



Talbot Mackenzie & Associates
Consulting Arborists

2220 Cook St, Victoria

Construction Impact Assessment & Tree Preservation Plan

Prepared For: Garde Collins
Linhar Projects Ltd.
1137 North Park Street
Victoria, BC V8T 1C7

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TRAQ – Qualified

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Jobsite Property: 2220 Cook St, Victoria, BC

Date of Site Visits: February 11 and 25, 2019

Site Conditions: Residential lot. No ongoing construction activity.

Summary: The proposal includes subdividing the property and constructing a new house with two proposed parking stalls within the CRZ of a bylaw protected Lawson Cypress tree (NT 1). Exploratory excavations indicate that there will be minimal root loss as a result of the re-grading associated with the new parking stalls. A small municipal boulevard tree (Beech NT 3) will require removal or transplanting as a result of the driveway and new services.

Scope of Assignment:

- To inventory the existing bylaw protected trees and any trees on municipal or neighbouring properties that could potentially be impacted by construction or that are within three metres of the property line
- Review the proposal to subdivide the property and construct a new house, which would include widening the existing driveway, providing two parking stalls and new services. The existing house will be retained. The new house does not have a full basement.
- Comment on how construction activity may impact existing trees
- Prepare a tree retention and construction damage mitigation plan for those trees deemed suitable to retain given the proposed impacts

Methodology: We visually examined the trees on the property and prepared an inventory in the attached Tree Resource Spreadsheet. No trees were tagged. Information such as tree species, DBH (1.4m), crown spread, critical root zone (CRZ), health, structure, and relative tolerance to construction impacts were included in the inventory. The conclusions reached were based on the information provided within the attached building and site plans from Christine Lintott Architects (dated 2019-03-22). The Tree Protection Site Plan was created by adding comments to the site plan provided.

Limitations: Other than the exploratory excavations in the locations specified, no other exploratory excavations have been conducted and thus the conclusions reached are based solely on critical root zone calculations and our best judgement using our experience and expertise. The location, size and density of roots are often difficult to predict without exploratory excavations and therefore the impacts to the trees may be more or less severe than we anticipate.

Summary of Tree Resource: Only one bylaw protected tree exists on the subject property: a multi-stem Lawson Cypress (NT01). Municipal trees on the boulevard as well as neighbour's (or shared) trees and hedges were included in the inventory.

Trees to be Removed:

NT 03 Columnar Beech: The Beech within the boulevard east of the existing driveway will require removal or transplanting due to the widened driveway and proposed services. The tree would be 70cm from the estimated driveway flare and within the trench footprint for the new sanitary and storm services (shown on the Landscape Plan). Depending on the preference of the municipality, the tree could either be transplanted a few metres east of the new driveway entrance or removed. Hydro lines are located above the boulevard.

Hedge NT 5: The small hedge west of the existing driveway (unknown ownership between neighbour and applicant) will require removal for re-grading of the driveway. We recommend confirming ownership and informing the neighbour of the plans to remove or transplant these plants.

Potential Impacts on Trees to be Retained and Mitigation Measures

- **Parking Stalls and Lawson Cypress NT 01:**

Two parking stalls are proposed within the CRZ of this tree. Exploratory excavations were conducted to assess what grade the parking stalls could be constructed at without significantly impacting the health of the tree (pictures are at the bottom this report). It is our understanding that the applicant is required to plant a hedge on the border of the parking stall in order to screen it from the street. In order to do this, the applicant would prefer to remove the existing wall and lower the grade of the stalls in order to create more growing room within the planting bed for the hedge.

Exploratory excavations were completed by hand-digging a narrow trench, 1.6m west of the trunk of the tree, beginning from the existing retaining wall and ending 2-3m from the retaining wall at the house. The depth explored was 45 to 50cm below existing grade (at or below the grade of the existing sidewalk). Only three roots were observed within the trench (all were retained): one 7cm in diameter, one 2.5cm, and one 1cm. In our opinion, the loss of these roots alone is unlikely to significantly impact the health or stability of the tree. It should be noted that the root disease *Phytophthora* is responsible for the decline of Lawson Cypress trees locally and could rapidly infect and lead to the decline of the tree at any time.

