



Talbot Mackenzie & Associates

Consulting Arborists

# **1442 Elford St, Victoria**

## **Construction Impact Assessment & Tree Preservation Plan**

Prepared For: Dan Hagel  
1442 Elford St.  
Victoria, BC  
V8S 3S8

Prepared By: Talbot, Mackenzie & Associates  
Noah Borges – Consulting Arborist  
ISA Certified # PN-8409A  
TRAQ – Qualified

Date of Issuance: April 4, 2019  
Revised: July 24, 2019  
Revised: October 16, 2019

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## Talbot Mackenzie & Associates

Consulting Arborists

Jobsite Property: 1442 Elford St, Victoria  
Date of Site Visit: March 27, 2019  
Site Conditions: Residential lot. No ongoing construction activity.

**Summary:** One tree on the adjacent property to the south (Douglas-fir NT2, 14cm DBH) will have to be removed for construction of the new driveway.

We do not anticipate the health of municipal English Oak NT1 will be significantly impacted as a result of replacing the existing house foundation; constructing a new driveway, walkway, stairs, or planting beds; upgrading the underground services; or removing the existing asphalt driveway if our recommended mitigation measures are followed. We recommend excavation not occur more than 1m east of the building footprint (6m away) and 30cm outside the stairway to the lower floor entry (approximately 3.5m away). If this can be accomplished, we estimate less than one-quarter of the tree's critical root zone will be impacted and do not anticipate the health or structure of the tree will be significantly impacted, though large roots (greater than 3cm in diameter) may be encountered. The project arborist should be on site to supervise any excavation within the critical root zone of this tree.

If excavation for construction of the proposed parking area in the backyard requires excavation down to bearing soil, roots from neighbour's Elm trees NT3 and NT5 are likely to be encountered. We recommend the arborist supervise any excavation within their critical root zones and the new parking area be raised above any critical roots encountered and that it be surfaced with permeable materials.

### **Scope of Assignment:**

- 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 renovate the house replacing the foundation, shift the house approximately 1m northward, and construct a new driveway and parking area in the rear of the property
- 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. Each by-law protected tree was identified using a numeric

metal tag attached to its lower trunk. Municipal trees and neighbours' trees were not 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 by-law protected trees with their identification numbers were labelled on the attached site plan. The conclusions reached were based on the information provided within the attached site and elevation plans (dated October 8, 2019) and landscape plan from LADR (dated May 28, 2019 and updated October 15, 2019).

**Limitations:** No exploratory excavations have been requested 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:** Five trees were included in the inventory. There are no by-law protected trees on the subject property. There is a large English Oak on the municipal frontage and two trees on each neighbouring property to the north and south.

**Trees to be Removed:** One tree will require removal due to construction related impacts:

- **Douglas-fir NT2** (14cm DBH) is located just south of the property boundary on the property of #1436 Elford St. The new driveway is proposed to be constructed along the south property line, which will require approximately half of this tree's crown to be removed. Furthermore, new underground services may be installed underneath the driveway, which would result in root impacts. We recommend this tree be removed prior to construction. (The neighbour has provided consent for the tree to be removed – see attached letter).

#### **Potential Impacts on Trees to be Retained and Mitigation Measures**

- **English Oak NT1** (103cm DBH, ID: 23585): The base of this tree is approximately 6.75m from the existing stairway to the front porch, which is to be demolished, and 7m from the house foundation. To avoid impacting the health of this tree, excavation must be minimized outside the building footprint in the front yard when lifting the house. We recommend excavation be limited to, at most, 1m outside the building footprint on the east side of the house. In addition, stairs to a new lower floor entry are proposed to be constructed approximately 3.75m west of the tree. Large roots (greater than 3cm in diameter) are likely to be encountered in this area, though we estimate less than one-quarter of the tree's CRZ will be impacted. An effort should be made to limit the extent of excavation outside the stairway footprint (e.g. 30cm to the east). If excavation can be limited to 1m outside the building footprint and 30cm outside the stairway footprint, we do not anticipate the health or structure of the tree will be significantly impacted. Excavation closer to the tree could result in significant impacts.

A new walkway is proposed to be constructed as close as 2m from the tree and a new stairway up to a new patio will be constructed about 6m away. To avoid impacting the health of this tree, the walkway will likely have to be constructed above the existing grade, as excavation down to bearing soil will likely encounter large, structural roots.

The attached landscape plan also indicates retaining walls will be constructed at the perimeter of planting beds approximately 4-4.5m to the southwest. If any large roots are encountered in these areas, the retaining walls should “bridge” them. Any fill to be added within the planting beds that overlaps with the CRZ of the tree should be comprised of at least 50% coarse horticultural sand to ensure adequate drainage.

We recommend the project arborist be on site to supervise any excavation within the tree’s CRZ, including the removal of the existing asphalt driveway and retaining wall along the driveway’s south edge.

