



# Selecting and Managing Trees to Avoid Conflicts With Overhead Utility Lines

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Trees add tremendous value to our neighborhoods and cities. They provide many benefits, such as beautification, wildlife habitat, filtering air pollutants, controlling stormwater runoff, reducing heating and cooling costs, and increasing property values (Roy, Byrne, and Pickering 2012). Unfortunately, trees can become a liability when they are planted close to overhead utility lines without considering their mature size. This is a serious conflict because tree growth into utility lines can damage electrical equipment, disrupt power delivery, and cause electrocution and fire hazards. Because of these risks, utility companies must prune or remove oversized trees to safeguard power lines, their customers, and the public. In this publication, we discuss tree conflicts with utility lines, how they are managed, and how to prevent conflicts by selecting utility-friendly trees for planting.

## Conflicts Between Trees and Utility Lines

Trees are the most common cause of overhead utility line damage and power outages due to trees falling onto lines, branches dropping onto lines, or branches growing into lines (Guggenmoos 2003). Losing power is always an inconvenience, but in the worst cases, it can cause losses in business revenue and even put lives in danger. A downed power line is an obvious electrocution and fire hazard. A less obvious hazard occurs when trees come in contact with energized wires and conduct electricity down to the ground. This can cause power outages, ignite building and forest fires, and electrocute people or animals coming in contact with the tree (see fig. 1). For their safety, homeowners should never attempt to prune or remove a tree that is near a power line. This type of work should only be performed by specially trained arborists contracted by the utility company.



**Figure 1.** Tree failure damaging utility lines after a storm. (Photo courtesy of Arlington County, Virginia, via Flickr.)

Due to risks associated with tree conflicts, governmental regulators and utility companies have policies and regulations that dictate tree management around utility lines. These rules may differ based on the type of utility line.

- Electrical distribution lines are the lower voltage lines that deliver power to homes and businesses. They are lower to the ground and are typically attached to wooden poles that are 30 to 40 feet tall.
- Electrical transmission lines move power over long distances from power plants to local consumers. They are attached to taller structures, commonly 50 to 180 feet tall, and carry a higher voltage than distribution lines (see fig. 2).

Transmission lines are much more critical to the electrical power grid, and an outage can affect many thousands of homes and businesses. Therefore, stricter regulations are put in place regarding acceptable tree heights and planting distances from transmission lines.

While trees may be allowed under distribution lines, trees are generally not allowed to grow under transmission lines. Therefore, this publication focuses primarily on distribution lines when discussing selection and management of trees under and near utility lines.



**Figure 2.** Examples of a distribution power line (left) and a transmission power line (right). Transmission structures typically support more lines and are built taller than distribution structures due to the higher voltage and greater liabilities of a power outage. (Photo by Laurie Fox.)

## Conflict Management: Tree Pruning and Removal

Utility companies typically have legally binding easement agreements with property owners that allow them access to utility lines for maintenance and repairs. A property owner may plant trees in an easement, but the utility company has the right to maintain or remove trees that become a hazard or nuisance. Depending on the utility company’s policy, property owners might need to file an easement encroachment request and receive approval before planting trees near utility lines. Utility companies diligently manage tree and utility line conflicts. Most, if not all, utility companies have utility foresters on staff who are skilled at identifying tree conflicts and recommending management solutions that balance security of the utility lines and well-being of nearby trees and landscapes.

There are two options for managing trees that conflict with utility lines: pruning or removal. For transmission lines, removal is almost always the solution to a potential

tree conflict. In contrast, either pruning or removal may be considered to manage tree conflicts with distribution lines.

### Tree Pruning Option

Utility foresters could opt to routinely prune a tree that grows toward distribution lines but is otherwise healthy and structurally sound. Pruning tree branches is an effective strategy for reducing power outages when performed on a repeated pruning schedule (Parent et al. 2019) and is usually a cheaper, quicker, and more environmentally sensitive alternative to tree removal in the short term.

Proper pruning of trees to reduce power line conflicts requires specialized knowledge, skill, and equipment. To keep a tree healthy, safe, and attractive, it cannot simply be shortened by arbitrarily cutting branches. “Topping,” also called “rounding over,” is an improper method of pruning where a maximum height is chosen for the tree and all branches extending above that height are cut without consideration for where the cuts are made or how the tree will respond (see fig. 3). Topping is harmful to trees because it removes excessive amounts of foliage, which reduces photosynthesis and starves the tree. It also creates wounds that are susceptible to pests and decay, which can compromise the structural integrity of the tree. Topping is inappropriate, whether done to trees near utility lines or in other landscapes. To learn more about proper pruning, read *A Guide to Successful Pruning: Pruning Deciduous Trees*, VCE publication 430-458 ([pubs.ext.vt.edu/430/430-456/430-456.html](https://pubs.ext.vt.edu/430/430-456/430-456.html)).



