

# City of Concord

## Technical Standards Manual

### Article VII

### Landscaping

Species Selection, Installation, and Maintenance Specifications





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## 1.0 Introduction

The City of Concord requires planting yards in accordance with the City's development ordinances. This Manual provides detailed specifications for plant species selection, installation, and maintenance.

## 2.0 Plant Materials

- 2.1. **Size.** The minimum allowable plant size for new installations is provided below. Due to the biological variations between species, the caliper or height necessary for newly installed plant materials may vary. See Figure 1 for a pictorial representation of common tree terms. As a general rule, the caliper or diameter of trees must be measured a vertical distance of 6 inches from the ground for a tree with a 4-inch caliper or less diameter and measured 12 inches from the ground for a tree with a 4-inch caliper or greater diameter. Shrubs must be at least 24 inches high as measured vertically from the ground to the densest portion of the top of the shrub or hedge. See Figure 2.
- a. *Shade Trees.* At the time of planting, shade trees must have a minimum caliper of 2 to 2½ inches and a minimum height of 10 to 12 feet.
  - b. *Ornamental Trees.* Ornamental trees must have a minimum caliper of 1½ to 2 inches for single-stem trees or 1 to 1½ inches for multi-stem trees, and a minimum height of 6 to 8 feet at the time of planting.
  - c. *Large Shrubs.* Large shrubs, normally planted for screening, must have a minimum height of 3 to 3½ feet at the time of planting. Shrubs planted for screening purposes shall form the required density to block visibility within three (3) years from the date of installation.
  - d. *Small Shrubs.* Small shrubs must have a minimum spread and/or height of 18 to 24 inches at the time of planting. A mix of deciduous and evergreen shrubs is encouraged in order to obtain a variety of color and texture throughout the year.
  - e. *Ground Cover (Organic).* Organic ground covers must provide 100 percent coverage on the ground within three (3) years of installation. Except when newly seeded, grass or turf shall provide 100 percent coverage. Organic mulch may be used around plantings to maintain soil moisture and prevent the growth of weeds.
  - f. *Ground Cover (Inorganic).* Inorganic ground covers consisting of river rock or similar materials may be used provided they do not exceed 20 percent coverage of the required landscape planting area.

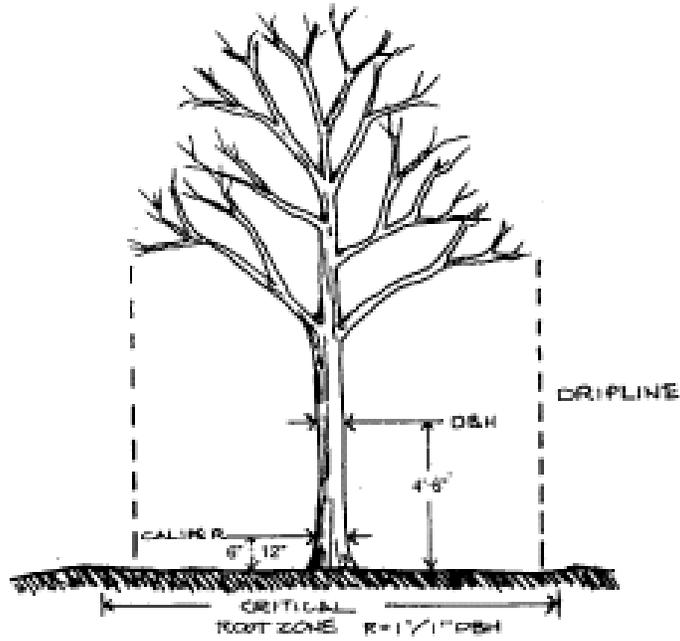


Figure 1: Diagram of Common Tree Terms.

