# - Lot “A” -

## Revised Application for Rezoning

City of Courtenay

# *Appendix E*

## *Tree Inventory and Assessment*

*- Skyline Tree Service -*

Rosebery Investments Ltd.
West Vancouver, BC

# Tree Inventory and Assessment at Lot A Copperfield Rd. Courtenay, BC.

**Prepared for: Skyline Tree Service**

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## Purpose:

Catalogue and assess the trees at Lot A located north of newly developed Swanson St. and west of Copperfield Rd. Courtenay BC.

## Methods:

Lot A was surveyed and the trees assessed for overall health and stability. To manage the size of the property and number of trees therein high density stands were broken into polygons which were then assessed for tree size, species composition, density (trees/Ha), hazards, and overall health. In areas of lower density, feature trees, or trees on the edge of retention areas (stream buffers) were mapped individually. In this way as buffers are adjusted individual trees may be selected for retention or removal. No trees were mapped outside of the property boundary however the overall stand characteristics and composition were noted for determining any impacts these trees may face if clearing were to occur on Lot A. A UAV was utilized to create an up to date and high resolution orthophoto layer to accurately locate individual trees and patterns in stand composition. This layer was added to the map of preliminary LAP setbacks produced by Current Environmental.

## Site Description:

Lot A, located at the end of Copperfied Rd. is approximately 150x500m with an area of approximately 8 hectares. The property is bounded on the SE side by Arden Road Park and beyond by the recently cleared development site at the end of Swanson St. and to the SW by the decommissioned section of Comox Logging Rd. To the NE the property is bordered by the last residential property on Copperfield Rd and the riparian area of Piercy Creek. The NW property line marks the approximate

Courtenay-CVRD boundary and the forest continues as an unbroken stand for approximately 800m from the property line to Lake Trail Rd. The site is largely forested with a trail running through the middle from Copperfield Rd to Comox Logging road which appears to be frequented by walkers, dogs, and deer as evidenced by numerous rub trees.

The forest appears to have been cleared 60-70 years prior as indicated by the size of the largest trees. The forest regrowth is variable across the site and likely a function of the moisture regime. The site is wettest along the southern boundary in the wetlands and riparian area that make up Piercy Creek and in the North corner from tributary 11. The site is driest along the northern boundary which correlates with the highest density of mature conifers. The middle of the property is composed of younger trees, predominantly Western Red Cedar (*Thuja plicata),* and Red Alder (*Alnus rubra*). The predominant wind direction is from the SE.

(See Appendix A. for site map)

**Results:**

Individual 'feature' trees, or mature trees in low density stands were mapped and described individually (See Table 1. and Appendix C) Specific zones of similar composition were mapped (See Appendix B.) and are described below.

Zone 1:
Stand of young mixed Cedar and Douglas Fir (*Pseudotsuga menziesii*) with occasional Sitka Spruce (*Picea sitchensis*). This area is located within the wetland and creek buffer. Good health and condition of the stand with no evidence of disease. Trees are 20-25m tall with 25-60cm dbh's. Density of approx 300/Ha

Zone 2:
Mostly young Douglas Fir ranging from 15-20cm dbh but containing three large Douglas Fir 45-65cm dbh. All are located inside the stream buffer. Density of approx. 100/Ha

Zone 3:
Grove of 10 medium Cedar trees 20-60cm dbh and approximately 22m tall.

Zone 4:
Grove of 6 Douglas Fir trees 23-55cm dbh, and 22-28m tall.

Zone 5:
Grove of Douglas Fir trees which likely straddle the property boundary with Arden Road Park. Trees are 48, 56, 75, 48, and 72cm dbh. The two trees closest to the fenceline have had their canopies thinned and were climbed using spurs as evidenced by gaff wounds. This area is located in the SW corner of the property and outside the 30m buffer for Piercy Creek.

Zone 6:
Stand is a mix of Alder and Cedar with a few Douglas Fir trees. General health of the stand is satisfactory with no significant hazards. Some cedar exhibit chlorosis and declining upper crowns. Some alder are also showing signs of decline.

Zone 7:
This stand is located outside the south property boundary and inside the 30m buffer of Piercy creek. This stand is predominantly young cedar trees (25-60cm dbh) exhibiting chlorosis but also mixed with some Douglas Fir trees (28-45cm dbh) exhibiting poor stem taper and poor live-crown ratios consistent with second growth trees that were dense stand grown. Density of approx. 400/Ha.

