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## Tree Installation: Process and Practices

### Introduction

Choosing and planting a tree should be a well-informed and planned decision. Proper selection and planting can provide years of enjoyment for you and future generations as well as increased property value, improved environmental quality, and economic benefits. On the other hand, an inappropriate tree for your site or location can be a continual challenge and maintenance problem, or even a potential hazard, especially when there are utilities or other infrastructure nearby. Refer to the publication *Tree Selection for the Unnatural Environment* (FNR-531-W) for more details on tree selection.

### Placement of Trees

Before planting your tree, consider the tree's "full-grown" size. When the tree nears maturity, will it be too close to your house or other structures? When selecting trees for energy efficiency, don't plant evergreen trees near the house on southern exposures. Trees may provide some shade and screening, but will also block out the warming effects of the sun during winter months. When choosing trees for shade and solar gain, choose larger, deciduous-canopy trees, which provide an advantage year round. Select good quality trees that are suitable for your location from a reputable source.

Correct placement is critical for an energy-efficient design and low maintenance as the tree grows and matures. Be certain that the mature height and spread fit the location before placing the tree. This allows the tree freedom to spread into the design space naturally without excessive pruning to prevent conflicts with the house. However, the tree still must be close enough to the house for the canopy to provide shade. A good rule of thumb to plant the tree at least 20 feet from the house. For larger shade trees, you may need to plant as far as 40 feet from the house to insure room for growth (Figure 1).

Will it provide too much shade for vegetable and flower gardens? Most vegetables and many annuals and perennials require considerable amounts of sun. If growing these plants, consider how the placement of trees will affect the gardens. Will it obstruct driveways or sidewalks? Think about the line of sight for street access and signage. Will it cause problems for buried or overhead utilities? Remember: Success can be achieved by planting the right tree in the right place. **Always be aware of utility service lines above and below ground.**

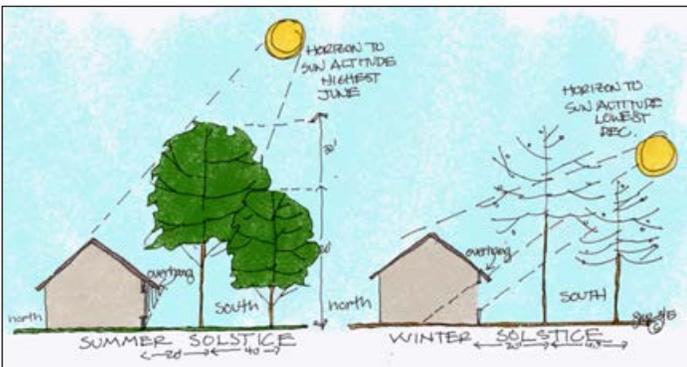


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Do not plant trees near overhead utility lines unless approved by a utility forester. This will help eliminate the need for harsh pruning measures as the tree matures.

**How common is this species in the neighborhood or town?** Some species, such as maples, already are over-planted and overused, creating a problematic monoculture with increased management issues. Increasing natural diversity and varying genus and species selections will help limit the opportunity for a single pest to devastate all plantings. In large-scale, urban plantings, never plant more of one type of tree than you can afford to lose.



Before you plant a tree, think about the shade it will provide.

#### Should evergreen or deciduous tree species be considered?

Evergreen trees will provide foliage cover and sometimes shade year-round. They also may be more effective as a barrier for wind and noise. Deciduous trees give summer shade but provide passive solar gain, allowing the winter sun to shine through to allow indirect heating. Keep this in mind when selecting a planting location. Orientation of structures and tree plantings can have a profound effect on site climate.

**Other considerations** include local regulations and ordinances. Check with local authorities about regulations pertaining to placement of trees. Some communities have ordinances requiring permits for tree planting, particularly in rights of way or on public property. Utility service providers are required to keep tree branches at a safe distance according to their vegetation management plans. Line clearance distances will be imposed by utility regulations as trees mature.

### Planting Trees

A well-planted and maintained tree will grow faster and live longer than one improperly planted or maintained. Trees can be planted almost any time of the year, as long as the ground is not frozen. Some trees establish best with spring planting, such as some oak

species, redbud, and sour gum trees. Early fall is the optimum time to plant most tree species in Indiana, because it gives trees a chance to establish new roots before winter arrives and the ground freezes. Late winter and early spring is the next-best time to plant trees. Summer plantings also are fine, although planting in hot summer weather should be avoided unless supplemental irrigation is certain and consistent.

