

# Working successfully in retaining mature trees

BCRPA Provincial Parks & Grounds Spring  
Training Conference 2013

Verna Mumby

---

ISA Certified Arborist

PNWISA Certified Tree Risk Assessor

B.C. Wildlife Danger Tree Assessor

Member, American Society of Consulting  
Arborists



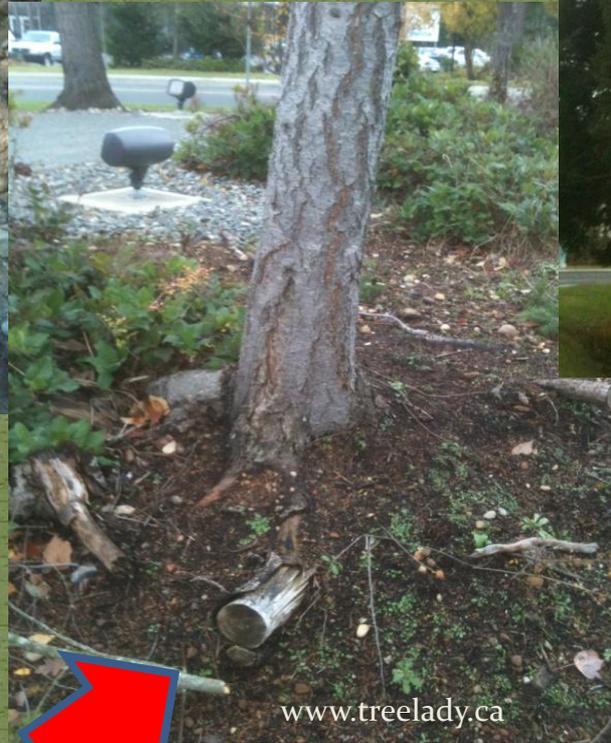
Mumby's Arboriculture Consulting

[www.treelady.ca](http://www.treelady.ca)

# In this presentation I will talk about:

- RISK ASSESSMENT
- REPORT WRITING
- COMMUNICATION
  
- PLANNING
- EDUCATION & ENCOURAGEMENT
- BEST MANAGEMENT PRACTISES





[www.treelady.ca](http://www.treelady.ca)



# Just some facts

- On average, one tree produces nearly 260 pounds of oxygen each year. Two mature trees can provide enough oxygen for a family of four."  
*Environment Canada*
- While cities expend resources to plant millions of new trees, land development, storms, old age and other factors are reducing the number of older, established trees in cities.
- An estimated **4 million trees** are lost every year in urban areas. *USDA Agricultural Research Service*





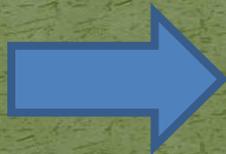






Decayed  
structural roots

Irrigation  
system



# We do care for our Trees



Oak @ Filberg Park, Comox



[www.treelady.ca](http://www.treelady.ca)



And then sometimes we don't think through the whole process.



Trees kept on the top of the hill with two 3 phase power lines.



100 year- old  
Douglas fir with  
eagle nest.

# Retaining 2nd & 3<sup>rd</sup> growth trees on private property.



- Single family dwelling in Comox

67 condo unit in Qualicum Beach



# Mature Tree Retention on Private land



30 metre  
tall  
cedars  
and  
Douglas  
firs  
located  
on a one  
acre  
property.



# Grove retention between residences near the ocean.



Importance of trees retaining the fore shore



Replace the saying  
“ When in doubt  
take it out” with  
“When in doubt  
think it out.”

Educate yourself, the  
workers, engineers,  
developers about  
mature tree retention.  
Everyone will benefit  
from your actions.



# Duty of Care

- For owners of trees the Duty of Care means as an owner they have a **legal responsibility to ensure that their trees are reasonably safe**
- - that means the owner must have all reasonable efforts to identify anything that can foreseeably cause harm to people or property.



# Standard of Care

- ....that degree of care which a reasonably prudent person should exercise in same or similar circumstances.
- If a person's conduct falls below such standard, he may be liable in damages for injuries or damages resulting from his conduct. Black 1990

The Standard of Care  
determines how the Duty of  
Care is measured.

Dunster & Murray 1997

Tree Risk Assessment courses define the Standard of Care. The risk manager can reasonably expect the assessor to provide the best possible advice.



### BCTS WINDTHROW MANUAL:

*A Compendium of Information and Tools for Understanding, Predicting and Managing Windthrow on the BC Coast*



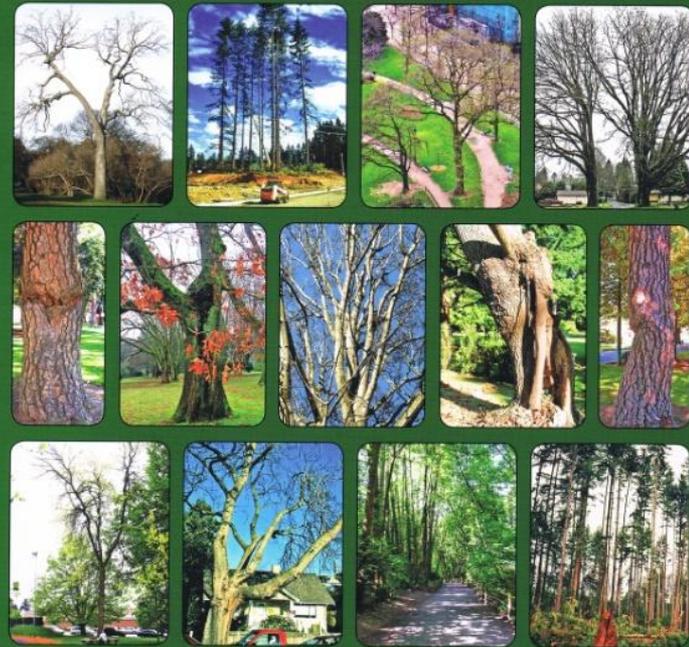
**UNBC** UNIVERSITY OF  
NORTHERN BRITISH COLUMBIA

# Wildlife Danger Tree Certification

## Parks & Recreation Module



## TREE RISK ASSESSMENT IN URBAN AREAS AND THE URBAN/RURAL INTERFACE



COURSE MANUAL



VERSION 1-4

- *Maslow's hammer*, popularly phrased as "if all you have is a hammer, everything looks like a nail" *The Psychology of Science*, 1966.
- : déformation professionnelle, a French term for "looking at things from the point of view of one's profession"

# Our love-hate affair with trees

- From 2005- 2012 communities in England have removed 40,000 street trees. 40% because of insurance claims. 1% of the removals were justified.
- In England 147 communities surveyed their urban trees. 11% were between 50-100 years old and only 2% over 100.
- “Insurance companies demand trees be cut down and councils cave in to their demand. Which means when trees get big, they get chopped down.”
- Capital Asset Value for Amenity Trees (CAVAT) to assess a tree’s worth was developed.  
*The higher the tree’s value, the more proof the insurers will need to chop it down.*

# A heritage group lists mature street trees among the city's most endangered heritage sites.

“If you look at the great cities around the world,” said Donald Luxton, president of Heritage Vancouver, “one of the things that helps define them are boulevards and canopies — and we’re losing ours.”

JEFF HODSON  
METRO VANCOUVER  
**Published:** April 26, 2010



# City of Victoria, BC needs to replenish its forest, report says

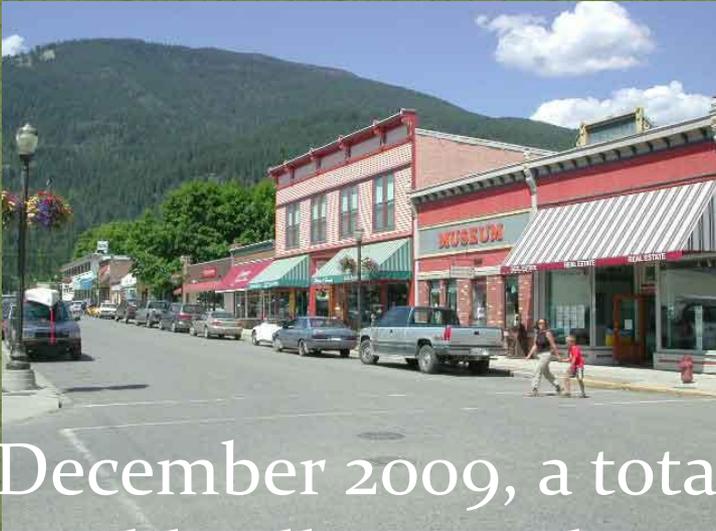
January 28, 2013 By: Times Colonist

*With increasing densification ... we're losing a lot of our mature trees and we don't have a lot of good sites for planting new trees as new buildings take up 90 per cent of a footprint of a property," Speed said.*

*...get across the message that urban forests play a vital role. "A small little grove of conifer trees can do for you what underground storm water sewers can do for you,"*

*...there's inherent conflicts between trees and density, trees and infrastructure like asphalt or underground services, and trees and solar power states Councillor Young*

