Public Tree Policy Manual

For the

Township of Woodbridge

Published by
The Township of Woodbridge
Department of Public Works
Division of Engineering

1 Main Street
Woodbridge, NJ 07095
Phone: 732-602-6047
Fax: 732-602-6048

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PURPOSE

The Township of Woodbridge is committed to the preservation of its unique village-like atmosphere, which is distinguished by its valuable and treasured community forest. Through sustaining the ecosystem, creating visually aesthetic landscaping, and maintaining and encouraging a diversity of trees, both in terms of age and species, our goal to preserve our environment can be achieved.

The Tree Ordinance (Section 23.50) of the Township of Woodbridge Municipal Code provides for the orderly protection of specified trees to promote the health, safety, welfare, and quality of life for the residents of the Township. By assuring the preservation and protection of the urban forest through regulations and standards of care, our natural resources will continue to enhance the landscape, streets, and parks, while helping to define the unique character of Woodbridge Township.

This Public Tree Policy Manual establishes the specific technical regulations, standards, and specifications needed to implement the Ordinance, and to realize the Township's public forest goals.

These goals are intended to provide consistent care and achievement in the following areas:

- Insure and promote preservation of the existing tree canopy cover within the Township Limits.
- Provide recommended standards for the maintenance of protected and public trees. Woodbridge's protected trees are the Torrey Pine and the Monterey Cypress as well as all trees of any species which are located within the Central Commercial, Open Space Overlay Zones of the Township, within a public right-of-way, or on public or township-owned property.
- Provide a standardized content for tree reports required by the Township.
- Establish criteria for determining when a tree is unsafe and a possible threat to public health, safety, welfare and/or the urban forest.
- Provide standards for the replacement of trees that are permitted to be removed.
- Increase the survivability of trees during and after construction events by providing protection standards and best management practices.

Although the primary intent of this policy manual is to provide guidance to the Township for the management of public trees, all Woodbridge residents are urged to use it as a reference tool for selecting, planting and maintaining privately-owned trees within the Township.

SECTION 1.00 DEFINITIONS

For the purposes of this *Policy* and interpretation of regulations, the following definitions shall apply:

1. Certified Arborist is an individual who has demonstrated knowledge and competency through obtainment of the current International Society of Arboriculture arborist certification, or a Registered Consulting Arborist with the American Society of Consulting Arborist.

2. Arborist means the person designated as such by the Township of Woodbridge.

3. Compaction means compression of the soil structure or texture by any means that creates an upper layer that is impermeable ('cap'). Compaction is injurious to roots and the health of a tree (see *Soil Compaction Damage, Section 5.20-A*).

4. Dangerous see Hazardous.

5. Dead Tree means a tree that is dead or that has been damaged beyond repair or is in an advanced state of decline (where and insufficient amount of line tissue, green leaves, limbs or branches, exists to sustain life) and has been determined to be such by a certified arborist. This definition may include a tree that is "dying." If the tree has been determined to be dead, removal may be permitted in accordance with Section 23.50.080 C-1 of the Township Municipal Code.

6. Diameter at Breast Height (DBH) or Diameter at Standard Height (DSH) means the diameter of the perimeter tree trunk at four and one-half feet (or 54 inches) above natural grade level The diameter may be calculated by using the following formula: DBH = circumference at 4.5-feet / 3.142 (D = C/Pi). To determine the DBH of multi-trunk trees or measuring trees on slopes, consult the current Guide for Plant Appraisal, published by the Council of Tree and Landscape Appraisers.

7. Director means the Director of Public Works or the Director's designee, unless otherwise specified in the Policy.

8. Discretionary Development Approval means Design Review Board or Municipal Council approval.

9. Disturbance refers to all of the various activities from construction or development that may damage trees.

10. Dripline Area means the suggested minimum area within X distance from the trunk of a tree in a typical location, measured from the perimeter of the trunk of the tree at 54-inches above natural grade, where X equals a distance ten times the diameter of the trunk at 54-inches above natural grade, or the distance ten times the diameter of the trunk at 54-inches above natural

grade, or the distance to the outermost edge of the tree canopy, whichever is the lesser distance. (Example; a tree with a DBH of 24" has a drip line radius of 240", (24" DBH x 10 = 240" or 20 feet from the trunk in all directions; 18" DBH x 10 = 180" or 15 feet.

11. Excessive Pruning means removing in excess of one-fourth (25 percent) or greater, of the functioning leaves and stems. Pruning in excess of 25 percent is injurious to the tree and is a prohibited act. Excessive pruning typically results in the tree appearing as a 'bonsai', 'lion's-tailed', 'lolly-popped' or overly thinned (*see 'Standards for Pruning Protected Trees', Section 2.15*). "Heading Cuts" and "Topping Cuts" are considered to be excessive pruning in the Township of Woodbridge.

Unbalanced Crown: Excessive pruning also includes removal of the leaf or stem area predominantly on one side, topping, or excessive tree canopy or crown raising. Exceptions are when clearance form overheard utilities or public improvements is required or to abate a hazardous condition or a public nuisance (see *Definitions, Section 1.17*).

Roots: Excessive pruning may include the cutting of any root two (2) inches or greater in diameter. It is recommended that a Certified Arborist be consulted prior to any cutting or removal of tree roots.

12. Hazardous Tree refers to a tree that possesses a structural defect which poses and imminent risk if the tree or part of the tree that would fall on someone or something of value (target) (see *Hazardous Trees, Section 4.00*)

13. Injury means a wound resulting from any activity, including but not limited to 'excessive pruning', cutting, trenching, excavating, altering the grade, paving or compaction within the tree protection zone of a tree. Injury shall include bruising, scarring, tearing or breaking of roots, bark, trunk, branches or foliage, herbicide or poisoning, or any other action foreseeably leading to the death or permanent damage to tree health.

14. Project Arborist means a certified arborist (see *Certified Arborist, Section 1.1*) retained by a property owner or development applicant for the purpose of overseeing on-site activity involving the welfare of the trees to be retained. The project arborist shall be responsible for all reports, appraisals, tree preservation plans, or inspections as required.

15. Protected Tree means: 1) a tree of the species *Cupressus macrocarpa* (Monterey Cypress); 2) a tree of the species *Pinus torreyana* (Torrey Pine); 3) a tree of any species located on property within the Central Commercial, Open Space Overlay Zones of Township, within a public right-of-way, or on public or Township owned property; or 4) any tree planted as a result of required mitigation for the removal of another Protected Tree(s).

16. Protective Tree Fencing means a temporary enclosure erected around a tree to be protected at the boundary of the Tree Protection Zone. The fence serves three primary functions: 1) to keep the foliage crown, branch structure and trunk clear from direct contact and damage by

equipment, materials or disturbances; 2) to preserve roots and soil in an intact and non-compacted stated; and 3) to identify the Tree Protection Zone (*see Section 5.15-E*) in which no soil disturbance is permitted and activities are restricted.

17. Public Nuisance means something that is offensive to the community or that violates the legal rights of persons or the community, as determined only by the Director of Planning and Community Development, City Attorney or the Public Works Department.

18. Public Tree means any tree growing within the street right-of-way [outside of private property], public property or easements. In some cases, property lines lie several feet behind the sidewalks or the edge of the paved street. A Township Encroachment Permit is required prior to any work on or around these trees. Check with the Public Works Department to verify prior to any work near a street tree.

19. Recommended Practice means an action, treatment, technique or procedure that may be implemented for superior care or preservation of trees. Recommended practices may be required under specific conditions of approval for discretionary development projects or injury mitigation.

20. Removal means any of the following: 1) complete tree removal such as cutting to the ground or extraction of the tree; or 2) taking any action foreseeably leading to the death of a tree or permanent damage to its health or structural integrity, including but not limited to excessive pruning, cutting, girdling, poisoning, over watering, unauthorized relocation or transportation of a tree, or trenching, excavation, altering the grade, or paving within the dripline of the tree.

21. Required Practice means a mandatory action, treatment, technique or standard of care required to be implemented by the property owner, developer, contractor or designee for the preservation of trees.

22. Root Buffer means a temporary layer of material to protect the soil texture and roots. The buffer shall consist of a base course of tree chips spread over the root area to a minimum of 6-inch depth, capped by a base course of ¾-inch quarry gravel to stabilize ¾-inch plywood on top.

23. Site Plan means a set of drawings (e.g. preliminary drawings, site plan, grading, demolition, building, utilities, landscape, irrigation, tree survey, etc.) that show existing site conditions and proposed landscape improvements, including trees to be removed, relocated or retained. Site Plans shall include the following minimum information that may impact trees: 1) surveyed tree location, species, size (height, width, DBH or DSH), dripline area (including trees located on neighboring property that overhand the project site) and street trees within 30-feet of the project site; 2) paving, concrete, trenching or grade change (including the limits of over-excavation) located within the tree protection zone; 3) existing and proposed utility pathways; 4) surface and subsurface drainage and aeration systems to be used; 5) walls, tree wells, retaining walls and grade change barriers, both temporary and permanent; 6) landscaping, irrigation and lighting within dripline of trees, including all lines, valves, etc.; or 7) location of other landscaping and significant features. All of the final approved site plan sheets shall reference tree protection instructions (*see also Site Plant, Section 6.35*).

