VIRGINIA TECH CAMPUS TREE CARE PLAN
2008

1. PURPOSE
The purpose of the Virginia Tech campus tree care plan is to identify the policies, procedures, and practices that are used in establishing, protecting, maintaining, and removing trees on the Virginia Tech campus. The overall goal of the plan is to ensure a safe, attractive, and sustainable campus urban forest. The specific objectives of the plan are:

- Ensure proper species selection, high-quality nursery stock acquisition, and industry-consensus planting procedures
- Promote species diversity and proper age structure in the tree population
- Protect high-value campus trees during construction and renovation projects
- Promote tree health and safety by utilizing ISA's best management practices when maintaining campus trees
- Ensure that trees are reasonably replaced when there is mortality due to weather, pest infestations, injury, or construction displacement
- Encourage campus community members to respect and value the campus urban forest

Note: This plan has been promulgated in partial fulfillment of Arbor Day Foundation's standards for Tree Campus USA designation and does not reflect official university policy on all matters. However, many of these policies, procedures, and practices are currently in place and administered. The Arboretum Committee is seeking to have the plan officially adopted by the university.

2. RESPONSIBLE DEPARTMENT
Virginia Tech Grounds Department located within the Facilities Department under the direction of the Associate Vice President for Facilities.

3. CAMPUS TREE ADVISORY COMMITTEE
The tree advisory committee is formally known as the Arboretum Committee. The committee is comprised of faculty and staff from numerous plant related programs throughout the university. The committee meets biannually, and provides important input in to care and improvement of the campus landscape.

4. CAMPUS ARBORICULTURE PRACTICES

I. Pruning Schedule

The maintenance pruning schedule shall be dictated by tree species, age, function, and placement.

- Trees less than 7 years old should receive structural pruning on an annual or biennial basis
- Trees 7-20 years old should receive structural pruning every two to five years
- Trees 20 years old and older receive maintenance pruning every five to seven years to clean dead, diseased, dying, and defective branches from the crown

- Trees adjacent to roadways, walkways, signs, and street lights are annually inspected for safety and clearance issues and maintenance pruned as necessary

II. Pruning Practices

To encourage the development of a strong, healthy tree, the following guidelines shall be followed when pruning.

General

- Pruning shall not be conducted without a clear objective or outcome.
- Prune first for safety, next for health, and finally for aesthetics.
- When removing branches, the pruning cut shall not damage the branch bark ridge and branch collar.
- Internode (heading) cuts should not be used except in storm response and crown restoration procedures
- Branch reduction or thinning should be used to achieve pruning objectives rather than making large (>8" diameter) branch removal cuts.

Cleaning

- Thinning shall be performed to remove dead, diseased, dying, and defective branches, which reduces hazards, promotes, health, and improves appearance
- Large branches should be removed with the aid of ropes and rigging equipment to minimize the risk of tree injury from falling debris

Thinning

- Thinning shall be performed to reduce the density of branches, which increases light penetration, improves visibility, and decreases wind load.
- Assess how a tree will be pruned from the top down.
- Favor branches with strong, U- shaped angles of attachment. Remove branches with weak, V-shaped angles of attachment and/or included bark.
- Ideally, lateral branches should be evenly spaced on the main stem of young trees.
- Remove any branches that rub or cross another branch.
- Make sure that lateral branches are no more than one-half to three-quarters of the diameter of the main stem to discourage the development of co-dominant stems.
- Do not remove more than one-quarter of the living crown of a tree at one time. If it is necessary to remove more, do it over successive years.

Raising

- Raising shall be performed to provide vertical clearance from thoroughfares, signs, street lights, and structures
- Always maintain live branches on at least two- thirds of a tree's total height. Removing too many lower branches will hinder the development of a strong main stem.

- Remove basal sprouts and vigorous epicormic sprouts.

Reduction

- Reduction shall be performed to decrease the overall height of a tree or to decrease the length of an individual branch
- Use reduction pruning only when absolutely necessary. Make the pruning cut at a lateral branch that is a least one-third the diameter of the stem to be removed.
- If it is necessary to remove more than half of the foliage from a branch, remove the entire branch.

III. Cultural Practices

Mulching and Irrigation

Tree mulching- every two years for trees up to approximately 6". Periodically, drip lines of larger trees and tree groupings are mulched extensively with waste wood chips.

Fertilization and Pest Management

- Trees are treated for pest problems as needed. There is an extensive Dutch Elm Disease treatment program on campus. There is some regular treatment of Hemlocks on campus for Hemlock Wooly Adelgid.
- There is no regular tree fertilization beyond treatment received as a result of fall lawn fertilization. Specimen or high-value trees may receive prescription fertilization when severe nutrient deficiencies are diagnosed.

