



ACL
arbortech consulting ltd

February 22, 2011

Attn.: **James Fox**
Wedgewood Ventures
450 East 21st Street
Vancouver BC V7L 3C2

cc:

ACL File: **11114**

Project Ref: **Braemar School Project, North Vancouver BC**

Re: **Tree Retention Assessment Report**

Dear James,

Arbortech Consulting Ltd has been retained to undertake a detailed study of the existing trees located on or within close proximity to the above noted site to determine their current condition and to make preservation and protection recommendations in context to the proposed land use changes. Staff from this office visited the site on January 19, 2011 to inspect the trees. The tree location and topographic plan as well as the preliminary design plans for the proposed development project have been provided for our use in completing this report. The tree condition data and tree retention recommendation are compiled herein and on the enclosures.

TREE ASSESSMENT AND RETENTION REVIEW

Existing trees located on or within close proximity to the development site have been assessed using Visual Tree Assessment (VTA) procedures. Certain dominant trees have also been tagged with a serial number as referenced in this report, on the attached tree retention plan, and for future reference within the design, approval and construction phases of the project. Please note visual inspection was hampered due to the dumping of garden waste within the rooting areas in some parts, as well as the dense ground vegetation and ivy vines concealing the trunks. For the proposed retained trees, it is recommended the vegetation be carefully cleared by hand within the root zones and the ivy stripped from the trees prior to a re-inspection.

In general terms, the existing trees located on this site consist of occasional mature Hemlock, Western redcedar and Red alder in the south east quadrant, with young pioneer species regeneration, predominantly of Red alder (70%), Cottonwood (20%) and Bitter Cherry (5%) colonising the previously cleared areas. The under-storey trees consist of Vine maple, Holly with occasional immature Western redcedar and Hemlock. Bramble, Salmon berry, ferns and ivy form the ground cover.



The approximate species count not including the tagged trees is:

- Red alder (Dbh > 15cm) = 73**
- Cottonwood (Dbh > 15cm) = 7**
- Bitter Cherry (Dbh > 15cm) = 5 + 1 tree dead**
- Western redcedar (Dbh < 20cm) = 10**
- Hemlock (Dbh < 20cm) = 6**

There are two distinct areas of tree cover separated by a central clearing area within the site and are referenced as Stand A and Stand B on the tree retention plan. The individual Stand description is as follows:

Stand A: Consisting of 7 individually tagged mature class Hemlock and Western redcedar trees located to the south east corner, 4 mature Red alder trees to the southern boundary, a group of 7 Cottonwood to the south west corner, 2 mature Cherry trees to the north boundary and semi-mature mixed forest trees with Red alder dominant forming the remaining stand areas. To the far south eastern corner there is a Hemlock tree # 493 that is assessed as high risk based on Certified Tree Risk Assessor (CTRA) methods. The Western redcedar tree # 494 located on the eastern boundary may be a shared asset with the neighbour or an off-site tree. It was not shown on the survey drawing.

Stand B: Consisting of a dense group of semi-mature Red alders with 3 immature Western redcedar trees located to the south western corner. To the north western corner there is a tagged Red alder tree # 498 that is assessed as high risk based on CTRA methods.

The central clear area consists of dense bramble with immature regenerating pioneer deciduous species where it transitions into the wooded area to the south.

Due to the site topography, the tagged Hemlock and Western redcedar trees are growing within an exposed position on the leading edge of the west facing slope. Further, these trees, due to their size, species and location, are considered to have visual prominence especially when viewed from the surrounding streets to the north and east of the site.

A photographic record of the trees is on file and they are detailed as follows.

Within the tree inventory (see Table 1 below), we present the tree specific data and observations. In addition, we have rated the condition of the trees based on both health and structure factors that guide us in determining the value and viability of retaining the trees. Condition ratings used in our assessment are:

- High Risk** deemed hazardous by CTRA methods.
- Very Poor** dead, severe structural defects, advanced decline.
- Poor** low vigour, restorable defects, decline.
- Normal** fair to good condition.