**Figure 3.** These trees have been topped, which is an inappropriate pruning practice. Water sprouts have grown in response to excessive branch removal and will quickly conflict with overhead utility lines due to their rapid growth rate. (Photo reprinted by permission from Rebecca Latta, [rebeccalattaconsulting.com](http://rebeccalattaconsulting.com).)

The appropriate technique for pruning trees near distribution lines is called “directional pruning.” As the name implies, this technique directs branch growth away from utility lines by selectively removing branches or leaders that are growing toward the lines. Unlike topping, which cuts branches at indiscriminate midpoints, directional pruning cuts are made at natural branch unions so the tree can seal the wounds quickly and avoid pests and decay.

While directional pruning is preferred to topping, it is not without its own potential problems. Trees that are directionally pruned under distribution lines often develop a V-shaped crown, which may encourage spreading of the branches with foliage weight concentrated at the branch tips (see fig. 4). This can put stress on branch unions and increase the risk of branch failure. Directionally pruned trees can also end up with branches that are unbalanced to one side of the crown, putting abnormal stress on trunk stability and root anchorage (see fig. 5). These problems can be reduced if a tree is put on a directional pruning regimen at an early age, allowing the crown, trunk, and roots to adapt to this growth habit and the uneven weight distribution. Directional pruning is more stable and more attractive when performed on species with an open or spreading growth habit, such as maples and elms. Directional pruning is less desirable for trees that grow upright or pyramidal, such as oaks or conifers.



**Figure 4.** An example of an American elm that has been directionally pruned in the center of the crown, creating a distinct V-shape. While this pruning technique might be the most practical solution for trees growing directly under power lines, it unbalances the crown and can increase the risk of branch failure. (Photo by Eric Wiseman.)



**Figure 5.** An example of a loblolly pine growing adjacent to power lines that has been directionally pruned along one side of the crown. In moderation, this pruning technique is a good solution to deal with branches from nearby trees growing into power lines. However, excessive branch removal can cause instability of the tree and negatively impact tree health. (Photo by Brittany Christensen.)

In addition to pruning, tree growth regulators are occasionally used by utility tree managers to reduce tree conflicts with power lines. These chemicals mimic tree hormones and slow down the growth of trees so they do not have to be pruned as often. They are typically applied as a liquid soil drench that is absorbed by the tree roots and usually slow growth for three to four years. Due to their expense, growth regulators are usually reserved for specimen trees that would be adversely stressed or disfigured by regular pruning.

## Tree Removal Option

Although costly and disruptive to the landscape, removing trees near utility lines is sometimes necessary, especially if the tree is in poor health or has structural problems (see fig. 6). To comply with safety regulations for high voltage power lines, trees or branches that could come within a specified distance of transmission lines must be removed. Although a secondary option to pruning, the best solution for a tree that has frequently recurring conflicts with distribution lines is to remove it and replace it with a utility-friendly tree of smaller mature size. Many utility companies are agreeable to removing trees that cause frequent problems, and some

will even replant utility-friendly trees or low-growing plants at no or reduced cost to the property owner. Before tree pruning or removal, most utility companies will attempt to notify property owners of the planned work. This is an opportune time for property owners to ask questions and communicate preferences for pruning or to inquire about tree removal and replacement options.



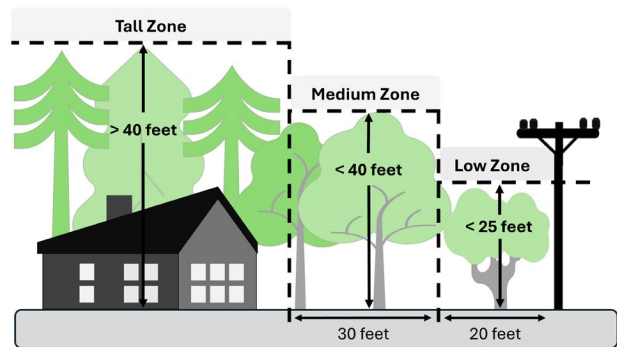
**Figure 6.** A utility arborist removes a conflicting tree that has broken in a storm and damaged utility lines. (Photo by Greg Henshall, FEMA, via picryl.com.)

## Conflict Prevention: Planting Utility-Friendly Trees

When planning a landscape where overhead utility lines exist, selection of appropriately sized trees is critical to preventing conflicts. Before planting new trees, look above and around the planting site. Determine whether the site is in proximity to a transmission or distribution line. If the site is near a transmission line, tree planting may be prohibited in the utility easement. If the site is near a distribution line, consider if the location falls into a low-, medium-, or tall-tree height zone, which is determined by the distance from the tree trunk to the utility pole or line (see fig. 7). The low zone is less than 20 feet from the line, the medium zone is 20 to 50 feet from the line, and the tall zone is more than 50 feet from the line. These zones are named according to the restrictions on the mature size of trees that can be planted near distribution lines.