Zone 8:
Mixed Cedar and Bigleaf Maple (*Acer macrophyllum*). Cedar are chlorotic and have declining upper crowns. Maple are also showing signs of decline with some large dead stems present. This size of multi-species impact is likely a result of hydrology changes from clearing and grading the adjacent property. Denisity of approx. 200/Ha

Zone 9:
This stand is located on the northwest boundary of the property and consists of a mixed composition of Cedar, Douglas Fir, and Bigleaf Maple in an approximate proportion of 70/25/5% respectively. Dbh range is 30-70cm with an average of 50cm. All trees appear very healthy and vigorously growing with excellent live-crown ratios. Density of approx. 500/Ha.

Zone 10:
A stand of younger Cedar trees 20-35cm dbh. Density of approx. 180/Ha

Zone 11:
Stand of Cedar trees 20-50cm dbh with healthy crowns. Density of approx. 200/Ha

Zone 12:
Variable mixed-age stand of Bigleaf Maple, Fir, and small to medium Cedar. In the middle of the stand is a cluster of three dead Fir trees 25-50cm dbh. Not enough evidence to indicate a root rot center but still a situation that should be monitored for evidence of decline in adjacent trees. Density of approx. 200/Ha

Zone 13:
Mature trees have been mapped individually.

Zone 14:
High density stand (700/Ha) of small (10-30cm dbh) of mixed species (Cedar, Douglas Fir, Alder, Cottonwood, and Bitter Cherry)

Zone 15:
High density stand (600/Ha) of small (10-30cm dbh) of largely deciduous species including Red Alder, Black Cottonwood (*Populus trichocarpa*), Bigleaf Maple, and Bitter Cherry (*Prunus emarginata*).

Table 1. Individually mapped and documented trees at Lot A, Copperfield Rd.

