

Tree Retention Plan

for The Blueline Group
Project Location:
275th Ave NE and NE 150th Street
Duvall WA 98019



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Assignment

I was hired to provide a tree retention plan for a pedestrian path on the east side of 275th Ave NE between NE 145th Lane and NE 150th Street in Duvall WA. My report will be guided by Duvall Municipal Code (DMC) tree protection requirements and arboricultural best practices.

Limits of Assignment

Unless stated otherwise, the information contained in this report covers only the trees I examined, and reflects the condition of these trees at the time of inspection. My inspection is limited to visual examination of the subject trees as prescribed in the ISA Best Management Practices: Tree Risk Assessment: International Society of Arboriculture: 2011 and the ISA Best Management Practices: Managing Trees During Construction: International Society of Arboriculture: 2016.

Purpose and Use of the Report

This report should be used to establish compliance with DMC land use in regard to tree protection and retention efforts.



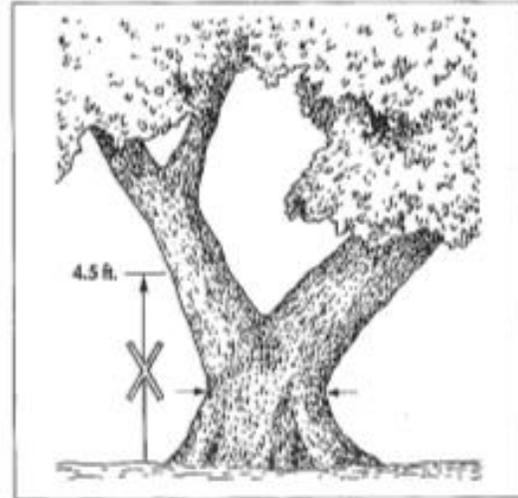
Image 1 - Aerial view of the trees in this survey are indicated by the dashed oval. (Google Maps)

Tree Measurement

I measure a tree at the smallest circumference at or below four and a half feet from grade. The girth of a tree is typically expressed in terms of the DBH (diameter at breast height); I derive this measurement by dividing the measured circumference by π or 3.14159.

When measuring a tree with more than one trunk or stem, I follow the industry standard of measuring each stem, calculating for the cross sectional area, and adding these together for a total representative diameter.

Municipalities differ in regard to standards for girth measurement. DMC defines the Diameter at breast height (DBH) as the “diameter...four and one-half feet above the ground line on the high side of the tree.” The code also specifies measuring multi-stemmed trees by using “the square root of the sum of the DBH for each individual stem squared.”



Visual Tree Assessment

I use a Visual Tree Assessment (VTA) method to evaluate tree health, structure, and form. The VTA is an ordered analysis of the foliage and buds, small twigs, scaffold branches, the trunk, trunk flare, any roots that may be visible, and the general site condition around the tree. I am able to compare a tree with other trees I have observed to note typical patterns and abnormalities that may be present. The observations are based on my knowledge of tree structure and conditions as well as my past experiences as an arborist. (Lilly, 2001)

Observations

The plan will retain 12 trees - 7 western red cedar *Thuja plicata*, 4 Douglas-fir *Pseudotsuga menziesii*, and 1 big leaf maple *Acer macrophyllum*. A dead Douglas-fir snag approximately 20 feet tall and 26" DBH will also be retained.

Six of the trees retained are exceptional based on the DMC criteria of 30" DBH or greater.

There are several alder *Alnus rubra*, cottonwood *Populus trichocarpa*, willow *Salix spp.*, and locust *Robinia pseudoacacia*, trees on site. They range in size from a few inches in diameter to 26 inches DBH. Some of these will be removed by the city public works crews and others by PSE contractors and some by the construction contractor during the project.

The pedestrian path will of necessity be within a few feet of the retained trees.

Twenty-four Fireburst® paperbark maple *Acer griseum*, trees will be planted within the ROW. These will be placed forty feet apart on center in the areas where there are no preserved trees.

Please see Appendix A - Topo-survey, Appendix B - Retained Trees, and Appendix C - Tree Inventory.



Image 2 - This photo looks south from NE 150th Street at the north end of the trail project. The evergreen trees here have a good outcome for preservation even though the new pathway will be within the critical root zone on the road side of the trees.



Image 3 - This is the same group of trees from Image 1 but looking to the NE. The evergreen trees in this image are all viable candidates for preservation.