- **Underground Services:** Based on discussions with the applicant, new underground water, sewer, and storm service laterals will be installed south of Oak NT1. Their exact locations have yet to be determined but a sketch provided by the applicant showed water, storm and sewer connections between the tree and the driveway. The water service was the nearest to the tree, 5.25m away. At this distance, we do not anticipate any roots greater than 5cm in diameter will be encountered or that the health of the tree will be impacted. If possible, we recommend shifting these services even farther from the tree to limit impacts to small feeder roots (preferably under the new driveway). As these services will be installed within the CRZ of the tree, we recommend alternative digging methods be used (e.g. hydro-vac, air-spade, or a combination of machine and hand digging) to limit root impacts.

Existing underground services are to be capped and abandoned as far from the tree as possible. If any excavation or machine access is required within the CRZ of Oak NT1, it must be completed under the supervision and direction of the project arborist. If temporarily removed to access underground services, barrier fencing must be erected immediately after the supervised construction-related activity.

- **Site Access and New Driveway:** If the existing driveway is to be used throughout the construction phase, we recommend, in addition to erecting barrier fencing as indicated on the attached site survey, solid hoarding be placed against the trunk of Oak NT1 to avoid accidental mechanical damage. The hoarding should be at least 3m in height and visible to vehicle operators. If a second access driveway is required during the house lifting phase, we recommend it be located along the south property boundary in the location of the proposed new driveway. As proposed, a 3.5m wide driveway can be constructed approximately 7m from the base of the oak. As this is still within NT1’s CRZ, we recommend the project arborist supervise the excavation. If no large roots are encountered, a temporary gravel driveway can be constructed with fencing along the north edge to prevent soil compaction in the front lawn. If large roots are encountered, they should be retained and a sheet of geotextile fabric be placed over top, beneath a 15cm layer of crushed rock. The attached plans show the final driveway will be constructed using Grasscrete, which should ensure water permeates below the surface towards any roots that may be present.
- **Rear Parking Area:** Two elms on neighbouring properties, NT3 (30, 29, 29cm DBH) and NT5 (~70cm below unions), have critical root zones that overlap with the proposed parking



area. It should be noted NT5 may be a bylaw protected tree (we could not access the tree to measure it).

NT3 is 1m from the north property line; NT5 is approximately 3m from the south property line. The pavement surrounding NT3 is uplifting and cracking, likely the result of root growth. Elms typically have extensive root systems, and we anticipate large roots (>3cm in diameter) from both trees may be encountered if excavation were to occur to bearing soil within the footprint of the proposed parking area. To avoid health and/or structural impacts to these trees, a raised, permeable surface will have to be constructed where the proposed parking area overlaps with their CRZs (this area may be reduced if the project arborist delineates a boundary where a conventional parking area may be constructed). Specifications for constructing a “floating” parking area are attached.

The objective is to avoid root loss and to instead raise the parking area and its base layer above the roots. This may result in the grade of the “floating parking area” being raised above the existing grade (the amount depending on how close roots are to the surface and the depth of the base layers). Final grading plans should take this potential change into account. This may also result in soils which are high in organic content being left intact below the paved surface. To allow water to drain into the root systems below, we also recommend that the surface be made of a permeable material (instead of conventional asphalt or concrete) such as permeable asphalt, paving stones, or other porous paving materials and designs such as those utilized by Grasspave, Gravelpave, Grasscrete and open-grid systems.

- **New Fence:** The attached plans show a new fence will be constructed along the west, east, and south property lines. Any excavation for pilings for the new fence should take into consideration the CRZs of trees to be retained (NT1 and NT3-5). We recommend the project arborist supervise any excavation within the CRZ of these trees and that excavation be performed by hand-digging to limit root loss. If any large roots are encountered, the location of the pilings should be shifted to retain them.
- **Mountain Ash NT4** (18cm DBH) is approximately 2.5m from the north fence line. We do not anticipate any critical roots from this tree will be encountered if excavation can be limited to within the property boundary. Small branches overhang onto the subject property approximately 1m and minor pruning for building clearance may be desired.
- **Arborist Supervision:** All excavation occurring within the critical root zones of protected trees should be completed under supervision by the project arborist. Any severed roots must be pruned back to sound tissue to reduce wound surface area and encourage rapid compartmentalization of the wound. In particular, the following activities should be completed under the direction of the project arborist:
  - Any excavation for replacing the existing foundation; constructing the new driveway, walkway, and stairs; installing new underground services; capping and abandoning existing services; or removing paved surfaces within the CRZ of English Oak NT1
  - Excavation for construction of the parking area in the backyard within the CRZs of Elms NT3 and NT5

- **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.
- **Scaffolding:** This assessment has not included impacts from potential scaffolding including canopy clearance pruning requirements. If scaffolding is necessary and this will require clearance pruning of retained trees, the project arborist should be consulted. Depending on the extent of pruning required, the project arborist may recommend that alternatives to full scaffolding be considered such as hydraulic lifts, ladders or platforms. Methods to avoid soil compaction may also be recommended (see “Minimizing Soil Compaction” section).

