



URBAN FORESTRY & FOREST MANAGEMENT CONSULTING

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November 29, 2021

Joey Theberge
Kanata Woods Inc.
1600 Laperriere Ave, Suite 205
Ottawa, ON
K1Z 8P5

RE: TREE CONSERVATION REPORT FOR 180 KANATA AVENUE, OTTAWA

Dear Joey,

This report details a pre-construction Tree Conservation Report (TCR) for the above-noted property in Kanata. The need for this TCR is related to the proposed development of the subject property and the future City of Ottawa laneway located to the east. The need for this report is related to trees protected under the City of Ottawa's Tree Protection By-law (no. 2020-340). Under this By-law such reports are required for properties subject to site plan control applications which are greater than one hectare in area and on which there are trees 10 centimetres in diameter or greater.

The approval of this TCR by the City of Ottawa and the issuing of a permit by them authorize the removal of approved trees. **Importantly, although this report may be used to support the application for a city tree removal permit, it does not by itself constitute permission to remove trees or begin site clearing activities. No such work should occur before a tree removal permit is issued by the City of Ottawa.**

The construction proposed for the 1.13 hectare subject property includes a multi-storey mixed-use building with two levels of underground parking. The foot print of the building in addition to surrounding amenity areas and surface parking, and the excavation necessary for the underground parking will result in the removal of the vast majority of trees currently on the property. The same is true of the City laneway. The exceptions are those trees located in proximity to the northern and western property lines – both of which are contiguous with Bill Teron Park, a park owned by the City of Ottawa. All trees on this adjacent property will be retained. The tree preservation and protection measures cited in this report will be followed to ensure the survival of all trees proposed for retention. Field work for this report was completed in June and November 2021.

TOPOGRAPHY

Bedrock outcroppings are common along the northern limits of the subject property, the highest of which is in the area of the northeast corner where the elevation ranges from 108 to 110m Above Sea Level (ASL). From this height the site slopes quickly towards the south and east, reaching approximately 99-100m ASL at the southern forest edge near Kanata Avenue. The soil covered portions of the site are undulating except in localized areas where recent substantial



changes have been made for mountain biking courses. No wetlands or water courses were encountered during field work for this report.

METHODOLOGY

A survey of this fully wooded property was completed using a total of twenty-nine 50m² sample plots placed at set intervals along transect lines. This provided a total sampling intensity of just over 10 percent of the total property area, including the City laneway. In each plot all overstory and understory trees 10cm in diameter and greater were assessed for species, size (average diameter) and general health condition (*i.e.* alive or dead). This information was then compiled so that ‘stands’ (areas of similar tree age and species composition) could be delineated. In this instance it became apparent early in the inventory that a single stand type was present – one which has now largely transitioned from an upland mixedwood stand to a tolerant deciduous stand.

Typically, on most urban sites individual planted trees or mature trees thought especially worthy of preservation as amenity features are also identified. However, due to the lack of planted trees and the intensity of the proposed development – which is particularly hard on large mature trees in forest settings - tree preservation will instead centre on linear groupings along the north and west property lines. These groupings are intended to serve as buffers for the parkland trees – to protect them from the impacts of ‘edge effect’ – where trees remaining along forested edges suffer from being newly exposed to direct sunlight and wind forces. This often leads negative consequences in terms of tree health – wind throw, stem breakage, sunscald, etc. Retaining an existing buffer, or where not possible creating one through new landscapes, will be critical to preserving the integrity of the adjacent city parkland.

TREE INVENTORY

It is apparent the subject land has been in a fully forested condition for many decades. Essentially, it is a small area of a larger remnant forest mainly contained within the adjacent parkland, one which has for the most part escaped disturbance – either natural or anthropomorphic.

Because of the lack of disturbance and the distance of this particular property from built landscapes, the usual presence of invasive woody vegetation in the overstory, in particular Norway maple (*Acer platanoides*), is lacking. However, the invasive buckthorn (*Rhamnus* spp.) is present in the understory, especially in proximity to Kanata Avenue. Naturalized Manitoba maple (*Acer negundo*) is found in the same area, but in small numbers. As this species of maple is intolerant to shade it will not invade the closed canopy of the forest as Norway maple would if present. Both species of maple are frequent urban and peri-urban species which were not present pre-settlement but now are naturalized throughout Eastern Ontario. So much so that it is unusual not to find them in large numbers on urban properties.

