TREE ASSESSMENT AT:
Ferncliff
Bainbridge Island, WA 98110

PREPARED FOR:
Housing Resources Board (HRB)
250 Madrona Way NE Suite 110 B
PO Box 11391
Bainbridge Island, WA 98110

May 13, 2008

PREPARED BY:
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Tuesday, May 13, 2008

Housing Resources Board (HRB)
250 Madrona Way NE Suite 110 B
PO Box 11391
Bainbridge Island, WA 98110

Re: Ferncliff Project Tree Assessment

Dear Mr. Florea and Mr. Luria:

On May 1, 2008 I visited the property on Ferncliff, Bainbridge Island with Julie Kriegh from Kriegh Architects and Bill Luria from the Bainbridge Island Housing Resources Board (HRB) for a preliminary walk through of the proposed development site. During this time we discussed property boundaries, scope of the building project and general site attributes including tree diseases. This lot is currently in the pre-application short plat process.

Determining where housing can be located while being mindful of saving trees is one of the objectives of this project. The HRB would like to plan for building 30 units of affordable housing on this site. This report can be used as a draft discussing general site conditions and locations of pockets of disease. It can be used by the HRB and Kriegh Architects in site planning for the short plat permit and as an exhibit for the design charrettes held in May and June, 2008.

METHODOLOGY

Tree assessment is a process by which the potential hazards or disease presence can be reasonably assessed and subsequently managed. To evaluate the trees in this report I combined my field experience and education with current accepted practices as defined by ANSI standards and the International Society of Arboriculture. The tools I use to make an assessment are limited to a rubber mallet, binoculars, compass, laser pointer, hand brush, shovel and hand trowel unless otherwise noted. A Visual Tree Assessment and other methods are only conclusive for the day of inspection and do not guarantee that conditions will remain the same in the future.

OBSERVATIONS

On May 13, 2008 I completed a site visit to make a general assessment of the trees on the property located on Ferncliff, Bainbridge Island. I used this time to walk the borders of the

property as well as parts in the interior that Ms. Kriegh, Mr. Luria and I did not visit on our previous walk through.

This six acre site near downtown Winslow is comprised of a partially developed piece of land that includes a lama farm with historic fruit trees, naturalistic open area with native and non-native deciduous trees and groundcovers and a large stand of second growth Douglas fir forest remnant. Surrounding the property is a lightly developed site to the south, heavily treed ravine to the west and part of the north, a single family housing development to the north and an arterial road to the east. The entire site is comprised of sandy soil with good drainage.

I have roughly divided the lot into three areas: The lama pasture, lightly treed area bordering the open space to the west and the stand of Douglas firs.

1) Within the lama pasture (still fenced in to date) there are several older fruit, ash and red alder trees with grass and nettle groundcover. All of these trees are in fair or senescent condition and most have varying degrees of rot – normal for species of their age. There are two Douglas firs standing alone near the center of the pasture that are in good condition and, given proper tree protection during the construction process, may be able to remain.

   This is the least treed area of the lot and is fairly level. This may be a possible area to situate homes without losing significant canopy cover.

2) West of the Douglas Fir stand up to the open space boundary is a lightly treed mix of red alders, big leaf maples, bitter cherries and a few young Douglas firs. There is also sparse groundcover consisting of ivy, nettle, sword fern, blackberry and grasses.

   The trees, particularly the alders and maples are in fair condition and are lower in elevation than the Douglas fir they stand adjacent to. If left as a single stand while surrounding trees were removed, the exposure to new weather conditions may affect them adversely. These species are not known to be windfirm or long lived trees.

   This area is connected to an access and utilities easement from Cave Avenue to the north. This may be a possible area to situate homes without losing significant canopy cover.

3) The Douglas fir stand is comprised almost exclusively of second growth Douglas Firs with few Pacific Madrones, big leaf maples and red alders scattered throughout. The groundcover is primarily ivy which grows up nearly every single tree to a height of at least 15 feet. Most of the trees are in fair condition though there are some early

stages of rot in trunks and trunk collars scattered throughout. The tree canopies are generally in fair condition but nearly all of the interior trees only have about 20-30 percent of live crown ratio.

