



Talbot Mackenzie & Associates

Consulting Arborists

# **CONSTRUCTION IMPACT ASSESSMENT AND TREE PRESERVATION PLAN**

**505-521 Quadra St. & 931 Convent Pl.,  
Victoria (Beacon Hill Residential)**

**PREPARED FOR:** Wensley Architecture Ltd.  
104 – 3212 Jacklin Rd.  
Victoria, BC  
V9B 0J5

**PREPARED BY:** Talbot, Mackenzie & Associates  
Noah Borges – Consulting Arborist  
ISA Certified # PN-8409A

Box 48153 RPO - Uptown Victoria, BC V8Z 7H6  
Ph: (250) 479-8733  
Fax: (250) 479-7050  
Email: [tmtreehelp@gmail.com](mailto:tmtreehelp@gmail.com)



## **Talbot Mackenzie & Associates**

Consulting Arborists

Jobsite Property: 505-521 Quadra St. & 931 Convent Pl., Victoria

Date of Site Visit: August 23, 2017 Time: 8:15am

Weather conditions: Sunny, 14° Celsius, no significant wind

Site Conditions: One 4-story apartment building and three single-family dwellings. Gradual increase in elevation from north to south. Slight slope downwards from west to east. No construction activity present.

**Summary:** Based on the existing site conditions and the information provided, we anticipate it will be necessary to remove trees on the neighbouring property to the East numbered: **NT9, NT10, NT11 and NT13** to accommodate the proposed excavation for the underground parking area. The trees located on municipal property have a good potential for being retained providing their critical root zones can be adequately protected during the construction process and the proposed excavation does not go beyond the property line of the subject property.

**Scope of Assignment:** To inventory the existing bylaw protected trees and any trees on neighbouring properties that could be potentially impacted by construction or that are within 3 meters of the property line. Review the proposal to demolish the existing buildings and construct one new 6-storey apartment building, four town homes, one shed, and underground parking, and 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 on August 15, 2017 and prepared an inventory in the attached Tree Resource Spreadsheet. Each tree was identified using a numeric metal tag attached to its lower trunk. 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 trees inventoried with their identification numbers were added to the Site Plans. The conclusions reached were based on the information provided within this site plan specification package.

**Summary of Tree Resource:** 23 trees were inventoried, none of which are located on the subject property. There are eight trees on the south and west municipal frontages, and 15 on neighbouring properties. The large *Cedrus atlantica* tree at the southwest end of 505 Quadra Street is not bylaw protected size.

**Trees to be Removed:** There are no bylaw-protected trees within the property boundary in direct conflict with the building footprint that require removal prior to construction.

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

- **Underground Parking:** The highest potential impact on the tree resource will be related to the excavation for and construction of the underground parkade. Excavation will encroach within the critical root zones of several municipal and neighbours' trees, some of which may require removal. To minimize impacts, we recommend the proposed excavation be shored, rather than sloped, to reduce the likelihood of encountering structural roots. An arborist should also be present to supervise all excavation. If roots are encountered, the arborist should prune the critical roots back to sound tissue to encourage rapid compartmentalization and root re-growth, and re-evaluate the health and stability of the trees.
  - **Trees NT9-11, and NT13:** These trees are located on the neighbouring property to the east on Southgate Street. They are separated from the existing parking lot by a retaining wall, though it likely does not extend to a depth sufficient to prevent root growth onto the subject property. Therefore, we expect roots to be encountered during excavation for construction of the underground parkade, which will likely necessitate their removal. To better evaluate the potential impacts on these trees, exploratory digging is required (currently precluded because of the existing asphalt surface covering the root zones).
  - **Trees NT1-7:** Construction of the underground parkade may impact the six Horse chestnut and one Cherry tree located on the west and south municipal frontages. NT1, NT2, and NT7 are most likely to be impacted, as the parkade extends to the property boundary at the southwest corner of the lot, or about 6 m away from NT1 and NT2 and about 3m from NT7. Given the depth of excavation required, additional excavation for working room outside this footprint will be required. If a cut slope is used, it will infringe on municipal property where structural roots are expected to be encountered, and the health and the stability of the trees may be significantly impacted.
  - **Trees NT18-23:** Excavation for the underground parkade will not be as extensive on the north end of the property given the north-south slope. However, the parkade is only a 1.5m setback along the entirety of the east property line, and with additional required working room, excavation will likely impact trees NT18-23. We have been provided no information as to whether the homeowner consents to their removal.
- **Underground services:**
  - **Water service:** Construction of a water service connection may impact Cherry NT7 located on the south municipal frontage. Site plans indicate a vault is to be located on the south boulevard. The excavation will likely encroach on the critical root zone of the tree. An arborist should be on site to monitor the excavation and prune any roots that are damaged. Depending on the exact location of the service connection, it may be advantageous to excavate using Hydro-Vac or Air Spade. If the excavation must encroach into significantly into the critical root zone of this tree, it may require removal and a replacement tree be planted.
  - **Drain service:** Excavation for the drain service connection at the northwest end of the property may encounter roots from Horsechestnut NT6, located on the west municipal frontage. An arborist should be on site to monitor the excavation and prune any roots that are damaged. Depending on the exact location of the service connection, it may be advantageous to excavate using Hydro-Vac or Air Spade.

