



REGIONAL DISTRICT OF CENTRAL KOOTENAY

DEVELOPMENT PERMIT

DP2114A-04339.100-Premier_Resorts_Ltd.-DP000119

Date: December 2, 2021

Issued pursuant to Section 490 and 491 of the *Local Government Act*

1. This Development Permit is issued to Premier Resorts Ltd of 10141 Highway 3A, as the registered owner (hereinafter called the "Permittee") and shall apply to those lands within the Regional District of Central Kootenay, in the Province of British Columbia legally described as LOT 1 DISTRICT LOTS 2636B, 2637 AND 15821 KOOTENAY DISTRICT PLAN NEP71491 (PID 025-441-001) as shown on the attached Schedules 1 and 2, forming part of this Permit, referred to hereafter as the "said lands". This permit shall carry over to new lots created from said lands as a result of subdivision.
2. This Development Permit is issued subject to compliance with all of the bylaws of the Regional District of Central Kootenay applicable thereto.
3. This Development Permit shall not have the effect of varying the use or density of land as specified in the applicable Zoning Bylaw of the Regional District of Central Kootenay, nor a Floodplain Specification under Section 524 of the Local Government Act.
4. The said lands have been designated 'Country Residential' and are located within a Development Permit Area pursuant to the Electoral Area 'A' Comprehensive Land Use Bylaw No. 2316 as amended.
5. The Permittee has applied to the Regional District of Central Kootenay for an Environmentally Sensitive Development Permit in order to facilitate subdivision of the property. Pursuant to this Development Permit and subject to the terms and conditions herein contained, as well as all other applicable Regional District Bylaws, the Regional District of Central Kootenay hereby authorizes the use of the said lands for residential purposes.
6. The Permittee is required to obtain approval in writing from the Regional District of Central Kootenay prior to the construction any new buildings, external additions to existing buildings or for any deviation from the development authorized under Section 5 of this Development Permit. Furthermore, the Permittee is hereby advised of the following requirements:
 - 6.1 Subdivision and future development is authorized in accordance with the terms described in the report titled "10141 Highway 3A Subdivision Twin Bays, BC" prepared by Masse Environmental Consultants Ltd., dated August 3, 2021, and referred to hereafter as "the report" attached to this permit including:
 - 6.1.1 Measures to Protect the integrity of the Streamside Protection and Enhancement Area (SPEA) including the protection of vegetation and trees with the SPEA, sediment and erosion control, storm water management, protection of fish and wildlife habitat, management of equipment and fuel/lubricant materials, and invasive plant management. **All work shall be done in accordance with Sections 5 of the attached report.** Notably, the following conditions shall be adhered to;

- 6.1.1.1 A Streamside Protection and Enhancement Area within a 15 metre setback distance from the natural boundary of Kootenay Lake be retained, and no earth, vegetation disturbance or removal is permitted in this area. Any future development (i.e., structures, foreshore access, landscaping, vegetation/tree removal) proposed within the SPEA will require a Riparian Areas Protection Regulation (RAPR) assessment conducted by a Qualified Environmental Professional (QEP) and an Environmentally Sensitive Development Permit.;
 - 6.1.1.2 A Streamside Protection and Enhancement Area within a 30 metre setback distance from the High Water Mark of the wetland as identified in Appendix 2 of the report be retained, and no earth, vegetation disturbance or removal is permitted in this area. Any future development (i.e., structures, foreshore access, landscaping, vegetation/tree removal) proposed within the SPEA will require a RAPR assessment conducted by a QEP and an Environmentally Sensitive Development Permit.;
 - 6.1.1.3 The SPEA boundaries shall be flagged or identified with snow fencing prior to the issuance of building permits.
 - 6.2 A building permit shall be required prior to any construction involving land in this location at which time the Permittee shall be required to address sewage disposal issues to the satisfaction of the Interior Health Authority and Regional District of Central Kootenay Senior Building Official.
7. The said lands shall be developed strictly in accordance with the terms and conditions of this Development Permit and the requirements of all applicable Regional District Bylaws.
8. In accordance with the Local Government Act, if the development authorized by this Development Permit is not commenced within two years of the date of this Permit, this Permit shall lapse.
9. In accordance with the Local Government Act, 'Notice' shall be filed in the Land Title Office that the said lands are subject to this Development Permit.
10. The terms of this Development Permit including subsequent amendments, are binding on all persons who acquire an interest in the said lands associated with this Permit.
11. It is understood and agreed that the Regional District has made no representations, covenants, warranties, guarantees, promises, or agreement (verbal or otherwise) with the Permittee other than those in this Development Permit. It is solely the responsibility of the Permittee to ensure that the requirements of all other applicable government agencies are satisfied.
12. This Development Permit does not constitute a building permit.
13. This Development Permit shall come into force and effect 14 days after the date of issuance unless a Waiver of Appeal is received from the Permittee at which time the Development Permit shall be deemed to be issued upon receipt of the Waiver of Appeal. OR If a Notice of Appeal is received the Development Permit shall be suspended until such time as the Board of the Regional District of Central Kootenay has decided the Appeal.