# Kaslo, B.C. population 1,029

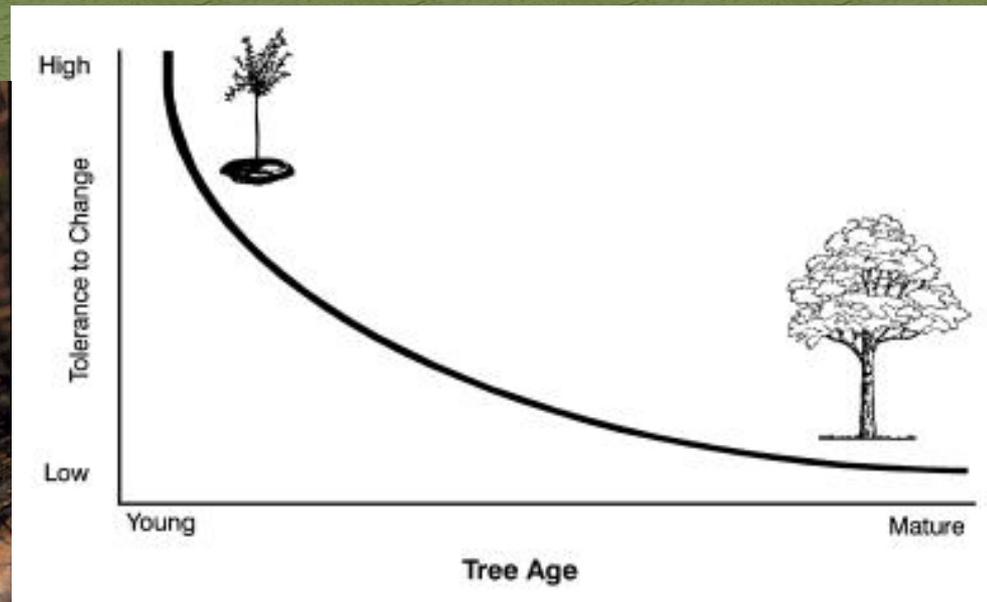


In December 2009, a total of 295 publically owned trees were tagged and inventoried. Of the 295 trees, 7% were recommended for removal, 11% require a risk assessment and 34% require pruning over the next 3-5 years.



# Assessing your mature trees:

- All wounded trees do not become infected
- All infected trees do not become decayed
- All decayed trees do not fail.



# Crown condition indicates health not structural stability.



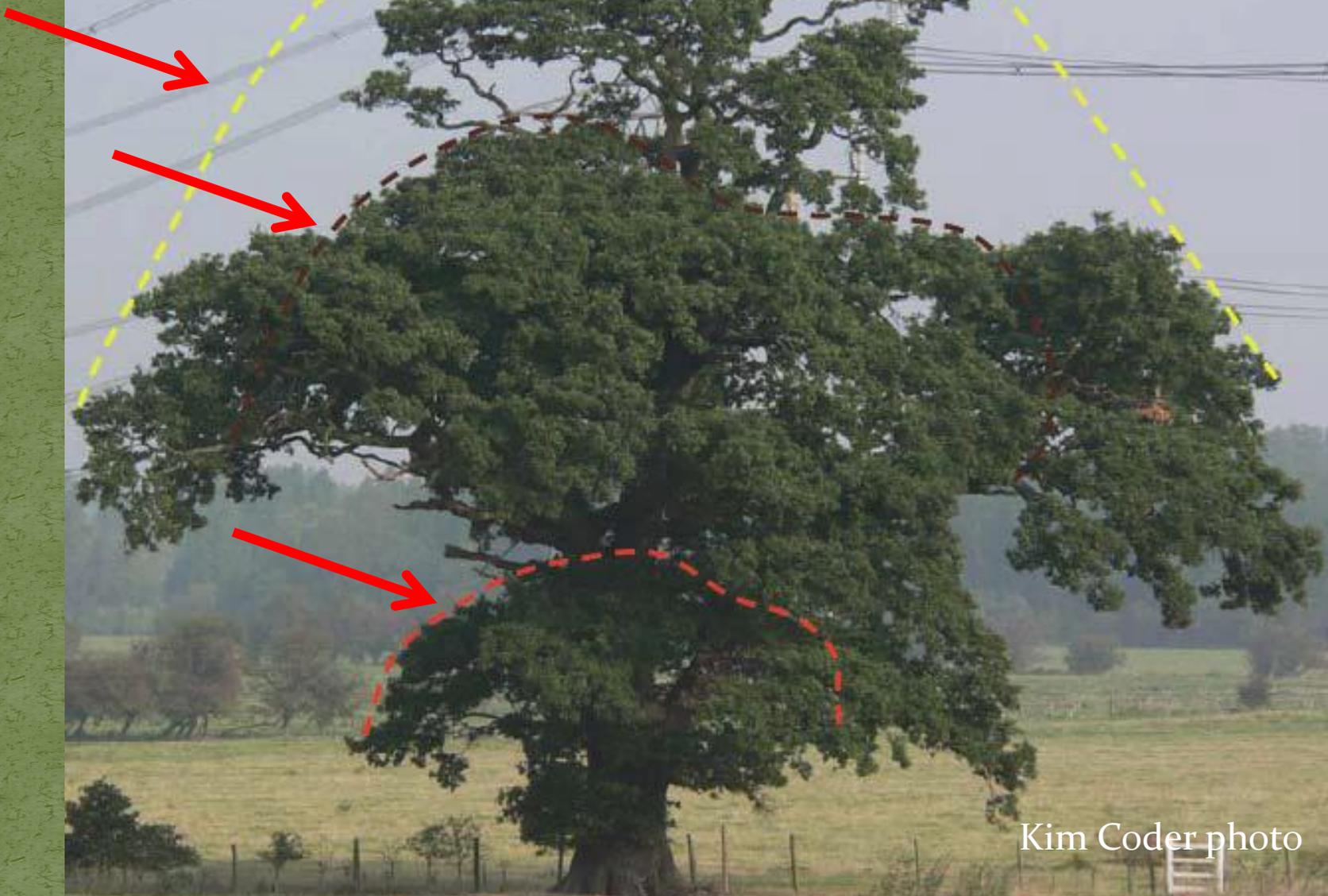
Kim Coder photo



# March 2012 : 103 km winds Comox 137 km winds Campbell River



# Quercus showing early crown transition - II



Kim Coder photo

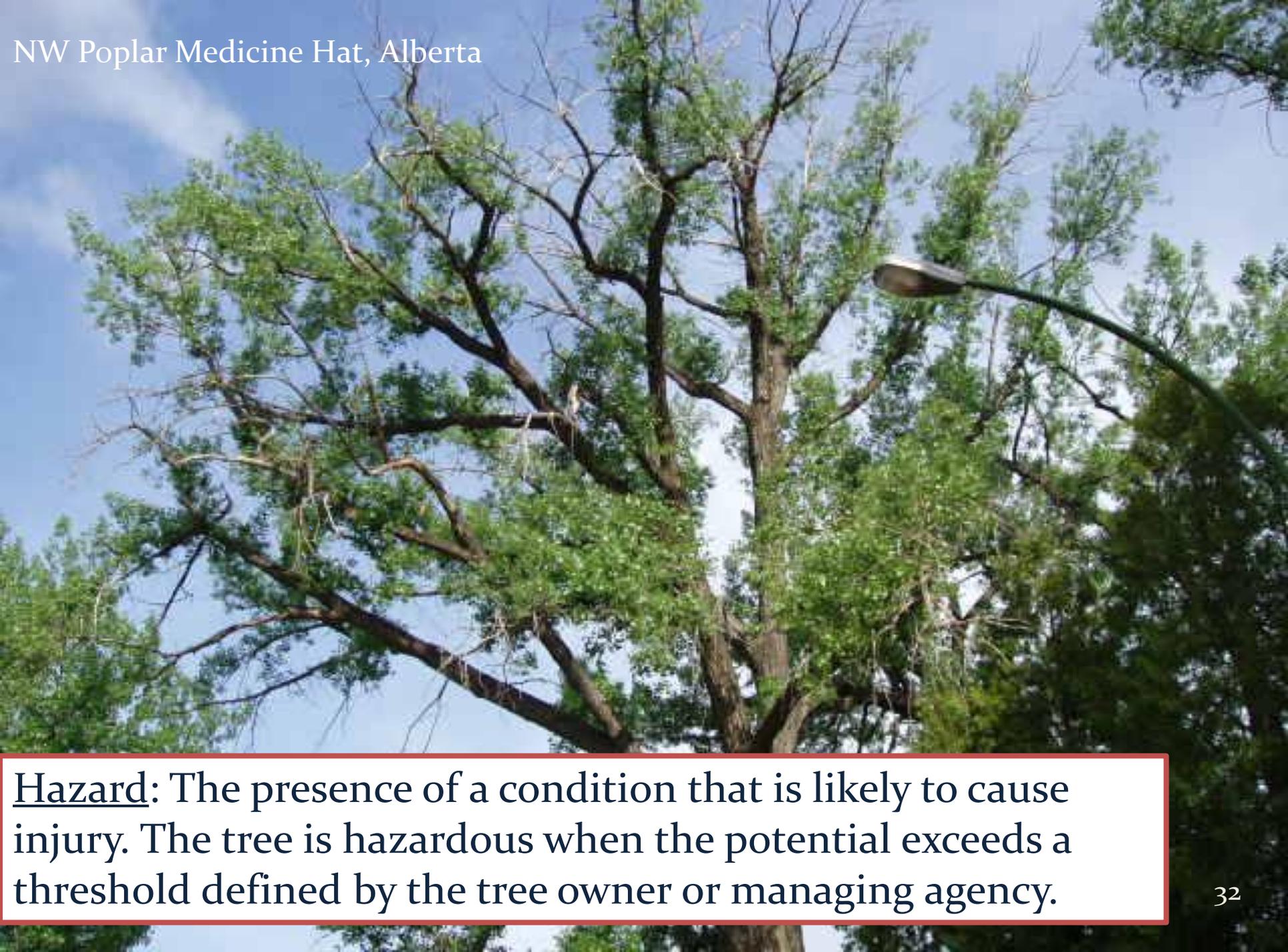


Is this tree a risk  
or a hazard?