- **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.

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

Thank you,



Noah Borges  
ISA Certified #PN-8409A  
TRAQ – Qualified

Talbot Mackenzie & Associates  
ISA Certified Consulting Arborists

Encl. 1-page tree resource spreadsheet, 1-page site survey with trees, 3-page site and elevation plans, 1-page landscape plan, 1-page letter from neighbour at #1436 Elford St, 1-page floating driveway specifications, 1-page barrier fencing specifications, 2-page tree resource spreadsheet methodology and definitions

**Disclosure Statement**

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.

## Talbot Mackenzie & Associates

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	By-Law Protected	Retention Status
NT1	English Oak	<i>Quercus robur</i>	103	18	10.5	Good	Fair	Fair	Municipal tree (ID: 23585), some dieback, trunk conflicting with utility lines, next to existing asphalt driveway, damaged buttress root	Y (Municipal)	Retain
NT2	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	4	2.0	Poor	Good	Good	Neighbour's tree, near property boundary	N (Neighbour's)	X
NT3	Elm	<i>Ulmus spp.</i>	30, 29, 29	8	8.0	Moderate	Good	Fair	Neighbour's tree, 1m from fence, uplifting pavement, included bark in unions, small branches overhang subject property 2-3m	N (Neighbour's)	Retain
NT4	Mountain Ash	<i>Sorbus aucuparia</i>	18	5	2.5	Poor	Good	Fair	Neighbour's tree, 2.5m from fence, small branches overhang subject property 1m	N (Neighbour's)	Retain
NT5	Elm	<i>Ulmus spp.</i>	~70 below unions	8	8.5	Moderate	Good	Fair	Neighbour's tree, 3m from fence, possibly by-law protected	Possibly (Neighbour's)	Retain

# **SITE PLAN OF LOT 19, SECTION 74, VICTORIA DISTRICT, PLAN 490.**



NOTE: Lot dimensions shown are based upon field survey measurements and may vary from those registered.

Lot dimensions, offsets, and area shown may vary upon completion of a comprehensive legal survey. Geodetic elevations shown are based upon observations to geodetic control monuments 15-43 (Elevation= 44.61m) and 15-49 (Elevation= 39.04m).

This plan is for building design & permit purposes only and is for the exclusive use of our client. This plan shall not be used to define property lines or property corners. Unregistered interests have not been included or considered.

## **LEGEND**

- CO Denotes clean out
- ▽ Denotes street sign
- Denotes catch basin
- Denotes utility pole
- WM Denotes water meter
- 0.25 Fr Denotes approximate tree location, diameter and species
- ### Denotes elevation

Field survey dated February 20th and March 11th, 2019.