S Sudan

Sangita Sudan, General Manager of Development Services

December 9, 2021

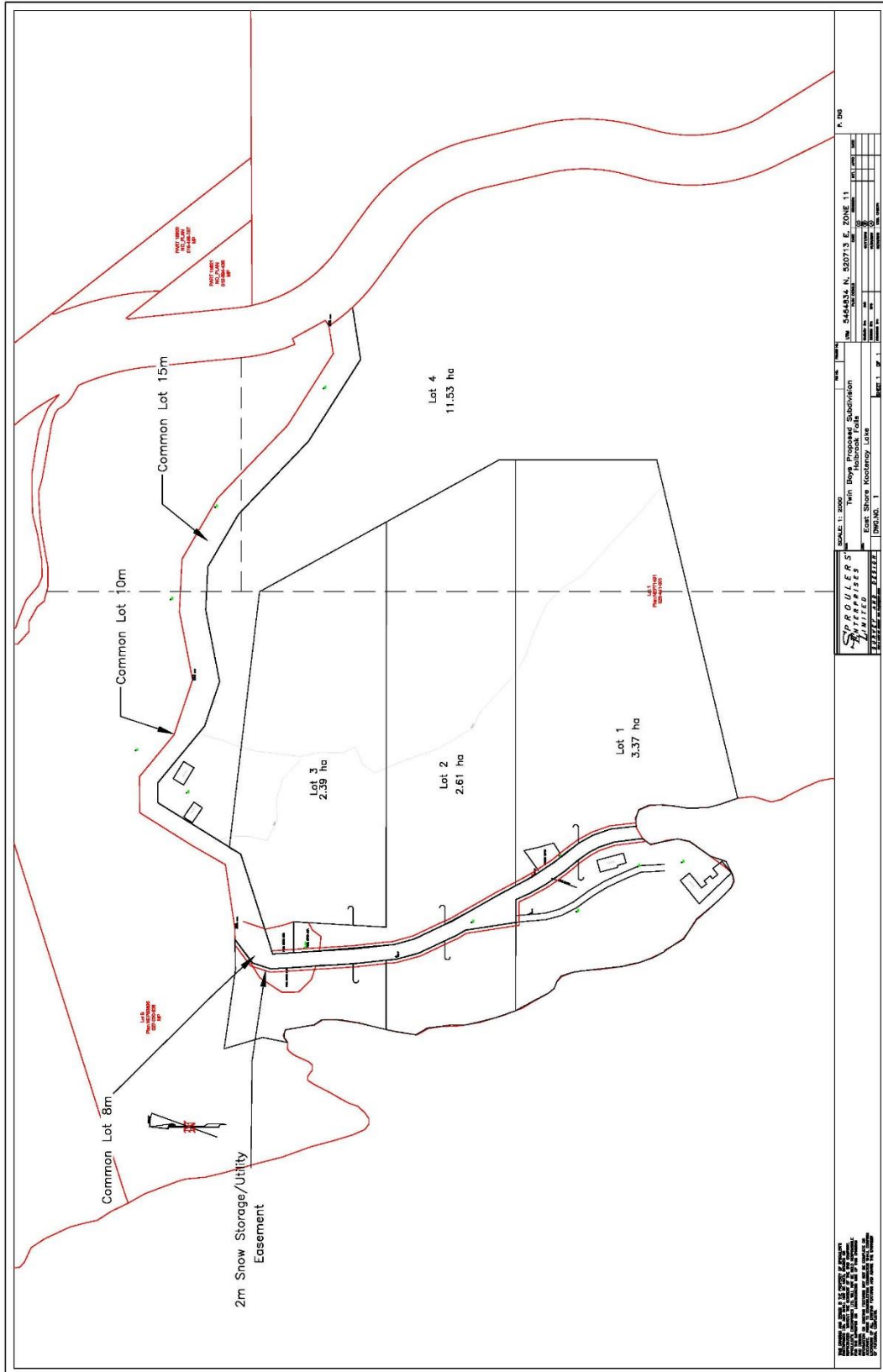
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Date of Issuance (pending receipt of securities)