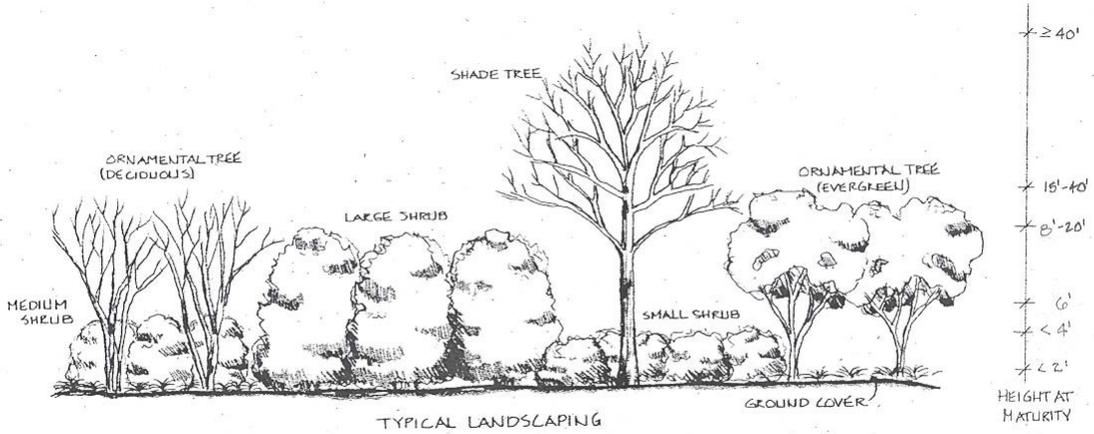


Figure 2: Size of Plant Classifications.

2.2. **Species.**

- a. *Acceptable Plant Species.* All plant material, excluding ground covers, must be selected from Table 1. This table lists plants by classification, shade tree, ornamental tree, or shrub that are acceptable for landscaping in this area of North Carolina. Consideration should be given to the environmental conditions of the site, such as soil, topography, climate, microclimate, pattern of sun movement, prevailing winds and precipitation, and air movement to ensure that plant materials will be established successfully. Plant materials that are allowed in perennial and intermittent stream buffers are specially marked in Table 1. The removal and replacement of invasive exotic plant species are strongly encouraged. Trees near utility rights-of-way must be small to medium in size, pest- and disease-resistant, and slow growing.
- b. *Acceptable Substitutes.* The Administrator has the authority to approve the installation of comparable substitution plant materials to satisfy the requirements of the approved landscape plan when the approved plants and landscape materials are not available at the time that installations are scheduled to occur, or when other unforeseen conditions prevent the use of the exact materials shown on the approved landscape plan. However, under no circumstances are plant materials identified in Table 2 permitted. Significant changes that require the replacement and relocation of more than 25 percent of the plant materials requires a new landscape plan and approval through the plan review process.
- c. *Uniformity and Diversification.* Except in street yards, a mixture of plant genus and species, and perennials and annuals is encouraged to avoid potential loss due to infectious disease, blight, or insect infestation. Street yard trees should retain a reasonably uniform pattern along both sides of a street within the same block or corridor.

**Table 1: Acceptable Plant Species.**

<b>Acceptable Shade Trees</b>	<b>Botanical Name</b>	<b>Common Name</b>	<b>Use in Stream Buffers</b>	<b>Use Discouraged</b>
	<i>Acer rubrum</i>	Red maple		
	<i>Acer saccharum</i>	Sugar maple	X	
	<i>Amelanchier canadensis</i>	Serviceberry		
	<i>Betula nigra</i>	River birch	X	
	<i>Carya cordiformis</i>	Bitternut hickory	X	
	<i>Carya glabra</i>	Pignut hickory	X	
	<i>Carya illinoensis</i>	Pecan		
	<i>Carya ovata</i>	Shagbark hickory	X	
	<i>Cedrus deodara</i>	Deodar cedar		
	<i>Celtis occidentalis</i>	Hackberry		
	<i>Cupressocyparis leylandii</i>	Leyland cypress		X
	<i>Diospyros virginiana</i>	Persimmon	X	
	<i>Fagus grandiflora</i>	American beech	X	
	<i>Fraxinus americana</i>	White ash	X	
	<i>Fraxinus pennsylvanica</i>	Green ash	X	
	<i>Ginkgo biloba</i>	Ginkgo		
	<i>Juniperus virginiana</i>	Eastern red cedar		
	<i>Liquidambar styraciflua</i>	Sweetgum		
	<i>Liriodendron tulipifera</i>	Tulip poplar	X	
	<i>Magnolia grandiflora</i>	Southern magnolia		
	<i>Nyssa sylvatica</i>	Black gum	X	
	<i>Pinus echinata</i>	Short leaf pine	X	
	<i>Pinus nigra</i>	Austrian pine		
	<i>Pinus taeda</i>	Loblolly pine		
	<i>Pinus thunbergi</i>	Japanese black pine		
	<i>Pinus virginiana</i>	Virginia pine		
	<i>Platanus acerifolia</i>	London planetree		
	<i>Quercus acutissima</i>	Sawtooth oak		
	<i>Quercus alba</i>	White oak	X	
	<i>Quercus bicolor</i>	Swamp white oak	X	
	<i>Quercus borealis</i>	Northern red oak		
	<i>Quercus coccinea</i>	Scarlet oak	X	
	<i>Quercus falcata</i>	Southern red oak	X	
	<i>Quercus laurifolia</i>	Laurel oak	X	
	<i>Quercus nigra</i>	Water oak	X	
	<i>Quercus phellos</i>	Willow oak	X	
	<i>Quercus shumardii</i>	Shumard oak	X	
	<i>Quercus velutina</i>	Black oak	X	
	<i>Quercus virginiana</i>	Live oak	X	
	<i>Sophora japonica regent</i>	Japanese pagoda tree		
	<i>Taxodium distichum</i>	Bald cypress	X	
	<i>Ulmus alata</i>	Winged elm	X	
	<i>Ulmus parvifolia</i>	Lacebark elm		
	<i>Zelkova serrata</i>	Japanese zelkova		