# TERMS

- Risk: The potential for injury or damage due to tree failure.
- Hazard: The presence of a condition that is likely to cause injury. The tree is hazardous when the potential exceeds a threshold defined by the tree owner or managing agency.
- Risk Assessment: The process of evaluating the likelihood that a tree or tree part will fail and cause injury or damage.

Arborist News Managing Risk in the Urban Forest Part 2. June 2007



**Hazard**: The presence of a condition that is likely to cause injury. The tree is hazardous when the potential exceeds a threshold defined by the tree owner or managing agency.

# Data should be clear & concise

TABLE 1 Shalev tree report

Mumby's Arboriculture Consulting [www.treelady.ca](http://www.treelady.ca)

## BIG LEAF MAPLE *Acer macrophyllum* (BLM)

Tag #	DBH (cm)	Height (m)	Tree Health	Tree Defects	Hazard Rating	RST cm	AST cm	Hazard Abatement	Re-assess	Remarks on pg #
651	44/32	18	Average	Trunk	7	11	35	Fill cavity at base of tree	5 years	4
310	56/49/59	34	Average	Root/Crown	8	9	12	Pocket of decay to monitor	2-3 yrs	4
659	105/48	33	Fair-Poor	Root/Crown	9	22	22	Open cavity to fill, prune, decay column to monitor	2 yrs	4

## Douglas Fir *Pseudotsuga menziesii* (DgF)

Tag #	DBH (cm)	Height (m)	Tree Health	Tree Defects	Hazard Rating	RST cm	AST cm	Hazard Abatement	Re-assess	Remarks on Pg. #
336	105	18	Average	Trunk	9	15	18	Prune to reduce load & re-assess	2 yrs	5
338	94	16	Average	Crown	8	13	17	Radial crack in stem, prune for load	3-5 yrs	5
340	99	18	Average	Root/Crown	11			Extensive butt rot, removal		5
343	108	20	Average		5	n/a		Prune upper 1/3 @ old topping cuts	3-5 yrs	5
654	69	36	Average		5	n/a			3-5 yrs.	5
658	92	33	Average	Root/Crown	10	13	20	Prune & re-assess or wildlife tree	2 yrs.	5

658 | 92|33|Average|Root/Crown|10|13|20|make wildlife tree & re-assess|2yrs|5

									ys.	
--	--	--	--	--	--	--	--	--	-----	--

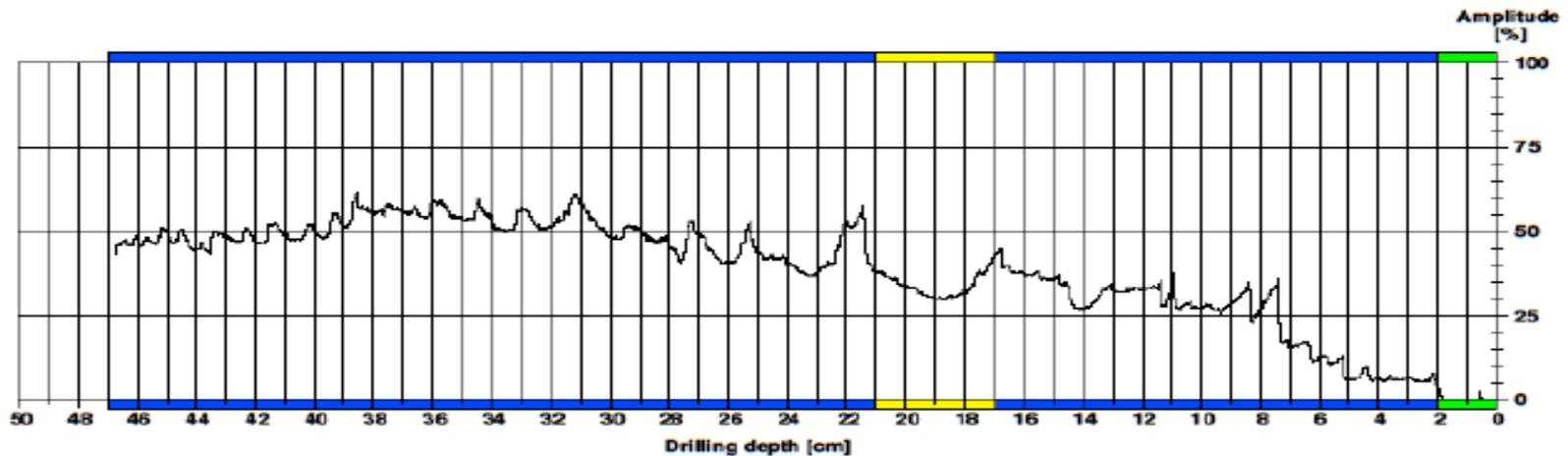
## Arbutus *Arbutus menziesii* (A)

Tag #	Tree Type	DBH (cm)	Height (m)	Tree Health	Tree Defects	Hazard Rating	Hazard Abatement	Re-assess	Remarks on pg. #
339	A	44/33	11	Fair-Poor	Trunk	8	Advanced decay in upper stem. Few targets, allow to decline naturally.		6

# Resistograph Machine; just one tool in the toolbox.

## Measuring / object data

Measurement no. : 2	Time : 11:38:39	Location : Comox
Drilling depth : 46.72 cm	Avg. curve : off	Name : Halliday
Wood species : Soft (1)	Diameter : 64.0 cm	
ID number : willow	Level : 170.0 cm	
Advance : 81.6 cm/min	Direction : south to north	
Date : 11.08.2010	Objet species : Salix fragilis	