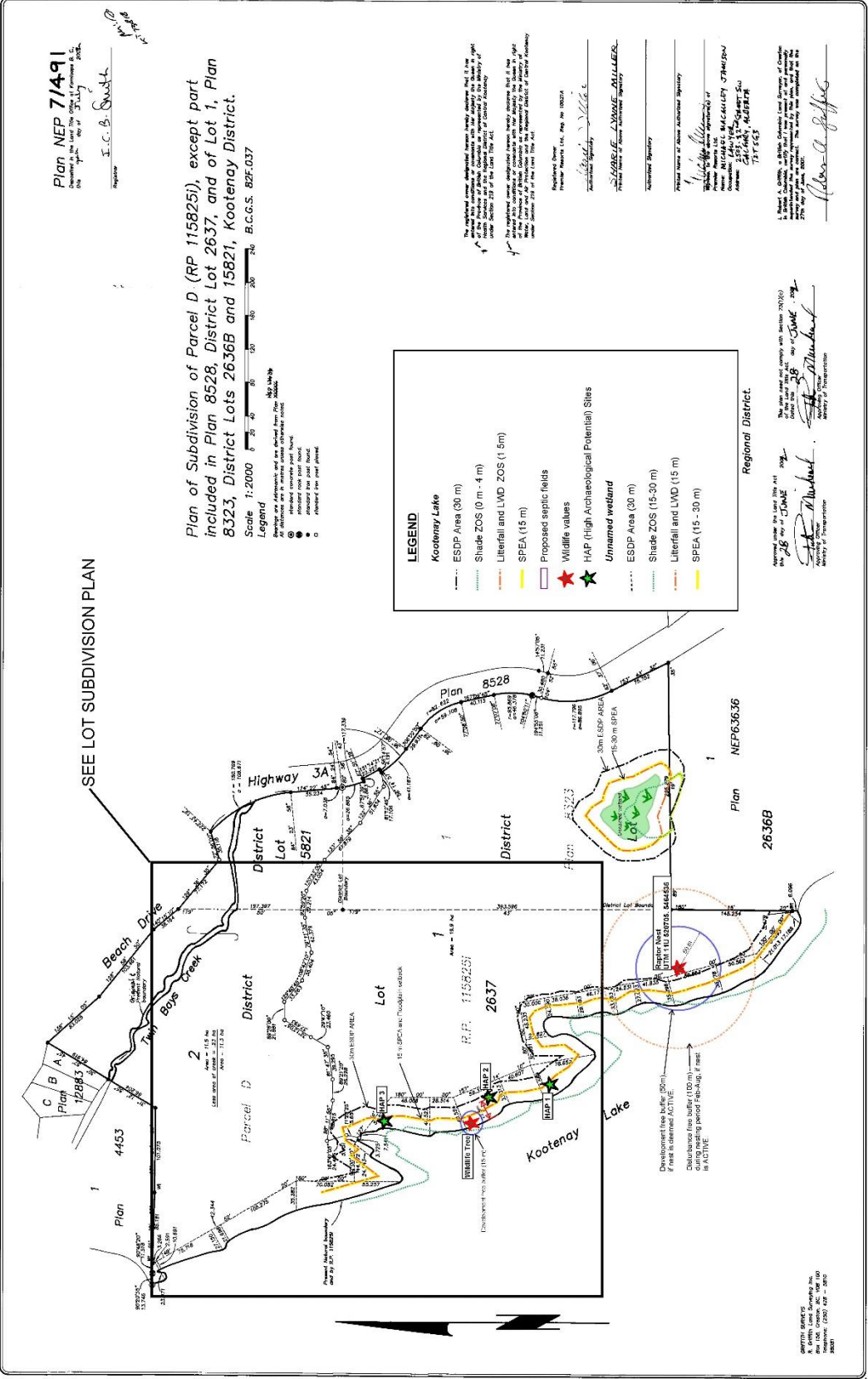
Schedule 1: Subject Property



Schedule 2: Site Plans



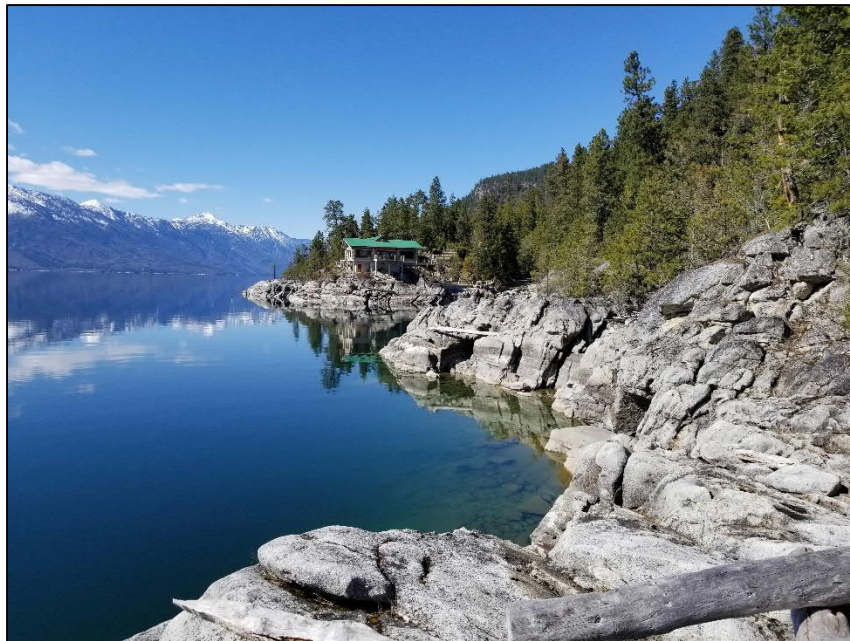
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Regional District of Central Kootenay: Box 590, 2021 Lakeside Drive, Nelson, BC V1L 5R4 1-800-280-7225



10141 HIGHWAY 3A SUBDIVISION
TWIN BAYS, BC
Environmental Assessment



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August 3, 2021

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ABBREVIATIONS

AHI: Aquatic Habitat Index

CDC: Conservation Data Centre

DBH: Diameter at Breast-Height

ESDP: Environmentally Sensitive Development Permit

FIM: Foreshore Inventory Mapping

HAP: High Archaeological Potential

HWM: High Water Mark

ICHxw: Interior Cedar - Hemlock very dry warm biogeoclimatic subzone

LWD: Large Woody Debris

PFR: Preliminary Field Reconnaissance

QEP: Qualified Environmental Professional

RAPR: Riparian Area Protection Regulation

RDCK: Regional District of Central Kootenay

RPF: Registered Professional Forester

sp.: used when the actual specific name is not specified (spp. is plural)

SPEA: Streamside Protection and Enhancement Area

SPVT: site potential vegetation type

UTM: Universal Transverse Mercator

ZOS: Zones of Sensitivity

1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Peter Muirhead, Muirhead Land Development Solutions Ltd. (Muirhead), on behalf of Premier Resorts Ltd. (Owner), to provide environmental consulting services in support of a proposed subdivision of 10141 Hwy 3A, legally described as Lot 1, Plan NEP 71491, DL 2636B, KLD (PID 025-441-001). The area proposed for development consists of one property with a total area of 49.17 acres, which the proponent proposes to subdivide into four parcels (Lots 1, 2, 3, and 4) ranging in size from 2.39 ha to 11.53 ha. The proposed subdivision is located within the riparian areas of Kootenay Lake and an unnamed wetland, triggering the requirement for an environmentally sensitive development permit (ESDP) area application.

A site survey was conducted on April 19, 2021, by Fiona Lau, B.Tech., A.Sc.T. and Jennifer Ross, M.Sc., P. Chem. to assess the habitat values and potential impact of the proposed subdivision on the riparian and foreshore areas.

