District Lot 14 Baseline Ecological Report

April 7th, 2025

Prepared by:
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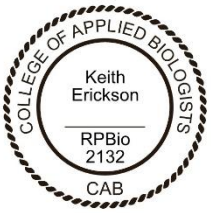

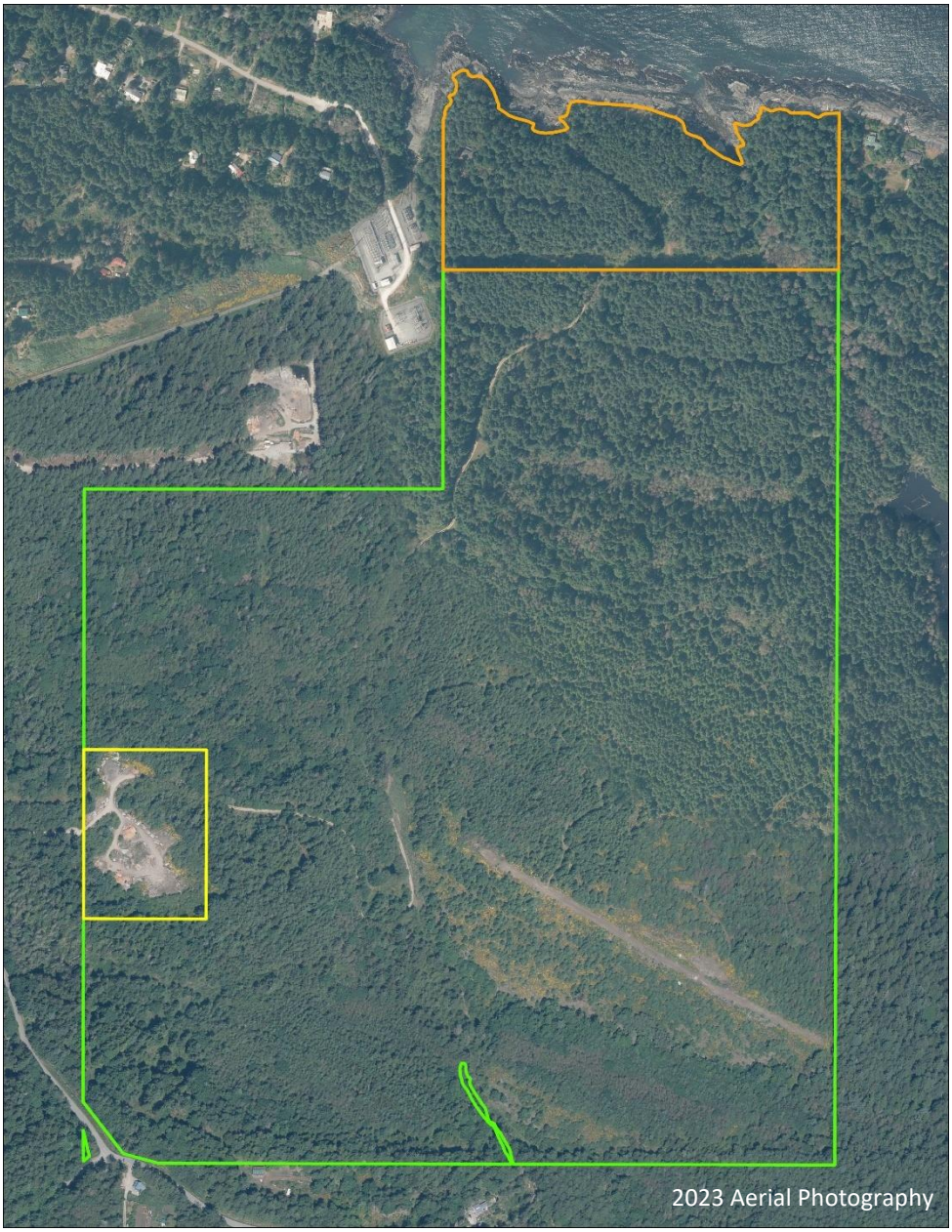

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List of Figures

Description and Location of the Property

Legal Description:

STRATA LOTS 1,2, 3, 4, 5 DISTRICT LOT 14 GALIANO ISLAND COWICHAN DISTRICT, STRATA PLAN VIS4887, TOGETHER WITH AN INTEREST IN THE COMMON PROPERTY IN PROPORTION TO THE UNIT ENTITLEMENT OF THE STRATA LOT AS SHOWN ON FORM 1

Strata Lot 1: PID 024-621-013
Strata Lot 2: PID 024-621-021
Strata Lot 3: PID 024-621-030
Strata Lot 4: PID 024-621-048
Strata Lot 5: PID 024-621-056

Property size: 85.25 hectares / 210.66 acres

Strata Lot 1 - 64m^2
Strata Lot 2 - 63m^2
Strata Lot 3 - 64m^2
Strata Lot 4 - 64m^2
Strata Lot 5 - 21m^2
Common Property – 852,224m^2

Each of the Strata Lots includes an area of Limited Common Property for its exclusive benefit as shown on Figure 1: Strata Plan with Limited Common Property below.

For the purposes of this report, the strata lots and the common property together are referred to as the “Land” or “DL14”.

DL14 is located at the south end of Galiano Island at the terminus of Haulback Road, off Galiano Way, roughly a 5km drive from Sturdies Bay Ferry Terminal (see Figure 2: Property Location Map below).

Figure 1: Strata Plan with Limited Common Property

Status: Filed Plan #: CAS2564504 App #: N/A Ctrl #: 133-780-2876 RCVD: 2012-05-29 RQST: 2025-03-24 10.56.06

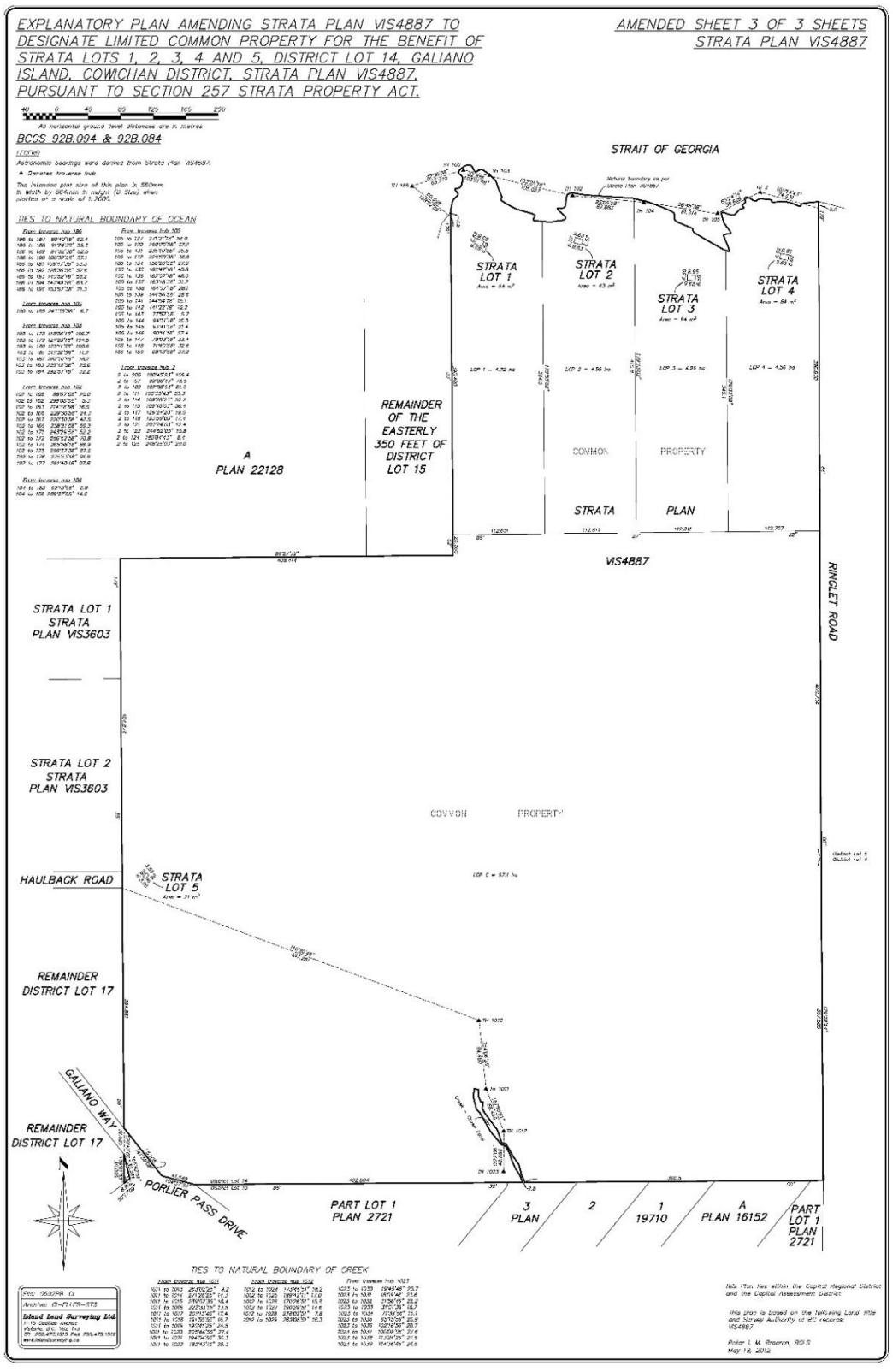
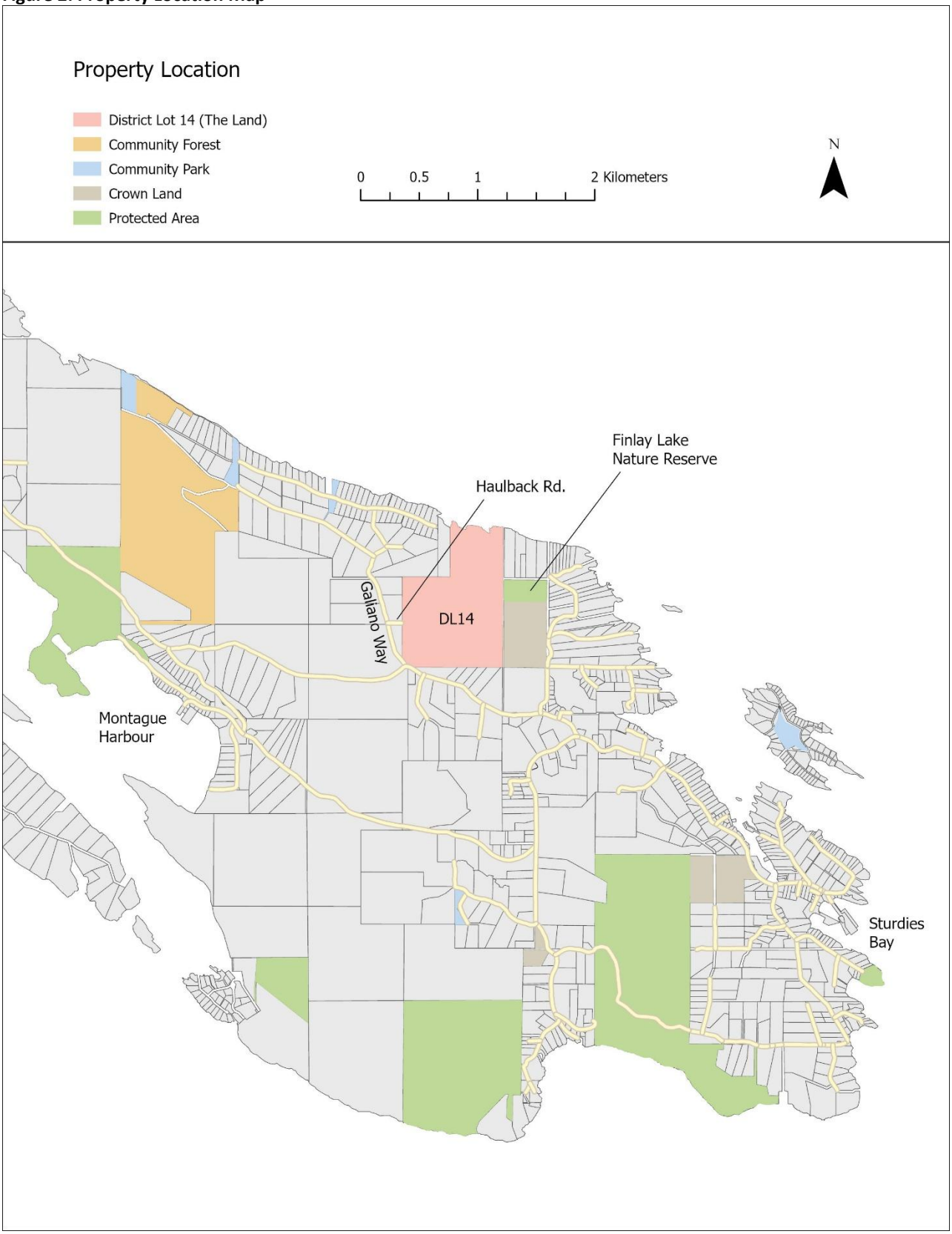


Figure 2: Property Location Map



Legal Encumbrances:

The locations of the Statutory Rights of Way are shown on Figure 3: Strata Plan with Legal Encumbrances below.