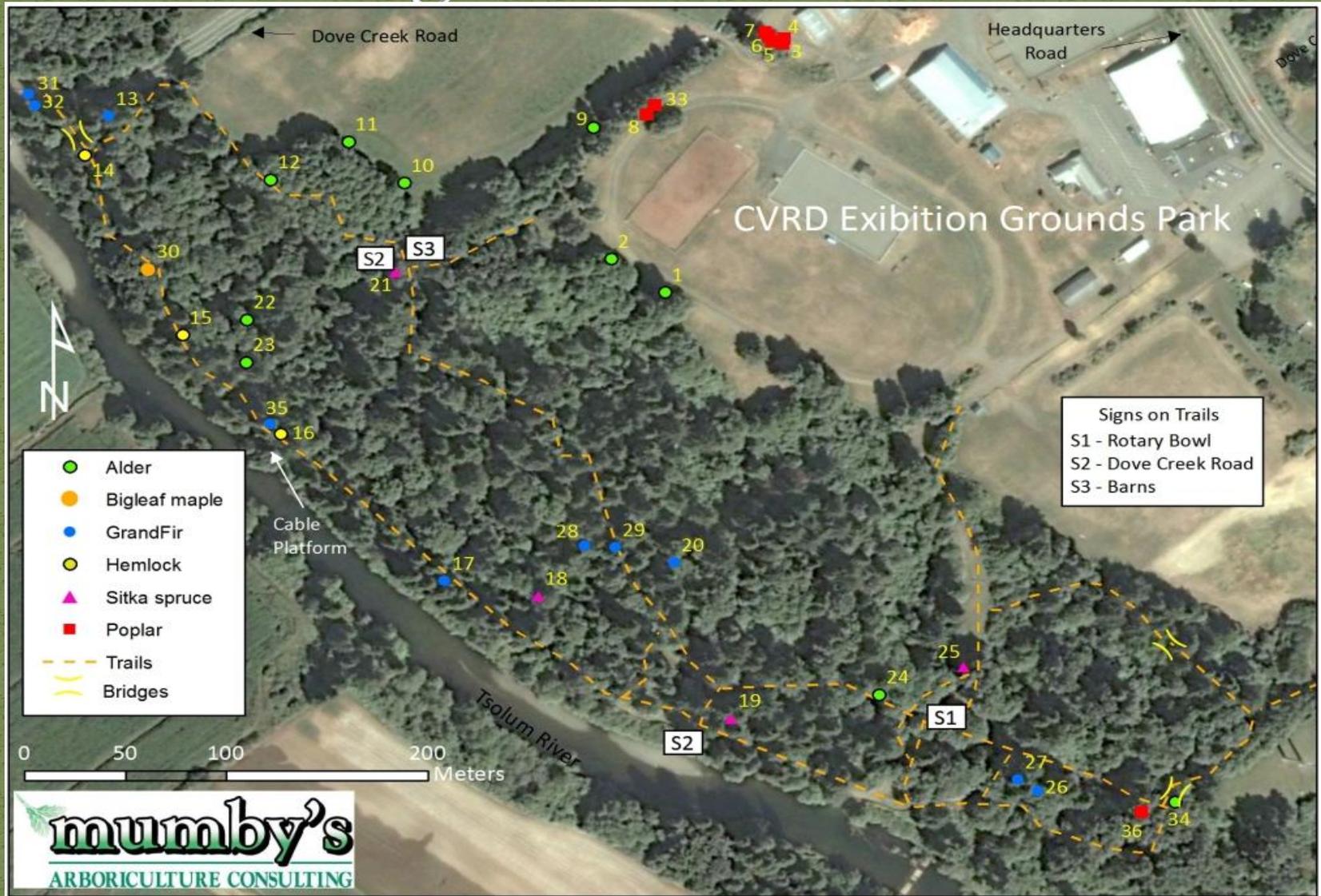
## Assesment

<span style="color: green;">█</span>	From 0.0 cm to 2.0 cm : bark
<span style="color: blue;">█</span>	From 2.0 cm to 17.0 cm : sound wood
<span style="color: yellow;">█</span>	From 17.0 cm to 21.0 cm : incipient decay
<span style="color: blue;">█</span>	From 21.0 cm to 47.0 cm : sound wood
<span style="color: white;">█</span>	From 0.0 cm to 0.0 cm :
<span style="color: white;">█</span>	From 0.0 cm to 0.0 cm :

## Comment

Risk Rating	Risk category	Interpretation and Implications
3	Low 1	Insignificant – no concern at all.
4	Low 2	Insignificant – very minor issues.
5	Low 3	Insignificant – minor issues not of concern for many years yet.
6	Moderate 1	Some issues but nothing that is likely to cause any problems for another 10 years or more.
7	Moderate 2	Well defined issues – retain and monitor. Not expected to be a problem for at least another 5-10 years.
8	Moderate 3	Well defined issues – retain and monitor. Not expected to be a problem for at least another 1-5 years.
9	High 1	The assessed issues have now become very clear. The tree can still reasonably be retained as it is not likely to fall apart right away, but it must now be monitored annually. At this stage it may be reasonable for the risk manager / owner to hold public education sessions to inform people of the issues and prepare them for the reality that part or the entire tree has to be removed.
10	High 2	The assessed issues have now become very clear. The probability of failure is now getting serious, or the target rating and /or site context have changed such that mitigation measures should now be on a schedule with a clearly defined timeline for action. There may still be time to inform the public of the work being planned, but there is not enough time for protracted discussion about whether or not there are alternative options available.
11	High 3	The tree, or part of it has reached a stage where it could fail at any time. Action to mitigate the risk is required within weeks rather than months. By this stage there is not enough time to hold public meetings to discuss the issue. Risk reduction is a clearly defined issue and although the owner may wish to inform the public of the planned work, he/she should get on with it to avoid clearly foreseeable liabilities.
12	Extreme	The tree, or part of it, is in the process of failing. Immediate action is required. All other, less significant tree work should be suspended, and roads or work areas should be closed off, until the risk issues have been mitigated. This might be as simple as removing the critical part, drastically reducing overall tree height, or taking the tree down and cordoning off the area until final clean up, or complete removal can be accomplished. The immediate action required is to ensure that the clearly identified risk of harm is eliminated. For trees hit by severe storms, where many extreme risk trees can occur, drastic pruning and/or partial tree removals, followed by barriers to contain traffic, would be an acceptable first stage of risk reduction. There is no time to inform people or worry about public concern. Clearly defined safety issues preclude further discussion.

# Retaining Mature trees in Parks



Tree Risk Assessment courses define the Standard of Care. The risk manager can reasonably expect the assessor to provide the best possible advice.



### BCTS WINDTHROW MANUAL:

*A Compendium of Information and Tools for Understanding, Predicting and Managing Windthrow on the BC Coast*

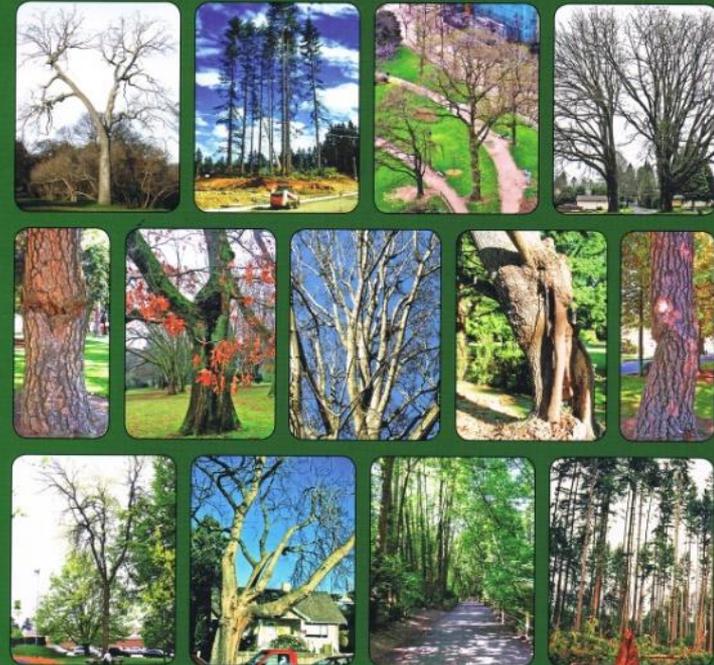


# Wildlife Danger Tree Certification

## Parks & Recreation Module



### TREE RISK ASSESSMENT IN URBAN AREAS AND THE URBAN/RURAL INTERFACE



COURSE MANUAL



VERSION 1-4



# Wildlife Trees

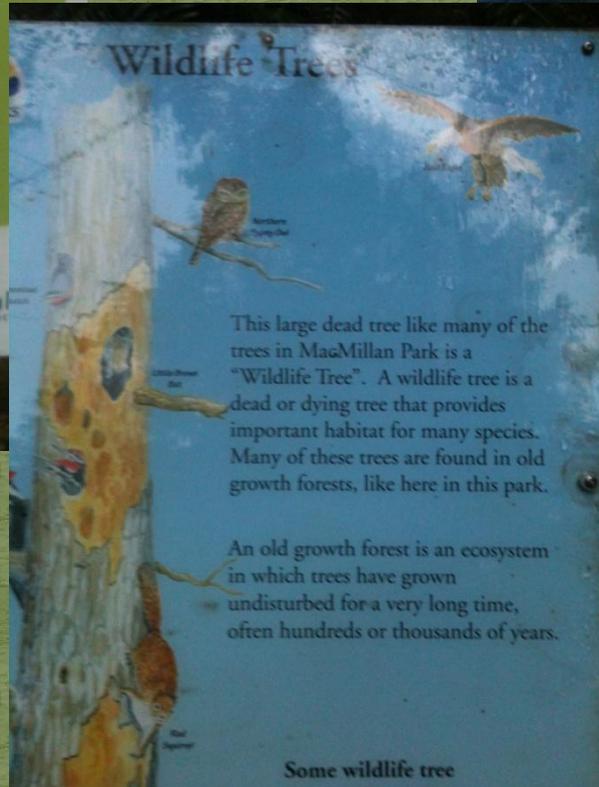
Trails at Glover Community Nature park pass through dead and dying trees that provide food and shelter for birds, bats and other wildlife.

Please look, listen and be aware of falling limbs and trees.

Do not enter park during periods of high winds or heavy snowfall.

Thank you.

Report ideas or concerns to  
250-334-6000 1-800-331-6007  
communityservices@comoxvalleyrd.ca



Some wildlife tree

## WARNING

Cathedral grove is an old forest

These large trees will continue to live for many years, but root and stem diseases will cause some trees and branches to die.

They will fall without warning.

Please be alert at all times.

