-barked trees planted in spring or summer into hot or paved areas may benefit from wrapping if a white wrap is used. To avoid trunk girdling, do not attach wraps with wire, nylon rope, plastic ties, or electrical tape. If wraps must be used, remove within one year.

For protection against animal or equipment damage, install guards to protect the trunk. Be sure the guards are loose-fitting and permit air circulation.

Prune codominant leaders

DO NOT prune terminal leader or branch tips

Prune rubbing or cross branches

Prune narrow crotch angles and water spouts

DO NOT stake or wrap trunk unless necessary

Prune broken branches

Remove tags and labels

Prune suckers

2"-3" mulch kept away from trunk

Cut away all balling ropes

Soil well to contain water

Remove top of wire basket

UNAMENDED backfill soil

Partially backfill, water to settle soil, finish backfilling

Widen and score hole wall

Area for water drainage (pipe or tile could be installed)

Remove container and cut circling roots if container-grown, or as much burlap as possible if field-grown

Leave solid soil pedestal - do not dig deeper than ball depth

Dig hole 2-3 times root ball width