Acceptable	Botanical Name	Common Name	Use in Stream Buffers	Use Discouraged
<b>Ornamental Trees</b>	<i>Acer buergeranum</i>	Trident maple		
	<i>Acer campestre</i>	Hedge maple		
	<i>Acer palmatum</i>	Japanese maple		
	<i>Carpinus betulus</i>	European hornbeam		
	<i>Carpinus caroliniana</i>	American hornbeam	X	
	<i>Cercis canadensis</i>	Eastern redbud	X	
	<i>Cornus florida</i>	Flowering dogwood	X	
	<i>Cornus kousa</i>	Kousa dogwood		
	<i>Crataegus phaenopyrum</i>	Washington hawthorn		
	<i>Eleganus angustifolia</i>	Russian olive		
	<i>Halesia carolina</i>	Carolina silverbell	X	
	<i>Hammamelis mollis</i>	Chinese witch-hazel		
	<i>Ilex fosteri</i>	Foster holly		
	<i>Ilex opaca</i>	American holly	X	
	<i>Ilex opaca hume</i>	Hume holly		
	<i>Ilex x attenuata savannah</i>	Savannah holly		
	<i>Koelreutaria paniculata</i>	Golden rain-tree		
	<i>Lagerstroemia indica</i>	Crape myrtle		
	<i>Magnolia soulangeana</i>	Saucer magnolia		
	<i>Magnolia stellata</i>	Star magnolia		
	<i>Malus hybrids</i>	Flowering crabapple		
	<i>Ostrya virginiana</i>	Ironwood	X	
	<i>Oxydendrum arboreum</i>	Sourwood		
	<i>Prunus caroliniana</i>	Carolina cherry laurel	X	
	<i>Prunus cerasifera pissardii</i>	Purpleleaf plum		
	<i>Prunus serrulata kwanzan</i>	Kwanzan cherry		
	<i>Prunus subhirtella pendula</i>	Weeping cherry		
	<i>Prunus yedoensis</i>	Yoshino cherry		
	<i>Pyrus calleryana 'Redspire'</i>	Redspire pear		X
	<i>Pyrus calleryana 'Capital'</i>	Capital pear		X
<b>Shrubs</b>	<i>Abelia grandiflora</i>	Glossy abelia		
	<i>Aucuba japonica</i>	Japanese aucuba		
	<i>Azalea hybrida</i>	Glenn dale azalea		
	<i>Azalea indica</i>	Indian azalea		
	<i>Azalea obtusum Kaempferi</i>	Kaempferi azalea		
	<i>Bambusa multiplex</i>	Hedge bamboo		
	<i>Berberis julianae</i>	Wintergreen barberry		
	<i>Berberis thunbergii</i>	Japanese barberry		
	<i>Camellia japonica</i>	Camellia		
	<i>Camellia sasanqua</i>	Sasanqua camellia		
	<i>Chaenomeles speciosa</i>	Flowering quince		
	<i>Cleyera japonica</i>	Cleyera		
	<i>Euonymus alatus</i>	Winged euonymus		
	<i>Euonymus japonicus</i>	Evergreen euonymus		
	<i>Eleagnus pungens</i>	Eleagnus		
	<i>Forsythia intermedia</i>	Forsythia		
	<i>Hammamelis virginiana</i>	Witch-hazel	X	
	<i>Hydrangea quercifolia</i>	Oakleaf hydrangea		
	<i>Ilex aquifolium</i>	English holly		
	<i>Ilex cornuta</i>	Chinese holly		
<i>Ilex cornuta burfordi</i>	Burford holly			