UNDERSURFACE RIGHTS
- Registration Number: D23415
- Registration Date and Time: 1975-01-27 08:10
- Registered Owner: HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA
- Remarks: INTER ALIA
- ASSIGNMENT OF 155756G (DD 215206I AND 379902I) SEE 325410G

STATUTORY RIGHT OF WAY *(Shown on Figure 3 below)*
- Registration Number: FB301700
- Registration Date and Time: 2009-09-28 11:38
- Registered Owner: BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
- Remarks: INTER ALIA

STATUTORY RIGHT OF WAY *(Shown on Figure 3 below)*
- Registration Number: FB301701
- Registration Date and Time: 2009-09-28 11:38
- Registered Owner: TELUS COMMUNICATIONS INC.
- Remarks: INTER ALIA

RENT CHARGE
- Registration Number: CA2661665
- Registration Date and Time: 2012-07-17 12:36
- Registered Owner: THE OWNERS, STRATA PLAN VIS4887

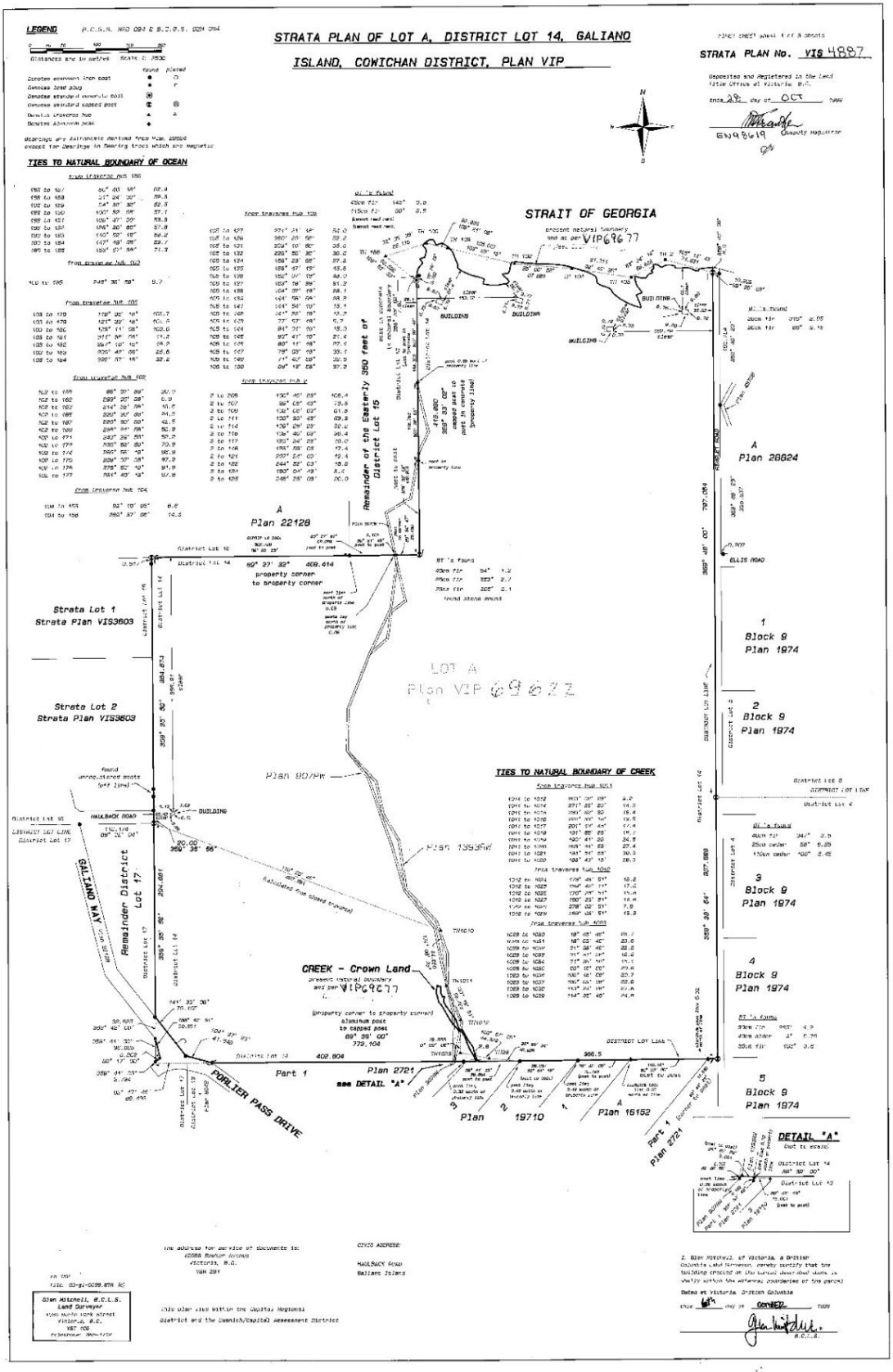
MORTGAGE
- Registration Number: CA5843101
- Registration Date and Time: 2017-02-28 11:08
- Registered Owner: VANCOUVER CITY SAVINGS CREDIT UNION INCORPORATION NO. FI 97
- Remarks: INTER ALIA

ASSIGNMENT OF RENTS
- Registration Number: CA5843102
- Registration Date and Time: 2017-02-28 11:08
- Registered Owner: VANCOUVER CITY SAVINGS CREDIT UNION INCORPORATION NO. FI 97
- Remarks: INTER ALIA

NOTE: The small area along the southern boundary of the Land that contains a portion of the creek that drains to the south is Crown Land and does not constitute part of the Land.

Figure 3: Strata Plan with Legal Encumbrances

Status: Filed Plan #: VIS4887 App #: CA2564504 Ctrl #: (Altered) RCVD: 1999-10-28 RQST: 2025-03-24 10.56.06



Land-use History

The Land is situated within the core territory of the Penelakut and shared territory of other Hul'qumi'num-speaking First Nations Peoples who hold traditional rights, responsibilities, and Indigenous rights and title in and around what is now known as Galiano Island.

The Land has likely been used and stewarded for millennia with respect to its forest and wetland resources, its seasonal freshwater creeks, and its accessible shoreline with outstanding views of the Georgia straight across to Tsawwassen and the Fraser River.

DL14 was Crown granted (along with DL12, 16, and 17) to Samuel M. Robins for the price of $1 per acre in 1889. The primary colonial use of the Land has been forestry.

The first logging by settlers is estimated to have occurred in the 1880's prior to the Crown Grant, hand falling selected trees on a portion of the Land, roughly one third of the area. Burn scars, observed on old stumps but not on 80- to 100-year-old live trees, indicate that the Land was likely burned in association with this original logging.

The remaining two thirds of the Land was logged more thoroughly by chainsaw throughout the 1940's where all merchantable timber (mature conifers) was removed, likely leaving smaller diameter and sub-canopy trees behind.

In the mid-1990's roughly 40% of the property was logged for a second time. The intensive clearcut logging was focused on the western portion of Land. This included the construction of an extensive network of roads and landings along with ditches to direct surface flow. Soils in flatter bench areas were particularly disturbed from extensive machine use. Harvesting was conducted in areas that had been logged previously both in the 1880's and 1940's. The gravel pit was established, likely to provide materials for road building, and the current forest industrial site was established as a major staging and processing area. The current BC Hydro line clearing was also established during this entry.

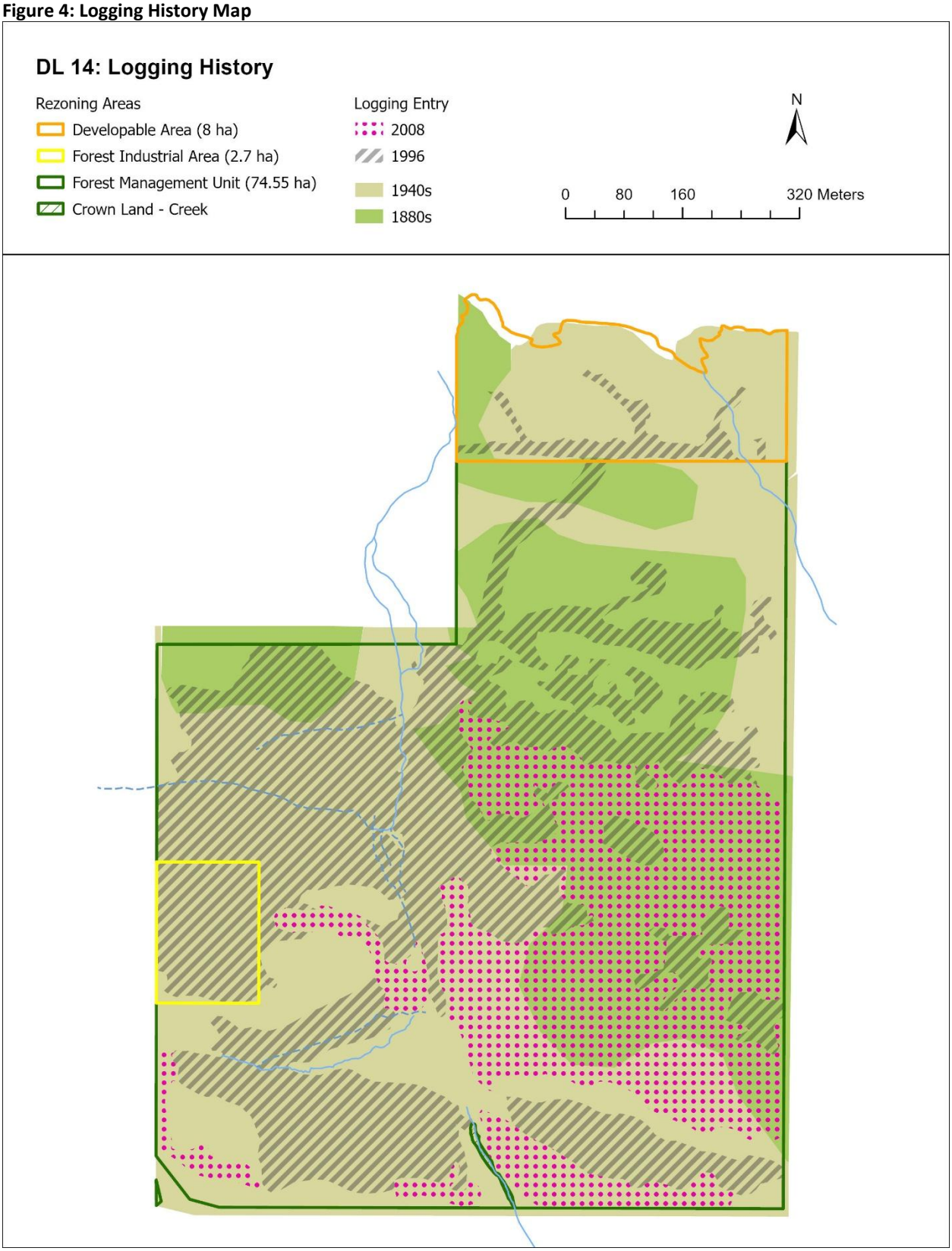
Examination of aerial photography indicates that the current garage sites and related roads and clearings were established sometime between 1998 and 2002.

The final major logging entry occurred in 2004/5 when an additional roughly 25% of the Land was intensively clearcut, again with extensive machine use resulting heavy soil disturbance. This was focused primarily on the eastern portion of the property.

An airstrip was also constructed sometime between 2005 and 2009, including extensive blasting and import of fill material.

Figure 4: Logging History Map below shows the approximate locations and extent of the various logging entries.

