

BEECHWOOD

Consultancy & Tree service
4300 Riverside Road
Duncan BC V9L 6M8
Ph: 250-715-7910
Email: jens@beechwoodtrees.com



January 12, 2021

Updated, January 25, 2021

Mayne Island Housing Society
518 Dalton Drive
Mayne Island BC V0N 2J2

Re: Lot 1, 375 Village Bay Road, tree assessment of significant trees

Dear Mr. David Brown;

I have inspected and evaluated the five Douglas firs (*Pseudotsuga menziesii*) and four wildlife trees on Lot 1 at 375 Village Bay Road on Mayne Island. The concern is if they pose a risk to people and property during and after completing the planned housing development.

My assessment and evaluation skills are from 18 years of education, experience, and training in arboriculture and urban forestry. The tools I use are limited to visual and external means and can include diameter tape, binoculars, and rubber mallet for sounding. I do not implement any invasive techniques such as drilling or coring unless I deem it necessary to determine the presence and extent of internal defects.

Background

The purpose of the tree assessment and this report is to determine if the five Douglas firs and the four wildlife trees can be preserved and incorporated into this property's planned housing development.

The recommendations in this report are based on information that I received prior to the site visit, site details that David Brown provided and data I collected when I was on site

This report provides information on tree preservation followed by details on each tree with recommendations for needed abatement and setbacks for construction around these trees. Next is a map showing the assessed trees with the recommended setback. Last are pictures of the assessed trees.

Tree preservation

Preserving trees adjacent to excavation, construction and installation of services or infrastructure is challenging. Larger trees need a proportionally greater tree protection zone (TPZ) than younger trees. Trees in poor to fair health need a larger TPZ than trees in average or better health. The TPZ also varies in size depending on the tree species.

There are two main components to tree preservation. The first and most important factor is to preserve a large enough root zone for each tree to ensure that it survives and thrives after development is complete. Erecting temporary fencing around trees is essential; rebar and flagging tape do not work. The fencing has to physically stop people and equipment from entering the tree protection zone. At a minimum, it can be done with snow fencing attached to metal T bars hammered into the ground. A more solid fence constructed out of wooden 2 by 4 is better.

The second component to tree preservation is the location of excavation sites for buildings, driveways, parking lots and, in particular, underground utilities (power, water, sewer, drainage and irrigation). This part is frequently overlooked or neglected and often results in needless damage to tree roots; fencing is crucial!

Tree roots are close to the surface as they need oxygen to survive. Excavating to a depth of 20 centimetres removes nearly all the tree's absorbing roots. If you dig to a depth of 50 centimetres, nearly all roots are cut, including anchoring roots.

Excavation inside the TPZ should be avoided as it majorly impacts tree health and can make the tree unstable, causing it to fail (fall over). If excavation is required inside the TPZ, a Certified Arborist should supervise the work to minimize tree root damage.

Grade changes and compaction

Changing the grade adjacent to trees can have detrimental effects on tree health and survival; root compaction can have similar effects.

Grade changes mainly affect soil moisture availability to trees. Raising the grade can result in saturated soils in the tree root zone resulting in the decline or death of trees; Douglas firs are vulnerable to this. Saturated soils have less holding strength on roots, increasing the likelihood of tree failures; roots pull out of the muddy soil. Lowering the grade results in less water availability for tree roots resulting in drought conditions for the tree, potentially causing the decline, loss of vigour and death of the tree.

Fill soil on the tree root zone is an issue as it can cut or reduce oxygen supply, effectively killing the tree. Douglas firs are tolerant of fill soil if it is limited to one-quarter of the root zone.

Driving heavy equipment, trucks, excavators or bobcats on the tree root zone can damage or compromise tree roots. It also compacts the soil reducing oxygen and carbon dioxide exchange between the roots and the atmosphere, negatively impacting tree health.

The impact of excavation and construction around trees is greatest in the summer months as root loss will result in drought stress as they have fewer roots to absorb the limited soil moisture. The optimal time for excavation is fall or winter as trees can regrow some of their lost roots before the dry season

Preservation of mature trees.

