



Tree Risk Assessment & Abatement Procedures and
Information: Urban Forestry and Natural Areas Programs

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Introduction

The Urban Forest is a vital component of our community. They occur as street trees, park trees, private trees and in natural areas or remnant forest stands. Our goal, as described in the Urban Forestry Strategy, is to protect and enhance the urban forest, however, our obligation is also to provide a safe setting for staff and the public.

Under Work Safe BC Regulations, the Municipality of Saanich (Employer) is required to ensure the worker is safe from hazards. Under the Occupiers Liability Act the Municipality of Saanich also has a duty to the public to take reasonable care to see that people and their property will be reasonably safe on the municipality's premises. In either case, the municipality must take steps to ensure that any trees located on its property are not hazardous to persons or staff.

Urban Forestry staff do not routinely inspect trees for hazards. On undeveloped Road Right of Ways, developed parks, medians and boulevards we assess trees in response to service requests or complaints through our Call For Service (Calls) Program (Tempest). These Calls are recorded and will be responded to in a timely manner, and then prioritized according to the reported immediacy of the hazard. Procedures will vary depending on the specific type of request.

In undeveloped parks and park natural areas' we respond to complaints or service requests from the public or municipal staff. In particular, tree risk assessments are performed if the municipality has work scheduled or when registered volunteers are performing authorized work within the parks system. Saanich Parks also responds to service requests or complaints from the public, invasive species removal and restoration requests (authorized volunteer activities), and service requests from other divisions within Saanich Parks or other municipal departments. Prior to commencement of scheduled maintenance activities or volunteer activities in these parks, we must complete a tree risk assessment.

The following information is intended to provide procedural guidance to District of Saanich Parks Division staff that conduct tree risk assessments on trees managed by the Urban Forestry Section of the Parks Division.

Certified Tree Risk Assessors, as certified by the International Society of Arboriculture will conduct all tree risk assessments. The assessment system generally utilized is that recommended in the Tree Risk Assessment in Urban Areas and the Urban/Rural Interface course (the course) offered by the International Society of Arboriculture.

In Park natural areas, we will couple this with assessing the wildlife value of trees in parks as outlined in the "Wildlife Danger Tree Assessors Course for Parks and Recreation Sites" (See Wildlife Tree Procedure in Undeveloped Parks or Park Natural Areas)

In managing tree risks in park natural areas, our goals are to provide for safe use and access, while limiting the risk of injury to park users and staff and increasing long term benefits to natural area ecosystems. To meet these goals, our guidelines are that:

- maintaining trees for ecological value should be balanced with the need to minimize the risk to people and property;
- trees are part of natural ecosystems and provide leisure and learning opportunities for residents and visitors
- tree hazard management should be conducted using ecologically sound techniques;
- wildlife trees provide habitat for animals and contribute to overall ecosystem health

Risk Thresholds for Determining Hazard Abatement

The Tree Risk Assessment in Urban Areas and the Urban/Rural Interface course sets out low, moderate, high and extreme risk thresholds, with action recommendations. In the following scenario, the recommendations are problematical.

Probability of failure	4	High - "require treatment with the next few days or weeks"
Size of defective part	2	10 to 50 centimetres - relatively large piece
Target	1	Course ratings – "picnic area, moderately used trails" City ratings - private property grass and gardens (low human occupancy)
Total risk rating	7	Course recommendation – "not expected to be a problem for at least another 5-10 years"

In the above, it seems the recommendations under probability of failure and total risk rating are in conflict. The Probability of failure recommends treatment within the next few days or weeks, while the Total risk rating states the tree is not expected to be a problem for at least 5-10 years.

In light of the above, the District of Saanich developed its own risk thresholds for tree hazard abatement to occur and are listed later in this document. For example, any tree with a target, failure probability of 4, size of part of 2, total risk rating of 7, will receive hazard abatement work.

Although not intended to be a comprehensive list, the target values provided later in this document should enable assessors to, with a reasonable degree of certainty establish a target value.

The District of Saanich has adopted the 12 point rating for tree hazard assessment as recommended in the Tree Risk Assessment in Urban Areas and the Urban/Rural Interface course manual (the manual).

Probability of Failure	5 point maximum
Size of part	3 point maximum
Target rating	4 point maximum

Target, size of part and probability of failure values are described in the manual. For specific target values refer to the District's list of values found in the document entitled Target Values for Tree Risk Assessment.