IV. Other Practices

Tree Removals

- Live trees are generally removed only when required to protect the public safety or are detracting from the quality of the landscape.
- Trees may only be removed after consultation with the Arboretum Committee where the committee reaches a consensus.
- Where the committee cannot reach a consensus, an independent assessment by a qualified arborist may be required and submitted to the committee for review.

Planting and Tree Diversity

- As the campus is used as a teaching lab, increasing the diversity of tree species is extremely important. However, species selection must be dictated by site conditions.
- A 'species list' for campus planting does not exist, but Arboretum Committee members are consulted regularly to recommend species for specific site conditions. Committee members often request use of new cultivars and species that are absent or underrepresented on campus to assist in their teaching activities. Based on the vernacular of the site, some

landscapes will be planted in native species while others may include exotics. Known invasive woody plants are consciously avoided in tree planting plans.

Storm Response and Recovery

Storm response and recovery are generally accomplished in-house. In a crisis, the first priority is to remove tree debris that blocks campus thoroughfares, disrupts campus operations, or poses hazards to the campus community. Once these critical needs are addressed, a prioritized recovery plan is implemented during which unsalvageable trees are systematically removed and salvageable trees are pruned to restore their health and structure. As the tree planting budget permits, lost trees are strategically replaced to restore the structure and function of the campus urban forest in a reasonable time frame. During storm response and recovery, trees requiring specialized equipment not available in-house are addressed by outside contractor.

5. PROTECTION AND PRESERVATION PROCEDURES

Protection procedures- See attachment one at the end of this document.

I. Preservation During Design Phase

On the site survey map, identify all trees whose root systems are likely to be impacted by construction equipment, cut and fill activities, utility corridors, proposed walks and roads, and potential construction staging areas; and whose branches may be damaged by construction equipment.

NOTE: if trees are grouped in a forest or woodlot, then only the location of the woodlot and any trees greater than 24 inches diameter at 4.5 feet above the ground (DBH) need to be identified

A. Not salvageable

1. All trees that are within the footprint or in close proximity to the footprint of a proposed building. (Note: alternative footprints to save large, valuable trees should be considered, provided that the alternatives maintain the desired features and costs of the proposed building)
2. Trees of undesirable species or in very poor health. Examples include, but are not limited to species that have low landscape and educational value, and heavily diseased or damaged trees that have little chance of recovering desirable form and function, even if protected from construction damage.

B. Low priority for protecting

1. Small trees (less than 10 inches DBH) that fall outside of the building footprint, but are likely to be impacted by construction activities.

2. Larger trees outside of the building footprint with relatively low landscape value. Examples include but are not limited to, trees with poor form, species of relatively low landscape and educational value, or trees with inadequate space to accommodate current or future growth even if the site is ameliorated.

C. High priority for protecting

1. Medium (> 10 inches DBH) to large (> 24 inches dbh) trees of desirable species with good form, good health, and room to continue to grow.

II. Avoid locating the general construction site around low and high priority trees where possible by:

A. Planning all construction activities including new utility corridors, staging areas, new sidewalks and new roads for a minimum clearance of 15 feet away from the base of trees, and not within the edge of the canopy drip line. Greater distances are desirable.

B. High priority trees should receive more consideration than low priority trees in planning corridors, staging areas, walks, and roads.

6. GOALS AND TARGETS

Tree Inventory

A digital tree inventory covering the core campus has been developed. When the data is placed on a web based server, updates will be performed by the Campus Landscape Architect, participating Forestry professor(s), the Landscape Superintendent and/or future campus Arborist. The inventory may be used for campus planning purposes, tree management, academic exercises (read only access), and the general public (read only access). As of September 2008, the data is stored locally on a Forestry Department computer. Notify Dr. Eric Wiseman re: needed updates.

Tree Canopy and Campus Master Plan

- See attachment two at the end of this document.
- Increasing the campus tree canopy is an important component of the draft University Sustainability Plan and Climate Action Commitment.

7. TREE DAMAGE ASSESSMENT, ENFORCEMENT, AND PENALTIES

Assessment on low profile trees is performed via the Arboretum Committee. Higher profile trees are assessed by an outside consultant (such as Bartlett Tree Experts). Enforcement of protection measures is performed by project managers and on-site engineers.

8. PROHIBITED PRACTICES

I. Bike Locking

Virginia Administrative Code
Title 8, Agency 105, Section 520

8VAC105-10-520. Parking enforcement.

