Landscaping Committee
Doverbrook Association

Maintenance

Technical Guide, Maintenance of Established Trees

Maintenance of established trees differs significantly from that of newly planted trees. if a young tree fails, the tree itself is lost. But, improper maintenance or neglect of an established tree may result in damage to property or people. In addition to losing the benefits of a well established tree, proper maintenance directly affects the safety, health, and welfare of urban inhabitants. Maintenance involves several categories of activities, including: scheduling, pruning, controlling insects and disease, fertilizing and aerating, as well as removing trees and stumps.

Tree Hazard Inspections

Most tree hazards can be prevented by regular checkups and proper treatments. To determine the scope of work, a field survey should answer thirteen questions.

1. **Target:** If the tree falls will it hit cars, houses, power lines or people? If so, the need for immediate action becomes much greater.
2. **Architecture:** Has the tree grown beyond its normal form into a dangerous form?
3. **History:** Has the tree lost large branches recently?
4. **Edge Tree:** Were neighboring trees cut away recently leaving tall trees at the edge?
5. **Dead Branches:** Are there dead tops or branches? Is the tree dead?
6. **Cracks:** Are there deep, open cracks in the trunk and branches? Cracks are major starting points for trunk and branch failures. Crack drying is just as important a factor leading to failures as over loading and decaying wood.
7. **Crotch Cracks:** Are there deep, open cracks below joining stems?
8. **Living Branches:** Do living branches bend abruptly upward or downward where tips of large branches were cut off? Living branches may pull out of trunks that are weakened by rot or cracks. Long periods of hot, dry weather may dry out the rot or cracks and weaken the union of the branch on the trunk. Beware of large branches on rotten or cracked trunks.
9. **Topping:** Are large branches growing rapidly from topping cuts on big trees? Sprouts that lean away from topping cuts have weak attachments. Sprouts near the edge of a cut may roll inward as it grows and further weaken the attachment.
10. **Storm Injury:** Are there broken branches, split trunks, or injured roots? Are branches close to power lines?
11 . **Root Rot:** Are there fungus fruit bodies (mushrooms) on roots? Were roots injured by construction?
12. **Rots and Cankers:** Are there hollows or cankers (dead spots), some with fungus fruit bodies? Is the tree leaning?
13. **Construction Injury:** Have roots, trunk, or branches been injured? Is there a new lawn or garden over injured roots? Water and fertilizer applied to new lawns over injured roots are absorbed by the tree's smaller, non-woody roots. The water and fertilizer stimulate the growth of the fungi that are rotting the injured woody roots. While the woody support roots grow weaker, the

tree top gets larger and heavier. Once the root structure is sufficiently weakened, a moderate storm could cause the tree to fall.

Scheduling
Most public agencies use two approaches for deciding when to do tree maintenance. They respond to crisis situations that demand immediate attention, and they schedule maintenance according to a well planned program. While crises will surely occur, urban forestry programs should strive to maximize the amount of scheduled work.

Closely related to work schedules are specifications. Because many communities have increased their use of contractors, there is a growing need for a clearly identified scope of work. Some situations lend themselves to a per unit bid and others to an hourly time and material estimate. Specifications communicate needs, form the basis of bids and serve as a standard for evaluating the quality of the completed work. In-house crews also require clearly defined expectations and objective evaluation of their work. Specifications will help them, too. When developing tree work specifications, consider the following.

Pruning Guidelines
In writing a work plan for in-house staff or contractual specifications, the purpose and scope of pruning needs to be clearly identified. Trees respond in predictable ways to pruning. By studying these responses arborists have developed pruning practices that preserve or enhance the beauty, structure, and function of trees. The Western Chapter of the International Society of Arboriculture (ISA) has developed standards for pruning that provide general guidelines. Of course, each tree has a unique form and structure, so pruning needs may not always fit strict rules. However, it is the arborist that must take responsibility for special pruning practices that vary greatly from the standards.

The following descriptions of the various types of pruning mature trees were taken from these:

Crown cleaning or cleaning out is the removal of dead, dying, diseased, crowded, weakly attached, and low vigor branches and water sprouts for the tree crown.