- **Clearance pruning:**
  - **Trees NT9-NT11 and NT13:** These trees will need to be pruned to create clearance for construction equipment and the new 6-storey apartment building. Some of the lower branches of the cedar trees have been pruned previously for driveway clearance, and it is unlikely that additional pruning may significantly impact the health of the trees.
- **New sidewalk construction:**
  - It is our understanding that the existing sidewalks on the Southgate Street and Quadra Street municipal frontages are to remain undisturbed and the existing driveway entrances off of Quadra will be decommissioned and turned into boulevard area.
- **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 to be erected 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 (see attached diagram). 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.
  - All municipal trees should be protected using barrier fencing encompassing as much of the critical root zones as possible.
- **Arborist Supervision:** The excavation of the underground parkade be completed under supervision by the project arborist. Any roots encountered must be pruned correctly to sound tissue to encourage rapid compartmentalization of the wound and re-growth of new roots.
- **Methods to avoid 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 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.
- **Demolition of the existing building:** The demolition of the existing buildings and any services that must be removed or abandoned, must take the critical root zone of the trees to be retained into account. If any excavation or machine access is required within the critical root zones of trees to be retained, it must be completed under the supervision and direction of the project arborist.

- **Mulching:** Mulching is an important proactive step in maintaining the health of the trees to be retained 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. As much of the area within two times the dripline of the tree should be mulched, both inside and outside of the critical root zone. No mulch should be touching the trunk of the tree. See “methods to avoid soil compaction” if the area is to have heavy traffic.
- **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 for the proposed new houses, road upgrades, driveways and service footprints that are 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 demolition, site clearing or other construction activity occurs.

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

Yours truly,  
Talbot Mackenzie & Associates



Tom Talbot & Graham Mackenzie  
ISA Certified, & Consulting Arborists  
Encl. 1-page site plan with tree numbers, 3-page tree resource, key to headings in resource table, Barrier fencing specifications.

#### 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.

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.