Image 4 - This photo looks south from the same vantage point as Image 2. Most of the trees on the left side of the photo are alder trees that are non-significant. They will be removed and replaced with paperbark maple trees.



Image 5 - The white arrow points to the habitat snag that will likely remain as an ecological feature of the site. It is an approximately 20 foot tall dead Douglas-fir snag and is tagged as #5057.



Image 6 - is a 10" DBH western red cedar, tag #5081, that will be retained.



Image 7 - This multi-stemmed bigleaf maple, tag #5082, has a calculated DBH of 50". The path will pass on the back side of this tree between it and a large western red cedar (#5084).



Image 8 - These two trees, Douglas-fir #5115 and Western red cedar #5116, are the last two trees to be preserved. From this point south to NE 145th Lane are mostly cottonwood and alder trees that will be removed and replaced with paperbark maple trees.



Image 9 - This view is to the south end of the pedestrian path. These non-significant trees will be removed and replaced.

Discussions

Condition Rating

Tree condition is a factor of overall health, structure, and form. The categories are based on a Visual Tree Assessment (VTA) and are described as follows:

Exceptional - Good health, structure, and form. This would be an ideal (or nearly) tree of the species and location.

Good - Normal vigor, and well-developed structure as well as functionally and aesthetically beneficial. A tree with potential long life on this site.

Fair - Reduced vigor and/or significant damage or problems that are not fatal. At least one significant structural problem or multiple moderate defects requiring treatment. Major asymmetry or deviation from the species normal form. Function and aesthetics are compromised.

Poor - Poor vigor with abnormal foliar color, size or density with potential irreversible decline. One serious structural defect or multiple significant defects that cannot be corrected and failure may occur at any time. Such poor form the tree has little or no function/aesthetic benefit.

Very Poor - Poor vigor and dying with little foliage and in irreversible decline. Severe defects with the likelihood of failure being probable or imminent. This would be a very unappealing tree in the landscape.

Dead - No foliage with no functional benefit to the site.

(Some dead trees may have a high ecological benefit to the site and would be noted as such.)

Suitability for Preservation

Health, distance from grading or construction activities, structural defects, construction tolerance of a species, relative age, soil quality, and species desirability are factors that determine a tree's suitability for preservation. I rate these using a scale of good, moderate, or poor as described below:

Good - High potential for longevity on the site after construction.

Moderate - May require more in-depth management and monitoring, before, during, and after construction, and may have a shortened lifespan compared to those in the "Good" category.

Poor - These trees can be expected to decline during or after construction regardless of management.

Construction Impact Rating

Construction impact assesses how the development process will affect the condition and suitability of an individual tree for preservation. For example, a tree in good condition and suitable for preserving for other reasons may be located too close to an area on the site containing underground utilities and the only reasonable way of implementing the construction plans would result in too much root loss. Or the tree may be located in the middle of the new building footprint. In these cases the construction impact rating helps to guide whether or not changes can be made to the plan or if great effort should be made to preserve an otherwise suitable tree. I divide the construction impact rating into the four following categories:

Extreme - These are trees that will have an extreme impact on the construction process if required to be retained. Preservation will require drastic efforts or a complete redesign of construction plans to successfully retain the tree.

Significant - Trees where retention could be considered but will require more than normal efforts for successful retention. Examples would be trees where the majority of the Critical root Zone (CRZ) is located within an area of highly used during construction and no other means of access are available. These will require constant or frequent monitoring and mitigation of damage after construction and may still not survive the development process.

Minor - These are trees where normal protection will be required. Examples are trees where the CRZ can be fully protected even though construction personnel will need to pay attention to not violate any preservation restrictions.

Negligible - These are trees where normal tree protection will not impact the construction and development in any way. These will often be trees located some distance from construction activity.

Critical Root Zone and Tree Protection Zone

A Critical Root Zone (CRZ) is an established concept based on condition, size, age, and species tolerance. It is generally accepted trees will survive a development process if the CRZ is preserved.

A CRZ is defined as the area immediately adjacent to a tree where roots essential for health and stability are located. The CRZ is subjectively evaluated based on an arborist's professional judgement and experience with tree species and local factors - there is not an accepted formula defining it. *However, the DMC defines the CRZ as, "the circular area surrounding a tree, centered at the base of the trunk, with a radius equal to one foot for every one inch of trunk diameter."*

There is, an industry accepted basis for establishing a Tree Protection Zone (TPZ) intended to protect roots and soil within the CRZ and beyond, to ensure future tree health and stability. Current best practices call for an arborist defined TPZ based on the diameter of the trunk multiplied by a factor of 6 to 18 depending on tree condition, species tolerance to construction damage, and its relative age.