Tree hazard ratings are determined when combining the assessed value of the target, size of part and failure potential. The manual categorizes the tree hazard ratings as Risk Thresholds as follows:

Risk Threshold:	Hazard Rating:
Low risk	3-5 points
Moderate risk	6-8 points
High risk	9-11 points
Extreme risk	12 points

The following applies to trees managed by the Urban Forestry Section of the Parks Division:

1. In order for the tree to pose a hazard there must be an identified target.
2. All dead standing trees with a target will be removed or modified to abate the hazard.
3. When the tree risk threshold is moderate (6 points or less) the District will not undertake any abatement work.
4. Dying trees with a target will be removed or modified to abate the current or future hazard, with the exception of 'significant trees' as per the District inventory, or special feature trees. These trees may be pruned or modified to abate the hazard.
5. Dying specimen trees on public land with a target may be removed or modified to abate the hazard.

6. Hazard tree abatement will occur when there is a target and the following thresholds are met:
- Tree has a failure potential rating of 4 or greater and a size of part rating of 2 or greater.
 - Tree has a hazard rating of 8 or greater with a probability of failure rating of 3 or greater.
 - Tree has a rating of 10 or greater.

Target Values for Tree Risk Assessment

The target value categories (1-4 points) are adopted from the Tree Risk Assessment in Urban Areas and the Urban/Rural Interface course manual. The target values follow the manual category descriptors and were established after reviewing other jurisdiction's target values and input from staff. Target values are based on a combination of property value and/or frequency of human occupancy. In order for the tree to pose a hazard there must be an identified target (i.e. if there is no target there is no hazard).

In Park natural areas, exposure to this risk is highest along on trails, at the interface with private property, urban or rural roadways, parking lots, and buildings, or during volunteer stewardship activities.

The following target values are minimums, the assessor can increase target value rating when justified, (i.e. use is determined to be more frequent).

Target Value Description:

1. Very rarely used for long period of time; low value structure
2. Target area has occasional use meaning less than 50% of the time and do not stay very long, just passing by; moderate value structure
3. Target area has frequent use more than 50% of the time, more than just passing by; moderately high value structure.
4. Target area has constant use, high volumes of people occupying the area, or people occupying the area for long periods of time, or a combination of the two; very high value structure

Target	Description	Target Value
Buildings	Building – low value and occasional human occupancy (storage or garden shed)	2
	Building – Moderate value and frequent human occupancy (fieldhouse, park washrooms)	3
	Building – high value and constant human occupancy (residence/hospital)	4
	Building – historic	4
Park Areas	Courts – tennis, basketball, lacrosse, skateboard	2
	Athletic fields, football, baseball, soccer etc.	2
	Pool/beach	2
	Playground – occasional use	2
	Playground – frequent use (destination parks)	3
	Picnic area, table, bench, information kiosks/signs; bridges	2
	Open lawn area; garden beds	1
	Nature Trail	1
Parking Areas	Other trails and paths	2
	Day use parking	2
	24 hour parking	3
Roads	Residential road including sidewalk	2
	Collector road and sidewalk	3
	Highway/Arterial road and sidewalk	4
Utilities	Utilities	4
Private Yard	Grass and Gardens Only	1
	With structures (occasional use)	2
	With structures (frequent use)	3

Tree Hazard Inspection and Assessment Procedure

Tree inspections and assessments will follow the Parks Division standard operating procedures outlined below:

Scheduled Tree Inspection Procedures

District of Saanich staff do not routinely inspect trees for risk. Tree risk assessments are scheduled and conducted only if the municipality has maintenance work scheduled (staff), or when registered volunteers groups are performing authorized work within the parks system. In these cases, Certified Tree Risk Assessors will inspect trees within the prescribed work site prior to commencement of maintenance activities.

Tree hazard assessment procedures for scheduled tree inspections;

1. delineate the site and area that will be the subject of the tree inspection and review site and tree history.
2. identify and value the potential targets at the site.
3. conduct a visual tree assessment to determine tree hazards that can impact the potential targets and cause significant damage.
4. if the visual tree assessment, site history information and other factors warrant, the assessor may need to conduct a detailed tree assessment to determine the extent of the tree defects.
5. record all trees that require hazard abatement work.
6. photograph the tree and defects.
7. if necessary schedule further inspections to monitor the site.

Site assessment

A site assessment is used during some tree inspection processes to determine overall tree and forest health by visually scanning for obvious and general conditions that indicate tree or forest health problems. The purpose of the site scan is to determine if there is a need to schedule further visual or detailed tree assessment as described below. The scan would be conducted at some distance and could include assessing for the following:

- over all general tree canopy health
- over all general forest composition and health
- general site conditions

Visual Tree Assessment

The purpose of a visual tree assessment is to assess trees for obvious tree defects and emerging problems, site conditions and other factors that are visually apparent and could contribute to tree failure and impact to a target. A visual tree assessment requires the assessor to circumnavigate the tree to assess for defects. Visual defects may lead to a subsequent more detailed tree assessment as described below.