Figure 4: Logging History Map



Summary of landform expression and terrestrial ecological communities

Excerpts from: "DL14: Forest Cover Report**,** Andrew Simon, B.A.&Sc. *23 July 2017."*

District Lot 14 is situated on the northeast coast of Galiano Island and consists of approximately 210 acres[1]1 of predominately dry Douglas-fir (*Pseudotsuga menziesii*) forests, with an understory of salal (*Gaultheria shallon*) occurring over shallow, moderately-well to well drained soils (20–100 cm to bedrock). The exposed geology is composed of a veneer of marine sediments and moraine over sedimentary bedrock, over which lie scattered granitic erratics. Consistent with the overall landform expression in the southern Georgia Depression, the surficial sediments and underlying bedrock of the landscape tilt broadly toward the northeast coastline, undulating and giving expression to mostly gradual to moderate slopes.

The local ecology is characteristic of the regional Mediterranean-like climate. Defining the dry ecosystems of Coastal Douglas-fir Biogeoclimatic Zone (CDF), Douglas-fir and salal abound in association with western redcedar (*Thuja plicata*), grand fir (*Abies grandis*) and western hemlock (*Tsuga heterophylla*). Other drought-tolerant shrubs such as Scouler's willow (*Salix scouleriana*), pink and orange honeysuckle (*Lonicera hispidula, L. ciliosa*), oceanspray (*Holodiscus discolor*), red huckleberry (*Vaccinium parvifolium*), evergreen huckleberry (*Vaccinium ovatum*), and to a lesser extent, dull Oregon grape (*Berberis nervosa*), are major components of the forest understory. The forest floor is covered with mosses such as Oregon beaked moss (*Kindbergia oregana*) and electrified cat'stail (*Rhytidiadelphus triquetrus*) and ferns such as bracken fern (*Pteridium aquilinum*) and sword fern (*Polystichum munitum*), among various annual vascular plants[2]. These dry ecological communities are most well represented by maturing young conifer forests established to the northern extent of the property.

Toward the coastline where soils become thinner, draining quickly into the sea, open woodland environments of Douglas-fir, arbutus (*Arbutus menziesii*) and shore pine (*Pinus contorta*) emerge. The understory in these woodlands is composed of dry-adapted shrubs and annual herbacious communities, which form a sparse mosaic interspersed with various lichens and mosses. Small- and large-flowered blue-eyed Mary (*Collinsia* spp.), chocolate lily (*Fritillaria affinis*), broadleaf stonecrop (*Sedum spathulifolium*), reindeer lichen (*Cladina* spp.), juniper haircap moss (*Polytrichum juniperinum*) and redstem feather moss (*Pleurozium schreberi*) are typical species of the coastal zone, all increasing in frequency toward the shoreline as the forest canopy opens up and more light reaches the ground. Several lichen and moss species (*e.g. Schistidium maritimum*) are especially well adapted to the intertidal and can be found established on rocks along the shore.

[1] Note there is a discrepancy in figures provided by realty documentation and available cadastral data for the areal extent of the property. Real estate documentation states 215 acres while cadastral data estimates approximately 210 acres. The difference presumably owes to differences in surveying methods, or perhaps uncertainties in demarcating the limits of the foreshore (Crown Land). Quantitative analysis employed in compiling this report assumes the latter figure in estimating forest cover (approx. 85.296 ha).

[2] See Appendix A for a preliminary inventory of species present on the property

In moist depressions and riparian areas western redcedar becomes prominent among sword fern and salmonberry (*Rubus spectabilis*). These areas are most extensive toward the southern reaches of the property, along the modified central drainage, and along an ephemeral creek that crosses the northeastern foreshore and drains into the Georgia Strait from Finlay Lake. Throughout these ecosystems the moisture regime varies from relatively dry habitats composed mainly of western redcedar, Douglas-fir and Oregon beaked moss, to richer, more moist riparian forests composed of western redcedar, grand fir and foamflower (*Tiarella trifoliata*), and, in the wettest sites, skunk cabbage (*Lysichiton americanus*). The former, drier areas occur on gently sloping sites, having soils which are imperfectly to moderately-well drained, and grade into the latter, richer habitats, which are found at toe positions at the base of slopes and along creeks where soils tend to be deeper and richer with greater amounts of loamy silt, and silty clay loam.

Bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*) and black cottonwood (*Populus trichocarpa*) form the deciduous forest component alongside watercourses and associated riparian forest wetland complexes. Beneath a denser, more closed canopy, the vegetation communities emergent of these moist ecosystems are composed of few shade tolerant shrubs and herbs, such as sword fern, red huckleberry and dull Oregon grape, as well as enchanter's nightshade (*Circaea alpina*) and Pacific water parsley (*Oenanthe sarmentosa*), among other water-loving shrubs and herbs.

Several areas of open water, classified among sensitive riparian areas according to available land classification data, can be found in proximity to the central watercourse. These basins occur along the natural drainage yet to some extent appear to be the product of modified landscape hydology, lying adjacent to roads and skidder trails. While these wetlands do not provide important habitat for fish, they may provide ephemeral habitat for amphibians and arthropod species, before drying up in the height of summer.

Fringing the margins of the conifer plantations are shrub communities dominated by Scotch broom (*Cytisus scoparius*). Also reflecting DL14's heavily modified state: numerous skidder trails cross the property and have compacted the water table, giving rise to wet-adapted shrub and herbaceous communities which occur alongside regenerating stands of red alder. Scattered mature coniferous trees (veterans) and patch reserves can also be found across the property as structural legacies of logging.

Topography and Hydrology

The Land is located within the Coastal Douglas-fir Biogeoclimatic Zone and is generally characterized by a northeast facing gradual to moderate slope that rises out of the Georgia Strait. Within this overarching character, the topography includes a series of undulating east to west running crests and benches along with north / south running creek and wetland

depressions resulting in a diversity of aspects, meso-slopes, and microsites throughout the Land.

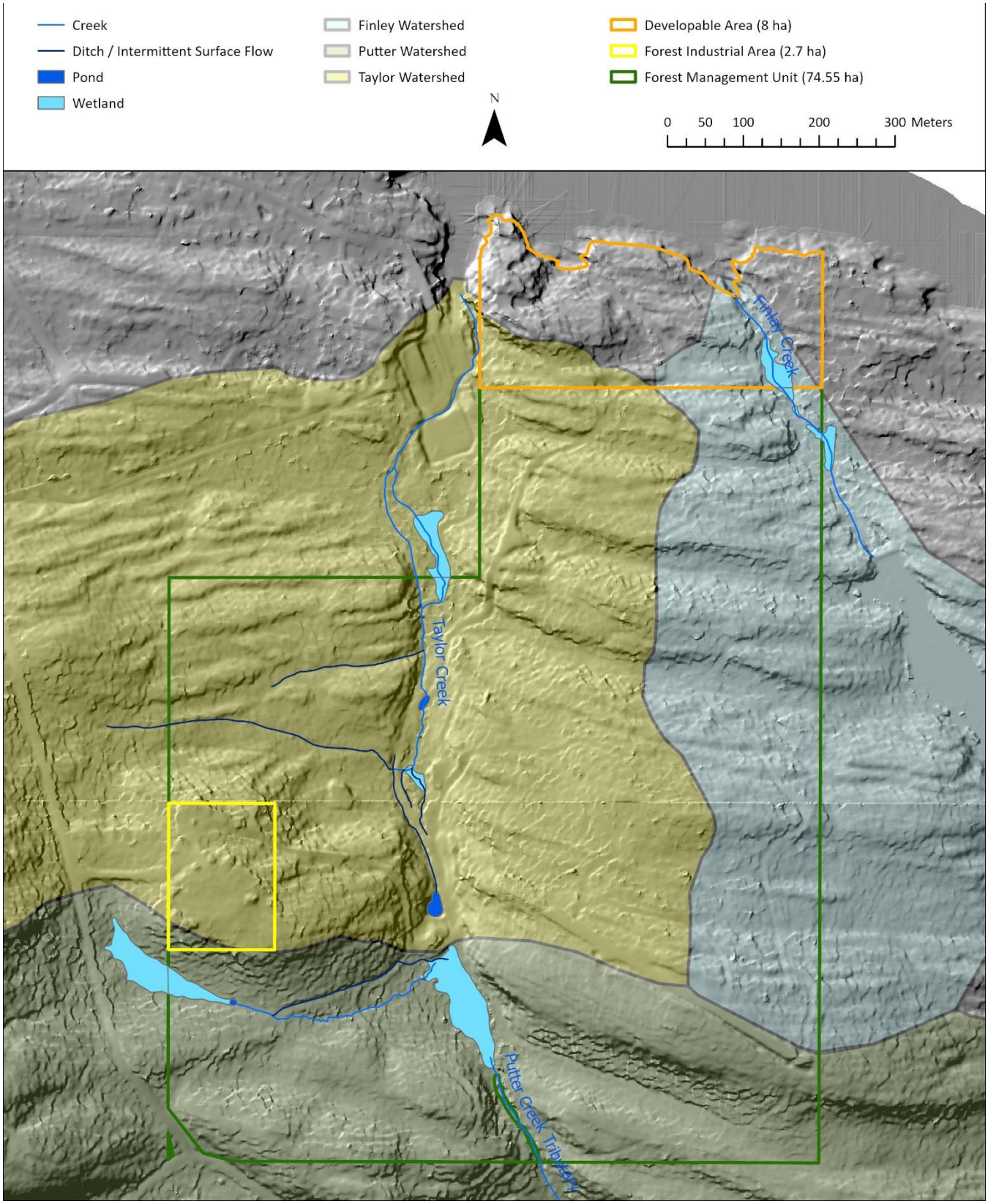
The Land rises from sea level to its highest point in the southern third of the property, reaching 99m in elevation along the southern edge of the forest industrial site and 98m along the southern edge of the old airstrip. The topography then generally transitions and begins its downward trend to the south.

The Land includes portions of three watersheds, with Taylor Creek and Finlay Creek draining to the north directly into the Georgia Straight, and a small tributary to Putter Creek that drains to the southeast through the golf course and into Whaler Bay. The creeks are seasonal, flowing over the winter and shoulder seasons but dry over the summer.

All three of the creeks have been substantially modified due to past logging, roadbuilding and related ditching. Heavy soil disturbance and compaction from skid trails and machine use has also resulted in the channelling and accumulation of surface water flow during storm events and periods of high-water table (intermittent flow).

Figure 5: Watersheds and Topography Map below includes a relief layer that illustrates the undulating nature of the land as well as the approximate watershed boundaries and related aquatic features.

Figure 5: Watersheds and Topography Map



Soils

Four primary soil types have been identified to occur on the Land (Soils of the Gulf Islands of British Columbia Vol 3 Soils of Galiano, Valdes, Thetis, Kuper and lesser islands (1989); Report No. 43, BC Soil Survey. Agriculture Canada). These are Saturna, Rock-Saturna, Rock and Brignatine soils. Generally, Brigantine soils occur on lower slopes, depression or bench areas and are moist and rich. Saturna soils are on moderate slopes and are well drained, dry to medium moisture, and poor to medium nutrients. Rock-Saturna soils are also well drained, but shallower and include larger areas of exposed bedrock. Rock is dominated by exposed sandstone cliffs and bluffs. The extent and location of these soil types are shown on Figure 6: Soils Map below.

Saturna

Saturna soils are well-drained soils that have developed on shallow deposits of channery, sandy loam to channery, loamy sand textured, colluvial and glacial drift materials over sandstone bedrock within 100 cm of the surface. Coarse fragment content varies between 20 and 50%. They are moist throughout the late fall to spring but are droughty during summer. During and shortly after wet periods, water may flow laterally through the saturated subsoil on top of sloping bedrock.

The Saturna map unit consists dominantly (82%) of the well-drained Saturna soils. The map unit includes, on average, 18% (up to 45%) of other soils and non-soil, of which sandstone bedrock exposures (Rock) are the most commonly occurring inclusions in the map unit. bedrock exposures are usually associated with the very shallow lithic Saturna soil. The soil landscape consists of shallow soils over sandstone bedrock on usually gently to very strongly sloping (6-45%) topography in subdued and hummocky terrain. In some places, the Saturna map unit occupies steeper landscape positions such as side slopes (46-100%) of rock ridges. Bedrock exposures are scattered, most commonly in association with the very shallow lithic Saturna soils (Shown as STsl on map).

Rock-Saturna

Rock-Saturna consists dominantly (56%) of sandstone bedrock exposed or covered by less than 10 cm of mineral soil. This map unit also contains subdominant proportions (42%) of well-drained soils developed on shallow (10-50 cm, in some places 10-100 cm), channery, sandy loam to channery, loamy sand textured, colluvial and glacial drift materials over sandstone bedrock (shallow Saturna soil). Soils have 20-50% coarse fragments. These areas occur dominantly on rock ridges and knolls (slopes 31-70%) and in areas with smooth, unweathered sandstone (slopes *6-30%).* Saturna soils occur on colluvial side slopes and in areas where bedrock has been fractured and weathered, commonly as pockets on top of, or in between, the ridges or knolls.

