

The City of Takoma Park enacted a tree protection and preservation ordinance in 1987. One facet of this ordinance is a requirement that removed trees be replaced. In most situations the replacement requirement will be “like for like.” That is, when a large shade tree is removed the replacement must be a tree that will, when mature, be as large as the removed tree was/would have become. The following list includes some suggestions for types and varieties of trees suitable for planting in the Washington metropolitan area sorted by size and possible uses.

The City of Takoma Park MD has adapted the following table and explanation from the Fairfax County, VA Public Facilities Manual and would like to thank the Fairfax County Department of Public Works Urban Forestry Branch for the work invested in collecting and collating the material for this publication.

#### TREE SELECTION GUIDE

BOTANICAL/COMMON NAME	Min. Plant Area in ft2 (m2)	Projected 10-YR Tree Cover Area in ft2 (m2) and Caliper in inches (cm) at Planting			Tree Uses	Screen Use	Environmental Tolerances	Problems
		1.0 (2.5)	2.0 (5.0)	3.0 (8.0)				
CATEGORY I - DECIDUOUS TREES								
Trees 50 feet or less in height at maturity with a spread less than one-half of their height								
Acer rubrum 'Columnare'/ Columnar red maple	50 (5)	40 (4)	50 (5)	75 (7)	RA		RZ	
Carpinus betulus 'Fastigiata'/ Fastigate European hornbeam	50 (5)	40 (4)	50 (5)	75 (7)	RA		PS	
Fagus sylvatica 'Fastigiata'/ Fastigate European beech	50 (5)	40 (4)	50 (5)	75 (7)	RA		PS	
Ginkgo biloba 'Sentry'/	50	40	50	75	RA		AP, D, RZ, SC	

Sentry ginkgo	(5)	(4)	(5)	(7)				
<i>Quercus robur</i> 'Fastigiata' / Fastigate English Oak	50 (5)	40 (4)	50 (5)	75 (7)	RA		SC	
<b>CATEGORY II - DECIDUOUS TREES</b>								
Trees that can be maintained at a height of 20 feet or less and have a spread approximately equal to their height								
<i>Acer campestre</i> / Hedge maple	50 (5)	75 (7)	100 (9)	125 (12)	G	SD	AP,D	
<i>Acer ginnala</i> / Amur maple	50 (5)	75 (7)	100 (9)	125 (12)	G, RA	SD	D,PS,RZ	
<i>Acer palmatum</i> / Japanese maple	50 (5)	75 (7)	100 (9)	125 (12)	G	SD	RZ, SH	
<i>Amelanchier arborea</i> / Downey serviceberry	50 (5)	75 (7)	100 (9)	125 (12)	G,N,RA,WL	SD	PS,RZ,W	
<i>Amelanchier laevis</i> / Allegheny serviceberry	50 (5)	75 (7)	100 (9)	125 (12)	G,N,RA,WL	SD	PS,RZ,W	
<i>Carpinus caroliniana</i> / American hornbeam	50 (5)	75 (7)	100 (9)	125 (12)	G,N,RA	SD	SH,W	
<i>Cercis canadensis</i> / Eastern redbud	50 (5)	75 (7)	100 (9)	125 (12)	G,N,RA	SD	D,PS,RZ,SC	DS
<i>Chionanthus virginicus</i> / Fringetree	50 (5)	75 (7)	100 (9)	125 (12)	G,N,RA	SD	PS,RZ,W	
<i>Cornus florida</i> / Flowering dogwood	50 (5)	75 (7)	100 (9)	125 (12)	N,WL		PS	DS
<i>Cornus kousa</i> / Kousa dogwood	50 (5)	75 (7)	100 (9)	125 (12)	G,WL	SD	RZ	
<i>Cornus mas</i> / Corneliancherry dogwood	50 (5)	75 (7)	100 (9)	125 (12)	G,RA,WL	SD	PS,RZ	
<i>Halesia carolina</i> / Carolina silverbell	50 (5)	75 (7)	100 (9)	125 (12)	G,N	SD	PS	