Visual tree assessments could include inspecting for the following types of defects and site conditions:

Tree Defects	Site conditions and other factors
splits or cracks in the trunk or branches	newly exposed trees
necrotic or chlorotic appearance	site or tree exposure to winds
unnatural lean (>10%)	saturated or compacted soils
visible decay pocket	recently altered grades or drainage patterns
fungal fruiting bodies	poor rooting substrate
seeping sap (resinosus) or bark stains	evidence of other failures nearby
insect frass or bore holes	undermined or heaving roots
canker faces	topography
scars or sunscald	depleted or contaminated soils
thick, sloughing bark scars or sunscald	Mechanical injury or underground utility installations
hanging or weakly attached limbs or tops	
evidence of recent mechanical damage	
codominant stems, included bark	

Detailed Tree Assessment

The purpose of a detailed tree assessment is to determine the extent of tree defects and is subsequent to and more comprehensive than a visual assessment. Detailed assessments follow up on the defects noted in the visual assessment often requiring the assessor to perform tests to determine the extent of the defects noted in the visual assessment.

The tests and procedures included in a detailed assessment would include:

- core sampling
- strength loss calculations
- sounding
- water table / hardpan location (soil pit)
- pull testing
- drilling or resistographing roots or trunk
- root crown excavation and inspection
- soil compaction tests (penetrometer)
- aerial inspections (upper trunk and crown)
- sample collection and analysis (fungi, foliage, wood, roots, soil, insects)

Demand Tree Risk Inspection Procedures

Tree hazard inspections requested by internal and external clients, will be conducted in a timely manner and then prioritized according to the reported immediacy of the hazard. Procedures will vary depending on the specific type of request.

Site Assessment

A site assessment is appropriate for determining overall tree and forest health, and involves visually scanning for obvious and general conditions that indicate tree or forest health problems. The site assessment is a visual scan of the area to determine if there is a need to schedule further visual or detailed tree assessments (described below). Site assessments could address the following:

- General site conditions
- Overall tree canopy health
- Overall forest composition and health

Visual Tree Assessment

A visual tree assessment is appropriate when assessing for obvious tree defects, emerging problems, site conditions and other visually apparent factors that could contribute to tree failure. Trees should be circumnavigated to assess for defects, and then hazard management strategies or further assessment could be recommended (see below).

Possible defects and site conditions are as follows:

Tree Defects	Site conditions and other factors
splits or cracks in the trunk or branches	newly exposed trees
necrotic or chlorotic appearance	site or tree exposure to winds
unnatural lean (>10%)	saturated or compacted soils
visible decay pocket	recently altered grades or drainage patterns
fungal fruiting bodies	poor rooting substrate
seeping sap (resinosis) or bark stains	evidence of other failures nearby
insect frass or bore holes	undermined or heaving roots
canker faces	topography
scars or sunscald	depleted or contaminated soils
thick, sloughing bark scars or sunscald	Mechanical injury or underground utility installations
hanging or weakly attached limbs or tops	
evidence of recent mechanical damage	
codominant stems, included bark	

Detailed Tree Assessment

The purpose of a detailed tree assessment is to follow up on a visual assessment in order to determine the extent of tree defects. Tests and procedures such as the following are often required:

- core sampling
- strength loss calculations
- sounding
- water table / hardpan location (soil pit)
- pull testing
- drilling or resistographing roots or trunk
- root crown excavation and inspection
- soil compaction tests (penetrometer)
- aerial inspections (upper trunk and crown)
- sample collection and analysis (fungi, foliage, wood, roots, soil, insects)

Tree hazard inspectors will make judgments as to which natural areas should be inspected, and then employ the following recommended methods of inspection.

Hazard Assessment for Specific Trees Identified by the Requestor

- Review site and tree history.
- Discuss request with service requester.
- Identify and value the potential targets at the site.
- Conduct a visual tree assessment for the specific trees.
- If the visual tree assessment, site history and other factors warrant, conduct a detailed tree assessment to determine the extent of the tree defects.
- Record all trees that require hazard abatement work.
- Conduct hazard tree abatement work in a timely, cost effective manner.

From the vicinity of the tree assessment site, conduct a site assessment of the remaining trees or forest area. If necessary, schedule a tree inspection for the future and prioritize with other planned scheduled tree inspections.

If necessary, schedule further inspections to monitor the site.

Hazard Assessment for Trees in a General Area as Identified by the Requestor

- Determine the specific area of concern to the requester.
- Review site and tree history.
- Conduct a visual tree assessment to determine tree hazards that can impact the potential targets and cause significant damage.
- If the visual tree assessment, site history information and other factors warrant, conduct a detailed tree assessment to determine the extent of the tree defects.
- Record all trees that require hazard abatement work.
- Conduct hazard tree abatement work in a timely, cost effective manner.
- If necessary, schedule further inspections to monitor the site.