505-521 Quadra Street, 931 Convent Place  
Tree Resource

Tree ID	Common Name	Latin Name	DBH (cm) * over ivy ~ approximate	Crown Spread (m)	CRZ (m)	Health	Structure	Relative Tolerance	Bylaw Status	Remarks and Recommendations
NT1	Horsechestnut	<i>Aesculus hippocastanum</i>	59	13	7	Fair	Fair	Moderate	Municipal	Municipal tree. 4m from road. 2m from sidewalk. Wounds and cracks on main stem and limbs. Y-pruned for line clearance.
NT2	Horsechestnut	<i>Aesculus hippocastanum</i>	80	13	9.5	Fair/Poor	Fair	Moderate	Municipal	Municipal tree. 2m from road and sidewalk. 2.5m from walkway. Large cavity from limb failure at 4m above ground level (50 X 30cm). Epicormic growth on main stem.
NT3	Horsechestnut	<i>Aesculus hippocastanum</i>	72	17	8.5	Fair/Poor	Fair	Moderate	Municipal	Municipal tree. 2m from road and sidewalk. 3.5m from driveway. Crack on main stem (1.5m in length). Wounds with possible decay on 3 limbs on west side.
NT4	Horsechestnut	<i>Aesculus hippocastanum</i>	97	20	11.5	Good	Good	Moderate	Municipal	Municipal tree. 2m from road and sidewalk. 6m from driveway. Minor deadwood and defoliation. Interfering with utility lines.
NT5	Horsechestnut	<i>Aesculus hippocastanum</i>	55	14	6.5	Good	Good	Moderate	Municipal	Municipal tree. 2m from road and sidewalk. 1.5m from #517 Quadra St. driveway. Small crack and reaction wood on underside of limb overhanging driveway. Interfering with utility lines.
NT6	Horsechestnut	<i>Aesculus hippocastanum</i>	53	9	6.5	Good	Good	Moderate	Municipal	Municipal tree. 2m from road and sidewalk. Insect defoliation and minor epicormic growth on main limbs. Minor deadwood. Interfering with utility lines.
NT7	Flowering Cherry	<i>Prunus spp.</i>	41	8	5	Fair	Fair	Moderate	Municipal	Municipal tree. 1m from road and sidewalk.
NT8	Flowering Cherry	<i>Prunus spp.</i>	52	11	6	Fair	Fair	Moderate	Municipal	Municipal tree. 1m from road and sidewalk. Competing with cedar (NT9).
NT9	Deodar cedar	<i>Cedrus deodara</i>	64	11	6.5	Fair	Fair	Good	Not protected	Neighbour's. 1.5m from property line. 2m from sidewalk. Overhanging property line 5m at 3m above ground level. Ivy at base. Minor deadwood.

Prepared by:  
Talbot Mackenzie & Associates  
ISA Certified, and Consulting Arborists  
Phone: (250) 479-8733  
Fax: (250) 479-7050  
email: Treehelp@telus.net

505-521 Quadra Street, 931 Convent Place  
Tree Resource

Tree ID	Common Name	Latin Name	DBH (cm) * over ivy ~ approximate	Crown Spread (m)	CRZ (m)	Health	Structure	Relative Tolerance	Bylaw Status	Remarks and Recommendations
NT10	Deodar cedar	<i>Cedrus deodara</i>	34, 28, 24	7	7.5	Fair	Fair/Poor	Good	Not protected	Neighbour's. 3m from property line. 4m from sidewalk. Codominant union at 1m above ground level. 34cm and 24cm stems crossing and rubbing. Overhanging property line 2m at 4m above ground level.
NT11	Deodar cedar	<i>Cedrus deodara</i>	51	6	5	Fair	Fair	Good	Not protected	Neighbour's. 1.5m from property line. Ivy at base. Competing with surrounding cedars and oak. Minor deadwood. Overhanging property line 4m at 2m above ground level.
NT12	Vine Maple	<i>Acer circinatum</i>	8	4	1	Fair	Fair	Moderate	Not protected	Neighbour's. 1.5m from property line. Overhanging property line 1m at 4m above ground level. Roots protected at surface level by retaining wall.
NT13	Pin Oak	<i>Quercus palustris</i>	53*	14	6.5	Good	Fair	Moderate	Not protected	Neighbour's. 2m from property line. Ivy at base. Overhanging property line over carport at 6m above ground level. Minor deadwood.
NT14	Western Red Cedar	<i>Thuja plicata</i>	3, 3	1	0.5	Good	Good	Poor	Not protected	Neighbour's. 1m from property line. Roots protected by retaining wall.
NT15	Western Red Cedar	<i>Thuja plicata</i>	5, 3	1.5	1	Fair	Fair	Poor	Not protected	Neighbour's. 2m from property line. Roots protected by retaining wall.
NT16	Lilac	<i>Syringa vulgaris</i>	2, 2, 2	1	0.5	Fair	Fair	Poor	Not protected	Neighbour's. 1m from property line. Roots protected by retaining wall.
NT17	Cypress	<i>Chamaecyparis spp.</i>	Multi-stem (5 individuals)	3.5	-	Fair	Fair	Moderate	Not protected	Neighbour's. 0.5m from property line. Roots protected by retaining wall.
NT18	Pyramidal Yew	<i>Taxus spp.</i>	Multi-stem	1	-	Good	Good	Good	Not protected	Neighbour's. 0.5m from #933 Convent Pl. driveway. 3m from #931 Convent Pl. driveway.
NT19	Linden	<i>Tilia spp.</i>	Multi-stem	5	-	Good	Fair	Moderate	Not protected	Possible shared tree (#931 and #933 Convent Pl.). Extends over #931 Convent Pl. driveway by 1m.

