



Natural Resource Conservation:

Components of a Tree and Landscape Ordinance, Part II

The University of Georgia College of Agricultural and Environmental Sciences

Melvin P. Garber, Extension Horticulturist

This paper covers the elements of a Tree and Landscape Ordinance that relate to tree removal, tree replacement and tree planting. The components of an ordinance may vary but the elements to consider include:

- (1) tree preservation and removal restrictions
- (2) replacement requirements for removal of trees
- (3) incentives for preservation of trees
- (4) tree protection requirements
- (5) tree planting requirements
- (6) target canopy area or number of trees
- (7) tree bank

(1) TREE PRESERVATION. A major goal of a Tree and Landscape Ordinance should be preservation of existing trees in the community. Images of communities are often shaped by their older canopy trees. These trees are also vital to the clean air and water in a community. Numerous smaller trees are also very important, as they also contribute to a clean environment. Construct an ordinance that encourages preservation of trees and discourages their removal.

The first step in tree preservation is identification of trees targeted for preservation. Preserved trees are usually of two types, (a) older, larger trees (specimen trees) that are desired for their canopy cover, and (b) trees that are native or rare in the community and represent critical native flora. A survey of the urban forest and identification of tree species and sizes helps identify trees for preservation. Establish a list of species and minimum sizes targeted for preservation. For example, the community may decide to focus preservation efforts toward all oaks that are a minimum 10" DBH (diameter at breast height – 4.5ft.). A tree inventory, required for the tree removal permit, would identify the number and location of trees targeted for preservation.

The minimum size that triggers protection is an important standard for the community. The community could also decide that all trees of a given species, regardless of size, would be targeted for preservation. The smaller the minimum diameter, the greater the number of trees that would be targeted for preservation. The minimum size set for larger trees, such as oaks, may be greater than those for trees, such as dogwoods, that reach a smaller size at maturity. Trees that should receive serious consideration for preservation in Georgia include pine, oak, magnolia, black gum, maple, elm, and sweet gum. The minimum size targeted for preservation could be as small as a 4-inch diameter, since it is fairly easy and economical to purchase and install trees less than 4 inches in diameter.

The preservation requirements may also apply to trees that exceed an established size. For instance, a provision in the ordinance may prevent or disallow the removal of oaks (pines, etc) that exceed 24 inches DBH. These trees may be designated as crucial to the heritage and character of the community. In some cases, rare trees or trees crucial to wildlife habitat are not allowed to be removed, regardless of size.

(2) REPLACEMENT REQUIREMENTS. The greatest emphasis should be given to preservation of existing trees. It is difficult (impossible) to replace large specimen trees that may be 10 to 30 inches in diameter with a single 2-inch diameter tree. If identified specimen trees are to be removed, establish replacement requirements.

Stringent replacement requirements provide incentives to preserve targeted trees. Most ordinances base the replacement requirement on the size of the removed tree. The replacement requirement could be a percentage of the

diameter of trees removed. The percentage replacement could be related to the minimum size for preservation. For instance, an ordinance may require a 25 percent replacement for 10-inch minimum DBH, and 33 percent replacement for 15-inch DBH trees, since a 10-inch minimum would result in more trees for replacement. The replacement requirement for removal of two trees of 15-inch DBH (30 total diameter inches), would be 10 inches (30" removed x 0.33 replacement factor). If the minimum planting size is 2.5 inches, the developer would plant four replacement trees for the two 15-inch trees removed.

The replacement requirement could also be based on the number of trees removed instead of the size of the trees removed. For instance, for every tree removed, two trees (of a designated size) would be planted. This provides a simple two-for-one replacement that is easily calculated and enforced. Replacement trees should be of the same species as the ones removed or of a species having the potential for similar size, form and longevity. The local arborist, member of the Tree Board or extension specialist could develop this list. The replacement requirement should put emphasis on preservation of trees most critical to the community. Still another option, in lieu of planting trees on the same project site, is to place money (based on replacement costs) in an account (tree bank) for planting trees on public property somewhere else in the community.

(3) INCENTIVES TO PRESERVE TREES. The strongest incentive to preserve trees is to include a statement in the ordinance that certain trees cannot be removed. In some cases this may not have community support. Such a clause can be restrictive to development and should be used selectively to preserve the most critical components of community resources. Properly designed incentives can be used to allow flexibility in development and to maximize the preservation of trees.