Mature trees, trees with defects, or trees in poor health are difficult to preserve. They need a very large TPZ to preserve and maintain their health and vigour. They also need more care post-construction, regular evaluation, ongoing pruning to maintain health and structural strength. If they decline, develop major defects, or die post-construction, they are more challenging and costly to remove.

Groups of trees are easier to preserve than single trees. Trees in groups have interwoven or grafted root systems adding structural support during wind events. Their canopies buffer each other during winds, reducing structural stress on the trunks and anchoring roots.

Single trees rely solely on their own root system for support during windstorms, and they are often exposed to stronger winds or from different directions post-construction. The likelihood of failure is greater for single trees than trees in groupings.

Septic Field installation

As per discussion with David Brown and Brent Dennis, P. Eng. BWD Engineering Inc, the proposed septic field will be installed at the south end of the property parallel to Village Bay Road. The field is to be placed on top of the root zones of trees number one, two and three.

Douglas firs are tolerant of fill soil on up to 25% of their root zone. Based on the septic field's drawings and discussion with Brent Dennis, I estimate that the septic field would cover 10 to 15% of each tree's root zone. Impact on tree health will be negligible; they will likely benefit from the additional moisture from the field during droughts.

Specifications for installation:

- The field shall be at least two meters from tree trunks to prevent the decay of trunks and anchoring roots.
- Fill material for the field shall be placed with a slinger truck, or similar, to avoid root zone compaction.
- Heavy equipment, trucks, excavators or bobcats shall stay outside the TPZ.

Inspected trees

Tree # 1: Douglas fir with a trunk diameter at breast height (DBH) of 142 centimeters and a height of 42 meters. It is located adjacent to the road at the southeast corner of this lot. The tree is in fair health with normal foliage colour, size and density; foliage is limited to the upper canopy. The top of the tree broke off in the past. The tree has a slight lean toward the south southeast; no indications that it shifted recently.

A past forest fire has scarred the bark, on the lower trunk, on the roadside (south). There are horizontal cuts in the bark on the east and west side of the trunk, about 1.5 meters up. It is likely from hardware attached to the trunk in the past. I also found a couple of old scars on the trunk 0.5 meters above ground on the west and south side. I found no visual signs of root rot

I was concerned that the external defects extended into the trunk. To verify or disprove this, I drilled the area with a Rhinntech Resistograph®¹ to determine if internal decay or defects was present in the trunk; none was found. The external defects impact on structural integrity is minor.

This tree can be preserved, the risk of tree failure within the next three years is improbable², the most likely parts to fail are branches; this is common on Douglas firs. This is a large tree requiring a very large tree protection zone. I recommend that the TPZ (tree protection zone) extends 15 meters out from the trunk (see map).

Tree # 2: Douglas fir with a DBH of 155 centimeters and a height of 53 meters; it is adjacent to tree number one. It is in poor and declining health. The foliage size is normal; the foliage colour is dull green. The foliage density is sparse, particularly in the upper canopy, where there is little to no live foliage.

I found no visual indication of the trunk or root decay. I drilled the trunk to determine if there is internal decay, none was found. The tree is still structurally sound; the risk of tree failure within the next three years is improbable.

If the tree continues to decline, it will likely die. Application of water during the summer months would improve its chances of survival. If the tree dies, it should be removed or turned into a wildlife tree. If the desire is to preserve this tree, the TPZ should extend 18 meters out from the trunk (see map).

Tree # 3: Douglas fir with a DBH of 105 centimeters and a height of 50 meters. It is situated at the south end of the lot. It is in fair health with normal foliage size; density is a bit sparse, and foliage is a dull green. I found no major defects in this tree.

The tree is structurally sound; the risk of tree failure within the next three years is improbable. To preserve this tree, the TPZ should extend 9 meters out from the trunk (see map).

Tree # 4: Douglas fir with a DBH of 128 and a height of 30 meters, situated in from the road on the southwest corner of the lot. It is in fair health with normal foliage size; foliage colour is near normal, and foliage density is slightly sparse. The tree has a slight lean toward the northeast, and the trunk has a bow in the lower trunk and partway up; all minor issues. The canopy has some dead and dying branches throughout.

