

**A CITIZEN'S GUIDE TO
URBAN FOREST MANAGEMENT
IN
THE CITY OF CLYDE HILL**

By

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BACKGROUND

As a Washington community with unique topography and strategic location, Clyde Hill has two very special characteristics: landscapes and views. Many people in the community benefit from picturesque vistas of the Seattle skyline, the Olympic and Cascade mountain ranges, Mount Rainier and Lake Washington. Because the Town is located in a region well suited for the growth of many special varieties of plants, the entire community cherishes their landscaping and has the opportunity to see plants grow rapidly.

Landscape related issues are becoming community problems as Clyde Hill matures and the effects of continued urbanization increase. These problems affect both remnant forests as well as newer man-made landscapes. To strike a balance between urban demands such as views, and urban forest benefits such as a beautifully landscaped neighborhood, knowledge of appropriate plant materials and proper plant care is necessary. A goal of the City is to achieve that balance between urban growth issues and the maintenance of urban landscapes.

The adoption of a view preservation ordinance in 1991 was one of three steps the City believes is necessary to achieve this goal. An ongoing educational program is a second step to address the issues. As a third integrated step, landscape ordinances are begin developed to assist the City in finding a long-term sense of harmony with the potentially opposing interests of the landscape.

In mid 1992, the City staff applied for a state grant to help develop a landscape ordinance and possibly some related educational material. In December 1992, the Washington State Department of Natural Resources and the University of Washington College of Forest Resources helped coordinate my internship with the City to develop such a program. With the assistance of the Planning Commission and the Ad-hoc Advisory Committee, a list of landscape issues to be addressed for the City was compiled. The major product of the research is this Guide, organized to provide information for both the citizens and the City staff. With this guide the City is able to confidently develop the appropriate ordinances as well as begin educating the citizens on these important issues.

Since the time of its first printing this Guide has been used extensively throughout Clyde Hill and was requested by other cities both within and outside of Washington State. Since the Landscape Review program began, over 25% of all homes in Clyde Hill have requested a review of their landscapes. This has already helped greatly to reduce or eliminate long-term landscaping problems in the City.

Now a decade after the first publication, the City saw a need to update the Guide with the latest resources and technology. In 2003, the City applied for a small grant with the Washington State Department of Natural Resources, which enabled me to revisit my work and make the necessary changes and additions.

As the author, I continue to be proud of this Guide with its plethora of good information for any citizen or interested party in Clyde Hill...and beyond.

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Above all, I would like to thank my parents for their support, on all levels, during my graduate studies.

PURPOSE OF THIS GUIDE

In response to the view protection ordinance (Municipal Code 17.38) passed in 1991, the Clyde Hill Planning Commission saw a need for information on proper tree selection and pruning techniques to preserve views. Collectively, the landscapes of the City are considered the community or urban forest. When working with the landscape, several important aspects of the forest, such as slope stability and root control, also need to be considered.

The purpose of this guide is to outline the proper management of landscapes in urban settings, a concept called urban forest management. Clyde Hill is in the unique situation of being surrounded by urbanized areas of King County while maintaining a relatively low density of development. Within the City there are several appealing natural elements: tall conifers, creeks, lakes, and maturing landscapes. All these elements are connected and are easily affected by impacts of urbanization such as pollution and land development. By understanding the processes of the environment and ways to manage the landscapes, it is possible to maintain a healthy community forest, where all benefit.

During this study, it was noted that the City is composed of areas that possess unique characteristics and sets of issues. As a result, the City has been classified into "zones". Each zone is described and its issues identified as a part of this introduction. With this delineation, information can be "customized" for each zone.

A collection of technical information on the issues identified has been provided in the second part of this guide. Each issue is discussed in a separate section with special discussion relating to the appropriate zones. Some issues pertain to the whole community for which general information is provided.

The third part of this guide is devoted to a concept called sustainable landscape management, which emphasizes effective landscaping techniques when addressing the issues of the urban forest. Topics in this section include proper plant selection, pruning, and planting methods with references for more detailed information.

The 2003 revision of this guide includes discussion of the latest techniques as well as references to the most recent applicable City Code. Updates to references are also required especially since the evolution of the internet has allowed it to be a very valuable tool, one not nearly as accessible a decade ago.

The sections on each issue have been designed to stand alone (with a few cross references to other sections for more discussion). The intent was to allow access to and extraction of information on a single topic by interested citizens or by the City staff to develop tools, such as educational brochures and ordinances. It would be essential, however, to become familiar with the zones of Clyde Hill, as outlined in the first part, as well as the concept of sustainability in the last part, to fully comprehend each discussion.

In 1993 an Urban Forest Library was created at the City Hall. Many references and sources used for the guide in 1993 are located in the library and are available for use by citizens. Since the library was not utilized by the community, the decision was made to not continue maintaining the library, but rather provide web sites in this guide for the latest publications and sources for each topic.

THE BENEFITS OF THE URBAN FOREST

There are many benefits associated with having vegetation in an urban environment. Besides adding aesthetic value to homes and yards, trees and shrubs reduce the effects of wind and noise, while absorbing and filtering pollutants and releasing oxygen.

Vegetation also offers a cooling effect, by shading the many reflective hard surfaces of residential areas, e.g., pavement, exterior walls, and roofs. As plants diffuse the light and heat of the sun and evaporate water through their leaves, they cool the surrounding area. The community as a whole can benefit from this tempering of extreme environmental conditions.

Plants play other important roles in enhancing our environment. The interception of precipitation by plants minimizes the runoff potential and incidence of erosion on hillsides. While trees and shrubs can provide privacy of living space, the richness and diversity of plant species can also enhance wildlife habitat in the urban place.

The City's embrace of the urban forest is appropriately noted in the revised Clyde Hill Comprehensive Plan in the "Environment" Section (2003).

The importance of vegetation in a community like Clyde Hill may be well understood and appreciated, but the proper selection and management of the plants are still necessary to effectively manage the community forest. Zones of Clyde Hill and their issues, as identified in this guide, along with some basic information, are used to begin the process of urban forest management.

THE URBAN FOREST ZONES OF CLYDE HILL

The City of Clyde Hill has been classified into seven general zones based on topography, views, and existing vegetation. This classification is broad-based and may differ between lots, particularly those near zone borders. The zones of the City are illustrated on the next page and are described below. The issues identified for each zone are also noted. Some issues may pertain to all zones, but may be noted in a particular zone because of a special association.

All zones. General issues applicable to all zones include:

- Root Control
- Rights-of-Way
- Historic Trees
- Privacy and Screening
- Hazard Trees
- Watershed Protection
- Energy Conservation and Climate Control
- Pollution Abatement
- Tree Preservation During Construction
- Vacant Lot Management
- Landscaping with Native Plants
- Wildlife

Zone 1. Highland with a low to moderate density of vegetation. This area is predominantly on the top, flat part of the hill without a significant amount of trees. This area does not have views that must be preserved.

Issues: Sandy Soils (in most areas)
 Runoff Control
 Historic Trees

Zone 2. Highland with a high density of vegetation. This area is characterized by a high density of trees, particularly evergreens, on and near the top of the hill. This area does not have views.

Issues: Sandy Soils (in most areas)
 Runoff Control
 Historic Trees
 Wildlife

Zone 3. Hillside with a low to moderate density of vegetation. This area is along the slope of the hill where trees are not very dense. Views are important to maintain in this zone.

Issues: Landscaping for View Preservation
 Hardpan Soils (in most areas)
 Runoff Control

Slope Stability
Historic Trees

Zone 4. Hillside with a high density of vegetation. The vegetation in this area on the slope is dominated by trees. While the vegetation is dense, views are still maintained through the trees.

Issues: Landscaping for View Preservation
 Hardpan Soils (in most areas)
 Runoff Control
 Slope Stability
 Historic Trees
 Wildlife

Zone 5. Lower hillside with a low to moderate density of vegetation. The lower part of the slope is dominated by a moderate amount of vegetation. Trees are incorporated into territorial views, and the growth of tall trees in this area could obstruct views in Zones 3 and 4.

Issues: Landscaping for View Preservation
 Hardpan Soils (in most areas)
 Runoff Control
 Slope Stability

Zone 6. Lowland with a low to moderate density of vegetation. This area is on the lower, more level part of City. There are no views, however the growth of tall trees in this area could obstruct views in upper zones.








Issues: Landscaping for View Preservation
 Wet Soils (in most areas)
 Pollution Abatement

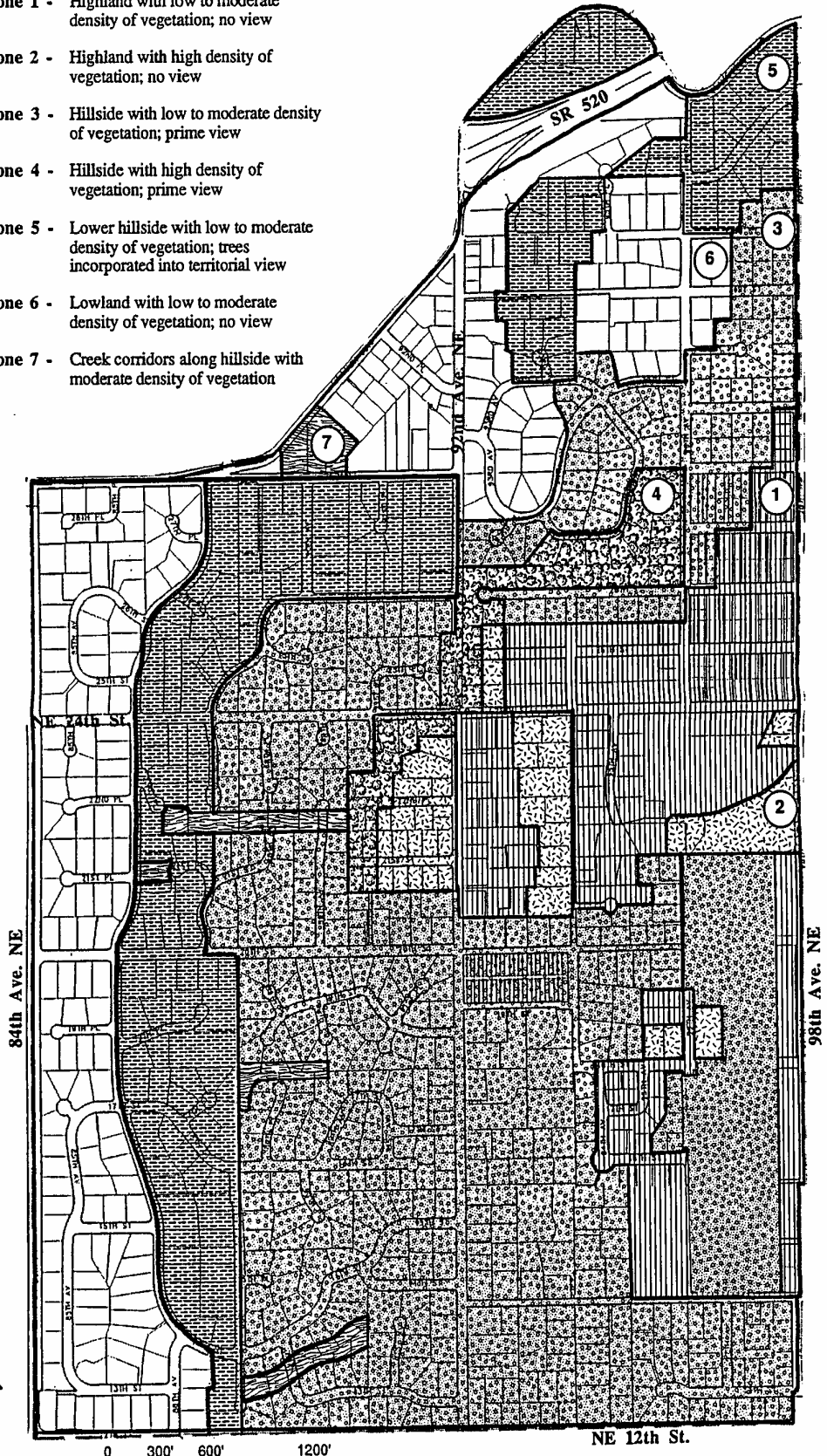
Zone 7. Creek corridors. These areas along the slope of the hill have a creek or regular outflow of water on hillside. The zone is characterized by a moderate amount of vegetation.

Issues: Landscaping for View Preservation
 Runoff Control
 Watershed Protection
 Wildlife

A matrix of the issues for each zone is provided on the Page 8 to further emphasize the uniqueness of each zone within the City of Clyde Hill.

LEGEND

-  Zone 1 - Highland with low to moderate density of vegetation; no view
-  Zone 2 - Highland with high density of vegetation; no view
-  Zone 3 - Hillside with low to moderate density of vegetation; prime view
-  Zone 4 - Hillside with high density of vegetation; prime view
-  Zone 5 - Lower hillside with low to moderate density of vegetation; trees incorporated into territorial view
-  Zone 6 - Lowland with low to moderate density of vegetation; no view
-  Zone 7 - Creek corridors along hillside with moderate density of vegetation



URBAN FOREST ZONES OF CLYDE HILL

Through several discussions with the Planning Commission and members of the advisory committee (see Acknowledgments), a list of urban forest issues was made for the City of Clyde Hill. The scope of the list is very broad, covering most of the issues with which many communities of this area must deal. The distinct zones of Clyde Hill require different approaches in management for some of these issues, and for those instances, special discussion is provided.

Reference

- ¹ United States Department of Agriculture Forest Service. **Benefits of Urban Trees**. Forestry Report R8-FR 17. USDA Forest Service - Southern Region, Atlanta, GA.

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Fazio, J.R. 2003. **Urban and Community Forestry: A Practical Guide to Sustainability**. The National Arbor Day Foundation. Arborday.org

McPherson, E.G., S.E. Maco, J.R. Simpson, P.J. Pepper, Q. Xiao, A.M. VanDerZanden, and N. Bell. 2002. **Western Washington and Oregon Community Tree Guide: Benefits, Costs, and Strategic Planning**. USDA Forest Service, Pacific Southwest Research Station.

¹ Copy available in the Clyde Hill Urban Forest Library.

RELATIONSHIP OF ISSUES TO ZONES

ISSUES	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6	ZONE 7
VIEW			◆	◆	◆	◆	◆
SANDY SOILS	◆	◆					
HARDPAN SOILS			◆	◆	◆		
WET SOILS						◆	
RUNOFF CONTROL	◆	◆	◆	◆	◆		◆
SLOPE STABILITY			◆	◆	◆		
ROOT CONTROL	◆	◆	◆	◆	◆	◆	◆
RIGHTS-OF-WAY	◆	◆	◆	◆	◆	◆	◆
HISTORIC TREES	◆	◆*	◆	◆*	◆	◆	◆
PRIVACY & SCREENING	◆	◆	◆	◆	◆	◆	◆
HAZARD TREES	◆	◆	◆	◆	◆	◆	◆
WATERSHED PROTECTION	◆	◆	◆	◆	◆	◆	◆*
ENERGY CONSERVE-CLIMATE CONTROL	◆	◆	◆	◆	◆	◆	◆
POLLUTION ABATEMENT	◆	◆	◆	◆	◆	◆*	◆
PRESERVE DURING CONSTRUCT	◆	◆	◆	◆	◆	◆	◆
VACANT LOT MGMT	◆	◆	◆	◆	◆	◆	◆
NATIVE PLANTS	◆	◆	◆	◆	◆	◆	◆
WILDLIFE	◆	◆*	◆	◆*	◆	◆	◆*

* Special discussion of issue in this zone is included in the guide.

THE CITY'S URBAN FORESTRY PROGRAM

Clyde Hill is a community with two very distinctive characteristics: landscapes and views. Many people in the community enjoy picturesque vistas. Because the City is located in a region well suited for plant growth, residents cherish their landscaping and have the opportunity to see plants develop rapidly.

Landscape related issues have become community problems as Clyde Hill matures and the effects of continued urbanization increase. A goal of the City is to find a balance between urban demands, such as views, and urban forest benefits, such as a beautifully landscaped neighborhood, by providing an Urban Forestry Program that will promote an accurate knowledge of appropriate plant materials and proper plant care. This on-going source of good information will reduce long-term conflicts of views and trees that in turn, will enhance the character and land values of the entire community.

To help strike an appropriate balance between urban growth issues and the maintenance of urban landscapes, the City adopted a unique View Preservation Ordinance in 1991, as one of three steps taken to develop an urban forestry program.

To achieve stability between urban demands, such as views, and urban forest benefits, such as a beautifully landscaped neighborhood, knowledge of appropriate plant materials and proper plant care are necessary. The City, the State Department of Natural Resources and the University of Washington have worked together to develop an Urban Forestry Educational Program as a second step to address these types of issues in Clyde Hill. Two Landscape Ordinances were adopted establishing a City Tree Board, landscaping regulations for plants on public property and a Landscape Review Program as a third integrated step to assist the City in finding harmony within these potentially opposing interests.

Overview of the City's "View Ordinance"

Chapter 17.38 of the Municipal Code was enacted in November 1991, and directs itself toward regulating the maintenance and restoration of views within the City of Clyde Hill. These regulations establish a specific process for resolving situations where the growth of one or more trees on a neighboring property unreasonably obstructs the view or sunlight reaching another particular property.

- ◆ The initial step in the established process is for the complainant to make all reasonable efforts to find a voluntary solution with their neighbor. This is the most important and sometimes the most challenging step in the process. The intent of the View Ordinance is to exhaust all reasonable efforts to resolve these matters as neighbors, without governmental intervention. The experiences of many other people throughout Clyde Hill have demonstrated many successes when a degree of respect and sincerity for each neighbor's concerns was taken seriously.
- ◆ If after exhausting all reasonable approaches as neighbors the view obstruction matter is still unresolved, the complainant is required, with the voluntary concurrence of the tree owner, to seek the services of the King County Dispute Resolution Center in an attempt to settle the matter.

- ◆ If this is unsuccessful, the issue can go before the City's Board of Adjustment for a public hearing and a specific decision by the Board. The Board must base its decision on standards and guidelines set forth in Chapter 17.38 of the Municipal Code and on the factual testimony from a public hearing where the matter would be discussed. The tree owner and the complainant are bound by the Board's decision unless the findings are appealed to the City Council, whose decision is final.
- ◆ Any tree whose age precedes the incorporation of the City (1953) shall be exempted from these regulations.

Overview of the Landscape Review Program

The City has three goals for the educational landscape review program:

1. To regulate new plantings such that they are less likely to become view problems when they mature and therefore reduce the need for continued maintenance of these plantings. The ultimate goal is to augment both trees and views to enhance the character and land values of the community.
2. To protect and manage the City's trees within the right of way, through the maintenance of visual, traffic, and overhead utility line clearances while adding to the community character through appropriate landscaping. To protect the underground utility systems from root invasion through proper landscaping in the right of way.
3. To incorporate the necessary provisions to become a Tree City USA, which will promote a continued awareness of urban forest and landscape issues among the community and especially with the schools.

The highlights of the program are:

- ◆ Using this Guide as a foundation, all Clyde Hill residents have an opportunity for a professional landscape review of their property.
- ◆ Beginning on June 1, 1994, a landscape review is mandatory for those who apply for a building permit that changes the "footprint" of a house or proposes building modifications that change the landscaping on the property. Reviews shall take place prior to final inspection of the work under the building permit. (CHMC 15.04.110).
- ◆ The landscape review will be conducted by a landscape professional that will help provide information and tips. The reviewer is there as a source of good information.
- ◆ There is no requirement to use any of the reviewer's advice. Where the property owner intends to plant vegetation that may cause damage to streets, sidewalks, overhead or underground utilities or which may have an impact on views, the reviewer will suggest alternatives from the City's Guide and will explain the benefits of such alternatives.

- ◆ This free service is available to all City residents on a reservation basis.

Tree City USA

The City is proud to claim Tree City USA status for at least a decade. This designation is a program through the National Arbor Day Foundation and is administered in part through the State Forester at the Washington State Department of Natural Resources. The program was developed to recognize cities across America who care about the trees in their community. There are four standards in which to achieve for Tree City USA (every year):

- ◆ Form a Tree Board (Clyde Hill's Planning Commission)
- ◆ Develop and implement a tree protection ordinance (CHMC 17.38)
- ◆ Spend at least \$2 per capita on an Urban Forestry Program (Clyde Hill spends \$10-12 per capita with above activities)
- ◆ Celebrate and proclaim Arbor Day (Clyde Hill successfully celebrates with schoolchildren every April)

LANDSCAPING FOR VIEW PRESERVATION

Areas along the hillside and hilltop of Clyde Hill have commanding views of the mountains, Lake Washington, and surrounding communities. With the recent passage of the view preservation ordinance, citizens have become aware of the ability to restore lost views as well as the need to maintain current views.

PLANT SELECTION

Below are lists of suggested species for particular zones where views are a critical issue. Species that are particularly slow growing (less than a foot of growth per year) or fast growing (more than two feet of growth per year) are indicated as such on the list. The other species are considered moderate growers. Many factors influence the size and rate of growth of a tree, including exposure, soil, drainage, and water and nutrient availability. Individual trees will also vary. In the selection of a tree or shrub, attention has to be given to the form and spread of the species and varieties to ensure that the plant will meet the landscaping needs. Accommodation for mature growth with appropriate spacing has to be provided at planting time. For more information on plant selection, see "Proper Plant Selection" in "Sustainability in Landscape Management" section.

ZONES 3 AND 4*

In an effort to avoid future conflict, the planting of small trees and shrubs in Zones 3 and 4 is suggested. The maximum mature height of 25 to 30 feet would be in accordance to the height restriction of structures in the City. The list provided has species of trees and large shrubs that have a maximum height up to 25 feet. Some species of 30 and 35 feet mature height are included since they can be controlled with minor pruning. This list is not inclusive, and any species with a maximum mature height less than 25 feet could be appropriate. See "Proper Plant Selection" and "Large Trees" in "Sustainability in Landscape Management" section.

Trees and Large Shrub Species for Zones 3 and 4

Acer spp. (Maples) many appropriate species including:

Acer buergeranum (25' mature height) Trident maple

Acer campestre (30') Hedge maple

Acer circinatum (25-35') Vine maple

Acer glabrum var. *douglasii* (15-25') Rocky Mountain maple

Acer ginnala (15-20') Amur maple

Acer grandidentatum 'Schmidt' (25') Rocky Mountain Glow maple

Acer griseum (25') Paperbark maple

Acer palmatum (20') Japanese maple (slow)

Acer platanoides 'Globosum' (25') Globe Norway maple (slow)

Acer tataricum (25') Tatarian maple

Acer truncatum x *A. platanoides* Warrenred (30') Pacific Sunset maple

* The adjacent Zones 7 to these zones are also applicable.