| ID# | Species | DBH (cm) | Northing (mN) | Easting (mE) | Description | ID# | Species | DBH (cm) | Northing (mN) | Easting (mE) | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Cw | 77 | 5503620 | 354717 | Mature healthy tree | 34 | Cw | 70 | 5503533 | 354334 | Healthy full canopy, no decay |
| 2 | Cw | 89 | 5503620 | 354717 | Mature healthy tree | 35 | Cw | 70 | 5503533 | 354334 | Healthy full canopy, no decay |
| 3 | Cw | 95 | 5503620 | 354717 | Mature healthy tree | 36 | Cw | 71 | 5503557 | 354369 | Healthy crown |
| 4 | Act | 123 | 5503517 | 354299 | Large mature cottonwood with upper crown die back. Hazard only within half a tree length due to limb failure. Not a significant hazard for windthrow. | 37 | Cw | 74 | 5503536 | 354383 | Healthy crown |
| 5 | Act | 30 | 5503507 | 354297 | | 38 | Cw | 74 | 5503547 | 354343 | Healthy live crown |
| 6 | Act | 38 | 5503509 | 354292 | | 39 | Fd | 36 | 5503566 | 354379 | Poorly formed top |
| 7 | Act | 90 | 5503459 | 354368 | Healthy crown with no failures. | 40 | Fd | 58 | 5503566 | 354379 | Healthy crown |
| 8 | Act | 90 | 5503438 | 354404 | Healthy crown. | 41 | Fd | 40 | 5503469 | 354499 | Fir trees within the stream buffer which have been 'spiral pruned'. 40, 55 , 70cm |
| 9 | Act | 92 | 5503474 | 354354 | 35 m tall. Healthy crown. | 42 | Fd | 55 | 5503469 | 354499 | |
| 10 | Mb | 130 | 5503657 | 354517 | Large maple with healthy crown (some dead wood). Good structure. Good feature tree. | 43 | Fd | 70 | 5503469 | 354499 | |
| 11 | Mb | 65 | 5503598 | 354641 | HAZARD TREE, Codominant stem with large separation. Likelihood of failure CERTAIN. Declining crown. | 44 | Fd | 32 | 5503512 | 354370 | |
| 12 | Cw | 36 | 5503576 | 354528 | | 45 | Fd | 33 | 5503507 | 354290 | Stunted top, health good |
| 13 | Cw | 48 | 5503576 | 354528 | 48 and 36cm . Good Heath. | 46 | Fd | 35 | 5503469 | 354361 | Healthy crown. In ditch buffer. |
| 14 | Cw | 28 | 5503527 | 354351 | | 47 | Fd | 48 | 5503564 | 354365 | Healthy crown. |
| 15 | Cw | 30 | 5503527 | 354351 | 28 and 30cm respectively. | 48 | Fd | 50 | 5503487 | 354327 | Heathy fir within ditch buffer |
| 16 | Cw | 38 | 5503563 | 354386 | Close group, healthy crowns | 49 | Fd | 51 | 5503478 | 354338 | Healthy crown, in ditch buffer |
| 17 | Cw | 49 | 5503563 | 354386 | Close group, healthy crowns | 50 | Fd | 53 | 5503549 | 354353 | Healthy crown, slightly sparse |
| 18 | Cw | 58 | 5503563 | 354386 | Close group, healthy crowns | 51 | Fd | 55 | 5503493 | 354318 | 30m fir with healthy crown. Within the ditch buffer. |
| 19 | Cw | 50 | 5503581 | 354580 | Significant lower stem decay and woodpecker excavation. Poor candidates for retention | 52 | Fd | 58 | 5503596 | 354656 | |
| 20 | Cw | 50 | 5503581 | 354580 | Significant lower stem decay and woodpecker excavation. Poor candidates for retention | 53 | Fd | 59 | 5503541 | 354327 | |
| 21 | Cw | 50 | 5503581 | 354580 | Significant lower stem decay and woodpecker excavation. Poor candidates for retention | 54 | Fd | 59 | 5503541 | 354327 | Healthy canopy and live crown. On the edge of the property line. |
| 22 | Cw | 47 | 5503740 | 354712 | 47cm dbh, 22m tall | 55 | Fd | 63 | 5503531 | 354416 | Very good health and structure. Close to edge of wetland buffer and path. |
| 23 | Cw | 33 | 5503522 | 354398 | Thin canopy but healthy | 56 | Fd | 66 | 5503463 | 354358 | Healthy crown. In ditch buffer |
| 24 | Cw | 42 | 5503520 | 354371 | Good health | 57 | Fd | 70 | 5503535 | 354307 | Outside of property. Healthy crown and structure |
| 25 | Cw | 44 | 5503635 | 354663 | | 58 | Fd | 76 | 5503548 | 354360 | Very healthy crown. 30m tall. |
| 26 | Cw | 48 | 5503565 | 354593 | | 59 | Fd | 54 | 5503588 | 354542 | Healthy. Good for retention. 28m tall |
| 27 | Cw | 55 | 5503568 | 354603 | | 60 | Hw | 58 | 5503614 | 354683 | |
| 28 | Cw | 55 | 5503521 | 354395 | Evidence of wood pecker activity. No other sign of decay. | 61 | SNAGS | | 5503721 | 354586 | HAZARD TREES. 3 dead fir trees (possible rot centre?) 25-50cm |
| 29 | Cw | 60 | 5503588 | 354578 | Excellent condition, healthy live-crown 22m tall | 62 | SNAG | 35 | 5503521 | 354402 | HAZARD TREE, Dead Alder |
| 30 | Cw | 62 | 5503535 | 354385 | Healthy crown. Potential stem decay and defect. | 63 | SNAG | 35 | 5503521 | 354402 | HAZARD TREE, Dead Fir |
| 31 | Cw | 65 | 5503577 | 354643 | | 64 | Ss | 50 | 5503536 | 354301 | Healthy canopy and structure. Just outside property. |
| 32 | Cw | 65 | 5503540 | 354352 | Healthy crown. 30m tall. | 65 | Ss | 63 | 5503618 | 354684 | |
| 33 | Cw | 70 | 5503533 | 354369 | Healthy crown | | | | | | |

**Discussion:**

With a property of this size it is impossible to say with any certainty what hazard any individual tree may pose without the exact extent or level of disturbance they may be exposed to. Overall, no wide spread tree-related hazards were observed on Lot A. No evidence of widespread root-rot was observed nor was any prior incidence of windthrow. Zones 7 and 8 were the only locations where wide spread stress was observed in trees of several species. These symptoms are, at least in part, a result of the clearing and grade changes of Swanson St to the south. This area is upslope of the affected trees and the changes in runoff would significantly change the hydrology the trees in Zones 7 & 8 would have historically experienced.

Any clearing that occurs on Lot A will presumably be northwest of the 30m buffer for Piercy creek and its associated wetlands. As Piercy creek represents the lowest point, any clearing that occurs on Lot A will also cause hydrology related stresses to trees within the stream buffer on the left side of Piercy creek as has occurred on the right side.