Qualicum

Qualicum soils are rapidly to moderately well-drained soils developed on deep (>150 em) deposits of gravelly sandy loam to gravelly sand textured, glaciofluvial, fluvial, or marine deposits. Coarse fragment content throughout the profile is between 20 and 50%. They are moist throughout the late fall to spring but quickly become very droughty during summer. The water table remains below 90 cm from the surface throughout the year.

The Qualicum map unit consists dominantly (86%; 50-1009) of the rapidly to moderately well-drained Qualicum soils. The map unit includes, on average, 14% (up to *501)* of other soils. These other soils may be one or a combination of the following commonly occurring minor soils: Brigantine (BE) and Saturna (ST).

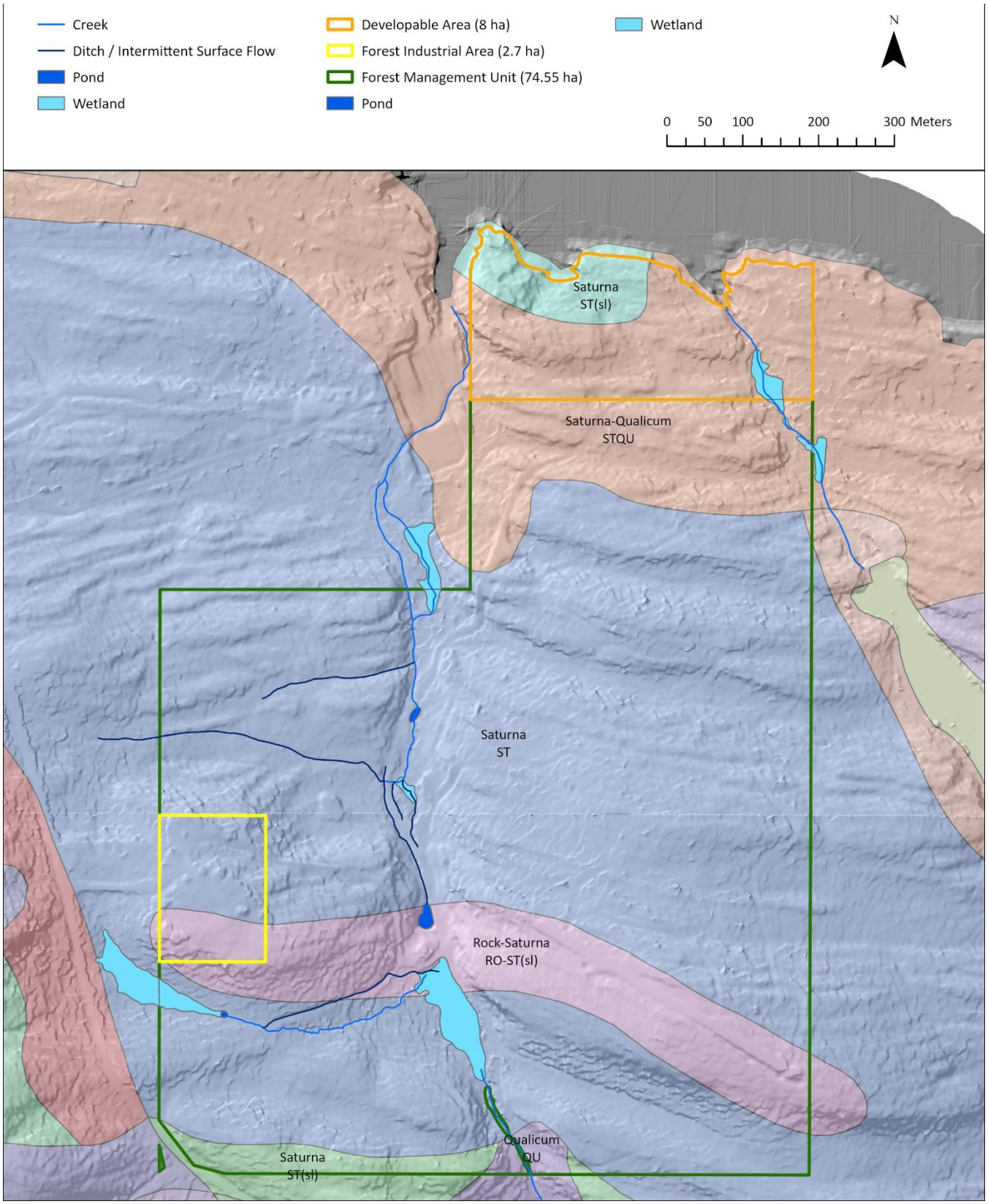
Soils of the Qualicum map unit occur as deep outwash (deltaic) and terrace deposits associated with old drainageways and as raised beach deposits on very gently to strongly sloping *(2-30%)* landscape positions. Brigantine soils occur in the lower and wetter landscape positions. Saturna Soil inclusions occur in areas that are shallow (<100 cm) to bedrock. These and other inclusions are scattered as small unmappable portions of the map unit.

Saturna – Qualicum

The Saturna-Qualicum map unit consists dominantly (57%; 45-60%) of well-drained Saturna soils. The map unit contains a subdominant proportion (33%; 25-55%) of rapidly to well-drained deep (>150 cm), sandy loam to sand textured soils developed on glaciofluvial, fluvial, or marine deposits with 20-5074 coarse fragments (Qualicum soils). In addition, bedrock exposures (Rock) are the most commonly occurring inclusions. Unmentioned inclusions of other soils occur in a few places.

The soil landscape consists *of* subdued, hummocky, and ridged terrain with moderate to extreme slopes (10-70%) and, in some places, with more gentle slopes (2-9%). The Qualicum soils occur either on side-slope positions as deep, ancient beach gravels on terraces, or in between ridges as deep outwash deposits. Qualicum soils also occur in isolated pockets between the Saturna soils. Qualicum soils occur in such an intricate way among the Saturna soils that they cannot be mapped separately as individual map units. Inclusions of bedrock exposures and other soils occur at random.

Figure 6: Soils Map



Ecological Assessment

Ground-based ecological mapping and inventory was conducted between July 3rd 2024 and February 23rd 2025. Basic mapping of sensitive ecosystems was completed in July 2024 while detailed mapping and ecological classification was completed in February 2025.

Species observations recorded by Andrew Simon in his "DL14: Forest Cover Report" completed *23 July 2017"* are included as Appendix 1: DL 14 Preliminary Species Inventory.

The Land was divided into ten broad ecological communities determined through examination of soils, vegetation, slope position, and aspect, along with site disturbance and use. Their locations are shown on Figure 7: Ecological Communities Map, which is followed by summary descriptions of each community. Locations of trails, roads, infrastructure and other features are also shown on Figure 7: Ecological Communities Map.

Limitations to the Inventory and assessment include:

1) Inventory for this report did not include any targeted species-at-risk surveys of the site.
2) Inventory for this report did not include any targeted wildlife surveys of the site.
3) Vegetation inventory of the site is not comprehensive, includes only prevalent species, and was completed at a time of year when many plants are not readily identifiable.
4) An EOS Arrow 100+ submeter GNSS receiver was used to accurately identify boundaries and other features such as trails.

Ecosystems-at-risk

There is one ecosystem-at-risk identified and mapped by the BC Conservation Data Centre (CDC) that occur on the Property (BC Conservation Data Centre iMap, accessed February 10th, 2025 - https://maps.gov.bc.ca/ess/hm/cdc/). The community is provincially red listed and is considered 'critically imperilled' in the Province.

Scientific Name	English Name	Biogeoclimatic Units	Provincial Rank	BC List	Global Rank	CDC Occur. #	Ecological Community # (where observed)
Pseudotsuga menziesii / Berberis nervosa	Douglas-fir / dull Oregon-grape	CDFmm/01	S1 (2018)	Red	G2	55731	1,2,6

Examples of mid to late seral Douglas-fir / dull Oregon-grape community occurred on small and patchy microsites within Ecological Communities 01, 02, and 06.

Species-at-risk

No targeted species-at-risk surveys were completed as part of this assessment.

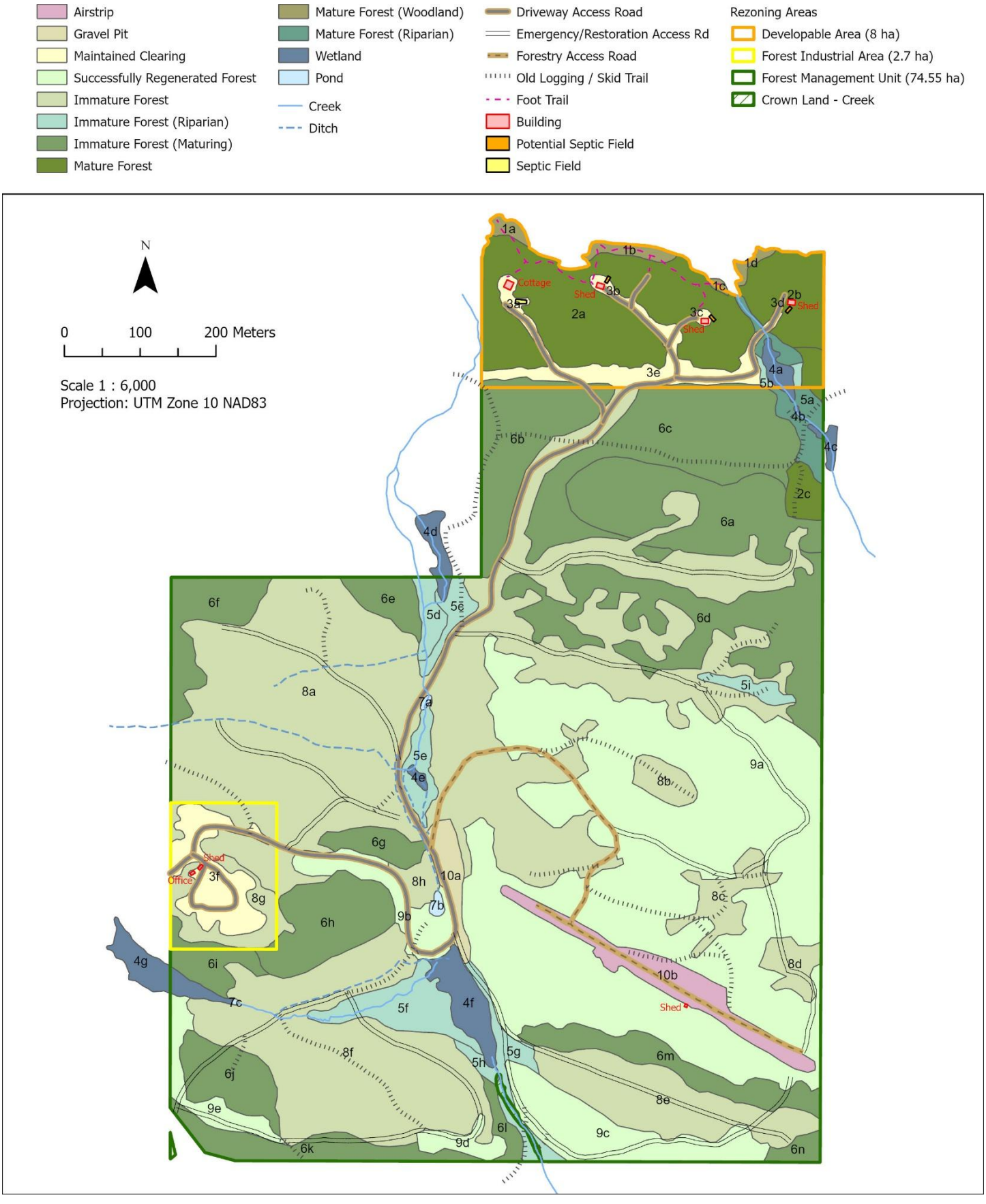
Flora and fauna found on the Land that are listed as provincially significant by the British Columbia Conservation Data Centre (BC CDC) include:

Scientific Name	English Name	Prov.	BC List	COSEWIC	SARA	Potential use of Study Area
Rana aurora	Northern Red-legged Frog	S3 (2016)	Blue	SC (2015)	1-SC (2005)	Foraging Breeding
Patagioenas fasciata	Band-tailed Pigeon	S3S4 (2015)	Blue	SC (2008)	1-SC (2011)	Foraging Breeding

Northern Red-legged Frog was not directly observed but is certain to occur on the property with suitable breeding habitat found in wetland (EC04) and pond (EC07) sites and foraging habitat throughout but most suitably in riparian forest areas (EC05) and maturing upland forest (EC02 and EC06). A conservation report concerning the management of this species at-risk can be found at the following link: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/mp_northern_red-legged_frog_e_proposed.pdf

The Band-tailed Pigeon (*Patagioenas fasciata*) is a blue listed species, considered vulnerable in British Columbia. This bird was sighted (heard) by Andrew Simon and documented in his "DL14: Forest Cover Report" completed *23 July 2017".* It was found to the western extent of DL14, in a grove of mature bigleaf maple. A conservation report concerning the management of this species at-risk can be found at the following link: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/mp_band-tailed_pigeon_e_proposed.pdf

Figure 7: Ecological Communities Map



Ecological Community 01

Ecological Community 01 is an open, moss dominated, mature woodland meadow along the shoreline with very shallow soils (<20cm) and high exposure to wind, sun, and marine spray. The community is transitional from more densely forested upland areas to the exposed sandstone bedrock shoreline. Soils are very well-drained, very dry, and medium to rich in nutrients.