**LEAVE THE PARK ON WINDY DAYS**



# TREE SIZE AND GROUP

**BIG TREES ARE GREAT BUT HARDER TO SAVE.**



■ **SMALLER TREES ARE MORE VIGOROUS-CAN GROW OVER TIME.**



Urban Forestry Services, Inc., Jim Barborinas,

# SPECIES RETENTION QUALITIES

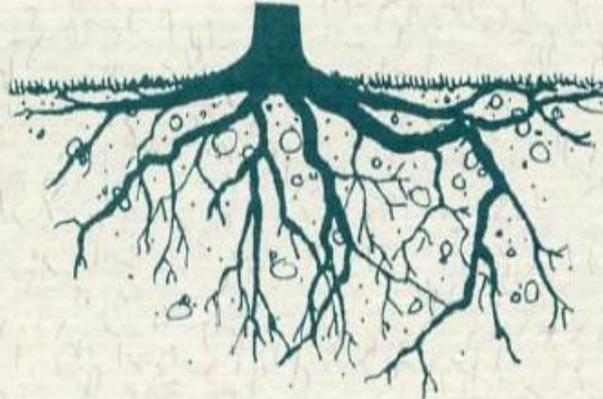
<b>DOUGLAS FIR</b>	<b>BEST</b>	<b>TOUGH FAST GROWING. TOLERATES ROOT DISTURBANCE.</b>
<b>WESTERN RED CEDAR</b>	<b>GOOD</b>	<b>SHADE AND WET TOLERANT, GOOD SCREENING TREE.</b>
<b>BIGLEAF MAPLE</b>	<b>GOOD</b>	<b>FAST GROWING AND TOLERATES ROOT DISTURBANCE.</b>
<b>WESTERN HEMLOCK</b>	<b>FAIR TO POOR</b>	<b>SHADE TOLERANT BUT DECLINES FROM ROOT DISTURBANCE.</b>
<b>RED ALDER</b>	<b>POOR</b>	<b>POOR ROOTS AND STRUCTURE EVEN WHEN HEALTHY</b>
<b>COTTONWOOD</b>	<b>POOR</b>	<b>FAST GROWING, HUGE TREE, WITH LIMB DROP AND INVASIVE ROOTS.</b>

Urban Forestry Services, Inc., Jim Barborinas,

[www.treelady.ca](http://www.treelady.ca)

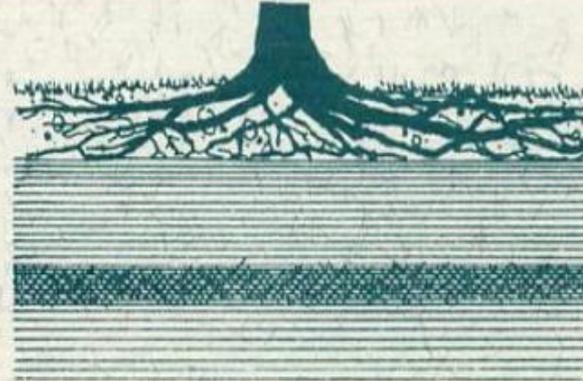
# RISK OF FAILURE MUST CONSIDER SOILS

DEEP SANDY  
GRAVELLY  
LOAM  
PROMOTES  
DEEPER  
ROOTING



Good soils for saving trees

SOILS



SHALLOW  
SOIL OVER  
HARDPAN  
AND/OR HIGH  
WATER TABLE  
LIMITS DEEP  
ROOTING

Poor soils for saving trees

Urban Forestry Services, Inc., Jim Barborinas,

# Tree Retention on Development Sites

1986: The 75 cm dbh tree was successfully kept and protected during construction: Winnipeg, Manitoba

- :utilities were tunneled under the tree
- :root injected with a preventative fungicide against Dutch elm disease.

2008:tree had grown to the following dimensions: 80 cm dbh, and 19 m height



# BORING TO AVOID ROOT DAMAGE



Urban Forestry Services, Inc., Jim Barborinas,

# Planning phase of the development project

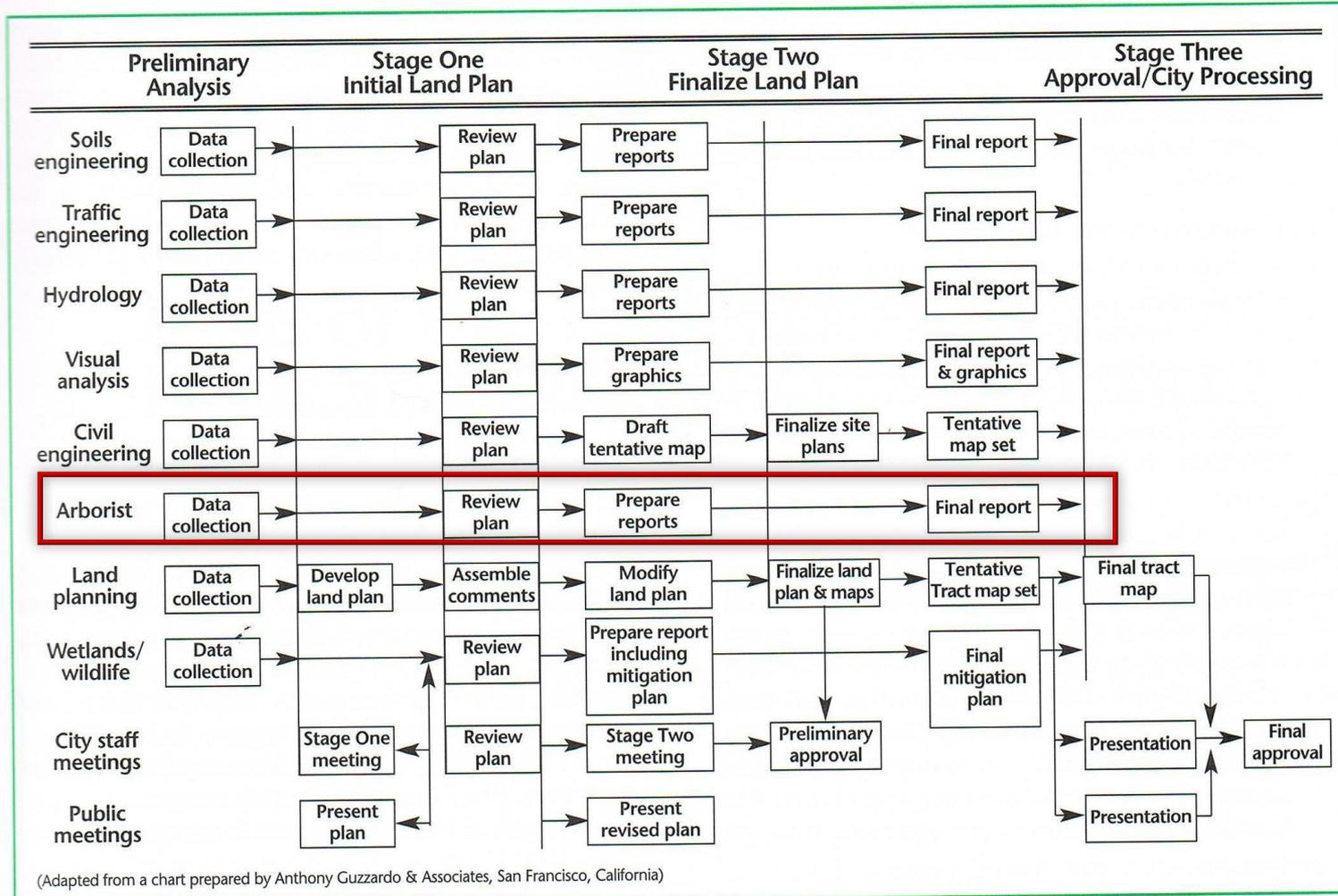


FIGURE 3.1 The planning phase of a development project involves using information from a variety of sources to formulate a comprehensive plan, including opportunities for review and comment by the public agencies involved.

## Prior to development application for approval

- Tree survey/preservation
- design guidelines



## Time of development application

- tree preservation plan
- review site plans
- ID tree protection zone



## Project Review

- responds to questions about preservation issues



## Project Approval

- prepares fencing plan
- final tree preservation plan
- recommendations/specifics for tree care