<i>Magnolia soulangiana</i> / Saucer magnolia	50 (5)	75 (7)	100 (9)	125 (12)	G	SD	AP,RZ	
<i>Magnolia stellata</i> / Star magnolia	50 (5)	75 (7)	100 (9)	125 (12)	G,RA	SD	AP,RZ	
<i>Magnolia virginiana</i> / Sweetbay magnolia	50 (5)	75 (7)	100 (9)	125 (12)	G,N,RA	SD	RZ,SH,W	
<i>Oxydendrum arboreum</i> / Sourwood	50 (5)	75 (7)	100 (9)	125 (12)	G,N	SD	D,PS	
<i>Prunus x incam</i> 'Okame' / Okame cherry	50 (5)	75 (7)	100 (9)	125 (12)	RA	SD		
<i>Stewartia koreana</i> / Korean stewartia	50 (5)	75 (7)	100 (9)	125 (12)	RA	SD	RZ	
<i>Stewartia ovata</i> / Mountain stewartia	50 (5)	75 (7)	100 (9)	125 (12)	G,RA	SD	RZ	
<i>Stewartia pseudocamellia</i> / Japanese stewartia	50 (5)	75 (7)	100 (9)	125 (12)	RA	SD	RZ	
<i>Styrax japonicus</i> / Japanese snowbell	50 (5)	75 (7)	100 (9)	125 (12)	G,RA	SD	PS,RZ	
<b>CATEGORY III - DECIDUOUS TREES</b> Trees 25 to 50 feet in height at maturity with a spread equal to or greater than their height and trees over 50 feet in height at maturity with a spread less than their height								
<i>Aesculus hippocastanum</i> / Horsechestnut	90 (8)	125 (12)	150 (14)	175 (16)	G	ID	IS,SC	
<i>Betula nigra</i> / River birch	90 (8)	125 (12)	150 (14)	175 (16)	G,N	LD	W	
<i>Castanea mollissima</i> / Chinese chestnut	90 (8)	125 (12)	150 (14)	175 (16)	G	LD		FR
<i>Celtis occidentalis</i> / Hackberry	90 (8)	125 (12)	150 (14)	175 (16)	EC,G,N,WL	LD	AP,D,SC,W	

<i>Cercidiphyllum japonicum</i> / Katsuratree	90 (8)	125 (12)	150 (14)	175 (16)	EC,G,PL	LD		
<i>Diospiros virginiana</i> / Persimmon	90 (8)	125 (12)	150 (14)	175 (16)	N,WL	SD	D,SC	FR
<i>Eucommia ulmoides</i> / Hardy rubber tree	90 (8)	125 (12)	150 (14)	175 (16)	EC,PL		D,SC	
<i>Fagus sylvatica</i> // European beech	90 (8)	125 (12)	150 (14)	175 (16)	G	LD	PS	
<i>Fraxius pennslvantica</i> // Green Ash	90 (8)	125 (12)	150 (14)	175 (16)	EC,N,PL	LD	D,IS,SC,W	IN
'Marshall's seedless'	90 (8)	125 (12)	150 (14)	175 (16)	EC,PL	LD	D,IS,SC,W	IN
'Patmore'	90 (8)	125 (12)	150 (14)	175 (16)	EC,PL	LD	D,IS,SC,W	IN
'Summit'	90 (8)	125 (12)	150 (14)	175 (16)	EC,PL	LD	D,IS,SC,W	
<i>Gleditsia triacanthos inermis</i> / Thornless honeylocust	90 (8)	125 (12)	150 (14)	175 (16)	PL	LD	AP,D,SC,W	IN,WW
'Imperial'	90 (8)	125 (12)	150 (14)	175 (16)	PL	LD	AP,D,SC,W	IN,WW
'Skyline'	90 (8)	125 (12)	150 (14)	175 (16)	PL	LD	AP,D,SC,W	IN,WW
'Shademaster'	90 (8)	125 (12)	150 (14)	175 (16)	PL	LD	AP,D,SC,W	IN,WW
<i>Gymnocladus dioicus</i> / Kentucky coffeetree	90 (8)	125 (12)	150 (14)	175 (16)	G	LD	D,SC,W	
<i>Juglans nigra</i> // Black walnut	90 (8)	125 (12)	150 (14)	175 (16)	N,WL	LD	Sc,W	FR