24. Soil Compaction means the compression of soil particle that may result from the movement of construction tools (wheelbarrows etc.), workers, heavy machinery and trucks, or storage of construction materials, structures, paving, etc. within the Tree Protection Zone. Soil compaction can result in atrophy of roots and potential death of the tree, with symptoms often taking 3 to 10-years to manifest (*see Soil Compaction, Section5.20-A; and Aeration, Section 2.50-A*).

25. Soil Fracturing means the loosening of hard or compacted soil around a tree by means of a pneumatic soil prove (Gro-gun) that delivers sudden bursts of air to crack, loosen or expand the soil to improve the root growing environment.

26. Target is a term used to include people, vehicles, structures or something subject to damage by a tree. Note: A tree may not be a hazard if a "target" is absent within the falling distance of a tree or its parts (e.g., a defective tree in a non-populated area away from pathways may not be considered a hazard.)

27. Topping means the practice of cutting back large-diameter branches or truncating the main stem.

28. Tree Appraisal means a method of determining the monetary value of a tree as it relates to the real estate value of the property, neighborhood or community. When required, a certified arborist determines the appraisal by adjusting a tree's basic value by its condition, location and species using the most recent edition of the Guide for Plant Appraisal, published by the Council of Tree and Landscape Appraisers (*see Tree Reports, Section 6.00*).

29. Tree Protection and Preservation Plan means a plan prepared by a certified arborist or registered landscape architect that outlines measures to protect and preserve trees on a project (*see Tree Protection and Preservation Plan, Section 5.10 and Reports Section 6.30*). This plan shall include requirements for preconstruction; treatments during demolition and/or construction; establishment of a Tree Protection Zone for each tree; tree monitoring and inspection schedule; and a provision for continued maintenance of those trees after construction according to the requirement sin this Manual.

30. Tree Protection Zone or (TPZ) means, unless otherwise specified by a project arborist or Township Arborist, the area of temporary fenced tree enclosure (*see Protective Tree Fencing, Section 5.15-D, and Section 5.15-E*). Within the TPZ, roots that are critical for tree survival are typically found in the upper three foot soil horizon, and may extend beyond the dripline area. Protecting the roots in the TPZ is necessary to ensure the Tree's survival. The TPZ is a restricted activity zone where no soil disturbance is permitted, unless otherwise approved. TPZ must be identified for each tree and shown on all applicable improvement plans for a development project. Restricted and approved activities within the TPZ are outlined in Section 5.15-E. Unless otherwise specified, the approved minimum TPZ shall be formulated in the following way: The TPZ radius shall be 10 times the DBH of the trunk or the distance to the outermost edge of the tree canopy, whichever is the lesser distance. (*see Dripline area, Section 1.10*). For example: a 2-

foot DBH = a 20-foot radius from the perimeter of the trunk – or a 40-foot TPZ. The Township Arborist retains discretionary right to extend or modify the TPZ at any time.

31. Tree Report means a report submitted to the Township for review that is prepared by a certified arborist retained by the property owner or agent.

32. Tree Survey Report In the case of a discretionary development approval, a tree survey report is required to provide information about all trees on the site including: inventory of all trees, location species, size, condition, maintenance needs, potential impacts of disturbance, recommended mitigation measures, tree appraisal value, etc. (*see Tree Reports, Section 6.00*).

33. Tree Policy Manual is the document.

34. Trenching means any excavation to provide irrigation, install foundations, utility lines, services, pipe, drainage or other property improvements below grade. Trenching within the TPZ is injurious to roots and tree health and is prohibited, unless approved. If trenching is approved within the TPZ, it must be in accordance with instructions and table outlined in this Manual (*see Trenching, Section 5.20-C, and Pavement and Hardscape Conflicts with Tree Roots, Section 5.40).*

35. Verification of Tree Protection means the project arborist shall verify, in writing, that all pre-construction conditions have been met (tree fencing, erosion control, pruning, etc.) and are in place. An initial inspection of protective fencing and written verification must be submitted to the Township Arborist prior to demolition, grading or building permit issuance (*see Inspections, Section 5.30*).

36. Vertical Mulching means augering, hydraulic or air excavation of vertical holes within a tree's root zone to loosen and aerate the soil, typically to mitigate compacted soil. Holes are typically penetrated 4- to 6-feet on center, 2- to 3-feet deep, 2- to 6-inches in diameter and backfilled with either perlite, vermiculite, peat moss or a mixture thereof.

SECTION 2.00 TREE MAINTENANCE GUIDELINES

INTRODUCTION

This chapter establishes recommendations for the care and maintenance of Woodbridge's public trees. These recommendations apply to all persons who own or are engaged in the business of repairing, maintaining, or preserving these trees. The following recommendations are set forth for pruning (including for utility, fire safety and traffic encroachment purposes), planting, watering, soil and nutrient requirements, as well as insect, disease and fruit control. Guidelines for selecting an arborist are also included. These guidelines are based on sound arboricultural principles and are applicable to trees, shrubs and woody plants.

2.10 PROHIBITED ACTS

The following prohibited maintenance practices for protected trees apply.

A. Excessive Pruning

Except for clearance pruning of utility lines, traffic or abating a Public Nuisance, excessive pruning (see *Excessive Pruning, Section 1.11*) shall be considered a prohibited act.

B. Topping

Topping shall be considered a prohibited act (see *Topping, Section 1.27*). Seek alternatives to topping (see *Types of Pruning, Section 2.20-A*).

C. Other prohibited actions

Taking any action which could lead to the death of a tree or could permanently damage its health, including but not limited to excessive pruning, cutting, girdling, poisoning, over watering, unauthorized relocation or transportation of a tree, or trenching, excavating, altering the grade, or paving within the dripline are of a tree.

2.15 STANDARDS FOR PRUNING PUBLIC TREES

The most compelling reason to prune trees is to develop a strong, safe framework. All work to be performed on public trees shall be in accordance with the following standards:

A. Permission

Prior to performing any work on a public tree, an Encroachment Permit from the Township must first be obtained. The requirement does not pertain to Township personnel or contracted service providers involved in work related/approved activities.

B. Specifications

When an Encroachment Permit is required for work involving a public tree, specifications for the proposed work shall be written and shall be administered by a qualified arborist. Such specifications shall be designed to promote the preservation of tree structure and health.

C. Industry Standards

All work on public trees shall be in accordance with the most current edition of the following industry standards: (*see Performance Standards. Standard Practices for Tree Care Operations – ANSI A300-1995 Appendix G; Safety Standards, ANSI Z133.1-1994, Appendix H; and Tree Pruning Guidelines, Appendix F*).

2.20 PRUNING MATURE TREES

There are six types of pruning that may be required for use on mature regulated trees (*see ISA Tree Pruning Guidelines, Appendix F*). Prior to working on the tree, the tree worker is required to be familiar with these types of pruning as stated in the Performance Standards, ANSI, A300-1995. Species-specific pruning promotes the natural shape of the tree (i.e. excurrent, decurrent, vase-shaped, fast growing, etc.)

A. Types of Pruning

- Crown Cleaning
- Crown Thinning
- Crown Raising
- Crown Restoration
- Crown Reduction
- Utility Pruning

B. Tree Injury

Climbing and pruning practices shall not injure the tree except for the pruning cuts.

C. Timing of Pruning

To reduce the probability of insect infestation, disease, or infection, the following seasonal restriction apply, except when public safety is a concern (*see Tree Pruning, Surgery and Removal, Section 5.15-G*):

- Pine (Pinus ssp.) or Elm (Ulmus ssp.): Do not prune March-October.
- All species: Do not prune during the flush of spring shoot growth.
- Tree with this bark: Do not prune in summer when sunscald injury may be a factor.
- Deciduous trees (leafless in winter): Best pruned November-February.
- Hazardous trees of any species may be pruned any time of the year for abatement reasons.

2.25 PRUNING DISTRESSED TREES

Distressed trees require as much leaf area as possible to overcome stressed conditions. To avoid additional injury, the following measures shall be followed for these trees.

A. Injury or Disturbance

If a tree has been damaged by injury or disturbance, delay pruning until deadwood becomes evident (typically 1-3 years after injury). Crown cleaning is then recommended

B. Neglect

Trees that have received little or no care or maintenance may need moderate crown thinning, reduction of end weights, or entire crown restoration.

2.30 PRUNING YOUNG TREES

Pruning trees early will improve life expectancy and is a proven, cost-effective measure. Added benefits are also reflected in safer trees with fewer branch failures. Trees that serve as replacements for public trees shall be pruned in the following way:

- Young trees should be pruned during the second year after planting to improve their structure, and only minor crown cleaning every 3-7 years thereafter. Refer to ISA Tree Pruning Guidelines (*see Appendix F*).