1; The resistograph drills into the wood while recording (graphing) wood density.

2; Likelihood of failure categories; Improbable, Possible, Probable and Imminent

The lower trunk looks bedraggled; there are fire scars, bulges, swellings and minor sap flow from the trunk. I thoroughly inspected the lower trunk to determine if these surface defects extended into the trunk, possibly affecting this area's structural integrity.

I drilled the lower trunk in three places and drilled the two largest anchoring roots to determine if there is internal decay. I found no internal decay in the places I drilled. The lower tree trunk is structurally sound. The likelihood of tree failure within three years is improbable.

I recommend removing the dead and dying branches to prevent them from falling onto people and property below. To preserve this tree, the TPZ should extend 10 meters out from the trunk (see map). If the other trees in the protection zone will be removed, they should be cut at ground level, leaving the stumps intact. Removal of stumps could make this tree unstable.

Post-construction the TPZ should be left intact; it should **not** be used for parking, storage or pathways as this will compromise the tree roots and tree health.

Amendment Jan 25, 2021: The TPZ can be oval or offset slightly to provide enough space for the planned road between the tree and the west property line. It is essential to stay at least 7 meters away from the trunk, as closer could increase the risk of tree failure.

Tree # 5: Douglas fir with a DBH of 103 centimeters and a height of 46 meters. It is in average health with normal foliage colour, density and size. The lower trunk has a moderate bow, and the tree has a slight lean toward the east. I found minor sap flow from the southwest side of the lower trunk. The bow, lean and sap flow are minor issues at this point.

I found no signs of trunk, or root decay. The likelihood of tree failure within three years is improbable. To preserve this tree, the TPZ should extend 8 meters out from the trunk (see map).

Wildlife trees

Tree # 6: Dead Douglas fir with a missing top. It has a DBH of 115 centimeters and a height of 24 meters and is situated to the east of tree number five. The trunk has a significant lean toward the north. I found extensive external and internal decay in the trunk and anchoring roots.

This tree can fail (fall over) at any time; when it fails, it will fall in the direction of the lean. It is an excellent wildlife tree that can be left, providing that people do not trespass into the fall zone. Installation of infrastructure or trails to the north of the tree should be at least 30 meters away from the tree.

Tree # 7: Douglas fir that died recently with a DBH of 92 centimeters. It is 41 meters tall and located just to the east of tree number six. The lower trunk has a bow in it. The tree trunk is in the initial stages of decay; the impact on structural integrity is minor at this point.

I recommend topping this tree while it can still be safely climbed to function as a wildlife tree. The proximity of people and property should determine the height of the topping cut. Distance to people and property should be 1.5 times that of the remaining tree trunk. For example, if the closest building is 15 meters away, the tree should be topped at the height of 10 meters.

Tree # 8: Douglas fir that died recently with a DBH of 168 centimeters and a height of 46 meters. It is located to the southeast of tree number seven and 20 meters to the northwest of the new wellhead. The trunk still appears sound; structural integrity is starting to decline due to external decay.

I recommend topping this tree while it can still be climbed safely to function as a wildlife tree; topping it at the height of 13 meters or less will prevent it from falling onto the new wellhead when it fails.

Tree # 9: Dead Western redcedar (*Thuja plicata*) with a DBH of 135 centimeters and a height of 36 meters with a lean toward the northeast. The trunk has a large wound from a past failure a few meters up on the southwest side.

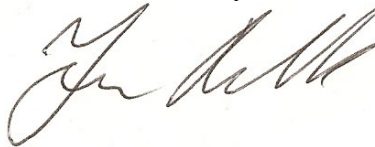
The trunk has extensive internal and external decay and can fail at any time. It will most likely fall toward the northeast. I recommend removing this tree as it can fall onto neighbouring properties; it should be cut at a ground level as it is not safe to climb.

Conclusion

The five large Douglas firs can be preserved provided that their root zones are protected during and after construction. I recommend re-evaluating them once construction is complete. It is essential that the tree protection zones around the trees be left intact following the completion of the project.