Based on conversations with the applicant, no further excavation or root loss is anticipated, other than the three roots observed. The retaining wall for the grade change would be constructed no closer to the tree than the exploratory trench. If additional roots are encountered below the 45-50cm depth explored, these can be retained below both the retaining wall and driveway construction using our "floating driveway specification" attached. If additional roots are encountered at a greater depth, we may recommend that the parking stalls be constructed

using a permeable surface. We do not recommend removing the portion of the retaining wall east of the parking stalls as the base of the tree could potentially be braced against it.

It is possible, but very unlikely that roots have grown underneath the exploratory trench and then have curved upwards to a shallower depth (rocks were encountered at the bottom of most of the trench). If a significant amount of roots have done this, the change in grade may be limited. The project arborist should supervise the excavation associated with the parking stalls.

- **Leyland Cypress Hedge NT 6:** It is our understanding that the applicant plans to retain the Lawson Cypress hedge along the property line. These trees require frequent pruning to maintain as a hedge and have aggressive root systems which may uplift the driveway in the future. Therefore, a more suitable option may be replanting with a less aggressive and invasive plant. However, if retention is desired, we would recommend an arborist supervise the excavation for the driveway and prune any roots severed or retain structural roots necessary for stability.
- **Cherry NT 7:** This tree will be over three metres from the proposed patio. If a critical amount of roots are encountered during excavation, we may recommend that the patio be raised over the roots and made permeable in order to avoid adverse health impacts.
- **Arborist Supervision:** All excavation occurring within the critical root zones of protected trees should be completed under supervision by the project arborist. In particular, the following activities should be completed under the direction of the project arborist:
 - Excavation associated with the parking stalls and retaining wall removal and construction within the CRZ of Lawson Cypress NT 1
 - Excavation associated with the patio within the CRZ of Cherry NT 7
 - Excavation for the new driveway within the CRZ of Leyland Cypress hedge NT 6
 - If the municipality would like European Beech NT 3 to be transplanted, this should be supervised by either the municipal arborist or the project arborist
- **Pruning Roots:** Any severed roots must be pruned back to sound tissue to reduce wound surface area and encourage rapid compartmentalization of the wound. Backfilling the excavated area around the roots should be done as soon as possible to keep the roots moist and aid in root regeneration. Exposed roots should be kept moist until the area is backfilled, especially if excavation occurs during a period of drought. This can be accomplished in number of ways including wrapping the roots in burlap or installing a root curtain of wire mesh lined with burlap, and keeping the area moist throughout the construction process.
- **Barrier fencing:** The areas surrounding the trees to be retained should be isolated from the construction activity by erecting protective barrier fencing. Where possible, the fencing should be erected at the perimeter of the critical root zones. The barrier fencing must be a minimum of 4 feet in height, of solid frame construction that is attached to wooden or metal posts. A solid board or rail must run between the posts at the top and the bottom of the fencing. This solid frame can then be covered with plywood, or flexible snow fencing. The fencing must be erected prior to the start of any construction activity on site (i.e. demolition, excavation, construction), and remain in place through completion of the project. Signs should be posted

around the protection zone to declare it off limits to all construction related activity. The project arborist must be consulted before this fencing is removed or moved for any purpose.

- **Minimizing Soil Compaction:** In areas where construction traffic must encroach into the critical root zones of trees to be retained, efforts must be made to reduce soil compaction where possible by displacing the weight of machinery and foot traffic. This can be achieved by one of the following methods:
 - Installing a layer of hog fuel or coarse wood chips at least 20 cm in depth and maintaining it in good condition until construction is complete.
 - Placing medium weight geotextile cloth over the area to be used and installing a layer of crushed rock to a depth of 15 cm over top.
 - Placing two layers of 19mm plywood.
 - Placing steel plates.
- **Mulching:** Mulching can be an important proactive step in maintaining the health of trees and mitigating construction related impacts and overall stress. Mulch should be made from a natural material such as wood chips or bark pieces and be 5-8cm deep. No mulch should be touching the trunk of the tree. See “methods to avoid soil compaction” if the area is to have heavy traffic.
- **Blasting:** Care must be taken to ensure that the area of blasting does not extend beyond the necessary footprints and into the critical root zones of surrounding trees. The use of small low-concussion charges and multiple small charges designed to pre-shear the rock face will reduce fracturing, ground vibration, and overall impact on the surrounding environment. Only explosives of low phytotoxicity and techniques that minimize tree damage should be used. Provisions must be made to ensure that blasted rock and debris are stored away from the critical root zones of trees.
- **Landscaping and Irrigation Systems:** The planting of new trees and shrubs should not damage the roots of retained trees. The installation of any in-ground irrigation system must take into account the critical root zones of the trees to be retained. Prior to installation, we recommend the irrigation technician consult with the project arborist about the most suitable locations for the irrigation lines and how best to mitigate the impacts on the trees to be retained. This may require the project arborist supervise the excavations associated with installing the irrigation system. Excessive frequent irrigation and irrigation which wets the trunks of trees can have a detrimental impact on tree health and can lead to root and trunk decay.
- **Arborist Role:** It is the responsibility of the client or his/her representative to contact the project arborist for the purpose of:
 - Locating the barrier fencing
 - Reviewing the report with the project foreman or site supervisor
 - Locating work zones, where required
 - Supervising any excavation within the critical root zones of trees to be retained
 - Reviewing and advising of any pruning requirements for machine clearances

