

Beechwood Tree Service
4300 Riverside Road
Duncan BC V9L 6M8
Ph: (250) 715-7910
E-mail: jens@beechwoodtrees.com

May 19th, 2009.

Ken Horton P. Eng
District of North Cowichan
Duncan BC

Dear Mr. Ken Horton:

I have inspected and evaluated 62 trees in the Gilana Place subdivision. I tagged all the evaluated trees for easier identification and each tree was located with GPS. A hazard rating including any major defects plus preservation information is listed for each tree on page 5 to 9.

I evaluated 28 Douglas Firs (*Pseudotsuga menziesii*), 17 Garry Oaks (*Quercus garryana*), 4 Western Red Cedars (*Thuja plicata*), 3 Big Leaf Maples (*Acer macrophyllum*), 3 Bitter Cherry (*Prunus emarginata*), 3 Cottonwoods (*populus spp.*), 1 Grand Fir (*Abies grandis*), 1 Hawthorne (*Crataegus spp.*), 1 Red Alder (*Alnus rubra*) and 1 Cascara (*Rhamnus purshiana*).

Most of the evaluated trees are in average health, the remaining are slightly above or below average. A few (# 322, 340 & 341) needs corrective pruning if they are to be retained. Tree # 349 has a major defect and it should be removed, also in lot # 9 there is a large Douglas Fir with a bow in the trunk and an increasing lean that should be removed, it is located 4 meters west of tree # 314.

The hazard rating for each tree is for the day they were evaluated. The rating will likely increase when the area is cleared. The target rating will increase during and after the construction phase as the area will become inhabited. In order to keep the hazard rating low to moderate it is essential that care be taken during clearing and construction. On page 3 and 4 you will find explanatory notes on the hazard ratings.

The most difficult trees to preserve in the subdivision are the mature (large) trees. They need a proportionally larger tree protection zone compared to a smaller tree; also mature trees are less tolerant of disturbance to their root system.

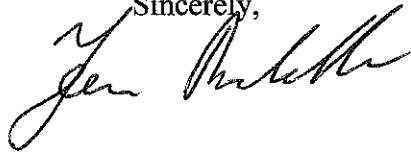
On page 10 you will find the table "Relative Tolerance of Selected Species to Development Impacts", that gives preservation specifications on each species found at the subdivision. On the site plan I have drawn tree protection zones around individual trees or groups of trees. No activity should occur inside this zone, i.e. grading, trenching equipment usage etc. The protection zone is off limits to anything that can compromise the trees root system and/or the trees. The tree protection zone can be altered somewhat to facilitate development but no more than one quarter to one third of the trees root system can be compromised. When you look at the site map you will find that not all

trees can be retained as they will block access to most of the lot. This is mainly an issue in lot 8, 9, 10 & 11.

I recommend that once the clearing of the underbrush is done a barrier (snow fence) be erected to identify and secure the tree protection zone areas. The clearing of the underbrush must be done so it has minimal impact on the protected trees. I recommend that equipment used for clearing should be operated from outside the protection zones (pull debris away from trees). The soil in the protection zone should preferably not be disturbed and if it is, no deeper than 5 centimeters. Trees have a shallow root system; most of the roots lie less than 20 to 30 centimeters below the surface. If equipment needs to drive on the protection zone, 15 to 20 centimeters of mulch (bark mulch or wood chips) can be placed to protect the roots.

If you have any question or need clarification on anything in this report call or e-mail me.

Sincerely,

A handwritten signature in black ink, appearing to read "Jens Barsballe". The signature is fluid and cursive, written over the word "Sincerely,".

Jens Barsballe
ISA Certified Arborist
Certified Tree Risk Assessor

Explanatory notes to the Tree Risk Assessment Form

The Tree Risk Assessment Form used for the Gilana Place Subdivision is set up to systematically record data required to calculate the overall risk level of trees. Some of the fields are self explanatory, the remainder needs some clarification. The Visual Tree Assessment or VTA method was used to evaluate the trees. I have added preservation information and Optimal Tree protection Zone for each tree to this form.

The diameter of a tree is measured at breast height, in short: DBH. This measurement is used to determine the growth of the tree between evaluation and it also gives the reader an idea of size of a tree.

The risk columns are divided into four groups; Probability of failure, Size of defective part (s), Probability of target damage and other risk factors.