In terms of tree health, Dutch elm disease (*Ophiostoma ulmi/Ophiostoma novo-ulmi*) has had an impact on the prevalence of white elm (*Ulmus americana*) and emerald ash borer (*Agrilus planipennis*) on ash (*Fraxinus* spp.). In fact, no living overstory ash trees were encountered during the inventory. This speaks to the duration and intensity of the invasion of this introduced

insect. However, both ash and elm trees are present as regeneration in the understory – though typically less than 10cm in diameter. Some of the larger understory ash trees are now showing signs of EAB infestation as well.

The results of the inventory found the forest composition to be almost completely deciduous. Alone, ironwood (*Ostrya virginiana*) and sugar maple (*Acer saccharum*) together make up seventy percent of the species composition. Both species are very tolerant of shade and so can regenerate under a consistently closed canopy like that found in this stand. From the presence of several super canopy and scattered dead standing trees, it is apparent that coniferous trees were present in greater numbers in the past, in particular white pine (*Pine strobus*), white spruce (*Picea glauca*) and white cedar (*Thuja occidentalis*).

Their diminished presence is one negative consequence to a lack of forest disturbance. White pine seeds require exposed mineral soil for germination, cedars need openings in the canopy for sufficient sunlight and soil moisture (through interception of precipitation) and white spruce seeds will have trouble penetrating the thick litter layer beneath a deciduous stand. Consequently, although trees of seed bearing age are present, no regeneration of the three coniferous species was found in the understory.

Table 1 below details the results of the inventory for 180 Kanata Avenue and the adjacent City laneway:

Table 1. Overstory inventory results for 180 Kanata Avenue and City laneway

Tree species	Average Diameter(cm)¹	Percent occupancy²
Ironwood (<i>Ostrya virginiana</i>)	13.9	52
Sugar maple (<i>Acer saccharum</i>)	16.7	18
White pine (<i>Pinus strobus</i>)	49.1	4
Ash (<i>Fraxinus</i> spp.) (dead)	15.6	3
Basswood (<i>Tilia americana</i>)	19.1	3
Bitternut hickory (<i>Carya cordiformis</i>)	23.5	3
Black maple (<i>Acer nigrum</i>)	33.7	3
Red maple (<i>Acer rubrum</i>)	20.7	3
Black cherry (<i>Prunus serotina</i>)	21.3	3
American elm (<i>Ulmus americana</i>)	20.3	2
American elm (dead)	18.6	1
Bur oak (<i>Quercus macrocarpa</i>)	23.2	1
Butternut (<i>Juglans cinerea</i>)	10.1	1
Poplar species (<i>Populus</i> spp.)	23.7	1
Red oak (<i>Quercus rubra</i>)	16.8	1
White birch (<i>Betula papyrifera</i>)	17.8	1

¹ diameter at breast height, or 1.3m from grade; ² by stem count (round to the nearest whole number)

Typical vegetative conditions on the subject property are shown below in Pictures 1 through 5.





Picture 1. Typical over- and understory conditions at 180 Kanata Avenue property (looking southeastward)



Picture 2. Typical over- and understory conditions at 180 Kanata Avenue property (looking northeastward)



Picture 3. Recently dead veteran white spruce at 180 Kanata Avenue property



Picture 4. Living veteran white pine tree at 180 Kanata Avenue property (notice canopy opening beneath living crown of pine)



Picture 5. Standing dead veteran white pine tree at 180 Kanata Avenue property (notice closed canopy above broken stem)

The understory, typically trees of less than 10cm diameter, consists primarily of shade tolerant species found in the overstory - especially ironwood and sugar maple. Other smaller growing tree and shrub species are present as well: serviceberry, staghorn sumac (*Rhus typhina*) and dogwood species (*Cornus* spp.). These species have been able to successfully regenerate along the southern stand edge due to the lack of shading from a consistent overstory canopy.

ENDANGERED SPECIES

A total of twelve butternuts (*Juglans cinerea*) were found on or within 50m of the subject property. This tree species is listed as endangered under the Province of Ontario's Endangered Species Act (2007) and so is protected from harm. Through the completion of a butternut health assessment all twelve trees were determined to be Category 1 (*i.e.* non-retainable). This assessment was sent to the Ontario Ministry of Environment, Conservation and Parks in June 2021.

