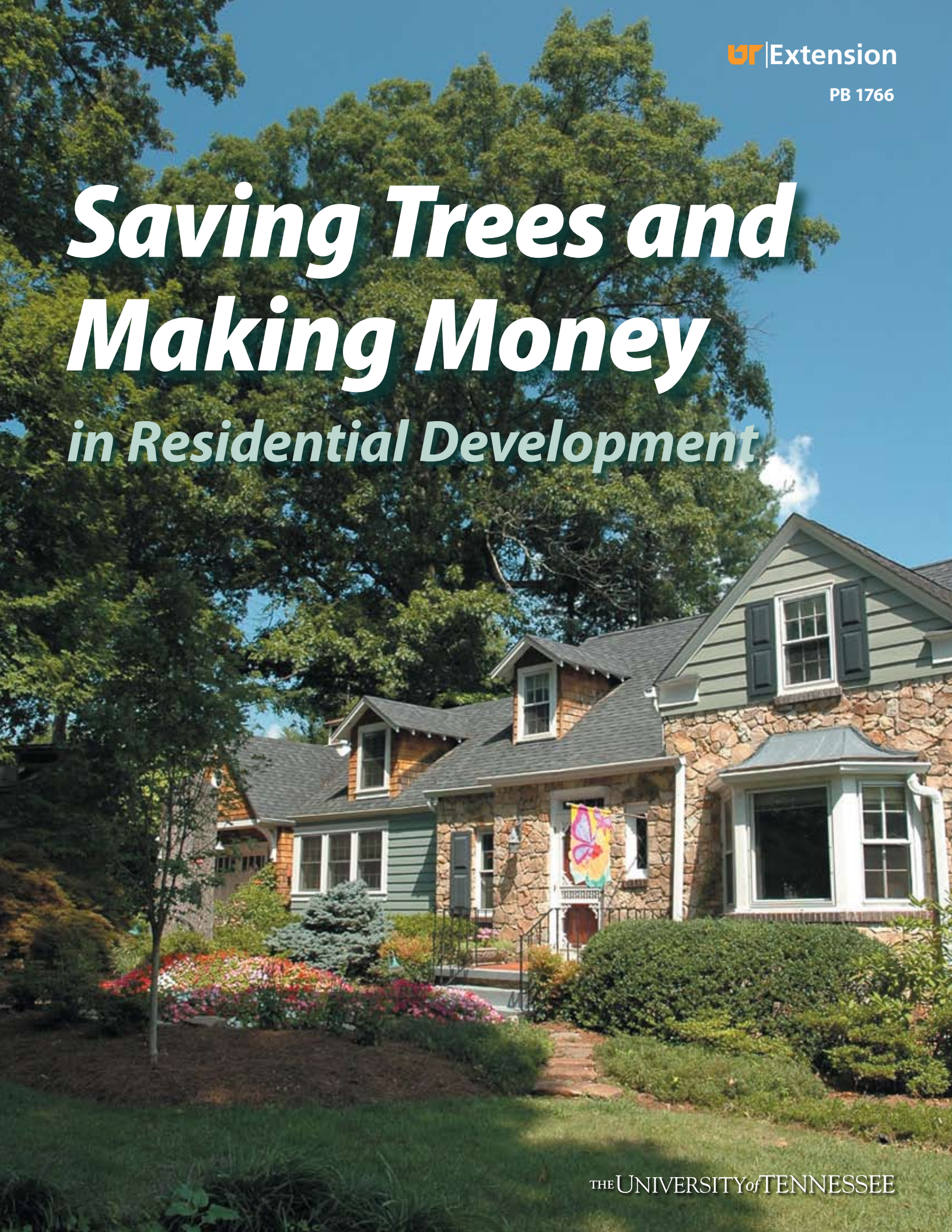


# ***Saving Trees and Making Money*** *in Residential Development*



# Saving Trees and Making Money in Residential Development .....

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## We all know it. Saving trees during construction is not easy.