- **Review and site meeting:** Once the project receives approval, it is important that the project arborist meet with the principals involved in the project to review the information contained herein. It is also important that the arborist meet with the site foreman or supervisor before any site clearing, tree removal, demolition, or other construction activity occurs and to confirm the locations of the tree protection barrier fencing.

Exploratory Excavation Photos (February 25, 2019)



Photo 1



Photo 2: 7cm diameter retained root in foreground near existing retaining wall.



Photo 3



Photo 4: 2.5cm retained root on the right side within the trench.

Talbot Mackenzie & Associates

Please do not hesitate to call us at (250) 479-8733 should you have any further questions.

Thank you,



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ISA Certified # ON-1943A
TRAQ – Qualified

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Encl. 1-page tree resource spreadsheet, 1-page tree protection site plan with trees, 5-page building plans excerpts, 1-page barrier fencing specifications, 1-page raised paved surface specification, 2-page tree resource spreadsheet methodology and definitions

Disclosure Statement

The tree inventory attached to the Tree Preservation Plan can be characterized as a limited visual assessment from the ground and should not be interpreted as a "risk assessment" of the trees included.

Arborists are professionals who examine trees and use their training, knowledge and experience to recommend techniques and procedures that will improve their health and structure or to mitigate associated risks.

Trees are living organisms, whose health and structure change, and are influenced by age, continued growth, climate, weather conditions, and insect and disease pathogens. Indicators of structural weakness and disease are often hidden within the tree structure or beneath the ground. It is not possible for an Arborist to identify every flaw or condition that could result in failure or can he/she guarantee that the tree will remain healthy and free of risk.

Remedial care and mitigation measures recommended are based on the visible and detectable indicators present at the time of the examination and cannot be guaranteed to alleviate all symptoms or to mitigate all risk posed.

Tree ID	Common Name	Latin Name	DBH (cm) ~ approximate	Crown Spread (m)	CRZ (m)	Relative Tolerance	Health	Structure	Remarks and Recommendations	Retention Status
NT 1	Lawson Cypress	<i>Chamaecyparis lawsoniana</i>	37, 36, 30, 28	9.0	11.5	P	Good	Fair	Potentially shared ownership with municipality. Codominant unions at base. Hydro lines north of canopy	Retain
NT 2	Hawthorn	<i>Crataegus oxyacantha</i>	16.0	5.0	2.0	G	Fair	Fair	Municipal boulevard tree (ID #18754). East of existing driveway. Trunk injury at base	Retain
NT 3	Columnar European Beech	<i>Fagus sylvatica</i> 'Fastigiata'	2.0	1.0	1.5	P	Good	Good	Municipal boulevard tree (ID#34176). Hydro lines above	Transplant or Removal
NT 4	English Yew	<i>Taxus baccata</i> 'Fastigiata'	Multistem	3.0	4.0	G	Good	Good	Informed by municipality that it is on private property and not bylaw protected.	Retain
NT 5	Pyramidal Cedar hedge	<i>Thuja occidentalis</i> 'Pyramidalis'	2.0	1.0	1.5	M	Fair	Good	Shared ownership potentially. Beside existing driveway near entrance. 2m tall	Transplant or Removal
NT 6	Leyland Cypress hedge	<i>Cupressus x leylandii</i>	~5-12cm	2.0	2.0	G	Fair	Fair	Shared ownership likely. Beside fence. 4m tall.	Retain
NT 7	Cherry	<i>Prunus spp</i>	~45	12.0	5.5	M	Fair	Fair	Neighbour's, ~3.5m from rear fence	Retain
NT 8	Douglas-fir	<i>Pseudotsuga menziesii</i>	~60	12.0	9.0	P	Fair	Fair	Neighbour's, ~5m west from SW corner of property.	Retain
NT 9	Columnar European Beech	<i>Fagus sylvatica</i> 'Fastigiata'	2.0	1.0	1.5	P	Good	Good	Municipal boulevard tree (ID#34178), west of driveway. Hydro lines above	Retain