Crown thinning includes crown cleaning and the selective removal of branches to increase light penetration and air movement into the crown. Greater light and air movement stimulates and maintains interior foliage, which improves branch taper and strength. Thinning reduces the wind-sail effect of the crown and the weight of heavy limbs. Thinning the crown can emphasize the structural beauty of the trunk and branches, as well as improve the growth of plants beneath the tree by increasing the light penetration.

When thinning the crown of mature trees, no more than one-quarter of the foliage should be removed. At least one-half of the remaining foliage should grow from branches that originate in the lower two-thirds of the tree. Removing laterals from a branch requires a similar approach. Try to retain inner laterals and leave the same distribution of foliage along the branch. Trees and branches pruned in this way have stress more evenly distributed. Removing the inside lateral branches also produces an effect known as "lion's-tailing." By removing all the inner foliage, weight is moved to the ends of the branches, which may cause the branch structure to weaken and limbs to break. Greater light penetration may cause sunburned branches and stimulate water sprouts.

Crown reduction, also known as drop-crotching, decreases the height and spread of a tree. Thinning cuts will maintain the structural integrity and natural form of a tree, and delay the time when it will need to be pruned again. To make this type of cut, prune the branch back to its point of attachment or to a lateral that is at least one-half the diameter of the cut being made.

Crown restoration improves the structure and appearance of trees that have been topped or

severely pruned using heading cuts. Select one to three main branch stubs that will grow to reform a more natural looking crown. Thinning or even heading may be required to match the weight of the new branches with the strength of their attachment. Restoration may require several prunings over a number of years.

Crown raising provides clearance for buildings, vehicles, pedestrians, and vistas by removing lower branches. It is important to maintain at least one-half of the tree's foliage on branches that originate in the lower two-thirds of the crown. This ensures a well-formed, tapered structure and uniformly distributed stress. When pruning for view, it's better to open "windows" through the foliage of the tree, rather than severely raising or reducing the crown.

Traffic Control
Take measures to expedite public passage through or around the work area and to prevent accidents, damage and injury. Tree removal should be conducted in such a manner as to insure continuous traffic flow in the street at all times.

Because trees planted in urban areas are frequently subjected to hostile growing conditions, they are not always in the best of health. Trees under stress are much more susceptible to attack by harmful insects and diseases and are more likely to exhibit symptoms of the adverse environment. The type, severity and duration of a particular insect, disease or environmental problem will vary greatly, depending upon the tree's location, climate and other environmental factors.

Here are some ideas to keep in mind when identifying problems and seeking advice on corrective measures. It is a good idea to examine trees and other vegetation on a regular basis-whether or not a significant problem currently exists. These examinations help identify problems sooner, by providing a history of the plants that serves as a point of comparison when a serious problem develops.

Fertilization and Aeration
Many street trees grow in an extremely hostile environment both above and below ground. The physical, chemical, and biological conditions of the soil may need to be managed just as elements of the trees' above-ground environment are managed. Two activities-fertilization and aeration-are the primary methods of managing this area below the soil surface. Both are vital to the health and longevity of the urban forest.

Trees need adequate amounts of nutrients, water and air in the soil. Without these elements trees will grow with less vigor and will be more susceptible to secondary problems, such as attack from insects and diseases. Properly nourished trees will be more able to withstand the attack of insects and diseases and tolerate the adverse growing environment afforded by most urban situations.

Fertilizers - Plants require at least sixteen chemical elements for proper growth and development. Three of these elements-carbon, hydrogen, and oxygen-are provided by air and water. The other essential elements are obtained by the roots from soil.

The specific fertilizers applied should be based on need. Every site is different, so soil tests should be conducted every two to three years. Cooperative Extension Services can analyze samples of soil taken from each tree site and make specific recommendations.

Trees most commonly require large amounts of nitrogen. Because it is easily leached and often volatile, it may be necessary to apply nitrogen once or twice a year. Other chemical elements, such as calcium, phosphorous, potassium, and magnesium, seldom need to be added. Acidity and alkalinity are measured on a pH scale, with lower pH indicating greater acidity. Soil pH affects the availability of certain nutrients, particularly iron and manganese, so it's important to maintain the pH between 5.5 and 7.0 for most plants.