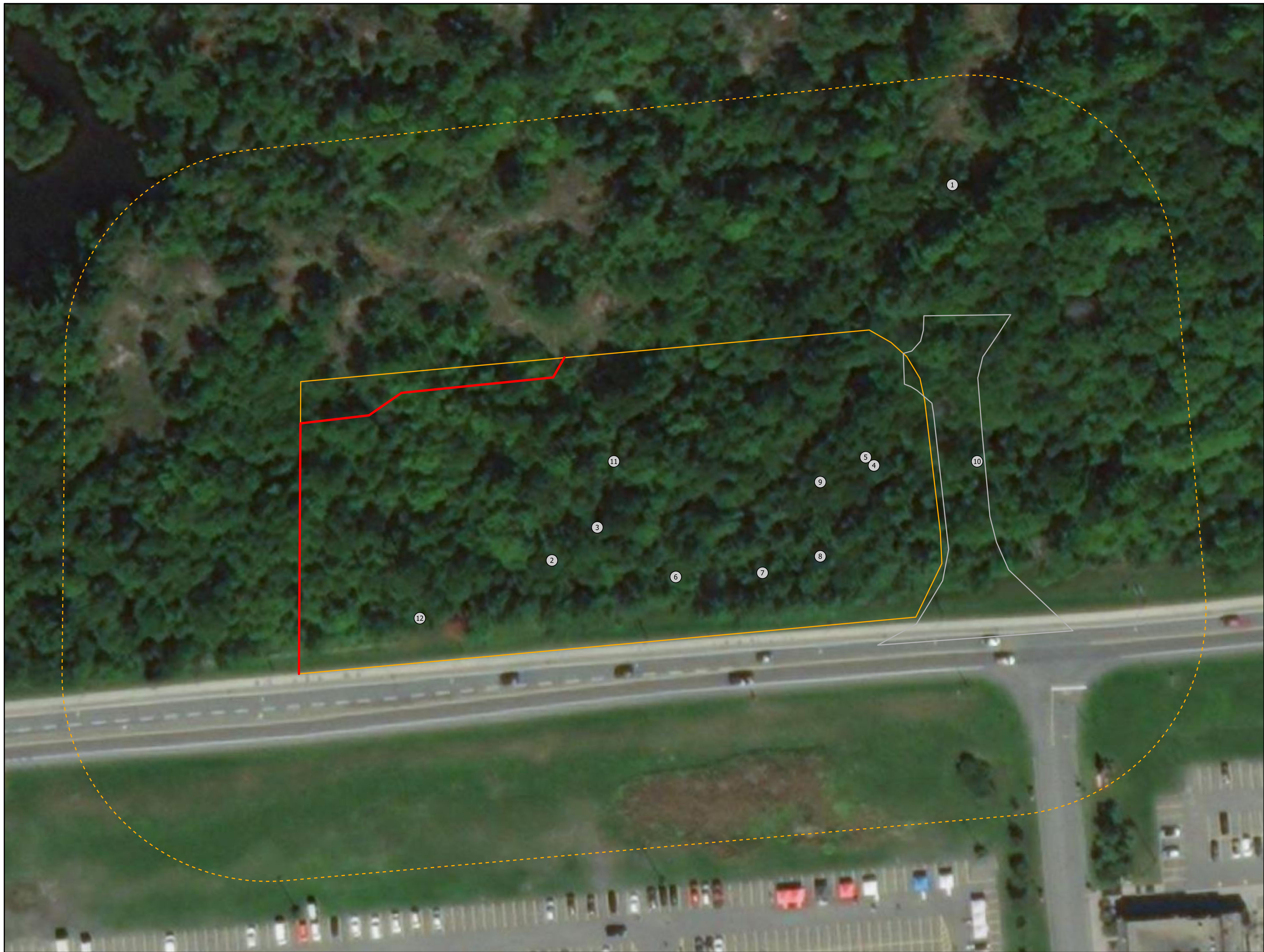
TREE CONSERVATION

Given the layout of the proposed development and parking below grade, and the relatively small area of the subject property, there are very limited opportunities for the conservation of existing trees. In particular, the need for substantial grade changes (via blasting due to the presence of extensive rock) precludes large scale tree conservation. Instead, tree retention will be limited to the margins of the property – in particular along the northern property line (see tree conservation plan included on page 9 of this report).

In this particular situation the need to drastically lower grades over much of the property will have a disproportionate impact on mature trees. In dense groupings mature trees develop far spreading root systems and living crowns held high proportionate to their total height. These growth patterns are the result of intense intercompetition between trees for sunlight, soil moisture and nutrients. On development sites these growth characteristics leave mature trees prone to root loss and vulnerable to the edge effect described earlier. Consequently, smaller trees, especially those under 20cm, will have a greater chance of survival following development. These trees will suffer less root loss and being generally more vigorous will be better able to adapt to their new environment, including altered soil moisture regimes. Mature trees will instead have to expand much energy reacting to very different growing conditions, often unsuccessfully, leading to their decline and death.