Issue	0
For Reasoning/	
Development Permit	Jan. 4, 2001

Revision

Consultant	
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2220 Cook
Street
Victoria, BC

Survey & Height Calculations

Date	20130322 055653
Version	
File Path	
A1.02	
Scale	1:1



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Issue: _____ Date: _____
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Development Permit: Jan. 4, 2019

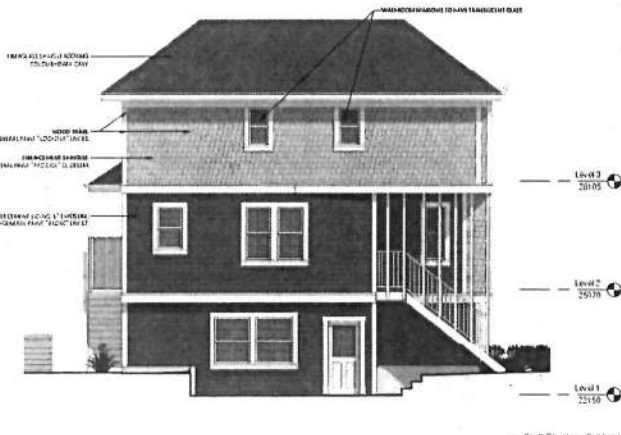
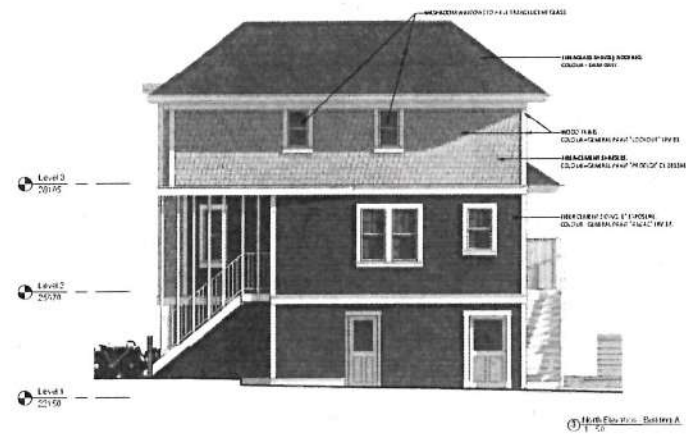