## Construction period

- provide tree care before construction begins
- monitor activity around trees



## Maintenance phase

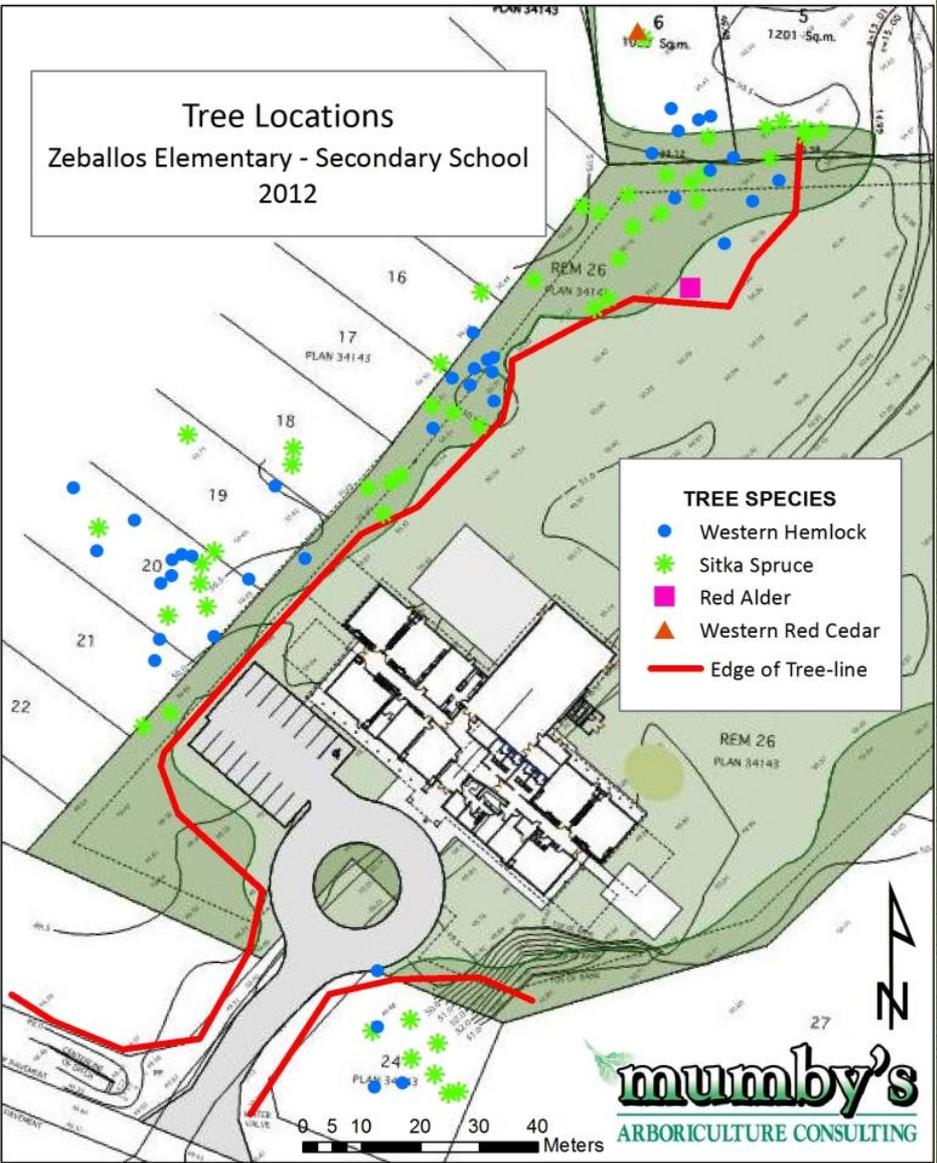
- evaluate trees after construction
- provide remedial treatments



## Post Construction Maintenance

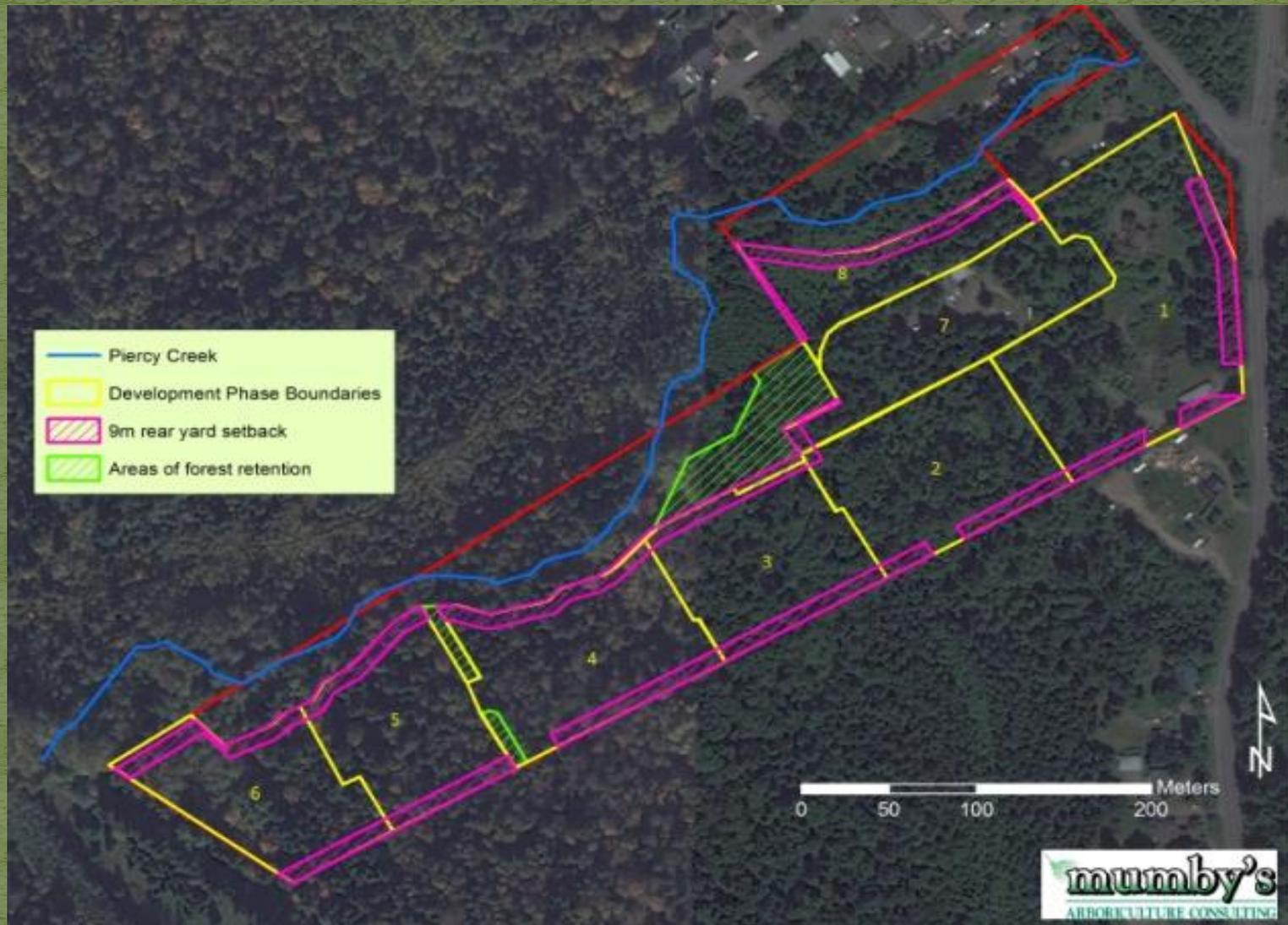
- prepare and implement tree management plan

**Tree Locations**  
Zeballos Elementary - Secondary School  
2012



New school development,  
called in at construction  
phase.

# Development project of 8 phases



# The Assignment

Determine the numbers of trees located outside the setbacks and riparian area that will be removed for the development.

Inventory all trees greater than 20 cm diameter located in the 9 meter setbacks of all the properties.

Identify any candidate trees within Phase 1 central cutting area that may have the potential for retention