This assessment evaluated the existing conditions of the foreshore and riparian areas, identified important habitat values, assessed the existing environmental impacts, and recommends measures to protect environmentally sensitive areas for future development. It is based on the following regulatory framework and best management practices documents:

- Electoral Area 'A' Comprehensive Land Use Bylaw No. 1315, 2013.
- British Columbia *Riparian Areas Protection Regulation*
- Kootenay Lake Shoreline Management Guidelines
- British Columbia *Water Sustainability Act*
- General BMPs and Standard Project Considerations (Ministry of Environment)
- On the Living Edge: Your Handbook for Waterfront Living
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in British Columbia

This report has been prepared by Jennifer Ross, M.Sc., P.Chem. and reviewed by Fiona Lau B.Tech., A.Sc.T. I, Fiona Lau, hereby certify that:

- a) I am a Qualified Environmental Professional (QEP), as defined in Section 21 of the *Riparian Areas Protection Regulation* made under the *Riparian Areas Protection Act*;
- b) I am qualified to carry out the assessment of the proposal made by the developer (Muirhead Land Development Solutions Ltd.), which is described in Section 2.3 of this Assessment Report (the "development proposal");
- c) I have carried out an assessment of the development proposal, and my assessment is set out in this Assessment Report; and
- d) In carrying out my assessment of the development proposal, I have followed the specifications of the *Riparian Areas Protection Regulation* and assessment methodology set out in the Minister's manual.

2 PROJECT OVERVIEW

2.1 Location

The subject property is located ~33 km northwest of the City of Creston, BC (Appendix 1). The property is bordered by private property to the north (10145 Highway 3A), private property to the south (10025 Highway 3A), Ministry of Transportation and Infrastructure (MoTI) right of way to the east (Highway 3A), and Kootenay Lake to the west.

The project area is within the Interior Cedar - Hemlock very dry warm (ICHxw) biogeoclimatic subzone. The ICHxw is present from valley floors to mid-slope (450-1100 m elevation). This zone has very hot dry summers, and very mild winters with very light snowfall. Snowpacks are shallow and of short duration, where soils do not generally freeze. It is characterized by open stands of interior Douglas fir (*Pseudotsuga menziesii* var. *glauca*), ponderosa pine (*Pinus ponderosa*) and lodgepole pine (*Pinus contorta*), with a variety of drought resistant shrubs and grasses (MacKillop and Ehman 2016).

2.2 Existing Site Conditions

2.2.1 Watercourses

Two watercourses were identified within the subject property: Kootenay Lake (Cover Photo, Photo 1) located along the west side of the subject property and a small unnamed wetland (UTM 11U 520895.5464592) located within proposed Lot 4 (Photo 2).

Twin Bays Creek is mapped within the subject property (Appendix 1), but no evidence of the creek was observed on the property. The actual creek is located ~ 90 m further north, crossing the private property to the north and flowing southwest of Twin Bays Road as shown on the attached site plan (Appendix 2)

During the site visit, the visible high-water mark (HWM) of Kootenay Lake was located at the natural boundary line surveyed and shown on the Site Plan (Appendix 2). HWM elevation is presumed to be between 533.5 -534.0 m, similar to the natural boundary elevation shown on the survey completed for the neighbouring properties at 10015 and 10025 Highway 3A (Masse 2017). The natural boundary was evaluated using high-water indications on the bedrock as there was very little soil, if any, present at this elevation (see definition below). The riparian setbacks will be measured from the natural boundary line as depicted on the survey.

“Natural Boundary” means the visible high water mark of any lake, river, stream or other body of water where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark on the soil of the bed of the body of water a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself (MOE 1996, RDCK 2013).”

Kootenay Lake’s main inflows include the Lower Duncan River to the north and the Kootenay River to the south. It drains through the west arm into the Kootenay River. Kootenay Lake typically experiences one

seasonal water level increase annually which occurs in the late spring and early summer months. Lake levels can vary by up to 4 m throughout the year affecting the extent of exposed shoreline.

The small unnamed wetland, ~0.2 ha in size, is classified as a cattail marsh (Wm05) as determined by vegetation and hydrologic characteristics (Mackenzie and Moran 2004). It has a shallow open water area surrounded by a dominant sedge community. The wetland is located in a natural depression which collects upland seepage and surface run-off with no visible defined inlet. A potential high-water outlet was observed at the southern extent of the wetland (Photo 3), where the low-lying forest floor appears to hold water intermittently throughout the year. There was no defined outlet channel observed, contrary to the Provincial 20K rivers, creeks, and shoreline mapping (iMap BC 2021). A rough road borders the northwestern edge of the wetland (Photo 4).

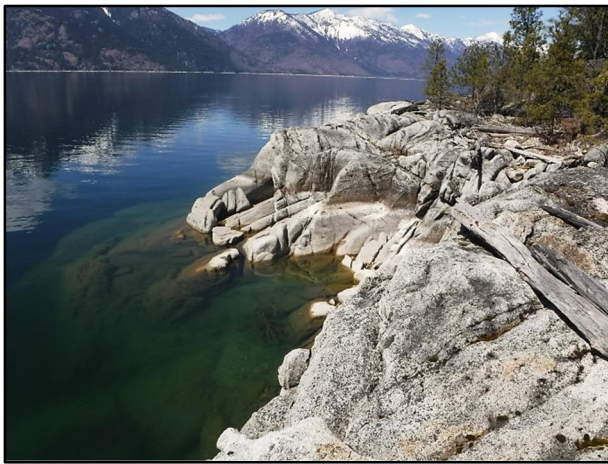


Photo 1. View of Kootenay Lake along west property boundary, looking northwest.