Trees may be purchased in containers, in root bags, balled and burlapped (B&B), or as bare root plants. Generally, containers and root bags are the easiest to plant, allowing trees to establish well in any season, including summer.

With container-grown stock, the tree has been growing in a container for a period of time, usually from seed or seedling. When planting “potted” plants, rootball damage is minimized as the plant is transferred to the soil. Container-grown trees range in size from very small plants in 1-gallon pots to large trees in 25-gallon pots. Root control bags are similar to containers in that they are grown in the medium and bag for a period of time, and harvested when desired size is achieved. Planting procedures are very similar and require the container be removed completely. The primary challenge with container-grown stock is dysfunctional root systems. Due to the round shape of the container, roots are forced to grow in a circular direction. This can cause future issues with health and stability resulting in stem-girdling roots. It is important to box or shave the root system with a hand saw before planting. Cut the outer inch of the roots on all four sides and the bottom. This will remove the malformed roots and encourage lateral rooting into the native soil.



Circling and diving roots later become stem-girdling roots creating an unstable, unhealthy tree.



Gently shave the off the roots on all four sides and the bottom of the soil/root system.



Remove the circling roots prior to planting to encourage good lateral root growth.

**B&B plants** are grown in the ground with no holding materials. The roots/soil balls are harvested with special mechanized equipment or hand-dug and wrapped in burlap and wire baskets. B&B plants can be quite large and provide the largest cultivated tree for purchasing. Typically, these are available year-round, but best selection is in the spring and fall. Of all the cultivation methods, balled and burlapped stock can be the most challenging from a physical standpoint, with the weight of the soil ball posing a serious impediment to planting.



Balled and burlapped trees provide an opportunity to plant larger trees in the landscape. However, there are fewer roots to help in establishment.

Additionally, as much as 80% or more of the roots are left behind after digging, providing very little root system for establishment. The critical point to remember for planting B&B trees is locating the root flare where the main order root system originates. Many balled and burlapped trees are planted too deep in the nursery, which leaves excessive soil buildup around the trunk after harvest. When the tree is dug and balled this excessive planting depth provides an improper depth at transplanting. If transplanted without finding the root flare, the excessive depth will cause decline in the tree and will become unstable as the tree matures, leading to windthrow or decline, leading to death of the tree. Be sure to establish the new tree at the proper grade by removing the excess soil on top of the root ball, prior to placing it in the hole.

**Bare root** trees usually are smaller in size and sometimes more difficult to obtain. Because there is no soil on the roots, they should

be planted when dormant to prevent desiccation of the roots. The roots must be kept moist until planted. Bare root trees often are offered by seed and nursery catalogs or by wholesalers, and usually in the spring. They should be planted as soon as possible upon delivery. Bare root trees are becoming increasingly popular and new planting techniques show promise for planting larger trees with no heavy medium.



**Know what's below.  
Call before you dig.**

**BEFORE DIGGING**, call local utilities companies to identify the location of any underground utilities. Also, consider aboveground utility lines, as well. Call the Indiana Underground Plant Protection Service at 811 for line location information.



This tree has been planted too deep. There is no visible root flare.



Nearly 10 inches of excess soil were removed to find the root flare and proper grade for planting.



This tree was established at the proper grade after finding root flare.

## Irrigation

During the establishment period, which can last up to two years, consistent watering is critical for survival. Examine the soil around the tree regularly, especially after a week or so of unusually dry weather. If it is dry and crumbly, supplemental irrigation is needed. Watch trees closely for signs of drought, which may include wilting, scorched leaves or burnt margins. Trees should never be allowed to go into severe stress. This can lead to other problems, such as predisposition to insect pests. If a minimum of 1 inch of rain per week is not available, supplemental irrigation is needed. A good rule is to provide water at the rate of 5 gallons for every inch of trunk diameter measured at 6 inches above the root crown. If leaves are wilting or scorching, irrigate the trees slowly enough to allow the water to soak into the tree root system and planting pit. This will encourage deeper root growth. Keep the area under the tree canopy mulched at a depth of 2–3 inches. Check soil with a soil probe, if available, for dampness and drainage. Overwatering can be just as lethal as underwatering. Most importantly, a consistent watering regimen in the fall before the ground freezes is recommended to help ensure a healthy plant in the spring.