On this site, the proposed development and construction consists of 7 single family homes with associated driveways and amenity space. The designation of **Retain** or **Remove** in the **ACTION** column below is based on the condition and retention value ratings that we have determined, with consideration for the proposed design for the project.



Table 1. TREE INVENTORY

TAG #	DBH ¹	SPECIES	CONDITION	RETENTION VALUE	ACTION
491	62	Hemlock	Very Poor	Nil	Remove

- Tall 20+m high regenerated tree on old decayed nurse tree stump resulting in elevated stilt like buttress rooting.
- Minor surface damage to buttress roots on the north side.
- No buttress taper south side.
- Ivy clad lower stem and root-plate.
- Old vertical wound with 'rams horn' wound wood formation and slight stem bulge at 10m height west side.
- Not a suitable candidate for individual retention

492	70	Hemlock	Very Poor	Nil	Remove
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- Tall 20+m high regenerated tree on old decayed nurse tree stump resulting in elevated stilt like buttress rooting.
- Minor surface damage to buttress roots on the south side.
- Main stem was either vandalised by an attempted ring barking or ropes/wires tied around and has since been embedded into the trunk. Staining and bulging on the east side indicate likely internal decay pocket and therefore a potential weak point in the main stem.

493	98	Hemlock	High Risk	Nil	Remove
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- Tall 24+m high regenerated tree on old decayed nurse tree stump resulting in elevated stilt like buttress rooting.
- Basal seam/crack passing north to south through the buttress.
- Ivy clad lower stem and root-plate.
- Old and new washing lines fixed to main stem at 5m height east side. Older lines embedded into stem causing a weakness.
- Vertical crack approximately 3m long in main stem at 6m height on east side with visual evidence of similar cracking on west side. Indicator of internal crack possibly related to a failure in progress from a main stem failure.
- Previously topped at 16m height with large (10+m high) marms developed at the cutting point. The topping wound likely to be a minimum of 20cm in diameter and therefore highly likely to be decayed at the marm attachment points creating strong likelihood of leader failure from above.

494	110	Western redcedar	Normal	Full	Sever and strip ivy
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- Heavily ivy clad tree becoming invasive within crown.
- Located within boundary fence line, likely a shared or off-site tree.
- Large compost pile to base west side and metal box container on a concrete pad north side.

¹ Dbh denotes the diameter of the trunk measured in cm at a height of 1.4m above grade, or as per arboricultural standards.



495	93	Hemlock	Poor	Marginal	Conditionally retained - Sever and strip ivy. Reassess trunk and roots for defects.
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- Heavily ivy clad tree becoming invasive within crown.
- Dead and broken branches south side of crown.
- Small canopy to stem ratio, and there is minimal value in the landscape.

496	74	Western redcedar	Very Poor	Nil	Remove
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- 20+m high tree with "pistol" swept stem with no buttress flare west side.
- Old internal seam/crack east side with decay pocket at base forming basal weak point.

497	100	Hemlock	Very Poor	Nil	Remove
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- Large 25+m tree with "pistol" swept stem with no buttress flare north side.
- Large surface stabilising root west side
- Vertical bark crack north side. Indicator of internal torsion crack.

498	44, 32, 29	Red alder	High Risk	Nil	Remove
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- Triple-stemmed tree with two sub-dominant stems at base with narrow and weak unions east and west sides of the dominant stem. These stems are very weakly attached and prone to failure.
- Eastern stem has either died off or has historically snapped due to canker at approximately an 8m height.
- Remaining stems lean to the north west towards the pathway linking the school with Braemar Road.

CERTIFIED TREE RISK ASSESSMENT

Based on Certified Tree Risk Assessor (CTRA) methods, the high risk trees noted as being hazardous to current site targets are detailed as follows:

Table 2. CTRA RESULTS.

Tree #	Probability of Failure (1 to 5 pts):	Size of Defective Part (1 to 3 pts²):	Target Rating (1 to 4 pts):	Total Rating (3 to 12 pts):	Risk Rating³:
493	3	3	3	9	High Risk
498	3	2	4	9	High Risk



RECOMMENDATIONS

In context to the proposed land use changes, the existing trees are recommended to be treated as follows:

- **Provisionally Retain and Protect 1 tree**

Tag #'s: 495

Pursuant to the tree protection guidelines noted below and on the attached drawing, this tree could be preserved within the project. However, it is strongly recommended that the ivy be stripped from the tree and the dense ground cover carefully removed and the tree re-inspected prior to full retention.