Acceptable	Botanical Name	Common Name	Use in Stream Buffers	Use Discouraged
	<i>Ilex cornuta burfordi nana</i>	Dwarf burford holy		
	<i>Ilex crenata 'convexa'</i>	Convex japanese holly		
	<i>Ilex crenata 'hetzi'</i>	Hetzi japanese holly		
	<i>Ilex crenata 'rotundifolis'</i>	Roundleaf japanese holly		
	<i>Ilex "Emily Brunner"</i>	Emily brunner holly		
	<i>Ilex glabra</i>	Inkberry holly	X	
	<i>Ilex latifolia</i>	Lusterleaf holly		
	<i>Ilex pernyi</i>	Perny holly		
	<i>Ilex vomitoria</i>	Yaupon holly	X	
	<i>Juniperus chinensis pfitzeriana</i>	Pfitzer juniper		
	<i>Juniperus chinensis hetzi</i>	Hetzi juniper		
	<i>Laurus nobilis</i>	Laurel		
	<i>Ligustrum japonicum</i>	Japanese privet		
	<i>Ligustrum lucidum</i>	Glossy privet		
	<i>Ligustrum vicaryi</i>	Vicary golden privet		
	<i>Loropetalum chinense</i>	Lotopetalum		
	<i>Mahonia bealei</i>	Leatherleaf mahonia		
	<i>Myrica cerifera</i>	Wax myrtle	X	
	<i>Nandina domestica</i>	Nandina		
	<i>Osmanthus fortunei</i>	Fortune tea olive		
	<i>Osmanthus fragrans</i>	Fragrant tea olive		
	<i>Osmanthus heterophyllus</i>	Holly osmanthus		
	<i>Osmanthus heterophyllus rotundifolius</i>	Curly leaf tea olive		
	<i>Pieris floribunda</i>	Mountain andromeda	X	
	<i>Pieris japonica</i>	Japanese andromeda		
	<i>Pittosporum tobira</i>	Pittosporum		X
	<i>Prunus laurocerasus</i>	English laurel		
	<i>Prunus laurocerasus "Zabel"</i>	"Zabel" Skip laurel		
	<i>Podocarpus macrophyllus maki</i>	Podocarpus		X
	<i>Prunus laurocerasus angustifolia</i>	Narrow leafed english laurel		
	<i>Pyracantha coccinea</i>	Scarlet firethorn		
	<i>Raphiolepis umbellata</i>	Yeddo-hawthorn		
	<i>Raphiolepis indica</i>	India hawthorn		
	<i>Spirea cantoniensis</i>	Reves spirea		
	<i>Spirea thunbergi</i>	Thunberg spirea		
	<i>Spirea prunifolia plena</i>	Bridalwreath spirea		
	<i>Spirea vanhouttei</i>	Vanhoutte spirea		
	<i>Taxus cuspidata</i>	Japanese yew		
	<i>Viburnum rhytidophyllum</i>	Leatherleaf viburnum		
	<i>Viburnum tinus</i>	Laurestinus viburnum		

<sup>1</sup> These species must be used for plantings within perennial and intermittent stream buffers.

<sup>2</sup> These species are discouraged due to marginal hardiness in this zone, disease susceptibility, or overuse.

**Table 2: Unacceptable and Invasive Exotic Plant Species.**

<b>Botanical Name (Genus and Species)</b>	<b>Common Name</b>
<i>Ailanthus altissima</i>	Tree-of-heaven
<i>Albizia julibrissin</i>	Mimosa
<i>Elaeagnus umbellata</i>	Autumn olive
<i>Hedera helix</i>	English ivy
<i>Lespedeza cuneata</i>	Korean or sericea lespedeza
<i>Ligustrum sinense</i>	Chinese privet
<i>Lonisera japonica</i>	Japanese honeysuckle
<i>Microstegium vimineum</i>	Japanese grass
<i>Paulownia tomentosa</i>	Princess tree
<i>Pueraria lobata</i>	Kudzu
<i>Rosa multiflora</i>	Multiflora rose
<i>Wisteria sinensis</i>	Chinese wisteria