Incentives for preservation usually are of two types: financial incentives to preserve trees and financial penalties for removing designated trees. Incentives used in ordinances include (a) require replacement of trees removed with planting on the same site or other sites in the community, (b) provide credit for each preserved tree toward the landscape requirements, and (c) value the removed tree and require developers to place money in a community tree bank for planting trees on public property.

Credits awarded for preserved trees provide significant financial incentives and are usually based on the size of trees preserved. For instance, preserved small trees (4") may justify a one-for-one credit (for each tree saved, the developer can reduce the landscape requirement by one tree). For larger trees, the credit may equal two for one (landscape requirement is reduced two trees for each tree preserved). Valuing trees and requiring developers to place money in a tree bank can be a strong incentive to preserve trees. This technique emphasizes the high value of large trees in the community and requires cash outlay by the developer. The cash replacement may require appraisal of all trees removed, which can be costly. Alternatively, a preset standard value can be established based on size of removed trees.

(4) TREE PROTECTION STANDARDS. The successful protection of trees on construction sites is usually a two-part effort requiring that (a) trees for preservation be identified during the tree inventory and a final construction plan accommodate trees targeted for preservation, and (b) steps are taken before and during construction to ensure survival of trees. Simply identifying trees for preservation will not ensure living trees at the end of the construction process. The following steps have proven useful to protection of trees:

(a) Identify trees to be preserved and the critical root zone area. The critical root zone area is the surface area of ground necessary to protect sufficient roots for survival. Minimum areas can be established in the ordinance for individual trees and for groups of trees. However, the final area identified for protection should be determined during a site visit by the arborist.

(b) Install tree protection devices once the critical root zone is identified. The ordinance should require that root zone protective devices be installed before land disturbance occurs. Do not allow any equipment, including chain saws, on the site prior to installation of the tree protection devices. This is critical to preservation of trees since damage from equipment is common. Tree protection devices alert personnel to avoid the tree and helps prevent soil compaction and trunk injury.

(c) Inspect tree protection devices prior to initiation of construction activity. Proposed changes in the protection devices, before or after installation, should be approved by the inspector.

(d) Tree protection devices should be in

functional condition throughout all phases of development. Unauthorized removal or destruction of devices should constitute a violation, subject to penalties identified in the ordinance.

(e) If trees targeted for preservation are severely damaged or killed during construction, require the owner to satisfy the replacement requirements prior to issuance of the Certificate of Occupancy. The contractors should be reminded of this provision prior to construction.

Active tree protection materials include chain link fence, orange laminated plastic, wooden post and rail fence, or other equivalent restraining material that would get the attention of the backhoe driver or serve as a deterrent to other construction activity. Active tree protection should be required in the ordinance. Passive tree protection materials include berms and colorful plastic flagging.

Prohibit the felling of trees into protected zones or the disturbance of roots in the protected zones. Sediment and erosion control measures should prevent accumulation of sediment in the protection zone. Utilities may have to impinge on the tree protection zone. If so, this should be identified and approved during the plan review process. All changes should require preapproval by the inspector. In these situations, encourage tunneling in lieu of trenching to prevent destruction of essential root system. Tunneling should begin before the critical root zone, end beyond the zone, and start a minimum of 36 inches below the soil surface.

(5) TREE PLANTING. Address site preparation in the ordinance since it has a major influence on tree survival and initial growth. This can be especially critical for trees planted in parking lot islands as compared to trees planted in relatively undisturbed perimeter areas. Specify a minimum planting area (usually in square feet) as well as minimum dimensions. Smaller areas can be specified for irrigated trees compared to non-irrigated trees. For instance, the minimum planting area per tree may be 150 square feet for non-irrigated trees and 130 square feet for irrigated trees. Specify the dimensions of islands. The length of planting beds should not exceed two and one-half (2.5) times its width. This will avoid situations where the square footage requirement is met with a long skinny bed that is not capable of supporting tree growth or where it would result in an

unstable root system subject to blow-over from strong winds.