It's a common sight in developments that are 3 – 5 years old. A homeowner had initially purchased a property for its wooded and natural aesthetic appeal and thinks he or she has succeeded in preserving this beauty. When the home is finished and the nearby trees still cast shade, the owner considers the trees to be past the critical stage. It isn't until after the interior is furnished and the lawn is established that the homeowner soon notices he or she is picking up a few more fallen branches in

the yard than is customary. Eventually, the owner looks up and sees the tree in serious decline (usually dieback along the ends of the branches).

As a professional in the housing or construction field, you can have a major impact on how site-sensitive your company is perceived to be by the practices you employ. Preserving existing vegetation does indeed take time and thought, but it can also increase your profit. "Trees are aesthetically pleasing and are well known to increase real estate values by as much as 15 percent."<sup>1</sup>

## The Economics of Vegetation

Given the finite amount of land that is available for construction, developers often feel pressure to maximize the usability of a property by completely clearing the site. Initially, this may appear to be a viable approach. Many builders and developers interpret real estate solely as dollars acquired per square foot, but two

case studies by the National Association of Home Builders examined smart growth issues that clearly illustrate the relationship

of site-sensitive design and profit.<sup>2</sup> Also, consider these statistics regarding the value of vegetation prior to developing a site plan:

1. The average base value for a 10-inch diameter tree is \$1729. A tree with a 30-inch diameter has an average base value of \$15,554. (These values are adjusted based on species, location in relation to the house and condition. See section on "What Is a Tree Worth" for formula).<sup>3</sup>

2. "Quality of product ratings" was 30 percent higher in shopping districts with trees rather than those with barren sidewalks.<sup>4</sup>

3. Studies have shown that wooded areas add \$5,000 to \$10,000 to the value of a residential lot. The added value is higher where wooded areas are adjacent to other protected areas of woodlands.<sup>5</sup>

4. According to other research, prices for products sold in a well-landscaped district compared to the same products in a "no-tree" district were 12 percent higher.<sup>6</sup>

5. Healthy, mature trees add an average of 10 percent to a property's value.<sup>7</sup>

6. In one study, 83 percent of realtors believe that mature trees can have a "strong or moderate impact" on the salability of



A common approach to development is to implement predesigned site plans with minimal regard to existing vegetation.

homes listed for less than \$150,000. On homes valued at more than \$250,000, this perception increases to 98 percent.<sup>8</sup>

These are just a few of the economic benefits of adding and/or preserving trees on a property. Other benefits include savings in both heating and cooling costs (using deciduous trees to cast shade in summer while still allowing solar radiation to warm the structure in winter), improving air quality through pollution absorption, improved water quality via less runoff, and the often difficult-to-measure quality of life improvement that comes from living in such a setting.

### What Is a Tree Worth?

Tree appraisers use a basic formula when calculating what a tree with greater than 12 inch caliper is worth. While there are some variations, this is the basic formula:

Value of Tree = Size (cross-section trunk area in square inches or  $3.14 \times \text{radius squared}$ ) x Value per square inch x Condition x Location.<sup>9</sup>

For an 18-inch diameter Willow Oak in good condition and located on a residential lot, the calculation is as follows:

$254 \text{ sq. in. } (3.14 \times 9 \text{ squared}) \times \$22 \times 95\% \times 80\% = \$3185$ <sup>10</sup>

A mature tree (one that is larger in stature, greater than 24 inches in diameter and possesses a sizeable canopy) can often have an appraised value of between

\$1,000 and \$10,000.<sup>11</sup>

Always consult with a certified arborist for more information regarding tree appraisal values.

### Deciding What to Keep

In a perfect world, development and tree preservation would co-exist with no sacrifices to either. In residential situations, buyers of homes sometimes pressure builders to save trees that simply do not stand a chance of surviving past 3 – 5 years. It is best to be honest and tell them that with the footprint of the home they have chosen, mature trees within close proximity of construction or soil disturbance (approximately 20 feet) cannot be saved without the construction of retaining walls or other means of grade alteration. While they may not want to hear this initially, you may back up your claim by providing them with an estimate of costs to remove tree(s) early in the construction process and an estimate of what it may cost to remove the same tree(s) after all construction is complete. If they mention a competitor's promise to save large trees, you may advise them that they would be wise to visit a 3 – 5 year-old development that same builder has completed and look up in the canopy of vegetation to note the amount of decline or die-back in some of those "saved" trees.