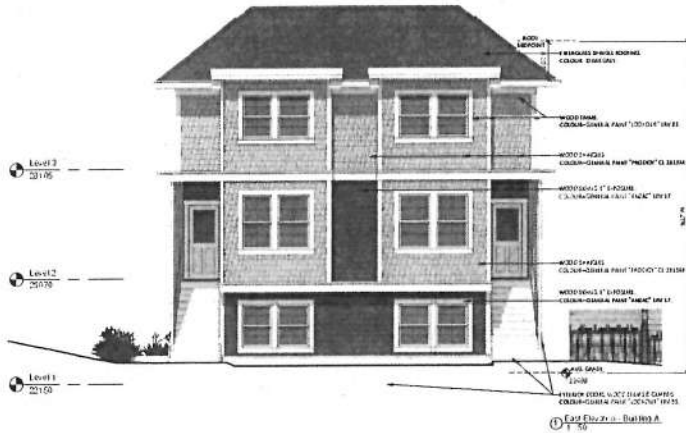
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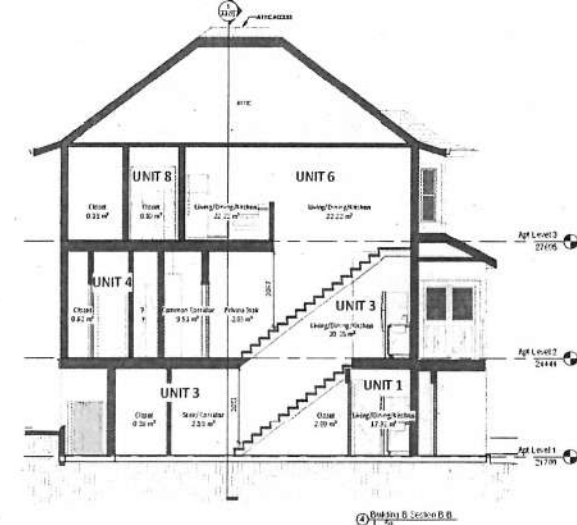
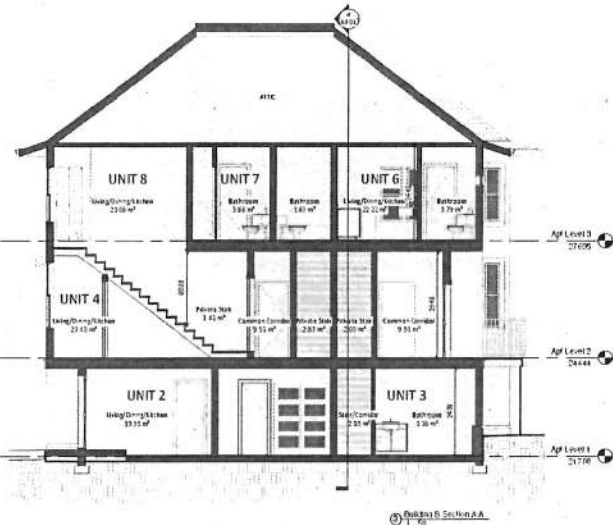
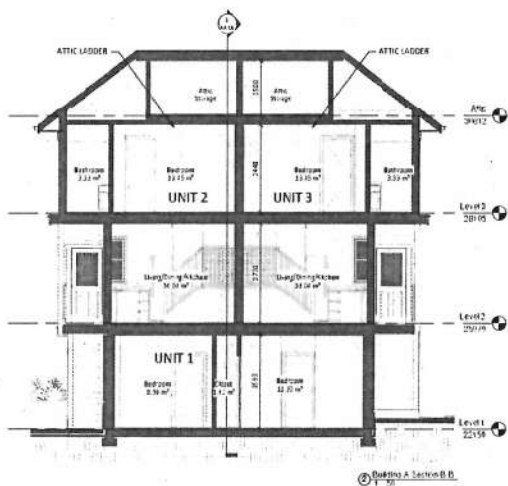
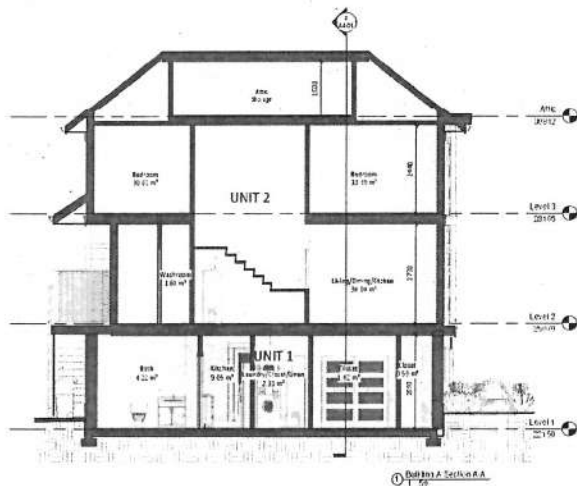
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Elevations - Building A

File: 2019.01.01_2220Cook.dwg
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Issue: 01

For Recording/
Development Permit: Jan 4, 2011

Revisions:
No. Description

Consultant:

2220 Cook
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Victoria, BC

Building Sections

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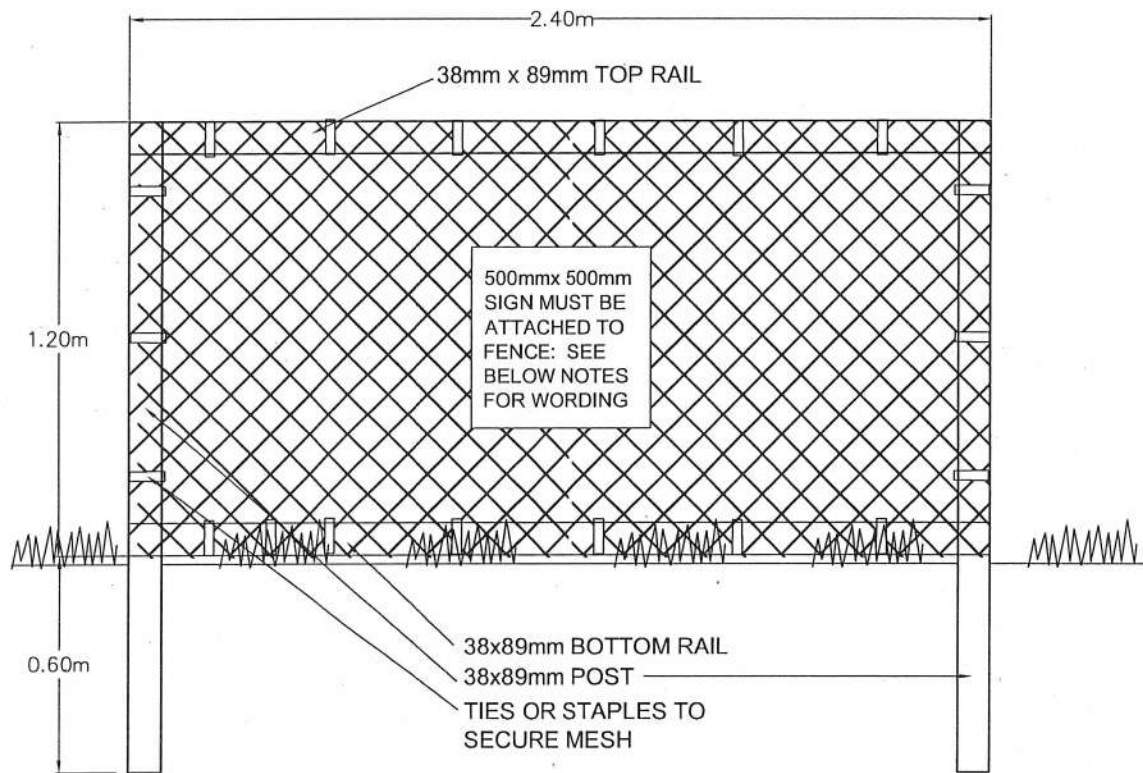
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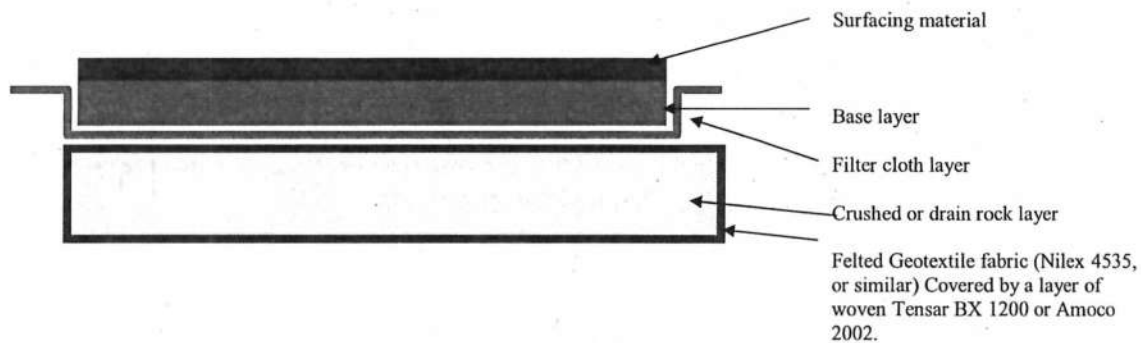
TREE PROTECTION FENCING

1. FENCE WILL BE CONSTRUCTED USING 38 mm X 89mm WOOD FRAME: TOP, BOTTOM AND POSTS * USE ORANGE SNOW-FENCING MESH AND SECURE THE WOOD FRAME WITH "ZIP" TIES OR GALVANIZED STAPLES.
 2. ATTACH A 500mm X 500mm SIGN WITH THE FOLLOWING WORDING: WARNING- TREE PROTECTION AREA. THIS SIGN MUST BE AFFIXED ON EVERY FENCE OR AT LEAST EVERY 10 LINEAR METERS.
- * IN ROCKY AREAS, METAL POSTS (T-BAR OR REBAR) DRILLED INTO ROCK WILL BE ACCEPTED