Probability of failure has four risk levels:

- | | |
|---------------------|--|
| Low, 1 point: | The defect is not likely to lead to imminent failure; minor defects |
| Moderate, 2 points: | One or more defects are well established but would typical not lead to failure for several years. Corrective action might be useful to prevent future problems: Several defects would be present |
| High, 3 points: | The defect is serious and imminent failure is likely and corrective actions is required immediately (next few days or weeks). One or major defects present. |
| Extreme, 4 points: | The tree or component part is already failing; an emergency treatment is required today. Multiple high or extreme risk defects present. |

Size of defective part(s) has three categories:

- | | |
|-----------|---|
| 1 point: | Branches or stems up to 10 centimeters in diameter. |
| 2 points: | Branches or stems between 10 to 50 centimeters in diameter; whole tree, some decay, minor cracks |
| 3 points: | Branches or stem greater than 50 centimeters in diameter; whole tree with advanced decay, extensive root rot, extensive cracks. |

Probability of target damage has three categories (partial list):

- | | |
|--------------------|--|
| Low, 1 point: | Infrequently used, seldom for any great length of time; trails and transition areas with limited access |
| Moderate, 2 point: | People move through the area regularly, but do not stay within striking range very long. Moderate use parks and picnic areas; moderate to high use trails and parking lots with daily use. |
| High, 3 points: | Frequent use by people often for longer periods, or high volumes of people coming and going within striking distance. Valuable buildings within striking distance. Short- |

term parking in constant use; pick-up and drop-off areas.
High use visitor centers or shelters.

Other risk factors, 0-2 point: This category is used for other factors, i.e. newly exposed trees that might not be wind firm, abnormal soil moisture levels, proximity of heavy machinery that might cause adverse vibration levels.

Risk rating is the sum of the four groups, ranking each tree:

Low risk	3 points
Moderate risk	4-6 points
High risk	7-9 points
Extreme risk	10-12 points

Note of caution; there are, of course, many permutations about ranking any one factor. For example: A large lateral limb separating from the trunk will have a high overall risk level if the target area is used all day long, but may have a moderate to low overall risk level if it faces away from the target area, or if it is located over a trail seldom used.

References

J. R. Clark and N.P. Matheny, 1998. Trees and Development, A Technical Guide to Preservation of Trees During Land Development. International Society of Arboriculture. 183 pp.

Tree Risk Assessment Form with preservation information

Tree #	Species	DBH (cm)	Location details (GPS)	Describe defects	Probability of failure				Risk rating (sum of 1, 2, 3 & 4)	Preservation Information	Optimal Tree Protection Zone (radius) in meters
					1	2	3	4			
301	Douglas Fir	80	48°47.604 N 123°43.745 W	Large branches	1	1	1	1	4	Large tree, needs a very large protection zone	9.60
302	Douglas Fir	50	48°47.607 N 123°43.751 W	Large branches	1	1	1		3	Can be retained	6.00
303	Cottonwood	47	48°47.604 N 123°43.758 W	Large limbs in upper part of tree	2	2	2		6	Can be retained, short lived tree	4.25
304	Garry Oak	44	48°47.592 N 123°43.734 W	Slight lean	2	2	1		5	Retain	3.90
305	Garry Oak	50	48°47.597 N 123°43.746 W	Dead branches	2	1	1		4	Retain	4.50
306	Garry Oak	25	48°47.597 N 123°43.752 W	Lean	2	1	1		4	Retain	1.75
307	Garry Oak	24	48°47.597 N 123°43.754 W		1	1	1		3	Retain	1.75
308	Douglas Fir	76	48°47.594 N 123°43.752 W		1	1	1		3	Can be retained, needs large protection zone	9.10
309	Douglas Fir	81	48°47.596 N 123°43.753 W		1	1	1		3	Can be retained, needs large protection zone	9.70
310	Garry Oak	16	48°47.596 N 123°43.754 W		1	1	1		3	Retain	1.50
311	Douglas Fir	28	48°47.596 N 123°43.753 W		1	1	1		3	Retain	2.50
312	Garry Oak	25	48°47.594 N 123°43.755 W		1	1	1		3	Retain	1.50
313	Douglas Fir	79	48°47.593 N 123°43.773 W		1	1	1		3	Can be retained, needs large protection zone	9.50