A. Bicycles may be parked only at bicycle racks, except when permission has been granted to keep a bicycle inside a campus building. (Bicycles may be kept in a residence hall room with the agreement of the roommate. Bicycles may not be kept in any other areas of a residence hall. A department head must grant permission to keep a bike in a faculty office.)

B. Mopeds may be parked only at bicycle parking racks.

C. No person is allowed to park a bicycle or moped as follows:

1. On a sidewalk, at a tree or post, on a lawn, next to a building, in a roadway, at a utility pole, light post, banister, parking meter, or other available structure. Always use a bicycle rack.

2. So that it blocks or obstructs any entrance, exit, ramp or breezeway.

3. In any campus building (except as permitted in dormitory rooms and faculty offices).

4. In a parking area designated for motor vehicles.

5. In other than an upright position.

D. Bicycles or mopeds found parked and/or locked in areas other than those allowed may be impounded or immobilized by the Parking Services Office or the University Police Department. The person responsible for the bike will receive a bicycle parking citation.

E. Motorcycles may not be parked in bicycle racks. Students' motorcycles are to be parked in designated student motorcycle areas.

II. Destruction of Trees

Code of Virginia
Title 18.2, Chapter 5, Section 18.2

§ 18.2-140. Destruction of trees, shrubs, etc.

It shall be unlawful for any person to pick, pull, pull up, tear, tear up, dig, dig up, cut, break, injure, burn or destroy, in whole or in part, any tree, shrub, vine, plant, flower or turf found, growing or being upon the land of another, or upon any land reserved, set aside or maintained by the Commonwealth as a public park, or as a refuge or sanctuary for wild animals, birds or fish, or upon any land reserved, set aside or maintained as a public park by a park authority created under the provisions of § 15.2-5702, without having previously obtained the permission in writing of such other or his agent or of the superintendent or custodian of such park, refuge or sanctuary so to do, unless the same be done under the personal direction of such owner, his agent, tenant or lessee or superintendent or custodian of such park, refuge or sanctuary.

Any person violating this section shall be guilty of a Class 3 misdemeanor; provided, however, that the approval of the owner, his agent, tenant or lessee, or the superintendent or custodian of such park or sanctuary afterwards given in writing or in open court shall be a bar to further prosecution or suit.

III. Topping of Trees

Topping, heading, hat-racking, or any other form of inappropriate crown/branch reduction pruning shall not be permitted except in emergency situations or in executing a crown restoration procedure.

9. COMMUNICATION STRATEGY

Currently, the tree protection guidelines listed in attachment one are communicated to project managers for inclusion in to project specifications. The tree preservation categorizing process is used by the Office of the University Architect for building siting and campus master planning.
Upon official adoption, the plan will be placed on the web with links from the tree inventory, Office of the University Architect, and Planning, Design and Construction web sites.

ATTACHMENT ONE

(Excerpted from design guidelines provided on all construction projects)

TREE PROTECTION FENCING (TREE PROTECTION ZONES)

- Tree protection fencing must be installed around all existing trees noted to remain on plans within the fenced staging area. Fencing shall extend a distance from the trunk of 1.25 feet per each inch of trunk diameter or 6', whichever is greater. For example, a tree with a 12" trunk diameter shall be fenced 15' from the trunk (30' diameter)
- Area within tree protection fencing must be mulched with shredded hardwood or wood chips to depth of 4".
- Fencing must be installed prior to any equipment arrival on the site. Work may not begin until fencing is installed.
- Fencing shall be galvanized chain link as specified below, 4' minimum height.. Plastic fencing and wood stakes, or snow fencing are NOT acceptable.
- Fence shall be maintained for the duration of the project, and shall not be removed without the owner's permission.
- No material storage, vehicles or any other activity shall occur at any time within tree protection fencing.
- Contractor may be required to pay tree replacement and/ or soil compaction remediation costs if there is any incursion in to tree protection zones.

FENCE DESIGN AND MATERIALS

- The minimum height for all temporary fencing shall be 4 feet.
- The fencing shall be of galvanized 11-1/2 ga. chain-link construction with a minimum of 1-5/8" O.D. tubular steel posts and top rails.
- Surface mounted fence panels may be used with the approval of the owner and are to be adequately braced to resist wind and ice loading and shall be continuously connected to prevent access by the public.
- Privacy netting to screen construction activities shall be used on all "core campus" (bounded by Perry Street, Washington Street, West Campus Drive and Kent/Stanger Streets) projects, or as specified in the contract documents.
- Privacy screen material shall be green, equal to the weave of US Netting's Windscreen, polyethylene netting.
- Barbed wire shall not be used.