The presence of dying and dead mature trees at the perimeter of the property, aside from being an eyesore, will also be a factor in worker health and safety. It is a known fact that edge trees are also often destabilized. With this in mind, the preserved areas should be managed in such a way as to remove mature trees in proximity to the forest edge. As the distance increases from the edge so should the average diameter of the retained trees. Allowing limited sun and wind to enter the newly exposed edges will better help the remaining trees to adapt.

Prior to all clearing activities the property lines must be well marked. It is important that trees on adjacent public property, including those straddling property lines, be preserved and not harmed in any way.



GENERAL NOTES

Maxar, Microsoft

LEGEND

- SUBJECT LANDS
- BUTTERNUT SURVEY
- CATEGORY 1 BUTTERNUT
- LINE OF TREE PRESERVATION
- NEW ROADWAY



DRAWING: Locations of Butternut

PROJECT: 180 KANATA AVENUE
CITY OF OTTAWA



SCALE: 1:394	DRAWING NO: 180K
DATE: 2021-11-24	
DRAWN BY: SS	
SHEET NO: 1	

LANDSCAPING/REFORESTATION PLANTING

Within retained buffers and in areas where treed buffers cannot be retained, consideration should be given to planting new trees as landscaping/reforestation elements. These plantings should emphasize the use of native coniferous trees in order to provide year round buffering to the exposed forest edge. Specifically, white spruce, white pine and white cedar should be used. Further into the forest the same species, along with red and bur oak, should be proposed for planting in the partially closed canopy conditions. In areas where soil depths are too limited for the use of caliper trees, bare root staghorn sumac (*Rhys typhina*) can be planted to prevent soil loss and provide seasonal buffering at the edges.

TREE PRESERVATION AND PROTECTION MEASURES

Preservation and protection measures intended to mitigate damage during construction will be applied for the forest edges to be retained on the perimeter of the subject property. The following measures are the recommended to help ensure edge tree survival during and following construction:

1. Erect a fence as close as possible to the retained trees; in this instance the fencing used should as tall as possible, self-standing and have an opaque screen so as to limit direct sunlight reaching the tree stems.
2. When trees to be removed overlap with the critical rooting zone (CRZ¹) of trees to be retained, cut roots at the edge of the CRZ and grind down stumps after tree removal.
3. Do not pull out stumps. Ensure there is not root pulling or disturbance of the ground within the CRZ.
4. Any exposed roots 20mm or larger should cleanly cut at right angles to reduce the area of wounding. Clean, sharp by-pass loppers are preferred for this work; chainsaws can be used for larger roots.

¹ The critical root zone (CRZ) is established as being 10 centimetres from the trunk of a tree for every centimetre of trunk diameter at breast height (DBH). The CRZ is calculated as DBH x 10 cm.

BLASTING SPECIFICATIONS

Blasting will be necessary to remove bedrock as grades are dropped throughout the site. If not done carefully this work will have far-reaching consequences for retained trees as their root-soil interfaces will likely be disturbed by vibrations travelling through the substrate. It is these intimate interfaces which allow for the absorption of moisture and nutrients from the soil. In order to mitigate damage from blasting the following specifications should be followed:

1. Prior to blasting the soil within any nearby trees' CRZs should be soaked with water to help increase the cohesiveness of the soil matrix;
2. Prior to blasting the bedrock must be pre-sheared to create a fissure between the CRZs to be protected and the blasting work. This is achieved by drilling closely spaced holes and using 'Primeaflex' as the explosive product. Pre-shearing will reduce the likelihood of fractures and reverberations traveling into the CRZ.
3. During blasting only dynamite should be used as the explosive product. Since dynamite is oxygen-balanced as well as waterproof it will completely burn off, leaving only CO² as the by-product of the explosion. An incomplete burn will produce unburnt gases which are toxic to tree roots.



I trust this report satisfies your requirements. Please do not hesitate to contact the undersigned with any questions or comments you may have.

This report is subject to the attached Limitations of Tree Assessments and Liability to which the reader's attention is directed.

Yours,



Andrew K. Boyd, B.Sc.F, R.P.F. (#1828)
Certified Arborist #ON-0496A and TRAQualified
Consulting Urban Forester

LIMITATIONS OF TREE ASSESSMENTS & LIABILITY

GENERAL

It is the policy of *IFS Associates Inc.* to attach the following clause regarding limitations. We do this to ensure that our clients are clearly aware of what is technically and professionally realistic in assessing trees for retention.

This report was carried out by *IFS Associates Inc.* at the request of the client. The information, interpretation and analysis expressed in this report are for the sole benefit and exclusive use of the client. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the client to whom it is addressed. Unless otherwise required by law, 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 public relations, news or other media, without the prior expressly written consent of the author, and especially as to value conclusions, identity of the author, or any reference to any professional society or institute or to any initialed designation conferred upon the author as stated in his qualifications.