Not all trees can or should be saved. Smaller, more vigorous trees with a strong leader may be much more beneficial in the

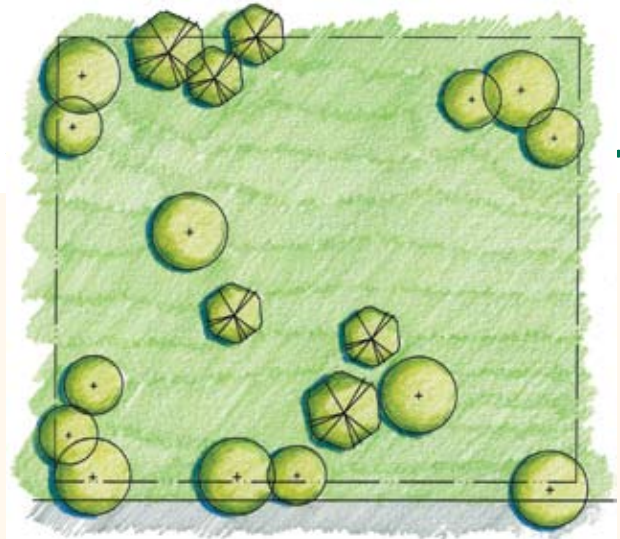


Figure 1. Typical residential lot with several existing trees.



Figure 2. Constructing a home on the property with little thought given to existing vegetation.

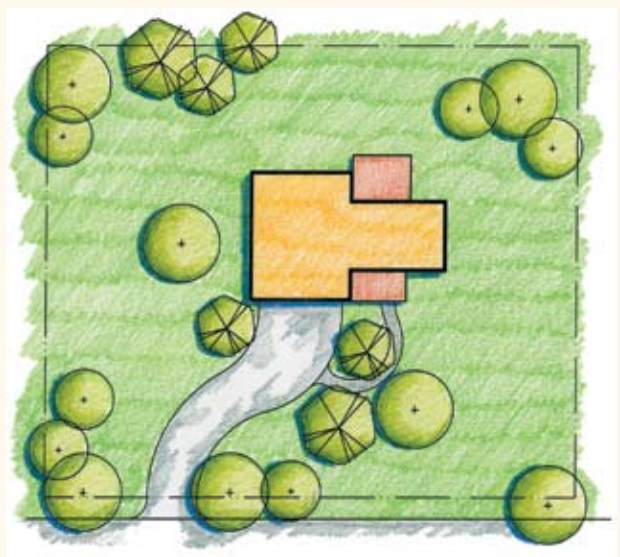


Figure 3. By mirroring the floorplan and repositioning house slightly, all trees could be saved in this scenario.

long term than an older, more mature tree that sits in a high-risk zone. You may also mention to a buyer that some very marginal trees (those that look unstable or spindly with poor branching structure) may be better replaced with younger trees that display attractive foliage at a more appreciated eye level. Ultimately, a property should possess both diversity of species and maturity of vegetation.

When deciding which trees to keep during new construction, a balanced and well-thought-out approach may prove to be the most profitable. For example, if well-established trees can be preserved through alternative site-design practices, the money invested in the extra time and ef-

fort it takes to do so might easily be regained in a higher selling price for a more attractive lot. Building up rather than out (multi-story vs. single-floor design) provides the same amount of usable floor space while making less of an impact on a site.



This dozer filling is an example of detrimental grading.

## How to Protect Trees During Construction

The four major causes of decline and eventual death of trees during and after construction are compaction of soil, cutting and

filling within the root-zone, physical or mechanical injury and trenching in the root zone. While some trees are more sensitive than others, a general rule is to not add any soil over the root zone of a tree.



Figure 4. Protective silt fence located beyond tree's dripline.