Prepared by:  
Talbot Mackenzie & Associates  
ISA Certified, and Consulting Arborists  
Phone: (250) 479-8733  
Fax: (250) 479-7050  
email: Treehelp@telus.net

505-521 Quadra Street, 931 Convent Place  
Tree Resource

Tree ID	Common Name	Latin Name	DBH (cm) * over ivy ~ approximate	Crown Spread (m)	CRZ (m)	Health	Structure	Relative Tolerance	Bylaw Status	Remarks and Recommendations
NT20	Monkey Puzzle	<i>Araucaria araucana</i>	7	2	1	Fair	Fair	Poor	Not protected	Neighbour's. 0.5m from property line.
NT21	Apple	<i>Malus spp.</i>	13, 13, 10, 8, 7	5	4.5	Good	Good	Moderate	Not protected	Neighbour's. 2m from property line. Overhangs #931 Convent Pl. backyard by 1m.
NT22	Apple	<i>Malus spp.</i>	Multi-stem	2	-	Fair	Fair	Moderate	Not protected	Possible shared tree (#931 and #933 Convent Pl.).
NT23	Apple	<i>Malus spp.</i>	8	5	1	Fair	Fair	Moderate	Not protected	Neighbour's. 2m from property line.

Prepared by:  
Talbot Mackenzie & Associates  
ISA Certified, and Consulting Arborists  
Phone: (250) 479-8733  
Fax: (250) 479-7050  
email: Treehelp@telus.net



### Key to Headings in Resource Table

d.b.h. – **diameter at breast height** - diameter of trunk, measured in centimetres at 1.4 metres above ground level

CRZ – **critical root zone** - estimated optimal size of tree protection zone based on tree species, condition and age of specimen and the species tolerance to root disturbance. Indicates the radial distance from the trunk, measured in metres.

Crown spread – indicates the diameter of the crown spread measured in metres to the dripline of the longest limbs.