- **Protect Off-Site Neighbouring Tree**

Tree #: 494

Note that tree # 494 appears to be a shared asset or a neighbour owned tree, and it is recommended that ownership be clarified by survey. In order to prevent this tree from being mortally damaged or destabilized, tree protection measures should be implemented as shown on the attached tree retention plan and in compliance with the restrictions noted herein.

- **Remove 2 High Risk trees**

Tag #'s: 493 and 498

The client should note that regardless of whether this project proceeds or not, the high risk trees should be treated for risk mitigation. The owner should make application for the removal of those high risk trees pursuant to applicable city regulation, policy or bylaw and undertake the removals at their earliest convenience.

- **Remove 4 Nil Retention Value Trees**

Tag #'s: 491, 492, 496 and 497

All trees with Nil retention value should be removed due to their pre-existing defects and other condition factors that make them very low value and/or otherwise not worthy for protection in this project.

- **Remove the remaining regenerated pioneer trees:**

These stands are of very low value and viability with any residential land use. The Red alder are regenerated trees with average diameters of approximately 30cm with occasional older tree reaching 82cm. These alder tree species are not well suited for residential retention due to inherent weaknesses related to their short life span, high incidence of disease and weak nature of the wood. Similarly Cottonwood trees have a weak wood structure and the propensity to fail during storm events and considered not suitable trees for retention. The remaining trees form the under-storey and ground cover where retention would not practical given the topographical constraints and construction activities proposed.

While the far northern sector of the site is detailed to be retained as an amenity area and lies outside the proposed development footprint, it is recommended that the existing tree cover of predominantly Red alder be re-inspected for health and safety if retained. However, in our opinion, consideration should be given to removal of the existing vegetation to provide an area of formal landscaping including tree planting with more suitable native species that characterise the local area, and that will grow to form a dominant long term



amenity to the community. Douglas fir and Western redcedar are well suited for this purpose.

- **Tree Protection Fencing.**

Tree protection fences must be erected as shown on the tree retention plan and restriction implemented as per the guidelines below. It is recognized that certain unpredictable construction conflicts may arise that could interfere with the safe retention of the selected trees. Examples include but are not limited to; unknown geo-technical conditions, unknown underground servicing locations, etc. Note that if any changes to the tree retention scheme, or if any encroachments into the protection areas are deemed to be necessary for construction purposes, that they are subject to approvals in advance by the city and/or the project arborist.

- **Tree Replacement.**

City requirements will dictate the required quantity of replacement trees for this project. Among other factors, the size and land use of the property as well as the presence of retained trees must be considered in determining the available space for planting. Those determinations will be subject to direction and/or approval by the city. Specifications for replacement trees will be provided by the project landscape consultant.

- **Permitting.**

The removal of any trees may require that a permit or authorization is issued by the District of North Vancouver. Application can be made concurrently with the re-zoning and/or building permit application.

TREE PROTECTION GUIDELINES

1. **Tree Protection:**

- a) All retained trees must be protected to meet Municipal and/or Arbortech specifications. The minimum standard for fence type that is required is detailed above.

- b) The tree protection fencing should be inspected and approved by the municipality and/or the project arborist prior to any demolition, site preparation or construction work commencing.

- c) Activities within and access to the tree protection zones are restricted so that no soil, spoil, aggregate, construction supplies/materials and/or waste materials etc. are placed within the protection areas, and no vehicles and equipment may pass within these zones.

- d) The trunks or limbs of retained trees may not be used to affix signs, lights, cables or any other device.

- e) Signs stating "TREE PROTECTION AREA – NO ENTRY" should be placed on the tree protection fence at a suitable frequency.

- e) If encroachment into the tree protection zone is required for any other reason, it should be authorized in advance by the project arborist. Special measures may need to be implemented to allow access, and some activities will not be allowed.