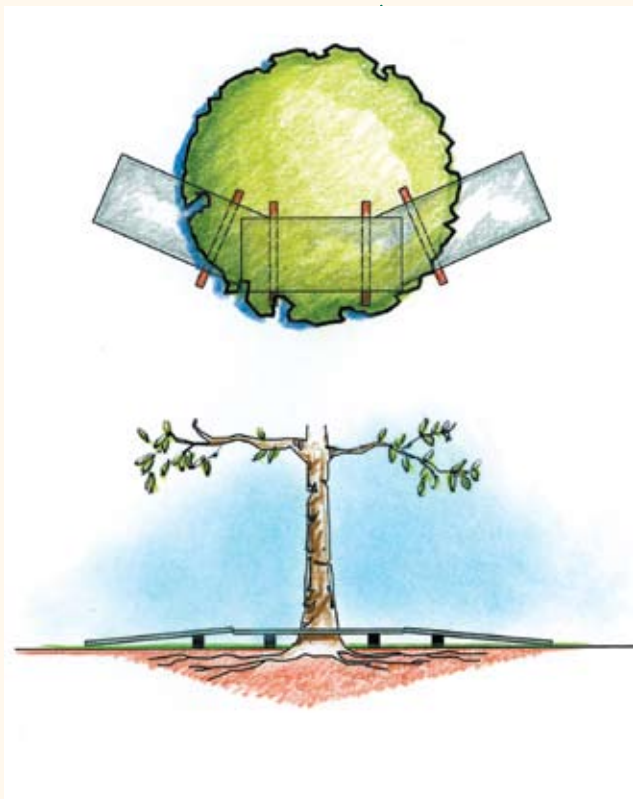


Figure 5. Temporary root zone bridge constructed of cross-ties and steel plates to prevent compaction.

## Compaction

Compaction occurs when construction equipment (even standard-sized trucks) makes multiple trips or is stored on the ground over the tree root-zone for an extended period of time. This can also occur with the addition of soils or construction materials.

To protect a tree from this hazard, construct a temporary fence around the entire perimeter of a tree's drip line and let all contractors and sub-contractors know that this is off limits to all equipment and disposal of anything other than clean water. Since the bulk of a tree's roots are a mat of finely meshed feeder roots that fan out well beyond the drip line of a tree and occur primarily within the top 12 inches of soil, this protective zone may extend well beyond the drip line.

## Detrimental Grading

Altering the amount of soil within a tree's root zone either by adding or removing that which was there prior to construction can cause a tree to die a slow death. Additional soils can lead to compaction and prohibit the flow of water and oxygen to the roots. Removing soil from this area exposes roots, which will cause them to dry out, also prohibiting this exchange. Existing contours on grading plans should be unaltered in a protected tree's root zone.

## Trenching

When routing underground utilities, it is critical to avoid any trenching within the drip line of trees to be preserved. There are many special tools available today to help. If the utilities to be buried are fairly minimal in size, air excavation (a tool that uses compressed air to blow soil away from roots) may work well. Most irrigation and utility construction companies possess tunneling or auguring devices that can be used to literally bore a tunnel beneath the critical zone in which trees' roots grow.

Installing such high-impact elements as drain fields is another issue. The amount of trenching needed to accommodate these will eventually kill any tree in this area. Therefore, it is best to remove any affected large trees at the time of construction, while the costs will be relatively small compared to post-construction removal.

Being creative with construction practices can go far in saving a large tree. Using a post and lentel system to build over a portion of a tree's roots may allow soil to remain relatively undisturbed. Therefore, the roots are able to get oxygen and water. Although roots in this zone may not receive any water, as long as this area is less than 25 percent of the total root mass and the remainder has access to water, this tree may stand a much higher chance of survival than if trenching for a foundation had occurred.