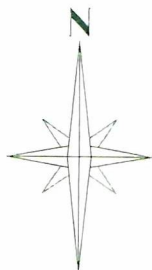
PID: 009-001-956

**LOT 1  
PLAN 28004**

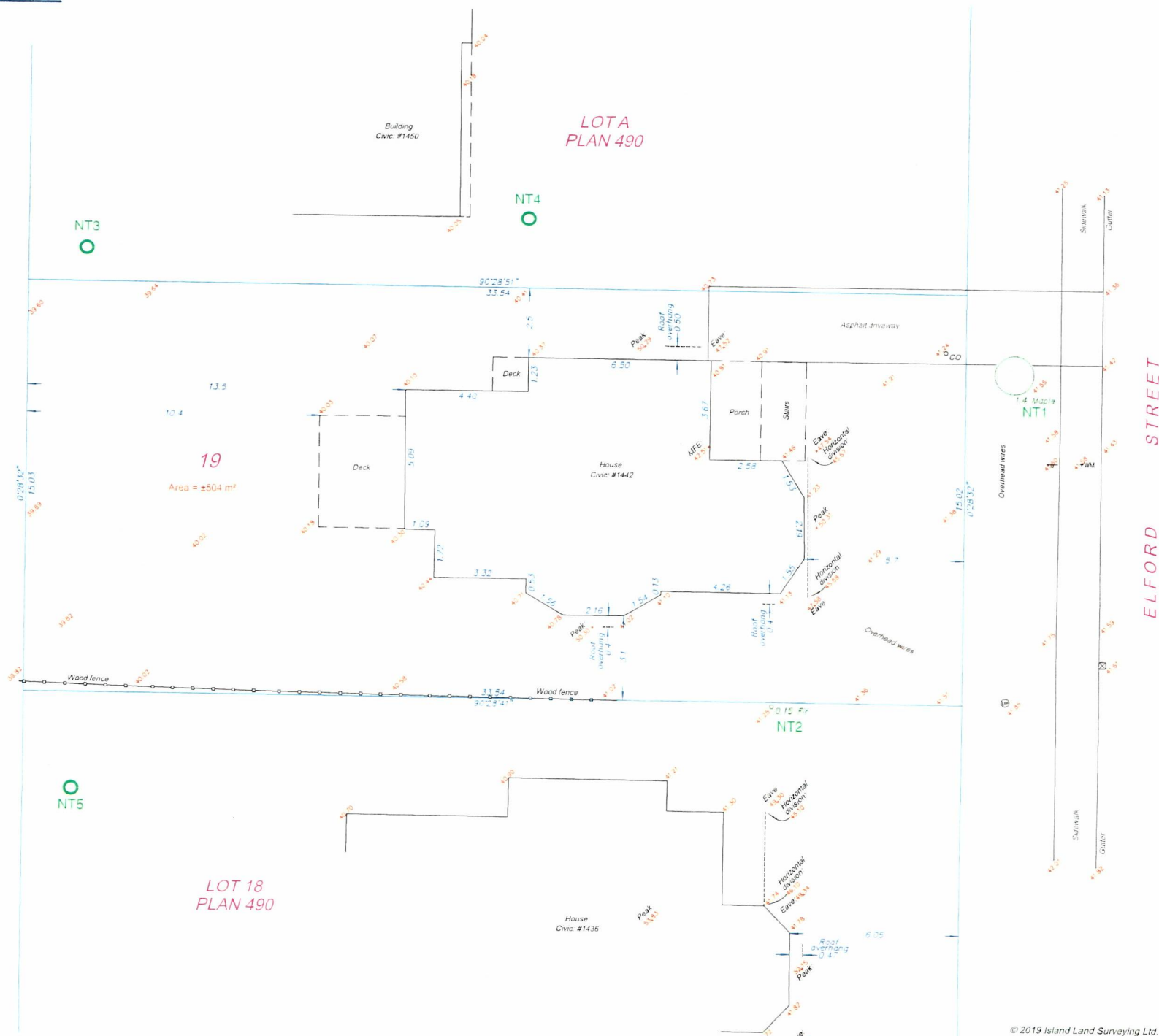
**LOT 18  
PLAN 490**

**LOTA  
PLAN 490**

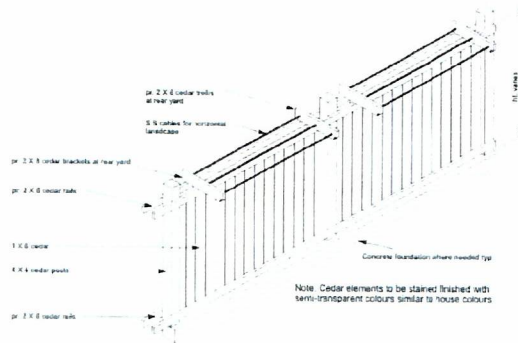
**19**  
Area = ±504 m<sup>2</sup>



File: 15-HAGEL-SP2  
Date: March 11, 2019  
**Island Land Surveying Ltd.**  
#117-693 Hoffman Avenue  
Victoria B.C. V9B 4X1  
TEL 250-475-1515 FAX 250-475-1516  
www.islandsurveying.ca PBD