Typically, trees in the low zone should not exceed 25 feet at maturity. This height restriction should prevent the crown from interfering with the power lines and reduce the need for pruning. In general, trees in the medium zone should be limited to a height of 40 feet. Trees taller than this height might bring down power lines if they are uprooted by a severe storm. Also, their mature crown spread should not grow within 10 feet of the lines. Trees in the tall zone may exceed 40 feet in height, but keep in

mind that a very tall tree may still strike power lines if it uproots.



**Figure 7.** This illustration of tree height zones shows the appropriate height of trees to plant, determined by their distance from the distribution utility line. (Illustration by Brittany Christensen.)

If the site is in close proximity to a transmission line, stricter regulations apply for vegetation under or near the line. Low-growing shrubs may be allowed by some utility companies, but homeowners might need to receive written approval for any new plantings under or within the adjacent border zone of transmission lines. Typically, no vegetation taller than 10 feet is allowed in the transmission right-of-way. To comply with regulations, utility foresters often remove any tree that has the potential to grow within 10 feet of the transmission line, regardless of the health or structural condition of the tree. Since regulations about tree planting in utility easements may vary, it is always best to check with the utility forester or city arborist to confirm the permissible tree height near the utility line before planting.

**When planting in the low zone,** the mature crown spread of short trees underneath power lines is typically not an issue unless the branches might interfere with a nearby street, walkway, parking lot, or other site use. In this situation, small trees with broad crowns are not recommended because the pruning of lower branches for clearance will create a maintenance burden and disfigure the tree. Instead, small trees with an upright or narrow (fastigate) growth habit will be more suitable. Some tree species are naturally short at maturity, and many dwarf cultivars have been developed from taller species, making them suitable for planting under power lines (see fig. 8).

**When planting in the medium zone,** keep in mind that crown spread growth may eventually cause utility line conflicts. If a taller tree is desired in these zones, consider selecting a fastigate or columnar cultivar of a species. The narrower crown spread will reduce branch conflicts and the need for excessive pruning.

**When planting in the tall zone,** there are fewer size restrictions on tree height. However, it is still important to reduce the risk of power outages from falling trees or branches by planting slow-growing, strong-wooded species such as white oak, pignut hickory, sweetgum, black gum, bald cypress, and hornbeam. Avoid planting fast-growing, weak-wooded species — such as silver maple, eastern white pine, willow, Callery pear, tulip-poplar, and basswood — near power lines.



**Figure 8.** An example of appropriately sized trees (crape myrtles) planted under distribution utility lines. (Photo by Eric Wiseman.)

Overhead utility line easements often travel along property boundaries, such as side and rear lot lines of residential parcels. This limits the options for trees that can be planted to create a landscape border and visual screen between adjacent properties. In these situations, large shrubs that reach a mature height of less than 15 feet (or 10 feet if near a transmission line) are a popular alternative to small trees because of their low-branching growth habit and dense foliage. These characteristics provide an effective physical border, visual screen, and buffer from trespassers, traffic noise, and car headlights. The dense branches and foliage can also support wildlife nesting, roosting, and foraging habitat. Further, many shrub species can be pruned to create a treelike appearance while maintaining a low mature height. Shrubs can be classified into two types based on foliage: evergreen, which provide year-round screening, or deciduous and flowering, which provide seasonal color and support pollinators.

Lists of trees and shrubs suitable for planting under or near distribution utility lines are provided at the end of this publication in tables 1, 2, and 3. Table 1 provides a list of shrubs and small trees that are suitable to plant under a utility line due to their mature height reaching less than 15 feet. Table 2 is a list of small trees that reach a typical mature height less than 25 feet. These

trees can be planted in the low zone under a utility line with caution, meaning the tree could require occasional pruning at maturity. Table 3 lists medium-sized trees that reach a mature height of less than 40 feet and are suitable to plant in the medium zone, 20 feet or more away from a utility line. All species listed in this publication were selected based on the following desired characteristics for the Mid-Atlantic region:

- 1. Appropriate physical traits:** Species with utility-compatible mature height, mature crown spread, and growth habit were selected and grouped based on mature height. Tree and shrub heights shown in the tables are typical for the species, but actual growth may vary depending on landscape conditions and cultivation practices.
- 2. Proven performers in urban landscapes:** Species were selected based on their tolerance to urban conditions, including tolerance to drought, heat, deer browsing, and poor soil conditions. Some common species of small trees, such as Japanese maple and crape myrtle, have been omitted from these recommendations. Despite their reliable performance in urban landscapes, some species were excluded due to either their current overabundance in urban forests or emerging concerns about their invasive potential or pest threats. For this reason, omission of a species from these recommendations does not necessarily imply that it is incompatible with utility lines, but rather that there may be preferable species to consider.
- 3. Widely available in plant nurseries:** Nursery lists published by the Virginia Nursery and Landscape Association and North Carolina Nursery and Landscape Association were referenced to determine general availability of utility-friendly tree and shrub species. North Carolina was included because the warmer climate expands the plant palette of species that can thrive in heat and drought. There is a tremendous variety of small trees that can be cultivated in the Mid-Atlantic region, but many are not readily available in the regional nursery trade and therefore have not been included in this publication. Additional appropriate species not listed in this publication may be available at nurseries outside of the region or by mail order.
- 4. Little to no invasive potential:** Species with potential to reproduce and harm native plant communities were omitted by cross-referencing restricted or invasive species lists from Virginia municipalities and the Virginia Department of Conservation and Recreation. Recommended species include both native and non-native trees and shrubs of the Mid-Atlantic region.