- f) Removal of the tree protection fence and/or encroachment into the tree



protection areas may constitute an offence under city bylaw provisions, and also may be subject to fines, penalties and/or delays in the project.

2. **Design: New Buildings and Infrastructure:**

The location of building foundations or underground pipes etc must consider whatever over-excavation needs are required to construct/install those items. The design consultant should make sure that the siting of those features will not result in an over-excavation encroaching into the tree protection areas.

- a) Where necessary, a geo-technical consultant may be required to make provision for the use of shoring systems/devices.
- b) Underground servicing and utilities, overland drainage, and finished grading should not cause any grade changes (any excavation or fill) within the tree protection zones, or grade changes of surrounding lands that would result in storm water accumulation or significant depletion of soil water within the tree protection areas.

3. **Design: New Landscape and Finished Grading:**

The developed portions of the site that abut tree protection areas should have new/final grades designed to 'meet' the existing grades within the tree protection areas.

- a) If the new or final grades are not able to match the existing grades at those locations, grade transitions such as retaining walls may be required. Those retaining walls should be designed and constructed to avoid any over-excavation or fill deposits that would result in encroachment into the tree protection areas.
- b) The site grading should not cause overland storm water flow to accumulate excessively in the tree protection areas. Some drainage devices or measures may be required to mitigate pooling or slow drainage, but those devices or measures will be subject to project arborist approval if they require any encroachment into the tree protection areas.
- c) Where the installation of the hard surface or grade transitions cannot avoid encroachment into the tree protection areas, there may be methods and materials that could accommodate their construction while minimizing impacts to the trees/roots. Those special measures can be considered and specified by the project arborist in consultation with the design consultant.

4. **Construction – Tree Management Treatments:**

- a) **Mulch:** If recommended by the project arborist, mulch may be required to be imported and applied to portions of the tree protection areas. The purpose is to protect the soil from desiccation and to enhance the soil fertility properties. This mulch should consist of ½ inch-minus and should be well composted for best efficacy. The mulch product should be approved by the project arborist before installation.
- b) **Pruning:** Pruning may be required for certain trees in order to improve the form and structure, to crown clean the tree (i.e. remove deadwood and to remove diseased and weakly structured limbs and branches), to resolve aerial spatial conflicts with structures, roads, driveways or sidewalks, and/or to improve aesthetics. The owner should retain the services of a qualified tree service contractor to undertake pruning treatments as per our specifications and our on-site direction.
- c) **Watering:** The trees may benefit from occasional watering during the



construction phase. The project arborist may recommend timely supplemental watering by hand or by an automated system. The owner should have a local water source available for this purpose, otherwise truck delivery may be required. Such supplemental watering is only a temporary measure. It is expected that the trees will adapt to the changes in the growing environment, and that they will not likely require long term supplemental watering.

d) **Fertilizer:** In some cases, soil enhancement may be recommended. An application of fertilizer to suit the needs may be required. The specifications for fertilizer will be prepared by the project arborist on an as-needed basis.

e) **Soil Remediation:** Where soil within a tree protection area has suffered from previous or current impacts, treatments to reduce compaction and improve percolation and aeration may be required. The specifications for such treatments will be prepared by the project arborist on an as-needed basis.

CONCLUSIONS

A total of seven tagged trees and one off-site or shared asset tree that form part of two distinct tree stands located to the north and south of the site were collectively considered in this assessment. Two trees were assessed as high risk and should be treated for hazard mitigation regardless of future development. Four trees and the remaining regenerated pioneer trees have been determined to be unsuitable for retention in context with the proposed land use and are recommended to be removed. One of the on-site trees and one (possible) shared asset tree were deemed to be viable for retention subject to further assessment after clearing the ground vegetation/debris and stripping off the ivy. Tree replacement will be determined by the city.

Thank you for choosing Arbortech for your tree assessment needs. If you require any further information, please call me directly at 604 275 3484 to discuss.

Regards,

Norman Hol,
Consulting Arborist
ISA Certified Arborist #PN-0730, Certified Tree Risk Assessor #0076, Wildlife and Danger
Tree Assessor (Parks and Recreation Module)

Enclosures;

Tree Retention Drawing