Tree cover is relatively sparse but includes old Douglas-fir (*Pseudotsuga menziesii*), arbutus (*Arbutus menziesii*), and shore pine (*Pinus contorta*). The community includes robust moss communities consisting of stair step moss (*Hylocomnium splendens*), broom moss (*Dicranum scoparium*), and electrified cattail moss (*Rhytidiadelphus triquetrus*), along with patches of grey rock moss (*Racomitrium canescens*) and reindeer lichen (C*ladonia portentosa*). Shrub cover includes Scotch broom (*Cytisus scoparius*), dull-Oregon grape (*Mahonia nervosa*) along with salal (*Gaultheria shallon*) and evergreen huckleberry (*Vaccinium ovatum*) along the upland forest edge. This community also includes a variety of wildflowers including small- and large-flowered blue-eyed Mary (*Collinsia* spp.), chocolate lily (*Fritillaria affinis*), and broadleaf stonecrop (*Sedum spathulifolium*).

The occasional stump was observed, indicating selective logging of the tallest and straightest Douglas-fir, leaving behind most of the more gnarled or broken topped individuals. The remaining old trees are prime perching habitat for raptors. This, combined with a diverse understory of shrubs, herbs, and mosses, make this marine riparian woodland highly valued wildlife habitat.

EC01 is high priority for removal of invasive vegetation, primarily Scotch broom, with a focus on protecting the fragile herb and moss communities.

Photo 1: Shows EC01d

Ecological Community 02

Ecological Community 02 is characterized by a mature (90 – 100 years old) Douglas-fir dominated (CDFmm/01) forest with western redcedar (*Thuja plicata*) in the sub-canopy and scattered arbutus, grand fir (*Abies grandis*) and big-leaf maple (*Acer macrophyllum*) throughout. As the community approaches the shoreline (within about a 100m or so), shore pine (*Pinus contorta*) is found scattered in the main canopy and sub-canopy. The occasional remnant old-growth Douglas-fir tree was observed. EC02a/b also include swaths of 70-80 year trees in the main canopy where logging appears to have occurred more recently.

EC02 is characterized generally by a north /northeast facing gentle to moderate slope (10-25%) that includes a series of undulating, bedrock swales running east / west. This microtopography results in a range of soil conditions (dryer, shallower on crests to moister, deeper in valleys) and subsequent expression of vegetation. Soils also generally become shallower as the community approaches the shoreline becoming transitional to the more open woodland/meadow of EC01. Some of the shallow, well drained crests and shoreline slopes become more characteristic of a CDFmm/02 Douglas-fir – Arbutus ecosystem with higher moss cover and less shrub cover.

This community was logged in the early 20th century with many of the stumps and remnant old veteran trees exhibiting fire scars from the subsequent slash burning.

The understory of EC02a/b is dominated by salal with a large component of oceanspray (*Holodiscus discolor*). The moss cover is robust comprised mostly of Oregon-beaked moss (*Eurhynchium oreganum)* and stair-step moss with patches of electrified cattail moss.

Patches of the red listed Douglas-fir – dull Oregon-grape (*Berberis nervosa*) ecological community were observed near the shoreline in EC02a/b.

EC02c is a slightly moister northeast facing moderate slope that includes patches where western redcedar forms the dominant canopy and is characterized by robust Oregon-beaked moss (*Eurhynchium oreganum)* cover with patches of salal (*Gaultheria shallon*) and sword fern (*Polystichum munitum*) throughout. Sword fern cover increases towards the bottom of the slope where the community transitions to the moister, richer riparian forest in EC5a.

Photo 2: Shows EC02b with shrub dominated micro-valley in foreground and moss dominated micro-crest in mid-ground.

Photo 3: Shows EC02c. Note old Douglas-fir stump with spring board notch and burn scars (mid-right)

Ecological Community 03

Ecological Community 03 is characterized by areas that have been cleared and are maintained for infrastructure. These areas include:

EC03a is the residential site that includes a cottage, a small shed, a septic field and modest landscaped (grass and shrub) area.

Photo 4: Shows EC03a

EC03b/c/d are cleared sites that include a storage shed and a surrounding cleared area with compacted soils with limited growth of vegetation. Natural tree and shrub (mainly Douglas-fir and salal) regeneration is occurring along the edges of the clearings.

Photo 5: Series shows EC03b/c/d from left to right.

EC03e is the hydro power line clearing. A roughly 15 to 20m east west swath of trees were cut and removed. Soils were disturbed by machinery to establish hydro poles and to construct roads and turnarounds. The site is now characterized by a robust shrub layer that includes regenerating sapling Douglas-fir, western redcedar, grand fir, western hemlock and red alder trees, along with an invasive grass dominated herbaceous layer. Scotch broom is the dominant shrub mixed with patches of salal and sword fern. Areas where soils are not heavily disturbed will transition back to forest unless the clearing is maintained.

Photo 6: Shows hydro line clearing and tree and shrub regeneration.

EC03f is the active forest industrial site including landing areas, wood and wood waste storage areas, a small office, a storage container, a water tank, and a mill site. Soils are compacted, and vegetation is limited to the edges of the polygon as it transitions to surrounding forest areas. Scotch broom and invasive grass are the dominant vegetation cover along the margins.

Photo 7: Shows EC03f forest industrial site

Ecological Community 04

Ecological Community 04 is characterized by a patchwork of 40- to 65-year-old wet CDFmm/13 and CDFmm/14 forest with a strongly fluctuating water table and Ws53 swamp wetland.

Soils in the forested areas are flooded in the winter and saturated for a good portion of the summer. These areas are dominated by a mix of western redcedar and red alder (*Alnus rubra*) with salmonberry (*Rubus spectabilis*) and salal providing the dominant understorey cover along with scattered patches of and slough sedge (*carex obnupta*). Salal is generally growing on woody debris and raised microsites where there is no winter flooding.

Small swamp wetland patches are scattered throughout where soil moisture fluctuates less through the summer. These areas show characteristics of Ws53 sites and include Scouler's willow (*Salix scouleriana*), skunk cabbage (*Lysichiton americanus*), and slough sedge in micro depressions with western redcedar and sword fern on raised sites scattered throughout.

EC04 sites have all been impacted by past logging and road building directly through tree removal and soil compaction and indirectly through alterations to hydrology in surrounding uplands. Logging and road building occurring since the late 1990's has likely resulted in more extreme seasonal variation in moisture with flashier and more intense flooding occurring during winter and drier soils in summer. These logging impacts have been further exacerbated by climate change.

Despite impacts from logging and climate change, these sites have not been drained for agriculture and should continue to recover and stabilize as surrounding upland forest re-establishes. Reestablishing a more natural hydrological regime through the removal of unused roads and by decreasing the concentration of surface water flow through ditching (create more swales and water crossing points over roads that cut across slopes) will also contribute to stabilization.

Wildlife habitat values in EC04 are very high with year-round surface water, a multi-storied, mixed age, mixed species (conifer and broadleaf) tree canopy, a robust shrub layer, abundant coarse woody debris, and scattered large diameter snags.

This community will shift towards western redcedar dominance but will retain broadleaf and shrub dominated patches over the next century.

EC04a,b,c,d,e and f are representative of EC04 generally.

Photo 8: Shows EC04a western redcedar – slough sedge swamp fringed by red alder – salmonberry.

Photo 9: Shows EC04f swamp with Sitka willow, Scouler's willow, red alder and salmonberry in background along with salal growing on large woody debris and cedar on fringes in foreground.

EC04g

EC04g is part of a larger more open red alder / western redcedar swamp wetland that was heavily impacted during logging. The main body of the wetland (mostly on adjacent lot) has a

more consistent hydroperiod with most of the area characterised by swamp (Ws53 and Ws52) transitioning to wet forest with fluctuating water table along its edges. The portion of this wetland on the Land was logged in the late 1990's with skidder and machine use throughout resulting in compaction and disturbance to the wet soils. The outflow end of the wetland was used as part of forestry landing site that extends into EC08f and also includes a small dug pond (EC07c). This seasonally flooded area is heavily compacted, dominated by invasive grasses with scattered sword fern on raised hummocks, and a fringe of Scotch broom and blackberry where it transitions to drier soils.

Photo 10: Shows EC04g compacted soils with standing water in ruts (from logging) and micro depressions.

Ecological Community 05

Ecological Community 05 is a moisture receiving riparian forest on the lower slope and toe slope that transitions to wetlands (EC04) and seasonal creeks. The forest canopy is relatively low in density, multi-storied, and diverse. It is comprised of a mix of western redcedar, Douglas-fir, grand fir, bigleaf maple, and red alder with the odd bitter cherry (*Prunus emarginata*), Scouler's willow, and western hemlock (*Tsuga herterophylla*) scattered in the sub-canopy.

Soils are transitional from medium in moisture and nutrients (CDFmm/01) on the mid-slope edges to moist and rich (CDFmm/06) at the toe. Understorey is dominated by sword fern with patches of salal. The community also includes micro depressions in the toe slope along the edges of braided creek channels and feathering into wetlands where the water table fluctuates strongly and winter flooding is observed. Salmonberry and slough sedge are more prevalent in these areas with salal and sword fern occurring on raised areas and woody debris.

These riparian ecosystems are high value habitats due to their proximity to wetlands and creeks, their diversity in forest structure and composition.

EC05a

Mature forest stand (80 – 100 yrs old) with multi-storied, low-density canopy, large diameter trees and robust understory dominated by sword fern. Western redcedar is most prevalent followed by a relatively even mix of Douglas-fir, big-leaf maple, red alder and grand fir.

Photo 11: Shows EC05a

EC05b

An extension of the hydro line corridor (EC03e) but allowed to regenerate. It is now characterized by a young (26-year-old) red alder dominated riparian forest with western redcedar scattered throughout in the sub-canopy and emerging as dominant trees. Very similar to EC05c described below.

EC05c

Characterized by a young (26-year-old) red alder dominated riparian forest with western redcedar scattered throughout in the sub-canopy and emerging as dominant trees. Big-leaf maple are also scattered along with Douglas-fir poles and saplings below the red alder. The understory includes patches of salal, sword fern, and salmonberry. Slough sedge is also present in micro depressions where the water table is higher and more strongly fluctuating. Western redcedar will grow up into the dominant canopy over the next century. Moister soils are likely compacted from extensive skidding and machine use during logging leaving a more disturbed feel to the area.

Photo 12: Shows EC05c

EC05d

Characterized by 60- to 70-year-old mixed western redcedar, Douglas-fir, big-leaf maple forest with patches of red alder and scattered grand fir. Located at the toe of a steep northwest slope and includes a braided creek channel and associated micro-depressions sites with higher and strongly fluctuating water table. Understorey is dominated by sword fern with salmonberry and slough sedge.

Photo 13: Shows EC05d with seasonal braided channel running right to left in foreground.

EC05e

Characterized by a mix of young red alder (26-year-old) with older western red cedar and big-leaf maple. The canopy is denser, there is less diversity, the understorey is sparser, less woody debris and generally more disturbed from logging than in EC05a/d/f.

Photo 14: Shows EC05e

EC05f

Characterized by a 50- to 60-year-old mixed conifer / broadleaf stand with a northeast facing 10 to 20% slope that includes the creek draining wetland EC04g above. Sword fern is dominant in the understorey with salmonberry emerging along the creek edges and towards the toe of the slope where the water table is higher and fluctuates more strongly. This area also includes 26-year-old red alder dominated patches that feather in from its boundaries with EC08f.

Photo 15: Shows EC05f with red alder patch transitioning to EC08f on top right.