Provide the inspector or arborist with discretionary authority to decide if special site preparation is required for planting areas. The ordinance, however, should identify minimum requirements to facilitate planning and not overload the arborist. It would be appropriate to require that planting islands have a minimum depth (12 to 18 inches) of top soil. An alternative that would reduce landscaping costs and provide individual trees with a reasonable root environment for the critical establishment phase is to require that individual trees have at least 6 inches of top soil around and below the root ball.

The ordinance should address preferences, if any, for the type of production system used to grow the trees. The two major options available are (a) container trees and (b) ball-and-burlap trees (referred to in the trade as B&B trees) that are grown in the ground. It is not necessary to require one type of production system over the other in the ordinance. The objective of the ordinance should be to specify size of trees to be planted, quality of trees and survival standards. A suggested approach is to specify the minimum size tree required in terms of trunk diameter, and set a minimum size container or soil ball associated with the minimum size. For instance, a minimum 2.5-inch basal caliper may be required in the ordinance. The ordinance would further specify that a container tree would be grown in a minimum of a 30-gallon container. This would avoid installation of 2.5-inch trees grown for excessive periods in small containers. Trees grown for excessive periods in a container often have a pot-bound root system. The roots on pot-bound trees are very slow to emerge from the root ball and establish in the surrounding soil. This makes the trees vulnerable to water stress and increases the chance of mortality in the first year or two after planting.

Two types of trees are usually planted on site – (a) large canopy-type trees including oak, maple, elm and pine, and (b) small shade or flowering trees such as holly, crepe myrtle, red bud and dogwood. The ordinance should specify a minimum percentage of large canopy trees in order to achieve a target canopy cover. A recommended minimum would be 60-70 percent large canopy trees. The minimum size for the canopy-type trees should be 2.5 inches to 3.0 inches basal caliper and for the small trees, 2.0 inches basal caliper.

(6) TARGET CANOPY AREA OR NUMBER OF TREES.

The ordinance will have to address the number of trees required in the landscape. Ordinances usually address this issue by either specifying a minimum number of trees to be planted or targeting a percentage canopy cover. For instance, the overall goal in the ordinance can be a 50 percent canopy cover within five years of planting.

To determine the number of trees to be planted, the ordinance could contain a chart that identifies the canopy area of mature trees of each species. The developer uses this information and the number and species of preserved trees to determine canopy coverage with existing trees. The difference consists of newly planted trees. In addition to size and species, the canopy goal requires that trees be located on the property so the 50 percent goal is achievable. For instance, trees grouped in clusters with most of the area void of tree islands probably would not meet the intent of the ordinance.

Some of the earlier ordinances used canopy cover as the criterion for required tree planting, and, recently and during follow-up surveys, found landscapes did not meet the 50 percent coverage goal but were closer to 25 percent. The primary cause seems to be the tree size used in calculating canopy coverage. The information on mature size of trees was obtained from reputable sources, but these sizes are based on trees grown in landscapes where there is generous water and soil area, and cooler temperatures. In other words, trees planted in urban developments generally do not reach the same size or grow as fast as trees in rural areas.

The recommended approach would be to specify in the ordinance a specific number of trees to be planted, their location, their initial size and irrigation standards. This approach is easier to enforce since fewer variables are left to interpretation. When calculating landscape requirements, remember that trees with restricted root zones will probably not reach the typical mature size. Therefore the number of trees required may need to be increased by 25 percent to 50 percent when calculating number of trees required for a target canopy cover.

(7) TREE BANK. The total trees to be planted on a developed site would include the landscape requirements and replacement trees for those large trees removed. Generally the developer would be given the option to plant replacement trees on site. If the site cannot support all trees required, give the developer the opportunity to plant trees on other public property in the community as designated by the community Tree Board. If the site cannot accommodate extra trees and the developer cannot plant trees prior to occupancy, a Tree Bank can be established.

The Tree Bank allows the developer to place money in a community account that would be used to plant trees on public property at a later date. A recommended value would be \$100 per diameter inch of trees required for replacement. For example, if the developer is required to plant 10 inches of replacement trees, then \$1,000 would be placed in the Tree Bank. This provision provides flexibility for the developer and allows the city to plant trees on critical sites in the community.

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H-00-058

November, 2000

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, The University of Georgia College of Agricultural and Environmental Sciences and the U.S. Department of Agriculture cooperating.

Gale A. Buchanan, Dean and Director