This report and any values expressed herein represent the opinion of the author; his fee is in no way contingent upon the reporting of a specified value, a stipulated result, nor upon any finding to be reported. Details obtained from photographs, sketches, *etc.*, are intended as visual aids and are not to scale. They should not be construed as engineering reports or surveys. Although every effort has been made to ensure that this assessment is reasonably accurate, the tree(s) should be reassessed at least annually. The assessment presented in this report is valid at the time of the inspection only. The loss or alteration of any part of this report invalidates the entire report.

LIMITATIONS

The information contained in this report covers only the tree(s) in question and no others. It reflects the condition of the assessed tree(s) at the time of inspection and was limited to a visual examination of the accessible portions only. *IFS Associates Inc.* has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the forestry and arboricultural professions, subject to the time limits and physical constraints applicable to this report. The assessment of the tree(s) presented in this report has been made using accepted arboricultural techniques. These include a visual examination of the above-ground portions of each tree for structural defects, scars, cracks, cavities, external indications of decay such as fungal fruiting bodies, evidence of insect infestations, discoloured foliage, the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the tree(s) and the surrounding site, and the proximity of people and property. Except where specifically noted in the report, the tree(s) examined were not dissected, cored, probed or climbed to gain further evidence of their structural condition. Also, unless otherwise noted, no detailed root collar examinations involving excavation were undertaken.

While reasonable efforts have been made to ensure that the tree(s) proposed for retention are healthy, no warranty or guarantee, expressed or implied, are offered that these trees, or any parts of them, will remain standing. This includes other trees on or off the property not examined as part of this assignment. It is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree or groups of trees or their component parts in all circumstances, especially when within construction zones. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure in the event of root loss due to excavation and other construction-related impacts. This risk can only be eliminated through full tree removal.

Notwithstanding the recommendations and conclusions made in this report, it must be realized that trees are living organisms, and their health and vigour constantly change over time. They are not immune to changes in site conditions, or seasonal variations in the weather. It is a condition of this report that *IFS Associates Inc.* be notified of any changes in tree condition and be provided an opportunity to review or revise the recommendations within this report. Recognition of changes to a tree's condition requires expertise and extensive experience. It is recommended that *IFS Associates Inc.* be employed to re-inspect the tree(s) with sufficient frequency to detect if conditions have changed significantly.

ASSUMPTIONS

Statements made to *IFS Associates Inc.* in regards to the condition, history and location of the tree(s) are assumed to be correct. Unless indicated otherwise, all trees under investigation in this report are assumed to be on the client's property. A recent survey prepared by a Licensed Ontario Land Surveyor showing all relevant trees, both on and adjacent to the subject property, will be provided prior to the start of field work. The final version of the grading plan for the project will be provided prior to completion of the report. Any further changes to this plan invalidate the report on which it is based. *IFS Associates Inc.* must be provided the opportunity to revise the report in relation to any significant changes to the grading plan. The procurement of said survey and grading plan, and the costs associated with them both, are the responsibility of the client, not *IFS Associates Inc.*

LIABILITY

Without limiting the foregoing, no liability is assumed by *IFS Associates Inc.* for: 1) any legal description provided with respect to the property; 2) issues of title and/or ownership with respect to the property; 3) the accuracy of the property line locations or boundaries with respect to the property; 4) the accuracy of any other information provided by the client or third parties; 5) any consequential loss, injury or damages suffered by the client or any third parties, including but not limited to replacement costs, loss of use, earnings and business interruption; and, 6) the unauthorized distribution of the report.

INDEMNIFICATION

An applicant for a permit or other approval based on this report shall agree to indemnify and save harmless *IFS Associates Inc.* from any and all claims, demands, causes of action, losses, costs or damages that affected private landowners and/or the City of Ottawa may suffer, incur or be liable for resulting from the issuance of a permit or approval based on this report or from the performance or non-performance of the applicant, whether with or without negligence on the part of the applicant, or the applicant's employees, directors, contractors and agents.

Further, under no circumstances may any claims be initiated or commenced by the applicant against *IFS Associates Inc.* or any of its directors, officers, employees, contractors, agents or assessors, in contract or in tort, more than 12 months after the date of this report.

ONGOING SERVICES

IFS Associates Inc. accepts no responsibility for the implementation of any or all parts of the report, unless specifically requested to supervise the implementation or examine the results of activities recommended herein. In the event that examination or supervision is requested, that request shall be made in writing and the details, including fees, agreed to in advance.