Condition health/structure –

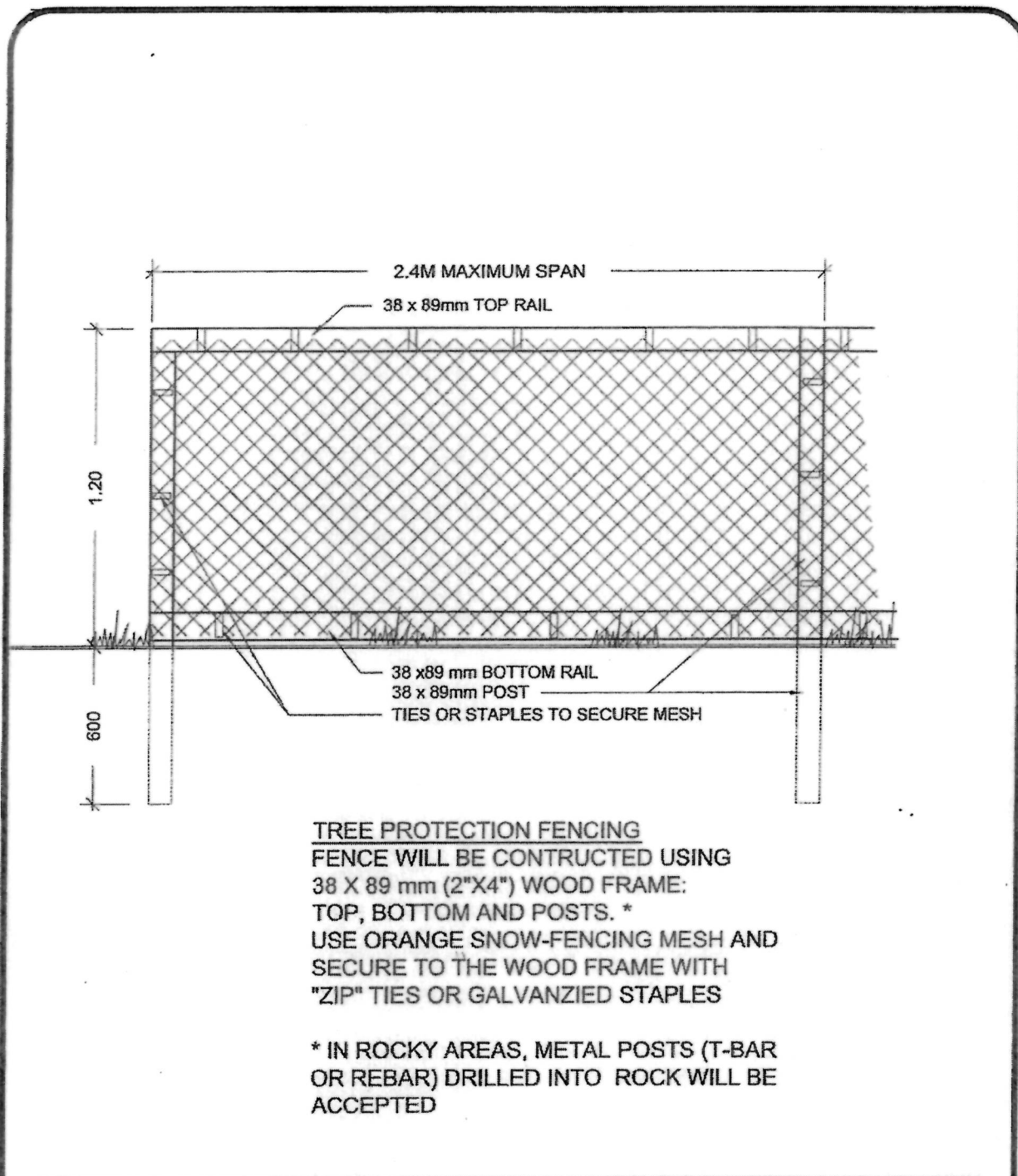
- Good – no visible or minor health or structural flaw
- Fair – health or structural flaw present that can be corrected through normal arboricultural or horticultural care.
- Poor – significant health or structural defects that compromise the long-term survival or retention of the specimen.

Bylaw status – status of trees on the property and frontage

- Protected - tree that is protected under the current tree protection bylaw.
- Not protected - tree that is not protected under the current tree protection bylaw.
- Municipal - Tree that is located on the municipal frontage.

Relative Tolerance – relative tolerance of the selected species to development impacts.





DETAIL NAME:

**TREE PROTECTION FENCING**

DATE: Oct 30/07  
 DRAWN: DM  
 APP'D: RR  
 SCALE: N.T.S.

