

SCANNED



WASHINGTON FORESTRY CONSULTANTS, INC.

FORESTRY AND VEGETATION MANAGEMENT SPECIALISTS

W F C I

360/943-1723
FAX 360/943-4128

1919 Yelm Hwy SE, Suite C
Olympia, WA 98501

- Tree Protection and Replacement Plan -

SIENNA

7731 Littlerock Road SW
Olympia, WA

Prepared for: Ron Deering
Bob Hilden

Prepared by: Washington Forestry Consultants, Inc.

Date: August 9, 2004

THURSTON COUNTY
RECEIVED

JUL 22 2016

THURSTON COUNTY
RECEIVED

RESOURCE STEWARDSHIP

JUL 13 2022

BUILDING DEVELOPMENT CENTER

Introduction and Overview

The owners are planning to develop an 83-lot single-family residential development on 16.16 acres in the urban growth area of Tumwater, in rural Thurston County. The proponent has retained WFCI to:

- Evaluate all trees on the site pursuant to the requirements of Chapter 17.25 of the Thurston County Forest Land Conversion Ordinance.
- Make recommendations for trees suitable to be saved on lots, in open space or tree tract areas, along with required protection and cultural measures.
- Prepare a tree replacement and street tree plan for the project.

Methodology

Pursuant to this request, WFCI has individually evaluated each tree (in potential save areas) over 6" DBH (Diameter at breast height) in the proposed subdivision, and assessed its potential to be incorporated into the new project. Many smaller trees were evaluated in the tree tract and on the lots as well. The tree evaluation phase used methodology

developed by Matheny and Clark ¹ and of Harvey and Hessburg ² in the evaluation and preparation of this report.

Observations

Site History

The site was formerly used for a residence, pasture, and woodland. No structures exist today. The majority of the site today is forested, in grass, or it is old field in succession to forest.

The site is bordered by a similar rural-residential parcel to the south, agriculture to the north, forestland to the east, and Littlerock Road SW to the west. Black Hills High School occurs across Littlerock Road SW to the west.

Soil Depth and Productivity

The entire site is typed as the Nisqually loamy fine sand by the Thurston County Soil Survey. This is a very deep, somewhat excessively drained soil found on terraces. It formed in sandy glacial outwash. Permeability is moderately rapid in the surface layer and very rapid in the substratum. Available water capacity is moderate and the effective rooting depth for trees is over 60 inches. Windthrow hazard is *slight* under normal conditions. Droughtiness during the summer months may cause seedling mortality.

Tree Conditions

The forest cover was stratified into 2 forest cover types for purposes of description.

Type I. – This is the forest stand that covers the majority of the parcel (Appendix I). It has been partially harvested removing many of the larger, higher quality trees. The stand today is a mixture of the residual western hemlock (*Tsuga heterophylla*), bigleaf maple (*Acer macrophyllum*), western red cedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), and red alder (*Alnus rubra*). There are scattered other native species. The stocking level in the forest stand ranges from 55 to over 110 trees per acre. The trees range from 4 to over 40 inches DBH (diameter at breast height).

The health of the trees is fair to good, though many declining or multi-stemmed bigleaf maples occur. The soils on the site will support all of the above native tree species and many cultivars of ornamental trees.

¹ Matheny, Nelda and James R. Clark (1998). Trees and Development – A Guide to Preservation of Trees during Land Development. International Society of Arboriculture. Champaign, IL

² Harvey, Robert D. and Paul F. Hessburg (1992) Long-Range Planning for Developed Sites in the Pacific Northwest: The Context of Hazard Tree Management. USDA Forest Service Publication No. FPM-TP039-92, Washington D.C.

For the purposes of tree selection for retention, the highest priority should be as follows:

1. Western red cedar
2. Douglas-fir
3. Bigleaf Maple (single-stem form only without verticillium wilt symptoms)
4. Western hemlock (open grown, full-crowned trees only, or groves of small trees)

Red alder, cherry (*Prunus avium*), and Scouler willow (*Salix scouleriana*) should not be considered for retention, except in large natural stands where there are no targets.

I found no evidence of laminated root rot; however Armillaria root disease will occur in many of the larger western hemlocks. Many of the larger, decrepit bigleaf maples had stem conks and decay, as well as other structural problems. Several hazard trees along the edges of the project (in potential areas where trees could be saved) were marked (orange paint) in this type. These were mostly defective bigleaf maples.