- Branches should be spaced at least 18-inches apart to alleviate tight grouping branches.

- Select permanent branching and allow temporary low branching on the lowest part of the trunk to remain.

2.35 WILDLIFE AVOIDANCE / MIGRATORY BIRD TREATY ACT COMPLIANCE

Prior to pruning any tree, it is important to ensure that birds and other wildlife are not currently nesting in the subject tree. For most species of trees, November through February is the best time to prune when considering the health interests of the trees. This time frame is also the best time to prune when trying to avoid bird nests.

It is important to note that state and federal regulations (such as the Migratory Bird Treaty Act) prohibit the disturbance and destruction of active bird nests.

2.40 FERTILIZING

Apply fertilizer only if specified by the Township's Arborist. Fertilizing mature trees is generally not necessary. Fertilizing may be specified for trees that will be impacted by an upcoming disturbance, grade changes, or modified environment. Fertilizing, in these instances, may aid the tree to overcome the stress caused by disturbance. Specifications for fertilizing trees will be determined by the Township Arborist or Township Landscape Architect on a case by case basis.

2.45 WATERING SCHEDULE

Newly installed trees, including drought tolerant species, are dependent upon supplemental irrigation until established, typically for two years. If a tree is native to areas of higher rainfall, then the tree will require supplemental water – usually by means of an irrigation system – throughout its life cycle, unless the tree finds a subterranean water source. Periods of extreme heat, wind or drought may require more or less water than recommended in these specifications. The method and amount that is applied may vary depending upon soil composition, drainage, heat, wind, planting location, or periods of abnormal rainfall (*see Drainage, Section 3.40-C*). With the specific exception of Torrey Pine trees (*see Appendix I*); the watering of public trees or their replacements shall follow these standards:

A. New trees

During the establishment period (1-2 years), trees should be watered thoroughly to their root depth as frequently as needed. A watering schedule, which should include watering frequency and quantity, is recommended. The minimum standards should be as follows:

- 1-3 months in the ground: 4 times per month or as necessary
- 4-6 months in the ground: 2 times per month or as necessary
- 7-12 months in the ground: 1 time per month or as necessary

B. Mature trees

Most mature public trees in the Township are established in areas without formal watering systems. These trees shall only receive manual irrigation when it is determined necessary by the Township Arborist in order to restore the health of the tree(s). In this case, the watering specifications shall also be determined by the Township Arborist.

C. Watering Methods

The method and type of watering system to be used is dependent on the location as well as the associated public improvements installed at the time of the tree planting. It is recommended that trees planted in association with the construction of public improvements (medians, parkways, sidewalk tree wells, et.) should be irrigated by automated watering systems. The type of automatic system used shall be determined by the Public Works Director in consultation with the Township Landscape Architect and Township Arborist.

Trees planted in public areas where no irrigation system exists shall be hand-watered until established. After that, a watering schedule determined by the Township Arborist or Landscape Architect, shall be in effect until deemed to be no longer necessary.

2.50 SOIL IMPROVEMENT

Every effort to avoid compaction of soil porosity within the Tree Protection Zone shall be taken at all times (*see Soil Compaction, Section 1.24*). When required by the conditions of the Design Review Board (for a project or a s mitigation for injury or a prohibited action), the following performance standards for improvement of compacted or damaged soil shall be implemented:

A. Aeration

Soil that is damaged or compacted within the dripline of public trees shall be loosened or aerated to promote root growth and enhance tree vitality. One of the following aeration methods shall be specified in effort to correct compacted soil conditions:

- Vertical Mulching: auger holes 2 to 4-inch diameter, 2 to 3-feet deep, on 4-foot centers and backfilled with porous material such as perlite, vermiculite or volcanic rock.
- Radial Trenching: with an air excavator, excavate a soil trench 3 to 6-inches wide and a minimum of 12-inches deep from (approximately) 3-feet from the trunk out to the dripline area. The trenches shall radiate out form one foot apart at the closest point.

- Soil-fracturing with a pneumatic air-driven device (*see Site Plan, Section 1.23*).
- Subsurface injections under moderate hydraulic pressure using a three-foot probe and applied on 3-foot centers under the dripline.

B. Drainage

Adequate drainage must be provided to the surrounding soil for the planting of new trees. If the trees are to be planted in impermeable or infertile soil, and water infiltration rates are less than 2-inche an hour, then one of the following drainage systems or other approved measures must be implemented.

- French drain, a minimum of three feet in depth
- Drain tiles or lines beneath the trees
- Auger six drain holes at the bottom perimeter of the planting pit, a minimum of 4-inches in diameter, 24-inches deep and filled with medium sand or fine gravel.

2.60 INSECT AND DISEASE CONTROL

If acting against pests is warranted, Integrated Pest Management (I.P.M.) suggests that the pest source be identified and targeted with a specific and timely treatment. If it appears that insects or disease may lead to the death of a public tree, then it is the responsibility of the Township to evaluate the condition according to the following guidelines and treat the problem in a timely fashion to prevent further deterioration of the tree.

A. Insects

For treatment, consult a pest control operator that is licensed by the New Jersey Department of Pesticide Regulation. Accurate timing is critical for success.

- Nontoxic materials should be used whenever possible.

B. Disease and Decay – above ground

Disease such as heart-rot decay that erodes the health or weakens the structure of a public tree may compromise the safety of people or property (see Hazardous Trees, Section 4.00). It is the Township's responsibility to correct a known hazardous condition in a timely fashion.

- Consult with a certified arborist for remedy possibilities, for example, pruning out infected branches, thinning, or the spray application of a chemical treatment.

C. Disease – below ground

Soil borne diseases, such as Root Rot *(Phytophthora sp.),* are present in Woodbridge soils. Often, a poor landscape design surrounding old trees encourages harmful and often lethal diseases. The following conditions that favor a disease environment must be avoided.

- Conditions to avoid: Compacting of the soil within the tree's dripline, adding fill dirt, rototilling, trenching, removing soil from the tree root are, and excessive or regular watering on or near the tree trunk area and planting incompatible water-loving plants

within the tree's dripline. Combined with poorly drained soil, these factors often activate normally dormant fungi to become opportunistic and infect the tree, which can lead to the decline and eventual death of the tree. This decline can be slow and may not be evident for many years.

- Landscape Design: When planning landscaping around a public tree, and evaluation of the tree and soil must be performed to determine if there is a disease present. If the tree is diseased and it is reasonable to expect that landscaping will contribute to decline, permanent damage or render it hazardous, it is the obligation of the Township to take measures to reduce or eliminate the conditions that may cause the decline of the public tree.

2.80 FRUIT CONTROL

While many trees produce flowers or fruits or some kind, some trees can be considered a nuisance if the use area is not compatible with the litter generated by the tree. For example, the dropping fruit of the European Olive *(Olea europaea),* American Sweet Gum (*Liquidamber styraciflua),* or acorn drip of a Holly Oak *(quercus iles)* may be a safety hazard if it is in the proximity of a handicap ramp or other high pedestrian area. In such cases, control measures are warranted. Control can only be successful if materials are applied carefully at optimum timing. For treatment to control the situation, consult a pest control operator that is licensed by the New Jersey Department of Pesticide Regulation.

2.90 FIRE PROTECTION

The following measures are recommended (but not required) to be followed by Woodbridge Homeowners. If followed, they may help avoid a catastrophic and irreplaceable fire loss to persons, houses, hillsides and mature trees that are centuries old.

Checklist:

- Keep dry grass mowed below 6-inches.
- A 30-foot defensible space should be maintained.
- No vegetation growing or combustible storage under decking.
- No tree canopy within 10-feet of chimney spark arrester.
- Break up solid areas of non-fire-resistant, continuous plant growth (which create a fire-ladder).
- Ask nursery professionals or get advice from a landscape architect or garden designer about fire-resistant shrubs to use in landscaping.
- Keep tree(s) well-watered, regularly pruned and in healthy condition.
- Prevent build-up of leaves and old branches.
- No firewood storage within 10-feet of structures.
- Make sure your driveway, road and bridges allow access for fire equipment (14-foot vehicle clearance needed.)
- Homes adjacent to slopes over 30% will need additional clearing and thinning of vegetation from the structure 100-200 feet to protect against radiant and convective heat currents and flame reach.