**Fertilization** is not recommended for newly planted trees. Depending on soil and growing conditions, fertilizer may be beneficial at a later time, after establishment. Fertilizing a stressed tree can do more harm than good for several reasons: It is important for root growth to dominate during this time and fertilizers containing higher nitrogen ratios will stimulate top growth at the expense of roots.

## Maintenance

Young trees need **protection** against animals, frost cracks, sunscald, lawn mowers, and string trimmers. Mice and rabbits frequently girdle small trees by chewing away the bark. Since the tissues that transport nutrients in the tree are located just under the bark layer, a girdled tree often dies in the spring when growth resumes. Weed whackers or string trimmers also are a common cause of girdling. Plastic or vinyl guards are an inexpensive and easy control method. Sunscald and bark cracks occur mostly on the south and southwest sides of smooth-barked trees. Sunscald and frost cracking are caused by the sunny side of the tree expanding at a different rate than the colder, shaded side. This can cause large splits in the trunk and can occur when a young tree in a shady spot suddenly is exposed to



Whenever possible, mulch trees to the dripline of the tree canopy, at the edge of the farthest limbs, at 2–4 inches deep.



Pruning should be minimal, removing only dead or damaged branches, as needed.

direct sunlight. Light-colored tree guards can be used to protect the trunk from sunscald and other tree enemies. Avoid tight-fitting paper or synthetic wraps.

**Pruning** is an important maintenance practice for tree care. Start with corrective pruning to remove any broken, damaged or dead branches, or suckers that sprout from the base of the tree. Young tree pruning is critical to establish a strong branch structure to improve stability and health. Be sure to see the publication FNR-506-W for more information on tree pruning.

These considerations are important for the success and sustainability of the newly planted tree. The best way to prevent tree problems is to understand the concept of “right tree, right place” and install new trees using the correct planting techniques.

If you are unsure about proper tree planting, consult a local International Society of Arboriculture Certified Arborist for assistance.

## Proper Tree Planting -- The 12-Step Process

- 1) **Select the appropriate tree for the location.**  
Choose a tree that will grow well in your conditions, and provide plenty of space to grow and mature. This includes both vertical and horizontal space for the canopy and plenty of room for root growth.
- 2) **Dig the planting pit 1–1½ to times as wide as the root system.**  
Provide space when digging the planting pit for roots to expand. Dig the hole no deeper than the depth of the main order root system, which includes the soil, to keep the tree from settling too deep. Box or shave the perimeter of container plants to prevent circling roots. Find the root flare and make sure it is not below the soil line at final grade establishment.
- 3) **Provide proper drainage for tree survival.**  
Most plants don't like “wet feet” or prolonged wetness around their roots. Be sure the planting pit has good drainage. Know the soil type in the planting area in order to make adjustments to tree selection or planting procedures. If unsure of soil type, try the two-hour test by digging the hole and filling it half full with water. If the water is gone after two hours, drainage is great!
- 4) **Prune the tree to remove and prevent problems.**  
Remove dead, broken, and damaged branches and any other nonbeneficial plant parts. Develop a strong branch structure, removing weak branch attachments and codominant stems establishing a central leader system.
- 5) **Set the tree in the hole with the root collar even or slightly above existing grade.**  
Planting too deep is a leading cause of mortality for a newly planted tree. Be certain the root flare is visible above the soil line. Do not pick the tree up by the trunk. Always handle by the container or root ball.
- 6) **Remove all foreign materials from the root ball.**  
Remove wires, tags, twine, cords, containers and, especially, non-biodegradable bags. If planting a balled and burlap tree, removal of only the upper ½ to 1/3 of the handling materials is all that is needed. If using a container or other root performance covering, remove them completely.
- 7) **Gently back fill the hole with native soil.**  
Soil amendments and fertilizers are not necessary. Settle the soil with water and lightly tamp to remove air pockets and insure good root/soil contact. Construct a small earth rim around the planting pit to help hold water during supplemental irrigation.
- 8) **Stake the tree, if necessary.**  
Support systems for trees are not recommended. However, trees sometimes require additional support to maintain stability and provide defense in challenging areas. Stakes and guying should not be left in place longer than one year. If support systems are left in place too long, serious damage to the tree can occur by girdling the plant and discouraging good taper and trunk strength.
- 9) **Mulch the planting area.**  
Mulch around the tree to at least the drip line—2 to 3 inches deep—and up to, but not smothering the trunk. Do not overapply or mound the mulching materials around the trunk of the tree.
- 10) **Water the tree, but don't drown it.**  
A newly planted tree should have adequate water for establishment. A thorough soaking is much better than light, frequent watering. One inch of water per week, from rainfall and/or supplemental watering, is preferred. Check the planted area periodically to ensure good water movement through the soil.
- 11) **Protect the tree from animals and humans.**  
Plastic, expanding tree wraps are ideal for protection against tree enemies. Deer and other furry creatures can damage a tree if it is not protected. String trimmers and mowers likely will be fatal to a tree if allowed to harm the bark. Mulch can also provide a visual cue to stay away from the tree with equipment.
- 12) **Avoid fertilization during the first growing season.**  
Adding fertilizer to newly planted trees can create stress and delay establishment. Also, drought-stressed plants should never be fertilized, especially during the establishment period.