EC05g

Similar to EC05f but is more linear and with more significant impacts from recent logging (26 and 16 years ago) and related road building along its upland edge. This includes tree removal, interruption of the hydrology by the road, soil compaction, side cast of road material, and increased cover of invasive species (Himalayan blackberry (*Rubus discolor*), English ivy (*Helix hedera*), and Scotch broom). Removal and restoration of the roadbed should be considered generally and is recommended for the portion after the first junction north of EC09c (shown in photo below).

Photo 16: Shows the roadbed, looking south, along the upland edge of EC05i where restoration is recommended.

EC05h

Characterized by a red alder dominated stand with a variety of conifer species growing up in the sub-canopy. It was logged approximately 26 years ago with relatively high disturbance to soils.

EC05i

Characterized by a red alder dominated 26-year-old stand with western redcedar and douglas-fir similar in character to EC05b/c. The stand is located in a slight east west running depression/swale that was used to stage and skid logs resulting in a matrix of compacted and more poorly drained soils. Western redcedar will become the dominant canopy.

Photo 17: Shows EC05i

Ecological Community 06

Ecological Community 06 is characterized by maturing 60- to 70-year-old forest with a multi-storied, mixed species structure. Trees generally range from 40 to 80 years old with main canopy Douglas-firs coming in between 60 and 70 years. Soils are generally medium to rich in nutrients with a subxeric to mesic moisture regime and support CDFmm/01 community dominated by Douglas-fir and sword fern with a healthy component of western redcedar, scattered grand fir, and big-leaf maple along with patchy salal and scattered evergreen huckleberry (*Vaccinium ovatum*).

This community is mostly on moderate (15-25%) northeast facing slopes but includes undulating terrain and variation with steeper areas reaching 40%, some areas with south facing slopes, and slope position ranging from mid to crest. Soil depth is also varied with shallow areas found on crests and bedrock benches being generally dryer and poor in nutrients supporting a higher density of Douglas-fir and with salal as the dominant understory cover. Deeper areas on mid slopes have a richer, moister soil profile, transitioning to CDFmm/04 communities in some areas with a higher density of western redcedar, grand fir, and big-leaf maple and more robust sword fern cover.

EC06 appears to have been logged in the late 1940's and has since naturally regenerated to its present state. The patchy, amoeba like stands are scattered throughout the Land and are influenced by the surrounding matrix of more recently logged areas in EC08 and EC09. Impacts

include altered light conditions, disturbed soils from machine use during logging, and increased cover of invasive introduced species (Scotch broom, Himalayan blackberry) along the edges.

Relative to the rest of the forest ecosystems on the Land, EC06 stands offer good wildlife habitat. They have a mix of conifer and broadleaf trees and include significant structural diversity with maturing, large diameter dominant trees, a multi-layered canopy, scattered large diameter snags and a growing volume of large woody debris of various decay classes on the forest floor.

EC06a

Characterized by relatively shallow, well drained and coarse soils (CDFmm/01s), with Douglas-fir dominated canopy and western redcedar and western hemlock saplings and poles scattered in the sub-canopy. Stair-step moss is the dominant ground cover along with a robust shrub layer comprised mainly of salal and evergreen huckleberry.

Photo 18: Shows EC06a

EC06b / EC06c / EC06d / EC06j

Representative of EC06 generally. Douglas-fir are dominant with scattered western redcedar patches and individuals, and with grand fir and big-leaf maple mixed in. Understorey is a mix of sword fern, salal, Oregon-beaked moss and scattered evergreen huckleberry. These are generally richer CDFmm/01 communities. ECO6d and EC06j have more edge and less interior area and are more significantly impacted by recent logging activities.

Photo 19: Shows EC06b looking west into a deeper soiled and richer mid-slope area.

Photo 20: Shows EC06d along the top of an east / west running crest with western redcedar prevalent in the main canopy after logging of previously dominant Douglas-firs.

EC06e / EC06l / EC06g

Characterized by steeper more east facing slopes from the crest down to the lower sections where they transition to wetter EC05 and related creek and wetland features. These sites are

Douglas-fir dominated with patchy salal and sword fern on the crest and upper slope (CDFmm/01), becoming slightly richer and moister towards the bottom of the slope where they have a well spaced, mixed species canopy comprised of Douglas-fir, grand-fir, big-leaf maple and western redcedar along with abundant sword fern (CDFmm/04).

Photo 21: Shows EC06e with creek channel seen on left running roughly from south (top) to north (bottom).

EC06f

Slightly older stand with a mature forest feel on a northwest aspect. Mixed Douglas-fir / western redcedar canopy and patchy salal dominated understorey. Includes a minor component of arbutus along with a couple of old veteran Douglas-fir trees scattered.

Photo 22: Shows EC06f

EC06h / EC06m

EC06h is a swath of forest wrapping around the Forest Industrial site with variable aspect ranging from southeast to east. It includes a knoll that is exposed to high winter winds (southeasters) and has significant windthrow from storms in recent years. Both sites include areas with dry, shallow soiled, south facing, crest and upper slope, dominated by Douglas-fir with scattered arbutus and the odd western redcedar in the sub-canopy. These portions are relatively dry and nutrient poor, approaching a CDFmm/02 Douglas-fir – arbutus community.

Photo 23: Shows windthrow in EC06h.

Photo 24: Shows shallow soiled crest of EC06m with scattered arbutus and exposed, moss-covered rock.

EC06i / EC06k / EC06n

Characterized by south facing slopes and slightly richer soils but otherwise generally characteristic of EC06 generally.

Photo 25: Shows south facing EC06k with Porlier Pass Road peaking through the trees on the left.

Ecological Community 07

Ecological Community 07 is characterized by human dug ponds. The ponds were dug at the time of road building associated with logging 15 to 30 years ago. The ponds are located along roadways and were likely created to provide access to water for fire suppression. These ponds should be maintained to help retain water on the site and to continue to function as a source of water for fire fighting. All the ponds retain water year-round though the levels include significant seasonal fluctuation. Excavated mineral soil material appears to have been wasted as berms around the ponds resulting in disturbed, compacted soils with generally poor growing conditions.

EC07a

This pond was dug along the creek channel and directly receives surface water flow. The upstream edge was less disturbed with no berm and has a more natural vegetation growth with a mix of western redcedar, red alder, salmonberry and sword fern.

Photo 26: Shows EC07a with Access Driveway on the left.

EC07b

This is the largest pond on the property and includes robust growth of red alder along its fringes just above the high water mark transition to invasive grasses in the surrounding disturbed soils. There is a small, dilapidated, floating dock in this pond.

Photo 27: Shows EC07b with Access Driveway and gravel pit (EC10a) on the right.

EC07c

This pond was dug at the outflow of a large wetland (EC04g) where soils have been severely compacted from past logging activity. Excavated material was not bermed around its perimeter but the soils were heavily compacted and are dominated by invasive grasses.

Photo 28: Shows EC07c with incflow from the bottom right and outflow towards the top over grass dominated, compacted soils.

Ecological Community 08

Ecological Community 08 is characterized by a young, 26-year-old CDFmm/01 forest over undulating, generally northeast facing terrain with moderate to gentle slopes. The majority of the community is split between relatively drier, well-drained sites on 20 to 40% grade mid-slopes that are dominated by Douglas-fir along with relatively moister, slightly richer sites on 5 to 20% grade lower slopes and benches that are dominated by red alder. The undulating terrain results in a wide variation of aspect, gradient, and micro slope positions with shallow soiled crests and steeper (40%) southeast and east facing slopes also represented, resulting in slightly dryer and slightly warmer variations, respectively, of the CDFmm/01 site series. An occasional remnant 60 to 100-year-old Douglas-fir, big-leaf maple, or western cedar are also scattered throughout.

On the mid-slope, soils are generally shallow with exposed cobbles, boulders, and occasionally bedrock throughout. They are medium in nutrients and well drained with a high coarse fragment content. Towards the bottom of the slopes and on benches, soils remain relatively shallow and coarse, but moisture increases and nutrients push towards a richer regime, on the cusp of a CDFmm/04 site series. Soils in the flatter bench sites appear to have been subject to

higher levels of compaction and disturbance from machine use during the most recent logging than those on surrounding slopes.

On the mid-slopes, Douglas-fir is dominant with big-leaf maple, red alder, Scouler's willow, and bitter cherry persisting in the sub-canopy and western redcedar of various sizes scattered throughout. Self-thinning is just beginning with the smallest diameter Douglas-fir stems starting to be shaded out and the main canopy beginning to close in on broadleaf trees in the sub-canopy. The understorey is dominated by Oregon-beaked moss along with scattered, patchy sword fern and the occasional salal patch. Patches of stair-step moss and the occasional dull-Oregon grape (*Berberis nervosa*) are present on upper slopes and in areas where soils are very shallow indicating slightly drier and poorer soils. These areas will continue through the stem exclusion stage over the next several decades with a dense Douglas-fir canopy and relatively low canopy and understorey diversity.

On the lower slopes and benches, sword fern cover increases and tree cover transitions to red alder dominance with patches of big-leaf maple in the main canopy and grand fir, Douglas-fir, and western redcedar poles and saplings growing up in the sub-canopy. There are areas where soil compaction from skid trails has disrupted the flow of moisture through the soils and with ephemeral surface flow emerging and being directed along these channels. Occasional small patches of EC05 riparian community with slough sedge and salmonberry are present along the surface flow channels but are too small to differentiate from the larger EC08 unit. These benches will transition to a Douglas-fir – western redcedar dominated canopy over the next several decades to century with a healthy component of big-leaf maple. Red alder will slowly be overshadowed by the emerging conifers.

Also scattered throughout are very small amoeba-like patches of 50 to 60-year-old trees, commonly big-leaf maple and western redcedar, that are too small to differentiate from the EC08 unit.

Five 100m^2 plots were established in Douglas-fir dominated mid-slope sites to determine density and basal area. Live tree density ranged from 1300 stems per hectare to 2200 with an average of 1648 stems per hectare across the site. Douglas-fir over 20cm in diameter at breast height accounted for 760 stems per hectare. The basal area of the trees over 20cm in diameter averaged 39.65m^2 per hectare for the site.

Generally, in the near term, EC08 provides an excellent opportunity for forest restoration thinning treatments that will achieve multiple objectives including enhancement of ecological diversity, reduction of fire risk, while potentially also generating a product such as firewood or poles for construction. Thinning treatments are suitable in both Douglas-fir and red alder dominated areas.

EC08a / EC08e / EC08f

These stands are representative of EC08 generally.

Photo 29: Shows typical EC08a Douglas-fir dominated gentle to moderate northeast facing slope with scattered Dr and Oregon-beaked moss dominated understory with scattered sword fern.

Photo 30: Red alder dominated micro-valley with Douglas-fir growing in the sub-canopy in EC08a.

Photo 31: Shows an old landing site in EC08a with compacted soils and large debris piles. The landing is skirted by an old skid road with surface water flow (right of photo).

Photo 32: Shows red alder dominated lower slope and bench with higher cover of sword fern and more disturbed soils in EC08f.

Photo 33: Shows dense Douglas-fir on crest / upper slope site with shallow soils with exposed boulders and cobbles in EC08f.

EC08b / EC08c / EC08d

While generally representative of EC08, these amoeba-like small stands are surrounded by more recently logged areas characterised by EC09 and have strong edge effects. Light infiltration around the edges has enabled mixed stands with greater depth of live canopies on conifers and more robust shrub, herbaceous, and moss growth.

Photo 34: Shows the edge effects that characterize EC08d, taken from the adjacent road.

EC08g

This unit is located around the edge of the forest industrial site and is heavily influenced by related disturbance. It includes soil berms and patches of younger more recently cut (EC09) feathered throughout. It includes areas that were cleared, scraped, and compacted, now characterized by slow growing red alder dominated patches with invasive grass understorey. Sword fern and Oregon-beaked moss are more prevalent on the top soil berms.

EC08h

This is a high density mixed stand of Douglas-fir, red alder, and big-leaf maple on a moderate (30%) east facing slope spanning from crest to toe. Soils are shallow with lots of exposed, moss-covered boulders and cobbles.

Ecological Community 09

Ecological Community 09 is a naturally regenerating pole-sapling CDFmm/01 Douglas-fir salal forest growing on an undulating, generally northeast facing, gentle to moderate slope. The stand is characterized by patchy salal and Scotch broom dominated gaps within a matrix of dense 16-year-old Douglas-fir dominated regenerating forest. Western redcedar, grand fir, and western hemlock poles and saplings are also common throughout.

Salal and Oregon-beaked moss provide the dominant understory cover with scattered sword fern and evergreen huckleberry.