<i>Koelreuteria paniculata</i> / Goldenrain tree	90 (8)	125 (12)	150 (14)	175 (16)	G	SD	D,SC	WW
<i>Larix decidua</i> / European larch	90 (8)	125 (12)	150 (14)	175 (16)	G	LD	D	
<i>Macluar pomifera</i> / Osage orange (male only)	90 (8)	125 (12)	150 (14)	175 (16)	G,N	LD	D	RS
<i>Magnolia acuminata</i> / cucumber tree	90 (8)	125 (12)	150 (14)	175 (16)	G,N	LD		
<i>Magnolia macrophylla</i> / Bigleaf magnolia	90 (8)	125 (12)	150 (14)	175 (16)	G	LD		
<i>Metasequoia glyptostroboides</i> / Dawn redwood	90 (8)	125 (12)	150 (14)	175 (16)	G	LD	AP,W	
<i>Nyssa sylvatica</i> / Black gum	90 (8)	125 (12)	150 (14)	175 (16)	EC,G,N,PL,WL	LD	PS,W	
<i>Phellodendron amurense</i> / Amur corktree (male only)	90 (8)	125 (12)	150 (14)	175 (16)	EC,G	LD	AP,D	
<i>Prunus serrulata</i> 'Kwansan'/ Kwansan cherry	90 (8)	125 (12)	150 (14)	175 (16)	G	LD	AP	DS,WW
<i>Prunus sargentii</i> / Sargent cherry	90 (8)	125 (12)	150 (14)	175 (16)	G	SD		
<i>Prunus subhirtella</i> / Weeping Japanese cherry Not grafted	90 (8)	125 (12)	150 (14)	175 (16)	G	SD		
<i>Prunus yeodoensis</i> /Yoshino cherry	90 (8)	125 (12)	150 (14)	175 (16)	G	SD		
<i>Taxodium distichum</i> / Bald cypress	90 (8)	125 (12)	150 (14)	175 (16)	G,N	LD	W	

<i>Tilia cordata/</i> Littleleaf linden	90 (8)	125 (12)	150 (14)	175 (16)	EC,G,PL	LD	AP	IN
'Glenleven'	90 (8)	125 (12)	150 (14)	175 (16)	EC,G,PL	LD	AP	IN
'Greenspire'	90 (8)	125 (12)	150 (14)	175 (16)	EC,G,PL	LD	AP	IN
<b>CATEGORY IV - DECIDUOUS TREES</b> Trees 50 feet or greater in height at maturity with a spread equal to or greater than their height and trees over 75 feet in height at maturity with a spread less than their height								
<i>Acer rubrum/</i> Red maple	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,PL	LD	IS,PS,W	RS
<i>Acer saccharum/</i> Sugar maple	130 (12)	150 (14)	200 (18)	250 (23)	EC,G	LD	PS	RS
<i>Carya illinoensis/</i> Pecan	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,WL	LD	W	
<i>Carya ovata/</i> Shagbark hickory	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,WL	LD		
<i>Fagus americana/</i> American beech	130 (12)	150 (14)	200 (18)	250 (23)	G,N,WL	LD	PS	
<i>Fraxinus americana/</i> White ash	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N	LD	IS,W	
<i>Ginkgo biloba/</i> Ginkgo (male only)	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,PL	LD	AP,D,RZ	
<i>Liquidambar styraciflua/</i> Sweetgum	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N	LD	W	FR
<i>Liriodendron tulipifera/</i> Tulip poplar	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N	LD	AP,W	WW
<i>Platanus acerifolia/</i> London planetree	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,PL	LD	AP,D	RS

<i>Platanus occidentalis/</i> Sycamore	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N	LD	W	DS
<i>Quercus alba/</i> White oak	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,WL	LD	IS	
<i>Quercus bicolor/</i> Swamp white oak	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,WL	LD	D,IS,SC,W	
<i>Quercus coccinea/</i> Scarlet oak	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,WL	LD		
<i>Quercus imbricaria/</i> Shingle oak	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,WL	LD	W	
<i>Quercus palustris/</i> Pin oak	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,PL,WL	LD	W	DS
<i>Quercus phellos/</i> Willow oak	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,PL,WL	LD		
<i>Quercus rubra</i> (borealis)/ Northern red oak	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,WL	LD	IS	DS
<i>Sophora japonica/</i> Japanese pagoda tree	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,PL	LD	AP,D,SC	FR
<i>Tilia americana/</i> American linden, basswood	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,N,PL	LD		
'Redmond'	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,PL	LD		
'Legend'	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,PL	LD		
<i>Ulmus hollandica</i> 'Groenveldt'/ Groenveldt elm	130 (12)	150 (14)	200 (18)	250 (23)	EC,G	LD	D	IN
<i>Ulmus parvifolia/</i> Chinese elm	130 (12)	150 (14)	200 (18)	250 (23)	EC,G,PL	LD		