Photo 2. Small wetland located on proposed Lot 4.



Photo 3. Potential high-water outlet for small unnamed wetland.



Photo 4. Road bordering northwestern edge of small unnamed wetland.

One road ditch was observed along the north property line, which captures drainage from the access road as it meanders down the embankment from Highway 3A. The ditch discharges to a vegetated clearing

within private property to the north. The road ditch was fully vegetated and only flows intermittently < 6 months per year. It is not fish bearing and is not considered a watercourse under the RDCK bylaw.

“Watercourse” means any natural or man-made depression with well-defined banks and a bed 0.6 metres (2.0 feet) or more below the surrounding land serving to give direction to a current of water at least six months of the year and/or having a drainage area of two square kilometers (0.8 square miles) or more upstream of the point of consideration (RDCK 2013).”

Most of the property was observed to be dry with a warm southwest aspect, shallow soils, and moderately steep slopes down to the rocky shoreline. No drainage or erosion issues were observed during the environmental assessment.

2.2.2 Existing Development

The subject property has two existing private residential developments. The first private residence (footprint ~ 500 m²) is located on the foreshore of Kootenay Lake with an existing setback of ~ 7 m at its closest point (Photo 5). The building is constructed on concrete footings poured directly onto the foreshore bedrock. A three-car garage (footprint ~ 145 m², Photo 6) is located north of the residence with a setback of ~ 26 m from the high-water mark of Kootenay Lake at its closest point.

A private driveway accesses the residence from Highway 3A. This driveway parallels the shoreline of Kootenay Lake from the northern property boundary to the private residence and garage, maintaining a distance > 45 m from Kootenay Lake until it accesses a private boat launch directly east of the residence. A concrete boat ramp (11.3 m x 3.4 m), a floating dock (length 24.5 m, area 46 m²), and raised area armoured with riprap (length ~20 m, height ~4 m) are all located within a natural cove protected by a rock groin (length 16.5 m, width 10 m, height 5 m) (Photos 7 - 9). A wooden walkway (Photo 10) built on cement pillars poured directly onto the bedrock shoreline of Kootenay Lake provides access from the residence to the boat launch. The total footprint of the walkway and associated stairs is ~ 25 m² with a setback of 2 m from Kootenay Lake. Two sundecks (Photo 11) and a gravel pad (Photo 12) are also associated with the residence. The lower sundeck is located within a 4 m setback from Kootenay Lake. The total footprint of both sundecks is ~ 100 m². The gravel pad (6.8m x 5.8 m) is located northwest of the residence and is set back ~ 20 m from Kootenay Lake.

The second private residence consists of a small cabin and a shop that are located along the private driveway accessing the first private residence described above. This second private residence does not have any buildings or associated infrastructure within 30 m of Kootenay Lake.



Photo 5. View of private residence and ~ 7 m



Photo 6. View of cleared parking area and garage next to residence.



Photo 7. View of concrete boat ramp and floating dock at boat launch area.



Photo 8. View of raised area armoured with riprap at boat launch area.



Photo 9. View of rock groin.



Photo 10. View of wooden walkway and stairs.



Photo 11. View of two sundecks.



Photo 12. View of gravel pad.

Overall, the property is mostly in a natural state, with disturbance limited to the footprints of the driveways, residences, garage, shop, sundecks/stairs, boat launch, and septic fields.

A few overgrown access roads have been constructed across the subject property. One short access road used to provide access to the cove at the northwestern property boundary from the driveway (Photo 13). Another road accesses the unnamed wetland from Highway 3A and continues to the shoreline of Kootenay Lake, along the southern property boundary (Photo 14).

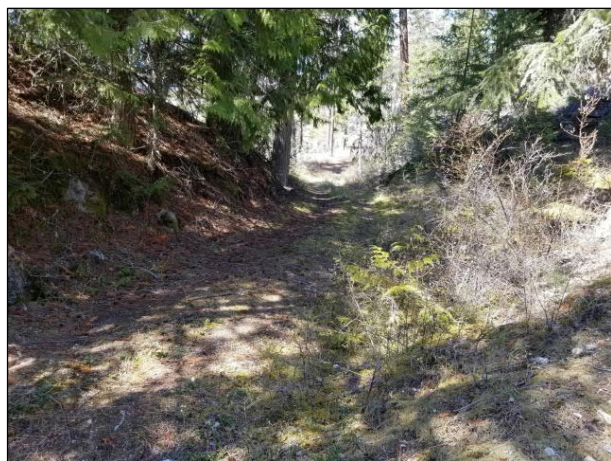


Photo 13. Access road from driveway to cove at northwestern property boundary.



Photo 14. Access road from Highway 3A to shoreline of Kootenay Lake via the unnamed wetland.

2.3 Development Proposal

The proposed development within the 15 m ESDP area consists of subdivision of a single 49.17-acre lot into four lots (Lot 1 (3.37 ha), Lot 2 (2.61 ha), Lot 3 (2.39 ha), Lot 4 (11.53 ha). At this time, no further development is proposed. Refer to Site Plan for proposed subdivision development layout (Appendix 2).

2.4 Services

The existing residences are serviced with electricity via power lines that run along the driveway and propane supplied via an above-ground storage tank. Two existing septic fields are located within the subject property, both outside of the 30 m setback from any water. The septic field servicing the first residence is located north of the garage on proposed Lot 1 (UTM 11U 520607.5464759). The second septic field for the cabin is located north of the existing cabin within the field area (exact location unknown). Water supplying both existing residences is sourced from Kootenay Lake, with two active water licenses (*pers. comm.* Peter Muirhead). The water license for the first residence is registered to Premier Resorts Ltd. under license number C117425.