2.95 TIPS FOR SELECTING AN ARBORIST

A. Who should you look for?

Hiring a tree care provider deserves careful consideration and caution. A mistake can be expensive and long lasting, while the right choice can assure health, beauty and longer life for your trees and landscape. The following suggestions will help Woodbridge residents select an arborist:

- Look for professional membership affiliations. Membership does not guarantee quality, but a lack of may cast doubt on the company's commitment to professionalism.
- Use an arborist or tree worker that has been certified through a program of the International Society of Arboriculture (ISA). This program is the standard of performance for appropriate training, experience and knowledge about tree care.
- It is best to use an arborist who is familiar with the trees and ordinances of the Township of Woodbridge.
- Require a certificate of insurance including liability for personal injury and property damage, and workers compensation. Phone arborist's insurance company to make certain each policy is current. Under some circumstances, the Township may be held financially responsible if an uninsured worker is injured or if damage is done to private property.
- Ask for local references and information about other jobs the company or individual has done in Middlesex County. Experience, education and good reputation are signs of a good arborist.
- Have more than one arborist look at your job and give you a written estimate that clearly states their scope of work. Don't expect a company to lower its bid to match another's bid. Be willing to pay for the estimate, if necessary. Two or more opinions and estimates are worth the extra effort.
- A good arborist will offer a wide range of services including removal, pruning, fertilizing, cabling, pest control, etc.
- A good arborist will not recommend topping.
- A knowledgeable arborist will not use climbing spikes if the tree is to remain in the landscape. These should be used only for removal or an emergency rescue. Climbing spikes should never be used for trimming, even on palm trees.
- Beware of an arborist who is eager to remove a living tree. Removal clearly should be a last resort.

B. The Contract for Services

To be assured of having your work performed to the standards you expect a contract should include all the necessary assurances. Most companies will provide their own contract and should include the following basics:

- Dates that work will begin and end.
- List exactly what will be done. If the trees are to be sprayed, get a written statement detailing the insect or disease to be treated, the chemical to be used, and what precautions need to be taken.

- If fertilizer is to be used, how many pounds of fertilizer per inch of trunk diameter will be applied and by what method.
- Cleanup procedures should be listed. Clarify if a tree removal includes grinding the stump and surface roots and if so, how deep?
- Will they remove grindings and backfill the hole?
- A traffic/pedestrian control plan.

C. Using Arborists for Preventative Care

- A proactive tree and plant health care program can assure that minor, early pruning will prevent major, corrective pruning later on.
- Annual inspections will likely help you develop the landscape relatively hazard-free and display attractive curb appeal.
- Consulting arborists also offer advice and appraisals, diagnosis of problems, and recommend treatment. They also can provide a second opinion, if needed.

SECTION 3.00 REMOVAL, REPLACEMENT AND PLANTING OF TREES

INTRODUCTION

A Protected Tree may not be removed without Township review and approval, except in certain emergencies. The purpose of Township review is to verify that the removal is allowed under Township law, and to prevent unnecessary tree removal. In some cases, a removed tree must be replaced by the property owner or, in the case of Public Trees, the Township. This section refers to the permit application process used for the proposed removal of protected trees and it also provides the technical specifications to be used when planting a new or replacement tree.

3.1 TREE REMOVAL

A. Allowable Removal

A Tree Removal Permit is required to remove a Protected Tree. In the case of Public Trees, a [separate] Encroachment Permit from the Township is also required. (This statement does not apply to the Township or its contractors).

B. Permit Application

Tree Removal Applications are available at the Township of Woodbridge, Department of Public Works, 225 Smith Street, Keasbey, NJ or the Township's website at www.twp.woodbridge.nj.us

3.2 TREE PLANTING SPECIFICATIONS

The following specifications pertain to all trees that are to be planted within the public right-of-way or on publicly-owned property with the exception of Torrey Pines trees, for which specific planting and watering specifications are included as Appendix I. Also, it is highly recommended that the residents of Woodbridge follow the species and planting recommendations listed in this manual.

A. Species

Replacement trees shall be of the same species unless the Director of Public Works determines, through consultation with the Township Arborist and/or Landscape Architect, that another species would be more suitable for the location. Factors to be considered include: the long term health of the tree in the location; its compatibility with the adjacent uses; and any adopted streetscape or master planting plans that encompass the tree's location. In the event that an alternative species of tree should be planted, the new species shall be selected form the applicable plan or the Preferred Species Tee List (*see Appendix C*).

B. Location

The location of a replacement tree shall be subject to the approval of the Public Works Director. A replacement tree shall be planted in a reasonable location as close as possible to the removed tree, unless otherwise noted in an approved streetscape or master planting plan.

C. Area Requirements

The planting area that can be considered a minimum size for a tree varies by species. A reference for the width of parkways and tree wells that is to be used as a standard for tree planting area is

the most current publication of Street Trees Recommended for New Jersey, published by Street Tree Seminar, Inc.

3.3 PLANTING STOCK AND MATERIALS

A. Quality

It is the contractor's responsibility to supply stock that meets ANSI Z60.1-1996 and Township of Woodbridge Tree Policy Manual Standards and Specifications.

- All plants and trees installed within the Township of Woodbridge shall conform to the American Association of Standards, ANSI Z60.1-1996, *Specifications for Acceptance of Nursery Trees at the Time of Delivery*, in all ways.
- Plants shall be sound, healthy, vigorous, and free of plant disease and insect pests and their eggs.
- Container stock shall be grown for at least 8-months in containers in which delivered and shall not be root bound or have girdling roots.
- Trees shall not have been topped or headed-back.

B. Miscellaneous Materials

When deemed necessary by the Township Landscape Architect or Township Arborist, the following materials, as specified, shall be used:

- Tree stakes: Support stakes shall be treated or untreated 2-inch diameter Lodgepole Pine, two stakes per tree or approved equivalent. No cross brace shall be used. After installation, stakes shall be trimmed so that the branches clear the top of the stake. Generally, the stakes shall have an installed height of two-thirds the height of the tree.
- Tree Ties. V.I.T. or Cinch-Tie: Tree Supports (recommended) or equivalent, twist brace, fabric-reinforced rubber (3/8-inch minimum), or equivalent approved by the Township of Woodbridge shall be used and installed in a figure eight fashion to support the tree to the stakes at the bending point of the truck.
- Mulch: Screened untreated wood chips ½- to 1-inch in size, spread to a 2-inch depth out to the edge of the root ball. The mulch should be kept at least six inches away from the trunk and shall be applied to each tree at two-time the diameter of the tree rootball, if feasible.
- Root Control Barriers: Where appropriate, use along public sidewalks, and as indicated on approved plans and drawings. 18-inch linear barrier shall be used. Unless specified otherwise, a 10-foot length shall be placed on center with the tree and on the sidewalk or curb side only. Root barrier boxes or barrier circles that encircle the tree are not approved. Site appropriate geotextile root barriers with pre-emergent may be used.
- Mower guards. For trees in turf areas requiring regular mowing, the tree stem shall be protected with Tree Guard or equivalent and shall be 4'x4' unless specified otherwise.
- Tree Grates: Where sidewalk width is less than 8-feet and new trees will be installed in a tree well, decomposed granite, d.g., shall be used as a mulch covering that is flush with the surrounding paving, as approved by Public Works. Tree grates are appropriate for

some areas of The Village are in Woodbridge where a 60" wide pedestrian width cannot be attained without the use of tree grates. Tree grates shall be mounted in tree grate frames. Minimum size for tree grates shall be 5 feet square, but rectangular and larger sizes are encouraged for certain medium to large trees.

3.4 PLANTING SITE PREPARATION

A. Soil Preparation and Conditioning

- All debris, wood chips, pavement, concrete and rocks over 2-inches in diameter shall be removed from the planting pit to a minimum of 24-inch depth, unless specified otherwise (*see also Soil Improvement, Section 2.50*).

B. Planter Pit

- Trees in a confined planter pit or sidewalk area:
    - The planting hole shall be excavated to the depth of the tree rootball/nursery container x the width of the exposed area.
    - Scarify the sides of the pit.
    - Soil beneath the root ball shall be native, undisturbed soil.

- Trees in all other areas:
    - Excavate the hole's width a minimum of two times the diameter of the container, and deep enough to allow the root ball of the container to rest on firm soil.
    - Scarify the sides and the bottom of the pit.
    - Soil beneath the root ball shall be native, undisturbed soil.

- The tree should be placed so that the long term height of the container root ball will be 1-2-inches higher than the existing grade level.

C. Drainage

1. Planting Percolation Test. A minimum of one test per improvement site is required. Additional tests may be needed as required by Landscape Architect or Township Arborist. Fill planting hole with water; provide drainage that is greater than 2-inches per hour. If percolation is less, one or more of the following mitigation measures must be implemented for tree planting (*see Soil Improvement, Section 2.50*).
2. Poor drainage. For capital improvement projects, a percolation test is required to ensure there is adequate drainage for planting new trees. A minimum of one test per site shall be reviewed with Township Landscape Architect or Township Arborist prior to plant installation. One or more of the following mitigations are required for locations with poor drainage.

Mitigation for locations with poor drainage:

- Install French drain. The trench shall radiate away from the tree and be a minimum of 18-inches in depth filled with drain rock. The grade shall fall away from the tree trunk.
- Install perforated pipe directing water away from the tree.

- Install a drain chimney at the bottom of the planting pit. With a filter-fabric lined, perforated hollow pipe a minimum of 4-inches in diameter to ensure percolation of all water from the filled planter pit. Auger bore drain holes to penetrate hardpan or cileechee clay a minimum of 12-inche into undisturbed pervious soil. Angle the boring as close to vertical as possible.