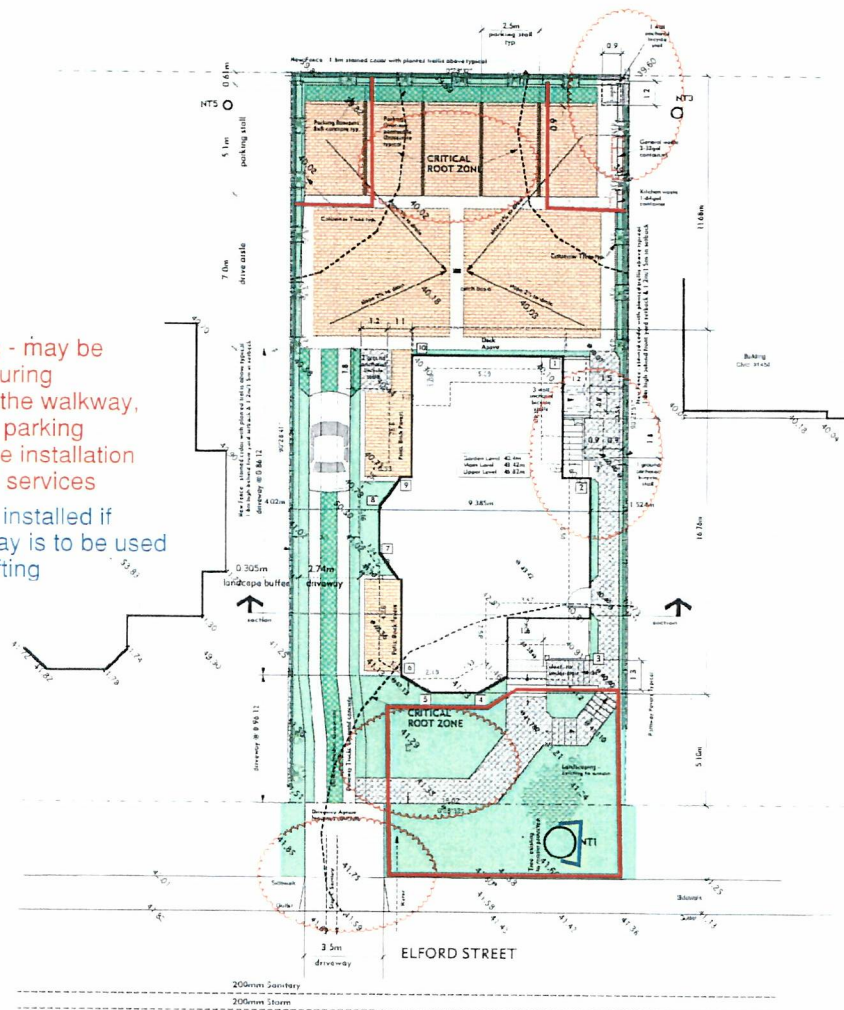


FENCE DETAIL

9	Grade point on site plan
AVERAGE GRADE CALCULATION	
1	40.3
2	40.3
3	40.3
4	41.3
5	41.3
6	41.13 + 40.3 / 2
7	41.02
8	40.75
9	40.3 + 40.71 / 2
10	40.5
Average	40.68

PROJECT INFORMATION	
Proposed Zone	New Zone
Site Area	504 sq m
Total Floor Area	302 sq m
Commercial Floor Area	0
Floor Space Ratio	0.60:1
Site Coverage	26.9%
Open Site Space	73.1%
Number of Storeys	3
Height of Building	9.52m
Parking Stalls on Site	5
Bicycle parking	7
Front Yard	5.1m
Rear Yard	11.68m
Side Yard (south)	4.02m
Side Yard (north)	1.524m
Combined Side Yards	5.562m
Rear Yard Landsc %	18.1%
Total # of Units	5
Unit Types	4 - 1 Bedroom + 1 - 2 Bedroom
Minum Floor Area	43.9 sq m
Total Residential Area	302 sq m

- Barrier Fencing - may be adjusted only during construction of the walkway, stairs, and rear parking area, and for the installation of underground services
- Hoarding to be installed if existing driveway is to be used during house lifting



LOT 19, SECTION 74,  
VICTORIA DISTRICT, PLAN 490

1442 Elford Street:  
Rezoning - Heritage Designation  
Site Plan scale: 1:100m

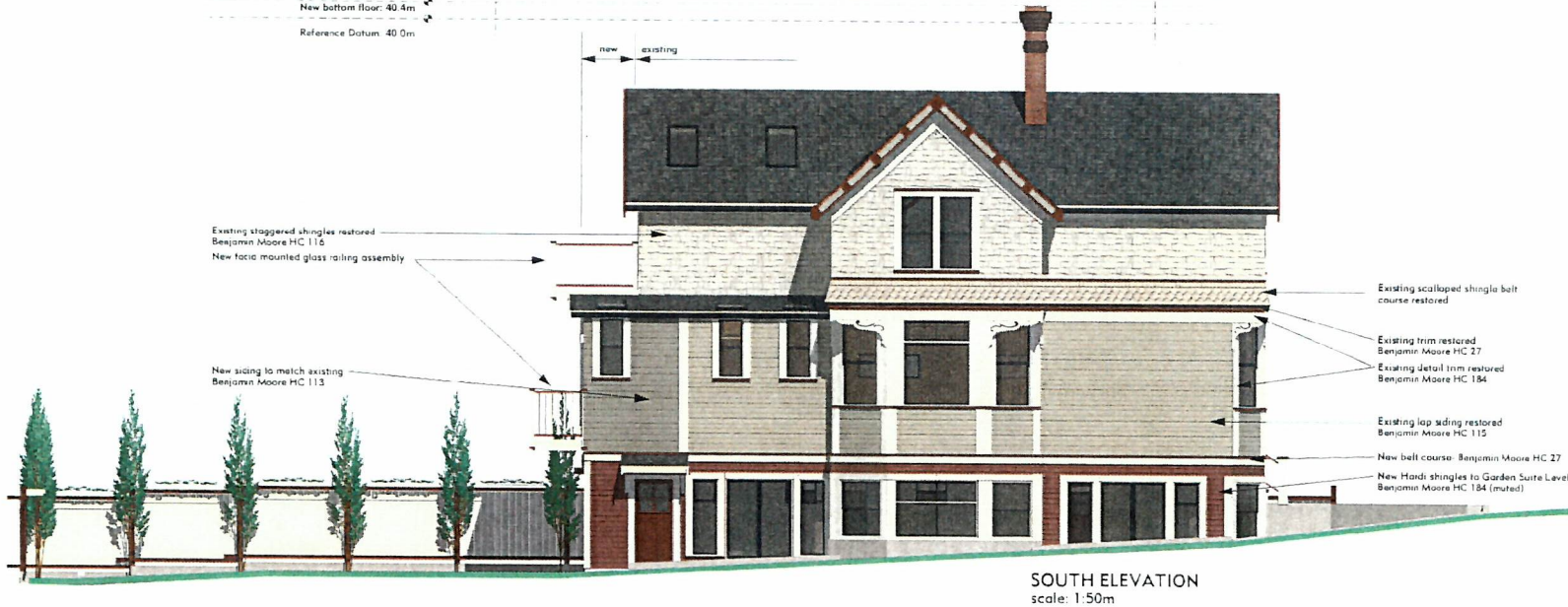
Chris Gower  
Architect  
Urban Design  
Planner  
AIBC FRAIC RPP CIP LEED AP