Native trees and shrubs are important additions to the landscape for their ecological role in supporting native wildlife — including pollinators, birds, and small mammals — by providing food sources and nesting sites. To find more information on Virginia’s native trees and shrubs, visit [Plant Virginia Natives](http://plantvirginiannatives.org) (plantvirginiannatives.org). Although native trees should be planted whenever possible, it is important to note that many non-native trees (as long as they are not invasive) are more tolerant of harsh landscape conditions and also help increase tree species diversity and climate change resilience of the urban forest (Chalker-Scott 2015).

Important species traits are included in the tables to help with selecting the right tree to plant in the right place. The deciduous trees and shrubs listed provide interesting fall colors and spring flowers or fruit. Evergreen trees and shrubs are often used to provide

privacy screening beneath utility lines and foliar interest throughout the seasons. The heights provided in the tables are the typical mature heights reported for these species when grown in urban environments. The growth rate and actual height a tree reaches will vary based on the growing conditions of the site, such as the soil volume and quality, sun exposure, water and nutrient availability, and length of the growing season. In the digital version of this publication, a hyperlink is attached to the botanical name of each tree species in the tables. Each hyperlink directs to the associated plant record in the [North Carolina Extension Gardener Toolbox](https://plants.ces.ncsu.edu/find_a_plant/) (https://plants.ces.ncsu.edu/find\_a\_plant/), with pages containing detailed descriptions and photographs of the tree species. The plant profiles were written by authors at North Carolina State University, but provide information applicable to cultivation of these species throughout the eastern United States.

**Table 1.** Screening shrubs for planting under distribution utility lines (typical mature height less than 15 feet).

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#">Aronia arbutifolia</a>	Red chokeberry	6-12' x 3-5'	3a-9b	Tolerates wide range of soils and compaction.	Moderate	✓	C	Pink-white flowers; edible red berries in fall and winter; red fall leaf color.
<a href="#">Cornus amomum</a> <sup>c</sup>	Silky dogwood	6-12' x 6-12'	5a-8b	Prefers well-drained, medium-to-wet acidic soils.	Moderate	✓	B	Gold-white flowers in summer; showy blue drupes in fall.
<a href="#">Cotinus coggygria</a>	Common smokebush	10-15' x 10-15'	4a-8b	Tolerates a wide range of soils and restricted soil spaces.  Intolerant of wet, poorly drained soils.	High		B	Pink flowers with showy hairs; fall leaf color ranges from yellow to red to purple.
<a href="#">Heptacodium miconioides</a>	Seven-son flower	10-20' x 8-10'	5a-9b	Prefers medium moisture, well-drained soil.  Tolerates wide range of soils.	Moderate		C	White, showy, fragrant flowers in spring, turning bright red in fall; red-purple drupes; yellow fall leaf color.
<a href="#">Ilex x 'Nellie R. Stevens'</a>	Nellie R. Stevens holly	15-20' x 8-12'	6a-9b	Tolerates a wide range of soils.	Moderate		C	Small white fragrant flowers in spring; red berries in winter; evergreen.

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#">Magnolia stellata</a>	Star magnolia	15-20' x 10-15'	4a-8b	Prefers moist, organically rich, acidic-to-neutral well-drained soils. Tolerates clay. Intolerant of extreme dry or wet soil.	Moderate		A	White showy fragrant flowers; red conelike fruit matures in fall; yellow fall leaf color.
<i>Myrica spp.</i>	Wax myrtle or bayberry	8-15' x 8-10'	3a-11b	Prefers moist, acidic soils. Tolerates a wide range of soils.	Moderate	✓	A	Insignificant flowers in spring; showy blue berries in winter; evergreen. Commonly available as <a href="#">Northern bayberry</a> or <a href="#">Southern wax myrtle</a> .
<a href="#">Osmanthus fragrans</a>	Fragrant tea olive	10-20' x 10-14'	8a-11b	Prefers moist, well-drained soils. Tolerates clay soils.	Moderate		B	White, fragrant flowers in spring; blue-black drupe in winter; evergreen.
<a href="#">Sambucus canadensis</a> <sup>d</sup>	American elderberry	8-12' x 6-12'	4a-8b	Prefers moist-to-wet fertile soils.	Moderate	✓	A	White-cream flowers; edible (if cooked) dark berries in fall; yellow fall leaf color.
<a href="#">Viburnum dentatum</a>	Arrowwood viburnum	5-10' x 6-10'	2a-8b	Prefers slightly acidic, moist but well-drained soil. Tolerates wide range of soils.	Moderate	✓	B	White bell-shaped flowers; edible berries in late summer; yellow-to-red fall leaf color.
<a href="#">Viburnum lentago</a>	Nannyberry	15-20' x 8-10'	3a-7b	Prefers slightly acidic, moist, well-drained soils. Tolerates wide range of soils.	Moderate	✓	C	White showy flowers; edible blue berries; yellow-to-purple fall leaf color.