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Diagram – Site Specific “Floating” Driveway, Parking and Walkway



Specifications for “Floating” Driveway, Parking and Walkway Areas

1. Excavation for construction of the driveway/parking/walkway areas must remove the sod layer only, where they encroach on the root zones of the protected trees
2. A layer of medium weight felted Geotextile fabric (Nilex 4535, or similar) is to be installed over the entire area of the critical root zone that is to be covered by the driveway. Cover this Geotextile fabric with a layer of woven Amoco 2002 or Tensar BX 1200. Each piece of fabric must overlap the adjoining piece by approximately 30-cm.
3. A 10cm layer of torpedo rock, or 20-mm clean crushed drain rock, is to be used to cover the Geotextile fabric.
4. A layer of felted filter fabric is to be installed over the crushed rock layer to prevent fine particles of sand and soil from infiltrating this layer.
5. The bedding or base layer and permeable surfacing can be installed directly on top of the Geotextile fabric.
6. Two-dimensional (such as CombiGrid 30/30 or similar) or three-dimensional geo-grid reinforcements can be installed in combination with, or instead of, the geotechnical fabric specified in the attached diagram.
7. Ultimately, a geotechnical engineer should be consulted and in consultation with the project arborist may specify their own materials and methods that are specific to the site's soil conditions and requirements, while also avoiding root loss and reducing compaction to the sub-grade.



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Tree Resource Spreadsheet Methodology and Definitions

Tag: Tree identification number on a metal tag attached to tree with nail or wire, generally at eye level. Trees on municipal or neighboring properties are not tagged.

NT: No tag due to inaccessibility or ownership by municipality or neighbour.

DBH: Diameter at breast height – diameter of trunk, measured in centimetres at 1.4m above ground level. For trees on a slope, it is taken at the average point between the high and low side of the slope.

* Measured over ivy

~ Approximate due to inaccessibility or on neighbouring property

Crown Spread: Indicates the diameter of the crown spread measured in metres to the dripline of the longest limbs.

Relative Tolerance Rating: Relative tolerance of the tree species to construction related impacts such as root pruning, crown pruning, soil compaction, hydrology changes, grade changes, and other soil disturbance. This rating does not take into account individual tree characteristics, such as health and vigour. Three ratings are assigned based on our knowledge and experience with the tree species: Poor (P), Moderate (M) or Good (G).

Critical Root Zone: A calculated radial measurement in metres from the trunk of the tree. It is the optimal size of tree protection zone and is calculated by multiplying the DBH of the tree by 10, 12 or 15 depending on the tree's Relative Tolerance Rating. This methodology is based on the methodology used by Nelda Matheny and James R. Clark in their book "Trees and Development: A Technical Guide to Preservation of Trees During Land Development."

- 15 x DBH = Poor Tolerance of Construction
- 12 x DBH = Moderate
- 10 x DBH = Good

To calculate the critical root zone, the DBH of multiple stems is considered the sum of 100% of the diameter of the largest stem and 60% of the diameter of the next two largest stems. It should be noted that these measures are solely mathematical calculations that do not consider factors such as restricted root growth, limited soil volumes, age, crown spread, health, or structure (such as a lean).

Health Condition:

- Poor - significant signs of visible stress and/or decline that threaten the long-term survival of the specimen
- Fair - signs of stress
- Good - no visible signs of significant stress and/or only minor aesthetic issues

Structural Condition:

- Poor - Structural defects that have been in place for a long period of time to the point that mitigation measures are limited
- Fair - Structural concerns that are possible to mitigate through pruning
- Good - No visible or only minor structural flaws that require no to very little pruning

Retention Status:

- X - Not possible to retain given proposed construction plans
- Retain - It is possible to retain this tree in the long-term given the proposed plans and information available. This is assuming our **recommended mitigation measures are followed**
- Retain * - See report for more information regarding potential impacts
- TBD (To Be Determined) - The impacts on the tree could be significant. However, in the absence of exploratory excavations and in an effort to retain as many trees as possible, we recommend that the final determination be made by the supervising project arborist at the time of excavation. The tree might be possible to retain depending on the location of roots and the resulting impacts, but concerned parties should be aware that the tree may require removal.
- NS - Not suitable to retain due to health or structural concerns