As part of the subdivision proposal, a septic field assessment study was completed by David Hough of Steel Wheels (Appendix 3). All suitable septic field locations were sited outside of the 30 m setback from any watercourse. The proposed subdivision does not include installation of services such as water, power, and septic; however, two additional water licenses are being applied for to prove a water source for the newly subdivided properties (Lots 2 and 3).

3 REGULATORY REVIEW

3.1 Streamside Protection and Enhancement Area

The default ESDP area is 15 meters from natural boundary of Kootenay Lake and the small unnamed wetland. To determine if the ESDP area aligns with the *Riparian Areas Protection Regulation* (RAPR) criteria, a detailed assessment of the subject property was conducted to calculate the Streamside Protection and Enhancement Areas (SPEAs) for Kootenay Lake and the wetland on the proposed site. Results for the Zones of Sensitivity (ZOSs) and SPEAs are presented in Table 1 and shown on the Site Plan in Appendix 2. The SPEA was calculated to be 15 m along the foreshore of Kootenay Lake and 15-30 m around the wetland.

Table 1. Results of detailed assessment.

Feature Type	Lot ID	SPVT	Zones of Sensitivity			SPEA
			LWD	Litter fall	Shade	
Lake	1	TR	15 m	15 m	0 - 5 m	15 m
Lake	2	TR	15 m	15 m	0 - 5 m	15 m
Lake	3	TR	15 m	15 m	0 - 2 m	15 m
Lake	4	TR	15 m	15 m	0 - 8 m	15 m
Wetland	4	TR	15 m	15 m	0 - 30 m	15 m - 30 m

SPVT- site potential vegetation type (TR-tree)

LWD- large woody debris

SPEA- streamside protection and enhancement area

Kootenay Lake

As per the RAPR, the large woody debris (LWD), and litter ZOS were plotted 15 m inland from the HWM of Kootenay Lake. The shade ZOS was plotted 0 -8 m from of the HWM. The SPEA setback is determined based on the ZOS with the greatest width. Therefore, within the subject property, the SPEA is 15 m from the HWM of Kootenay Lake.

Small Unnamed Wetland

As per the RAPR, the LWD and litter ZOS were plotted 15 m inland from the HWM of the wetland. The shade ZOS was plotted 0 -30 m from of the HWM. The resulting SPEA setback is 15 – 30 m from the HWM of the wetland.

3.2 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Inventory Mapping (FIM) and the Kootenay Lake Shoreline Management Guidelines documents (Schleppe and Cormano 2013, KLP 2020) were used to help determine site-specific risks for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline. The property is located within FIM segments 181 and 182. Table 2 provides the environmental and archaeological risk results identified by the FIM along the shoreline of the property.

Table 2. Environmental and archaeological risk results.

FIM Segment	Aquatic Habitat Index Rating (AHI)	Aquatic Sensitivity	Archaeological Risk	Enhanced Engagement Required
181	Moderate	Yes	Orange ¹	Yes
182	Low	No	Red ²	Yes

¹Orange: High risk.

²Red: Very high risk.

4 RESOURCES

4.1 Fish and Fish Habitat

The Kootenay Lake foreshore is predominantly steeply sloping bedrock (50-60 % gradient) with some overlying cobbles and boulders (Photo 15-16) and some lower gradient areas located in two small coves within proposed Lots 1 and 3. Deep water habitat along the shoreline provides both cover and migratory habitat to adult fish. Cover is also provided by infrequent large woody debris (LWD) and boulders. The substrate in the coves is predominantly sand with some small and large woody debris (Photo 17-18). The coves provide potential rearing and cover habitat for juvenile and adult fish. No aquatic vegetation was observed in Kootenay Lake along the subject property.

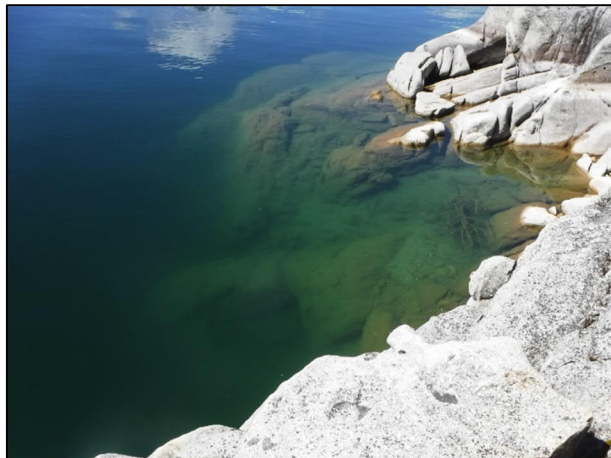


Photo 15. View of typical bedrock shoreline, Lot 1.

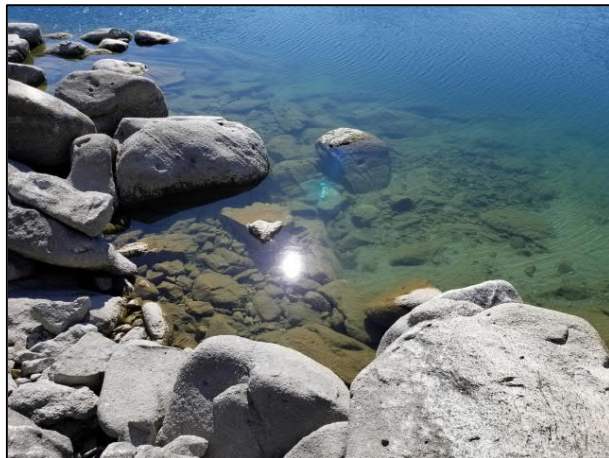


Photo 16. View of typical bedrock shoreline, Lot 4.