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#">Viburnum nudum</a>	Smooth witherod	5-12' x 5-12'	5a-9b	Prefers slightly acidic, moist, well-drained soils. Tolerates wide range of soils.	Moderate	✓	B	White-cream flowers; edible blue berries in fall; red-to-purple fall leaf color.
<a href="#">Viburnum prunifolium</a>	Blackhaw viburnum	10-15' x 6-15'	3a-9b	Prefers slightly acidic, moist but well-drained soil. Tolerates wide range of soils.	Moderate	✓	B	White-pink flowers; edible black berries in fall; red-to-purple fall leaf color.
<a href="#">Viburnum x rhytidophylloides</a>	Lantana-phyllum viburnum	8-10' x 8-10'	5a-8b	Prefers moist, slightly acidic, well-drained soils.	Moderate		B	White, showy, fragrant flowers in spring; drupes turn from green to red then black in the fall; semi-evergreen.
<a href="#">Vitex agnus-castus</a>	Chastetree	10-15' x 15-20'	7a-8b	Prefers moist or dry soils. Intolerant of wet soils.	High		B	Purple, fragrant, showy flowers in spring and summer; purple drupes in fall; yellow fall leaf color.

<sup>a</sup> Typical mature size in urban landscapes of the southeastern United States.

<sup>b</sup> Deer resistance is rated on a letter scale, with A meaning “rarely damaged by deer,” B meaning “seldom damaged by deer,” C meaning “occasionally damaged by deer,” and D meaning “frequently damaged by deer.”

<sup>c</sup> Thickets may form from root suckers if not pruned to maintain single-stem growth habit.

<sup>d</sup> Poisonous to humans in leaves, stems, twigs, and uncooked berries.



**Table 2.** Trees for planting in the low zone or under distribution utility lines with caution (typical mature height less than 25 feet).

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#">Acer griseum</a>	Paperbark maple	15-25' x 15-25'	4a-8b	Prefers moist, well-drained soil.  Tolerates somewhat dry moisture and poor soil type.	Moderate		C	Yellow flowers, not showy; orange-to-red fall leaf color.
<a href="#">Aesculus pavia</a>	Red buckeye	15-20' x 10-20'	4a-8b	Prefers acidic, moist, well-drained soils.  Tolerates dry soils, poor soils, and extended flooding.	Moderate	✓	C	Orange-red showy flowers; nuts are not edible for humans; red fall leaf color.
<a href="#">Amelanchier arborea</a>	Downy service-berry	15-25' x 10-15'	4a-9b	Prefers acidic, moist, well-drained soils.  Tolerates alkaline soil and dry or wet sites.	Moderate	✓	B	White, showy, fragrant flowers; edible berries; yellow-to-red fall leaf color.
<a href="#">Amelanchier laevis</a>	Allegheny service-berry	15-25' x 15-20'	4a-8b	Prefers moist, well-drained loams.  Tolerates wide range of soils.	Moderate	✓	B	White, fragrant, showy flowers; edible red-to-black berries; ripe in late spring/early summer; yellow-to-red fall leaf color.
<a href="#">Amelanchier x grandiflora</a> 'Autumn Brilliance'	Autumn Brilliance <sup>®</sup> service-berry	25-30' x 15-20'	3a-8b	Prefers plenty of soil space.  Tolerates wide range of soil conditions.	Moderate		C	White, fragrant, showy flowers; edible red-to-black berries; red-to-orange fall leaf color.
<a href="#">Asimina triloba</a>	Pawpaw	15-20' x 15-20'	5a-9b	Prefers rich, moist, and slightly acid soil.	Moderate	✓	A	Purple-to-red flowers; unpleasant odor during pollination by flies; edible fleshy fruit ripe in fall.