ATTACHMENT TWO
(Excepted from the 1994 Campus Master Plan Update- see related campus plan)

Campus Forest Areas

The proposed campus forest areas consist of existing wooded areas and open areas proposed for reforestation. There are four long-term objectives for the forest areas. The first is to maintain stands of large native trees with associated understory and ground layer plants that will provide a regionally fitting visual theme for beautifying and unifying the University owned area surrounding the core campus. The second is to provide the environmental benefits of cooling, enhanced storm water management, erosion control and water quality protection, increased species diversity and reduced water consumption and energy expenditure for grounds maintenance. The third is to provide areas for research, education, and passive recreation in close proximity to the campus. And, the fourth is to provide an example of environmental responsibility that will serve to heighten public awareness of the relationship between human society and the natural environment. All of these objectives are supportive of the University president's commitment to the 1990 Talloires Declaration for a sustainable future.

In balancing these objectives, it should be recognized that in areas of high visual sensitivity along roadways, the aesthetic quality of the forest should be given priority. Research activities that may result in "unattractive" landscapes or the dominance of invasive exotic species over extended periods of time should be located in areas with limited public exposure. The forest areas along roadways should be designed and managed to enhance and unify the campus image over the long-term with a minimum of short-term unattractiveness during periods of canopy establishment. The detailed planning of reforestation initiatives should also include, as an overarching design parameter, the maintenance of campus safety and security , and the preservation of significant views.

The forest areas should not be designed as strict restorations of the forest communities that naturally occur or occurred in the region during previous times. Rather, the forest areas should be designed to simulate the general structure and ecosystem functions of naturally occurring forest communities of the region, with a composition of species that may not necessarily replicate the original forests of the area. The designs and the management methods for each forest area should respond to the existing vegetation soils, hydrology, exposure, size, shape and context of each site.

The methods for establishing new forests should be adapted to the site conditions and budget available for each site. The preferred method of forest establishment in areas of high public visibility is to plant canopy trees at densities and proportions of species similar to their final desired configuration, and to allow and encourage invasion by understory species as the forest canopy develops. Examples of the canopy trees that would be included in the initial canopy plantings are listed below . The list will require refinement based on more detailed studies that would address issues of plant availability in required

sizes, species transplant characteristics, and the matching of tree types to field conditions.

Acer saccharum — Sugar Maple
Acer rubrum — Red Maple
Betula lenta — Sweet Birch
Carya sp — Hickory
Fagus grandifolia — American Beech
Fraxinus americana — White Ash
Liriodendron tulipifera — Tuliptree
Nyssa sylvatica — Black Tupelo
Prunus serotina — Black Cherry
Pinus rigida — Pitch Pine
Pinus strobus — White Pine
Pinus echinata — Short-leaf Pine
Quercus alba — White Oak
Q. coccinea — Scarlet Oak
Q. prinus — Chestnut Oak
Q. borealis — Northern Red Oak
Q. velutina — Black Oak
Tilia americana — Basswood
Tsuga canadensis — Hemlock

In the interest of minimizing the period for canopy establishment and increasing their immediate visual effect, trees should be planted at the largest sizes practical. Weed and grass competition should be reduced in the immediate area around the planted trees until such time that the new planting can successfully compete. Existing grass and forbes should be allowed to grow without mowing in the remainder of the project area, until they are ultimately shaded out and colonized by woody plants. The grass should be removed if rodent control becomes necessary to protect young trees from girdling. To maintain a neat edge along roadways, a narrow strip of lawn, free of trees, may be maintained during the establishment years, and later be phased out or maintained as a grass shoulder .
Other methods of planting may be employed in situations where less immediate visual effects are acceptable, or where soil conditions, exposure or the project budget will not allow planting large canopy trees at ultimate densities. These methods include: planting desired canopy trees at lower densities in loose savanna configurations that will, over time, naturally close or can be supplemented with future planting; planting desired canopy trees at higher than ultimate densities (probably with smaller size planting stock for cost reasons) to increase the rate of canopy establishment and the opportunity for development of an understory layer; and planting fast-growing pioneer tree and shrub species at medium to high densities to rapidly establish a canopy followed by inter-planting with longer lived shade tolerant canopy species. Variations of these methods are also feasible. The planting

of fast growing temporary shelter belts and hedgerows may also be desirable to provide protection for the new forests during the first several decades of their establishment. In proposed forest areas along the edges of large parking areas it would be desirable to include a large proportion of conifers for visual and wind screening. For example, the Prices Fork Road edge between West Campus Drive and Stanger Street should be planted in this way to supplement the street trees that are already there.