*Trees and all forestlands are a major asset to our cities, towns and communities. They work hard to provide aesthetic, functional and environmental benefits to improve the quality of life. Preservation and conservation of our urban forests are of critical importance to all of us as professionals and as a society.*

**Plant a tree, cool the globe!**

## Tree Planting Detail

(Not to scale)

Install approved attachment devices to stabilize tree. Materials should be flexible and allow for movement so that trunk taper develops correctly.

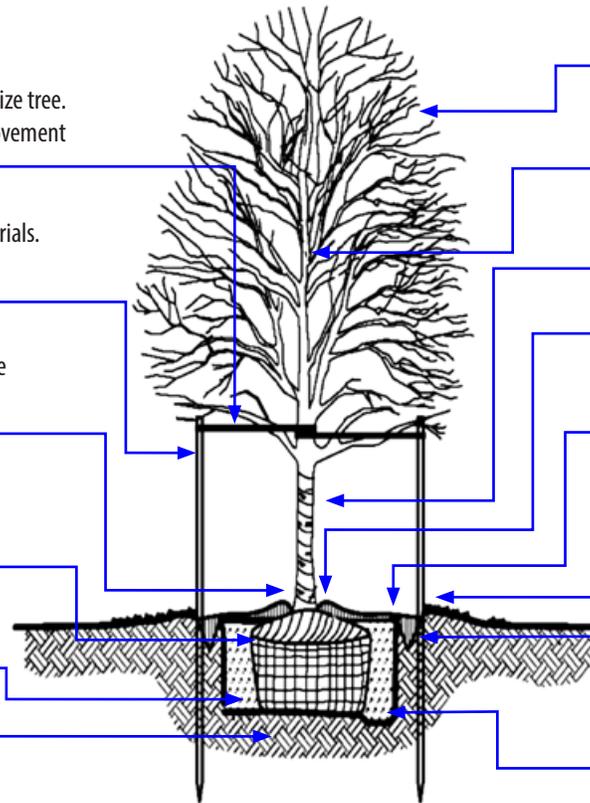
Stake trees only if needed, using sturdy materials. Attach at the lowest branches, or no higher than 2/3 the height of the tree.

Excavate soil or media to expose the root flare just above the uppermost roots, to identify proper planting depth.

Remove container or, if B&B, remove upper 1/3-1/2 of wrapping material and wire basket.

Backfill planting pit with native soil material. Do not use any amendments.

Place tree on undisturbed subgrade or compact, if disturbed.



Prune only dead or damaged branches.

Remove all tags, ties, strings, twine, wire, wrapping, etc.

Wrap smooth bark trees, if necessary. Use a light-colored, flexible wrapping material.

Locate root flare slightly above finish grade.

Excavate planting pit 1½-2 times the size of the root ball, maintaining vertical sides.

Create a mulch ring to slightly exceed the diameter of the tree's drip line, forming a saucer for watering.

Apply suitable mulching materials 2-4 inches deep. Avoid mounding against trunk.

Water thoroughly after planting.

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