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#"><i>Carpinus caroliniana</i></a>	American hornbeam	20-30' x 20-30'	3a-9b	Tolerates wide range of soil conditions, including wet soil. Intolerant of alkaline soils.	Moderate	✓	B	Yellow flowers, not showy; edible nuts; orange-to-red fall leaf color.
<a href="#"><i>Cercis canadensis</i></a>	Eastern redbud	20-30' x 15-25'	4a-9b	Prefers moist-to- occasionally dry, well-drained soil. Tolerates wide range of soil conditions.	High	✓	C	Pink-purple-red showy edible flowers; edible bean pod fruits; yellow fall leaf color.
<a href="#"><i>Chionanthus retusus</i></a>	Chinese fringetree	15-20' x 10-15'	5a-9b	Prefers moist, acidic soil.	Moderate		A	White-to-purple, showy, fragrant flowers; drupe on female trees; yellow fall leaf color.
<a href="#"><i>Chionanthus virginicus</i></a>	White fringetree	12-20' x 10-15'	3a-9b	Prefers moist, acidic soil.	Moderate	✓	C	White, showy, fragrant flowers; yellow fall leaf color.
<a href="#"><i>Cornus alternifolia</i></a>	Alternate-leaf dogwood	15-25' x 20-30'	3a-7b	Prefers moist, acidic, well-drained soil.	Low	✓	B	White showy bracts with green flowers; fragrant spring and summer bloom; edible sour and bitter drupe; red fall leaf color.
<a href="#"><i>Cornus florida</i></a>	Flowering dogwood	20-30' x 25-30'	5a-9b	Prefers a deep, organically rich, well-drained soil.	Moderate	✓	B	White showy bracts with green flowers; red drupe; purple-to-red fall leaf color.
<a href="#"><i>Cornus hybrids</i></a> (C. <i>florida</i> x C. <i>kousa</i> ) <sup>c</sup>	Hybrid flowering dogwood	15-30' x 15-20'	5a-9b	Prefer moist, well-drained soil.	Moderate		B	Pink or white showy bracts with green flowers; no fruit; cultivars are sterile; purple-to-red fall leaf color.

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#">Cornus kousa</a>	Kousa dogwood	15-20' x 15-20'	5b-8b	Prefers moist, well-drained soil, open soil space, and some shade. Intolerant of heavy clay soils.	Moderate		B	White showy bracts with green flowers; edible pink-to-red drupe; purple-to-red fall leaf color.
<a href="#">Crataegus virdis</a> 'Winter King'	Winter King hawthorn	20-30' x 20-30'	4a-7b	Prefers dry-to-medium well-drained soils.	High	✓	B	White showy flowers with an unpleasant odor during pollination; red berries display through winter; purple-to-red fall leaf color.
<a href="#">Hamamelis virginiana</a>	Common witchhazel	20-30' x 15-20'	3a-9b	Prefers acidic, organically rich soils. Tolerates alkaline and heavy clay soils.	Moderate	✓	B	Yellow, fragrant flowers; edible seeds; yellow fall leaf color.
<a href="#">Ilex latifolia</a>	Lusterleaf holly	20-25' x 15-25'	7a-9b	Prefers moist, fertile, well-drained soils.	High		C	Evergreen; yellow-green fragrant flowers, not showy; fall and winter fruit display.
<a href="#">Ilex x attenuata</a> 'Fosteri'	Foster's holly	20-30' x 10-15'	6a-9b	Prefers moist, well-drained, slightly acidic soil.	Moderate		C	Evergreen; white flowers, not showy; drupes display in fall and winter.
<a href="#">Magnolia grandiflora</a> 'Little Gem'	Little Gem dwarf southern magnolia	20-25' x 10-15'	7 to 9	Prefers well-drained, acidic soils. Tolerates wide range of soils. Intolerant of wet, poorly drained soils.	Moderate	✓	A	Evergreen; white showy fragrant flowers; red cone-like fruit matures in fall.
<a href="#">Magnolia virginiana</a> <sup>d</sup>	Sweetbay magnolia	10-35' x 10-35'	5a-10b	Prefers moist-to-wet, acidic, organically rich soils. Tolerates extended flooding.	Moderate	✓	A	Creamy white showy, fragrant, cuplike flowers; red conelike fruit matures in fall; deciduous in cold climates.

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#">Magnolia x soulangeana</a>	Saucer magnolia	20-25' x 20-30'	4a-9b	Prefers organically rich, moist, porous soil. Tolerates poor drainage for short periods; dislikes dry soil.	Moderate		C	White-pink-purple fragrant, showy flowers; red cone-like fruit matures in fall; deciduous.
<a href="#">Malus spp.</a> <sup>e</sup>	Crabapple	10-25' x 10-20'	4a-8b	Prefers slightly acidic, moist, well-drained soils. Tolerates poor drainage and compaction. Intolerant of high pH.	Moderate		D	Pink-white fragrant flowers; edible small pomes display from September to October; yellow fall leaf color.
<a href="#">Parrotia persica</a>	Persian ironwood	25-30' x 20-25'	4a-7b	Prefers well-drained, slightly acid soils. Intolerant of wet soil.	High		C	Red flower, not showy; capsule fruit; yellow-to-orange-to red fall leaf color.
<a href="#">Prunus serrulata</a>	Japanese flowering cherry	15-25' x 15-25'	5a-8b	Prefers moist, loose soils.	Moderate		B	White-pink showy flowers; yellow-to-red fall color.
<a href="#">Prunus x incam 'Okame'</a>	Okame cherry	15-20' x 15-20'	6a-9b	Prefers moderately fertile, well-drained soil with plenty of root space. Tolerates wide range of soil conditions.	Moderate		B	Pink showy fragrant flowers; yellow-to-orange-to-red fall leaf color.
<a href="#">Styrax japonicus</a>	Japanese snowbell	20-30' x 15-25'	5a-9b	Prefers a moist, peaty, acidic soil. Intolerant of waterlogged soil.	Moderate		A	White fragrant showy flowers; yellow-to-red fall leaf color.