<i>Zelkova serrata</i> / Japanese zelkova	130 (12)	150 (14)	200 (18)	250 (23)	G,PL	LD		
<i>BOTANICAL/COMMON NAME</i>	Min. Plant Area in ft2 (m2)	Projected 10-YR Tree Cover Area in ft2 (m2) and Height in ft (m) at Planting			Tree Uses	Screen Yard Use	Environmental Tolerances	Problems
		6.0 (1.8)	8.0 (2.4)	10.0 (3.0)				
CATEGORY I - EVERGREEN TREES								
Trees generally less than 30 feet in height at maturity with a spread less than 15 feet								
<i>Ilex x attenuata</i> 'Fosteri'/ Foster's holly	30 (3)	40 (4)	50 (5)	75 (7)	G	ME	SH	
<i>Ilex x</i> 'Nellie Stevens'/ Nellie Stevens holly	30 (3)	40 (4)	50 (5)	75 (7)	G	ME		
<i>Juniperus chinensis</i> / Chinese juniper	30 (3)	40 (4)	50 (5)	75 (7)	G		D	
'Columnaris'	30 (3)	40 (4)	50 (5)	75 (7)	RA		D	
'Denserecta'	30 (3)	40 (4)	50 (5)	75 (7)	RA		D	
'Erecta Glauca'	30 (3)	40 (4)	50 (5)	75 (7)	RA		D	
'Grey Gleam'	30 (3)	40 (4)	50 (5)	75 (7)	RA		D	
'Hetzi columnaris'	30 (3)	40 (4)	50 (5)	75 (7)	RA		D	
'Keteleeri'	30 (3)	40 (4)	50 (5)	75 (7)	RA		D	
'Robusta green'	30	40	50	75	RA		D	



	(3)	(4)	(5)	(7)				
'Torulosa'	30 (3)	40 (4)	50 (5)	75 (7)	RA		D	
<i>Juniperus virginiana</i> 'Princeton Sentry'/ Eastern redcedar	30 (3)	40 (4)	50 (5)	75 (7)	RA	ME	D,IS	IN
<i>Taxus baccata</i> 'Fastigiata'/ Upright Irish yew	30 (3)	40 (4)	50 (5)	75 (7)	RA			
<i>Thuja occidentalis</i> 'Nigra'/ Dark green American arborvitae	30 (3)	40 (4)	50 (5)	75 (7)	G,RA		W	
<i>Thuja orientalis</i> / Columnar oriental arborvitae	30 (3)	40 (4)	50 (5)	75 (7)	G,RA	ME	PS,W	
<b>CATEGORY II - EVERGREEN TREES</b> Trees 30 to 40 feet in height at maturity with a spread of 15 to 20 feet								
<i>Abies concolor</i> / White fir	50 (5)	75 (7)	100 (9)	125 (12)	G	ME		
<i>Calocedrus decurrens</i> / Incense cedar	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	W	
<i>Chamaecyparis lawsoniana</i> / Lawson falsecypress	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	PS	
<i>Chamaecyparis obtusa</i> / Hinoki false cypress	50 (5)	75 (7)	100 (9)	125 (12)	G	LE	W	
<i>Chamaecyparis thyoides</i> / Atlantic whitecedar	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	W	
<i>Cryptomeria japonica</i> / Japanese cryptomeria	50 (5)	75 (7)	100 (9)	125 (12)	G	LE	IS	

<i>Cunninghamia lanceolata</i> / China fir	50 (5)	75 (7)	100 (9)	125 (12)	G	ME		
<i>Cupressocyparis leylandii</i> / Leyland cypress	50 (5)	75 (7)	100 (9)	125 (12)	G	LE	PS,W	
<i>Ilex aquafolium</i> / English holly	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	SH	
<i>Ilex opaca</i> / American holly	50 (5)	75 (7)	100 (9)	125 (12)	G,N	ME	IS,SH	
<i>Juniperus scopulorum</i> 'Moonglow'/ Rocky Mt. Juniper	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	D	
<i>Juniperus virginiana</i> / Eastern redcedar	50 (5)	75 (7)	100 (9)	125 (12)	G,N	ME		
'Canaert'	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	D,IS	IN
'Manhattan Blue'	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	D,IS	IN
<i>Picea glauca</i> / White spruce	50 (5)	75 (7)	100 (9)	125 (12)	G	LE	D,PS,RZ	
<i>Picea omorika</i> / Serbian spruce	50 (5)	75 (7)	100 (9)	125 (12)	G	LE		
<i>Picea orientalis</i> / Oriental spruce	50 (5)	75 (7)	100 (9)	125 (12)	G	LE	SC	
<i>Picea pungens</i> / Colorado blue spruce	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	D	
<i>Pinus bungeana</i> / Lacebark pine	50 (5)	75 (7)	100 (9)	125 (12)	G	ME		
<i>Pinus parviflora</i> / Japanese white pine	50 (5)	75 (7)	100 (9)	125 (12)	G	ME		