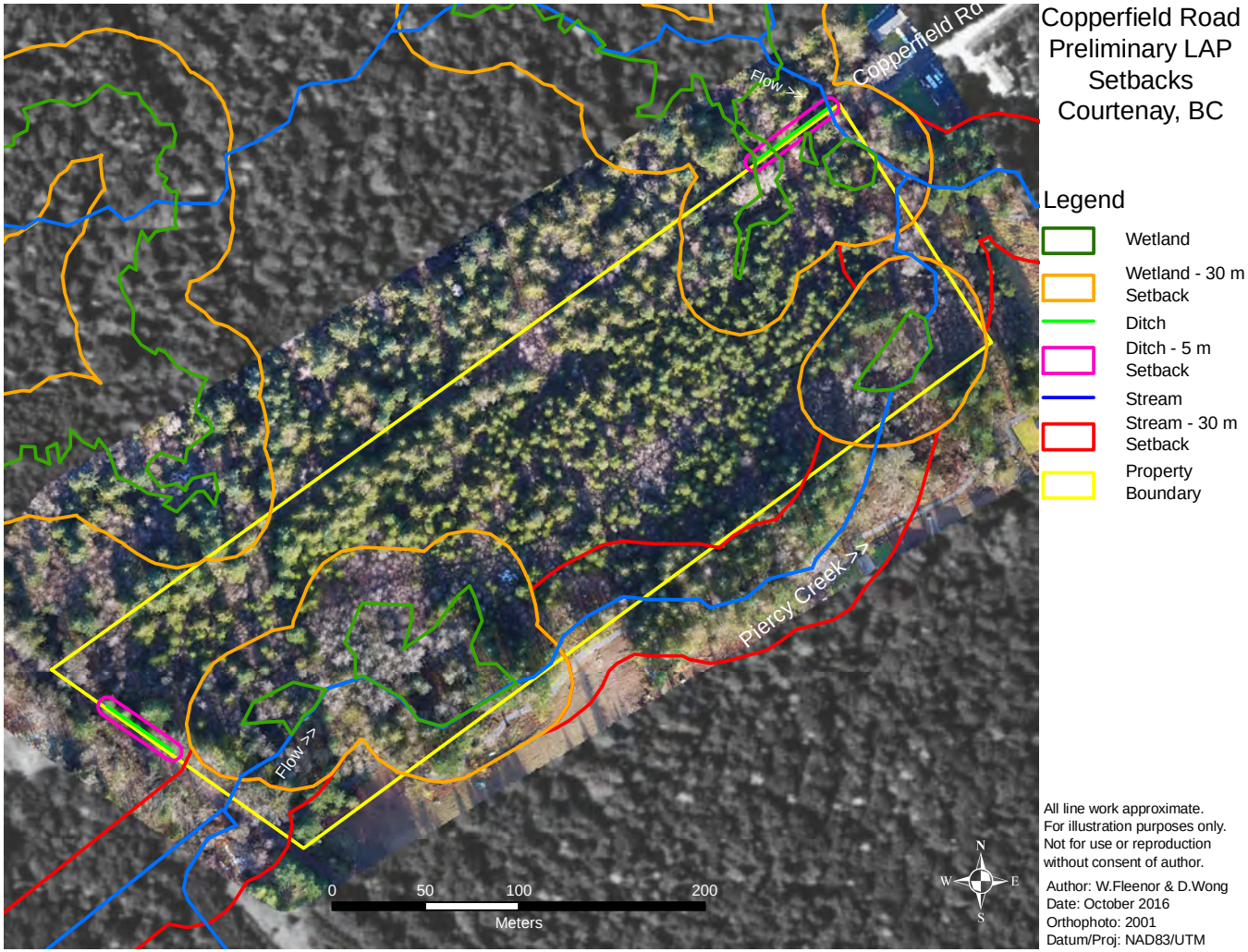
The area which the primary footpath bisects (Zones 14&15) is mostly composed of smaller trees with some smaller pockets of mature trees such as zone 3. The areas of Lot A with the highest density of mature and sizeable trees are zone's 1, 3, 4, 9, 10, 11, 12, and 13. These areas also represent the driest areas of the site and those most likely to be cleared for development. At present the gradient in tree height from shorter in zones 14 & 15 to the much taller mature trees to the northwest provides an ideal buffer for the dominant winds from the southeast. Newly exposed edge trees northwest of zones 14 & 15 would see an increased likelihood of whole tree failure as a result of higher wind loading. This risk would be higher in areas of saturated soil conditions such as the wetlands in zone 1 and beyond the property line of zones 9 & 13.

As the riparian area of Piercy creek has already been exposed by clearing of Swanson St., clearing in zones 3, 14, and 15 would also increase the windthrow potential within the stream buffer by allowing wind to pass through this stand with greater velocity. It was observed that several Douglas Fir trees in zones 5 and 7 have been previously 'wind firmed' presumably to address this potential. While thinning the canopies of additional trees in this area may be advisable, retaining as much of the stream and wetland buffer would be the most effective strategy for reducing the wind throw potential in this area.