The Douglas firs along Ferncliff have been utility pruned up to about 40 feet. Most seem to be in good condition and will probably need to be retained as part of a road buffer.

Weakening crowns, short shoot (needle) elongation and sounding indicate the presence of Laminated Root Rot (*Phellinus weirii*) but can be confirmed through a soil test later if necessary. On the attached map I have noted the locations in green where the disease seems to be affecting trees.

This native root pathogen is often found in forested and urban areas and severely affects second growth stands of Douglas fir. Infection spreads from tree to tree through the stand and from infected stumps to roots that come in contact with other healthy living wood. Root infections eventually lead to root and lower trunk decay which directly causes death or death by windthrow. Diseased trees might not show crown conditions for 5-15 years. Cultural control includes planting resistant species but direct control methods are largely untested or unknown for urban areas and forest remnants.

Unfortunately there were at least three suspected pockets of the disease in this stand. This directly affects at least 20 trees (that are dead or have rot) but possibly more due to root contact and the method of disease spread. Furthermore, the pockets are near each other but are not connected.

Removing only the trees that are dead or have rot (green circles) is not recommended. Typically trees with most of their foliage at the top of the trunk are more prone to wind and weather conditions than a tree that has foliage growing further down on its trunk. New exposure of trees that are not windfirm and are near rot pockets may increase the likelihood of limb or whole tree failure. I recommend that large swaths of this stand are left intact rather than areas being carved out for construction.

A Note about Accumulated Stress

Stress in trees may be caused by natural factors and conditions or through the activities of man or animals. These factors may be chronic (recurring and lasting for a long time) or acute (immediate impact). Examples of chronic damage are wet soils caused by site selection, soil compaction, or poor nutrition; acute damage includes flooding, drought conditions, or severe construction damage or disturbance.

Tree stresses may be very dramatic and obvious or in many cases not easily observed or recognized. Trees often do not display immediate responses to stresses because of their

accumulated growth habit. However, with stresses come several changes within the tree depending on the damage caused by the stress. In some cases, the process of photosynthesis, which is the primary supply of carbohydrates for all tree functions, is reduced and the tree's stored food reserves are depleted. When root systems are damaged by construction damage, compaction or poor drainage, they cannot supply adequate water and nutrients for the trees growth and survival. When this happens, often the tree is unable to produce sufficient carbohydrates and growth regulating chemicals. If trunks or stems are damaged, carbohydrates movement to where they are needed for growth and function is stopped, and may result in death of roots or other growing points of the tree. The end result of these reduced processes is that the tree at best, operates at less than peak efficiency and in many cases it begins a downward spiral of all of its growth functions.

As stresses continue, the tree does eventually exhibit external symptoms. Annual incremental growth is reduced and becomes significantly less than normal. Leaves may be fewer in number and smaller in size. Sometimes, the tree produces excess fruit or seed as a survival mechanism. With continued stresses, branches begin to die, and at the same time the root system of the tree is reduced because the crown is producing inadequate food for good root expansion and growth. These processes continue and usually result in the continued decline and eventual death of the tree over a period of 2-15 years. In most cases, once the tree has tipped the balance of not providing sufficient carbohydrates for continued growth of the tree, it cannot recover. If the physical stresses do not kill the tree, it will often be exposed to more stresses through opportunistic diseases and insect attacks. These biotic attacks may speed up and/or complete the demise of the tree.

The phenomenon of accumulated stress is why it can be difficult to determine how long a stressed tree has to live. Furthermore, the more stressed a tree has become makes it that much harder to bring it back to good health – it will take just as long or longer to respond to good treatment as it took for it to become stressed, particularly in the case of construction damage.

As plans are honed for building we can talk further about how to reduce stresses on the trees you choose to retain before, during and after the project.