Amelanchier alnifolia (18') Western serviceberry
Amelanchier laevis 'Cumulus' (25') Allegheny serviceberry
Amelanchier x grandiflora (20-25') serviceberry
 'Autumn Brilliance'
 'Cole'
 'Princess Diana'
Aesculus x carnea 'Briotii' (30') Red horsechestnut
Aesculus californica (10-20') California buckeye
Arbutus unedo (10-30') Strawberry tree
Cercis canadensis (25-35') Eastern redbud (variety 'alba' slower growing)
Cercis occidentalis (15') Western redbud
Cladrastis lutea (30') Yellowwood
Cornus florida (20') Flowering dogwood
Cornus kousa (20-25') Japanese dogwood
Cornus mas (20-25') Cornelian cherry dogwood
Corylus avellana (15') European filbert
Corylus cornuta var. *californica* (5-15') Western hazelnut
Cotinus coggygria (20') Smoketree
Crataegus x lavalleyi 'Carrierei' (20-25') Carriere hawthorn
Crataegus phaenopyrum (20-30') Washington thorn
Crataegus laevigata Crimson Cloud (25') Crimson Cloud hawthorn
Cunninghamia lanceolata (30') China fir
Elaeagnus pungens (15') Silverberry
Fraxinus oxycarpa 'Raywood' (25-35') Raywood ash
Hamamelis species (10-25') Witch hazel
Koelreuteria paniculata (20-35') Goldenrain tree
Laburnum x waterei (15-25') Goldenchain tree (slow/mod)
Laurus nobilis (25-30') Bay Laurel (slow)
Ligustrum lucidum (25-35') Waxleaf privet (mod/fast)
Maackia amurensis (25') Amur maackia
Magnolia spp. Several species and varieties with appropriate height, including:
 Magnolia kobus (30') Kobus magnolia
 Magnolia salicifolia (30') Saucer magnolia (slow)
 Magnolia stellata (20') Star magnolia (slow)
 Magnolia grandiflora 'Victoria' (20') Victoria grand magnolia
Malus spp. (Crabapples) Choose only pest/disease resistant varieties:
 Malus floribunda (-30') Japanese crabapple
 Malus x atrosanguinea (20) Carmine crabapple
 Malus tschonoskii (30') Tschonoski crabapple (little/no fruit)
 Malus sargentii (10-20') Sargent crabapple
 Resistant cultivars include:
 'Adirondack' (white/pink) 'Jewelcole' (white w/ red fruit)
 'Centzam' (red flower/purple leaf) 'Schmidtcutleaf' (golden fruit)
 'Prairifire' (pink red/red fruit) 'Sutyzam' (pink bud/white flower)
 'Sentinel' (pink)
Myrica californica (25') Pacific wax myrtle
Osmanthus heterophyllus (8-10') Holly leaf osmanthus (slow/mod)
Oxydendrum arboreum (15-25') Sourwood (slow)
Parrotia persica (15-30') Persian parrotia
Photinia x fraseri (10-15') Photinia

Photinia serrulata (30') Chinese photinia
Photinia glabra (10') Japanese photinia
Pinus mugo (5') Mugho pine (slow)
Pinus aristata (20') Bristlecone pine
Pinus contorta (25-30') Shore pine
Pinus densiflora 'Umbraculifera' (12-20') Tanyosho pine (slow/mod)
Prunus laurocerasus (20-30') English laurel (as tree)
 var. 'Schipkaensis' and 'Zabeliana' (6') as shrubs
Prunus lusitanica (10-20') Portugal laurel
Prunus spp. (Flowering cherries) Choose only disease/pest resistant varieties, for example:
 Prunus serrulata 'Shirotae', 'Shirofugen', 'Mt. Fuji' (25')
 Prunus yedoensis 'Akebono' (25')
Prunus cerasifera 'Thundercloud' (25') Flowering plum
Prunus padus 'Summer Glow' (25-30') Bird cherry
Rhododendron spp. (-25') Rhododendron
Sorbus aucuparia (15-35') European mountain ash (mod/fast)
Sorbus sitchensis (20') Sitka mountain ash
Stewartia pseudocamellia (30') Japanese stewartia
Styrax japonicus (20-30') Japanese snowbell (slow/moderate)
Styrax obassia (20-30') Fragrant snowbell (slow/moderate)
Syringa reticulata (20-30') Japanese tree lilac
Taxus baccata (30') - English yew (slow)
Taxus baccata 'Stricta' (20') Irish yew (slow)
Taxus brevifolia (15-30') Western yew
Thuja occidentalis 'Pyramidalis' (25') Arborvitae
Tsuga mertensiana (20-30') Mountain hemlock (slow)
Viburnum rhytidophyllum (6-15') Leatherleaf viburnum

Some conifer species that have dwarf forms are:

Chamaecyparis obtusa (Hinoki false cypress)
Chamaecyparis lawsoniana (Port Orford cedar)
Cryptomeria japonica (Japanese cryptomeria)
Cupressus species (Cypress)
Picea abies (Norway spruce)
Pinus species (Pine)
Juniperus species (Juniper)

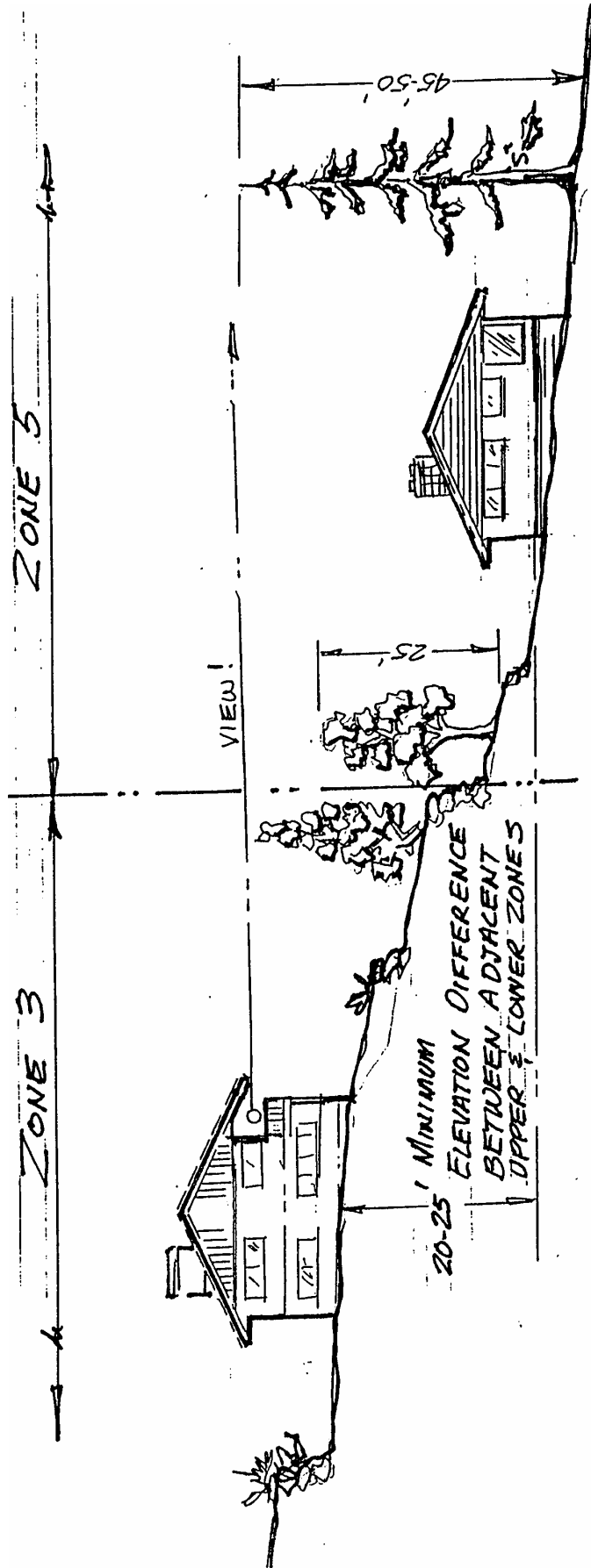
Consult the local nurseries and plant reference books for available dwarf forms.

ZONES 5 AND 6*

Although homes in the lower areas of the City, Zones 5 and 6, do not have distant views, the growth of tall trees in these areas can still obstruct views from above, and can create conflict among community members. The minimum difference in elevation between the upper and lower zones is 20 to 25 feet. This difference would allow for trees with a maximum height of 45 to 50 feet, without view hindrance (see diagram on next page). In addition to the species for Zones 3 and 4, these taller tree species could be planted on the lower part of the slope:

Acer miyabei 'Morton' (45' mature height) State Street maple
Acer platanoides (40-50') Norway maple (several cultivars)
Acer pseudoplatanus (40') Sycamore maple
Acer rubrum (40-45') Red maple
Acer saccharum (45') Sugar maple
Betulus jacquemontii (40') Jacquemonti birch
Betulus nigra (40') River birch
Carpinus betulus (40') European hornbeam
Catalpa bignonioides (50') Common catalpa
Cercidiphyllum japonicum (50') Katsura tree (slow)
Davidia involucrata (35') Dove tree
Fagus sylvatica 'Dawyck Purple' (40') Dawyck purple beech
Fraxinus oxycarpa 'Flame' (35-40') Flame ash
Fraxinus ornus (50') Flowering ash
Fraxinus pennsylvanica (45-50') Green ash
Gleditsia triacanthos 'Inermis' (50') Thornless honey locust
Halesia carolina (20-50') Silverbell
Liquidambar styraciflua (50') Sweetgum
Malus 'Dolgo' (40') Dolgo crabapple
Morus alba (40-50') White mulberry (fast)
Nyssa sylvatica (30-50') Sourgum, Tupelo (slow/mod)
Ostrya virginiana (35') American hophornbeam
Prunus sargentii (35') Sargent cherry
Pyrus species (35') Flowering pear
Sophora japonica (50') Japanese pagodatree
Quercus bicolor (45') Swamp white oak
Quercus coccinea (50') Scarlet oak
Quercus robur (50') English oak
Quercus rubra (50') Red oak
Sciadopitys verticillata (40') Umbrella pine (slow)
Sophora japonica (40') Japanese pagoda tree (slow)
Tilia x euchlora (30-50') Crimean Linden
Tilia cordata (30-50') Littleleaf Linden
Zelkova serrata (50') Sawleaf zelkova (mod/fast)

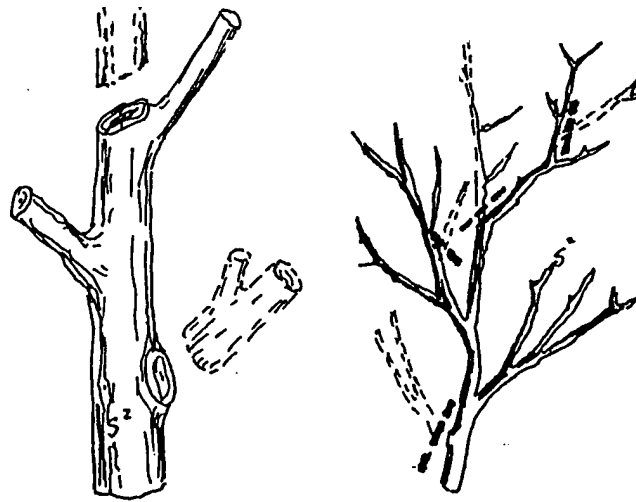
* The adjacent Zones 7 to these zones are also applicable.



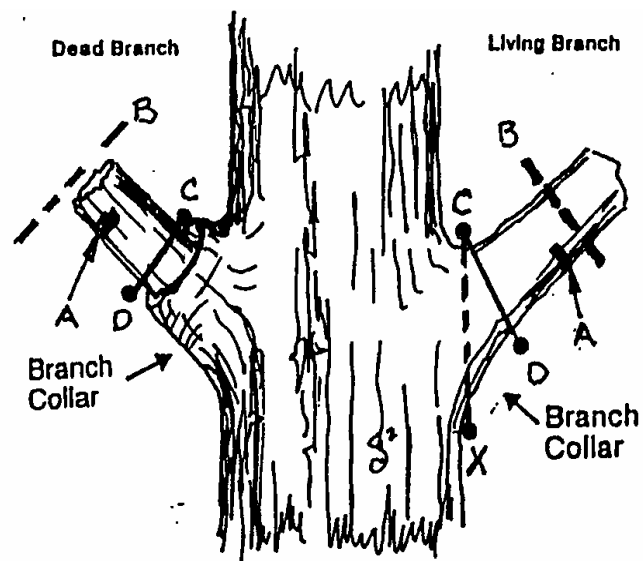
PRUNING

For existing trees in Zones 3 through 6, there are some pruning practices that can help maintain views. However, if a significant amount of pruning is required, where over a quarter to a third of a tree canopy is removed, the tree has outgrown its place and REPLACEMENT OF THE TREE IS SUGGESTED.

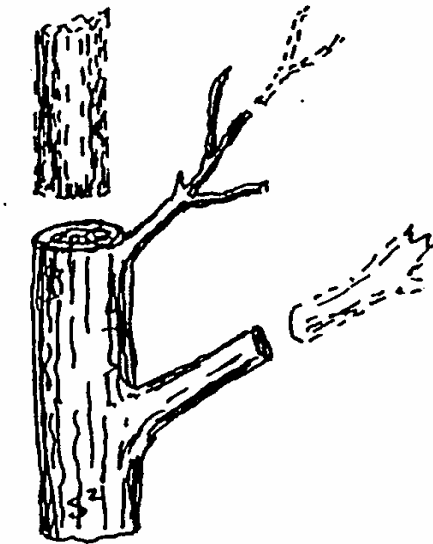
On mature trees, the only proper pruning cut on most all branches is a thinning cut; removing the limb or branch back to its connection to a larger branch or the trunk.



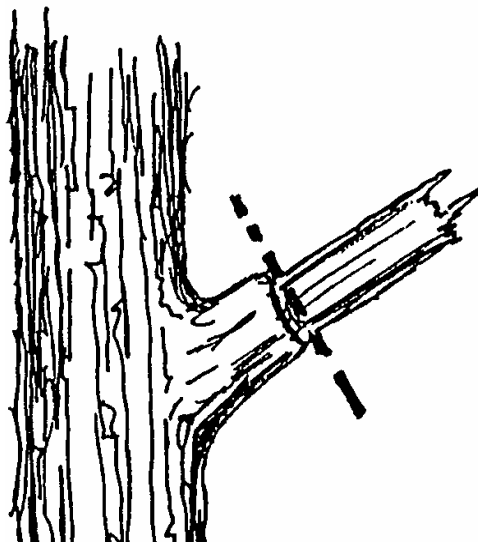
The proper way to make a thinning cut is to remove the branch back to the branch collar (line C-D on diagram). A flush cut into the branch collar (line C-X) does not allow the tree to completely callous over the wound.



A heading cut, pruning a branch back to a bud on the branch, is a pruning technique that is to be done on wood not older than one or two years. This cut promotes growth at the nodes (buds) immediately adjacent to the cut, which results in a bushy appearance.

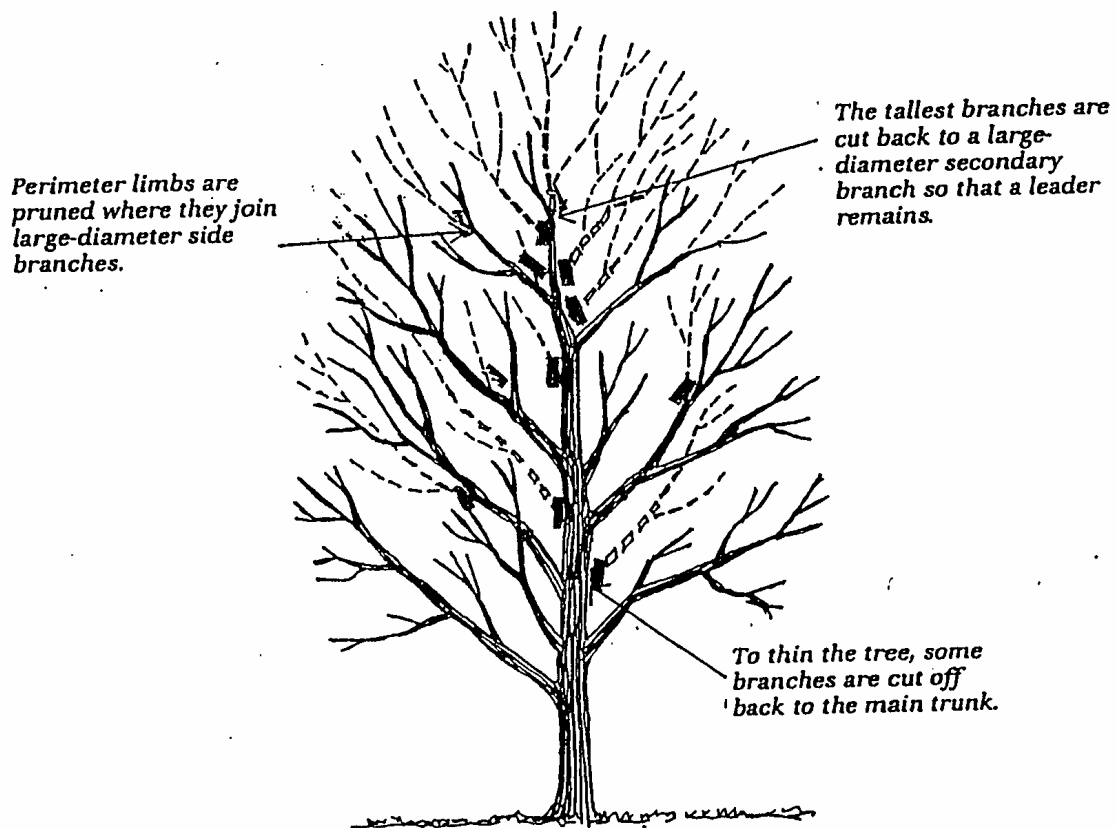


First step in any pruning job is to clean the crown. Remove dead branches properly back to the branch collar.



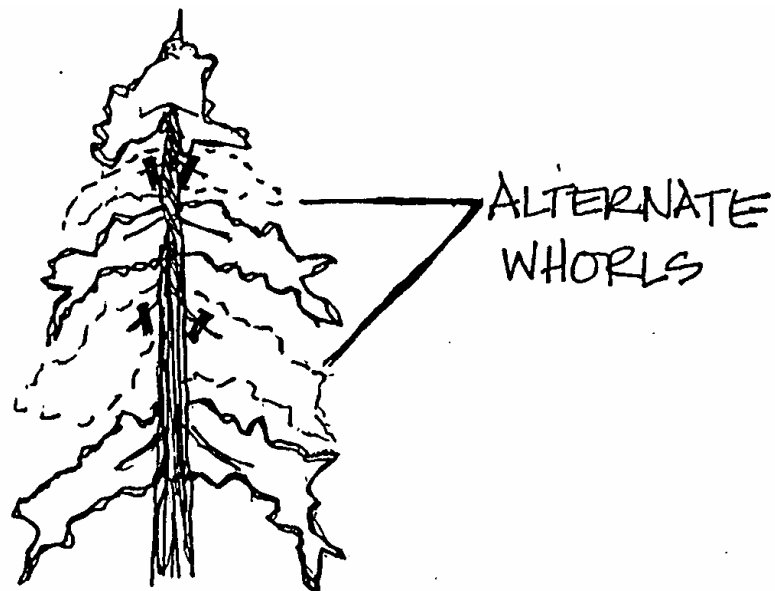
The selection of limbs and branches for removal to restore views can be done several ways. A few techniques are described below.

Branches, selectively removed throughout the canopy is called **crown thinning**. This pruning method can allow for views through a crown while maintaining the overall shape of the tree.

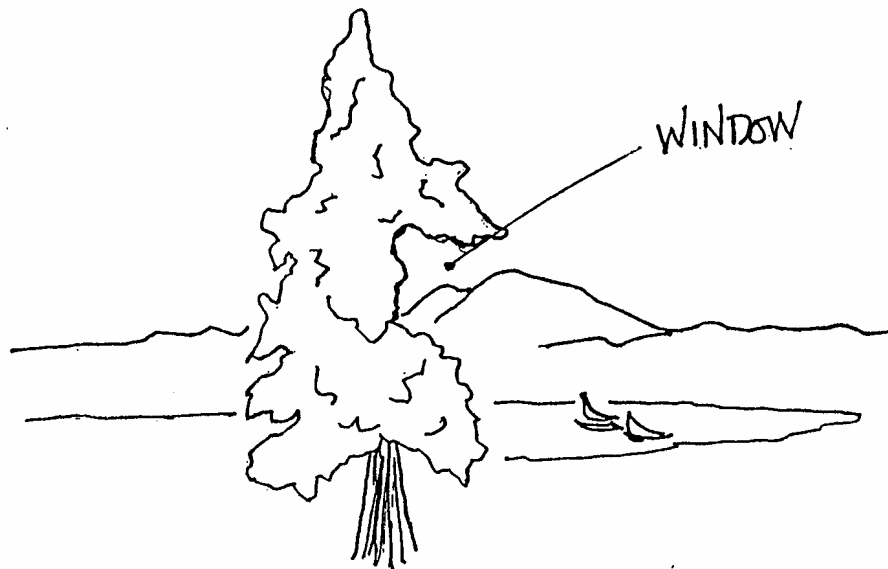


(Tree City USA)

For conifers, where the form of the tree is dominated by a main stem, the thinning process can be done by removing alternate whorls of branch attachment. By eliminating branches evenly throughout the crown, there is a reduction of wind resistance and the opening of the canopy allows for light and views through the crown.

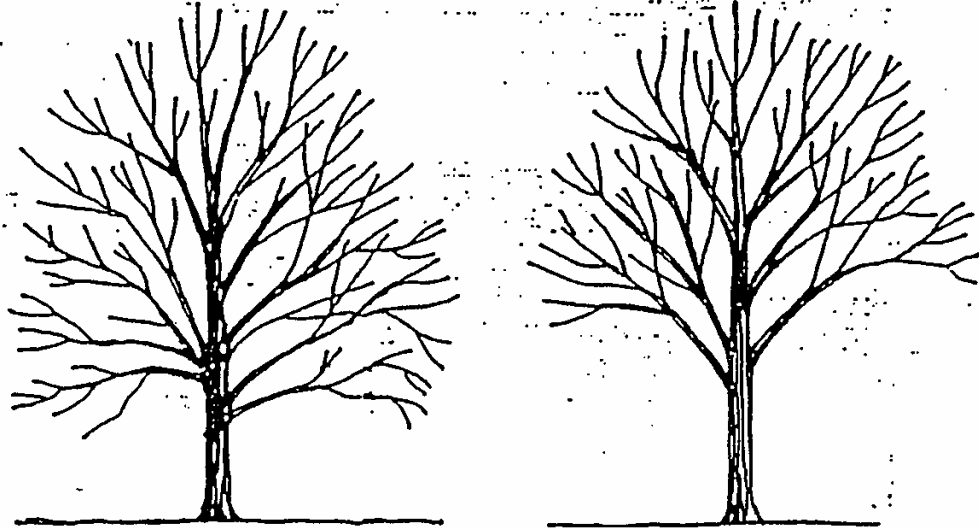


"Windowing" a tree may be an option where a few branches in an area are removed. This technique should be done sparingly as to not create a significant imbalance in the crown.



No more than a quarter of the live crown should be removed through the thinning process.

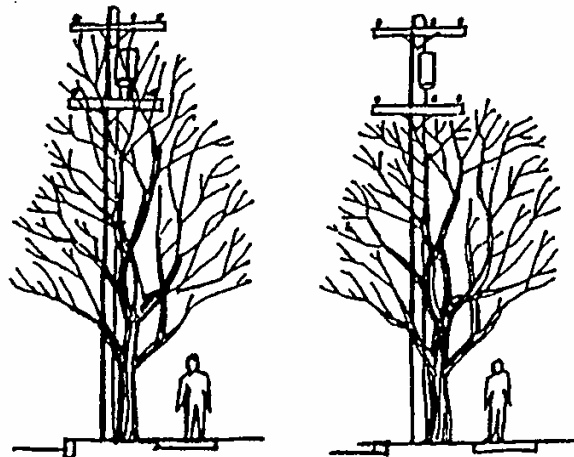
A view may be restored if the tree is "limbed up" (lower branches removed) or what is called **crown raising**. The remaining crown should be thinned to avoid creating a "sail effect" and endangering the tree. Again if a significant amount of the crown has to be removed in this process, removal and replacement of tree is recommended.



(Tree City USA)

Another pruning technique that can be used is **crown reduction**. This thinning process is the removal of branches at their attachment on the trunk or a lower, larger branch to lower the height of the crown. It is also known as "drop crotching". Crown reduction is particularly difficult to do on trees with a single leader, such as most conifers. Replacement with a more manageable species may be the better option.