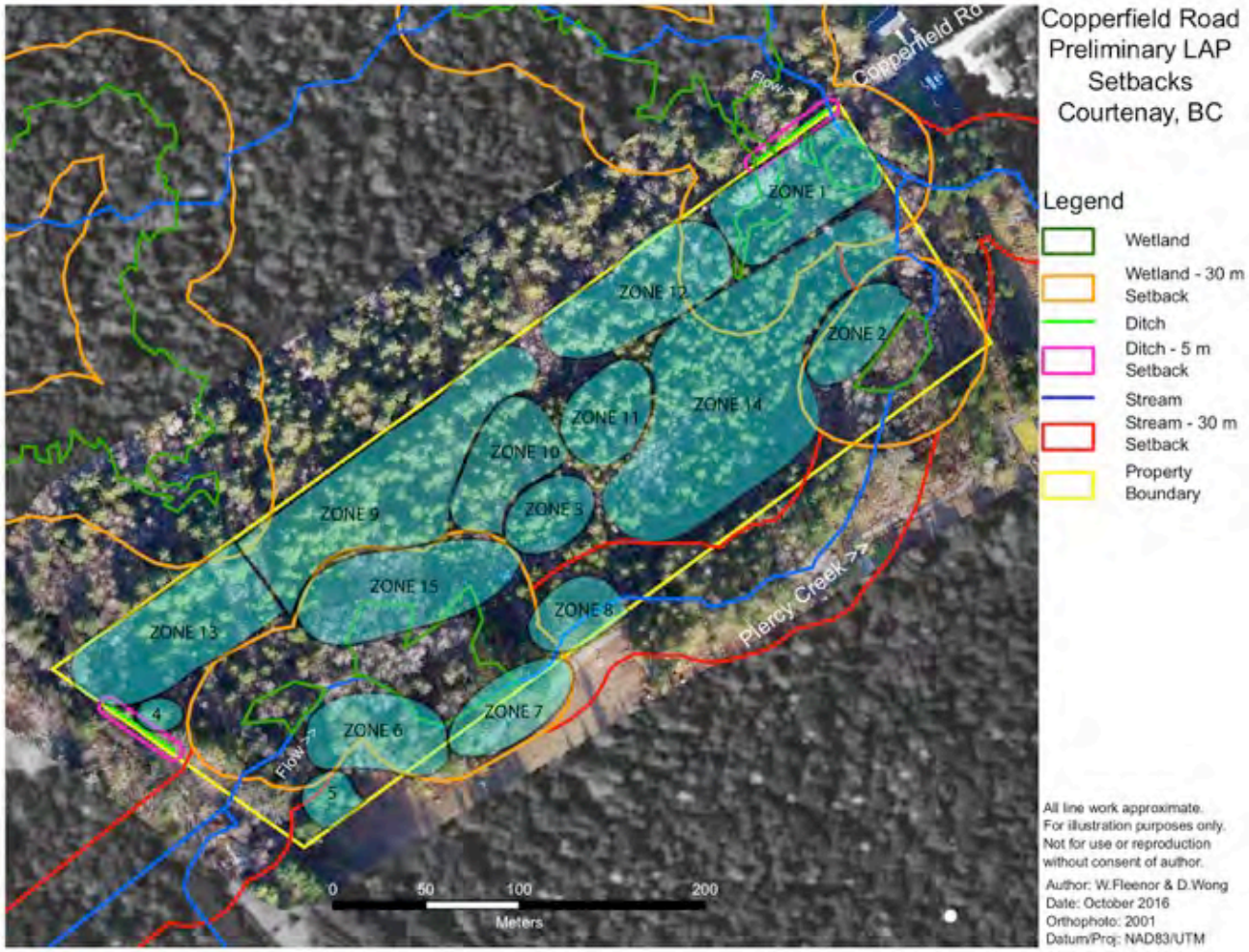
**Recommendations:**

Once a final lot plan has been established and surveyed a second, more detailed arborist report should be requested. This report, with the aid of specific lot plans would highlight potential conflicts and outline tree protection measures to be implemented during clearing and development. Any specific measures such as pruning to assist in the long term health and stability of retained trees would also be recommended at this time.

Appendix A: Lot A, Preliminary LAP setbacks by Current Environmental Ltd. with updated forest cover layer.



Appendix B: Lot A, Preliminary LAP setbacks by Current Environmental Ltd. with updated forest cover layer and tree stand zones.



Appendix C: Lot A, Preliminary LAP setbacks by Current Environmental Ltd. with individually surveyed and described trees.