Tree Risk Assessment Form with preservation information

Tree #	Species	DBH (cm)	Location details (GPS)	Describe defects	Risk rating (sum of 1, 2, 3 & 4)				Preservation Information	Optimal Tree Protection Zone (radius) in meters	
					1 Probability of failure 1-4 points	2 Size of defective part (s) 1-3 points	3 Probability of target damage 1-3 points	4 Other risk factors 0-2 points			
314	Douglas Fir	59	48°47.595 N 123°43.775 W		1	1	1		3	Retain	7.10
315	Cottonwood	36	48°47.599 N 123°43.778 W		1	1	1		3	Retain	2.25
316	Bitter Cherry	24	48°47.605 N 123°43.767 W		1	1	1		3	Retain	2.90
317	Bitter Cherry	25	48°47.605 N 123°43.768 W		1	1	1		3	Retain	3.00
318	Big Leaf Maple	32	48°47.604 N 123°43.770 W		2	1	1		4	Retain	1.95
319	Big Leaf Maple	27	48°47.606 N 123°43.770 W		1	1	1		3	Retain	1.60
320	Douglas Fir	52	48°47.610 N 123°43.778 W		1	1	1		3	Retain	6.25
321	Garry Oak	17	48°47.608 N 123°43.777 W		1	1	1		3	Retain	1.50
322	Cottonwood	23	48°47.608 N 123°43.779 W		3	1	1		5	Defective top needs pruning if it's retained	1.5
323	Douglas Fir	54	48°47.603 N 123°43.779 W		1	1	1		3	Retain	6.50
324	Douglas Fir	41	48°47.595 N 123°43.784 W		1	1	1		3	Retain	4.70
325	Douglas Fir	22	48°47.601 N 123°43.784 W		1	1	1		3	Retain	2.00

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Tree #	Species	DBH (cm)	Location details (GPS)	Describe defects	Probability of failure				Risk rating (sum of 1, 2, 3 & 4)	Preservation Information	Optimal Tree Protection Zone (radius) in meters
					1-4 points	Size of defective part (s) 1-3 points	Probability of target damage 1-3 points	Other risk factors 0-2 points			
326	Douglas Fir	53	48°47.607 N 123°43.786 W		2	1	1		4	Large tree, needs a large protection zone	6.35
327	Douglas Fir	46	48°47.607 N 123°43.786 W		2	1	1		4	Large tree, needs a large protection zone	5.50
328	Douglas Fir	45	48°47.605 N 123°43.785 W		2	1	1		4	Large tree, needs a large protection zone	5.40
329	Western Red Cedar	19	48°47.603 N 123°43.797 W		1	1	1		3	Retain	2.30
330	Garry Oak	12	48°47.601 N 123°43.797 W		1	1	1		3	Retain	1.50
331	Douglas Fir	56	48°47.605 N 123°43.801 W		2	1	1		4	Large tree, needs a large protection zone	6.70
332	Garry Oak	12	48°47.605 N 123°43.801 W		1	1	1		3	Retain	1.50
333	Garry Oak	18	48°47.602 N 123°43.797 W		1	1	1		3	Retain	1.50
334	Garry Oak	16	48°47.600 N 123°43.804 W		1	1	1		3	Retain	1.50
335	Douglas Fir	44	48°47.599 N 123°43.828 W		2	1	1		4	Large tree, needs a large protection zone	5.30
336	Douglas Fir	47	48°47.599 N 123°43.831 W		2	1	1		4	Large tree, needs a large protection zone	5.65
337	Douglas Fir	56	48°47.592 N 123°43.836 W		2	1	1		4	Large tree, needs a large protection zone	6.70
338	Big Leaf Maple	27	48°47.592 N 123°43.836 W		1	1	1		3	Retain	3.25