D. Aeration tubes for trees

- Trees planted in the Township right-of-way, sidewalk planter pits, planting strip, medians or protected tree when specifically required in improvement plans, shall use 4-inch diameter perforated aeration piping (rigid or flexible), circling the bottom of the planter connected by a "T" fitting to two riser tubes with grated caps and wrapped with filter fabric – or other detail as approved by Public Works Director. A detail shall be shown on the approved landscape plans.
- All trees not in a planter (*see Aeration Tube Table, 3-1*) shall be planted with 4-inch diameter perforated aeration tubes with grated plastic caps placed at the edge of the root ball to the bottom of the pit per Table 3-1, Aeration Tubes. Irrigation heads shall not be installed inside the aeration pipes.
- Any of the above hole, pipes, grates or fixtures shall include the installation of Filter Fabric wrap over the side openings and be secured as recommended by manufacturer when connected to an approved aeration system.

TABLE 3-1
Aeration Tubes

AERATION TUBE TABLE	
TREE SIZE	NUMBER OF TUBES
15 gallon trees	One tube
24' box trees	Two tubes
36' box trees	Two tubes
48" box trees or larger	Four tubes or as needed

3.5 PLANTING THE TREE

Unless otherwise directed by the Township Arborist or Township Landscape Architect, the tree planting guidelines of this policy (see appendix J) shall be used. These guidelines are also intended as a handy reference for private property owners.

3.6 PLANTING IN DIFFICULT SOIL CONDITIONS

A. Turf Areas

In turf areas the watering berm may be eliminated. Trees in turf areas shall have a ring of mulch. The turf shall be maintained a minimum of one foot from the new tree stem, with mulch placed on top of the root ball. The mulch shall be 6-inches away form and not touching the tree stem. In turf areas, install tree guard.

B. Alternate Specifications

Occasionally, tree planting must occur in poor or difficult soil where standard-planting techniques will result in poor-to-average performance or mortality (such as unique or unusual regional geology, slope, soil volume, restrictive physical or chemical properties, poor drainage, etc.). In this case, the responsible party must investigate alternative solutions to enable long-term tree growth. Alternative planting specifications or plans that vary from the native or typical soil conditions shall be submitted to the Township Arborist for approval prior to installation.

- Alternative or specified soils, such as engineered, amended or structural urban tree soil mix, including written specifications and physical samples, shall be submitted for approval from the Township Arborist and/or Landscape Architect (*see Alternative Base Course Materials, Section 5.40-D*).

SECTION 4.00 HAZARDOUS TREES

INTRODUCTION

Health and safety of a tree are two distinct functional characteristics. A vigorous and healthy tree may not necessarily be of sound wood or structure. To remove a dangerous tree, it must first be evaluated and determined to be "hazardous" as defined in this section. This must be verified in writing by the Township Arborist and a Tree Removal Permit shall be obtained before its removal. In accordance in DMMC 23.50.050©, the Township may remove a tree in an emergency situation for reasons for public health, safety and welfare.

A. Tree Hazard Responsibility

On public property, it is the responsibility of the Township to mitigate or abated a known hazardous condition of a tree that may be of questionable structure or deemed as hazardous.

B. Recognizing Tree Hazards

Determining whether or not a tree's defect constitutes a condition that presents an imminent hazard requires a high degree of knowledge and experience. Hazard tree assessment of a tree should be evaluated only by an arborist who is familiar with tree physiology and can interpret the external signs of weaknesses, perform internal checks if necessary, and recommend mitigation. The Township Arborist shall be responsible for hazard assessment of public trees. (*see Hazard Reduction and Prevention, Section 4.40, and Hazard Evaluation Form, Section 4.20-B*).

4.10 EMERGENCY REMOVAL CONDITIONS

A. Abatement

When a public tree has partially failed or is deemed about to fail and persons or properties are immediately threatened, the Planning Department may approve removal without an Arborist's Report. In emergency circumstances, the situation may exempt the tree from Tree Removal Permit process; however, the tree must be removed in accordance with DMMC Sections 23.50.040 and 23.50.050 (see Appendix A).

4.20 CRITERIA USED BY THE TOWNSHIP TO DETERMINE IF A TREE IS HAZARDOUS

A. Definition of Hazardous

If a tree possesses a structural defect that may cause the tree or part of the tree to fall on someone or something of value (i.e. 'target'), and the condition is determined to be imminent, the tree is considered hazardous.

B. Evaluation Form

The Township uses the national standard, and ISA – HAZARD EVALUATION FORM as a basis to determine the hazard rating of a tree (*see Hazard Rating, Section 4.25*). This form or an approved equivalent must be completed by the Township Arborist.

C. Authorization

If the hazardous condition or *target* cannot be mitigated or reduced to a less than significant level then the tree shall be authorized by the Township, in accordance with DMMC Section 23.50.080 C-6, to be removed to abate the condition.

4.25 DETERMINING A TREE'S HAZARD RATING

For the purpose of removal, if a tree is declared a hazard, it must be rated for the level of hazard to persons or property by using the Hazard Rating Formula, or other professional methodology acceptable to the Township of Woodbridge (*see Hazard rating formula Table 4-1 and Appendix E*).

TABLE 4-1
Hazard Rating Formula

ISA – HAZARD RATING FORMULA **International Society of Arboriculture**			
Failure Potential	**+ Target**	**+ Additional Factors/Size of Part**	**= Hazard Rating**
	+	+	=
1= low	**1 = low**	**1 = low**	**3- low**
4 = severe	**4 = severe**	**4 = severe**	**12 = severe**
Note: The above factors are combined to quantify a hazard rating. For example, a minimum rating of 3 is the safest (a low predicable hazard), and the maximum rating of 12 is an imminent hazard (a high predictable hazard). Further details regarding this formula can be found in the ISA-HAZARD EVALUATION FORM (see Appendix C) and the ISA publication *Evaluation of Hazard Trees in Urban Areas, most current edition.			

A. Failure Potential Rating

Failures do not occur at random, but are the result of a combination of defects and aggravating conditions. The scope of the professional evaluation will include structural defects in the tree, including branches, trunk and roots, and shall employ the most current methods of internal decay inspection available); soil/slope and/or creek bank stability; individual species susceptibility to failure; pruning; history; decay weaknesses and any other compromising or pertinent factors considered by the consultant.

B. Target Rating

Evaluation of potential targets shall include people, structures, or property use and occupancy that are imminently threatened. Property use shall consider structures or activities under or around the tree (e.g. building, parking, pedestrian, recreational, utility lines, hardscape, etc.). Occupancy shall consider frequency of use (occasional, intermittent, frequent, or constant), and whether the target will be present when failure occurs.

- Consideration shall be given to whether the target can reasonably be removed or isolated to reduce the hazard rating to a less than significant level. (A target means people or property, public or private).

- A tree may be a potential hazard if it is: (a) a tree with the potential to fail; (b) in an environment that increases the likelihood of failure and; (c) a tree that would strike a target.

C. Additional Factors

Evaluation of other factors that contribute to aggravating conditions shall be considered, such as: size of the affected defect (i.e. a small branch versus the entire tree uprooting); significant potential of fire, utility line contact or catastrophic effects, etc.

4.40 HAZARD REDUCTION AND PREVENTION

A healthy, vigorous tree that receives regular care is less likely to become hazardous than one that is ignored. Prevention is the best solution to the tree hazard problem.

If there are no other options to abate the hazard, the tree may need to be removed entirely (*see Removing a Hazardous tree, Section 4.10*).

The following checklist may help to avoid future problems:

- Inspect public trees during scheduled maintenance.
- Avoid planting brittle species are falling limbs could injure people or property.
- Prune trees when they are young (*see Pruning Young Trees, Section 2.30*) and regularly thereafter.
- Use correct pruning methods, always making the pruning cut outside the branch collar. This will allow only the minimum of decay infection.
- Do not allow toping (*see Definition, Section 1.27*).
- Plant trees that not problematic and that fit the site. Select trees based upon their mature height and shape, and make sure the species selected matches the soil and other site characteristics.
- Erect Tree Protection Zone fencing-around or slightly beyond the root protection zoned of trees during construction. Insist that these roto protection Zone be honored by construction worker.
- The risk of a hazard tree may be reduced by removing dead and broken branches or reducing branch end weights.
- Do not plant trees with a narrowly forded stem V-crotch, imbedded bark or girdling root ball.
- Where a valuable specimen tree may be suspected of developing into a hazardous tree, use landscaping to keep people at a safe distance (*see Determining if a tree is Hazardous, Section 4.20*).
- Plant a wide variety of tree species to avoid a monoculture.
- Develop a diverse tree population with regard to age (20% juvenile, 20% young adult trees, 20% adult, 20% mature).