Type II. – This includes the old home site, the recently mowed pastures, and old field successional areas. Ten scattered western hemlock, Douglas-fir, Lombardy poplar (*Populus nigra* 'Italica'), and Colorado blue spruce (*Picea pungens*) occur. The trees range from 6 to 24 inches DBH. They are located around the old home site east of Littlerock Road SW. Tree quality is fair to poor. Only the Douglas-fir is located where it potentially can be retained.

Discussion and Recommendations

Site Impacts

Tree removal on this parcel will not impact trees on any surrounding parcels.

Forest Land Conversion Permit

Trees removed from this parcel will contain more than 5,000 board feet. Therefore, a forest lands conversion permit is required.

Potential for Tree Retention

Tree Tract A. – This is the tree tract at the north edge of the entrance off of Littlerock Road SW. There are 5 Colorado blue spruce trees in the tract. The trees have been heavily damaged by the white pine weevil, which repeatedly kills the terminal leader. The tops have died back on all trees and they have developed a short, wide appearance. These 5 trees should be removed and replaced.

Tree Tract B. – There are no trees in Tract B. A large patch of western hazelnut occurs on the west edge of this tract. This will be removed and replaced with landscape trees.

Tree Tract C. -- This tract is located near the center of the Type I forest stand. The tree tract surrounds the stormwater pond and is approximately 35 feet wide. It is presently stocked with trees and brush. Many quality trees occur in this strip that can be retained. Several very high quality western red cedars occur. The actual boundary was not staked at the time of the evaluation; however some trees were located, evaluated, and marked with blue ribbons and/or paint. It is estimated that at least 32 trees can be saved (only 2 have been marked to date). The species included western red cedar, bigleaf maple, Douglas-fir, and western hemlock. This tract will need to be delineated in the field so that tree selection for retention can be completed prior to the start of clearing.

Lots. -- There are approximately 19 marked (blue paint dots) trees along the backs of lots that can be retained. These are western red cedar, Douglas-fir, bigleaf maple, and western hemlock that range in diameter from 4 to 26 inches. They occur within 15 feet of the back lot lines. Most are smaller diameter trees, however several large open grown western red cedars were marked for retention, and one large bigleaf maple that hangs over the neighbors pasture was marked to be saved.

Summary of Tree Retention. -- The following table provides a summary of the proposed tree retention:

AREA	SPECIES	EXISTING TREES	# SAVE TREES	DBH RANGE
Tree Tract A	None	5	0	--
Tree Tract B	None	0	0	--
Tree Tract C	Bigleaf maple, western red cedar, Douglas-fir, and western hemlock	~48	~32	8-34"
Lots	Bigleaf maple, western red cedar, Douglas-fir, and western hemlock	--	19	4-26"
Total		~53	~ 51	

Tree Protection Measures

Trees to be saved must be protected during construction by orange mesh fencing, located at the edge of the critical root zone. The individual critical root zones are a radius of 1' for each 1" of DBH (6' minimum), unless otherwise delineated by WFCI.

There should be no equipment activity within the critical root zone. No irrigation lines, trenches, or other utilities should be installed within the critical root zone. If roots are encountered outside the critical root zone, they should be cut cleanly with a saw and covered immediately with moist soil. Noxious vegetation within the critical root zone should be removed by hand or 'plucked' with an excavator sitting outside of the critical

root zones. If a proposed save tree must be impacted by grading or fills, then the tree should be re-evaluated by WFCI to determine if the tree can be saved and mitigating measures, or if the tree should be removed.

Pruning and Thinning

Trees in the vicinity of structures or other high use areas should have their crowns raised to provide 8 feet of ground clearance over landscaped areas and sidewalks, and 15 feet over driveways, streets, and access roads. Some trees will need to be crown cleaned to remove dead, dying, damaged, defective, and extra branches. This will improve the health, safety, and aesthetics of the trees. All pruning should be done, or be supervised by an International Society of Arboriculture Certified Arborist® and conform to the ANSI A300³ for proper pruning.

There will be some thinning recommended in the Tract C tree tract. The thinning will be designed to release higher quality trees and to promote stable trees with full crowns. This pruning and thinning should be marked by WFCI just prior to the start of clearing. The corners and either line of the Tract C will need to be marked to allow WFCI to marked the 'save' trees and trees and brush to be removed during clearing.