ASSUMPTIONS, LIMITING CONDITIONS AND GENERAL WAIVER

I, Katy Krokower, certify that:

I have personally inspected the tree(s) and or the property referred to in this report;

I have no current or prospective financial or other interest in the vegetation or the property which is the subject of this report and have no personal interest or bias in favor of or against any of the involved parties or their respective position(s), if any;

The analysis, opinions and conclusions stated herein are the product of my independent professional judgment and based on current scientific procedures and facts, and the foregoing report was prepared according to commercially reasonable and generally accepted arboricultural standards and practices for the Pacific Northwest and Puget Sound areas;

The information included in this report covers only those trees that were examined and reflects the condition of the trees as of the time and date of inspection;

This report and the opinions expressed herein are not intended, nor should they be construed, as any type of warranty or guarantee regarding the condition of the subject trees in the future;

Covenants, Conditions, and Restrictions ("CC&Rs") may restrict the number, type and height of vegetation on the subject property, and I have made no investigation regarding whether the property is subject to such CC&Rs; and

To the best of my knowledge and belief, all statements and information in this report are true and correct and information provided by others is assumed to be true and correct.

I am not an attorney or engineer. This report does not cover these areas of expertise and represents advice only of arboricultural nature. Without limiting the generality of the preceding sentence, it is specifically understood that nothing contained in this report is intended as legal advice, or advice or opinions regarding soil stability or zoning laws, and this report should not be relied upon to take the place of such advice.

Thank you for calling me for your arboricultural concerns.

Katy Krokower
PNW ISA member # PN-3069A
PNW Certified Tree Risk Assessor # 199

GLOSSARY OF TERMS

General Terms

Critical Area – Aquifer recharge areas, fish and wildlife habitats, frequently flooded areas, geologically hazardous areas, wetlands and streams.

Failure Potential - Identifies the most likely failure and rates the likelihood that the structural defect(s) will result in failure within the inspection period.

Hazard Assessment/Risk Assessment – Process of evaluating what unexpected things could happen, how likely it is, and what the likely outcomes are. In tree management, the systematic process to determine the level of risk posed by a tree, tree part or group of trees.

Target – 1) Person, object or structure that could be harmed (damaged or injured) by a tree or tree part in the event of a failure. 2) Location of target pruning.

Visual Tree Inspection (VTA) - Procedure developed by Claus Mattheck and Helge Breloer for assessing trees. This method relies initially on fairly subjective assessment, but becomes increasingly objective as issues are identified and warrant further investigation. Hazard Assessment Methodologies focus on levels of risk and more recently, probability of failure, based on criteria relating to tree size, structural integrity, proximity to 'targets' and the type and intensity of use of the areas surrounding the tree within the target area. Essentially all these methodologies are aimed at reducing risks associated with urban trees.

VALUE OF THE URBAN FOREST

An urban forest is defined as the native trees and vegetation left as a town or city grows and develops. Urban forests indirectly contribute millions of dollars in services annually to a neighborhood, of which the benefits include:

Providing habitat for many species of fish, birds and beneficial small organisms.
Intercepting rain and storm run-off to reduce erosion and management costs.
Removing carbon dioxide from the air.
Controlling glare and reflection.
Acting as a windbreak or sound barrier.
Improving air quality through the filtering process of the leaves, which removes dust and other particulates from the air and absorbs air pollutants such as carbon dioxide, carbon monoxide, and sulfur dioxide.

As more and more statistics are generated that show how community trees store carbon and clean the atmosphere, models indicate that in 50 years, one tree can generate $30,000 in oxygen, recycle $35,000 of water, and remove $60,000 of air pollution. On average, an acre of trees can store 2.6 tons of carbon (pollution) annually and generate enough oxygen daily for 18 people.

According to the American Forestry Association (now called American Forests) direct economic benefits for a homeowner are usually associated with energy costs. It has been found that properly placed trees can reduce air conditioning needs by 30 percent and trees placed properly for windbreak protection can cut energy used for heating by 25 percent to 50 percent. Around your neighborhood and home a healthy urban forest or stand of trees can contribute to property value and becomes an investment that appreciates in value.

It is never too late to reap the environmental and economic benefits that trees can provide. In a world that is now more conscious of climate control, air quality and water conservation properly managed and cared for trees are not only a good investment for your property but good for your quality of life.