<i>Pinus thunbergiana</i> / Japanese black pine	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	D,IS,RZ	
<i>Pseudotsuga menziesii</i> / Douglas fir	50 (5)	75 (7)	100 (9)	125 (12)	G	ME		
<i>Taxus cuspidata</i> 'Capitata'/ Pyramidal Japanese yew	50 (5)	75 (7)	100 (9)	125 (12)	G	ME		
<i>Tsuga canadensis</i> / Canadian hemlock	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	SH	IN
<i>Tsuga caroliniana</i> / Carolina hemlock	50 (5)	75 (7)	100 (9)	125 (12)	G	ME	SH	
<b>CATEGORY III - EVERGREEN TREES</b> Trees 40 to 50 feet in height at maturity with a spread 20 to 30 feet								
<i>Cedrus atlantica</i> / Atlas cedar	90 (8)	125 (12)	150 (14)	175 (16)	G	LE		
<i>Picea abies</i> / Norway spruce	90 (8)	125 (12)	150 (14)	175 (16)	G	LE	PS	
<i>Pinus echinata</i> / Shortleaf pine	90 (8)	125 (12)	150 (14)	175 (16)	G	LE	PS	
<i>Pinus nigra</i> / Austrian pine	90 (8)	125 (12)	150 (14)	175 (16)	G	LE		DS,N
<b>CATEGORY IV - EVERGREEN TREES</b> Trees 50 feet in height or greater at maturity with a spread of over 30 feet								
<i>Magnolia grandiflora</i> / Southern magnolia	130 (12)	150 (14)	200 (18)	250 (23)	G	LE	PS,W	WW
<i>Pinus rigida</i> / Pitch pine								

### **Explanation of Tree Selection and Cover Guide Columns and Codes**

A Botanical/Common Name. This column lists trees alphabetically and categorizes them based on their ultimate size and tree cover area. Botanical names are given first, including genus, species, and, in some cases, cultivate name. Common names used in the Mid-Atlantic region are given second. Deciduous trees are separated from evergreens in all categories. Evergreens include both coniferous and broadleaf species.

B Minimum Required Planting. This column shows the soil surface area in ft<sup>2</sup> (m<sup>2</sup>) that should be available when planting a given species. When minimum planting areas cannot be provided due to existing conditions, alternative plants should be considered.

C Projected 10-Year Tree Cover Area. These columns give the projected 10-year tree cover area in ft<sup>2</sup> (m<sup>2</sup>) for trees of different sizes at time of planting. Deciduous trees are listed by commonly available caliper sizes and evergreen trees are listed by commonly available heights. The 10-year canopy cover shall be used to determine tree cover credit for planted trees and shall be used for drawing trees to scale on the landscape plan and to determine minimum spacing requirements. When drawn to scale, tree canopies shall not significantly overlap.

### **TREE USES AND SCREENING USE CODES**

(1) General. These trees are suitable for a variety of uses.

(2) **N**ative. A native tree is defined as a species that was indigenous to the vegetation communities in Washington metropolitan area before the arrival of Europeans to North America (pre-Columbian).

(3) Parking Lot Planting Areas **PL**. These tree species have been selected for use in parking areas based on their favorable branching habits and tolerance of poor soils, drought, radiant heat, and restrictive root space. Trees most appropriate for planting on parking decks will have the following environmental tolerances: restricted root zone **RZ**, poor soils **SC**, air pollution **AP**, and drought tolerance **D**.

(4) Plantings in Restricted Areas **RA**. Where the ultimate size and form of a tree, along with its root structure, must be given consideration in order to avoid potential maintenance, safety, and access problems. These species should be considered.

(5) Energy Conservation **EC**. The deciduous species listed are suggested for use adjacent to buildings to conserve energy by providing shade.