An example of drop-crotch pruning to control tree growth beneath utility lines.



(Tree City USA)

Topping, or making a heading cut on the trunk or major branches is not an acceptable way to reduce the crown of a tree.

WHY NOT TOPPING?

Rapid new growth. Topping or heading cuts on major branches stimulates new growth of several smaller shoots that quickly gain the height discouraged.

Cost. The job of topping a tree is relatively expensive, for the topping usually results in the need for repeated pruning to keep the tree's height under control.

Weak Limbs. New smaller limbs (sprouts, suckers) that sprout from a large branch or trunk are weakly attached and can be a potential HAZARD with failure causing more damage to tree and possibly people or property.

Insects and disease. The tree has difficulty in callousing a trunk wound, and cannot defend invasion of insects and disease. Topping wounds are often the beginning of major trunk and branch decay that compromise the tree's structural integrity.

Starvation. Removal of a major part of crown upsets crown-to-root ratio. The tree needs the leaves to synthesize food (photosynthesis) for the rest of the plant.

Shock. When the interior of the tree is exposed, the loss of protection can result in sun scald or freeze cracks on the major branches and the trunk.

Aesthetics. Exposed trunk and disfigurement of the shape of a healthy symmetrical tree can devalue the tree, property, and new view.

If crown height reduction is required, drop crotch pruning should be considered as a last resort, and no more than a third of the canopy should be removed. The remaining crown should be reshaped. Again, the tree may react poorly to the exposure of trunk due to excessive limb removal. For more information, see "Hazard Trees" section.

Major pruning on large trees is a job for professional arborists. Before they do the work, review these guidelines on pruning techniques acceptable in Clyde Hill, and get a written description of what they will do (see "Hiring an Arborist" in the Sustainability in Landscaping section).

For the latest list of certified arborists in the area, contact the Pacific Northwest Chapter of the International Society of Arboriculture at www.pnwisa.org

In summary:

RIGHT PLANT, RIGHT PLACE. Be sure to select the species of trees that will not create a problem with view obstruction. The enclosed lists for the zones on the hillside of Clyde Hill can assist in this process.

BEGIN PROPER PRUNING EARLY IN THE LIFE OF THE TREE. Trees can be trained and controlled through early proper pruning. Regular light pruning is healthier for the tree, more aesthetically pleasing, lessens the danger of having hazardous trees, and is less costly. Do not wait until the tree is ten or twenty years old and attempt to significantly reduce its height.

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Plant Amnesty, Seattle, WA. www.plantamnesty.org
Literature available including an excellent "trees and views" article.

Pacific Northwest International Society of Arboriculture (ISA) has a list of certified Arborists for commercial tree work and consulting. www.pnwisa.org

SOILS

There is quite a variety of soils in the City of Clyde Hill. Included in this section is a general map locating these soils within the City, and a brief description of their properties. Such information is important when using the soil as a growing medium in the landscape. Soils may vary within each area, so it is useful to properly identify the type of soil and soil conditions that exist on your property.

SIMPLE SOIL TEST

To find out the characteristics of the soil, a simple soil test can be done to determine texture, drainage, and rooting depth potential.

1. Wet a small amount of the soil in hand, drain excess. Rub between fingers. If majority of the texture is:

Sticky? The soil contains clay.

Smooth? The soil is dominated by silt.

Gritty and rough? The soil is sandy.

2. In an area to be landscaped, dig a hole two to three feet deep. The ease of digging determines the ease of roots penetrating the soil. If the soil is diggable for at least two to three feet, then it is a fairly good growing medium. If a hard layer is encountered at a shallower depth, go to Hardpan Soils for remedy.

3. Fill the dug hole with water, and time how long it takes for the water to drain from of the hole. If the percolation rate is more than fifteen minutes per inch, then the drainage is very poor (see “Wet Soils”). If the water level is an inch lower in less than two minutes the drainage is considered very fast (see “Sandy Soils”). The average rate for good drainage is seven to eight minutes per inch.

A discussion on how to successfully landscape with the more difficult soil types follows.

SANDY SOILS (Zones 1,2,3)

Many areas in Zones 1, 2 and upper 3 have been described as sandy. They are made up of loosely consolidated sandy glacial deposits and fill brought in for development. A hard layer may be encountered at various depths below (in the substratum) but it does not seem to be located in the root zone. Quick drainage and poor nutrient retention can pose problems working with these soils.

LEGEND

Alderwood Series: Moderately well drained soils that have a consolidated substratum at a depth of 24 to 40 inches. Permeability is moderately rapid and runoff slow but increasing with slope.

- AgB Alderwood Gravelly Sandy Loam, 0 to 6% Slopes
- AgC Alderwood Gravelly Sandy Loam, 6 to 15% Slopes
- AgD Alderwood Gravelly Sandy Loam, 15 to 30% Slopes

Arents, Alderwood Material: Alderwood soils highly disturbed through urbanization. Features very similar to Alderwood.

- AmC Arents, Alderwood Material, 6 to 15% Slopes

Bellingham Series: Poorly drained soils with slow permeability and runoff. Shallow root depth if undrained.

- Bh Bellingham Silt Loam

Indianola Series: Somewhat excessively drained soils with rapid permeability and slow to moderate runoff.

- InC Indianola Loamy Fine Sand, 4 to 15% Slopes

Kitsap Series: Moderately well drained soils with a consolidated substratum at a depth of about 24 inches. Moderate permeability and runoff.

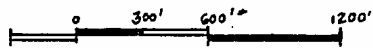
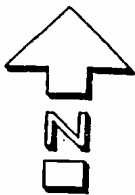
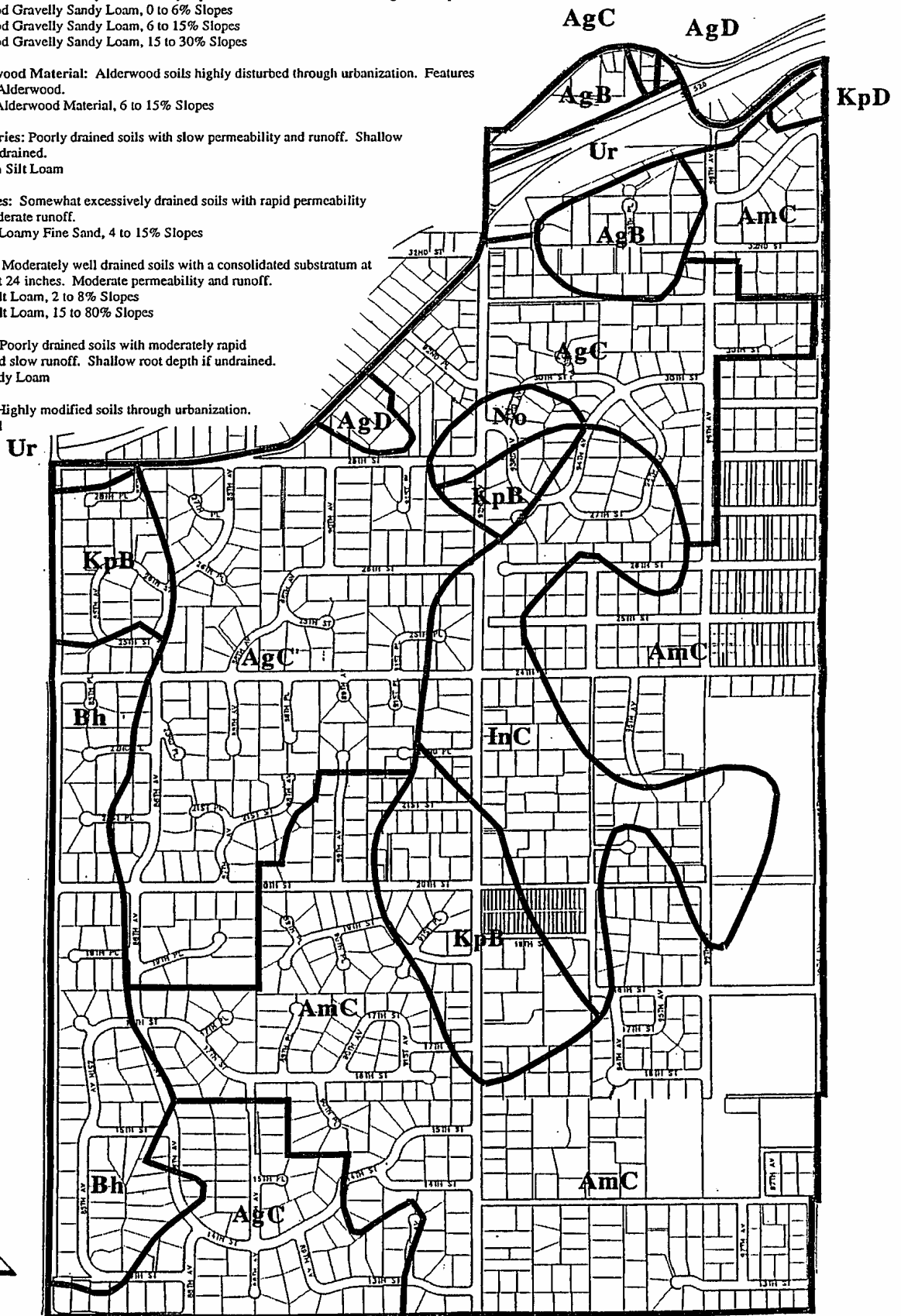
- KpB Kitsap Silt Loam, 2 to 8% Slopes
- KpD Kitsap Silt Loam, 15 to 80% Slopes

Norma Series: Poorly drained soils with moderately rapid permeability and slow runoff. Shallow root depth if undrained.

- No Norma Sandy Loam

Urban Land: Highly modified soils through urbanization.

- Ur Urban Land



--- CORPORATE LIMITS

SOILS

When dealing with these soils:

- ◆ Reduce percolation and thus the runoff effects down slope. (See “Runoff Control”)
- ◆ Amend the soil with topsoil or soil mix (without sand) to retain more water and nutrients for plants. The topsoil or mix should be incorporated into the existing soil, not just laid on top, to avoid creating an interface and drainage problems.
- ◆ Add organic matter (mulch or compost) and incorporate within the root zone (one to two feet).

HARDPAN SOILS (Zone 3,4,5)

Much of Clyde Hill's soils are composed of glacial material that was overridden by large sheets of ice, 3200 ft. deep, 12,000 to 15,000 years ago. This event has created a hardpan or a rock hard layer at various depths, of a foot or more, on the hillside, resulting in a limited water movement downward and poor root penetration.

Some solutions to hardpan problems are:

- ◆ Increase the depth of growing medium by adding good topsoil and incorporated into existing soil.
- ◆ Build up the bed by creating a berm or a raised bed.
- ◆ If there is less than 12 inches of good soil for a tree, then try to mechanically penetrate hard pan layer or make a berm.
- ◆ Ensure good drainage away from plants to prevent water logging.
- ◆ Use efficient irrigation for slow and thorough infiltration of water.

WET SOILS (Zone 6)

The areas at the bottom of the hill experience periodic saturated conditions. Many plants do poorly in wet, clay-like soil and may not survive.

One technique that can improve conditions for growing is to *divert the runoff*, or the excess water that collects at the low point. If possible, improve the drainage with drain tiles below the surface. Another option is to build up the planting bed as a berm above saturated soil.

There are some plants that are adapted to or can tolerate wetter soils. Below is a list of a few species:

Trees

Acer rubrum (smaller varieties 40-60 Feet) Red maple
Corylus cornuta (15) Hazelnut
Crataegus douglasii (20) Black hawthorn
Fraxinus latifolia (40-80) Oregon ash
Malus fusca (20) Western crabapple
Nyssa sylvatica (30-50) Sourgum, Tupelo
Physocarpus capitatus (20) Pacific ninebark
Pinus contorta (35) Shore pine (in Zone 6, dwarf varieties only)
Quercus bicolor (45') Swamp white oak
Rhamnus purshiana (30) Cascara
Salix scouleriana (40) Scouler willow
Salix lasiandra (40) Pacific willow
Salix hookeriana (40) Hooker's willow
Thuja plicata (75') Western redcedar

Shrubs

Cornus sericea (20) Red osier dogwood
Kalmia polifolia (3) Bog laurel
Lonicera involucrata (10) Black twinberry
Myrica californica (15) Pacific wax myrtle
Philadelphus lewisii (10) Mock orange
Rhododendron viscosum (10) White swamp azalea
Ribes lacustre (7) Prickly currant
Rosa nutkana (7) Nootka rose
Rubus spectabilis (15) Salmonberry
Salix geyeriana (15) Geyer willow
Spiraea douglasii (7) Douglas spirea
Viburnum edule Highbush cranberry
Viburnum opulus (10) European highbush cranberry

For extremely wet situations the following species are adaptable:

Andromeda polifolia (2) Bog rosemary
Betula glandulosa (15) Bog Birch
Kalmia microphylla (2) Alpine laurel
Ledum groenlandicum (3) Bog labrador tea
Myrica gale (7) Sweetgale
Vaccinium oxycoccos (3) Wild cranberry

In summary, there are some soil types in Clyde Hill that are less than ideal for landscaping. Improving the growing medium for better drainage and retention of nutrients is key in successful growing of plants. The use of plants adapted to particular soil conditions is encouraged and is probably the best way to ensure long-term health and survival of the plants.

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RUNOFF CONTROL

The goal in controlling runoff is to reduce the adverse effects of water flowing off impervious surfaces in urban areas. The large amount of impenetrable surfaces (roofs, pavement, compact soils) in the community increases runoff potential when storms occur, resulting in the flooding of the lower areas of Clyde Hill (Zone 6).

The soils are generally pervious in the upper areas of the City (Zones 1,2 and parts of 3), and runoff should be controlled here. Where the soil is classified Alderwood (AmC), Indianola (InC), and Kitsap (KpB) (see “Soils” section), much of the water that reaches the soil will infiltrate, hit the impervious substratum, and collect into springs that emerge at various points along the side of the slope of Clyde Hill. These springs or creek corridors (Zone 7) offer quality wildlife habitat and feed into larger tributaries flowing into the City's lakes and Lake Washington. Because of this pathway, fertilizers, pesticides, and roadway pollutants may enter the system and negatively affect the watershed. The accumulation of water throughout the City during a significant rainstorm can cause erosion and degradation of waterways.

Some steps in Reducing Runoff include:

Promote canopy cover. Trees intercept precipitation with their leaves, reducing the initial load of runoff. Allow for more infiltration at a slower rate so that some water can be retained for plant uptake, thus reducing watering needs.

Reduce the amount of hard surface whenever and wherever possible. A few methods that can be employed are:

- ◆ Use more vegetation, especially ground covers, to increase infiltration. Recently exposed soil can act as a hard surface and increase runoff potential.
- ◆ Avoid compaction of soil. When compacted, the soil becomes an impervious surface and increases runoff potential. Be wary of heavy foot and vehicular traffic on the soil, especially during construction.
- ◆ Use pervious paving materials for drives and parking areas. The use of bark, cinder blocks, porous tiles, or brick over a bed of sand minimizes compaction that can reduce aeration and drainage.

Water wisely. The conservation of water can be achieved several ways in the landscape. How and when plants are both planted and watered can greatly affect the amount of water is wasted. These techniques are described in more detail under Water Conservation of the Sustainability in Landscape Management section.

Use landscape chemicals wisely. Concentrate on keeping plants healthy, reducing the need for pesticides, and thus, the potential for the chemicals to add

to runoff. Use pesticides and fertilizers only when needed, and when using these chemicals, **READ THE LABEL**, for proper mixture, dose, and storage. Apply conservatively, using only the amount necessary. Excess chemicals and fertilizers will wash away and affect the water systems further down the slope (lakes and creeks), creating a chemical imbalance. A common example is the algae that "blooms" in the lakes from excess nitrogen and phosphorous, which in turn depletes the oxygen supply for other organisms in the lake when it decays. The effects of chemicals on wildlife and our water supply can be devastating.

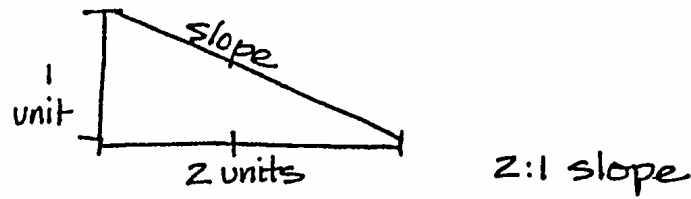
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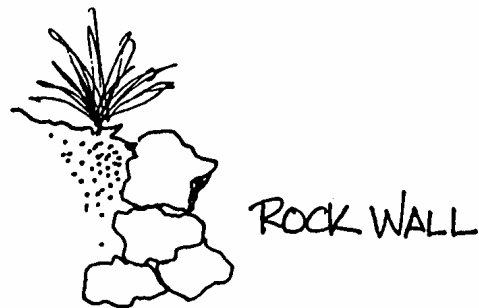
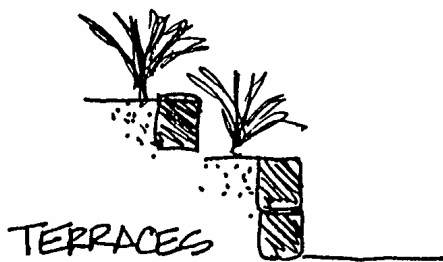
SLOPE STABILITY

Since the City is on a hill, there are several opportunities for landscaping on a slope (Zones 3, 4 and 5). Though plants are used to stabilize slopes, they cannot prevent soil slumps and slides. The vegetation can only provide surficial stabilization within the root zone (one to two feet). Vegetation tends not to perform well enough to effectively stabilize slopes greater than 2:1 grade (diagram), especially when establishing. A slope that is greater than 2:1 is generally considered a sensitive area by the county and may pose a hazardous landslide potential. These steep slopes should be stabilized by other means or remain undisturbed or undeveloped.



Many actions can be taken in stabilizing a slope and reducing erosion:

- ◆ Reduce the grade to prevent erosion of fertile topsoil and variability of conditions for landscaping. Plants typically have a hard time establishing on a slope. Drainage and nutrient conditions are highly variable. The incidence of erosion while the plants are trying to establish is high.
- ◆ Cut the slope with one or more terraces. Use boulders, pressure treated timbers, railroad ties or concrete to stabilize each terrace face.



- ◆ Retain healthy, established vegetation. Plants that have already established on the slope are acclimated to the environment and have developed a rooting system that reduces the chance for erosion. Again, any vegetation will reduce the effects of runoff on the slope by intercepting precipitation.
- ◆ Avoid plant species and plantings that require a lot of maintenance and thus, disturbance of the slope. Reconsider species with large leaves needing pickup and trees that require frequent pruning. Widely spaced plants leave gaps for weeds to colonize.

- ◆ Use mulch. Adding a layer of mulch (compost, bark or gravel) will reduce erosion around the root system of the plants on the slope. In addition, the mulch diminishes weed growth and retains moisture for the plants, lessening the maintenance requirements for the landscape.
- ◆ Landscape cloths that are porous, letting water and air through, are often considered during establishment of new vegetation. These geotextiles, however, do not appear to reduce weeds over the long term and separate topsoil and mulch from the rest of the soil. Weeds that do penetrate are difficult to remove from the cloth. It is best to remove the cloth once the desired plants have established.
- ◆ Avoid removing trees on a slope, for their root systems bind and stabilize the soil. If a tree dies, remove it above the base, leaving the roots intact.
- ◆ Use plants that are adapted to drier soils on top of a slope and those adapted to wetter conditions at the bottom. The variability of drainage on the slope should be considered when selecting species to ensure a more efficient and successful landscape.
- ◆ Plant ground covers and shrubs that have fibrous root systems that will bind the soil and prevent erosion. Below is a list of suggested plants for slope:

Shrubs and Ground cover

Arctostaphylos uva ursi - Kinnick kinnick
Ceanothus spp. - Wild lilac
Cistus spp. - Rock rose
Cotoneaster spp. - Cotoneaster
Fallugia paradoxa - Apache plume
Fragaria chiloensis - Strawberry
Jasminum mesnyi - Primrose jasmine
Juniperus spp. - Junipers (ground cover varieties)
Mahonia repens - Creeping mahonia
Rhus aromatica, *R. trilobata* - Fragrant sumac
Rosa multiflora, *R. rugosa*, *R. nutkana* - Roses
Rosmarinus officinalis - Rosemary
Spiraea douglasii - Douglas spirea
Symphoricarpos - Snowberry
Euonymus fortunei - Euonymus

Trees

Acer circinatum - Vine maple
Corylus cornuta - Hazelnut
Fraxinus spp. - Ash
Juniperus spp. - Tree juniper
Pinus spp. - Pines (acceptable species for Zone)
Rhamnus purshiana - Cascara
Sorbus spp. - Mountain ash
Salix spp. - Willow (acceptable species for Zone)

Some species used for slope stability have vigorous roots and can get out of control. Several common plants widely used in landscapes can be invasive and weedy if left unchecked, including:

Hedera helix - English Ivy (some varieties are not as invasive)

Hypericum calycinum – St. John’s wort

Lonicera japonica - Japanese Honeysuckle

Polygonum cuspidatum - Japanese Knotweed

Romneya coulteri - Matilija Poppy

Bamboos - especially the running type in the genera:

Arundinaria, *Chimonobambusa*, *Phyllostachys*, *Pseudosasa*, *Sasa*,

Semiarundinaria, and *Shibataea*

Salix spp. – Willows

Vinca spp. - Periwinkle

For more discussion on root problems, see “Root Control” section.

References

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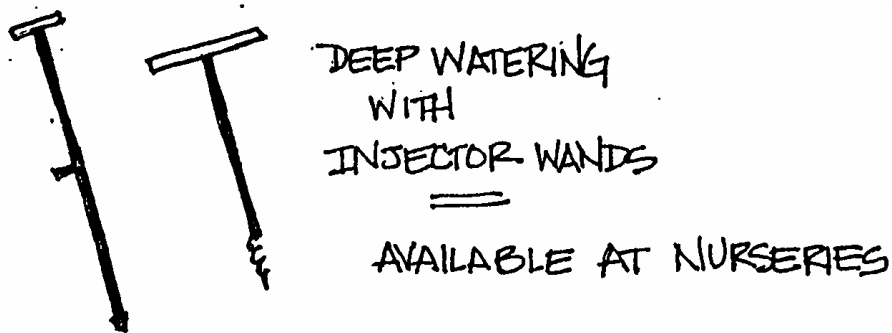
ROOT CONTROL

Root growth is a function of three main factors: soil (available space), location of available water and oxygen, and to some extent species genetics. A widespread myth of plants (particularly trees) is that they have a taproot, which in most all cases is not true. One good observation is that generally speaking, the larger the tree species the larger the root system needing space.

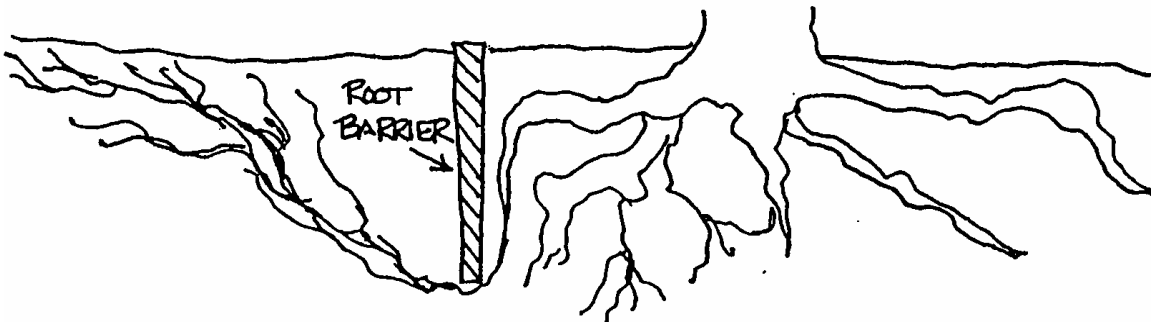
Plants that have aggressive root systems can create problems for underground utilities and hard surfaces of roads, sidewalks, and patios. It can also be a nuisance to neighboring gardens by invading the cultivated areas of the landscape and competing with desired vegetation for water and nutrients.