Dan Hagel  
Builder / Developer

Oct. 8, 2019





1442 Elford Street:  
Rezoning - Heritage Designation  
Elevations

**Chris Gower**  
Architect  
Urban Design  
Planner

AIBC FRAIC RPP CIP Lead ap



**Dan Hagel**  
Builder / Developer

Oct. 8, 2019



WEST ELEVATION  
scale: 1:50m



NORTH ELEVATION  
scale: 1:50m

# 1442 Elford Street: Rezoning - Heritage Designation Elevations

**Chris Gower**  
Architect  
Urban Design  
Planner

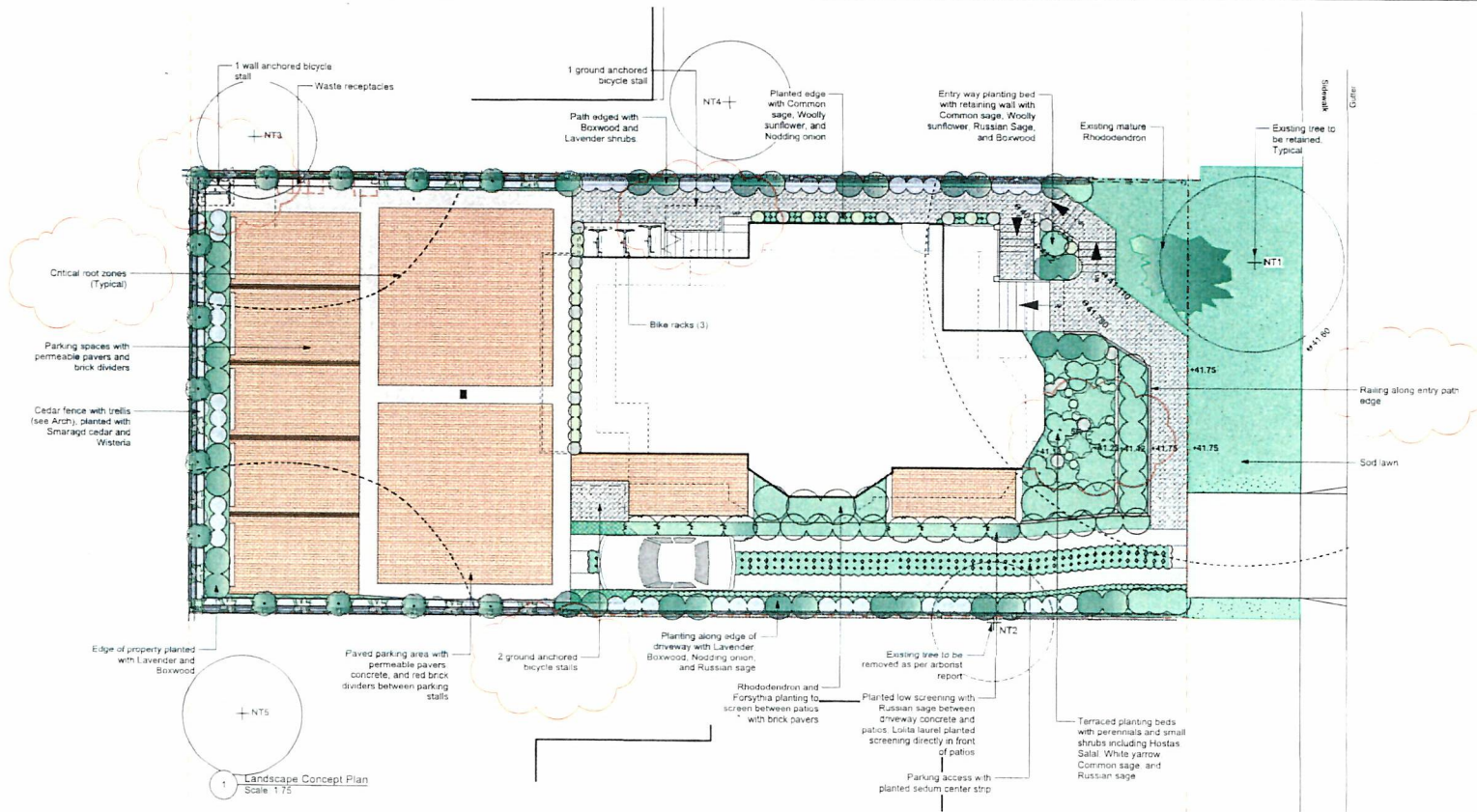
AIBC FRAIC RPP CIP Lead ap



**Dan Hagel**  
Builder / Developer

Oct. 8, 2019





## Recommended Nursery Stock

### Trees

ID	Quantity	Botanical Name	Common Name	Size
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TH01	14	Thuja occidentalis 'Smaragd'	Emerald Cedar	6 cm cal
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### Medium Shrubs