New Lot, Street, and Tree Tract Trees

The proposed tree replacement plan is designed to stock the new subdivision with quality shade trees and native conifers. Some accent trees are provided along Littlerock Road SW. The goal, however is to create a canopy of larger trees with contrasting conifer clusters. I expect residents to add their own choices of smaller flowering trees in their lot landscape plans.

A variety of shade tree species have been selected to provide contrasting fall and summer color, bark patterns, a mix of flowering, different textures, and contrasts while attempting to protect solar access and keep the large trees away from houses.

The following is the recommended tree planting plan for the subdivision. The plan recommends planting: 1) street trees throughout all interior streets, 2) at least 1 tree per 4000 ft² of lot area where no existing trees are to be retained, and 3) replanting of the tree tracts. The tree protection and tree planting design is illustrated on Figure 1.

The spacing between the larger street trees is recommended to be 50 feet. This spacing will vary due to locations of driveways and utilities. Do not plant the larger street trees closer than 30 feet on center.

The small scale street trees along Littlerock Road SW should be planted on 25 foot centers. Again this may vary due to the presence of improvements and signage.

³ American National Standard – ANSI A300 (Part 1 – 2001). Pruning for Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices. Washington, D.C.

No substitutions of other tree species should occur without consultation with WFCI.

Table 2. Tree Planting Recommendations.

MAP ID	SPECIES	BOTANICAL NAME	SIZE	TYPE	# TREES	TOTAL COST
	LOTS					
C	Western Red Cedar	<i>Thuja plicata</i>	7-8'	B&B	30	\$2,700
D	Douglas-fir	<i>Pseudotsuga menziesii</i>	7-8'	B&B	18	1,530
RO	Northern Red Oak	<i>Quercus rubra</i>	1.75"	B&B	12	2,520
T	Tuliptree	<i>Liriodendron tulipifera</i>	1.75"	B&B	12	1,680
L	Greenspire Linden	<i>Tilia cordata</i> 'Greenspire'	1.75"	B&B	4	840
S	Sugar Maple	<i>Acer saccharum</i> 'Green Mountain'	1.75"	B&B	12	2,520
W	Swamp White Oak	<i>Quercus bicolor</i>	1.75"	B&B	2	430
N	Norwegian Sunset Maple	<i>Acer truncatum</i> x <i>A. platanoides</i> 'Keithsform'	1.75"	B&B	3	630
RM	October Glory Red Maple	<i>Acer rubrum</i> 'October Glory'	1.75"	B&B	4	760
	Subtotal - Lots				97	\$13,610
	TREE TRACTS A,B,C					
CH	Royal Burgundy Flowering Cherry	<i>Prunus</i> 'Royal Burgundy'	1.75"	B&B	6	\$1,260
H	Ruby Red Horsechestnut	<i>Aesculus</i> x <i>Carnea</i>	1.75"	B&B	3	645
B	European Beech	<i>Fagus sylvatica</i>	1.75"	B&B	1	215
W	Swamp White Oak	<i>Quercus bicolor</i>	1.75"	B&B	4	860
G	Goldenraintree	<i>Koelreuteria paniculata</i>	1.75"	B&B	6	1,140
RO	Northern Red Oak	<i>Quercus rubra</i>	1.75"	B&B	2	420
C	Western Red Cedar	<i>Thuja plicata</i>	7-8'	B&B	8	720
D	Douglas-fir	<i>Pseudotsuga menziesii</i>	7-8'	B&B	7	595
RM	October Glory Red Maple	<i>Acer rubrum</i> 'October Glory'	1.75"	B&B	1	190
TG	Tupelo Gum	<i>Nyssa sylvatica</i>	1.75"	B&B	1	215
P	Redspire Flowering Pear	<i>Pyrus callaryana</i> 'Redspire'	1.75"	B&B	3	555
J	Japanese Snowbell	<i>Styrax japonica</i>	1.75"	B&B	8	1,840
	Subtotal - Tree Tracts				42	\$ 8,655
	STREET TREES					
F	Red Jewel Flowering Crabapple	<i>Malus</i> 'Jewelcole'	2.0"	B&B	7	\$1,470
T	Tuliptree	<i>Liriodendron tulipifera</i>	2.0"	B&B	38	8,360
A	Autumn Purple Ash	<i>Fraxinus americana</i> 'Autumn Purple'	2.0"	B&B	37	8,140
N	Norwegian Sunset Maple	<i>Acer truncatum</i> x <i>A. platanoides</i> 'Keithsform'	2.0"	B&B	27	6,075
	Subtotal - St. Trees				109	\$24,045
	GRAND TOTALS				248	\$46,310

B&B = Balled and Burlap; Cont. = Containers; All trees are available from Northwest Shade Trees in Boring, OR; Cost includes the tree, planting and 3 years of maintenance.