At times the TPZ radius is impractical or prohibits the ability to perform the necessary construction activities without without compromising tree health or structure. In these instances, the impact on construction from preservation would not make tree retention a viable or reasonable course of action.

When considering which trees are best preserved in a development area, the CRZ can be implemented into site plans. Often it is recommended to preserve those with an overlapping CRZ to ensure the maximum number of trees are preserved. It is also important to note smaller trees will have a much smaller CRZ needed and can be much easier to retain.

The DMC also defines an Inner CRZ as "an area... equal to one-half the diameter of the critical root zone." It calls for added post treatment care of any trees that experience disturbance within this zone.

Viability and Windfirm Assessments

According to the DMC definitions:

Viable "means a significant tree that a qualified arborist has determined to be in good health with a low risk of failure, is relatively windfirm if isolated or exposed, is a species that is suitable for its location, and is therefore worthy of long-term retention."

Windfirm "means a tree that is healthy and well-rooted, with qualified professional arborist evaluation and determination that it can withstand normal winter storms in Duvall."

I assess these conditions as part of my normal VTA and with guidance from industry standards for Tree Risk Assessment.

Conclusions and Recommendations

1. All of the retained trees are viable.
2. All of the retained trees are windfirm.
3. Install tree protection fencing to fit the edge of required construction on the west side of the trees and to inhibit any egress into the full CRZ in other areas. In application, the TPZ could easily be the whole portion of the site under the utility wires.
4. The pathway will be within the CRZ of the retained trees. Care will need to be taken when working around the trees by having an arborist on site during the initial excavation of the pathway to assess if any damage will result in their condition deteriorating. The contractor should be prepared to utilize alternative excavation methods such as hand digging, air or hydro excavation of soil, and perhaps lessening the depths of below grade material near the trees.
 - A. Because impact to the trees will only be on the west side of most of the trees, they should all remain viable and windfirm.
 - B. Specifically in regard to trees #5082 and #5084 - The path will pass between these two relatively large trees. An arborist should be on hand during the initial excavation or grading work to assess any roots encountered and evaluate whether the viability and windfirm status will be degraded due to the construction. At this time I believe they will continue to be viable and windfirm.

Bibliography

Accredited Standards Committee. ANSI A300 (Part 5) - 2005 Tree Shrub and Other Woody Plant Maintenance - Standard Practices (Management of Trees and Shrubs During Site Planning, Site Development, and Construction). Londonderry, NH: Tree Care Industry Association, 2005