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#">Syringa reticulata</a> 'Ivory Silk'	Ivory silk® Japanese tree lilac	20-30' x 15-20'	3a-8b	Prefers organically rich, moist, well-drained, slightly acidic soils.  Tolerates wide range of soil conditions, poor drainage, compaction.	Moderate		C	Creamy white fragrant flowers in summer; showy fruit capsules display in fall and winter; yellow-to-orange fall leaf color.
<a href="#">Thuja standishii x plicata</a> 'Steeple-chase'	Steeple-chase arborvitae	20-30' x 8-15'	5a-9b	Prefers moist, fertile, well-drained soils.  Tolerates wide range of soils.	Moderate		C	Evergreen.

<sup>a</sup> Typical mature size in urban landscapes of the southeastern United States.

<sup>b</sup> Deer resistance is rated on a letter scale, with A meaning "rarely damaged by deer," B meaning "seldom damaged by deer," C meaning "occasionally damaged by deer," and D meaning "frequently damaged by deer."

<sup>c</sup> The width and height may vary depending on the cultivar of *Cornus* hybrids.

<sup>d</sup> Wild forms of *Magnolia virginiana* may grow too large, especially in southern climates. Cultivars of suitable height and habit are preferred.

<sup>e</sup> *Malus* spp. are highly desired for ornamental qualities, but they are also highly variable in their height and growth habit as well as their disease susceptibility. The non-native spp. may be considered invasive in some localities.

**Table 3.** Trees for planting near distribution utility lines (typical mature height less than 40 feet, planted at least 20 feet from the line).

Botanical name	Common name	Height x spread <sup>a</sup>	Hardiness zones	Soil drainage	Drought tolerance	Native	Deer resistance (A-D) <sup>b</sup>	Ornamental qualities (flower, fruit, fall color, evergreen)
<a href="#"><i>Acer buergerianum</i></a>	Trident maple	25-35' x 20-30'	5a-9b	Tolerates wide range of soil conditions, poor drainage, compaction.	Moderate		C	Greenish-yellow flowers; winged seedpods; yellow-to-orange-to-red fall leaf color.
<a href="#"><i>Crataegus phaenopyrum</i></a> <sup>c</sup>	Washington hawthorn	20-35' x 20-25'	4a-8b	Tolerates wide range of soil conditions, poor drainage, compaction.	High	✓	A	White showy flowers with unpleasant odor during pollination; showy red berries; orange-to-red-to-purple fall leaf color.
<a href="#"><i>Juniperus virginiana</i></a>	Eastern redcedar	30-40' x 10-20'	2a-9b	Tolerates wide range of soil conditions, poor drainage, compaction.	High	✓	A	Blue fruits on female trees in winter; evergreen. Common cultivars include Taylor and Brodie.
<a href="#"><i>Ostrya virginiana</i></a>	American hophornbeam	30-40' x 25-30'	3a-9b	Tolerates wide range of soil conditions, poor drainage, compaction. Intolerant of wet soil.	High	✓	B	Yellow hanging flowers; hoplike seedpods; yellow-to-orange fall leaf color.
<a href="#"><i>Pistacia chinensis</i></a>	Chinese pistache	25-35' x 25-35'	6a-9b	Prefers moderately fertile, well-drained soils. Tolerates poor drainage and compaction.	High		B	Red flowers, not showy; clusters of drupes turn red to purple in the fall; yellow-to-red fall leaf color.
<a href="#"><i>Prunus x yedoensis</i></a>	Yoshino cherry	30-40' x 30-40'	5a-8b	Prefers moist, fertile, deep, well-drained soils.	Moderate		D	Pink-white showy fragrant flowers; black drupe; yellow fall leaf color.
<a href="#"><i>Stewartia pseudocamellia</i></a>	Japanese stewartia	30-40' x 20-30'	5a-8b	Prefers moist, well-drained, fertile soils.	Low		A	Yellow-white showy long-lasting flowers in summer; hard capsule fruit; yellow-to-red fall leaf color.

<sup>a</sup> Typical mature size in urban landscapes of the southeastern United States.

<sup>b</sup> Deer resistance is rated on a letter scale, with A meaning “rarely damaged by deer,” B meaning “seldom damaged by deer,” C meaning “occasionally damaged by deer,” and D meaning “frequently damaged by deer.”