ID	Quantity	Botanical Name	Common Name	Size
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F01	2	Forsythia x intermedia	Border Forsythia	# 3 pot
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PL01	8	Prunella vulgaris	Portugal Laurel Lortia	# 3 pot
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RH01	5	Rhododendron 'Capistrano'	Capistrano Rhododendron	# 5 pot
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### Small Shrubs

ID	Quantity	Botanical Name	Common Name	Size
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BuGr	35	Bonus 'Green Mountain'	Green Mountain Boxwood	# 3 pot
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LaGr	67	Lavandula officinalis	English Lavender	# 1 pot
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### Perennials, Annuals and Ferns

ID	Quantity	Botanical Name	Common Name	Size
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ACM	11	Achillea millefolium	Common White Yarrow	# 1 pot
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ACe	132	Allium cernuum	Nodding Onion	# 1 pot
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### Groundcovers

ID	Quantity	Botanical Name	Common Name	Size
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EnL	18	Encyphium lanatum	Woolly Sunflower	# 1 pot
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CaSh	12	Campanula medium	Sand	# 1 pot
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HoHy	2	Hosta hybrid	Hosta	# 3 pot
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HoSi	21	Hosta sieboldiana 'Elegans'	Hosta	# 3 pot
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PeAt	6	Perovskia atropurpurea	Russian Sage	# 1 pot
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SeGr	17	Salvia officinalis	Common Sage	# 1 pot
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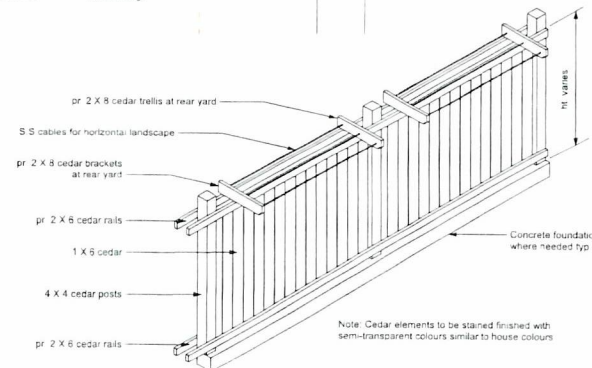
WiSe	16	Wisteria sinensis	Chinese Wisteria	# 1 pot
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### Notes

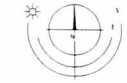
1. All work to be completed to current BCSLA Landscape Standards

2. All soft landscape to be irrigated with an automatic irrigation system

3. Tree numbers correspond to numbers in arborist report



2 Fence Detail Scale 1:25



# 1442 Elford St-Landscape Concept Plan

REVISIONS		
D	Oct 15 '19	Revisions for Rezoning
C	May 28 '19	DP Revision
B	May 14 '19	DP Submission
A	May 2 '19	Draft For review



#3-864 Queens Ave. Victoria B.C. V8T 1M5  
Phone (250) 598-0105

PROJECT  
1442 Elford Street  
Victoria, BC

TITLE  
Landscape Concept Plan

SCALE  
1:75

DRAWN OL  
CHECKED BW

PROJECT NO: 1917

DATE  
May 28, 2019

1 of 1  
SHEET

October 14, 2019

City of Victoria  
1 Centennial Square  
Victoria, BC  
V8W 1P6

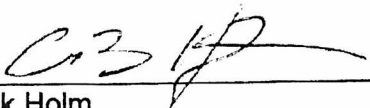
Attention: Parks Department

RE: 1442 Elford Street


Regarding the removal of tree number NT2 from the driveway, I consent to the removal of that tree to make room for the drive isle which leads to the rear parking areas.

It has also been brought to my attention that tree number NT5 has a critical root zone that will encroach into the rear parking area, I am comfortable with the fact that a professional arborist, Talbot Mackenzie & Associates, has been on site and has reviewed the critical root zone and that the developer in conjunction with the arborist will work together to insure that the critical root zone will be cared for before, during and after construction.