SECTION 5. PROTECTION OF TREES DURING CONSTRUCTION

INTRODUCTION

The objective of this section is to reduce the negative impacts of construction on trees to a less than significant level. The tree protection policies/ practices provided herein are intended to insure that appropriated practices that may result from uninformed or careless acts, and preserve both trees and property values. This chapter of the policy manual has been written to not only protect public trees during the course of public development/construction projects, but to also provide clear direction to applicants for private development when tree protection has been made a condition of Design Review approval.

Typical negative impacts that may occur during construction include:

- Mechanical injury to roots, trunk or branches.
- Compaction of soil, which leads to the degradation of the functioning roots and inhibits the development of new ones and restricts drainage, thus desiccating the roots and enabling water mold fungi to develop.
- Changes in grade which can cut or suffocate roots.
- Alteration of the water table – either raising or lowering.
- Microclimate change, exposing sheltered trees to sun or wind. Sterile soil conditions, associated with stripping off topsoil.

Construction projects within the dripline of protected trees shall be implemented to meet the protective practices described in Section 5.00.

5.1 TREE PROTECTION AND PRESERVATION PLAN

Prior to commencement of a development, the property owner shall have prepared a Tree Protection and Preservation Plan if any activity is proposed within the dripline of a Protected Tree or he/she has been directed to do so by the Design Review Board or Township Council. The Tree Protection Plan shall be prepared by a certified arborist or registered landscaped architect to assess impact to trees, recommend mitigation to reduce impacts to a less than significant level and identify construction guidelines to be followed through all phases of a construction project.

5.2 PRE-CONSTRUCTION REQUIREMENT

The following seven elements shall be incorporated within the Tree Protection and Preservation Plan prior to building permit issuance or the commencement of work.

A. <u>Site Plan</u>

On all improvement plans for the project, dimension accurate trunk locations and diameter of all "Protected" trees or trees to be preserved within the development area. Additionally, the plans shall accurately show the dripline of the tree(s) and clearly indicate the Tree Protection Zone to be enclosed with the specified tree fencing as a bold dashed line.

B. <u>Written Report</u>

The Tree Protection and Preservation Plan shall include a letter-type report (*see Tree Protection and Preservation Report, Section 6.30*). The report shall be 1) submitted to the Planning Department and kept in the project file for the subject development project; and 2) printed as additional "notes" on the Township approved grading plan and Construction plans for the project.

The written report shall consider all applicable requirement of this Chapter and shall include the "Standard Tree Protection Notes" provided by this policy (*see Appendix D*).

C. Verification of Tree Protection

The project arborist or contractor shall verify, in writing, that all preconstruction conditions have been met (tree fencing, erosion control, pruning, etc.) and are in place. Written verification must be submitted to and approved by the Planning Department prior to demolition, grading or building permit issuance (*see Inspection, Section 5.30*).

D. Pre-construction Meeting

The demolition, grading and underground contractor, construction superintendent and other pertinent personnel are required to meet with the Project Arborist at the site prior to beginning work to review procedures, tree protection measures and establish haul routes, staging areas, contacts, watering, etc.

E. Protective Tree Fencing for Protected Trees, Street Trees or Designated Trees

Fenced enclosures shall be erected around trees to be protected to achieve three primary goals: (1) to keep the foliage crowns and branching structure clear from contact by equipment, materials and activities; (2) to preserve roots and soil conditions in an intact and non-compacted state and; (3) to identify the tree protection zone (TPZ) in which no soil disturbance is permitted and activities are restricted, unless otherwise approved (*see Tree Protection Zone, Section 1.30 and 5.15-F*).

Size and Type of Fence:

All trees to be preserved shall be protected with five or six (5'-6') foot high chain link fences. Fences are to be mounted on two-inch diameter galvanized iron posts, driven into the ground to a depth of at least 2-feet at no more than 10-foot spacing. References to this detail shall appear on grading, demolition, utility and site improvements plans.

Area to be Fenced:

- **Type I Tree Protection**

  The fences shall enclose the entire area under the canopy dripline or TPZ of the tree(s) to be saved throughout the life of the project, or until final improvement work within the area is required, typically near the end of the project. Parking Areas: If the fencing must be located on paving or sidewalk that will not be demolished, the posts may be supported by an appropriate grade level concrete or metal base.

- **Type II Tree Protection**

For trees situated within a narrow planting strip, only the planting strip shall be enclosed with the required chain link protective fencing in order to keep the sidewalk and street open for public use.

- **Type III Tree Protection**
  Tree situated in a small tree well or sidewalk planter pit shall be wrapped with 2-inches of orange plastic fencing as padding from the ground to the first branch with 2-inch thick wooden slats bound securely on the outside. During installation of the wood slats, caution shall be used to avoid damaging any bark or branches. Major scaffold limbs may also require plastic fencing as directed by the Township Arborist.
  Duration: Tree fencing shall be erected before demolition, grading or construction begins and remain in place until final inspection of the project permit, except for work specifically required in the approved plans in which case the project arborist or Township Arborist (in the case of street trees) must be consulted.

  Warning Sign: A warning sign shall be prominently displayed on each fence. The sign shall be a minimum of 8.5x11-inches and clearly state: "WARNING – Tree Protection Zone – No Unauthorized Entry. This fence shall not be removed."

F. Tree Protection Zone (TPZ)

Each tree to be retained shall be a designated TPZ identifying the area sufficiently large enough to protect the tree and roots from disturbance. The recommended TPZ area can determined by the formula outlined (*see Definitions, Tree Protection Zone, Section 1.30*). The TPZ shall be shown on all site plans (*see Definitions, Site Plan, Section 1.23*) for the project. Improvements or activities such as paving, utility and irrigation trenching and other ancillary activities shall occur outside the TPZ, unless authorized by the Township Arborist. Unless otherwise specified, the protective fencing shall serve as the TPZ

1. Activities prohibited within the TPZ include:
   - Parking vehicles, storage of building materials, refuse, or excavated spoils, or dumping of poisonous materials on or around trees and roots. Poisonous materials include, but are not limited to: paint, petroleum products, concrete or stucco mix, dirty water or any other material which may be deleterious to tree health.
   - The use of tree trunks as winch support, anchorage, temporary power pole, signposts or other similar function.
   - Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches and other miscellaneous excavation without prior approval of the Project Arborist.
   - Soil disturbance or grade change (*see Activities During Construction & Demolition Near Trees, Section 5.20*).
   - Drainage changes.

2. Activities permitted or required within the TPZ include:

- Mulching. During construction, wood chips may be spread within the TPZ to a 4-to 6-inch depth, leaving the trunk clear of mulch, to help inadvertent compaction and moisture loss from occurring. The mulch may be removed if improvements or other landscaping is required. Mulch material shall be 2-inch unpainted, untreated wood chip mulch or approved equal.
- Root Buffer. When areas under the tree canopy cannot be fenced, a temporary buffer is required and shall cover the root zoned and remain in place at the specified thickness until final grading stage (*see Definitions, Section 1.22, and Heavy Equipment, Section 5.20-C4*).
- Irrigation, aeration, fertilizing or other beneficial practices that have been specifically approved for use within the TPZ.

3. Erosion Control. If a tree is adjacent to or in the immediate proximity to a grade slope of 8% (23 degrees) or more, then approved erosion control or silt barriers shall be installed outside the TPZ to prevent siltation and/or erosion within the TPZ.

G. Tree Pruning, Surgery and Removal

Prior to construction, various trees may require that branches be pruned clear form structure, activities, building encroachment or may need to be strengthened by means of mechanical support or surgery. The most compelling reason to prune is to develop a strong, safe framework and tree structure. Such pruning, surgery or the removal of trees shall adhere to the following standards:

1. Pruning limitations:
    - Minimum Pruning: If the project arborist recommends that trees be pruned, and the type of pruning is left unspecified, the standard pruning shall consist of 'crown cleaning' as defined by ISA Pruning Guidelines (see Pruning, Section 2.15 and Appendix F). Trees shall be pruned to reduce hazards and develop a strong, safe framework.
    - Maximum Pruning: Maximum pruning should only occur in the rarest situation approved by the Township Arborist. No more than one-fourth (25 percent) of the functioning leaf and stem area may be removed within one calendar year of any protected or designated tree, or removal of foliage so as to cause the unbalancing of the tree. It must be recognized that trees are individual in form and structure, and that pruning needs may not always fit strict rules. The project arborist shall assume all responsibility for special pruning practices that vary from the standards outlined in this manual (*see Excessive Pruning, Section 1.11*).
    - Tree Workers. Pruning shall not be attempted by construction or contractor personnel, but shall be performed by a qualified tree care specialist or certified tree worker, according to specifications contained within this Manual (*see Pruning Mature Trees, Section 2.20*).

2. Surgery. Prior to construction, if is necessary to promote health and prolong useful life or the structural characteristics, then trees shall be provided the appropriate treatments (e.g. cavity screening, bark tracing, wood treatment, cables, rods or pole supports) as specified by the project arborist (see ANSI A-300, Appendix G).