### 3.0 Installation Specifications.

- 3.1. **Soil Preparation.** The preparation of plant pits, hedge trenches, and shrub beds must conform to Leaflet No: 601, Planting Techniques for Trees and Shrubs, North Carolina Cooperative Extension Service, (1997), which is incorporated by reference. Rock, debris, inorganic compositions, and chemical residues must be removed from the soil in planting pits.
- 3.2. **Excavation.** For planting pits, beds or trenches that are developed in areas that were previously paved, all paving and base stone shall be removed as part of the excavation. Pits must be excavated with vertical sides at a depth approximately equal to the depth of the root ball with a circular outline approximately 2 to 3 times wider than the root ball.
- 3.3. **Planting.** Root balls should be installed on a flat, compact surface of undisturbed soil and any inorganic ties on top of the root ball must be removed. The top 1/3 of wire baskets should be removed. The top of the tree root ball must not be covered by soil and must be covered by mulch. At least 3 inches of mulch, pine needles, tree bark, or similar materials must be distributed around the plant. See Figures 3 and 4. Tree and shrub supports should not interfere with the plants' typical growing patterns.

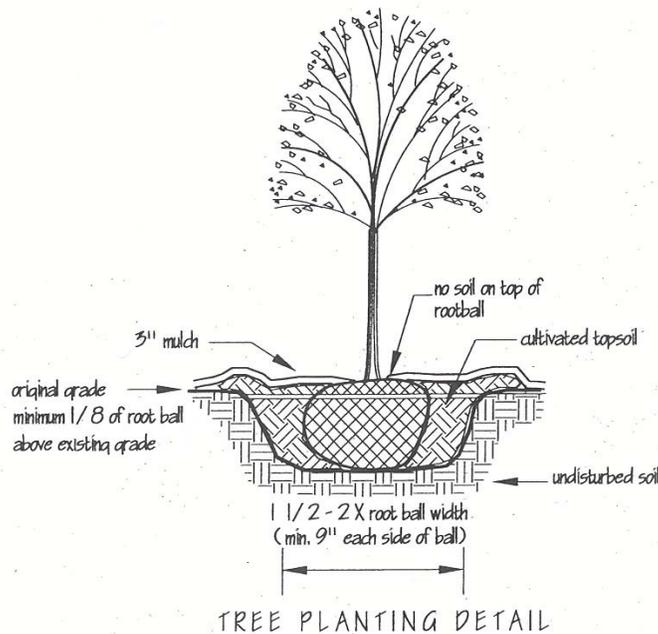


Figure 3: Tree Planting Detail.

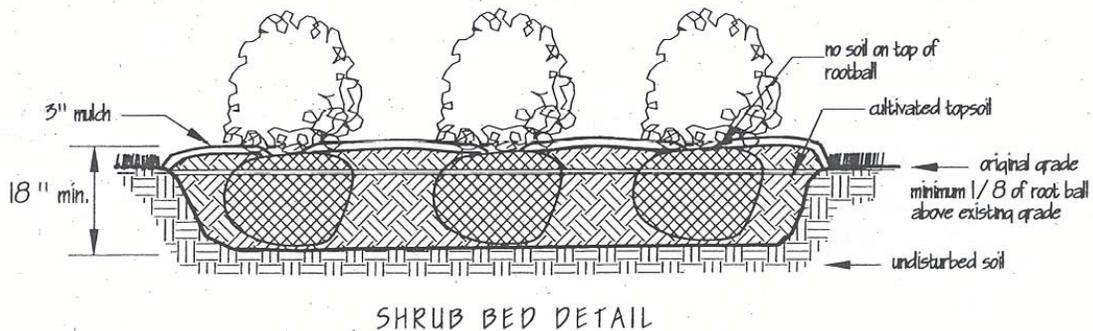


Figure 4: Shrub Planting Detail.

- 3.4. **Standard of Care during Construction.** Equipment, wood, and similar objects should not be stored or laid upon the critical root zone (see Figure 1) during or after construction. Chemicals and liquid construction wastes must not be dumped, poured, or spilled in the area of any plant materials. Concrete mixer washing should not be performed near the planting site.

- 3.5. **Associated References.** Soil preparation, planting, fertilization, mulching, and insect and disease control must conform to the North Carolina Cooperative Extension Service, Landscape Management Calendar, which is incorporated by reference hereto. Native plants salvaged from the site or relocated as a result of grading must be re-established in conformance with the recommendations of the North Carolina Cooperative Extension Service.