A few tips on controlling roots:

- ◆ Avoid shallow watering. Roots will remain on the surfaces interfering with shrubs and herbaceous plants; all competing for water and nutrients. For trees and large woody shrubs, water deeply and less often than for turf and herbaceous plants.



- ◆ A shallow soil layer or growing medium, due to an impervious layer less than 12" deep, may force the roots of larger trees, to remain close to the surface. This can create a problem with the trees ability to anchor itself and it will be subject to wind throw (uprooting from high winds). The shallow root system can also dry out in drought years causing drought damage to the top of the plant. See "Hardpan Soils" in "Soils" section for remedy.
- ◆ Root barriers may be constructed to deflect root growth. These structures are rather costly for the homeowner to install, and more aggressive root systems may surface further out if the deeper soil has poor penetration.



- ◆ Avoid using plants that have aggressive roots. Below is a species list of those trees and shrubs known to have invasive root systems. These species should not be planted in rights-of-way, near or along property lines, drives, patios, and near landscapes and gardens (including the neighbors!). Several of the species are generally not recommended due to their weediness/suckering, ultimate height, and pest problems along with their invasive roots (see "Sustainability in Landscape Management").

Acer macrophyllum - Bigleaf maple
Acer negundo - Box elder
Acer saccharinum - Silver maple
Ailanthus altissima - Tree-of-heaven
Alnus spp. - Alders
 Bamboos - especially the running type in the genera:
 Arundinaria, *Chimonobambusa*, *Phyllostachys*,
 Pseudosasa, *Sasa*, *Semiarundinaria*, and *Shibataea*)
Betula spp. - Birches
Catalpa bignonioides - Catalpa
Fraxinus spp. - Ash
Gleditsia triacanthos - Honey locust
Juglans nigra - Black Walnut
Liquidambar styraciflua - Sweetgum
Pinus spp. - some Pines (small/dwarf ones OK)
Platanus x acerifolia - London plane
Populus spp. - Poplars and Cottonwoods
Populus tremuloides - Quaking aspen
Prunus laurocerasus - English laurel
Prunus spp. - Flowering cherries
Rhus spp. - Sumac
Robinia pseudoacacia - Black locust
Salix spp. - Willows
Ulmus spp. - Elms, especially Siberian, Slippery, Rock, and American

References

- ¹ Beck, M. "Problem Plants in Western Washington". Leaflet from Northwest Arborvitae, Woodinville, WA. Municipal ordinances
- Harris, R. 1992. **Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines**. Prentice-Hall, Englewood Cliffs, NJ.
- ¹ Medina, City of . **Tree Preservation and Landscaping Requirements During Development**. Municipal Code 12.28. Ordinance #521.
- Roome, P. "Problem Plants in the Northwest". Leaflet from Pat Roome Landscape Design, Bellevue, WA.

¹ Copy available in the Clyde Hill Urban Forest Library.

RIGHTS-OF-WAY

Clyde Hill is a city that allows the property owner to plant within the adjacent right-of-way. With this privilege comes responsibility. There are two sections in CHMC (8.20 Vegetation and 8.21 Street Trees) that relate to this topic. It is very important to plant sensibly to avoid hazards and maintenance problems.

PLANTS IN THE RIGHT-OF-WAY

Underground considerations. The root systems of large trees or invasive species of shrubs can cause serious damage to sewer pipes, storm drainage systems and other underground utilities. These large plants may also be damaged or need to be removed if the utility lines must be dug up for repairs.

Broken pavement. Damage to sidewalks, roads and driveways due to surface roots is expensive to repair and dangerous.

Below are some plant species that should be avoided in the right-of-way because of aggressive root systems:

Acer macrophyllum - Bigleaf maple

Acer negundo - Box elder

Acer saccharinum - Silver maple

Ailanthus altissima - Tree-of-heaven

Alnus spp. - Alders

Bamboos - especially the running type in the genera:

Arundinaria, *Chimonobambusa*, *Phyllostachys*, *Pseudosasa*, *Sasa*,
Semiarundinaria, and *Shibataea*

Betula spp. - Birches

Catalpa bignonioides - Catalpa

Gleditsia triacanthos - Honey locust

Fraxinus spp. - Ash

Juglans nigra - Black Walnut

Liquidambar styraciflua - Sweetgum

Pinus spp. - Pines (small/dwarf OK)

Platanus x acerifolia - London plane

Populus spp. - Poplars and Cottonwoods

Populus tremuloides - Quaking aspen

Prunus laurocerasus - English laurel

Prunus spp. - Flowering cherries

Rhus spp. - Sumac

Robinia pseudoacacia - Black locust

Salix spp. - Willows

Ulmus spp. - Elms, especially Siberian, Slippery, Rock, and American

Overhead clearance. Since many power lines are above ground, trees that get tall (above 25 feet) that are placed near or underneath the lines will require constant pruning and may pose a dangerous situation with the electrical lines.

Severe pruning may create hazard trees. (see “Hazard Trees” and “Landscaping for View Preservation”).

Below is a list of preferred small trees and large shrubs to be planted in the right-of-way:

Acer spp. (Maples) many appropriate species including:

Acer buergeranum (25' mature height) Trident maple

Acer campestre (30') Hedge maple

Acer circinatum (25-35') Vine maple

Acer glabrum var. *douglasii* (15-25') Rocky Mountain maple

Acer ginnala (15-20') Amur maple

Acer grandidentatum 'Schmidt' (25') Rocky Mountain Glow maple

Acer griseum (25') Paperbark maple

Acer palmatum (20') Japanese maple (slow)

Acer platanoides 'Globosum' (25') Globe Norway maple (slow)

Acer tataricum (25') Tatarian maple

Acer truncatum x *A. platanoides* Warrenred (30') Pacific Sunset maple

Amelanchier alnifolia (18') Western serviceberry

Amelanchier laevis 'Cumulus' (25') Allegheny serviceberry

Amelanchier x *grandiflora* (20-25') serviceberry

'Autumn Brilliance'

'Cole'

'Princess Diana'

Aesculus x *carnea* 'Briotii' (30') Red horsechestnut

Aesculus californica (10-20') California buckeye

Arbutus unedo (10-30') Strawberry tree

Cercis canadensis (25-35') Eastern redbud (variety 'alba' slower growing)

Cercis occidentalis (15') Western redbud

Cladrastis lutea (30') Yellowwood

Cornus florida (20') Flowering dogwood

Cornus kousa (20-25') Japanese dogwood

Cornus mas (20-25') Cornelian cherry dogwood

Corylus avellana (15') European filbert

Corylus cornuta var. *californica* (5-15') Western hazelnut

Cotinus coggygria (20') Smoketree

Crataegus x *lavalleyi* 'Carrierei' (20-25') Carriere hawthorn

Crataegus phaenopyrum (20-30') Washington thorn

Crataegus laevigata Crimson Cloud (25') Crimson Cloud hawthorn

Cunninghamia lanceolata (30') China fir

Elaeagnus pungens (15') Silverberry

Fraxinus oxycarpa 'Raywood' (25-35') Raywood ash

Hamamelis species (10-25') Witch hazel

Koelreuteria paniculata (20-35') Goldenrain tree

Laburnum x *waterei* (15-25') Goldenchain tree (slow/mod)

Laurus nobilis (25-30') Bay Laurel (slow)

Ligustrum lucidum (25-35') Waxleaf privet (mod/fast)

Maackia amurensis (25') Amur maackia

Magnolia spp. Several species and varieties with appropriate height, including:

Magnolia kobus (30') Kobus magnolia

Magnolia salicifolia (30') Saucer magnolia (slow)
Magnolia stellata (20') Star magnolia (slow)
Magnolia grandiflora 'Victoria' (20') Victoria grand magnolia
Malus spp. (Crabapples) Choose only pest/disease resistant varieties:
Malus floribunda (-30') Japanese crabapple
Malus x atrosanguinea (20) Carmine crabapple
Malus tschonoskii (30') Tschonoski crabapple (little/no fruit)
Malus sargentii (10-20') Sargent crabapple
 Resistant cultivars include:
 'Adirondack' (white/pink) 'Jewelcole' (white w/ red fruit)
 'Centzam' (red flower/purple leaf) 'Schmidtcutleaf' (golden fruit)
 'Prairifire' (pink red/red fruit) 'Sutyzam' (pink bud/white flower)
 'Sentinel' (pink)
Myrica californica (25') Pacific wax myrtle
Osmanthus heterophyllus (8-10') Holly leaf osmanthus (slow/mod)
Oxydendrum arboreum (15-25') Sourwood (slow)
Parrotia persica (15-30') Persian parrotia
Photinia x fraseri (10-15') Photinia
Photinia serrulata (30') Chinese photinia
Photinia glabra (10') Japanese photinia
Pinus mugo (5') Mugho pine (slow)
Pinus aristata (20') Bristlecone pine
Pinus contorta (25-30') Shore pine
Pinus densiflora 'Umbraculifera' (12-20') Tanyosho pine (slow/mod)
Prunus laurocerasus (20-30') English laurel (as tree)
 var. 'Schipkaensis' and 'Zabeliana' (6') as shrubs
Prunus lusitanica (10-20') Portugal laurel
Prunus spp. (Flowering cherries) Choose only disease/pest resistant varieties, for example:
 Prunus serrulata 'Shirotae', 'Shirofugen', 'Mt. Fuji' (25')
 Prunus yedoensis 'Akebono' (25')
Prunus cerasifera 'Thundercloud' (25') Flowering plum
Prunus padus 'Summer Glow' (25-30') Bird cherry
Rhododendron spp. (-25') Rhododendron
Sorbus aucuparia (15-35') European mountain ash (mod/fast)
Sorbus sitchensis (20') Sitka mountain ash
Stewartia pseudocamellia (30') Japanese stewartia
Styrax japonicus (20-30') Japanese snowbell (slow/moderate)
Styrax obassia (20-30') Fragrant snowbell (slow/moderate)
Syringa reticulata (20-30') Japanese tree lilac
Taxus baccata (30') - English yew (slow)
Taxus baccata 'Stricta' (20') Irish yew (slow)
Taxus brevifolia (15-30') Western yew
Thuja occidentalis 'Pyramidalis' (25') Arborvitae
Tsuga mertensiana (20-30') Mountain hemlock (slow)
Viburnum rhytidophyllum (6-15') Leatherleaf viburnum

Some conifer species that have dwarf forms are:

Chamaecyparis obtusa (Hinoki false cypress)

Chamaecyparis lawsoniana (Port Orford cedar)
Cryptomeria japonica (Japanese cryptomeria)
Cupressus species (Cypress)
Picea abies (Norway spruce)
Pinus species (Pine)
Juniperus species (Juniper)

Line of sight. A clear line of sight for traffic is critical for two areas: intersections and driveways.

Sight triangle at intersection. According to Clyde Hill municipal code (Section 17.08.100), there shall be "no fence or landscaping to restrict visibility in a triangle area formed by measuring 85'0" each way from intersection". The proportions of this "clearance window" can be better defined with a minimum height of 12 feet to ensure clear visibility at intersections on the hillside (see Diagram A). Only ground cover should be allowed in this triangular area, particularly on the hillside.

Driveways. Require a visibility window with a clearance of vegetation between 3 and 6 feet tall, that is 10 or 20 feet (or more) from any driveway or private lane (see Diagram B). An appropriate length and depth of this "window" needs to be determined by the City. A triangular window may be sufficient, allowing taller vegetation closer to the street, when further from the drive.

MAINTENANCE OF TREES IN THE RIGHT-OF-WAY

In an effort to reduce the amount of maintenance and danger in the right-of-way, the following guidelines are suggested:

- ◆ Trees (Diagram B) are to be planted at least:

- 10 feet from street edge (the pavement)
- 15 feet from power poles or driveways
- 20 feet from street lights

Upright or columnar forms of trees are the best to plant near these areas to avoid conflict with the spread of the tree's canopy.

- ◆ Branches (Diagram C) should be pruned back to maintain a clearance of:

- 12 (18) feet above the roadway for vehicles
- 7 (8) feet over sidewalk and pedestrian lanes for foot traffic
- () Seattle Code

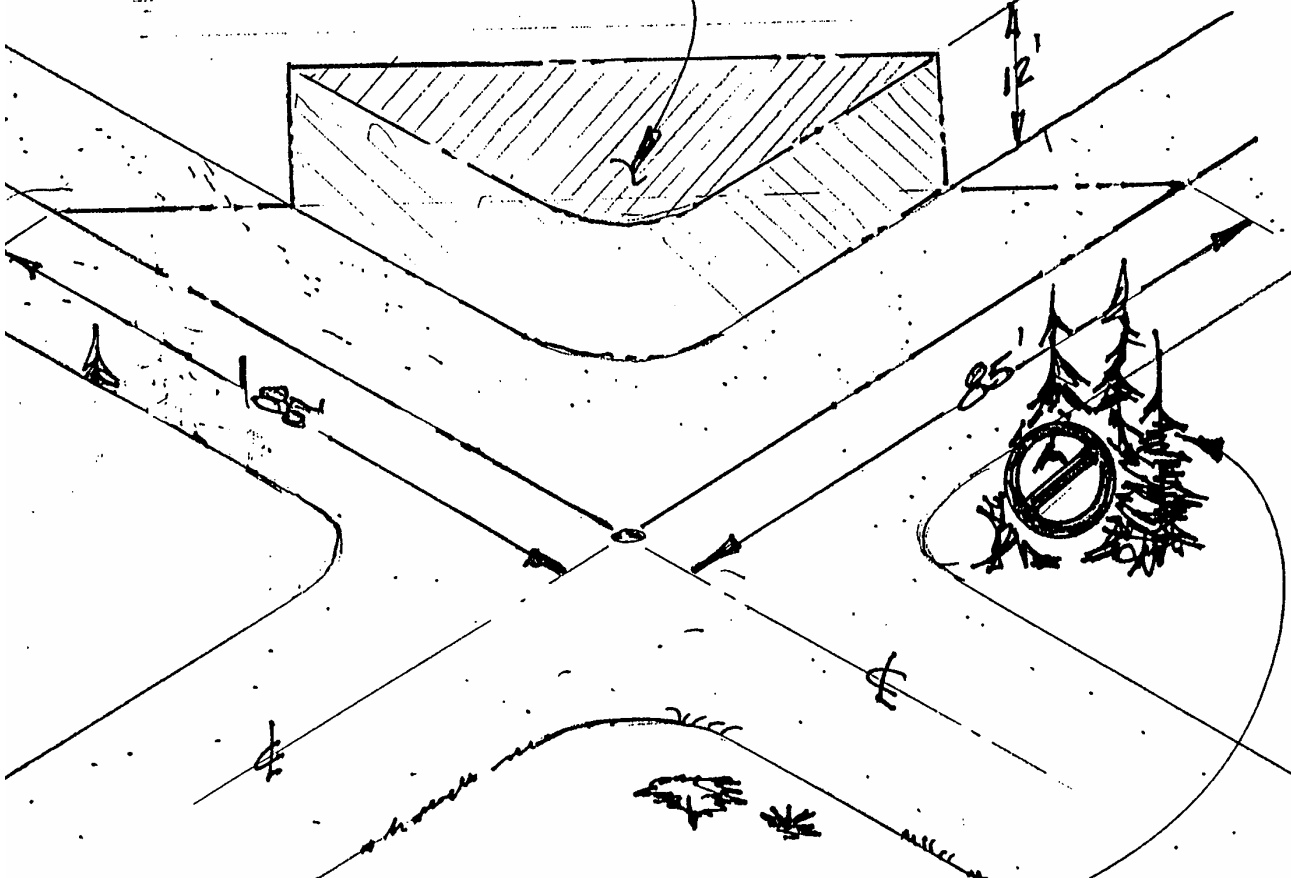
- ◆ For "street tree" planting of continuous trees in a parking strip or right-of-way, the following spacing is suggested to avoid overcrowding.

- Round/global forms - 20 to 25 feet apart
- Upright/columnar forms - 15 to 25 feet apart

- ◆ Maintain at least a three-foot clearance around fire hydrant.
- ◆ Maintain vegetation to ensure visibility of permanent signs (municipal and private).

DIAGRAM A

CORNER VISIBILITY TRIANGLE



NOTHING SHALL BE PLANTED OR ALLOWED TO GROW THAT WILL IMPEDE VISION IN CORNER VISIBILITY TRIANGLE

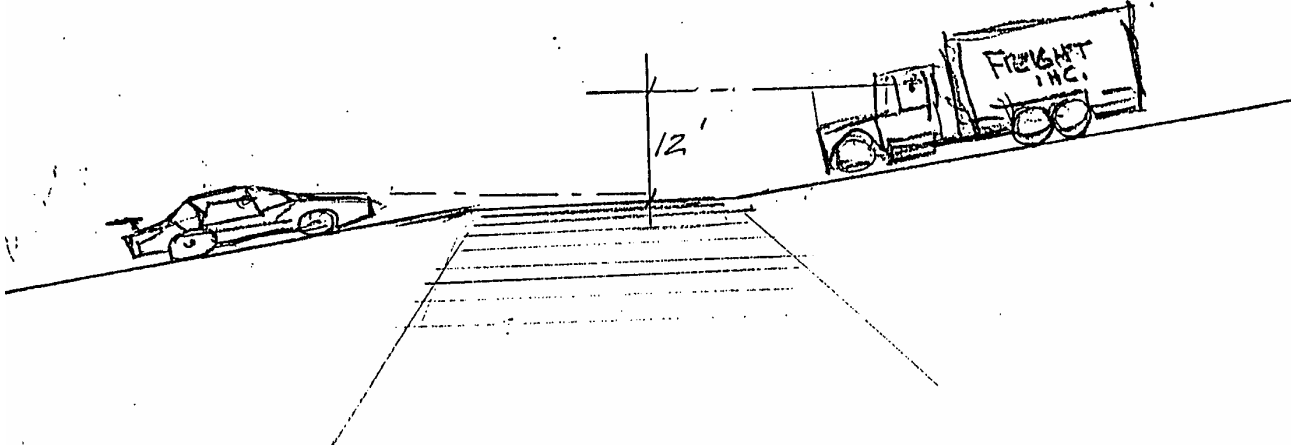
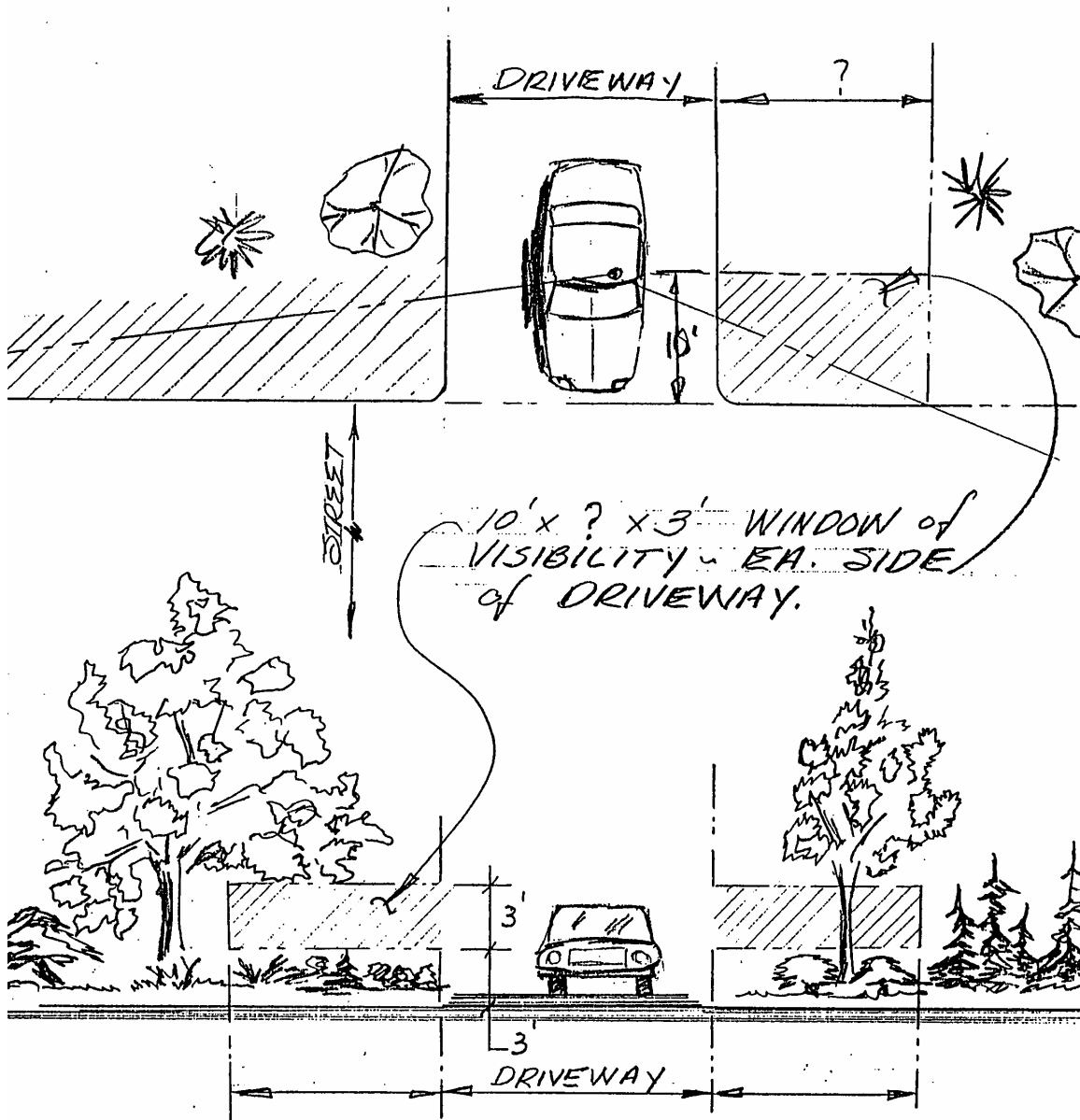