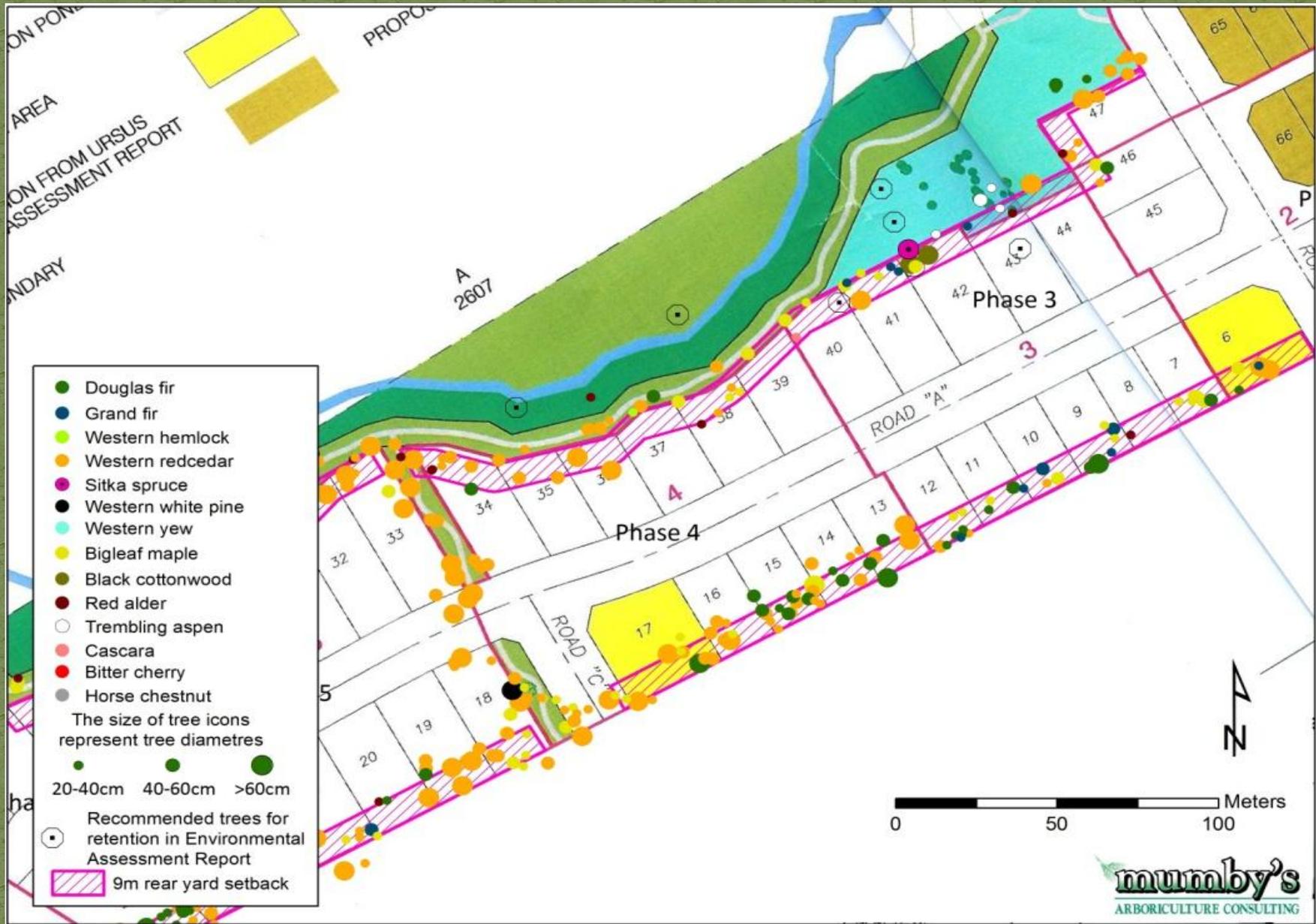
# The Assignment

Identify any eagle perch trees.

Confirm the recommended setback for the riparian area is adequate to retain wind firm trees.

Provide tree protection measures for pre-construction, during and post-construction phases.

Estimate tree replacement numbers for trees being removed.





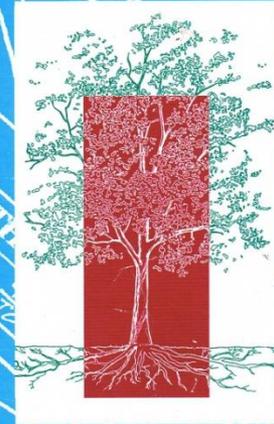
Pre-construction	Construction	Post –construction
<ul style="list-style-type: none"> <li>- Tree Inventory</li> <li>- Tree Assessment &amp; report</li> <li>- Identify tree protection zones on site plan &amp; in the field</li> <li>- Implement BMP treatments to trees that require it (thinning, pruning</li> <li>- Erect fencing around the tree protections zones (see Picture 8)</li> <li>- Provide signage to ID tree protection zone</li> <li>- Assess trees during or after a wind event.</li> </ul>	<ul style="list-style-type: none"> <li>- Educate construction workers about the TPZ, fencing &amp; signage.</li> <li>- Monitor any new work being done around the trees.</li> <li>- Be informed when engineering plans are changed by the developer or builder.</li> <li>- Be on site when construction is close to or impacting the CRZ of the trees.</li> <li>- Assess trees during or after a wind event.</li> </ul>	<ul style="list-style-type: none"> <li>- Update the pre-construction inventory and assess the trees</li> <li>- Write a post construction report</li> <li>- Provide PHC measures if required. Mulching, watering, fertilizing of trees for 1-2 years</li> <li>- Monitor the trees every 6 months then once a year for 3 years.</li> <li>- Assess trees during or after a wind event.</li> </ul>

# Reference Book

- principles of tree preservation
- tree biology
- development process
- plans & construction practise
- evaluation process
- designing for tree preservation
- impact to trees
- minimizing the impacts
- preparing specifications
- the construction phase
- post construction management
- reports & plans

# Trees and Development

## A Technical Guide to Preservation of Trees During Land Development



Lot 2

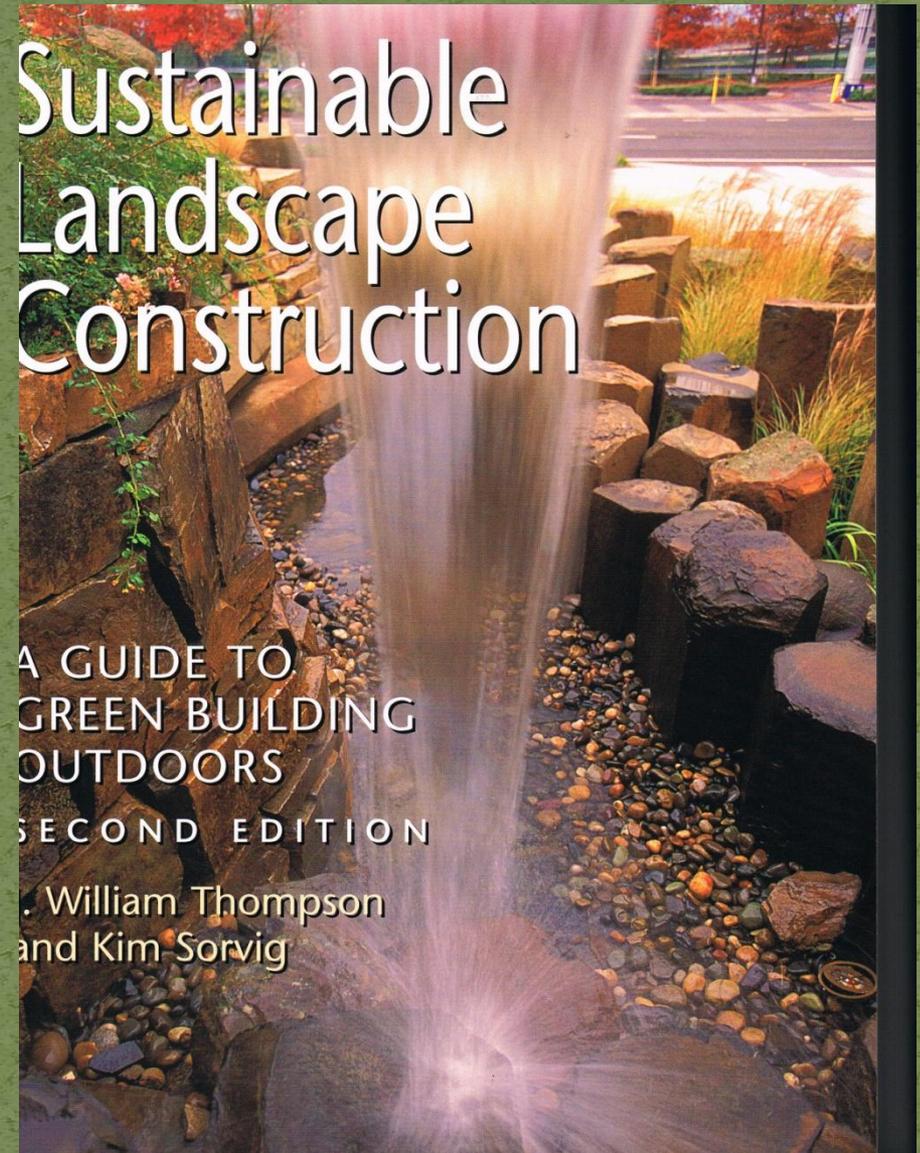
Lot 3

Nelda Matheny and James R. Clark

# Reference Book

Six of the 10 principles  
discussed:

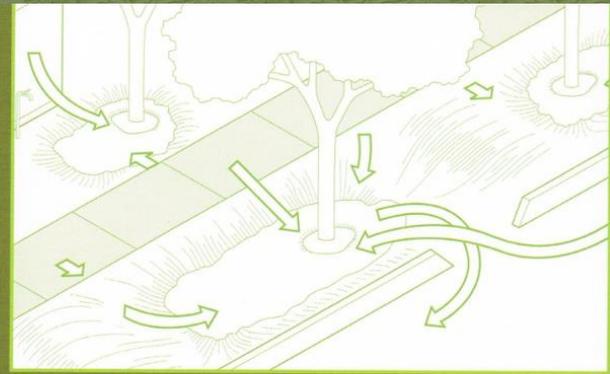
- Keep Healthy Sites  
Healthy
- Heal Injured Sites
- Cost of Energy over  
Time
- Respect the Waters of  
Life
- Pave Less
- Maintain to Sustain



# Reference Book

- Practise of landscape architecture
- Standards & Guidelines
- Process, Implementation & Application
- Materials