Soils are generally shallow, well drained, with a high coarse fragment content and are medium in both moisture and nutrients. Very thin soils less than 30cm in depth are found on micro crests and upper slopes throughout the undulating terrain. Scattered arbutus are found on these drier, poorer sites.

The occasional amoeba like patch of older 26-year-old trees (EC08) is found feathered into the stand but is too small to map.

The density of regenerating trees is highly variable ranging from 5000+ stems per hectare in dog hair patches down to 1500 in more reasonably spaced areas and as few as 100 or 200 per hectare in shrubby gaps. On average, this stand will be patchy but dense as it progresses towards a young forest in the stem exclusion stage. Scotch broom and native shrub cover in gaps will likely subside naturally as surrounding trees continue to grow and shade these areas out. As with EC08, ecological diversity will diminish, habitat values will be lost, and fire risk will increase. Forest restoration thinning treatments will likely be of benefit to this stand in the next 10 to 20 years.

Small landings, skid roads, and more substantial roads were constructed throughout this stand resulting in significant area with compacted and scraped soils along with associated topsoil berms.

EC09a / EC09c

These stands are representative of EC09.

Photo 35: Shows salal dominated gap surrounded by dense Douglas-fir poles in EC09a.

EC09b / EC09d / EC09e

These stands are small islands within the matrix of EC08 and are typically associated with roads, landings and heavy soil disturbance. Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus discolor*), and invasive grasses are dominant in these areas with a mix of Douglas-fir, grand fir, and western redcedar regenerating saplings and seedlings scattered in. Salal, sword fern, and Oregon-beaked moss are emerging in patches where soil is less disturbed and compacted. Red alder is also present in pockets on these sites.

Compacted areas would benefit from rough and loose restoration treatment followed by seeding and/or planting of appropriate trees species.

Photo 36: Shows EC09b with compacted soils from road and landing extending down towards pond and compacted pond spoil feathered out from its perimeter. Tree regeneration is slowly encroaching from less disturbed soils on the fringes.

Photo 37: Shows EC09e bisected by an old road with compaction and side cast materials inhibiting regeneration.

Ecological Community 10

Ecological Community 10 is characterized by sites that have been stripped of topsoil and heavily compacted with vegetation growth limited mainly to invasive grass, herb and shrub species. EC10a is an old gravel extraction site along the main access driveway and EC10b is the constructed airstrip. These sites will require significant intervention to reset them on a path towards forest regeneration. This could include rough and loose decompaction followed by seeding/planting with native tree species. If left unmanaged, Scotch broom and invasive grasses will persist as the primary cover for decades at a minimum, until the surrounding forest slowly begins to encroach with lateral roots penetrating from the edges and leaf litter and deadfall building soil.

Photo 38: Shows EC10a, the gravel extraction site, to the right of the road.

Photo 39: Shows EC10b, the old air strip looking east from the western end.

Surrounding Land Use:

Due to the relatively large size of the Land, there are a variety of adjacent land uses including a Hydro Power station to the northwest, residential uses along the adjacent shoreline, rural residential and agricultural use to the south, forestry use to the west, and nature protection areas to the east.

Most of the eastern boundary of the Land borders on Finlay Lake Nature Reserve, owned by the Galiano Conservancy Association, along with three Crown Land parcels that are currently zoned for nature protection (See Figure 2: Property Location Map for location). These protected lands include Finlay Lake along with its associated riparian areas and upland forests comprised of undeveloped young and mature and young. These areas contribute to the health of the downstream portions of Finlay Creek and associated wetlands and riparian forest located in the northeastern portion of the Land. Conversely, any conservation measures and hydrological protections implemented on the Land will contribute to the ecological health of the adjacent protected areas.

Potential Threats:

Trespass

There is an established walking route between the end of Sticks Allison Road up through the BC Hydro power station property and then along the main access driveway of the Land, branching onto an old logging road that carries through a residential property to the south out onto Porlier Pass Rd. This route has been traditionally used by locals in the Sticks Alison neighbourhood as an alternate walking route to get to Galiano's commercial areas as it cuts out significant elevation changes found along the public road.

There is also an east / west route stemming from the Hydro station that extends to a driveway servicing neighbouring lands to the east and out onto Salamanca Road. This route appears to be used regularly, likely by locals travelling by foot between neighbourhoods.

Currently there is no managed public access or trails within the adjacent Finlay Lake Nature Reserve or within adjacent Crown Lands. Despite this, there is informal hiking use of these areas by locals. Threats related to trespass stemming from these properties is limited.

Potential concerns stemming from trespass include:

- Smokers causing wildfire ignition.
- Hikers using unmanaged roads and trails could get injured or lost.
- Injury or death during active logging or forest restoration treatments.
- Vandalism or theft of equipment or timber especially in forest industrial site.

Forestry and Hydrological Impacts from Neighbouring Properties

Lands to the west are currently zoned for forestry with no formal protections or constraints. Large scale clearcut logging of these properties may impact the hydrology of the Land as they comprise the uplands for both the Taylor Creek and Putter Creek watersheds.

The BC Hydro power station adjacent to the northwest corner of the Land includes a large industrial / infrastructure portion (northern half) and a natural portion (southern half). The property includes the downstream portion and outflow of Taylor Creek, including shared wetlands and maturing forest contiguous with those found on the Land. Logging, clearing or alteration of the drainage within the natural southern portion of this property would impact the contiguous ecosystems on the Land.

Residential use of properties to the south, to the northeast, and to the northwest is reasonably well established, generally with clearings for houses, gardens, and infrastructure mixed with natural forests, wetlands, and riparian areas. Potential impacts include alteration of the hydrology of shared wetland and stream systems.

Wildfire

With large portions of the Land characterized by dense, young, closed canopy, conifer stands, the risk for conveying and increasing the intensity of wildfire is high.

Residential and industrial uses on the Land and on surrounding properties all have associated wildfire ignition risks.

Invasive Species

Invasive species are present and, in some areas, are prevalent on the Land. The most common and widespread species is Scotch broom which can be found along roads, in old landings, and in almost any opening where there is no closure of the forest canopy. Himalayan blackberry is common on rich/moist sites with heavily disturbed soils such as topsoil berms around landings and industrial sites. English holly (*Ilex aquifolium*) and daphne (*Daphne laureola*) occur occasionally as individual plants or small clusters but are not prevalent.

Introduction of additional invasive species is a potential threat to the integrity of ecosystems on the Land. The network of old logging roads and associated disturbed soils offer an ongoing vector for the spread of invasives where they cross over onto neighbouring properties. Similarly, stream systems entering Land from adjacent upstream properties are potential vectors for aquatic and wetland based invasives such as yellow flag iris (*Iris pseudacorus*).

Climate Change

There is significant threat to long-term ecological health from shifts in local climate conditions resulting from global warming. Areas of the Land where recent intensive logging, soil disturbance and alteration of hydrology have occurred (EC08 and EC09), may be more susceptible to future climate related impacts.

Potential impacts to the Land stemming from climate change could include:

- The decline of some species such as Western redcedar and grand fir, and an increased presence of other species such as shore pine and arbutus.
- The introduction of new species that are extending or shifting their ranges.
- Longer and more intense drought periods with increased frequency of wildfires, stress on vegetation growth, and shifts in ecological function. This may result in the expansion of more open woodland ecosystems like those along the shoreline, particularly in shallow soiled sites like those observed in EC02, EC06a/h/m, and on microsites within EC08 and EC09.
- Increased storm frequency and intensity leading to increased frequency and intensity of flood events, soil instability and erosion, especially where hydrology is already altered by roads, ditching and compacted soils. Expect to see more blowdown resulting from compromised soils, heavier snow loads, and more volatile wind events. Extensive erosion along some old logging roads and skid trials was already observed, most significantly along the road that crosses the outflow creek channel from wetland EC04g and pond EC07c in the southwestern portion of the property. Extensive blowdown was already observed in EC06h.
- Changes to pollinator, plant, and wildlife phenology, giving rise to high rates of mortality and shifting species assemblages that include the spread of new and existing pathogens and invasive introduced species along with shifts in predator prey relationships.
- Changes to patterns and timing of groundwater recharge.
- And other unforeseen effects.

Recommendations

Protected Stand Network

Create a protected stand network (PSN), totalling a minimum of 20% of the Land, to be permanently reserved from harvesting or other human disturbance other than for ecological restoration purposes or to maintain existing roads and infrastructure.

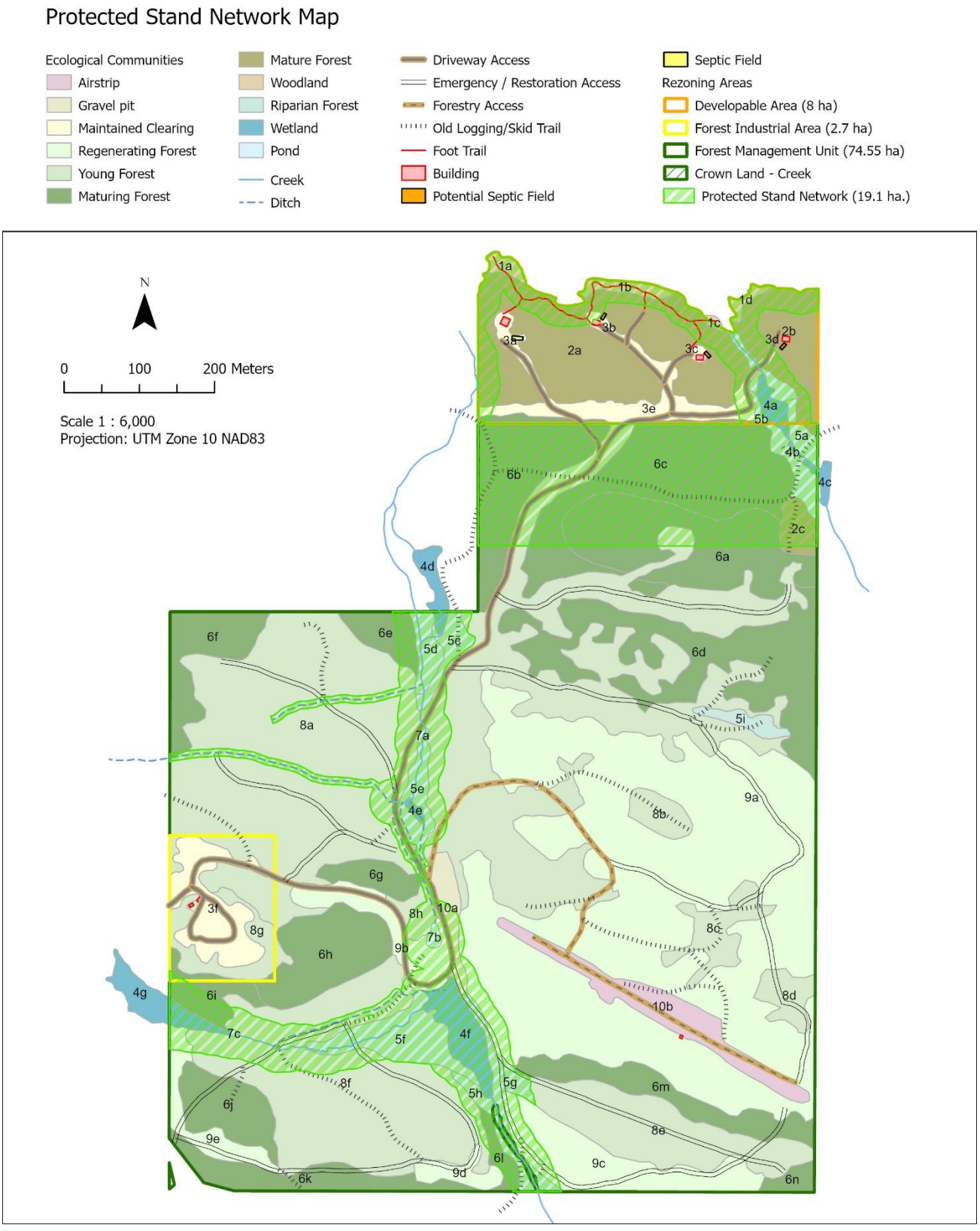
The PSN should include all areas of the Land subject to Development Permit Area (DPA) 1: Streams and Riparian, DPA 2: Shoreline and Marine, and DPA 5: Sensitive Ecosystems from the Galiano Island Official Community Plan Bylaw 108, along with representative maturing forest

areas not accounted for by DPA's. The recommended PSN along with existing roads and infrastructure is shown in Figure 8: Protected Stand Network below.