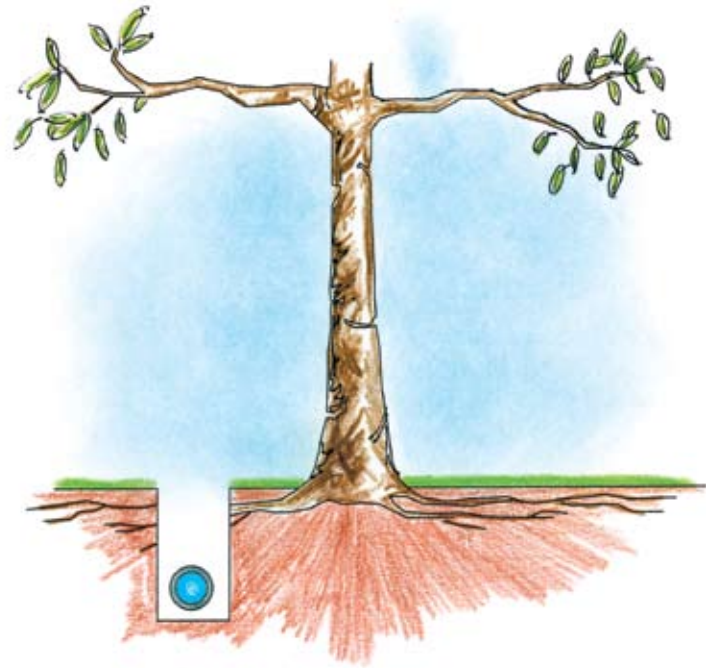


Figure 6. Traditional trenching devastates a tree's root system.

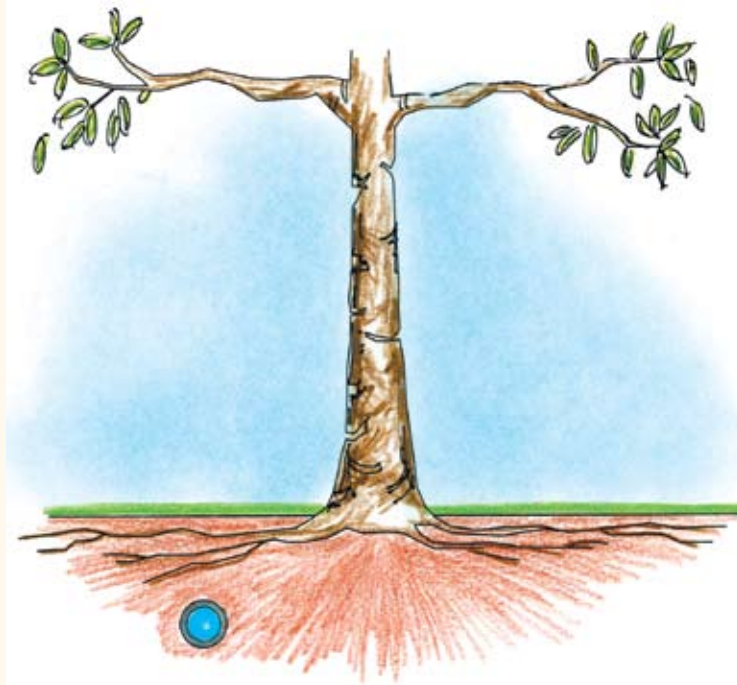


Figure 7. Boring beneath root zone saves tree's root system.

## Mechanical Injury

Mechanical injury occurs when construction equipment bumps and scrapes tree trunks or damages and breaks branches. This is probably one of the most avoidable of all practices. Project managers and contractors may simply construct the high-visibility plastic fencing mentioned earlier around trees to be protected. Any undesirable understory brush within the drip line of the tree should be removed by hand, rather than using machinery, to avoid soil compaction and mechanical injury. The larger the area fenced off, the better. Although a tree's roots are often equal to the mass of its canopy, it may be difficult to preserve 100 percent of this area and still perform any construction. A rule of thumb is to fence 1 foot of radius per inch caliper (for a 12-inch tree, a 12-foot radius or 24-foot diameter circle is marked and fenced).