Graphic Standards  
Standards & Guidelines



## LANDSCAPE ARCHITECTURAL GRAPHIC STANDARDS



LEONARD J. HOPPER, RLA, FASLA

# Grove of trees retained on new residence building site.



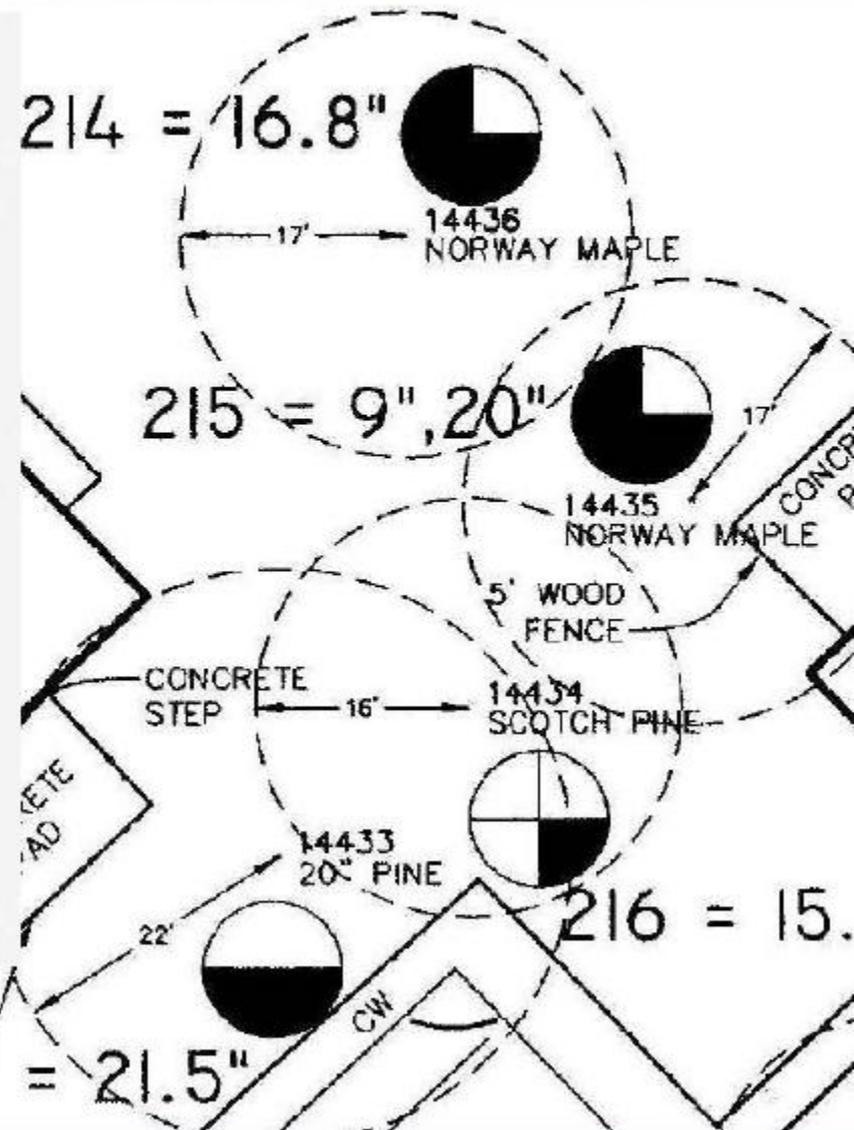
# SITE MAP WITH TREE INFORMATION

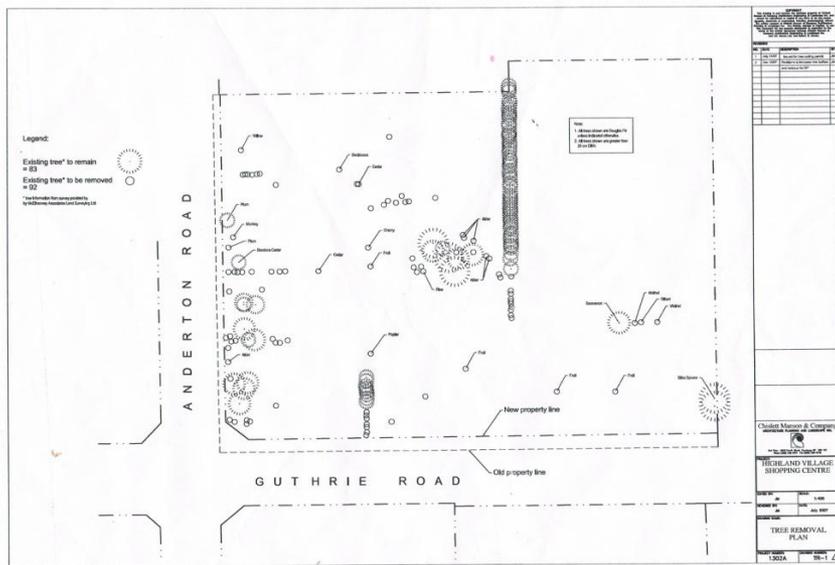
## PARK LAKE TREE EVALUATION

299 SIGNIFICANT TREES HAVE BEEN EVALUATED IN THE FIELD ON THE PARK LAKE SITE. THIS PLAN SHOWS THE TREE TAG NUMBER AND PRESERVATION VALUE SYMBOL NEXT TO EACH TREE. THE PRESERVATION VALUE RATING IS BASED ON INFORMATION DOCUMENTED FOR EACH TREE AVAILABLE ON AN EXCEL FILE. INFORMATION AVAILABLE INCLUDES TREE & SURVEY NUMBER, COMMON & SCIENTIFIC NAME, DIAMETER, VIGOR, STRUCTURE, RISK OF FAILURE, MAINTENANCE RECOMMENDATION, PRESERVATION VALUE, COMMENTS AND SUITABILITY FOR PRUNING TO 14' IN HEIGHT.

## PRESERVATION VALUE SYMBOL EXPLANATION

- **SPECIAL**, UNIQUE SPECIES, SPECIMEN OR FORM. SAVE
- ◐ **HIGH**, GOOD QUALITY, CHARACTER TREE. SAVE IF POSSIBLE.
- ◑ **MODERATE**, COMMON SPECIES, FAIR CONDITION. MAY NEED SPECIAL ATTENTION TO PRESERVE
- ◒ **LOW**. POOR SPECIMEN OR SPECIES. HIGH MAINTENANCE OR SOME CAUTION IF RETAINED.
- ⊕ **HAZARD OR DEAD**. TREE IS DEAD OR IN VERY POOR CONDITION AND SHOULD BE REMOVED.
- ☼ DENOTES EVALUATED TREE NOT SHOWN ON SURVEY





REVISED TREE RETENTION PLAN ACCEPTED:  
 DECEMBER, 18, 2007  
 S.L.G. - COMOX PARKS SUPT.

# Pre-development Stage



For reliable accurate data (tree numbers, species & location), surveys should be done by arborists or foresters.

# Tree Retention program on a commercial development site.



Before development: 247 trees

# Response about the town of Comox 25% tree retention tree by-law.

- Architect: “This is great!”
- Landscape Architect: “I’ve never done a commercial design with mature trees.”
- General Contractor: “None of my crew will be working on this site with trees on it.”
- Engineers: “This is absolutely ridiculous.”
- Developer: “This is costing me more money. Can’t we just get rid of them & plant more?”

# Caring Citizens



- Walnut / Apple / Chestnut : local wood carvers
- Ornamentals : rhodos, roses, plum,
- money puzzle trees: local gardeners
- To ensure the safety of the public, I had to be on site during these transactions. My liability insurance covered these tasks.





Educate

Communicate



On Site Arborist

There were a few bumps on the way...

The Tree Management Plan for the shopping centre development project specified 28 trees to be removed for Phase 2.

44 trees were removed in May, 2009.



# Improper removal of trees costs \$\$\$\$



- Remediation for the 16 trees removed was determined using The Cost of Cure formula and the Trunk Formula Method.
- Cost of Cure ranged from \$7,200.00 to \$12,800.00.
- The Trunk Formula Method appraised value of \$10,320.00.

# Geotechnical engineers

Geotechnical engineering is the branch of [civil engineering](#) concerned with the engineering behavior of earth materials.





Geotechnical engineers evaluate [stability of natural slopes](#) and man-made soil deposits; assess risks posed by site conditions; design [earthworks](#) and structure [foundations](#); and monitor site conditions, earthwork and foundation construction [\[1\]\[2\]](#)



**HIGHLAND VILLAGE**  
SHOPPING CENTRE  
PHASE 3 / UNITS FOR SALE

Michael Anderson  
604-74-1171

Exclusive Listing  
A

SHOPPERS DRUG MART  
ALDI



247 trees at beginning of project, 36 retained (15%).  
The additional 10% improperly removed were replanted 2:1  
ratio.

Responses about the 25% tree retention town tree by-law after Phases 1 and 2 were completed.

- Architect: “This is great! “
- Landscape Architect: “The end result design with mature trees worked out well. “
- General Contractor: “We now understand more about working around mature trees. The letter to WCB helped. “
- Engineers: “This is absolutely ridiculous. “
- Developer: “This was my idea from the start, isn't it great! “



[www.treelady.ca](http://www.treelady.ca)





We are capable of retaining 1,100 year old trees for future generations to enjoy!



Ranley Oak in England

Kim Coder photo

[www.treelady.ca](http://www.treelady.ca)

© DF







Thanks to BCRPA Provincial Parks &  
Grounds Spring Training Conference 2013 &  
Nancy McLean.

Thank  
You!

Verna Mumby  
Mumby's Arboriculture Consulting

[www.treelady.ca](http://www.treelady.ca)

[www.treelady.ca](http://www.treelady.ca)