Trees and Planting Specifications

The following summarizes the tree and planting specifications:

All street trees should be balled and burlap, or containerized trees with a good central leader. All trees and shrubs should conform to the *American Standard for Nursery Stock* ANSI Z60.1-1996 for size, root ball diameter, and quality, and be planted according to industry standards⁴. A 2-3" layer of bark or composted wood chip mulch should be applied at least 3 times the diameter of the root ball. All trees should be staked according to industry standards.

All landscape street trees should have a well-defined central stem (except flowering plums and cherries) and show evidence of corrective cultural pruning in the nursery. Tree planting should occur in the spring between March 1 and June 1, or in the fall between October 1 and December 1. Irrigation should be provided to the trees and shrubs at least weekly during the summer, in the absence of adequate rainfall. All street trees are to be planted on approximately 50' centers, unless shown otherwise on figure 1.

Timeline for Activity

1. Stake the perimeter of Tree Tract C.
2. Contact WFCI to mark the save trees and removals in Tract C along with the locations of the necessary tree protection fences.
3. Complete thinning and pruning of save tree areas.
4. Install tree protection fences as marked by WFCI. Maintain fences throughout construction.
5. Complete the logging and stump removal.
6. Construct project.
7. Plant street and other replacement trees during the appropriate season of planting (October 15 through December 1 and March 1 through April 15).
8. If street or other trees are planted prior to lot construction, then these trees need to be watered in the summer months and protected with tree protection fencing during construction on the lot. In some cases 'save' trees may also need irrigation if root systems have been disturbed.

Summary

The Thurston County ordinance requires that a least one tree be protected or replanted for each 4,000 sq. ft. of lot area. The following is a summary of the tree protection and replacement plan:

⁴ Principles and Practice of Planting Trees and Shrubs (1997). International Society of Arboriculture, Champaign, IL.

Total Project Acreage:	16.16 acres
Area of Lots	461,690 ft ²
# Trees Required to be Saved or Planted (461,690 ft ² /4000)	116 trees
Planned Retention for Lots	19 trees
Planned Replanting on Lots	<u>97 trees</u>
Total to be Saved and Planted on Lots	116 trees
Excess of Lot Planting/Retention over Requirement	0 trees
Trees to be Saved in Tract A:	0 trees
Trees to be Planted in Tract A:	7 trees
Trees to be Saved in Tract B:	0 trees
Trees to be Planted in Tract B:	20 trees
Trees to be Saved in Tract C:	~32 trees
Trees to be Planted in Tract C:	<u>~23 trees</u>
Total Trees Saved and Planted in Tree Tracts:	~82 trees
Street Trees to be Planted:	109 trees
Total Area in Tree Tracts	1.21 ac.(7.5%)

The area in lots is 461,690 ft². A total of 116 trees must be retained or replanted on lots. The above plan proposes retention and planting of 116 trees on lots, meeting the minimum Thurston County requirements. An additional 109 street trees and 42 tree tract trees are proposed to be planted. The total estimated cost of all tree planting, including trees, planting, and 3 years of maintenance is estimated to be \$46,310.

The location of many of the save trees in Tract C, will greatly reduce the clearcut appearance of the project. This tree retention coupled with proposed tree planting will create an attractive community of native and ornamental shade and accent trees over time.

Please give me a call if you have questions.