## 4.0 Maintenance

- 4.1. **Responsible Party.** The applicant, property owner, and/or subsequent or successor owner, and their agents, including tenants, are jointly and severally responsible for maintenance of landscaping on the property on a continuing basis for the life of the development as specified in this section.
- 4.2. **Standard of Care.** All required landscaping must be maintained in a neat and orderly manner at all times. This includes, but is not be limited to, mowing, edging, pruning, fertilizing, watering, weeding, and other activities common to the maintenance of landscaping. Landscaped areas must be kept free of trash, litter, weeds, and other materials or plants not a part of the landscaping. Required landscaping shall be maintained in perpetuity. After the initial installation, the owner and/or tenant of the property upon which the landscaping is installed are responsible for maintaining all required plantings in a healthy, vigorous, and attractive state; and replace dead, diseased, or deteriorated plants. Within residential subdivisions, the maintenance of street trees in planting strips between curbs and sidewalks, which are within the street right-of-way, is the responsibility of the respective homeowners association, or the abutting homeowner, in the absence of a homeowners association. All required plant material must be maintained in a healthy growing condition as is appropriate for the season. Plant materials that exhibit evidence of insect pests, disease, and/or damage must be appropriately treated.
- 4.3. **Screening.** If after three (3) years following the installation of required screening plant materials, the plants have not formed an effective screen, or if an effective screen is not maintained, the Administrator may require that another type of screen be added or additional plants be installed.
- 4.4. **Protection from Vehicles.** Landscaped areas must be protected from vehicular encroachment. The Administrator must inspect all landscaping and no Certificate of Occupancy or similar authorization will be issued unless the landscaping meets the requirements of the development ordinances and these technical standards.
- 4.5. **Replacement of Dead Plants.** Dead plants must be promptly removed and replaced within the next planting season. If replacement is necessary, all plants and other non-living landscape materials shall be equal in size, density, and appearance as originally required at the time of the approval of the development.

4.6. **Pruning.** Utility crews and companies are encouraged to use the directional pruning technique to remove branches interfering with utility lines. This technique prevents damage, disfigurement, and heavy suckering and reduces future pruning needs. Utility tree trimmers should remove branches to laterals (drop-crotching) in order to direct tree growth away from utility lines. Directional pruning includes top trimming, side trimming, under trimming, and through trimming. See Figure 5 for a pictorial representation of directional trimming.

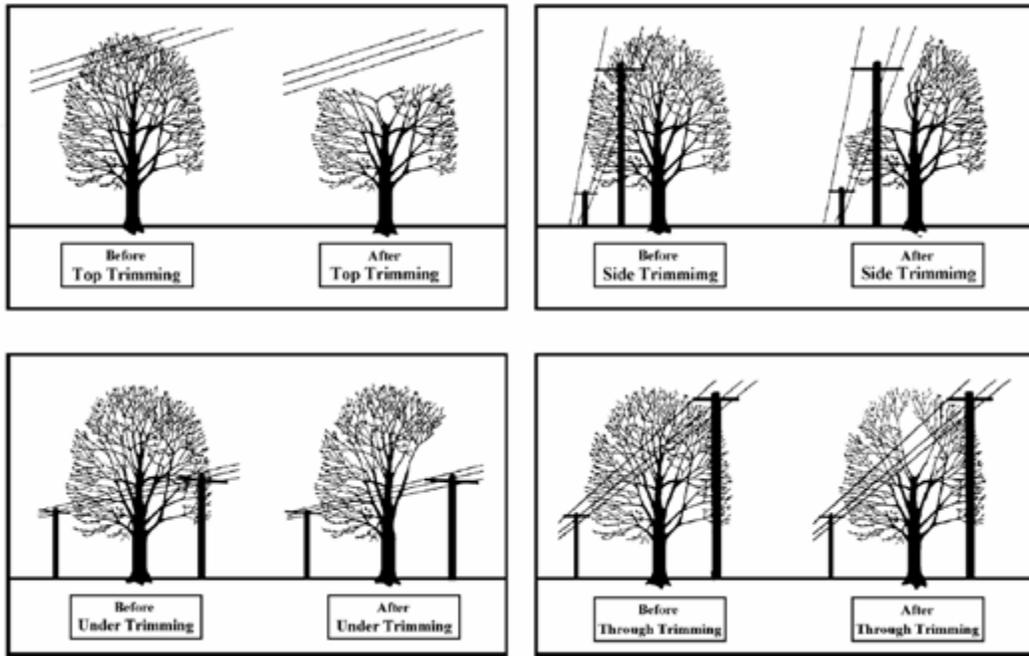


Figure 5: Directional Pruning Examples.