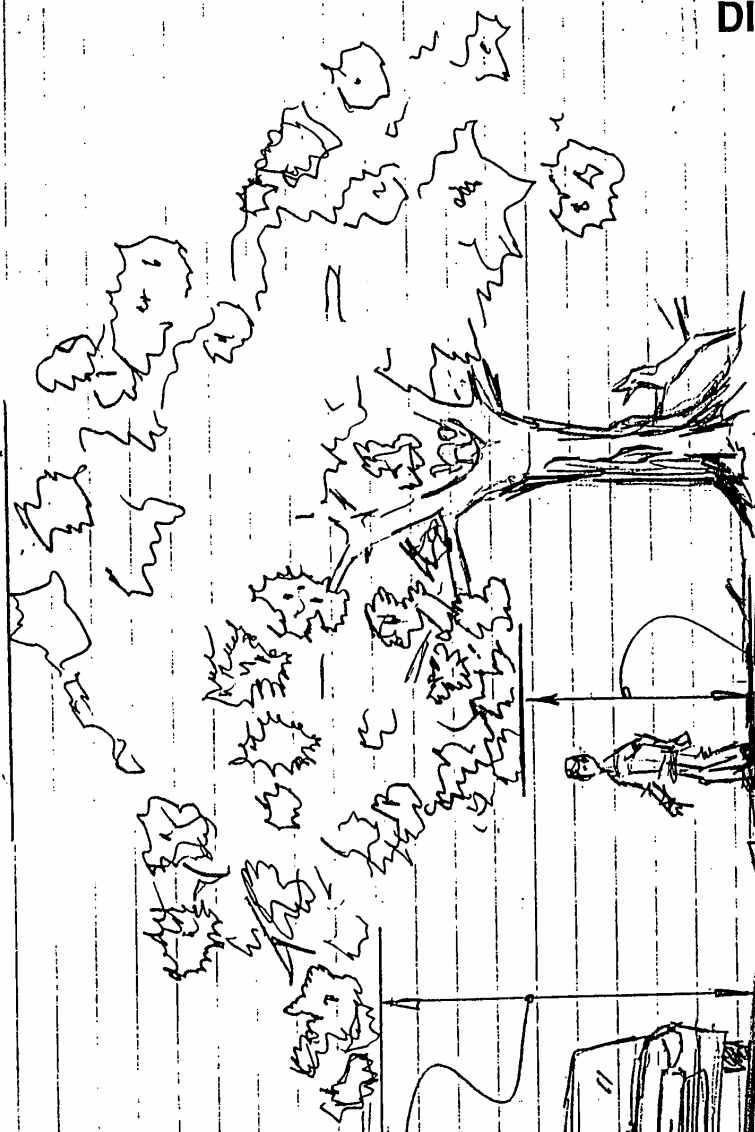
DIAGRAM B



WINDOW of VISIBILITY
@ DRIVEWAYS

DIAGRAM C

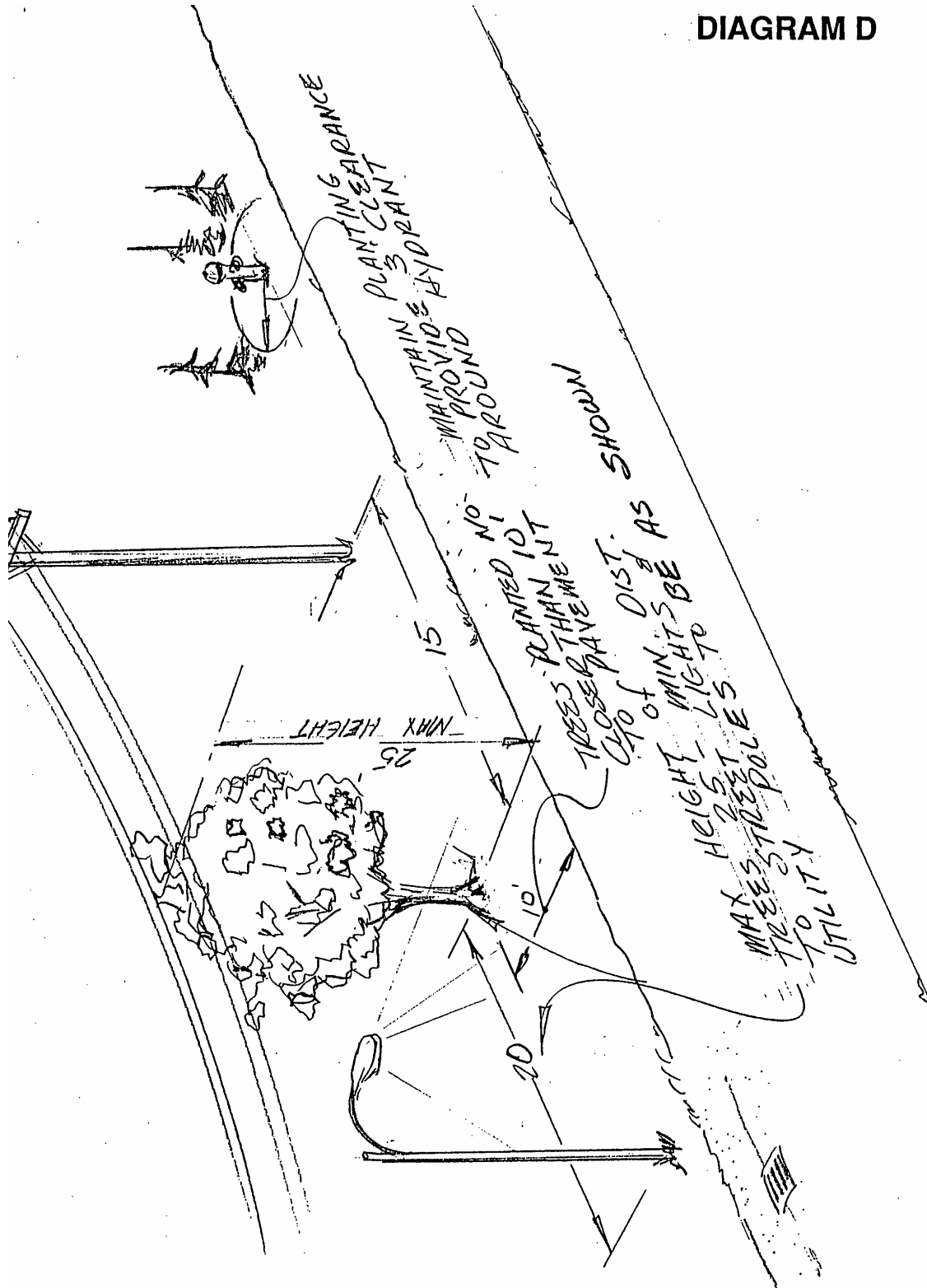
MAX HEIGHT of TREE
25' IN R.O.W.



MAINTAIN FOLIAGE
@ 12' OVER
PAVED ROADWAY.

10' MIN
MAINTAIN FOLIAGE @ 7'-0"
CLEAR OF GRADE
OUT TO EDGE OF
PAVEMENT

DIAGRAM D



- ◆ Call the City Public Works (425/453-7800) and the Utility Locator (1-800-424-5555) before digging in the RIGHT-OF-WAY.

In summary, maintain vegetation in the right-of-way to allow for visibility and clearance for traffic. Be aware of above and below ground utilities when selecting species.

References

- ¹ Medina, City of. **Tree Preservation and Landscaping Requirements During Development.** Municipal Code 12-28, Ordinance #521.
- ¹ Mount Pleasant, MI., City of. "Planting", Rule 1.3 of ordinance. Appendix C of **Ordinance Analysis No. 10: Trees.** Michigan Municipal League, Ann Arbor, MI.
- ¹ Morgan, R., with B. Sullivan, ed. 1990. **A Technical Guide to Community and Urban Forestry in Washington, Oregon and California.** World Forestry Center, Portland, OR.
- ¹ North Miami, FL, City of. "Comprehensive Landscape" ordinance.
- ¹ Puget Sound Power and Light Company. **The Tree Book.**
- ¹ Seattle, City of. **Planting Trees and Shrubs.** Municipal Code Chapter 15.42.
- ¹ Seattle Engineering Dept. **Seattle's City Forest.**
- ¹ Seattle Engineering Department. **Recommended Seattle Street Tree List.** Permit Counter Publications #525 and 526.
- ¹ Seattle Engineering Department. **Street Tree Planting Procedures.** Permit Counter Publication #520.
- ¹ Wagar, J.A. and P.A. Baker. "Tree Root Damage to Sidewalks and Curbs", *Journal of Arboriculture* 9(7): July 1983.
- ¹ Walker, E. 2003. "Street Tree Selection List." City of Vancouver and Kirkland.

¹ Copy available in the Clyde Hill Urban Forest Library.

HISTORIC TREES

In the Clyde Hill view ordinance, historic trees are defined as "any tree whose age antedates the incorporation of the City (1953)". By this description there are several trees that can be considered "historic" and significant parts of the landscape. These trees, however, can be threatened by severe pruning, urban stress, and natural decline.

ASSESSMENT OF HISTORIC TREES

Below are some important components in assessing the value and health of mature trees, to determine their success in contributing to the landscape.

Tree in good form. Has the tree maintained good form and vigor through proper pruning and healthy growth?

Right tree, right place. Large trees in rights-of-way or views are subject to continual pruning and may be a liability.

Regeneration. For trees that are in decline due to old age, replacement plantings will ensure continual vegetation.

Hazard tree evaluation. Any sign that a tree is posing a hazard to property and safety, may make the tree become inappropriate to preserve. Some signs include:

- ◆ **An isolated tree.** Has a tree that naturally grows in a group of trees or a stand recently been isolated? Most of the conifers in the area can tolerate weather extremes better in a stand. A single Douglas fir may pose a hazard.
- ◆ **A tree on slope.** Signs of creep, with a leaning trunk, or disturbance around a tree on a slope, may increase the instability of the tree.
- ◆ **Majority of the foliage is in the upper third of tree.** The ideal distribution of canopy for a tree, is foliage concentrated in the upper two thirds of the tree's total height. Tall trees with all branches in the top create a sail effect increasing the chance for the tree to blow down or break off. Consider reducing the crown by thinning or removing alternate whorls, allowing wind to pass through. (See "Landscaping for View Preservation: Pruning").
- ◆ **Shallow roots.** Roots appearing above or near top of soil (due to high water table, shallow watering or shallow hard layer) may be a sign of a shallow root system that may be insufficient in anchoring a large tree. These trees are often victims of windstorms and uproot.

- ◆ **Signs of disease and decay.** Root rot and heart rot can cause failure of tree. THE TREE MAY FAIL AT ANY TIME. Signs of a decline in the tree's health, with branch dieback, or a loss of vigor, with little new growth, may be related to disease.

See "Hazard Trees" section, for more clues on evaluation. Regardless, it is best to hire a consulting arborist to assess the health and safety of the tree (see "Hiring an Arborist" section).

MANAGEMENT OF HISTORIC TREES

Many of the "historic" trees of Clyde Hill are the tall conifers that are located in the hilltop and hillside communities. The hill was replanted with Douglas firs after a timber harvest in the early 1900s. Through development activities for residential subdivisions, many of these trees have been removed in the past decades. The forest remnants are heavily incorporated into residential areas, like Aqua Vista and Clydewood (in Zones 2 and 4), or are associated with City property in parks and schools. Nevertheless, historic trees are scattered throughout all zones and are all significant and demand special care.

The following is a guideline on some management tools for the preservation of these trees:

Allow the establishment of an understory around the significant tree. A variety of trees, shrubs and ground cover (especially native) provides not only protection of the tree but also a diversity of habitats for wildlife. In addition, wind effects can be reduced by minimizing the gap between the height of the tree canopy and the understory, using smaller trees. Introduce the plants beyond the drip line (the area below the canopy) to reduce the root disturbance and competition.

Limit activity around large trees. Avoid compaction of soil around the roots of the tree, by concentrating activity, e.g., play area, trails, and traffic, away from the tree. When landscaping around the tree, minimize the disturbance when digging and cultivating. Avoid lawns within the drip line, to reduce the incidence of mechanical damage of the trunk from mowers and trim line weeders.

Do not apply chemicals within the root zone (or at least within the drip line). Heavy or continuous application of herbicides around tree roots may hinder growth. Some species, like the Deodar cedar (*Cedrus deodara*), have been noted to be sensitive to herbicides. Instead, apply mulch to control the growth of weeds (see "Sustainability in Landscape Management").

Plant shade tolerant conifer species for the next generation. Western red cedar (*Thuja plicata*) and Western hemlock (*Tsuga heterophylla*) grow well under the canopy of large trees, and can mature to replace aging conifers.

Create a buffer along edges to reduce wind effects. Abrupt edges of tree stands, next to open spaces, make the trees vulnerable to extreme winds. Softening the edge with smaller trees and shrubs reduces this hazardous situation.

RETENTION POTENTIAL OF SOME NATIVE TREES

When incorporating native trees into the urban landscape, it is important to be aware of the potential of the species to be retained. Below is a discussion of the characteristics of certain native trees and their retention potential.

Western red cedar (*Thuja plicata*) - High. Inhabits wetter sites.

Douglas fir (*Pseudotsuga menziesii*) - High. The most wind firm; relatively deep root system, if soil profile allows it. Retention of single, large specimens may be hazardous; not recommended. Older trees are prone to wind breakage and large branch loss.

Western Hemlock (*Tsuga heterophylla*) - Moderate to Low. Prone to windfall when left as an individual. Retain in groups. Prone to fungal infections and dwarf mistletoe.

Big leaf maple (*Acer macrophyllum*) - High. Can retain as individual, although older trees become brittle and experience crown and branch dieback. Young or topped trees tend to sucker.

Vine maple (*Acer circinatum*) High. Retain as an understory plant, multiple stemmed.

Pacific Dogwood (*Cornus nuttallii*) High. Excellent understory tree. Leave undisturbed, for a change in grade or drainage may cause stress and the tree may not recover from a common *Anthraxnose* fungal infection.

Paper Birch (*Betula papyrifera*) Moderate. Only good in groups. Prone to sun scald.

Red Alder (*Alnus rubra*) Low to Moderate. Low potential as individual, small groups or in a thin buffer strip. Need large area (> 100 feet). Dieback at 40 years. Limb breakage in wind.

Black Cottonwood (*Populus trichocarpa*) Low. Large specimens prone to breakage and windfall; best in large stands away from valuable targets.

Be aware that most of these trees are only appropriate in Zone 1 and 2 because of their excessive size. (See “Landscaping for View Preservation” and “Sustainable Landscape Management: Large Trees”). Only the understory species (*Acer circinatum* and *Cornus nuttallii*) are of a reasonable size and can be incorporated into all zones. See “Landscaping with Native Plants” and “Watershed Protection” sections for more tree species.

References

Clyde Hill, City of. Archives: City History.

Clyde Hill, City of. Municipal Code, Chapter 17.38, **View Obstruction and Tree Removal**, Ordinance #648.

¹ Ham, D.L. and J.R. Clark. "Maintaining Tree/Turf Associations: A Plant Health Care Approach". *Arborist News*, June 1993.

¹ Pepper, J.S. & Associates. **Saving Native Trees in the Pacific Northwest; A Guide to Native Tree Retention for Developer, Homeowners, Contractors and Professionals**. Brochure for the British Columbia Recreation and Parks Association, Richmond, B.C.

¹ Roome, P. "Problem Plants in the Northwest". Leaflet from Pat Roome Landscape Design, Bellevue, WA.

¹ Tree City USA. **How to Save Trees During Construction**, Bulletin Number 7. The National Arbor Day Foundation, Nebraska City, NE.

¹ Copy available in the Clyde Hill Urban Forest Library.

PRIVACY AND SCREENING

In many situations throughout Clyde Hill, trees and shrubs are used as a "living fence" to define boundaries or create a screen for privacy and protection. The City has several regulations regarding fences, structures, arbors, and even living fences found in CHMC 17.37 and shown in figure on next page. There are two main ways this "fence" is achieved with plants: a hedge or a screen.

HEDGES

A hedge is considered a barrier made up typically of a monoculture grouping of plants (of the same species and age).

There are a few problems with the hedge design:

- ◆ When a continuous row of shrubs and trees (commonly of same species) is used, the grouping is considered a living fence and according to Clyde Hill municipal code (Section 17.37.020), the maximum height is 8 feet.
- ◆ It is very difficult to have a group of the same species of plant to evenly grow and function as a uniform barrier or fence. Any difference in soil, drainage, or exposure can result in variable growth. The individual plants may also vary in performance.
- ◆ There is easy transmittal of diseases and pests through the stand (same plant species planted close together can be a paradise for a pest).
- ◆ Annual pruning is required to keep uniform and contained. Some species are used for low shrub hedges that are really of tree proportions when grown naturally. The *Prunus laurocerasus* (English laurel) and *Tsuga* spp. (Hemlock) are common plants used for hedges, and yet they grow as a tree when mature, so it is difficult to retain in small scale. These hedges would require constant pruning, which is high maintenance and costly. If left unpruned for a few years, cannot be easily restored to a small dense hedge.
- ◆ Species with scale like leaves (in the genera - *Juniperus*, *Chamaecyparis*, *Thuja*, *Calocedrus*, *Thujopsis*) may not react well to shearing, if not done regularly. Older branches that have dropped needles/scales, being too dark in the center of the bush, do not grow new foliage, often resulting in dead or bald spots inside that are permanent.

Below is a list of some good hedge plants that can tolerate shearing. Small and slow growing species may accomplish the same effect without high maintenance.

Buxus spp. - Boxwood

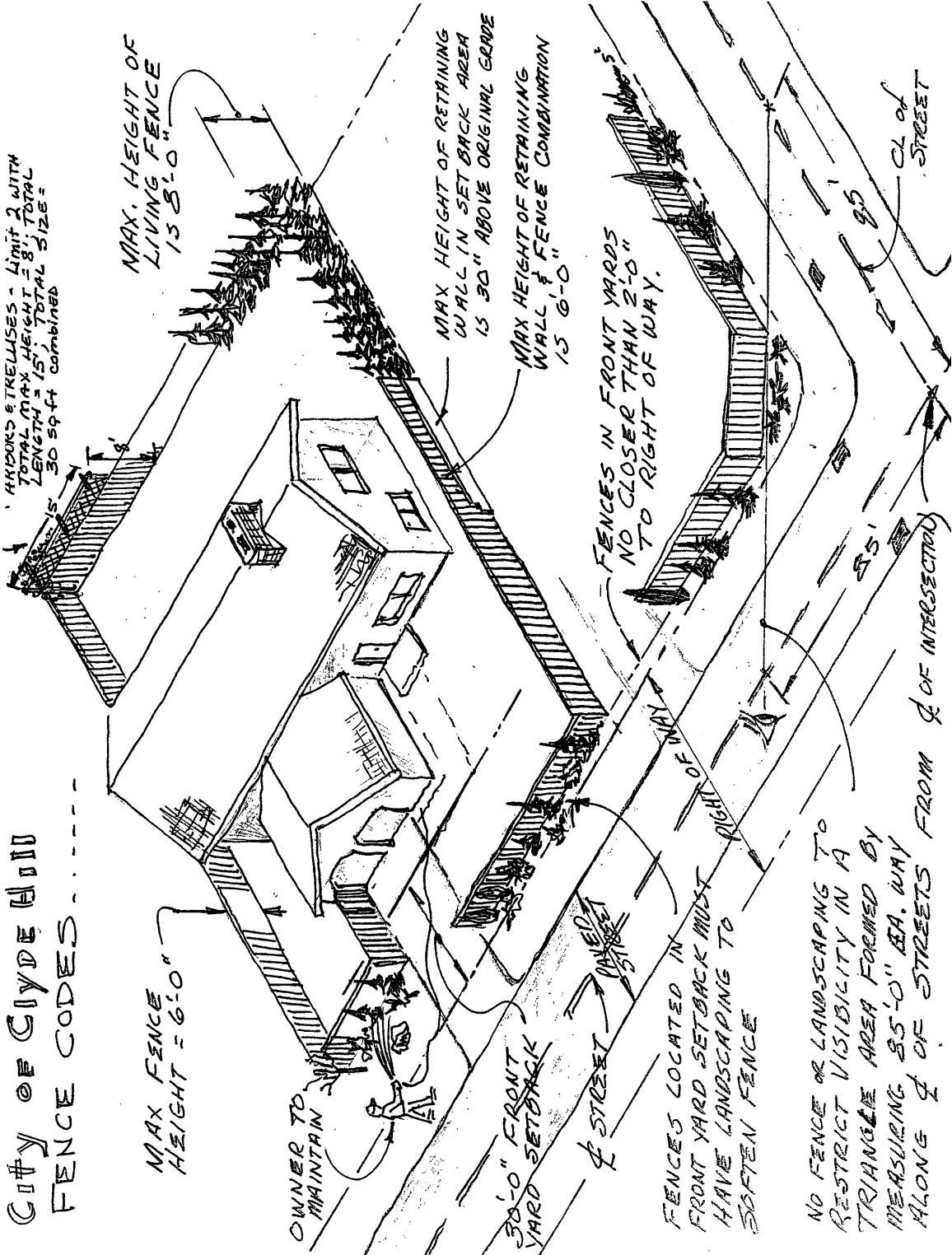
Euonymus japonica - Evergreen euonymus

Hebe buxifolia - Boxwood hebe

Ilex spp. - Holly

Ligustrum spp. - Privet

CITY OF CLYDE AHO FENCE CODES

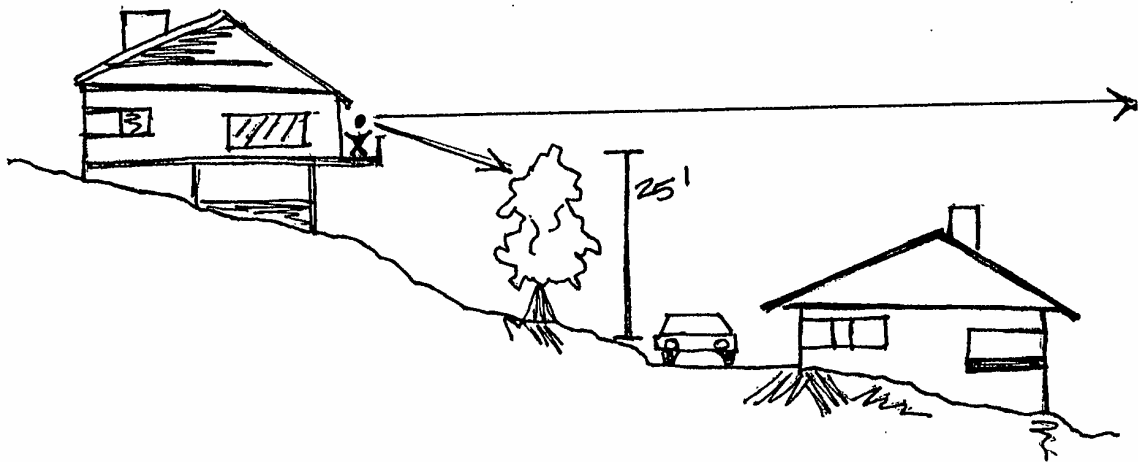


Myrica californica - California wax myrtle
Osmanthus delavayi - Osmanthus
Prunus lusitanica - Portugal laurel
Rosmarinus officinalis - Rosemary
Taxus spp. - Yew

SCREENS

A screen is a separation of space with various species and heights to provide privacy. A screen may not be a complete "barrier" but rather a loose grouping of plants.

- ◆ Select plants with the appropriate maximum height. The height of the plants or trees need only be the height necessary for gaining privacy, i.e., trees that are taller than 25 to 30 feet have outgrown their function and may be a view or solar hindrance and prove to be high maintenance.



- ◆ Add interest with broadleaf evergreens of different textures and colors (and flowers and fruits).
- ◆ If a looser screen is acceptable, introducing some deciduous trees adds seasonal character. Or add depth with layers of plants, deciduous and evergreen.

Below is a list of some ideal screen plants, which can be used in addition to the hedge species.

Amelanchier alnifolia - Western serviceberry
Arbutus unedo - Strawberry tree
Aucuba japonica - Japanese Aucuba
Cotinus coggygria - Smoketree
Elaeagnus pungens - Silverberry
Erica arborea - Tree heather
Myrica californica - California wax myrtle
Osmanthus heterophylla - Holly-leaf osmanthus
Photinia x fraseri - Photinia
Prunus lusitanica - Portugal laurel
Stranvaesia davidiana - Chinese stranvaesia
Vaccinium ovatum - Evergreen huckleberry
Viburnum rhytidophyllum - Leatherleaf viburnum
Viburnum tinus 'Robustum' - Laurustinus

References

¹ Puget Sound Power and Light Company. **The Tree Book.**

Sunset, editors. Latest edition. **New Western Garden Book.** Lane Publishing Co., Menlo Park, CA.

Turnbull, C. 1991. **A Complete Guide to Landscape Design, Renovation, and Maintenance.** Betterway Publications, Inc., White Hall, VA.

¹ Copy available in the Clyde Hill Urban Forest Library.

HAZARD TREES

Hazard trees are those trees with defects which have a good potential to fail and injure or damage a target (homes, utility lines, cars, people). Trees in populated areas usually are in a more stressful physical environment than those trees found in the forest. In an urban/suburban environment there is a much greater chance of a tree being close to valuable targets that will fail due to the stressful conditions. Many of the hazards of significant trees can be alleviated through early detection and assurance of a good environment for their health.