Tree Risk Assessment Form with preservation information

Tree #	Species	DBH (cm)	Location details (GPS)	Describe defects	Probability of failure				Risk rating (sum of 1, 2, 3 & 4)	Preservation Information	Optimal Tree Protection Zone (radius) in meters
					1-4 points	Size of defective part (s) 1-3 points	Probability of target damage 1-3 points	Other risk factors 0-2 points			
339	Douglas Fir	59	48°47.613 N 123°43.825 W		1	1	1	3	Large tree, needs a large protection zone	7.10	
340	Garry Oak	25	48°47.617 N 123°43.834 W	Co-dominant limbs	2	1	1	5	Retain; needs corrective pruning to preserve	1.65	
341	Bitter Cherry	38	48°47.614 N 123°43.841 W		2	1	1	4	Retain; needs corrective pruning to preserve	4.25	
342	Garry Oak	12	48°47.612 N 123°43.845 W		1	1	1	3	Retain	1.50	
343	Garry Oak	18	48°47.609 N 123°43.848 W		1	1	1	3	Retain	1.50	
344	Garry Oak	23	48°47.614 N 123°43.851 W		1	1	1	3	Retain	1.75	
345	Cascara	15	48°47.615 N 123°43.852 W		1	1	1	3	Retain	1.50	
346	Garry Oak	19	48°47.609 N 123°43.859 W		1	1	1	3	Retain	1.50	
347	Garry Oak	29	48°47.607 N 123°43.861 W		1	1	1	3	Retain	1.85	
348	Hawthorne	10	48°47.607 N 123°43.865 W		1	1	1	3	Retain	1.50	
349	Grand Fir	74	48°47.608 N 123°43.866 W	Two large tops that is prone to failure	3	2	1	6	Do not retain		
350	Douglas Fir	53	48°47.601 N 123°43.871 W		2	1	1	4	Retain	6.25	
351	Douglas Fir	56	48°47.600 N 123°43.883 W		2	1	1	4	Retain	6.70	
352	Douglas Fir	32	48°47.600 N 123°43.884 W		1	1	1	3	Retain	2.90	

Tree Risk Assessment Form with preservation information

Tree #	Species	DBH (cm)	Location details (GPS)	Describe defects	Risk rating (sum of 1, 2, 3 & 4)				Preservation Information	Optimal Tree Protection Zone (radius) in meters	
					1	2	3	4			
					Probability of failure	Size of defective part (s)	Probability of target damage	Other risk factors			
					1-4 points	1-3 points	1-3 points	0-2 points	3-12 points		
353	Douglas Fir	40	48°47.599 N 123°43.883 W		1	1	1		3	Retain	3.60
354	Douglas Fir	38	48°47.599 N 123°43.884 W		1	1	1		3	Retain	3.40
355	Douglas Fir	47	48°47.600 N 123°43.881 W		2	1	1		4	Retain	5.65
356	Douglas Fir	29	48°47.599 N 123°43.881 W		1	1	1		3	Retain	2.60
357	Douglas Fir	22	48°47.599 N 123°43.881 W		1	1	1		3	Retain	2.00
358	Red Alder	36	48°47.596 N 123°43.882 W	Small dead top, new top has replaced old one.	2	1	1		4	Retain	3.25
359	Douglas Fir	43	48°47.599 N 123°43.872 W		2	1	1		4	Retain	4.50
360	Western Red Cedar	80	48°47.593 N 123°43.892 W		2	1	1		4	Large tree, needs a large protection zone	7.20
361	Western Red Cedar	65	48°47.593 N 123°43.890 W		1	1	1		3	Large tree, needs a large protection zone	5.85
362	Western Red Cedar	63	48°47.592 N 123°43.891 W		1	1	1		3	Large tree, needs a large protection zone	5.65

Relative Tolerance of Selected Species to Development Impacts

Common Name	Scientific Name	Relative tolerance	Comments	Optimal Tree Protection Zone (radius). Multiply trunk diameter (DBH) by factor below to get size. Example: DBH 50 cm. x 12 (factor) = 600cm. or 0.5 meters x 12 = 6.00 meters	
				Young tree	Mature tree
Big Leaf Maple	<i>Acer macrophyllum</i>	Poor	Declines following addition of fill	12	15
Bitter Cherry	<i>Prunus emarginata</i>	Moderate	Intolerant of mechanical injury. Intolerant of saturated soils	9	12
Cottonwood	<i>Populus spp.</i>	Moderate	Prone to windthrow and decay. Intolerant of saturated soils	9	12
Douglas Fir	<i>Pseudotsuga menziesii</i>	Poor - good	Tolerant of fill soil if limited to one quarter of root zone. However may decline slowly following addition of fill. Tolerates root pruning. Intolerant of poor drainage	9	12
Garry Oak	<i>Quercus garryana</i>	Good	None	6	9
Grand Fir	<i>Abies grandis</i>	Moderate	Tolerant of root loss. Intolerant of saturated soils	9	12
Hawthorn	<i>Crataegus spp.</i>	Moderate	Intermediate tolerance to root loss and saturated soils	9	12
Red Alder	<i>Alnus rubra</i>	Poor-moderate	Retain only in groups or as individuals with strong taper and structure. Relatively short lived. Intolerant of root injury.	9 to 12	12 to 15
Western Red Cedar	<i>Thuja plicata</i>	Moderate	Relative windfirm. Intolerant of fill. Intolerant of changes in water table/ soil moisture	9	12