The following specific areas and criteria were used to create the recommended PSN boundaries:

- All creeks, ditches, intermittent surface water flow channels, wetlands (EC04), and ponds (EC07).
- All areas characterized by woodland ecosystems (EC01), and riparian forest (EC05).
- 30m riparian setback from all creeks, wetlands, and ponds.
- 5m riparian setback from all ditches and intermittent surface flows.
- 30m setback from the natural boundary of the sea.
- Representative areas of mature or maturing forest ecosystems (EC06 or EC02) within the Forest Management Unit.
    - A single, large area with relatively low perimeter to area ratio is preferred to small and narrow patches, both so it can be easily identified and maintained on the ground when sustainable forestry is being conducted and to reduce edge effects.
    - The area should ideally be contiguous with other identified PSN areas (riparian, wetland etc. from above)
    - The area should ideally connect with mature or maturing forest stands on adjacent properties.

Figure 8: Protected Stand Network



Ecological Restoration and Management

The ecology and hydrology of the Land has been significantly impacted by historical intensive clearcut forestry along with related road building and soil disturbance. Restoration treatments have the potential to enhance biodiversity, carbon sequestration and storage, reduce fire risk, and to generally speed up the recovery of ecological health and resilience. The scale and cost of potential treatments is high. The following treatments have been listed for guidance purposes, identifying opportunities to help heal the Land, with their full implementation likely dependent on partnerships with covenant holders or other external organizations that have access to funding for such work.

Forests and Hydrology:

- Many areas within EC08 are forming dense, single-storied canopies dominated by Douglas-fir. These areas are suited to forest restoration thinning treatments designed to increase biodiversity, reduce fire risk, and mimic natural successional processes such as stem exclusion and gap creation. Similar thinning treatments in red alder dominated patches could be designed to release selected conifer trees suppressed in the sub-canopy with a goal to develop a more diverse mixed species stand. Similar treatments as above may be applicable in EC09 as it enters the stem exclusion stage over the next 10 to 20 years.
- The outflow of surface water from wetland EC04g and pond EC07c currently splits with a portion of the flow feeding along the surface into a roadside ditch and a portion moving subsurface and feeding directly into the creek channel that flows down through EC05f. The portion feeding the roadside ditch should be blocked and redirected across the road (culvert if road is to be maintained, surface channel if road is to be abandoned) into the creek channel. Employ rough and loose decompaction treatments in the compacted landing area surrounding the outflow channel.
- Consider partnering with covenant holder to determine large scale ecological restoration treatments for EC10a and EC10b, and for the decommissioning of old logging road sections that run through or alongside wetlands and riparian areas generally, and specifically with reference to EC04f and EC05f, and EC05a. Remediation (rough and loose treatment) of compacted roadside areas and landings that are not required for future forestry work would also be of benefit, specifically in EC09b/c/d/e, but generally throughout the Land.
- Establish swales across the Driveway Access at regular intervals to facilitate the movement of surface water across the road surface and to prevent erosion of the road.
- When designing new measures or conducting maintenance for surface water control such as ditches, swales, and culverts, consider climate change predictions for precipitation and flood regimes, do not rely only on past observations.

Invasive Introduced Species

Control the spread of invasive introduced species on the Land. Species of specific concern include Scotch broom, Himalayan blackberry, Spurge laurel, and English holly.

- Prioritize removal within the PSN.
- For species like Scotch broom and Himalayan blackberry that are intolerant of shade, prioritize naturally open sites (such as EC01) and then within maintained clearings such as under Hydro lines.
- Further resources and best practices on the control of introduced species can be found on the Galiano Conservancy Association website @ https://galianoconservancy.ca/conservation/introduced-species/
- Monitor for spread of new invasive species, particularly along active and old roadways and along stream / ditches into wetlands.

Wildfire Risk and Safety:

- Ensure adequate and accessible water storage at the forest industrial site in EC03f for fire suppression purposes.
- Take measures to limit trespass including posting signage and potentially decommissioning or falling trees across old roads to create physical barriers near known entry points.
- In conjunction with forest restoration thinning (above), consider focused ground and ladder fuel reduction treatments along active roads, around the forest industrial site, and around homes, where ignition risks are highest.

General Monitoring:

- Establish a network of permanent, repeat photo monitoring sites and document every two to five years, and before/after any land management treatments in their immediate vicinity.
- Work with covenant holder to develop a simple biodiversity and hydrology monitoring program that will provide insight into how the land is changing and help develop adaptive management strategies.

Appendix 1: DL 14 Preliminary Species Inventory

From "DL14: Forest Cover Report, Andrew Simon, B.A.&Sc. *23 July 2017."*

FLORA

ALGAE & KELP		
Fucus distichus	Rockweed	—
Mazzaella cf *parksii*	Iridescent Horn-of-plenty	—
Pyropia sp.	Red Laver	—
Ulva sp.	Sea Lettuce	—
FERNS		
Athyrium filix-femina	Lady Fern	native
Polypodium glycyrrhiza	Licorice Fern	native
Polystichum munitum	Western Sword Fern	native
Pteridium aquilinum	Bracken Fern	native
FUNGI		
Amanita pantherina	Panthercap	—
Ganoderma sp.	Polypore	—
Hypocrea sp.	—	—
Pleurotus ostreatus	Oyster Mushroom	—
GRAMINOIDS		
Carex obnupta	Slough Sedge	native
Poa annua	Annual Meadow-grass	exotic
HERBS		
Achlys triphylla	Vanilla Leaf	native
Anisocarpus madioides	Woodland Madia	native
Calandrinia menziesii	Redmaids	native
Calypso bulbosa var. *occidentalis*	Western Fairy-slipper	native
Cardamine hirsuta	Hairy Bittercress	exotic

Cardamine oligosperma	Little Western Bittercress	native
Cerastium glomeratum	Sticky Mouse-ear Chickweed	exotic
Chimaphila umbellata	Prince's Pine	native
Circaea alpina	Enchanter's Nightshade	native
Cirsium vulgare	Bull Thistle	exotic
Claytonia perfoliata	Miner’s Lettuce	native
Claytonia rubra ssp. *rubra*	Redstem Springbeauty	native
Claytonia sibirica	Siberian Miner’s Lettuce	native
Collinsia grandiflora	Giant Blue-eyed Mary	native
Collinsia parviflora	Maiden Blue-eyed Mary	native
Corallorhiza maculata var. *occidentalis*	Western Spotted Coralroot	native
Digitalis purpurea	Purple Foxglove	exotic
Draba verna	Common Whitlowgrass	exotic
Fritillaria affinis	Chocolate Lily	native
Galium aparine	Cleavers	native
Geranium molle	Dove's-foot Crane's-bill	exotic
Geranium robertianum	Herb Robert	exotic
Goodyera oblongifolia	Western Rattlesnake Plantain	native
Jacobaea vulgaris	Ragwort	exotic
Leucanthemum vulgare	Ox-eye Daisy	exotic
Lysichiton americanus	Western Skunk Cabbage	native
Lysimachia latifolia	Western Star Flower	native
Mentha sp.	Mint	—
Mimulus alsinoides	Wingstem Monkeyflower	native
Montia parvifolia	Small-leaved Blinks	native
Mycelis muralis	Wall Lettuce	exotic

Nemophila parviflora var. *parviflora*	Small-flowered Nemophila	native
Osmorhiza berteroi	Mountain Sweet Cicely	native
Plectritis congesta var. *congesta*	Sea-blush	native
Prunella vulgaris var. *vulgaris*	Self-heal	exotic
Ranunculus occidentalis	Western Buttercup	native
Ranunculus uncinatus	Woodland Buttercup	native
Sanicula crassicaulis	Pacific Sanicle	native
Sedum spathulifolium	Broad-leaved Stonecrop	native
Stachys sp.	Hedgenettle	—
Stellaria media	Common Chickweed	exotic
Stellaria nitens	Shining Chickweed	native
Urtica dioica	Nettle	exotic
Veronica serpyllifolia var. *humifusa*	Bright Blue Speedwell	native
Vicia sativa	Common Vetch	exotic
LICHENS		
Cladonia portentosa ssp. *pacifica*	Reindeer Lichen	native
Cladonia rangiferina	Grey Reindeer Lichen	native
Cladonia squamosa	Dragon Horn	native
Evernia prunastri	Oakmoss	native
Fuscopannaria maritima	Seaside Shingles	native
Lecanora muralis s. lat.	Rim Lichen	native
Lepraria cf *nivalis*	Snow Dust Lichen	—
Leptogium palmatum	Antlered Jellyskin Lichen	native
Lichenomphalia umbellifera	Heath Navel	native
Parmelia saxatilis	Salted Shield Lichen	native
Peltigera membranacea	Membranous Pelt Lichen	native

Physcia caesia	Blue-gray Rosette Lichen	native
Sphaerophorus tuckermanii	Tuckerman's Coral Lichen	native
Xanthoparmelia cumberlandia s. lat.	Rock Shield	native
LIVERWORTS & MOSS		
Aulacomnium androgynum	Lover's Moss	native
Buckiella undulata	Waved Silk-moss	native
Calliergonella cuspidata	Pointed Spear-moss	native
Ceratodon purpureus	Fire Moss	native
Dicranum fuscescens	Dusky Fork-moss	native
Hylocomium splendens	Glittering Wood-moss	native
Hypnum circinale	Coiled-leaf Claw-moss	native
Isothecium stoloniferum	Cat's Tail Moss	native
Kindbergia oregana	Oregon Beaked-moss	native
Kindbergia praelonga	Common Feather-moss	native
Leucolepis acanthoneuron	Menzies' Tree Moss	native
Niphotrichum elongatum	Long Fringe-moss	native
Plagiomnium insigne	Badge Moss	native
Pleurozium schreberi	Red-stemmed Feather Moss	native
Polytrichum juniperinum	Juniper Hair-cap Moss	native
Rhizomnium glabrescens	Fan Moss	native
Rhytidiadelphus loreus	Lanky Moss	native
Rhytidiadelphus triquetrus	Big Shaggy-moss	native
Scapania bolanderi	Yellow Ladle Liverwort	native
Schistidium maritimum	Seaside Grimmia	native
SHRUBS		
Alnus rubra	Red Alder	native
Berberis aquifolium	Tall Oregon-grape	native
Berberis nervosa	Dull Oregon-grape	native

Buddleja davidii	Butterfly Bush	exotic
Cornus nuttallii	Pacific Dogwood	native
Cytisus scoparius	Common Broom	exotic*
Daphne laureola	Spurge-laurel	exotic*
Gaultheria shallon	Salal	native
Holodiscus discolor	Ocean spray	native
Ilex aquifolium	Holly	exotic*
Lonicera ciliosa	Orange Honeysuckle	native
Lonicera hispidula	Hairy Honeysuckle	native
Paxistima myrsinites	False-box	native
Prunus emarginata	Bitter Cherry	native
Ribes sanguineum	Red-flowering Currant	native
Rosa gymnocarpa	Baldhip Rose	native
Rubus armeniacus	Himalayan Blackberry	exotic
Rubus leucodermis	Blackcap Raspberry	native
Rubus spectabilis	Salmonberry	native
Rubus ursinus	Trailing blackberry	native
Salix scouleriana	Scouler's Willow	native
Sambucus racemosa	Red Elderberry	native
Spiraea douglasii	Rose Spiraea	native
Symphoricarpos albus	Common Snowberry	native
Vaccinium ovatum	Evergreen Huckleberry	native
Vaccinium parvifolium	Red Huckleberry	native
TREES		
Abies grandis	Grand Fir	native
Acer macrophyllum	Bigleaf Maple	native
Arbutus menziesii	Pacific Madrone	native
Pinus contorta var. *contorta*	Shore Pine	native
Populus trichocarpa	Black Cottonwood	native
Pseudotsuga menziesii var. *menziesii*	Coast Douglas-fir	native

Thuja plicata	Western Redcedar	native
Tsuga heterophylla	Western Hemlock	native
FAUNA		
BIRDS		
Bucephala islandica	Barrow's goldeneye	native
Patagioenas fasciata	Band-tailed Pigeon	blue-listed**
Regulus satrapa	Golden-crowned Kinglet	native
Strix varia	Barred Owl	native
Turdus migratorius	American Robin	native
INSECTS		
Epuraea aestiva	Sap-feeding Beetle	native
Harpaphe haydeniana	Yellow-spotted Millipede	native
Ptenothrix maculosa	Globular Springtail	native
MAMMALS		
Lontra canadensis	North American River Otter	native
Odocoileus hemionus columbianus	Columbian Black-tailed Deer	native
Phoca vitulina	Harbor Seal	native
MOLLUSKS		
Lottia sp.	Limpets	—
REPTILES		
Thamnophis ordinoides	Northwestern Garter Snake	native