**E105**  
 DRAWING

# Talbot Mackenzie & Associates

Consulting Arborists

Box 48153 RPO Uptown

Victoria, BC V8Z 7H6

Ph: (250) 479-8733 ~ Fax: (250) 479-7050

Email: tmtreehelp@gmail.com



## ARBORIST SUPERVISION REPORT

### LOCATION

REPORT DATE	PROJECT NAME/ADDRESS	ARBORIST	IN ATTENDANCE
June 15, 2018	505 Quadra Street Victoria, BC	Graham Mackenzie ISA #: PN-0428A TRAQ – Qualified  Noah Borges ISA #: PN-8409A	Farmer Construction Cats Eye Contracting Talbot Mackenzie & Associates

### PURPOSE OF SITE VISIT

We supervised an exploratory excavation along the east property line to evaluate impacts to four trees on the adjacent property: Deodar Cedars NT9-NT11 and Pin Oak NT13, previously inventoried for the Tree Preservation Plan we prepared for Wensley Architecture Ltd. in August 2017. None of the trees are by-law protected.

- NT9 Deodar Cedar: 64cm DBH, 1.5m from property line
- NT10 Deodar Cedar: 34, 28, 24cm DBH, 3m from property line
- NT11 Deodar Cedar: 51cm DBH, 1.5m from property line
- NT13 Pin Oak: 53cm DBH (measured over ivy), 2m from property line

### OBSERVATIONS

A 60cm wide trench, 90cm in depth, was excavated 60cm from the concrete retaining wall demarcating the property boundary. The site is an at-grade parking area and driveway with asphalt pavement. The trees are on neighbouring property, at a slightly elevated grade (30-60cm). Areas of uplifting pavement are visible in the parking area near the trees, particularly along the retaining wall.

### FINDINGS

A small area of uplifting pavement was removed immediately adjacent to the retaining wall, directly west of Cedar NT9. We encountered a 5-6cm diameter *Cedrus* root beneath the pavement. The root sustained minor bark damage during pavement removal but was retained.

Excavation of the trench started from the south, at the municipal sidewalk. One root, 2-3cm in diameter and oriented vertically, was encountered at the east end of the trench. A trench was excavated north up to approximately 0.5m south of the hydro pole. Only small roots, 1cm or less in diameter, were encountered. They were all located within the upper 60cm of soil.

We resumed excavation north of the hydro pole, immediately south of an area of uplifting pavement. Two 3cm diameter roots, which we identified as from one of the *Cedrus* trees, were encountered just below the pavement. There is a discontinuous path of cracking and uplifting pavement that traces back to the retaining wall. These two roots may have been from the 5-6cm diameter root we encountered near Cedar NT9. Excavation stopped approximately 4-5m north of Oak NT13. Eight additional roots were encountered, all 1cm or less in diameter, all within the upper 60cm of soil.

#### RECOMMENDATIONS:

Given the size of the trees and the distance from the trench, fewer roots were encountered than we anticipated. The concrete retaining wall and/or the asphalt pavement is likely restricting root growth onto the subject property. We anticipate that there will be a higher density of roots located on the neighbour's side and possibly directly below the existing retaining wall.

We anticipate construction of the proposed underground parking will likely require additional excavation closer to the property line, potentially up to the retaining wall. Based on the number and size of roots we encountered, we do not believe that the neighbour's trees will be significantly impacted by the proposed construction. To mitigate additional impacts, we recommend not excavating beyond the existing retaining wall location, if possible, leaving a 30cm strip west of the retaining wall undisturbed to preserve any roots growing along the wall.

We further recommend the project arborist be on site to supervise any additional excavation within the trees' critical root zones and, if required, removal of the retaining wall. As noted in our Tree Preservation Plan, we recommend shoring and blind-forming techniques be used to minimize the extent of excavation. This may also require that any proposed services such as perimeter drains be located inside the parking structure on this side of the building.