COMPONENTS OF HAZARD TREE EVALUATION

Constantly monitor trees, especially those around valuable targets. There are several signs of potential problems:

- ◆ **Architecture:** Understand the normal growth habit of the species and compare it to the condition of the specimen. A few tree species can have leaning trunks as part of their form. Trees with multiple trunks may be problematic.
- ◆ **History:** Damage or injury to the tree in the past, such as torn limbs or topped trunks, might have weakened the structure.
- ◆ **Signs of decay:** Dieback and decay in limbs, trunk, roots, and crown is a sign of real danger.
- ◆ **Recent Exposure:** Trees that are situated at the edge of a new open space are not accustomed to the elements of wind and sun. Common accounts of wind throw are at these edges.
- ◆ **Weak structure:** Cracks at branch attachments, narrow angle crotch between multiple branches, and the presence of two leaders codominating, are all potential setups for failure. According to a local certified arborist, John Hushagen, the major problems with trees have been with those that have high angles between multiple branches. The included bark and rot result in a weak attachment and ultimate failure.
- ◆ **Topping:** As stated previously, topping only encourages vigorous new growth of weakly attached branches. Topping also results in a major exposure of the tree's interior to disease and insects. (See "Pruning" in "Landscaping for View Preservation" section). There have been many problems with trees that have been previously topped.
- ◆ **Construction activity damage:** If a tree is not properly protected, or there is a change in grade, drainage, or soil conditions, the tree may decline and become hazardous.

- ◆ Root system: Healthy roots usually spread uniformly around tree and are expansive, providing support and uptake of water and nutrients. Fungal fruiting bodies (mushrooms) just above the roots may be signs of infection. Failure of the roots can be devastating.
- ◆ Environmental Conditions: Trees in unstable environments, such as wet soils or significant slopes, can fail. Competition with other trees and plants (like ivy and vines) for water and nutrients will weaken the tree.

Evaluate trees after storms. Is there any limb damage that needs corrective pruning? Does it appear that there is some soil cracking, root throw and destabilizing of the tree?

PROBLEM TREE SPECIES

Several species of trees are not recommended in the urban landscape due to their weak structure or brittle wood. Avoid planting the following species near targets. Some of these species are not recommended for numerous reasons and will appear on other problem lists (root, pest/disease, size, etc.) in the guide.

Populus spp. - Cottonwoods and Poplars

Ulmus pumila - Siberian Elm

Acer negundo - Box Elder

Robinia pseudoacacia - Black Locust

Acer saccharinum - Silver Maple

Acer macrophyllum - Big leaf maple

Catalpa bignonioides - Catalpa

Alnus rubra - Red alder

Be wary of fast growing trees, such as X *Cupressocyparis leylandii* (Leyland cypress) and *Cedrus deodara* (Deodar cedar). These trees may tend not to develop a strong trunk caliper or limb attachment.

HAZARD TREE MANAGEMENT

The key to reducing the risk with a tree is to identify and correct the problem. When in need of confirmation of possible hazards, get a professional opinion from a certified arborist who is a hazard tree expert. See section on “Hiring an Arborist.”

If the problem is detected early enough, the tree may be pruned or treated to reduce the hazard. However, in some instances the tree cannot be properly managed, and removal of the tree is advised.

For trees in decline, or ones that must eventually be removed because of their ultimate size, consider early planting of replacement plants (of appropriate species) to reduce the environmental effects and visual loss.

References

- Hushagen, J., owner of Seattle Tree Preservation, Inc. Personal communication.
- Maleike, R., Extension Horticulturist Washington State University, Puyallup. Personal communication on Hazard Tree Evaluation.
- Matheny, N.P. and J.R. Clark. 1991. **A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas**. International Society of Arboriculture, Urbana, IL.
- ¹ Medina, City of . **Tree Preservation and Landscaping Requirements During Development**. Municipal Code 12.28, Ordinance #521.
- ¹ Morgan, R., with B. Sullivan, ed. 1990. **A Technical Guide to Community and Urban Forestry in Washington, Oregon and California**. World Forestry Center, Portland, OR.
- ¹ Seattle Engineering Dept. **Seattle's City Forest**.
- Shigo, A. 1991. **Modern Arboriculture**. Shigo and Trees Associates, Durham, NH.
- ¹ Tree City USA. **How to Recognize and Prevent Hazard Trees**, Bulletin Number 15. The National Arbor Day Foundation, Nebraska City, NE.

Sources

Pacific Northwest Chapter ISA. www.pnwisa.org
List of consulting arborists.

¹ Copy available in the Clyde Hill Urban Forest Library.

WATERSHED PROTECTION

As we become more environmentally aware, we realize that the environment is all interconnected, so that what we do in one area, affects other parts of the community. This increased awareness is especially evident in the management of a watershed, or the drainage system of an area that flows into the same body of water. The most important step in protecting the Clyde Hill watershed is to reduce the amount of disturbance of the creeks and waterways in the City. This process begins in our backyard.

Steps in protecting the watershed include:

Control the amount of runoff in the watershed. See “Runoff Control” section on ways to reduce the runoff potential in an urban environment. The reduction of the load on our waterways (creeks, storm drainage, lakes) will help maintain a balance in the watershed.

Reduce non-point source pollution, or the accumulation of pollutants from several sources. Do not dump chemicals (oil, paints) in the storm drainage; check oil leaks of cars; properly dispose hazardous materials; apply landscape chemicals (fertilizers and pesticides) properly to reduce chemical runoff. Be particularly careful near the City lakes and creeks.

Eliminate point source pollution, or the direct dumping of pollutants into creeks and lakes. In essence, do not use waterways as dumping sites.

Maintain the integrity of the creek corridors (Zone 7). Preserve these corridors to provide a wildlife habitat and reduce incidence of erosion.

- ◆ Avoid disturbance of the area, e.g., plant removal, traffic or dumping.
- ◆ Leave snags and fallen trees to provide wildlife habitat and increase structure for stream flow. Since these areas are (or should be) away from target, retaining dead and fallen trees is beneficial for the stream environment.
- ◆ Retain and encourage natural vegetation, revegetating with native species. There are several benefits in encouraging vegetation in the creek corridors.
 - Root systems prevent soil erosion of stream banks.
 - Vegetation can slow runoff velocity and reduce effects of flooding below.
 - Plants along a stream act as a filter reducing bacterial and chemical contaminants, keeping a balance downstream and in lakes.

- Vegetation adds wildlife value to the zone. Leaf litter is food for invertebrates. Woody debris diversifies the stream flow, creating pools and gravel areas for fish spawning. Tree limbs in and over stream provide protection for wildlife. Various heights and species of plants provide food and shelter for animals. A continuous green corridor allows wildlife to migrate within the community.
- ◆ Revegetate with native plants. Since the creek corridors should be left natural, revegetation of the area with native plants is recommended. Allow for the areas to "naturalize", and provide a healthy greenbelt for privacy, wildlife habitat and watershed protection. Here is a list of some native plants ideal for Creek Corridors (Zone 7).

Trees

Acer circinatum - Vine maple
Crataegus douglasii - Black hawthorn
Corylus cornuta - Hazelnut
Malus fusca - Western crabapple
Prunus emarginata - Bitter cherry
Rhamnus purshiana - Cascara
Salix geeyeriana - Geyer willow
Salix scouleriana - Scouler willow
Sorbus scopulina - Cascade mountain ash

Shrubs

Cornus sericea - Red-osier dogwood
Gaultheria shallon - Salal
Holodiscus discolor - Oceanspray
Lonicera involucrata - Twinberry
Mahonia nervosa - Longleaf mahonia
Mahonia aquifolium - Oregongrape
Ribes sanguineum - Currant
Rosa nutkana, R. rugosa - Roses
Oemleria cerasiformis - Indian Plum
Philadelphus lewisii - Mock orange
Physocarpus capitatus - Pacific ninebark
Sambucus racemosa - Elderberry
Spiraea douglasii - Hardhack spiraea
Symphoricarpos albus - Snowberry
Vaccinium ovatum - Evergreen huckleberry

A healthy stream corridor and watershed can be an invaluable educational tool for the schools in teaching human impact on streams and wildlife, and the importance of urban forestry in the community. An Adopt-a-Stream program could be developed for Cozy Cove Creek, and incorporated into the school curricula. See Sources for more information.

References

¹ Ekenberg, E. and T. Fitzgerald. **Good Gardening! For Our Environment, Our Water, Ourselves.** Washington State University Spokane County Cooperative Extension, Spokane, WA.

Johnson, A.W. and J.M. Stypula (eds.). **Guidelines for Bank Stabilization Projects in the Riverine Environments of King County.** Surface Water Management Division, King County Department of Public Works, Seattle, WA., Draft, 1993.

¹ Voss, C. **A Guide to Stream Corridor Revegetation in Western Washington.** Thurston Conservation District, Dobbs Creek Model Farm, Olympia, WA.

Sources

Adopt A Stream Foundation. www.streamkeeper.org

Washington Department of Fish and Wildlife, 425/775-1311
<http://www.wa.gov/wdfw>

Metro King County, Department of Natural Resources, Land and Water Resources. <http://dnr.metrokc.gov/wlr>

Johnson, A.W. and J.M. Stypula (eds.). **Guidelines for Bank Stabilization Projects in the Riverine Environments of King County.** Surface Water Management Division, King County Department of Public Works, Seattle, WA., Draft, 1993.

¹ Copy available in the Clyde Hill Urban Forest Library.

ENERGY CONSERVATION AND CLIMATE CONTROL

Vegetation can effectively control the climate around the home and yard. Strategically placed trees and shrubs around living spaces can be as efficient in tempering extreme weather conditions as such energy saving home improvements as insulation and weather stripping. The vegetation can shade from the hot sun and buffer cold winds, reducing the need to heat and cool homes with the traditional utilities. The "heat island" effect of the community, or the higher temperatures from reflected heat, can be cooled by the evapotranspiration of many trees and shrubs in the City. The goal of climate control with vegetation is to provide benefits for the living space without interfering with the solar gain and air circulation for neighboring homes.

For energy conservation, the most efficient shading and insulating with plants are of the windows and walls, for the heat loss is greatest through these areas. Shrubs and small trees can be used to achieve this effect, which allows for climate control to be attained at any zone in Clyde Hill, regardless of height limitations for trees.

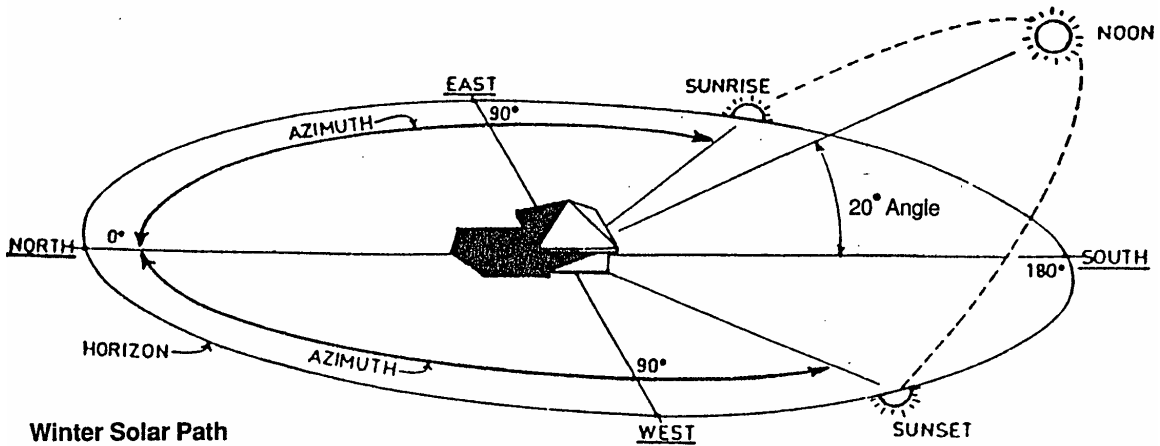
In order to position trees and shrubs properly for solar accessibility, the path of the sun throughout the seasons should be considered. At this latitude, as shown in the diagram (next page), the sun will always stay in the southern half of the sky midday, even at the peak of summer when it's 66 degrees from the horizon. The sun remains low in the south all winter, reaching only 20 degrees at noon of the winter solstice. The summer sun, however, rises in the northeast and sets in the northwest, which are points that need to be taken into account when dealing with the solar heat.

SUMMER

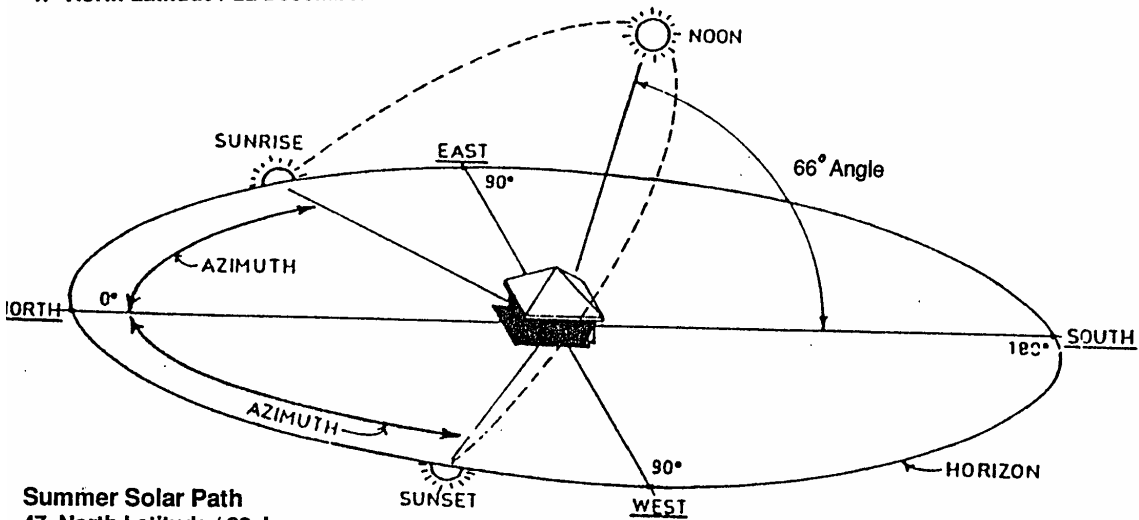
In the summer, the goal is to maximize the morning exposure on the east side, and minimize hot afternoon exposure on the south and west side of the home.

- ◆ Save energy through cooling in hotter months. The summer sun is the most intense in the afternoon in the south and west exposures. Plant trees where they will shade southwest and west facing walls and windows. The trees that are providing this kind of shade in the summer, however, need to allow sunlight into the living spaces in the winter (see Winter). Deciduous trees perform this dual role quite well. If solar accessibility is critical, see the discussion on "solar friendly" tree types in MacPherson & Wagar reference.
- ◆ Shade hard surfaces, drives, patios, and decks to minimize reflected radiation during the day and reradiation of heat at night.

SOLAR ANGLES

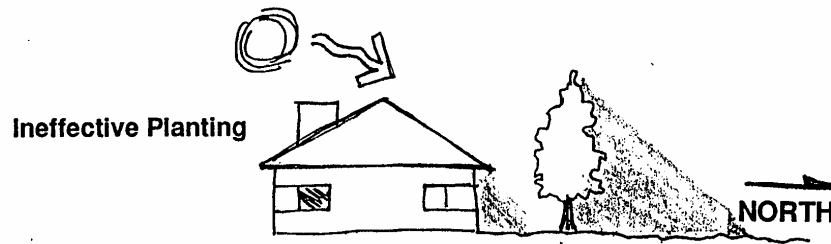


Winter Solar Path
47 North Latitude / 22 December



Summer Solar Path
47 North Latitude / 22 June

- ◆ Trees on the north side of the lot will not shade living spaces. Since the sun remains in the southern half of the sky, the shade would be to the north and away from the living space.

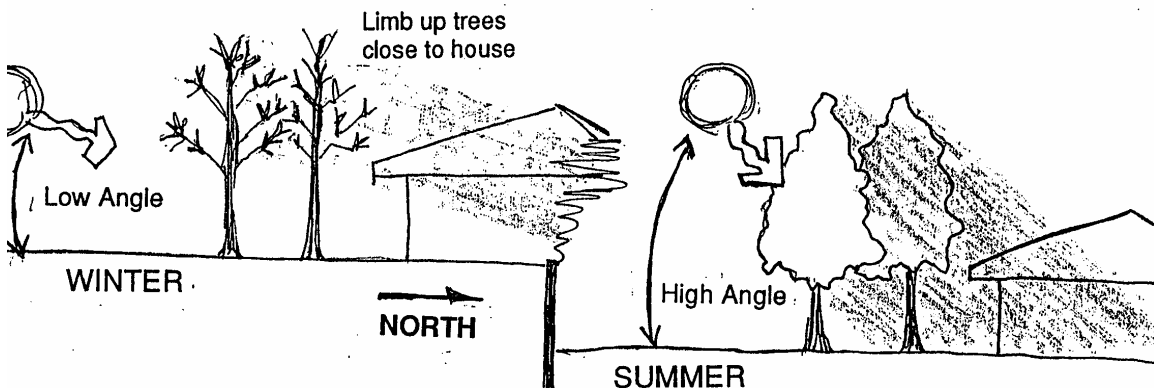


- ◆ Encourage openness for circulation of hot air trapped near structures or outdoor living areas. Avoiding creating a barrier with dense vegetation that would not allow some air flow.

WINTER

In the winter, the goal is to capitalize on the solar energy by maximizing the sun exposure all day.

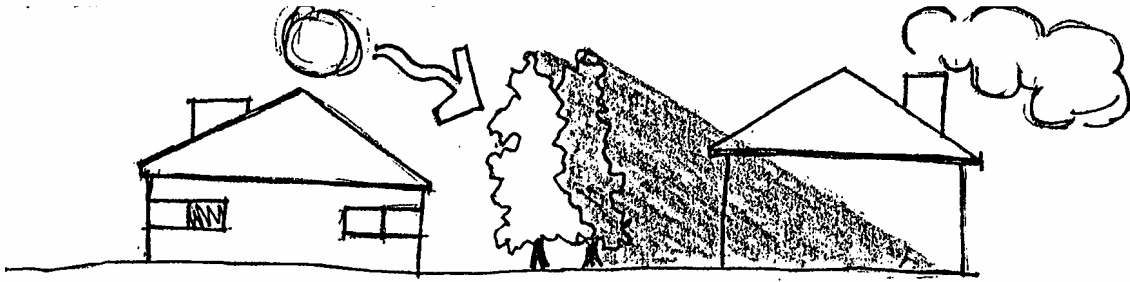
- ◆ Since the sun's path is in the extreme southern part of the sky in the winter, an "open" south side will allow sunlight throughout the day. Deciduous trees decrease the amount of shadow cast in the winter and should dominate the type of trees in southern area of lot.
- ◆ Trees should be planted close to the house to allow exposure under the canopy. Trees closer to the house could be "limbed up" to accomplish this effect as well.



WIND

Wind protection is probably the greatest need for residences in the Northwest. The cold winter air from the North will increase the need to heat living spaces.

- ◆ Evergreens can be planted as a windbreak near the north side of the house. Be careful of using evergreens extensively in the north part of the lot, for it may be the south exposure of neighboring home and will block solar access year round and possibly a view.



- ◆ Shrubs around the foundation and walls provide some protection in the cooler weather by reducing wind speed and air infiltration into the home. Make sure to plant the shrubs with their mature size in mind. Otherwise, the mature, stressed plants may not be as robust and effective, or if healthy, they will require pruning to reduce conflict with structures.

In summary:

- ◆ Use deciduous shade trees on the west and southwest sides to provide substantial shade for the hot hours of the day and conifers on the north side for a winter windbreak. Conifers do not need to be taller than the house to ameliorate extreme climate conditions.
- ◆ Trees on the south side should be deciduous and be placed close to the house to maximize summer shade and winter sun.
- ◆ Plant shrubs along the foundation and walls (not windows) for protection from cold air. Have them dominate the vegetation on the east side to maximize morning sun in the windows. Shrubs of the appropriate size will reduce above and below ground problems.
- ◆ Always consider the guidelines for solar accessibility and climate control for both you AND your neighbors when landscaping.

References

Harris, R. 1992. **Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines.** Prentice-Hall, Englewood Cliffs, NJ.

¹ MacPherson, G. and A. Wagar. "Energy Efficient Landscapes". Paper prepared for Special Purpose Landscapes: An Assessment, Workshop at Center for Urban Horticulture, University of Washington, Seattle. March 19-20, 1992.

McClenon, C., editor. 1977. **Landscape Planning for Energy Conservation.** Environmental Design Press, Reston, VA.

Sources

United States Environmental Protection Agency. 1992. **A Guidebook on Tree Planting and Light Colored Surfacing.** U.S. Environmental Protection Agency, Washington, D.C.

¹ Copy available in the Clyde Hill Urban Forest Library.

POLLUTION ABATEMENT

Residences near arterials are subject to noise and air pollution from automobile traffic. A few areas of particular concern include 84th Avenue Northeast and SR 520 (in Zone 6), although with an increase in traffic in the area, this may be an issue for many parts of the City. Trees and shrubs planted in a screen can be used as buffers to urban noise while filtering exhaust particulates from the air.

There are several techniques that can be employed to reduce the effects of noise and air pollution:

- ◆ Plant shrubs and trees in a dense mass close to the source of the noise.
- ◆ Fleshy leaves and numerous branches seem to attenuate noise more efficiently. Evergreens will provide buffer year round.
- ◆ Earth mounds or berms are more effective as noise barriers than plants.

Below is a list of some species with varying tolerances to automobile pollution (particularly ozone). It is important to choose the proper species that can withstand the automobile exhaust, if past plantings have shown ill-effects. In those cases, only those species tolerant or somewhat tolerant to pollution should be used as pollution buffers. Be aware of limitations of the zone when selecting trees, as well as the regulations of planting in the right-of-way. (See "Landscaping for View Preservation" and "Rights-of-Way" sections).

Tolerant:

Thuja occidentalis - American arborvitae
Sorbus aucuparia - European mountain ash
Taxodium distichum - Bald cypress
Cornus florida - Flowering dogwood
Betula pendula - European white birch
Calocedrus decurrens - Incense cedar
Pseudotsuga menziesii - Douglas fir
Fagus sylvatica - European beech
Ulmus spp. - hybrid elms
Ginkgo biloba - Ginkgo, Maidenhair tree
Nyssa sylvatica - Sour gum
Crataegus spp. - Hawthorn
Ilex spp. - Hollies
Carpinus betulus - European hornbeam
Kalmia latifolia - Mountain laurel
Tilia cordata - Littleleaf linden
Magnolia spp. - Magnolia
Acer spp. - Norway, Red, sugar, and sycamore maples
Paulownia tomentosa - Empress tree
Sequoia sempervirens - Coast redwood
Metasequoia glyptostroboides - Dawn redwood

Sequoiadendron giganteum - Giant sequouia
Spiraea douglasii - Hardhack
Picea spp. - Spruces
Viburnum spp. - Viburnum
Taxus spp. - Yew
Cedrus deodara - Deodar cedar
Quercus rubra - Northern red oak

Somewhat Tolerant:

Malus spp. - Some apple and crabapple cultivars
Ulmus parvifolia - Chinese elm
Liquidambar styraciflua - Sweet gum
Larix kaempferi - Japanese larch
Quercus spp. - Oaks
Pinus spp. - Austrian, Lodgepole, Scots, Shortleaf pines
Platanus x acerifolia - London plane
Cercis spp. - Redbud
Elaeagnus spp. - Silverberry
Gleditsia triacanthos - Honey locust

Sensitive:

Pseudotsuga macrocarpa - Bigcone spruce fir
Larix decidua - European larch
Syringa spp. - Lilacs
Amelanchier alnifolia - Western serviceberry
Alnus spp. - Alders
Symphoricarpos spp. - Snowberry
Rhus spp. - Sumac
Platanus occidentalis - American sycamore
Ailanthus altissima - Tree-of-heaven
Fraxinus spp. - Ashes
Liriodendron tulipifera - Tulip tree
Zelkova serrata - Japanese zelkova
Pinus spp. - Coulter, Jack, Jeffrey, Loblolly, Monterey, Ponderosa pines

References

¹ Edmonds, R.L. **Ozone: Friend and Foe.** Biology Digest.