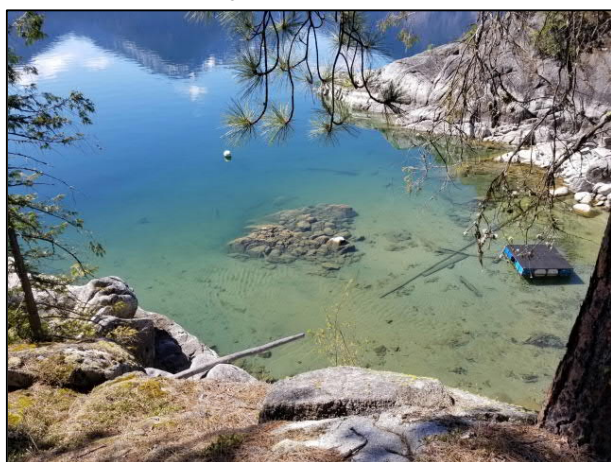


Photo 17. View of sandy cove, north end of Lot 3.



Photo 18. View of shallow sandy cove, fronting Lot 1.

Kootenay Lake supports a variety of fish species, including several species of regional interest, such as Rainbow Trout (*Oncorhynchus mykiss*), Bull Trout (*Salvelinus Confluentus*), Kokanee (*Oncorhynchus nerka*), White Sturgeon (*Acipenser transmontanus*), Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisii*), and Burbot (*Lota lota*). Mussels were not observed along the foreshore; however, a complete mussel survey was not conducted as part of the site visit, since no in-water works are proposed.

A fish presence and absence survey was not conducted for the unnamed wetland and is outside the scope of this report; therefore, fish presence is unknown.

4.2 Riparian Vegetation

4.2.1 Kootenay Lake

The riparian area along Kootenay Lake has an overall westerly aspect and is generally undisturbed. The steep bedrock shoreline (Cover photo) graduates to a steep embankment with slopes of 30 – 50 % (Photo 19) and one section of cliff (slopes > 50 % around the proposed Lot 1/Lot 4 property line) (Photo 20).

Exposed fractured bedrock is evident throughout the riparian area and is overlain with a thin layer of topsoil. Trees are sporadic with a well-developed understory of shrubs, herbaceous species, mosses, and lichens (Photo 21). Dominant riparian vegetation in Lots 1-3 consisted of ponderosa pine (*Pinus ponderosa*), Douglas fir (*Pseudotsuga menziesii*), juniper (*Juniperus spp.*), kinnikinnick (*Arctostaphylos uva-ursi*), pine grass (*Calamagrostis rubescens*), mosses, and lichens. Dominant riparian vegetation in Lot 4 consisted of the same species with mallow ninebark (*Physocarpus malvaceus*). Several snags and wildlife trees (Photo 22) were observed throughout the riparian area. Many of the riparian trees may have shallow root systems due to the lack of soils and available nutrients and may be susceptible to windthrow. Several large, uprooted ponderosa pine trees were observed in Lot 3.



Photo 19. View of typical riparian embankment along Kootenay Lake taken from Lot 2.

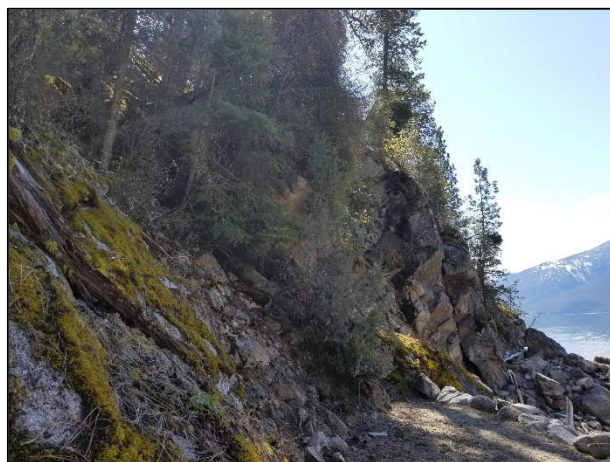


Photo 20. View of riparian cliff section around the proposed Lot 1/Lot 4 property line.

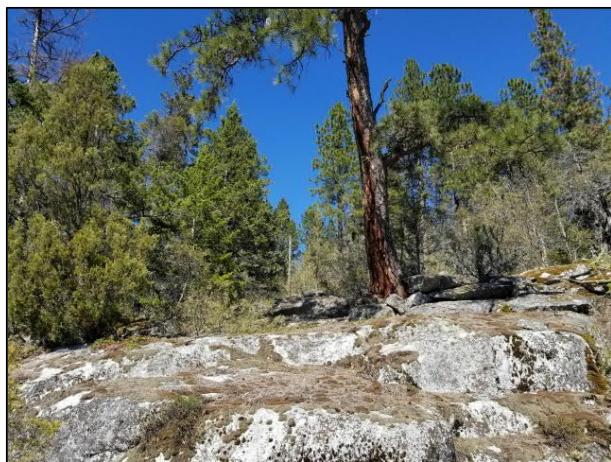


Photo 21. Sporadic trees and exposed bedrock typical of riparian areas, photo from Lot 4.



Photo 22. Typical riparian vegetation on steep slope taken from Lot 3.

Table 3 provides a list of riparian plant species encountered within the Kootenay Lake ESDP assessment area of the subject property.

Table 3. Plant species encountered within Kootenay Lake ESDP assessment area.