Trees may show signs of a specific nutrient deficiency, such as interveinal chlorosis, even though soil tests indicate the presence of that nutrient. in this case, the nutrient may be present in the soil in a form that is not available to the tree. Or, nutrient uptake by trees may be inhibited by soil compaction, poor drainage or poor aeration. An analysis of the foliage may be required to determine the plants needs.

Generally, the ideal time of the year to fertilize is in the late summer or fall. Fertilizer can also be applied after leaves open fully until early July. Avoid treatment with readily available inorganic nitrogen in heavy doses between July and September, because it could cause a late flush of growth that would not harden off before freezing weather.

There are a variety of methods for fertilizing trees. Fertilizers are mostly broadcast over the surface of the ground.

Surface applications are most commonly used for fertilizers that contain only nitrogen. A properly calibrated, mechanical spreader broadcasts fertilizer over the ground in a pattern of concentric circles or linear strips beginning two or three feet from the trunk and extending five or ten feet beyond the drip line. Care should be taken to avoid excessive overlapping.

Apply fertilizer when grass is dry and then wash the grass off thoroughly with a lawn sprinkler or irrigation system. Grass blades could be burned by fertilizer that becomes slightly wet after a light rain or dew.

Aeration - Pore spaces in the soil supply trees with air, as well as water. Some soils are naturally tight. Other soils may start out well aerated, but through the actions of pedestrians, vehicles, and even water, pore spaces are compressed. Soil compaction is far easier to prevent than it is to remedy.

Preventive measures include limiting pedestrian and vehicular access, and mulching exposed soil to minimize compaction caused by the impact of rain or irrigation water.

If planting into a site with poor aeration, first rip or deep plow the soil, replace the soil with a suitable medium, or try to select trees tolerant of low soil aeration.

Mechanical aeration is possible, but at best, it's a temporary solution. Physically separating soil particles merely buys time until the pore spaces cave in again.

Tree and Stump Removal
Trees and stumps are removed for several reasons. Tree inventory information can supply a set of criteria to guide tree removal decisions. Safety is perhaps the most important reason, and considering public liability for injuries, this becomes ample justification for removal. Trees could be removed to prevent the spread of harmful insects, disease or vegetation that may be harmful to the environment. Finally, aesthetics may dictate removing a particular tree.

As opposed to pruning, removal refers to disposing of the entire tree, including the leaves, branches, trunk, stump and major roots. When removing trees and stumps consider the following guidelines.

Stumps are defined as the lower portion of a tree-up to a maximum height of four feet-that remains after the foliage, limbs, branches, and the upper part of the trunk have been cut off.

Tree Removal
The stump removal area is generally between the sidewalk and the curb, or between the curb and another curb if growing in a median strip. For trees planted in an open space, the area for stump removal is that which causes the surface of the ground to be higher than the adjacent grade.

Roots within the stump removal area should be taken out as deep as 24 inches below the finished grade. This is especially true of roots that are exposed at grade and those adjacent to or growing over a curb or sidewalk. All exposed surface roots beyond the stump area should be removed to a depth of twelve inches below grade. Soil that has been displaced by deeper roots shall be leveled to the existing grade.

The hole or depression resulting from the removal work should be filled with topsoil. Do not use chips, leaves, brush, sawdust or tree debris as filler. This organic matter would eventually decompose allowing the soil to settle. Because any type of soil will settle a little over the first several months additional soil of the same quality should be added. The entire area should be made level with the existing grade.

Stump removal.
Cleanup involves removing all soil, leaves, twigs, or trash resulting from the work. Remove debris daily to approved disposal sites. Sewer systems, landfills and ocean dumping sites are not appropriate destinations for tree debris. Depending on the nature of the material, it could be used for lumber, arts and crafts, firewood, mulch or compost.

Damage to property resulting from this work should be repaired within a reasonable time. Before starting work at a new site, survey the condition of the area, including adjacent proper ties. During clean up, survey the area again to identify damage caused by the tree work. Cleanup activity may include brush chipping.

Overhead power lines pose a potential danger during removal operations. Exercise extreme caution to avoid damage to the lines or workers.