PHOTOS:



**Photo #1:** Three Deodar Cedars (NT9-NT11) and one Pin Oak (NT13) are located within 3m of the property line.



*Picture #2: A small area of uplifting pavement was removed west of Deodar Cedar NT9. A 5-6cm diameter root was encountered directly underneath the pavement.*

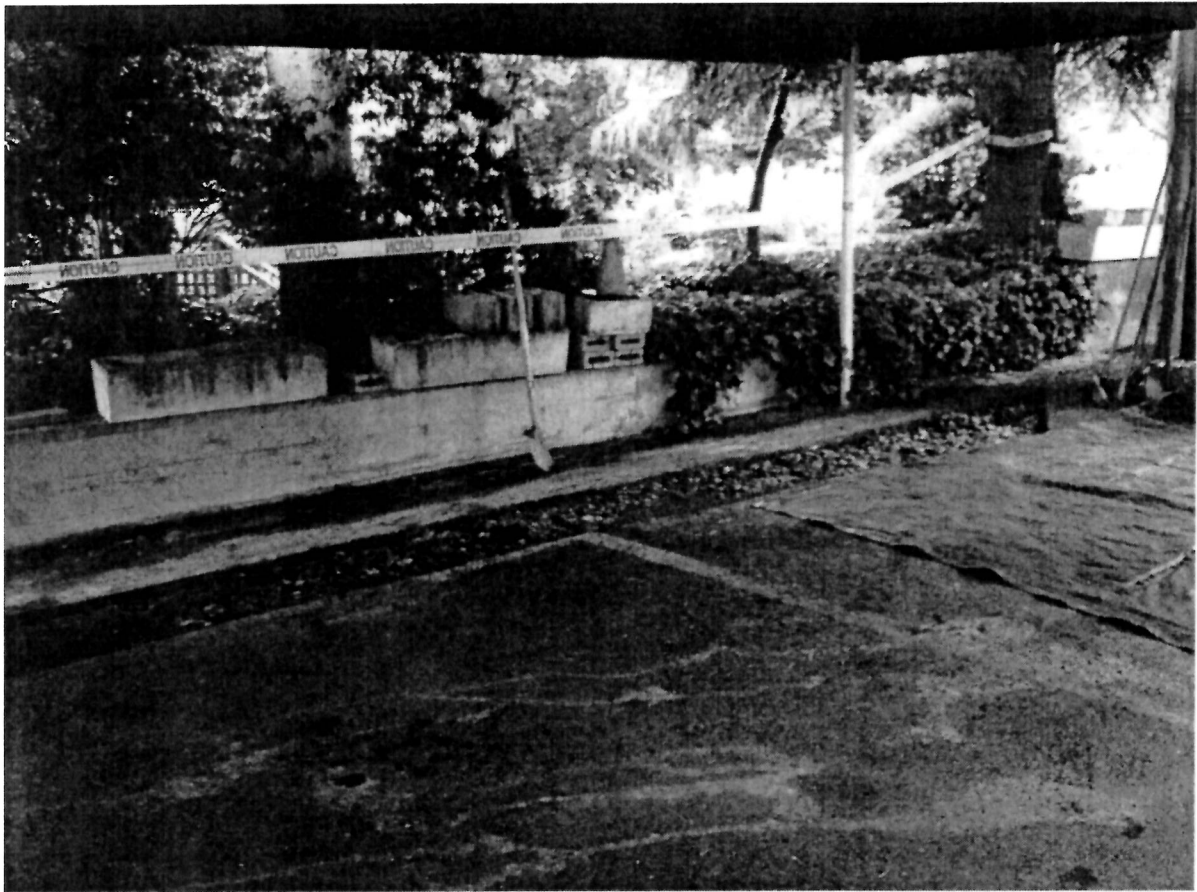


*Picture #3: A 60cm wide trench, 90cm in depth, was excavated 60cm west of the retaining wall.*





*Picture #4: Several small roots, 1cm or less in diameter, were encountered up to the hydro pole.*



*Picture #5: 50-75cm south and north of the hydropole were undisturbed. Excavation proceeded north to 4-5m north of Pin Oak NT13.*



*Picture #6: Two 3cm Cedrus roots were pruned 1m north of the hydro pole. An additional eight 1cm diameter roots were encountered north of the hydro pole.*

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

Yours truly,

Talbot Mackenzie & Associates  
ISA Certified Consulting Arborists

#### **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.

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.