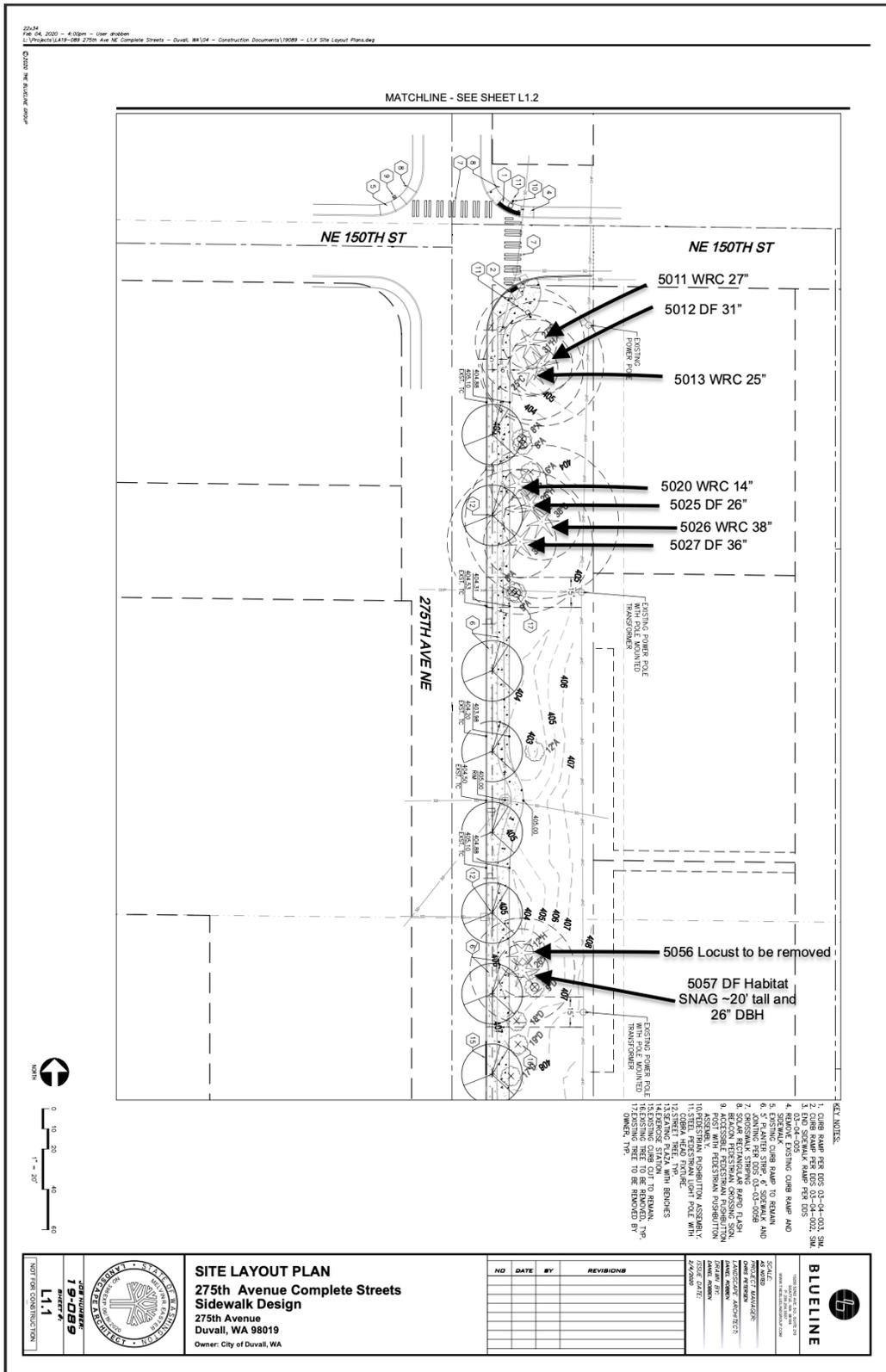
Dunster, Julian; et al. Tree Risk Assessment Manual. Champaign, IL: International Society of Arboriculture, 2013

Fite, Kelby; Smiley, E. Thomas. Best Management Practices Managing Trees During Construction, Second Edition 2016. Champaign, IL: International Society of Arboriculture, 2016

Lilly, Sharon. Arborists' Certification Study Guide. Champaign, IL: The International Society of Arboriculture, 2001

Oregon State University Extension Service. Tree Protection on Construction and Development Sites. Oregon State University, 2009

Appendix A - Topo-survey



Appendix B - Retained Trees

Species	Tag Number	Retain	DBH	Exceptional	CRZ	Interior CRZ	Condition	Suitability	Impact	Part most Likely to Fail	Likelihood of Failure	Likelihood of Impact	Consequences of Failure	Viability	Windfirm	Notes
Western red cedar	5011	Yes	27		27	14	Exceptional	Moderate	Significant	Root	Improbable	Low	Significant	Good	Yes	
Douglas-fir	5012	Yes	31	Yes	31	16	Exceptional	Good	Significant	Root	Possible	Low	Significant	Good	Yes	
Western red cedar	5013	Yes	25		25	13	Exceptional	Moderate	Significant	Root	Improbable	Low	Significant	Good	Yes	
Western red cedar	5020	Yes	14		14	7	Good	Moderate	Minor	Root	Improbable	Low	Significant	Good	Yes	
Douglas-fir	5025	Yes	26		26	13	Good	Good	Significant	Root	Possible	Low	Significant	Good	Yes	
Western red cedar	5026	Yes	38	Yes	38	19	Good	Moderate	Significant	Root	Improbable	Low	Significant	Good	Yes	
Douglas-fir	5027	Yes	36	Yes	36	18	Good	Good	Significant	Root	Possible	Low	Significant	Good	Yes	
Douglas-fir	5057	Yes*	26		26	13	Dead		Significant	Root	Possible		Significant	Good	Yes	Snagged
Western red cedar	5081	Yes	10		10	5			Minor							
Bigleaf maple	5082	Yes	50	Yes	50	25	Fair	Moderate	Significant	Root	Improbable	Medium	Severe	Good	Yes	13, 13, 18, 8, 14, 12, 18, 19, 16, 16, 17
Western red cedar	5084	Yes	40	Yes	40	20	Exceptional	Moderate	Significant	Root	Improbable	Low	Significant	Good	Yes	
Douglas-fir	5115	Yes	40	Yes	40	20	Exceptional	Moderate	Significant	Root	Improbable	Low	Significant	Good	Yes	
Western red cedar	5116	Yes	24		24	12	Good	Moderate	Significant	Root	Improbable	Low	Significant	Good	Yes	