Respectfully submitted,

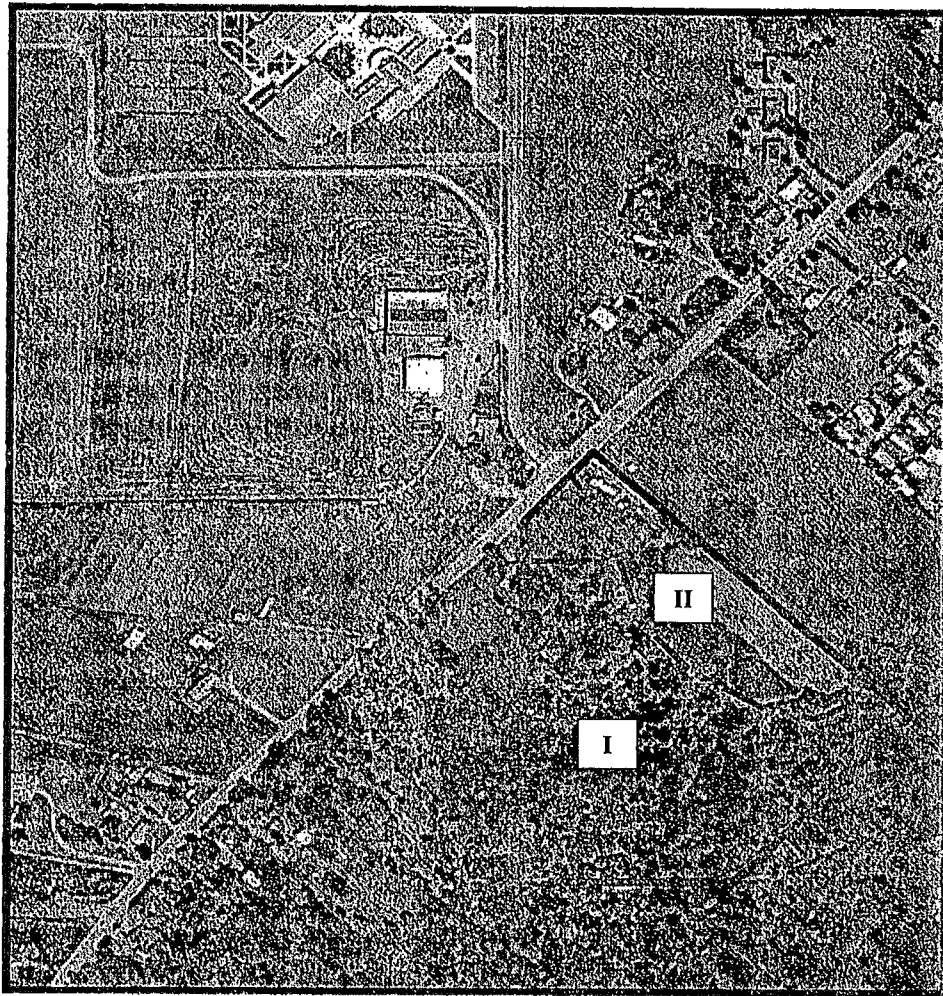
Washington Forestry Consultants, Inc.

Galen M. Wright, MSF, ACF, ASCA
Certified Forester No. 44
Certified Arborist No. PN-0129

attachments: figure 1 – proposed tree protection and replacement plan

APPENDIX I

Aerial Photo and Forest Cover Types Existing Conditions



Forest Cover Types

Type I – WH, bm,rc,df 4 to 40 " DBH 55 to 110 trees per acre (partially harvested)

Type II – Pasture and Old Field (10 trees)

APPENDIX II

Methodology for Tree Evaluation

The evaluation of the tree's condition, included assessment of:

- Live-crown ratio,
- Lateral and terminal branch growth rates,
- Presence of dieback in minor and major scaffold branches and twigs,
- Foliage color,
- Stem soundness and other structural defects,
- Visual root collar examination,
- Presence of insect or disease problems.
- Windfirmness if tree removal will expose this tree to failure.

In cases where signs of internal defect or disease were suspected, trees were cored to look for stain, decay, and at diameter growth rates, and root collars were dug to look for the presence of root disease.

In all cases, the overall appearance of the tree was considered relative to its ability to add value to a lot or the entire subdivision, and the scale of the tree and it's proximity to houses is considered.

Lastly, the potential for incorporation into the project design is evaluated, as well as potential site plan modifications that may allow the tree(s) to be protected in the development.

Trees that are preserved in a development must be carefully selected to make sure that they can survive construction impacts, adapt to a new environment and perform well in the landscape. Healthy, vigorous trees are better able to tolerate impacts such a root injury, changes in soils moisture regimes, and soil compaction than are low vigor trees.

Structural characteristics are also important in assessing suitability. Trees with significant decay and other structural defects that cannot be treated are likely to fail. Such trees should not be preserved in areas where damage to people or property could occur.

Trees that have developed in a forest stand are adapted to the close, dense conditions found in such stands. When surrounding trees are removed during clearing and grading, the remaining trees are exposed to extremes in wind, temperature, solar radiation that causes sunscald, and other influences. Young, vigorous trees with well-developed crowns are best able to adapt to these changing site conditions.