(6) Wildlife Value **WL**. These trees provide food and/or shelter for wildlife.

(7) Screening Trees **LE, ME, LD, SD**. Trees identified by these notations are effective in meeting screening needs by providing eye-level visual screening. Both deciduous and evergreen species are listed but only evergreens provide year-round screening.

## **ENVIRONMENTAL TOLERANCE CODES**

(1) Restricted Root Zone **RZ**. These species will tolerate limited planting areas better than other species. Roots of these trees will usually not disrupt surrounding hardscapes. It is noted that trees that are planted in areas that meet only the minimum requirements for planting area, generally will not be healthy, long-lived trees. A larger planting space will result in more healthy, vigorous specimen trees due to increased nutrient availability and improved soil conditions.

(2) Poor Soil Conditions **SC**. These species are noted for their tolerance to a range of soil conditions found in the urban environment. It should be noted that most trees do not tolerate poor soils. Tolerant trees that may grow in poor soil will generally not thrive.

(2)(a) A poor soil is a soil used as a growing medium that has marginal properties for support of plant life. Poor soil conditions may include one or more of the following characteristics: low nutrient content (essential nutrients have been leached or the soil lacks nutrient holding capacity), improper pH (a soil that is either too acidic or too alkaline) and poor structure (highly compacted with little pore space and a low water infiltration and percolation rate).

(2)(b) Subsoils used to provide a stable base for sidewalks, parking lots, buildings, etc., and general grading purposes are often inadequate for plant growth. Amending these soils with composted organic matter and agricultural lime may improve soil pH, structure, and nutrient availability. Testing soil for pH and nutrient content is advisable prior to amending soil. Soil amending in individual planting holes is not recommended. If soil amendments are needed, they should be applied using broadcast methods and tilled in over a large planting area.

(3) Partial Shade **PS**. These species tolerate or prefer areas receiving partial amounts of direct sunlight such as on the eastern or northern sides of structures or forested areas.

(4) Full Shade **SH**. These species tolerate or prefer a shaded environment. However, the deeper the shade, the more difficult it is for any tree to thrive.

(5) Air Pollution **AP**. This group of species will tolerate areas subjected to exhaust gas emissions found along roadways and within parking lots. These trees are typically deciduous and shed their leaves before particulate matter can damage plant tissue. Evergreens retain leaves or needles longer, allowing particulate matter to be absorbed and destroy plant tissue, and as such are more susceptible to pollution injury.

(6) De-icing Salts **IS**. These species are tolerant of root and leaf exposure to de-icing salts such as sodium chloride and calcium chloride. These trees should be planted along roadways and in the vicinity of parking lots, sidewalks, and asphalt paths subject to snow and ice removal operations.

(7) Wet Soil Conditions **W**. These species will tolerate moderate to excessive soil moisture. These trees should be planted adjacent to waterways, ponds, lakes, and stormwater retention and detention facilities.

(8) Drought Conditions **D**. These species will tolerate hot, dry conditions. They require less available soil moisture than most trees and should be considered for planting areas subjected to heat, drying winds, and intense solar radiation without the benefit of supplemental moisture. These conditions are often found along roadways, parking lots, parking decks, and around buildings that absorb heat and reflect sunlight.

## **PROBLEM CODES**

(1) Disease Problems **DS**. These species are susceptible to severe stress, disfigurement, or death caused by diseases which produce symptoms which are not curable or controllable. Species that fall into this category are not recommended for planting. If these species are planted, then it is likely that annual maintenance and periodic replacement of the entire tree will be required.

(2) Insect Damage **IN**. These trees are subject to damage by insects or related organisms. Considerable damage such as defoliation or death may occur with these species because the pests often cannot be effectively controlled without considerable expense and use of pesticides. Periodic inspection and maintenance will be necessary on these species.

(3) Structural Problems due to weak wood **WW**. These species are susceptible to structural failures such as falling branches and main stem failure. These species should not be planted near buildings or facilities where people gather or reside.

(4) Objectionable Fruit **FR**. These tree species produce fruit with objectionable qualities. These include fruit that is capable of causing damage when falling, is slick or sticky on roads or walkways, attracts pests, produces disagreeable odors, causes stains, and/or produces prolific seedlings.

(5) Objectionable Root System **RS**. These trees typically produce surface roots that are capable of heaving sidewalks and asphalt trails, clogging sewer and drainage pipes, and/or creating tripping hazards.