Three of the four wildlife trees can be left as wildlife trees provide that the abatement recommendations are followed. The last one threatens neighbouring properties and should be removed. The wildlife trees should be evaluated regularly to determine if they pose a risk to people and property.

Sincerely,

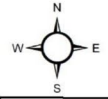
A handwritten signature in black ink, appearing to read 'Jens Barsballe', written in a cursive style.

Jens Barsballe

Registered Consulting Arborist #570
ISA Board Certified Master Arborist PN-2741B
ISA Tree Risk Assessment Qualified
Wildlife Danger Tree Assessor P2370

Map with tree locations and tree protection zones

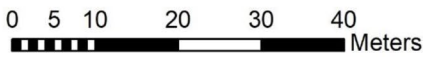
Map 2: Ecological Communities



LOT 1 of:
Proposed Subdivision of
Lot B, Section 7, Mayne Island
PID 002-552-256

Scale 1 : 4700

Map Date: September 17, 2020
UTM Zone 10 NAD83
Keith Erickson (R.P. Bio.)



Legend

Ecological Communities

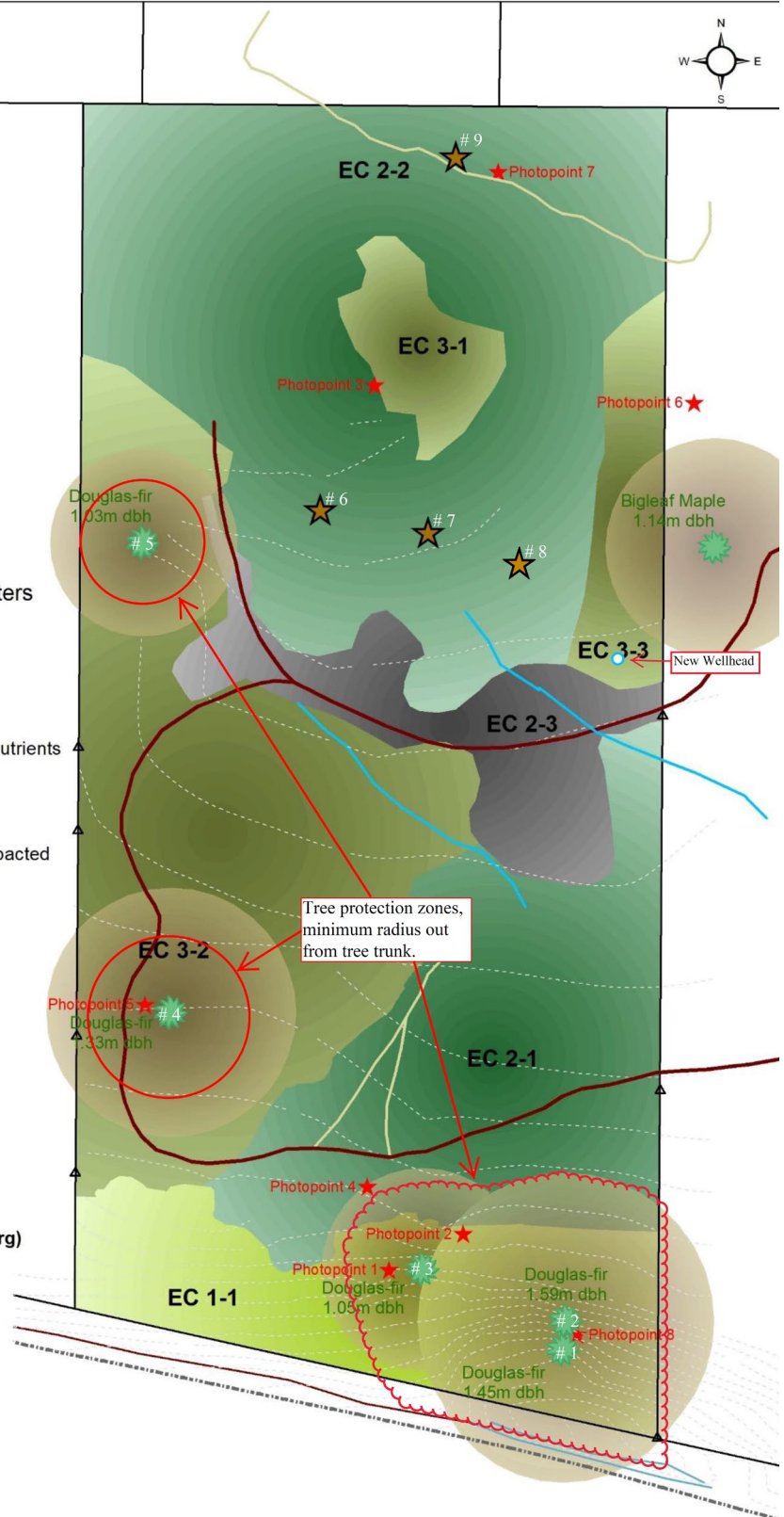
- Soils well drained, poor to medium nutrients
- Soils well drained, rich nutrients
- Soils moist to wet, rich nutrients
- Soils moist, very disturbed and compacted
- Tree Protection Zone