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Davis, D.D. and H.B. Gerhold. 1976. **Selection of Trees for Tolerance to Air Pollutants.** Proceedings of Better Trees for Metropolitan Landscapes Symposium. USDA Forest Service Gen. Tech. Report NE-22.

Karnosky, D. "Chamber and Field Evaluations of Air Pollution Tolerances of Urban Trees." *Journal of Arboriculture*, April 1981, Vol. 7 No. 4.

¹ Copy available in the Clyde Hill Urban Forest Library.

TREE PRESERVATION DURING CONSTRUCTION

If any vegetation is to be preserved while construction activities occur on a lot, the ENTIRE plant must be protected (both above and below ground). A change in grade, drainage or soil conditions (compaction, removal of topsoil) around significant trees and shrubs can have adverse effects on the very plants to be preserved. The outcome of this situation is usually the decline and eventual death of a valuable specimen. Large trees under stress can become hazardous, jeopardizing life and property.

Before preparing to protect a tree or design a landscape plan around a significant tree, an evaluation of the tree's health and longevity is key to determining if the tree is worth saving. The factors to consider would be:

- ◆ Is the tree healthy and disease-free? See “Hazard Trees” section.
- ◆ Is the new landscape design taking into account the tree's location, as in the retention of grade and drainage?
- ◆ What is the normal life span for the species? Research may need to be done on the species to determine if the carefully preserved tree has a short life span.
- ◆ Is the tree significant in size and value requiring a consulting arborist? Special care and protection steps may be warranted for those special trees. See “Hiring an Arborist” section.

Steps in Tree Preservation during Construction:

- ◆ Install a four-foot high fence or barrier (minimum) at least at the dripline (edge of canopy) of all trees to be retained (or twice the dripline for columnar trees). There are a few different guidelines about measuring the “critical root zone” of a tree. One common measure is for every inch in diameter of a tree (at breast height), one goes a foot out from the trunk for radius of the area. The root system of a mature tree can be easily two to three times the width of the canopy, and protection of as much of the root system is ideal.
- ◆ Retain grade level around any tree so it will not be lowered within either (a) the area within the critical root zone or (b) the protected area.
- ◆ Designate on-site parking, traffic and storage away from the trees.
- ◆ Locate trenches for utilities to minimize the effect on the root system of the trees to be retained.
- ◆ Take measures to protect tree root system from compaction. If the grade, outside of drip line, has been raised, a tree well should be constructed around the tree, preferably at drip line to maintain original grade.

- ◆ Maintain a buffer of trees or shrubs around the specimen for protection. This vegetation could then be removed after construction by hand or light equipment.
- ◆ Tree maintenance should be conducted during construction (watering, fertilizing, pruning, and pest control).
- ◆ Make provision for the disposal of potentially harmful items, e.g., excess concrete, runoff from cleaning equipment, paint thinners, heating oil tanks, etc., away from trees.
- ◆ Reduce disturbance around trees and restrict removal of topsoil around trees.
- ◆ Excavate trenches by hand in areas with roots larger than 1" diameter. If smaller roots are to be pruned, use a sharp saw or pruning blade for a clean cut.
- ◆ Prune lower branches if needed to provide clearance for construction traffic.
- ◆ Utilize pervious paving materials (interlocking blocks set on sand) around trees or provide aeration vents.
- ◆ Reduce changes in drainage; accommodate when necessary to avoid major environmental changes.(more water - tree well at drip line, improve drainage; less water - irrigation)
- ◆ Do not build up soil around base of tree! This can kill the tree; the roots need oxygen and water, and if roots are too deep, the tree will suffocate. Keep the natural flare of tree base above ground.
- ◆ Preserve species, that perform poorly in single stands, in groups or clusters. Maintain natural undergrowth to reduce high exposure to the elements.
- ◆ Avoid severe pruning and locating highly reflective surfaces nearby. The exposure may cause sunscald and heat cracking.

In summary, make sure the new landscape has accommodated for the existing conditions of the plants to be preserved. Avoid any disturbance of a valuable specimen by protecting both the above and below ground parts of the plant. And the best time to preserve and protect trees and vegetation is BEFORE breaking ground. Hire a certified consulting arborist to assist you during your planning stages of development to ensure proper protection of your valuable landscape.

References

- Harris, R. 1992. **Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines.** Prentice-Hall, Englewood Cliffs, NJ.
- Matheny, N. and J.R. Clark. 1998. **Trees and Development: A Technical Guide To Preservation of Trees During Land Development.** International Society of Arboriculture, Champaign, IL.
- ¹ Medina, City of . **Tree Preservation and Landscaping Requirements During Development,** Municipal Code 12.28, Ordinance #521.
- ¹ Morgan, R., with B. Sullivan, ed. 1990. **A Technical Guide to Community and Urban Forestry in Washington, Oregon and California.** World Forestry Center, Portland, OR.

Sources

Pacific Northwest Chapter International Society of Arboriculture (ISA).
www.pnwisa.org for a list of certified arborists available in the area.

¹ Copy available in the Clyde Hill Urban Forest Library.

VACANT LOTS AND UNMAINTAINED AREAS

Clyde Hill takes pride in its well-maintained appearance. Vacant areas often can be eyesores if not maintained. These unmanaged areas can also harbor noxious weeds and pests that can threaten landscapes throughout the community. Abandoned or vacant sites are sometimes used for illegal dumping.

The height of the vegetation in vacant areas may be regulated to prevent weedy species from getting out of hand. For instance, in Falls Church, VA, a maximum height of twelve inches is enforced.

It is important to control or eradicate weedy plants in the area. Blackberry, scotch broom, grasses, and bindweed may not be noxious but are not hailed for their contribution to the landscape.

NOXIOUS WEEDS

There are a few major noxious weeds that are posing a problem in the state and county:

Giant Hogweed (*Heracleum mantegazzianum*) is on the state-wide list of noxious weeds. The sap of the plant causes irritation and should be eradicated carefully.

Knapweed (*Centaurea* spp.). There are several species of knapweed that are on the regional list for King County.

Purple loosestrife (*Lythrum salicaria*) is displacing several wetland species in the area. The species is currently on the list for nearby regions and may be on the list for this region very soon.

Scotch broom (*Cytisus scoparius*) has become a serious problem in western Washington, and may appear on the regional list soon.

The owner is responsible to remove and eradicate noxious weeds. The alternative is a civil infraction, which may result in a monetary penalty.

Identification literature and more information on the noxious weed law can be found in the City Hall Urban Forest Library.

The maintenance of all landscapes in the City is imperative to ensure the welfare and success of the community urban forest. We are all responsible to manage our part and avoid posing problems.

References

- ¹ Falls Church, VA., City of. **Trees, Shrubs and Weeds.** Municipal Code Chapter 35.
- ¹ Washington, State of. **State Noxious Weed List and Schedule of Monetary Penalties,** Chapter 16-750, WAC.

Website

Noxious Weed Control Board. www.nwcb.wa.gov

¹ Copy available in the Clyde Hill Urban Forest Library.

LANDSCAPING WITH NATIVE PLANTS

There is a trend to incorporate native plants into new Northwest landscapes. Native vegetation provides us with a sense of connection with the Pacific Northwest flora, and the plants are well adapted to the region's climate. In fact, several of these plants are drought tolerant because of their ability to survive the dry summers without watering (after regular watering in the first season). Because of the recent "water shortage" and water quality issues in our region, native plants are popular.

It's important to be aware, however, that in an urban environment, the microclimates and soil conditions may be much different than those in the native forest, and the plants may not survive in the harsher urban conditions. For example, the native *Rhododendron macrophyllum* prefer partial shade as in the forest, when in fact they can be subjected to more direct sun in some parts of the City. In order to keep them alive, they would need a lot of water, which is not a wise use of our resources.

In order to select the perfect native plant for the landscape, first, observe the environmental conditions of the landscape areas. Do the irrigation, exposure, and soil mirror the conditions of the "native" environment? Fortunately, there are different kinds of environments in the Pacific Northwest, and in understanding the growing conditions of the native plants, one can make a match between the landscape and the plant (see Sources in this section).

Below are some considerations about possible microclimates, topography and growing conditions in each zone, when selecting native plants.

In Zone 1, the shading requirements may be critical. Select plants that like sandy soils, or are drought tolerant, if the drainage appears to be fast, or modify the soils (see "Soils").

For Zone 2, native plants suited for the understory layer of coniferous forests would be ideal. Regeneration planting of conifers with Western red cedar (*Thuja plicata*), Western hemlock (*Tsuga heterophylla*), Pacific yew (*Taxus brevifolia*) will help preserve the forest remnant (see "Historic Trees").

Zone 3 is restricted to small trees and shrubs that can tolerate the exposure and drainage conditions of the slope. See "Slope Stability" for some species.

The conditions in Zone 4 are similar to Zone 2 as far as exposure, but the slope adds a dimension to the scene. Be aware of views when planting trees in the more dense areas of the hillside.

Taller trees can be planted in Zone 5. Note the variable exposures with the different densities of the canopy.

For the wetter soils of Zone 6, the use of native wetland plants may be appropriate, keeping in mind the shade and sun requirements of the species.

In the creek corridors of Zone 7, there are several species that are ideal for riverine vegetation. The establishment of a good canopy is critical for the creek habitat. Wetland plants can be used along the creek or spring edge. See "Watershed Protection" section for some species.

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Sources²

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Newsletters: *Douglasia* from Washington Native Plant Society
NATIVE from Northwest Native Plant Society

Websites

Washington Native Plant Society. www.wnps.org

Native Plant Resources, Water and Land Resources Division, Metro King County. www.dnr.metrokc.gov. Look under 'Yard and Garden' topic.

² A list of several other books on this issue is located in the Clyde Hill Urban Forest Library.

WILDLIFE

Attracting wildlife in the urban forest is a popular activity. There are several areas in Clyde Hill that have ideal settings for birds, mammals, and invertebrates to inhabit. The majority of the desirable wildlife are birds and in wildlife sanctuaries, an effort is made to provide for a broader community to include less common species. Enhancing the environments around the community will attract more favorable species.

The basic components of a wildlife habitat are **FOOD, WATER, SHELTER,** and **SPACE**. Food sources and shelter can be easily provided by plants in the landscape.

PLANT SPECIES FOR WILDLIFE

Plants that produce berries and large seeds (like maples) are attractive for food value. Be careful of some species that are problems in the natural forested areas of the Northwest. Hollies, hawthorns, and mountain ashes germinate easily and become very invasive through dispersal from birds.

Trees and shrubs that have dense foliage or branching provide excellent cover for birds and mammals to rest and make homes.

Below is a list of plant species, mostly native, that provide at least one component for wildlife habitat. Select varieties that are non-sterile for the production on seeds and fruit.

Trees

Acer spp. - Maple
Alnus spp. - Alder
Betula papyrifera - Paper birch
Corylus cornuta - Hazelnut
Malus fusca - Wild crabapple
Pinus contorta - Lodgepole pine, Shore pine
Pinus monticola - Western white pine
Prunus emarginata - Bitter cherry
Quercus rubra - Red oak
Rhamnus purshiana - Cascara
Sorbus sitchensis - Sitka mountain ash
Tsuga mertensiana - Mountain hemlock

Shrubs

Amelanchier alnifolia - Serviceberry
Arctostaphylos spp. - Manzanita
Mahonia (Berberis) aquifolium - Oregongrape
Mahonia (Berberis) nervosa - Longleaf Oregongrape
Cornus sericea - Red-osier dogwood
Gaultheria shallon - Salal

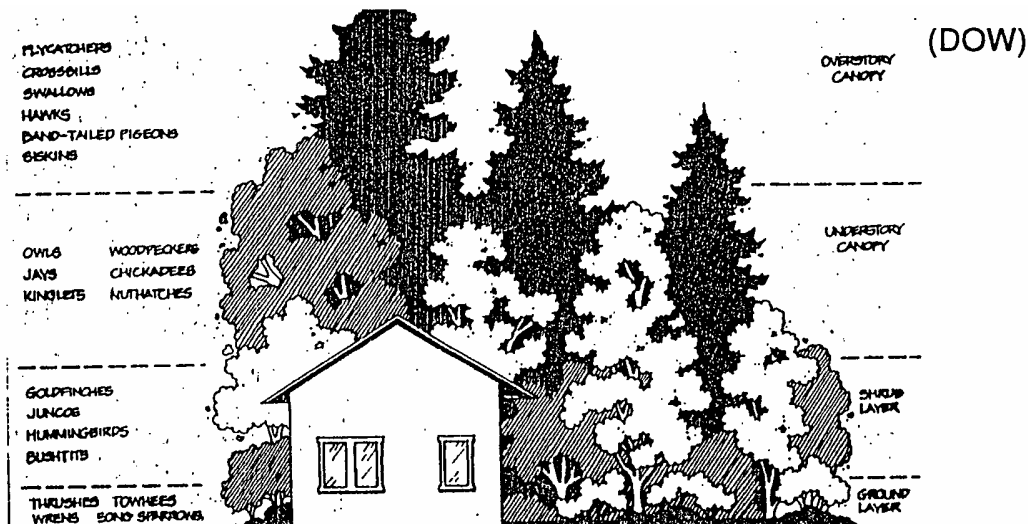
Lonicera ciliosa - Trumpet honeysuckle
Lonicera involucrata - Black twinberry
Oemleria cerasiformis - Indian plum
Prunus virginiana - Chokecherry
Ribes spp. - Currant
Rosa spp. - Rose
Rubus spectabilis - Salmonberry
Rubus spp. - Blackberry
Rubus parviflorua - Thimbleberry
Sambucus spp. - Elderberry
Spiraea douglasii - Hardhack
Symphoricarpos spp. - Snowberry
Vaccinium spp. - Huckleberry
Viburnum opulus - Highbush cranberry

Plants with fragrant, nectar and showy flowers will attract butterflies and hummingbirds. For an extensive list of species, check the Urban Forest Library at the City Hall.

LANDSCAPING FOR WILDLIFE

High density canopy areas (Zones 2 and 4) are desirable places for wildlife in the urban setting. The trees are the established canopy that creates a "forest island" for several native birds. Encourage understory growth of small trees and shrubs for protection and nesting for these woodland birds.

Add a complex vegetative structure in the landscape to provide a variety of habitats for several species. A combination of trees, shrubs, flowers, and ground cover will attract a wider community of birds and butterflies.



The addition of water component with shallow ponds or birdbaths can be made in the landscape. Make sure these features are out of reach of predacious cats!

Beware of plants that produce succulent berries, for they can be a problem in staining pavement and patio. Best to locate these food source plants in the more undisturbed areas of the garden.

The riparian or creek corridors (Zone 7) are ideal places for wildlife, if safe cover is provided for the animals to enjoy the water resource. Avoid disturbance of these areas and build habitat diversity with native vegetation. See “Native Plants” and “Watershed Protection” sections.

Although fish are not current residents of the Clyde Hill streams, Cozy Cove Creek is a major waterway for the area and could be made into a salmon spawning stream. In the Watershed Protection section, there is a discussion on providing structure for fish habitat.

Be aware of chemicals on lawns and plants. Some pesticides are toxic to fish, birds, small mammals, and beneficial insects (bees). Be sure to read the label prior to application. (See “Sustainable Landscaping: Plant Health Care”)

In any zone of Clyde Hill, Backyard Wildlife Sanctuaries are highly encouraged. For more information on this program, contact the Department of Wildlife (see Sources).

LESS DESIRABLE WILDLIFE

There is some wildlife that can become a problem in the urban context, like raccoons and opossum. Discourage these opportunists by keeping trash bins secure and air-tight, and not leaving dog or cat food outside.

Unfortunately, there are several birds that have entered the urban community that can become a nuisance (starlings, crows, flickers). Since they are so well adapted to the more urban conditions, it is difficult to eradicate them. Research shows that these species appear to be more attracted to open spaces where there is less competition for resources. Highly diverse woodland settings with many layers of shrubs and trees may discourage these less desirable species.

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Tilghman, N.G. 1987. "Characteristics of Urban Woodlands Affecting Breeding Bird Diversity and Abundance". *Landscape Urban Planning*, 14:481-495.

¹ Washington State Department of Wildlife. **Plants for Wildlife in Western Washington**. Mill Creek, WA.

Sources²

Link, R. 2002. **Landscaping for Wildlife in the Pacific Northwest**. University of Washington Press, Seattle, WA.

Washington Department of Fish and Wildlife, 425/775-1311.
<http://www.wa.gov/wdfw>

Washington State University Cooperative Extension – King County,
206/296-3900. <http://caheinfo.wsu.edu>

Visit the Backyard Wildlife Habitat at the Lake Hills Greenbelt Ranger Station, 15416 SE 16th, Bellevue, WA and the Wildlife Sanctuary at Clyde Hill Elementary.

¹ Copy available in the Clyde Hill Urban Forest Library.

² A list of several other books on this issue is located in the Clyde Hill Urban Forest Library.

PART III: SUSTAINABILITY IN LANDSCAPE MANAGEMENT

While addressing the preceding issues, the idea of sustainability can be incorporated into Clyde Hill's urban forest management plan. Sustainability is a concept which emphasizes the environmental impacts and benefits of landscapes. The management plan would stress actions that conserve, recycle, and reuse the resources which are invested in landscapes, and actions which will optimize the environmental benefits provided by landscapes. A great deal of attention is placed upon actions that increase energy efficiency in landscaping. Energy efficiency is improved by reducing the consumption of water, fossil fuels, electricity, inorganic fertilizers, and chemicals.

LOW MAINTENANCE PLANT MATERIAL

There are several aspects about a plant that can make it a problem to maintain. Plants with chronic pest and disease problems, poisonous parts or messy fruits may not be worth the effort to have in the landscape. Sustainability in the landscape can be achieved in part by reducing the use of problem plants and incorporate plant material requiring low maintenance.

PESTS AND DISEASES

Below is a list of species of trees and shrubs to reconsider using in the landscape because of their pest and disease problems, including dieback due to freeze damage. These species with numerous problems could require a lot of maintenance, monitoring, and possibly chemical control to keep in good form.

Abies spp. (Firs) - Balsam woolly adelgid (especially Subalpine fir, *A. lasiocarpa*), aphids

Acer spp. (Maples) - Aphids (bad on *A. platanoides* creating honeydew and sooty mold), scale, Nectria canker, root rot fungus

Albizia julibrissin (Silk tree) - fatal canker attacks, root rot fungus

Alnus rubra (Red alder) - tent caterpillar

Betula spp. (Birch) - Aphid (especially cutleaf forms and *B. pendula*), caterpillars, scale, leafminer

Ceanothus spp. (Wild lilac) - root rot fungus, freeze damage

Choisya spp. (Mockorange) - mites, winter damage

Cornus nuttallii (Native dogwood) - *Anthraxnose* fungus

Cornus florida (Flowering dogwood) - *Anthraxnose* fungus

Crataegus spp. (Hawthorn) - Leaf spot, aphids (especially *C. oxycantha* 'Paul's Scarlet')

Daphne spp. - Aphids

Escallonia spp. - Winter damage

Gleditsia triacanthos (Honey locust) - Podgall midge

Juniperus spp. (Juniper) - Scale, blight

Malus spp. (Crabapple) - Scab, caterpillars, aphids, codling moth, apple maggot
(Plant pest/disease resistant varieties.)

Platanus x acerifolia (London plane tree) - mites, scale, anthracnose, powdery mildew
Picea spp. (Spruce) - Spruce aphids (esp. *Picea pungens*), adelgids, mites
Pinus spp. (Pine) - Pine shoot moth (esp. *P. mugo*), blister rust (*P. monticola*), scale
Prunus spp. (Cherry) - Bacterial canker, brown rot, scale, caterpillars, leaf rollers (and now a devastating new pest - Cherry bark tortrix invading Whatcom Co.)
Pyracantha spp. (Firethorn) - scab
Rosa spp. (Rose) - Leaf spots, aphids, crown gall, mildew, viral diseases.
Raphiolepis spp. - Leaf diseases and winter damage
Rhododendron spp. - Root weevil
Salix spp. (Willow) - Blight, aphids, leaf spots
Sophora japonica (Pagoda tree) - fatal canker attacks (Sea. City Forest)
Syringa spp. (Lilac) - Leaf miner, blight
Ulmus spp. (Elm) - Dutch elm disease (esp. Siberian, Slippery, Rock, American)
Viburnum spp. - Leaf spot and winter damage
Chamaecyparis lawsoniana (Port Orford cedar) - *Phytophthora* fungus

References

Antonelli, A., Washington State University Cooperative Extension Entomologist. Personal communication.

¹ Beck, M. "Problem Plants in Western Washington". Leaflet from Northwest Arborvitae, Woodinville, WA.

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¹ Funk, S.A. **Urban Forestry Notebook**. 1990. Center for Urban Horticulture, University of Washington, Seattle, WA.

¹ Roome, P. "Problem Plants in the Northwest". Leaflet from Pat Roome Landscape Design, Bellevue, WA.

¹ Seattle Engineering Department. **Seattle's City Forest**.

¹ Copy available in the Clyde Hill Urban Forest Library.

"MESSY" PLANTS

Plants that drop fruit and flower parts may cause problems with stains and litter. Careful consideration of the best location for these species may be necessary in order to prevent them from being a nuisance. Fruit bearing trees and shrubs, e.g., Mountain ash (*Sorbus* spp.), Horsechestnut (*Aesculus* spp.), Oregon grape (*Mahonia* spp.), and White Mulberry (*Morus alba*), should not be planted near pavement and around living areas. Best to buy fruitless or sterile forms of the plants or locate the fruiting varieties in a more remote part of the yard (which would be good for wildlife).

Other trees and shrubs may be problematic due to the amount of litter they produce. Trees with large leaves and seed heads, such as *Paulownia tomentosa*, *Catalpa bignonioides* and *Magnolia grandiflora*, could necessitate major cleanup efforts. The *Arbutus* species (Madrone) frequently drop leaves and bark, which require constant cleanup.

LARGE TREES

Some trees, including basically all natural forms of West Coast conifers, grow to huge proportions, and if appropriate in the zone (only Zones 1 and 2 for height), trees should be given enough room to grow. Otherwise, constant or severe pruning would be necessary to keep them contained and in good form. Trees are at their finest when allowed to grow naturally in adequate space.

Several of these large species are most ideal in park settings or very spacious yards, including:

Fagus sylvatica - Beech (90')
Larix decidua - European larch (100')
Metasequoia glyptostroboides - Dawn redwood (100')
Platanus x acerifolia - London Plane (100')
Pseudotsuga menziesii - Douglas fir (150')
Quercus rubrum - Red oak (90')
Sequoia sempervirens - Coast redwood (200')
Sequoiadendron giganteum - Giant sequoia (200')
Taxodium distichum - Bald cypress (150')
Thuja plicata - Western red cedar (200')

There may be smaller species or varieties of these trees that would be more appropriate in the landscape.

POISONOUS PLANTS

Surprisingly, there are several common landscape plants that have poisonous parts. It is wise to be aware of these species, especially when landscaping where children and pets may be in danger. The WSU/King County Cooperative Extension has produced a list of several poisonous plants, and a copy is available in the Clyde Hill Urban Forestry Library. The Seattle Poison Center, at (206) 526-2121 or 1(800) 732-6985, can also provide information.