Tree Inspections Following Tree Failure

Following tree failure, an inspection should occur and a decision should be made as to the need for any future scheduled inspections. The following procedure should be followed:

- Review site history, particularly the history, amount, and reasons for previous tree failure.
- Determine the inspection area, based on site history and significant targets at the site.
- Conduct a site assessment to determine general tree health and site condition.
- If necessary, based on the results of the site scan, conduct a visual tree assessment to determine tree hazards that can impact the potential targets and cause significant damage.
- If the visual tree assessment, site history information and other factors warrant, conduct a detailed tree assessment to determine the extent of the tree defects.
- Record all trees that require hazard abatement work.
- Conduct hazard tree abatement work in a timely, cost effective manner.
- If necessary, schedule further inspections to monitor the site.

Wildlife Tree Procedure in Park Natural Areas

Background

Wildlife trees are defined as “any standing dead or living tree with special characteristics that provide valuable habitat for the conservation or enhancement of wildlife (Wildlife/Danger Tree Assessor’s Course Handbook: Parks and Recreation Sites)

For the District of Saanich’s purposes, a wildlife tree will be defined as any **standing dead or dying tree** with special characteristics that provide valuable habitat for the conservation or enhancement of wildlife.

By virtue of the Occupiers Liability act, the District of Saanich has a duty to ensure all persons and their properties are safe while visiting the developed portion of a park. Reasonable care must therefore be exercised to reduce the risk of tree failure to acceptable levels. The medium, high and extreme risk trees must be identified and appropriate safety measures implemented to successfully manage the risk of tree failures in park natural areas. In the District of Saanich, the standard of care for identifying and assessing hazardous trees is the Tree Risk Assessment in Urban Areas and the Urban and Rural Interface Course Manual.

One cannot have a hazardous tree unless there is a target. For the purposes of park natural areas, targets are those established trails, roads and facilities that are provided to the visiting public to help them safely enjoy the park. Workers responsible for the upkeep and development of the park and registered volunteers performing authorized activities such as removing invasive species are also targets.

Intent

Certified Tree Risk Assessors, as certified by the International Society of Arboriculture will conduct all tree risk assessments. The assessment system generally utilized is that recommended in the Tree Risk Assessment in Urban Areas and the Urban/Rural Interface course (the course) offered by the International Society of Arboriculture.

In Park natural areas, we will couple this with assessing the wildlife value of trees in parks as outlined in the “Wildlife Danger Tree Assessors Course for Parks and Recreation Sites”

In managing tree risks in park natural areas, our goals are to provide for safe use and access, while limiting the risk of injury to park users and staff and increasing long term benefits to natural area ecosystems. To meet these goals, our guidelines are that:

- maintaining trees for ecological value should be balanced with the need to minimize the risk to people and property;
- trees are part of natural ecosystems and provide leisure and learning opportunities for residents and visitors
- tree hazard management should be conducted using ecologically sound techniques;
- wildlife trees provide habitat for animals and contribute to overall ecosystem

Retaining an existing wildlife tree:

- The tree must be a minimum of the tree’s height away from any target.
- The tree must be more than the minimum height of the tree away from the target if located on a slope greater than 30%

Creating a wildlife tree:

- The tree must be a minimum of the tree's height away from any target.
- The wildlife tree should be a minimum height of 3m
- Extend the hazard zone as needed if the tree is leaning downhill on a slope greater than 30%
- Creating wildlife trees will be done in consideration of available funding, eg. it may be less costly to remove the entire tree.

Wildlife Tree Specifications

Natural areas in the District of Saanich generally consist as either Coastal Douglas fir (CDF) biogeoclimatic zones or Garry oak biogeoclimatic zones. These two BEC zones are potential habitat for tree- dependent species. Primary cavity excavators are birds that create their own holes in live or dead trees, while secondary cavity nesters are birds and mammals that use abandoned or natural cavities. Wildlife trees provide food and shelter to many species of wildlife and are one of the most valuable components of stand-level biodiversity.

Desirable Wildlife Tree Characteristics	Desirable Tree Species
Size- relative height and diameter (>30cm dbh)	Douglas fir
Greater than 10 metre in height	Western red-cedar
Bark condition- sougning or loose bark	Grand fir
Large branches	Black Cottonwood
Deformed and broken tops	Red alder
Tree structure / branch patterns	Big Leaf Maple
Hollow trunks or existing cavities	Garry Oak
Pre-existing decay (heart rot)	