Sincerely,

  
\_\_\_\_\_  
Chuck Holm

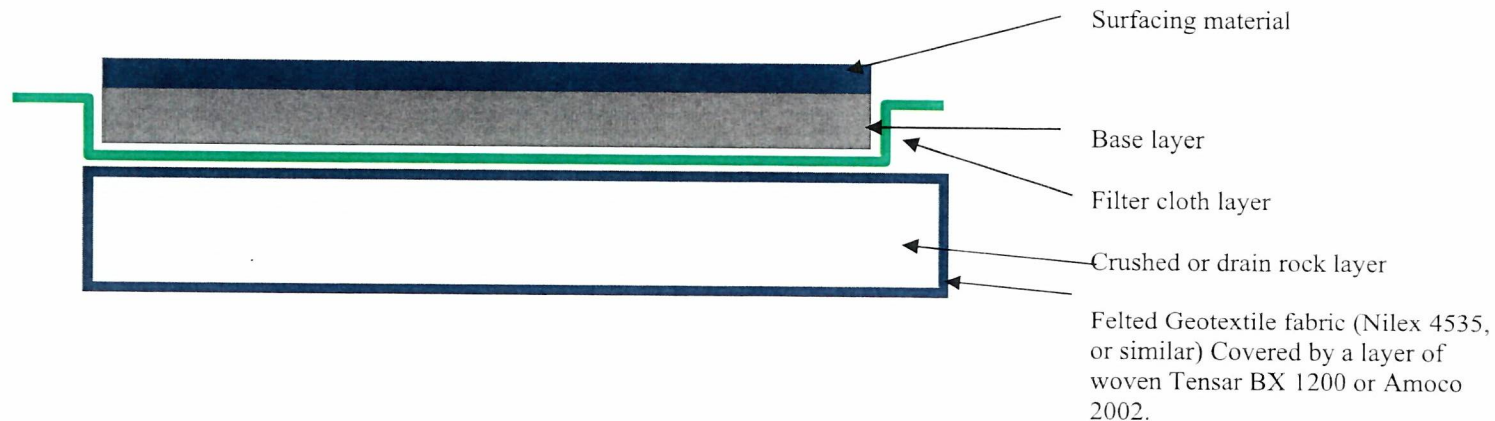
1436 Elford Street  
Victoria, BC  
V8S 3S8

  
\_\_\_\_\_  
Jeri-Ann Holm

# **Talbot Mackenzie & Associates**

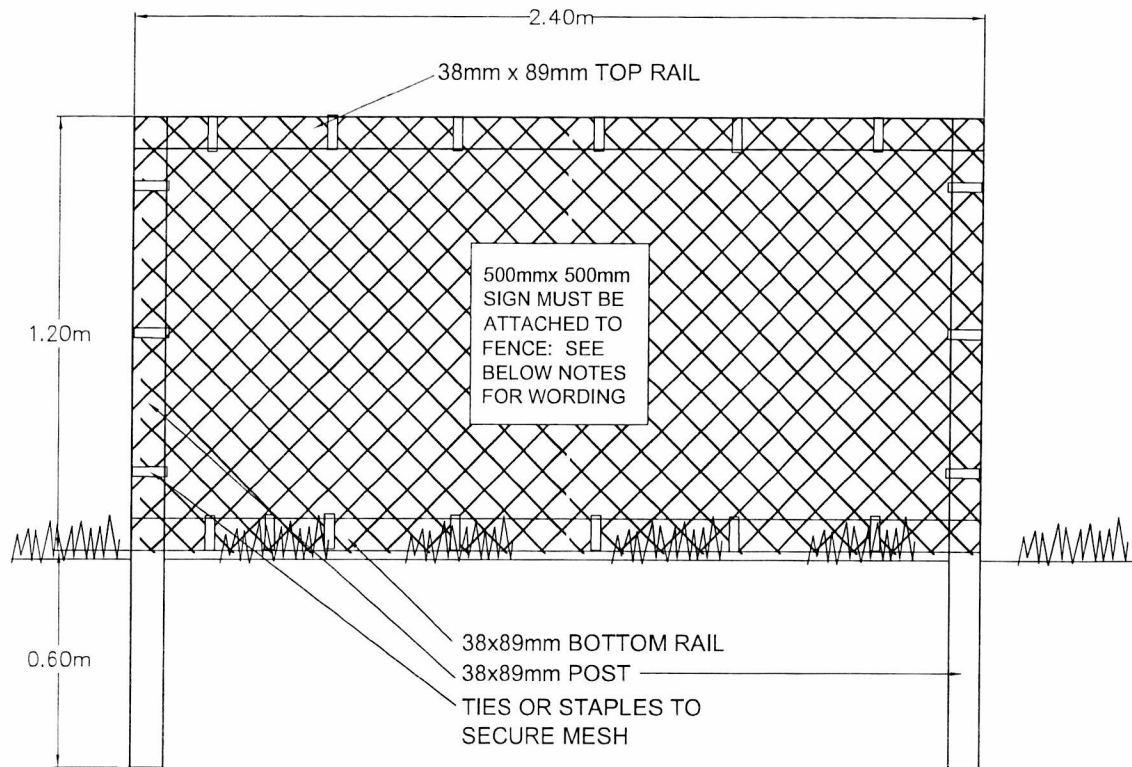
Consulting Arborists

**Diagram – Site Specific Driveway, Parking and Walkway**



## **Specifications for Paved Surfaces Over Tree Roots (Driveway, Parking and Walkway Areas)**

1. Excavation for construction of the driveway/parking/walkway areas must remove only the top layer of sod and not result in root loss
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 paved surface. 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 (depth dependent on desired finished grade).
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 geotextile 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.



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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### 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