<sup>c</sup> Large (1-3 inch) thorns make *Crataegus phaenopyrum* dangerous to plant near pedestrian areas.

## Other Considerations for Tree Planting

In addition to the tree height at maturity, the growing conditions of the site should also be considered. These include environmental factors such as hardiness zone, sun exposure, wind exposure, soil characteristics (texture, pH, fertility, moisture), and common pests and diseases of trees in the area. To learn more about soil testing, see [Soil Sampling for the Home Gardener](https://pubs.ext.vt.edu/452/452-129/452-129.html) (pubs.ext.vt.edu/452/452-129/452-129.html), VCE publication 452-129.

When selecting trees for utility easements in urban settings, avoid species that require high maintenance or drop messy fruits, leaf litter, or twigs, especially if the trees may overhang sidewalks, driveways, or patios. Look for trees that can tolerate adverse urban conditions (limited soil volume and moisture, compacted soil, high pH, etc.) and have a slow-to-moderate (never fast) growth rate. Because utility-compatible trees and shrubs stay small, their foliage remains within reach of deer browsing. If deer are abundant, opt for species that are less palatable for deer, especially if the trees or shrubs are intended as a screening border. The utility forester, city arborist, or [local Extension agent](http://www.ext.vt.edu) (www.ext.vt.edu) who works in the area may be able to provide advice on selecting trees that are appropriate for the type of utility lines and landscape conditions that are present on the property. Be sure to check local regulations for trees that are unsuitable to plant. Some localities have a list of restricted trees that should not be planted based on criteria such as invasive status or local overabundance.

Always follow proper tree planting guidelines and call [Virginia 811](https://www.811.com/) before digging to ensure underground utility lines are not located below the planting site. Consideration should also be given to the extent of the mature root system, and trees should be planted at a proper distance from underground utilities to prevent future conflicts. The recommended planting time is mid-fall to early spring. Adequate irrigation and mulch over the root zone during the first growing season are very helpful for successful tree establishment and growth. Whether a tree is tolerant of drought or not, a deep watering is recommended during periods of prolonged drought and is especially important during the first few years after planting (Johnson et al. 2021). For more information on the proper methods of planting trees, read *Planting Trees*, VCE publication 426-702 ([pubs.ext.vt.edu/426/426-702/426-702.html](https://pubs.ext.vt.edu/426/426-702/426-702.html)).

## Utility Arboretums in Virginia

There are five utility arboretums throughout Virginia that showcase over 300 specimens and 190 unique species and cultivars of utility-friendly trees and shrubs. These arboretums were established as part of an initiative of Trees Virginia and Virginia Cooperative Extension called Look Up Virginia! Utility-Friendly Trees. Although this initiative is no longer active, these arboretums still exist and are great places to see utility-friendly trees in person. Most of the trees in the arboretums have a physical tag with their botanical name and common name, as well as the year of planting. QR codes on plant tags are linked to online information pages about the specimens. Visit the [Plantsoon website](https://experience.plantsoon.com/visit/va-utility-friendly-trees) (experience.plantsoon.com/visit/va-utility-friendly-trees) to virtually tour the arboretums. Listed below are the five arboretums created by the initiative.

- Veterans Memorial Park, Abingdon, established in 2003.
- Utility Line Arboretum, Virginia Tech Hahn Horticulture Garden, Blacksburg, established in 2005.
- Utility Line Arboretum, Virginia Tech Hampton Roads Agricultural Research and Extension Center, Virginia Beach, established in 2008.
- Appalachian Power Arboretum, Lynchburg, established in 2008.
- Jefferson Park Avenue Utility-Friendly Arboretum, Charlottesville, established in 2015.

## Additional Resources

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## Safety Resources

- If you or a contractor is conducting work near power lines on your property, the High Voltage Safety Act (Virginia) requires you to contact Dominion Energy at 866-366-4357.
- Any tree crew performing work around power lines should be line-clearance certified, OSHA certified, and trained on tree care industry standards. Untrained individuals should not attempt to trim or remove trees near power lines due to the risk of serious or fatal injury.
- Prior to planting trees near utility easements, call 811 or visit [VA811.com](https://va811.com) before you dig. A contractor for the utility will visit your property free of charge and flag the location of underground utilities. Locating utilities will ensure everyone's safety as well as reliable utility service.

## Acknowledgements

This publication was reviewed by staff at Dominion Energy, including Carrie Rose Pace (communications specialist), Michael Kirk (transmission forestry supervisor), and Jennifer Felix (transmission forestry coordinator). Contributions were provided from the following peer reviewers: Alexander Niemiera (professor of horticulture, Virginia Tech), Adam Downing (Virginia Cooperative Extension forester, Northwest District), and Timothy Ohlwiler (VCE horticulture agent, Fauquier County).

We would like to acknowledge funding from the Virginia Department of Forestry Urban and Community Forestry Assistance Grant that supported production of this publication.

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VT/0824/CNRE-182P