Features From GPS Survey

- Old Veteran Tree
- Large Wildlife Tree
- Photopoint
- Ditch
- Driveway
- Old Road
- Skid

From Surveyed Site Plan (Wey Meyenburg)

- Edge of Road Bank
- Contours (1m)
- Roadside Ditch
- Edge of Pavement
- Legal; PL
- culvert
- rockoutcrop



Trees number one and two as seen from the southwest



Tree number three as seen from the south



Tree number four as seen from the south



Tree number five as seen from the south



Wildlife trees number six, seven and eight as seen from the east



Wildlife tree number nine as seen from the southeast



Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character.
2. All existing liens, encumbrances, and assessments, if any, have been disregarded (unless otherwise noted), and the tree(s) are evaluated as though free and clear, under responsible ownership and competent management. It is assumed that no violations of applicable governmental regulations have occurred.
3. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible, however, Beechwood Tree Service can neither guarantee nor be responsible for the accuracy of information.
4. Beechwood Tree Service shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in our fee schedule and contract of engagement.
5. Loss or alteration of any part of this report invalidates the entire report.
6. This report shall be used for its intended purpose only and by the parties to whom it is addressed. Possession of this report does not include the right of publication.
7. Neither all or any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales, or other media, without the prior expressed written or verbal consent of Beechwood Tree Service.
8. This report and any values expressed herein represent the opinion of Beechwood Tree Service. Our fee is in no way contingent upon any specified value, a result or occurrence of a subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
10. Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection, and 2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring.
11. There is no warranty or guarantee expressed or implied that problems or deficiencies of the tree or other plant or property in question may not arise in the future.
12. The right is reserved to adjust tree valuations, if additional relevant information is made available.

Certificate of Performance

I, Jens Barsballe certify that:

- I have personally inspected the subject trees in this report and I have stated my findings accurately.
- I have no current or prospective interest in the trees or properties that is the subject of this report and have no personal interest or bias with the respect to the parties involved.
- That the analysis, opinions and conclusions stated herein are my own and based on current scientific procedures and facts.
- The analysis, opinions and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices and standards.
- No one provided significant professional assistance to the author unless specified herein.
- My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other 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 member of good standing of the American Society of Consulting Arborists (ASCA) and International Society of Arboriculture (ISA).

I have been an ISA Certified Arborist since 2002, an ISA Board Certified Master Arborist since 2012. A Registered Consulting Arborist since the beginning of 2015. Also, ISA Tree Risk Assessment Qualified since 2005 and Wildlife Danger Tree Assessment Qualified since 2017.

I have been involved in the practice of arboriculture and study of trees for over 18 years.



Jens Barsballe
ISA Board Certified Master Arborist PN-2741B
Registered Consulting Arborist #570
ISA Tree Risk Assessment Qualified
Wildlife Danger Tree Assessment Qualified P2370

January 12th 2021