3. Tree Removal Procedure. When trees are removed and adjacent trees that are to be preserved must be protected, then the following tree removal practices apply:

    - Tree Removal

      Removal of trees that extend into the branches or roots of Protected Trees shall not be attempted by demolition or construction personnel, grading or other heavy equipment. A certified arborist or tree worker shall remove the tree carefully in a manner that causes no damage above or below ground to trees that remain.

    - Stump Removal

      If roots are entangled with trees that are to remain, these stumps shall have their roots severed before extracting the stump. Removal shall include the grinding of stump and roots to expose soil beneath stumps to provide drainage. In sidewalk or small planter areas to be replanted with a new tree, the entire stump shall be removed and the planting pit dug to a depth of 30-inches. If dug below 30-inches, compact the backfill to prevent settling. Large surface roots three feet from the outside circumference shall be removed, including the spoils, and backfilled with Township approved topsoil to grade, and the area tamped to settle the soil.

5.3 ACTIVITIES DURING CONSTRUCTION & DEMOLITION NEAR TREES

Soil disturbance or other injurious and detrimental activity within the Tree Protection Zone (TPZ) is prohibited unless approved by the Township based on a tree report. If an injurious event inadvertently occurs, or soil disturbance has been specifically conditioned for project approval, then the following mitigation is required:

A. Soil Compaction

If compaction of soil occurs, it shall be mitigated.

B. Grading Limitations within the Tree Protection Zone

Grade changes outside of the TPZ shall not significantly alter drainage to the tree.

- Grade changes within the TPZ are not permitted.

C. Trenching, Excavation and Equipment Use

Trenching, excavation or boring activity within the TPZ is restricted to the following activities, conditions and requirements if approved by the Township Arborist. Mitigating measures shall include prior notification to and direct supervision by the project arborist.

1. Notification. Contractor shall notify the project arborist a minimum of 24 hours in advance of the activity in the TPZ.

2. Root Severance. Roots that are encountered shall be cut to sound wood and repaired (*see Root Injury, Section 5.25-A1*). Roots 2-inches and greater must remain injury free.

3. Excavation. Any approved excavation, demolition or extraction of material shall be performed with equipment sitting outside the TPZ. Methods permitted are by hand digging, or hydraulic or pneumatic air excavation technology. Avoid excavation within the TPZ during hot, dry weather.
    - ♦ If excavating or trenching for drainage, utilities, irrigation lines, etc., it is the duty of the contractor to tunnel under any roots 2-inches in diameter and greater.
    - ♦ Prior to excavation for foundation/footings/walls, grading or trenching within the TPZ, roots shall first be severed cleanly 1-foot outside the TPZ and to the depth of the future excavation. The trench must then be hand dug and roots pruned with a sharp handsaw or other approved root pruning equipment.

4. Heavy Equipment. Use of backhoes, steel tread tractors or any heavy vehicle within the TPZ is prohibited unless approved by the Township Arborist. If allowed, a protective root buffer is required. The protective buffer shall consist of a base course of tree chips spread over the root area to a minimum of 6-inch depth, layered by ¾-inch quarry gravel to stabilize and ¾-inch plywood on top. This buffer within the TPZ shall be maintained throughout the entire construction process.
    - ♦ Structural design. If injurious activity or interference with roots greater than 2-inches will occur within the TPZ, plans shall specify a design of special foundation, footing, walls, concrete slab or pavement designs subject to Township Arborist approval. Discontinuous foundations such as concrete pier and structural grade beam must maintain natural grade (not to exceed a 4-inch cut), to minimize root loss and allow the tree to use the existing soil.
    - ♦ Basement excavations shall be designed outside the TPZ of all protected trees and shall not be harmful to other mature or neighboring property trees.

D. Tunneling & Directional Drilling

If trenching or pipe installation has been approved within the TPZ, then the trench shall be either cut by hand, air-spade, hydraulic vac-on excavation, or by mechanically boring the tunnel under the roots with a horizontal directional drill and hydraulic or pneumatic air excavation technology. In all cases, install the utility pipe immediately, backfill with soil and soak within the same day.

E. Injury Mitigation

A mitigation program is required if the approved development will cause drought stress, dust accumulation or soil compaction to trees that are to be saved. To help reduce impact injury, one or more of the following mitigation measures shall be implemented and supervised by the project arborist as follows:

1. Irrigation Program. Irrigate to wet the soil within the TPZ to a depth of 12-inches to 18-inches or apply sub-surface irrigation at regular specified intervals by injecting on approximate 3-foot center, 10-gallons of water per inch trunk diameter within the TPZ. Duration shall be until project completion or monthly until seasonal rainfall totals at least 8-inches of rain, unless specified otherwise by the project arborist.

2. Dust Control Program. During periods of extended drought, wind, or grading; spray wash trunk, limbs and foliage to remove accumulated construction dust.

3. Soil Compaction Damage. Compaction of the soil is the largest killer of trees on construction sites due to suffocation of roots and ensuing decline of tree health. If a compaction event to the upper 12-inch soil horizon within the Tree Protection Zone has or will occur by any means, then one or more of the following mitigation measures shall be implemented (*see Compaction and Grade Change, Section 5.20-A&B and Soil Improvement, Section 2.50*).
    - Type I Mitigation. If an approved paving, hardscape or other compromising material encroaches within the TPA, an aeration system shall be designed by the project arborist and used within this area (subject to approval by the Township Arborist).
    - Type II Mitigation. If inadvertent compaction of the soil has occurred within the TPZ, the soil shall be loosened by one or more of the following methods to promote favorable root conditions: vertical mulching, soil fracturing, core-venting, radial trenching or other method approved by the Township Arborist (*see Soil Improvement, Section 2.50*).
    - Type III Mitigation. For Township-owned improvements in the right-of-way, areas within the TPZ that will be improved (e.g., asphalt, concrete, or pavement) soil shall be compacted to 95% proctor density. Unimproved soil areas (e.g., grass, open landscape strip, etc.) in the TPZ shall not exceed 85% by water jet compaction.

F. Security Deposits

As a condition of a development approval, the Director may require that the developer post security of between 25% and 100% of the value of the trees to be preserved, as determined under Section 6.40(B). The security may be a cash deposit, letter of credit, or surety bond and shall be file with the Finance Department. It shall be in a form satisfactory to the Finance Director. The security shall be posted before issuance of any grading or building permits. The guarantee period shall be specified; in general, it shall be at least two years after expected completion of construction. If the trees fail to survive, the developer shall replace them; if the developer fails to do so, the Township may use the security to: (a) provide additional trees elsewhere on the site; (2) to add or replace street trees or other public landscaping in the vicinity; or (3) to add trees or other landscaping to other Township property.

5.4 DAMAGE TO TREES

A. Reporting

Any damage or injury to trees shall be reported within 6-hours to the project arborist and job superintendent or Township Arborist so that mitigation can take place. All mechanical or chemical injury to branches, trunk or roots over 2-inches in diameter shall be reported in the monthly inspection report. In the event of injury, the following mitigation and damage control measures shall apply:

1. Root injury: If trenches are cut and tree roots 2-inches or larger are encountered they must be cleanly cut back to a sound wood lateral root. All exposed root areas within the TPZ shall be backfilled or covered within one hour. Exposed roots may be kept from drying out by temporarily covering the roots and draping layered burlap or carpeting over the upper 3-feet of trench walls. The materials must be kept wet until backfilled to reduce evaporation from the trench walls.

2. Bark or trunk wounding: Current bark tracing and treatment methods shall be performed by a qualified tree care specialist within two days.

3. Scaffold branch or leaf canopy injury: Remove broken or torn branches back to an appropriate branch capable of resuming terminal growth within five days. If leaves are heat scorched from equipment exhaust pipes, consult the project arborist within 6 hours.

5.5 INSPECTION SCHEDULE

The project arborist or landscape Architect retained by the applicant shall conduct the following required observations of construction sites containing protected and designated trees. Observations shall verify that they type of tree protection and/or plantings is consistent with the standards outlined within this Manual and Conditions of Approval for discretionary projects. For each required observation or meeting, a written summary of the changing tree related conditions, actions taken, and condition of trees shall be provided to the Township of Woodbridge.

INSPECTION SCHEDULE

A. Inspection of Protective Tree Fencing. The Project Planner shall be in receipt of a written statement from the applicant or project arborist verifying that he has conducted field inspection of the trees and that the protective tree fencing is in place prior to issuance of a demolition, grading, or building permit, unless otherwise approved (*see Verification of Tree Protection, Section 1.35*).

B. Pre-Construction Meeting. Prior to commencement of construction, the applicant or contractor shall conduct a pre-construction meeting to discuss tree protection with the job site superintendent, grading equipment operators, project arborist, Project Planner, and, if a Township maintained irrigation system exists, the Public Works Superintendent.