New National toll-free number: 1-800-222-1222

LANDSCAPE MANAGEMENT TECHNIQUES

The idea of sustainability in the landscape encompasses several aspects of management. The way a landscape is maintained affects not only the success of the landscape itself, but the success of the entire community forest. As stated in the previous sections on runoff control and watershed protection, the effort to reduce water consumption and reliance on chemicals are key elements in sustainable landscape management. Below is a discussion of some techniques regarding these issues.

WATER CONSERVATION

Experts in the field say that water usage in landscaping can be reduced by as much as 35 to 60% through more effective watering systems and schedules and appropriate plantings (Bailey). A few strategies that can help reduce water consumption in the landscape are described below.

- ◆ A design concept called "hydro-zoning" is the effort to group plants in areas within the landscape based on the plants' watering requirements. This way, one can efficiently customize the watering regime for each area.
- ◆ Efficient irrigation systems, like drip irrigation or the soaker hose system, minimize the amount of water that evaporates during watering. In addition, the best times to water are early morning, late evening or night to reduce evaporation.
- ◆ Reduce the amount of lawn areas, which require constant watering in our dry summers. (They are also high maintenance.)
- ◆ Install plants in the wet seasons of fall and winter. The plants then have time to acclimate before the warm, dry weather of summer arrives. Spring may also be a good time to transplant, although the plants may experience some shock with such a change during their growing season.
- ◆ Using plant material that does not require a lot of watering is recommended. Drought tolerant plants, however, do need water in the first year, and may need some supplemental watering during a long period of drought. From the lists provided throughout this guide, there are a few tree species that are known to be drought tolerant:

Acer ginnala - Amur maple
Acer glabrum - Rocky Mountain maple
Arbutus unedo - Strawberry tree
Calocedrus decurrens - Incense cedar
Cedrus deodara - Deodar cedar
Cedrus atlantica - Atlas cedar
Cercis occidentalis - Western redbud
Cornus mas - Cornelian cherry dogwood

Cotinus coggygria - Smoketree
Crataegus phaenopyrum - Washington thorn
Fraxinus oxycarpa 'Raywood' - Raywood ash
Juniperus spp. - Junipers
Koelreuteria paniculata - Golden rain tree
Pinus spp. - Pines
Prunus lusitanica - Portugal laurel
Sorbus aucuparia - European mountain ash
Ulmus parvifolia - Chinese elm
Zelkova serrata - Japanes zelkova

For a more complete list of plants that require less water (including shrubs, ground covers, vines and perennials), a copy of a list from the Washington State University King County Cooperative Extension is available in the Clyde Hill Urban Forestry Library.

References

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¹ Irvine, City of. 1990, Draft: **Sustainable Landscaping Guideline Manual**. City of Irvine Community Development Department, Irvine, CA

¹ Kourik, R. "Xeri-what? The Myths and Realities of Drought-Resistant Landscaping". *National Gardening*, August, 1989.

¹ Pinyuh, G. "Low Water Use Plants". Pamphlet from Washington State University King County Cooperative Extension, Seattle, WA.

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¹ Copy available in the Clyde Hill Urban Forest Library.

PLANT HEALTH CARE

The essence of a low maintenance landscape is the emphasis on the health of the plants. In an effort to reduce the amount of chemicals (pesticides) used in the garden to maintain the health of plants, a concept called Integrated Pest Management (IPM) or Plant Health Care (PHC) has been successfully adapted for the urban landscapes. This system emphasizes pest control through prevention and advocates cultural, physical, and biological controls before resorting to chemical methods.

PEST PREVENTION

Below are some major points about prevention of pest problems in the landscape.

Select disease and pest resistant varieties of plants. Avoid plants that have persistent or chronic problems with disease or pests in this area.

A healthy plant will be more resistant to disease and pests. Proper selection, planting and management of plants will reduce the need for pesticides.

- ◆ Select the right plant for the right place. Make sure that the plant is appropriate for the site conditions (soil, drainage, and exposure). A match of the plant to these conditions will reduce the stress on the plant and thus reduce its susceptibility to pests and diseases. Choosing trees with the appropriate mature height for their location will reduce pruning requirements.
- ◆ Properly plant the plant to avoid stress early on. A plant experiences the most shock when it is transplanted from one place to another. Follow the guidelines in Proper Planting section.
- ◆ Understand and practice the proper techniques of pruning. Pruning, which is actually wounding, is a stressful action on any plant, and leaves the plant vulnerable to invasion of harmful pests. See “Proper Pruning” in this section.
- ◆ Mulch around plants with clean compost, bark, or even disease- and pest-free leaves. Mulch, especially in organic form, retains moisture, reduces weeds, and is a good supplement for healthy soil. All these features of mulch will help create a less stressful environment for the plants.
- ◆ Weeds can be controlled by means of mechanical removal. If it is difficult to do so, a proper application of herbicides could be used. Mulching will also reduce the need to weed.

PEST CONTROL

If there is damage appearing on the plants, it is very important to get proper identification of the pest at large (see Washington State University King County Master Gardeners in Sources). Understand that NOT EVERY INSECT IN THE LANDSCAPE IS A PEST, and the sign of a few critters may not be worth any effort to control if they do not do significant damage. Many insects are beneficial. With the proper identification of the pest, suitable and effective treatment can be used.

Initially, cultural, physical, and biological actions can be employed. The objective is to control an outbreak of a pest population that would significantly affect the health of the plant.

- ◆ Ensure that the cultural and environmental conditions are favorable for the plant so it can try to overcome the pest problem. A positive change in growing conditions tends to give a more permanent, long-term control than physical and chemical controls.
- ◆ Physical removal of dead and damaged leaves may reduce the spread of injury. Make sure to disinfect pruners with rubbing alcohol after each cut when pruning diseased plant material.
- ◆ Biological control of pests can be very effective. The use of beneficial insects and the natural pathogen *Bacillus thuringiensis* (BT) have proven to safely control several pests in the yard.
- ◆ The application of non-toxic horticultural oils and insecticidal soaps can also be very effective and friendly to the environment.
- ◆ Chemical control, with pesticides, generally should be the last resort. It is imperative to target the control of the pest. Be wary of blanket or routine sprays of a broad spectrum. Most of these are not in synch with the life cycle of the particular pest at large. The result is usually a costly and ineffective service that can be harmful to the environment. Carefully timed spot treatments, applied only to the infected plants, can greatly reduce pesticide usage over the cover spray approach.
- ◆ For effective control, the application of the right chemical must be accurately timed with the life cycle of the pest. Understanding the life cycle of the key pests in the landscape is valuable.
- ◆ When using chemicals, READ THE LABEL, for proper mixture, dose, and storage. It is unlawful to use a pesticide inconsistent with the labeled directions. Apply conservatively, using only the amount necessary. Excess chemicals will wash away and affect the water systems downhill (lakes and creeks), creating an imbalance. The effects of chemicals on wildlife and our water supply can be devastating, if misused.

FERTILIZING

The use of fertilizers in the landscape should be done conservatively. Most trees do not need supplemental minerals and elements, unless they show a deficiency or the soil is sandy or well drained. What is more effective and efficient is to develop the soil into a rich growing medium (see "Soils"). The addition of most types of organic matter provides the structure, elements, and the microbes necessary for the vegetation to flourish, reducing the need to fertilize. If a plant is not doing well, consult a professional for a diagnosis of the problem (see "Hiring an Arborist").

References

¹ Ekenberg, E. and T. Fitzgerald. **Good Gardening! For Our Environment, Our Water, Ourselves.** Washington State University Spokane County Cooperative Extension, Spokane, WA.

Harris, R. 1992. **Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines.** Prentice-Hall, Englewood Cliffs, NJ.

¹ Irvine, City of. 1990, Draft: **Sustainable Landscaping Guideline Manual.** City of Irvine Community Development Department, Irvine, CA

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¹ Ekenberg, E. and T. Fitzgerald. **Good Gardening! For Our Environment, Our Water, Ourselves.** Washington State University Spokane County Cooperative Extension, Spokane, WA.

Sunset, editors. 1993. **Garden Pests and Diseases.** Sunset Publishing Corporation, Menlo Park, CA.

Washington State University Master Gardeners, of the WSU/King County Cooperative Extension, offer several Plant Clinics and Bulletins on all of these topics. Call 206/296-3900 for more information.

¹ Copy available in the Clyde Hill Urban Forest Library.

PROPER PLANT SELECTION

Seek this information about a plant from references and nursery staff prior to purchasing:

- ◆ What is the maximum mature height of this plant?
Does it fall within the height limit of your Clyde Hill Urban Forest zone? Keep in mind that mature height and maximum height may be different. The mature height is the height of the plant when it begins to produce flowers and fruits. The plant may still grow taller and exceed its mature height. Know the plant's maximum height potential over several years. The rate of growth is also important when incorporating the species into the landscape. Many factors influence the size and rate of growth of a tree, including exposure, soil, drainage, and nutrient availability. Individual plants will vary.
- ◆ What are the soil and watering requirements for this plant?
- ◆ What are the ideal exposure and shade conditions for this plant?
- ◆ Is the plant hardy for this climate zone?
Be familiar with the climate zone of this area. The more popular zone systems are the Sunset publication system, in which Clyde Hill is between zone 4 and 5, and the USDA, in which the City is zone 8. Know the system to which the zone is referring.
- ◆ Is the species pest and disease resistant?
- ◆ What are the pruning and maintenance requirements, if any?
- ◆ What is the scientific name (Latin name), to ensure you get what you want? There are many plants called by the same common name, and forms and varieties of one species may have very different habits.

Make sure the plants are healthy and in proper natural form. If in a container, avoid any plants that are root bound or have circling roots. See the Maleike/Hummel reference for more discussion.

Check references for description. Local publications (Northwest and West Coast authors and publishers) are more accurate in describing how the plant species perform in this region.

Go to an arboretum or botanical garden to view trees and shrubs in their mature forms.

References

¹ Maleike, R. and R.L. Hummel. 1990. **Planting Landscape Plants**, Bulletin 1505. Washington State University Extension Service, Puyallup, WA.

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¹ Tree City USA. **How to Select and Plant a Tree**, Bulletin Number 19. The National Arbor Day Foundation, Nebraska City, NE.

Sources²

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Furgeson, N. 1984. **Right Plant, Right Place**. Summit Books, New York.

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¹ Puget Sound Power and Light Company. 1987. **The Tree Book**.

Sunset, editors. Latest edition. **New Western Garden Book**. Lane Publishing Co., Menlo Park, CA.

The local *Wells Medina Nursery* is an excellent source of knowledge and plant material conveniently located in proximity to Clyde Hill.

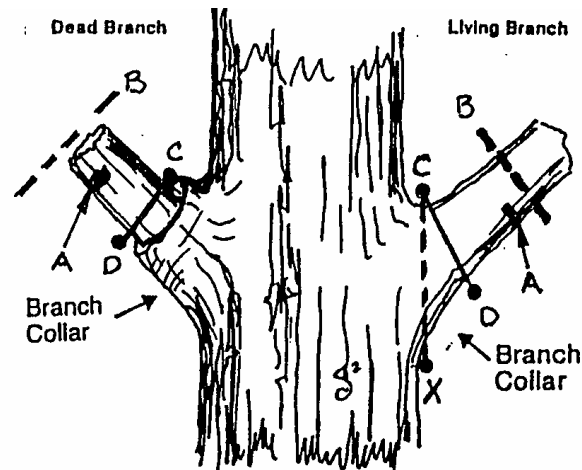
¹ Copy available in the Clyde Hill Urban Forest Library.

² A list of several other books on this issue is located in the Clyde Hill Urban Forest Library.

PROPER PRUNING

There are a few main rules about pruning trees and large shrubs:

1) The best cut to perform on a tree is a thinning cut where the branch is removed at the point of origin, either back to a larger branch or back to the trunk. Do not make a flush cut into the trunk tissue, but rather just outside of the branch collar.



2) Heading cuts are made to train one year old branches to grow a particular direction, or to encourage bud growth for bushiness. Do not make this kind of cut on the trunk or old large branches (termed topping or stubbing).

3) First, remove dead, diseased and damaged wood back to live, healthy tissue. If diseased, cut well below the infected tissue to reduce spread, and disinfect the pruners with rubbing alcohol after each cut.

4) The next kind of wood to remove would be any crossing or rubbing branches and branches out of place. Branches growing against the normal habit and suckers would be appropriate candidates.

5) Prune last to shape tree or shrub into desired form. The form that requires the least amount of maintenance is the normal growth habit of the plant. Become familiar with the species' unique form.

6) Do not remove more than a quarter to a third of the tree's live branches per year when performing these pruning techniques. Perhaps, tackle the most critical problems in one year and plan to shape in the next, to avoid the shock of significant leaf loss (by reducing the plant's capability to make food through photosynthesis).

7) Wound dressings are usually ineffective. It is best to make a proper cut and allow the tree to callous and close the wound on its own.

References

- Harris, R. 1992. **Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines.** Prentice-Hall, Englewood Cliffs, NJ.
- ¹ Maleike, R. **Pruning Trees: A Guide for Homeowners.** Washington State University Cooperative Extension Service. EB 1619.
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- Turnbull, C. 1991. **A Complete Guide to Landscape Design, Renovation, and Maintenance.** Betterway Publications, Inc., White Hall, VA.

Sources

- American National Standards Institute. **ANSI A300-2001 for Tree Care Operations-Tree, Shrub and other Woody Plant Maintenance-Standard Practices.**
- Pacific Northwest International Society of Arboriculture (ISA) has a list of certified Arborists for commercial tree work and consulting. www.pnwisa.org
- A list of several pruning books is available in the Clyde Hill Urban Forest Library.

¹ Copy available in the Clyde Hill Urban Forest Library.

PROPER PLANTING

Successfully planting landscape plants is probably the most critical factor in the success of the landscape. Refer to diagram during discussion below.

Planting time. The best time to plant is when the plant is inactively growing, usually between fall and spring. If planting at any other time, be very careful when dealing with the plant's tender root system.

Prepare the planting site. Dig a hole no deeper than the root ball but at least three times as wide, to allow lateral root movement into the native soil. Loosen the sides of the hole to eliminate an interface between the backfill and the undisturbed soil.

Prepare the plant. Keep the root ball moist at all times (before, during and after planting). If the plant is in a container, remove the pot, and for trees in burlap, remove the burlap and wire basket if possible without disturbing the root ball too much. If they cannot be removed, then untie and fold the burlap down at least a third of the way and slash the burlap in between the basket openings.

Planting. When the plant is set in the hole, make sure that the base of the trunk, or the root crown, is at or a little above the soil level. Do not plant too deep! If the soil with the plant is clay and very different from the native soil, scar or slash the root ball to lessen an interface between the two soils that will prevent root spread. However, if planting in the growing season, it is best to avoid any disturbance of the root ball. Make sure that any exposed roots are not damaged or circling. If possible evenly spread the roots and cleanly prune any damaged roots with sharp pruners to ensure good growth.

Do not amend the backfill. Research has shown that plants perform better when planted with native soil (Harris, Maleike, Turnbull). If the soil is poor, amend the entire planting area (see "Soils" section).

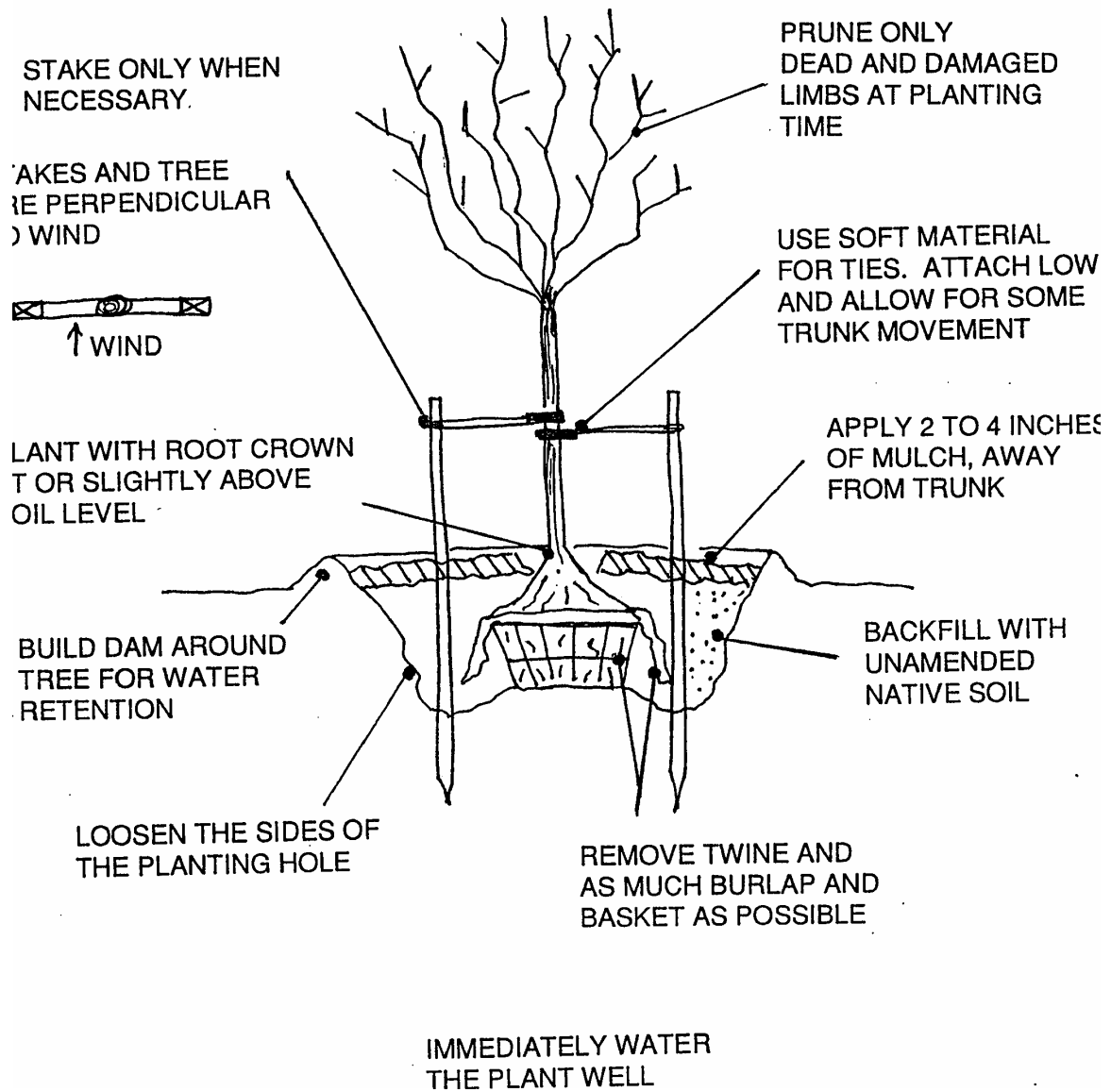
When backfilled, gently tap down the soil around the plant with a shovel or foot, or allow the water to settle the soil at initial watering. Do not stomp on wet soil. Create a drainage basin around the tree or shrub, with a dam at the periphery of the planting hole, to direct the water toward the root system.

Watering. Watering immediately after planting is one of the most crucial factors in the survival of the plant. If the soil is dry, give the root system a good soaking. Make sure that the water is penetrating the root zone by actually probing down for moisture after a watering period.

In the first growing season, it is imperative to water at least weekly (even native and drought plants). Water more often during droughts or with sandy soils.

Mulch. Applying 2 to 4 inches of mulch, around the root system, can greatly assist in the establishment of the plant. Organic materials, like compost, bark or

PROPER PLANTING TECHNIQUES



disease-free leaves, will retain moisture, reduce weeds and actually improve the soil structure and reduce the need for fertilizers. The mulch also designates a "no lawn" zone around the plant that will help prevent mechanical damage (from mowers, trimmers) to the plant. Do not put too much mulch, or it will prevent enough moisture and oxygen to get to the roots. Always mulch away from the trunk.

Fertilize? Many experts do not recommend fertilizing at planting time (Harris, Shigo). However, if drainage is fast (sandy soils), some slow release fertilizer would be advantageous. Allow the plant to acclimate, and perhaps fertilize in the next year, if the plant shows signs of nutrient deficiency.

Prune? Do not prune at planting time to compensate for root loss. Only prune out damaged branches, and consider pruning in the next year to balance or shape.

Stake? Although staking is widely seen, it is usually not necessary. Only stake if the tree cannot remain upright without support or would not be able to withstand strong winds. If needed, drive two stakes into undisturbed soil away from tree. Situate the stakes so that they and the tree are perpendicular to the prevailing wind. Use soft flat material for ties, not wire or twine that could easily injure the trunk of the tree. Put the ties as low as possible on the tree (about one third the height). Set the ties to allow some movement of the trunk.

Remove the stakes and ties as soon as the tree has established, usually after a year.

Wrap? Because of the mild and temperate climate of western Washington, it is not necessary to wrap the trunk of trees when transplanting.

References

Harris, R. 1992. **Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines**. Prentice-Hall, Englewood Cliffs, NJ.

Johnson, A.W. and J.M. Stypula (eds.). **Guidelines for Bank Stabilization Projects in the Riverine Environments of King County**. Surface Water Management Division, King County Department of Public Works, Seattle, WA., Draft, 1993.

¹ Maleike, R. and R.L. Hummel. 1990. **Planting Landscape Plants**. Washington State University Extension Bulletin 1505.

Shigo, A. 1991. **Modern Arboriculture**. Shigo and Trees Associates, Durham, NH.

¹ Copy available in the Clyde Hill Urban Forest Library.

- ¹ Tree City USA. **How to Select and Plant a Tree**, Bulletin Number 19. The National Arbor Day Foundation, Nebraska City, NE.
- Turnbull, C. 1991. **A Complete Guide to Landscape Design, Renovation, and Maintenance**. Betterway Publications, Inc., White Hall, VA.
- ¹ Washington State Department of Natural Resources. "Specifications and Maintenance Requirements for Small Businesses". Section 3, Planting Specifications.

HIRING AN ARBORIST

It is very important to hire knowledgeable and reputable professionals to do special tree care. Here are a few things to keep in mind when selecting an arborist.

- ◆ Ask if they are licensed, bonded, and insured for any tree work they will perform.
- ◆ Inquire about the arborist 's training and experience.
- ◆ Determine if the arborist is certified by the International Society of Arboriculture (ISA), which requires field experience and an examination. An updated list of certified arborists in the area is available on the website of the local chapter of ISA (www.pnwisa.org) or International (www.isa-arbor.com).
- ◆ Inquire if the arborist is a member of reputable organizations, e.g., the ISA, the National Arborist Association (NAA) or the American Forestry Association (AFA). These organizations promote continuing education through courses and publications. A list and description of several organizations are located in the Clyde Hill Urban Forest Library.
- ◆ Ask for local references, and contact the clients for evaluation of the service. If possible, view the work.
- ◆ If consulting services are needed (for diseases, hazards, etc.), ask if the arborist has done previous work, and check references.
- ◆ When getting an estimate, request for a written explanation of what the arborist will do (on which tree). Review their proposal with the guidelines on pruning in the Landscaping for View Preservation section and Proper Pruning in the Sustainability in Landscape Management section.
- ◆ Remember that a well-pruned tree often looks like no work was done at all, like a good haircut. The work of a good arborist is both an art and a science!

References

- ¹ Tree City USA. **How to Hire an Arborist**, Bulletin Number 6. The National Arbor Day Foundation, Nebraska City, NE.

Sources

Pacific Northwest Chapter International Society of Arboriculture. 503/874-8263
www.pnwisa.org.

¹ Copy available in the Clyde Hill Urban Forest Library.