Appendix C - Tree Inventory

Species	Tag Number	Retain	DBH	Exceptional
Western red cedar	5011	Yes	27	
Douglas-fir	5012	Yes	31	Yes
Western red cedar	5013	Yes	25	
Red Alder	5016		8	
Red Alder	5017		8	
Red Alder	5019		16	
Western red cedar	5020	Yes	14	
Douglas-fir	5025	Yes	26	
Western red cedar	5026	Yes	38	Yes
Douglas-fir	5027	Yes	36	Yes
Red Alder	5028		9	
Red Alder	5029		8	
Cottonwood	5043		12	
Black locust	5056		12	
Douglas-fir	5057	Yes*	26	
Cottonwood	5064		9	
Willow spp.	5066	No	18	
Black locust	5067	No	19	
Black locust	5077	No	17	
Black locust	5079	No	10	
Cottonwood	5080		9	
Western red cedar	5081	Yes	10	
Bigleaf maple	5082	Yes	50	Yes
Western red cedar	5084	Yes	40	Yes
Black locust	5092		12	
Cottonwood	5105		19	
Cottonwood	5107		18	
Cottonwood	5108		19	
Cottonwood	5111		18	
Cottonwood	5112		12	
Cottonwood	5113		13	
Douglas-fir	5115	Yes	40	Yes
Western red cedar	5116	Yes	24	
Red Alder	5117	?	8	
Bigleaf maple	5185	Yes	26	
Cottonwood	5189		15	
Cottonwood	5190		10	
Cottonwood	5191		18	
Cottonwood	5192		15	
Cottonwood	5193		20	
Cottonwood	5194		24	
Cottonwood	5195		13	
Cottonwood	5196		19	
Cottonwood	5197		14	
Cottonwood	5198		14	

Appendix D - Assumptions & Limiting Conditions

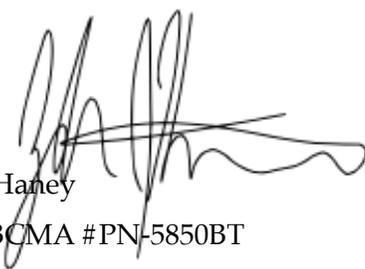
1. Consultant assumes that any legal description provided to Consultant is correct and the title to property is good and marketable. Consultant assumes no responsibility for legal matters. Consultant assumes all property appraised or evaluated is free and clear, and is under responsible ownership and competent management.
2. Consultant assumes the property and its used do not violate applicable codes ordinances statutes or regulations.
3. Although Consultant has taken care to obtain all information from reliable sources and to verify the data in so far as possible, Consultant does not guarantee and is not responsible for the accuracy of information provided by others.
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10. Loss or alteration of any part of this agreement invalidates the entire report.

Appendix E - Certification of Performance

I, Zebadiah J. Haney, certify that:

1. I have personally inspected the trees in properties referred to in this report and have stated my findings accurately.
2. I have no current or prospective interest in the tree or the property that is the subject of this report and have no personal interest or bias with respect to the parties involved.
3. The analysis, opinions and conclusions as stated herein are my own and are based on current scientific procedures and facts.
4. My analysis, opinions, and conclusions were developed in this report has been prepared according to commonly accepted arboricultural practices.
5. No one provided significant professional assistance to me, except as indicated within the report.
6. My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other reporting party nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.

I further certify that I am a Registered Consulting Arborist® with the American Society of Consulting Arborists (ASCA) and that I adhere to the ASCA Standards of Professional Practice. I am a Board Certified Master Arborist®, a Certified Tree Worker Climber Specialist® and a Qualified Tree Risk Assessor through the International Society of Arboriculture (ISA). I have been involved with the practice of Arboriculture since 1999.



Zeb Haney
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