C. Inspection of Rough Grading. The project arborist shall perform an inspection during the course of rough grading adjacent to the TPZ to ensure trees will not be injured by compaction,

cut or fill, drainage or trenching, and if required, inspect aeration systems, tree wells, drains and special paving. The contractor shall provide the project arborist at least 48 hours advance notice of such activity.

D. Monthly Inspections. The project arborist shall perform monthly inspections to monitor changing conditions and tree health. The Project Planner shall be in receipt of an inspection summary during the first week of each calendar month or, immediately if there are any changes to the approved plans or protection measures.

E. Special activity within the Tree Protection Zone. Work in this area (TPZ) requires the direct onsite supervision of the project arborist.

5.6 PAVEMENT AND HARDSCPAE CONFLICTS WITH TREE ROOTS

Conflicts may occur when tree roots grow adjacent to paving, foundations, sidewalks or curbs (hardscape). Improper or careless extraction of these elements can cause severe injury to the roots and instability or even death of the trees. The following alternatives must first be considered before root pruning within TPZ of a Regulated Tree.

A. Removal and Replacement of Pavement or Sidewalk

- Removal of existing pavement over tree roots shall include the following precautions:
  - Break hardscape into manageable pieces with a jackhammer or pick and hand load the pieces onto a loader.
  - The loader must remain on undisturbed pavement or off exposed roots.
  - Do not remove base rock that has been exploited by established absorbing roots.
  - Apply untreated wood chips over the exposed area within one hour, then wet the chips and base rock and keep moist until overly surface is applied.
- Replacement of pavement or sidewalk shall include the following precautions:
  - An alternative to the severance of roots greater than 2-inches in diameter should be considered before cutting roots. If an alternative is not feasible, remove the sidewalk, grind roots only as approved by the Township Arborist and replace sidewalk using #3 dowels at the expansion joint if within 10-feet of a street tree.
  - Replacement paving shall be unit pavers on structural soil base or concrete with rebar reinforcement if within 10-feet of the trunk of a protected or street tree. Install root barriers along the tree side of the hardscaped edge in accordance with Section 3.30-B.

** Note: Any (private) work in the right-of-way requires a Township of Woodbridge Encroachment Permit.

B. Alternative Methods to Prevent Root Cutting

The following remedies should be considered before cutting tree roots that may result in tree instability or decline:

- Grinding a raised sidewalk edge. Ramping the walking surface over the roots or lifted slab with pliable paving.
- Routing the sidewalk around the tree roots.
- Installing flexible paving or rubberized sections.
- On private property, new sidewalk or driveway design should consider alternatives to conventional pavement and sidewalk materials. Substitute permeable materials for typical asphalt or concrete overlay. Sub-base or footings to consider are: permeable paving materials (such as ECO-Stone or RIMA pavers), interlocking pavers, flexible paving, wooden walkways, porches elevated on posts and brick or flagstone walkways on sand foundations.

C. Avoiding Conflict

Conflicts and associated costs can be avoided or reduced by the following planting practices:

- Plant trees that are known to be non-invasive.
- Over soil that shrinks and swells, install a sidewalk with higher strength that has steel reinforcing and/or expansion slip joint dowel reinforcement.
- Follow soil loosening planting techniques to promote proper rooting.
- Install root barrier only along the hardscape area of the tree (but allow roots to use open lawn or planter strip areas).
- Dedicate at least 10-linear feet of planting space for the growth of each tree.

D. Alternative Base Course Materials

When designing hardscape areas near trees, the project architect or engineer should consider the use of recommended base course material such as an engineer structural soil mix. The Township of Woodbridge approved structural soil mix will allow a long term cost effective tree and infrastructure compatibility that is particularly suited for the following types development projects: repair or replacement of sidewalk greater than 40-feet in length: subdivisions with new street tree plantings; planting areas that are designed over structures or parking garages; or confined parking lot medians and islands or other specialized conditions as warranted.

SECTION 6.00 TREE REPORTS

INTRODUCTION

An arborist report may be needed for development projects and tree removal permits. If required, report must be prepared by a certified arborist for the applicant and submitted to the Township for the purposed of providing accurate information and opinion regarding the condition, welfare, maintenance, preservation or value of a protected tree.

A. When a written report is required?

Generally, there are two circumstances in which tree reports are required:

1) When a tree removal permit is sought, and
2) To assess tree impacts and establish tree protection from approved property development.

Types of report formats are: Letter Report, Tree Protection and Preservation Plan and Tree Appraisal.

B. Who may prepare the report?

The tee report is to be prepared by a certified arborist retained by the applicant or property owner. This person shall possess a current ISA certification (*see Certified Arborist, Section 1.1*); be a member of the American Society of Consulting Arborists; or a member of good standing in another nationally recognized tree research, care, and preservation organization.

6.05 TYPE OF REPORT – LETTER FORMAT

A. Letter Report

A brief format is acceptable for (1) and (2) below, and can generally be used for assessing one or two trees. The report is to be on letter head stationary of the individual preparing the report, including their ISA Certification number.

1. Removal

   If for a tree removal (i.e., and application request for a single tree removal only, not in connection with a property development), the report shall provide information as to how each tree meets the criterial for removal listed in DMMC 23.50.080.

2. Development

   If for development on a single family residential lot (not a subdivision), the report shall also clearly indicate whether or not a Protected Tree is so close to the 'building are or building footprint' that it will be killed or permanently injured by disturbance. The report must make specific recommendations to protect and preserve the tree during the course of construction that are consistent with the specifications within this *Manual (see Tree Protection & Presentation Report, Section 6.30).*

6.30 TREE PROTECTION AND PRESERVATION REPORT

All protected or designated trees to be retained on a development site shall be shown on approved sets of civil, building and landscape plans and shall be protected during the construction process. A Tree Protection and Preservation Plan submitted for review by the

Planning Department sis required when trees to be saved may be injured by disturbance. The tree preservation plan shall assume compliance with standards in Section 5.00 of this Manual (*see Protection of Trees During Construction, Section 5.00*). In addition, the following submittal information must be included in the report:

A. Scope & Construction Phasing

The tree protection and preservation plan shall identify, but not limited to, written recommendations for the health and long-term welfare of trees that are to be flowed during the following distinct phases and conditions: preconstruction; during construction, post construction, demolition activities; methods of avoiding injury, damage treatment and inspections. Schedules shall be included.

B. Tree Protection Zone

The tree protection and preservation plan shall establish a tree protection zone (TPZ) for each tree to be fenced and clearly outline site-specific measures for protection of the trees during construction and describe a plan for continued maintenance of those trees after construction. After project approval, any changes to the protection measures must be approved in writing, by the Township Arborist.

6.35 SITE PLAN

The tree protection plan shall include the following site plan elements:

A. Disclosure of all trees on and near the site

The property owner or designee shall provide accurate information to the project arborist to develop the tree protection measures and to enable accurate recommendations to insure their survival. This site plan shall accurately show the surveyed location, species, size of trunk and leaf canopy; show the dripline of nay neighboring trees that may overhang the sites and street trees that are within 30-feet on each side of the project (see Tree Disclosure Statement, Appendix I). Failure to show a tree on the plans that later is determined to be affected by construction may require the work to stop until mitigation can be agreed upon by the property owner and the Township.

B. Plans submitted to the Township

In addition to the above information, final improvement plans shall include and show the following information: show the tree protection zone of any tree to be retained and denote a 5-foot chain link type fencing around the protected zone of each tree or group of trees (to be clearly identified as such on all plans as a bold-dashed line); permeable paving located within the dripline are: approved utility pathways; grade changes; surface and subsurface drainage and aeration systems to be used; walls, tree wells, retaining walls and grade change barriers, both temporary and permanent; landscaping and irrigation within dripline of trees.

C. Plans must show tree protection

Protective tree fencing identified within the arborist report, both written and diagrammatic, shall be clearly shown as a bold, dashed line on the approved site plans submitted for demolition, grading, and construction, building permit or any other aspects that are relevant to the project.

6.40 TREE APPRAISAL

An appraisal is a process for determining a monetary opinion of the value of a tree as it relates to either the arborist is required to determine this value, and must exercise good and fair judgment by adjusting the basic value by the tree's condition and location. There are two methods to determine tree value; 1) the Replacement Method and 2) the Trunk Formula Method.

A. The Replacement Cost Method

Applies to trees removed in accordance with DMMC Section 23.50.090A-2. For this method, the appraised value shall be determined by combining: price quote + transportation + planting + other costs and applying the condition and location value to the tree. The sum of these is the appraised replacement cost.

B. The Trunk Formula Method

Applies to trees that are too large for practical replacement (transplanting) and shall be appraised by: determining the basic tree valued and adjusting this value by a condition and location ratings. The appraised value shall be determined by using the most recent edition of the 'Guide for Plant Appraisal', published by the Council of Tree and Landscape Appraisers. The Trunk Formula or Replacement Method Forms established by the International Society of Arboriculture must be used to compute the appraised value. All trees with a stem larger than 4-inched in diameter when measure at 12-inched above natural grade shall be calculated in this manner.