## Post-Development Replanting

After a property has been developed and has stabilized, it is time to plan(t) for the future. The benefits of planting trees are lengthy, but there is an important question to ask: How much of your site-planting work will be around for your grandchildren to enjoy? There are two classifications of trees to consider. The first is the smaller, flowering, decorative trees, which are very popular. They are attractive,

relatively inexpensive and non-threatening but offer little in the way of shade and longevity. The second category includes some species that are often classified as "legacy trees." These are shade trees that are typically slower growing but stronger and much longer-lived. Since they will be around for a long time, placement is critical.

If a lot size allows, larger-growing trees should be planted at least 20 feet away from structures. Choose strong trees with good branching habits and of the appropriate foliage texture.

Large-leaved trees such as Sycamore and Tulip Poplar will be better off planted in a setting where they may be permitted to drop their leaves without having to be collected. Smaller-leaved trees such as Willow Oak or Dawn Redwood produce relatively little debris when fall arrives and are less of a threat to clog gutters and drain inlets.

An abbreviated list of trees to consider planting in the Southeast is shown below. Do not plant trees that will grow large under utilities or in areas where they may potentially block park-

### Recommended Legacy Trees

Common Name	Scientific Name
Scarlet Oak	<i>Quercus coccinea</i>
American Linden	<i>Tilia americana</i>
Tulip Poplar	<i>Liriodendron tulipifera</i>
Swamp White Oak	<i>Quercus bicolor</i>
Bald Cypress	<i>Taxodium distichum</i>
Ginkgo (male)*	<i>Ginkgo biloba (male)</i>
Autumn Blaze Maple	<i>Acer x freemanii</i>
Sugar Maple	<i>Acer saccharum</i>
Black Gum	<i>Nyssa sylvatica</i>
Willow Oak	<i>Quercus phellos</i>
White Ash	<i>Fraxinus americana</i>
Japanese Zelkova*	<i>Zelkova serrata</i>
Lacebark Elm*	<i>Ulmus parvifolia</i>

\* Non-native species that are not invasive

ing lot lighting from illuminating dark, higher-risk zones. With regard to care, select trees that are self-sustaining in the environment after a couple years of watering. If irrigation is needed to keep a tree alive, it shouldn't be considered in the first place. For a complete list of native trees, contact the Tennessee Valley Authority (TVA) and ask for the publication, "Native Plants of the Tennessee Valley" (no. 5 in Riparian Restoration

Fact Sheet Series – [www.tva.gov/river/landandshore/stabilization/plantsearch.htm](http://www.tva.gov/river/landandshore/stabilization/plantsearch.htm).

Our landscapes are far from static. They will always change and hopefully mature. Developers, builders and realtors with an appreciation and respect for land and the landscape will be in high demand as the general public's knowledge of ecology and environment increases. Being attuned to natural ele-

ments and knowledgeable about beneficial landscape practices can result in higher profits, while also earning one the reputation of being an individual or company who cares about much more than just dollars per square foot.

## Resources:

- <sup>1</sup> National Association of Home Builders – NAHBNET issue summary, February 1990.
- <sup>2</sup> "Smart Growth Case Study: Newpoint" and "Smart Growth Case Study: The Preserve at Hunter's Lake" [www.nahb.org/generic.aspx?genericContentID=437](http://www.nahb.org/generic.aspx?genericContentID=437)
- <sup>3</sup> "Growing Greener Cities, A Tree Planting Handbook" (Global Releaf, Living Plants Press, Los Angeles, 1992).
- <sup>4</sup> Washington Community Forest Council. "TreeLink 1999.
- <sup>5</sup> The Maryland-National Capital Park and Planning Commission. Prince George's County Planning Department.
- <sup>6</sup> Research performed by Kathy Wolf. [www.treesforyou.org](http://www.treesforyou.org)
- <sup>7</sup> USDA Forest Service
- <sup>8</sup> American Forests, Arbor National Mortgage
- <sup>9</sup> Guide for Plant Appraisals, authored by the Council of Tree and Landscape Appraisers (CLTA).
- <sup>10</sup> Guide for Plant Appraisals, authored by the Council of Tree and Landscape Appraisers (CLTA).
- <sup>11</sup> Council of Tree and Landscape Appraisers

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