Species Name	Latin Name	Species Name	Latin Name
Trees	<i>Populus balsamifera ssp. trichocarpa</i>	Herbaceous (cont.)	
black cottonwood		indian hellebore	<i>Veratrum viride</i>
interior Douglas fir	<i>Pseudotsuga menziesii</i>	licorice fern	<i>Polypodium glycyrrhiza</i>
paper birch	<i>Betula papyrifera</i>	pearly everlasting	<i>Anaphalis margaritacea</i>
ponderosa pine	<i>Pinus ponderosa</i>	pinegrass	<i>Calamagrostis rubescens</i>
Western red cedar	<i>Thuja plicata</i>	prince's pine	<i>Chimaphila umbellata</i>
Shrubs		showy Jacob's-ladder	<i>Polemonium pulcherrimum</i>
common snowberry	<i>Symphoricarpos albus</i>	Stonecrop	<i>sedum spp.</i>
Douglas maple	<i>Acer glabrum</i>	sweet clover	<i>Melilotus spp.</i>
falsebox	<i>Paxistima myrsinites</i>	Wildrye	<i>Elymus spp.</i>
juniper	<i>Juniperus spp.</i>	wild strawberry	<i>Fragaria virginiana</i>
kinnikinnick	<i>Arctostaphylos uva-ursi</i>	yarrow	<i>Achillea millefolium</i>
mallow ninebark	<i>Physocarpus malvaceus</i>	yellow avalanche lily	<i>Erythronium grandiflorum</i>
oceanspray	<i>Holodiscus discolor</i>	Weeds	
red elderberry	<i>Sambucus racemosa</i>	blackberry	<i>Rubus spp.</i>
red-osier dogwood	<i>Cornus sericea</i>	common mullein	<i>Verbascum thapsus</i>
rose	<i>Rosa spp.</i>	common tansy	<i>Tanacetum vulgare</i>
saskatoon	<i>Amelanchier alnifolia</i>	oxeye daisy	<i>Leucanthemum vulgare</i>
soopolallie	<i>Shepherdia canadensis</i>	reed canarygrass	<i>Phalaris arundinacea</i>
tall Oregon grape	<i>Mahonia aquifolium</i>	spotted knapweed	<i>Centaurea stoebe</i>
thimbleberry	<i>Rubus parviflorus</i>	thistle	<i>Cirsium spp.</i>
willow	<i>Salix spp.</i>	wormwood (absinth)	<i>Artemisia absinthium</i>
Herbaceous		yellow salsify	<i>Tragopogon dubius</i>
alumroot	<i>Heuchera cylindrica</i>	Other	
bracken fern	<i>Pteridium aquilinum</i>	Grasses spp.	
clover	<i>Trifolium spp.</i>	Mosses spp.	
common dandelion	<i>Taraxacum officinale</i>	Lichens spp.	
common horsetail	<i>Equisetum arvense</i>	Ferns spp.	

4.2.2 Unnamed wetland

The riparian area of the small unnamed wetland is disturbed along the northern edge (access road) (Photo 4) and there is some evidence of logging (stumps) in the area. Dominant aquatic vegetation encountered within the wetland included sedges spp. (*Carex spp.*) and forget me not spp. (*Myosotis spp.*). The shoreline around the wetland is rocky with bedrock outcrops and slopes ranging from 2 – 20 % (Photo 23). The riparian vegetation consists of a variety of native tree, shrub, and herbaceous species (Photo 2, 24) that provide bank stability and erosion protection, shade, litter fall, and insect drop that benefit aquatic organisms and wildlife including birds, amphibians, and reptiles. Dominant riparian vegetation included Western red cedar (*Thuja plicata*), black cottonwood (*Populus balsamifera ssp. trichocarpa*), trembling

aspen (*Populus tremuloides*), Douglas maple (*Acer glabrum*), roses (*Rosa spp.*), red-osier dogwood (*Cornus sericea*), grasses, and sedges.



Photo 23. View of wetland and riparian vegetation along fringe.



Photo 24. Typical riparian vegetation around the fringe of the unnamed wetland.

in the Lot 4 wetland ESDP assessment area.

Table 4 provides a list of riparian plant species encountered in the Lot 4 wetland ESDP assessment area.

Table 4. Plant species encountered within the Lot 4 wetland assessment area.

Species Name	Latin Name	Species Name	Latin Name
Trees		Shrubs (cont.)	
black cottonwood	<i>Populus balsamifera ssp. trichocarpa</i>	red raspberry	<i>Rubus idaeus</i>
interior Douglas fir	<i>Pseudotsuga menziesii</i>	Herbaceous	
paper birch	<i>Betula papyrifera</i>	alumroot	<i>Heuchera cylindrica</i>
ponderosa pine	<i>Pinus ponderosa</i>	common dandelion	<i>Taraxacum officinale</i>
trembling aspen	<i>Populus tremuloides</i>	prince's pine	<i>Chimaphila umbellata</i>
Western red cedar	<i>Thuja plicata</i>	Weeds	
Western larch	<i>Larix occidentalis</i>	reed canarygrass	<i>Phalaris arundinacea</i>
Shrubs		spotted knapweed	<i>Centaurea stoebe</i>
black hawthorn	<i>Crataegus douglasii</i>	thistle	<i>Cirsium spp.</i>
common snowberry	<i>Symphoricarpos albus</i>	Aquatic Vegetation	
Douglas maple	<i>Acer glabrum</i>	Sedges sp.	<i>Carex spp.</i>
juniper	<i>Juniperus spp.</i>	Forget-me-not sp.	<i>Myosotis spp.</i>
kinnikinnick	<i>Arctostaphylos uva-ursi</i>	Marsh cinquefoil	<i>Comarum palustre</i>
mallow ninebark	<i>Physocarpus malvaceus</i>	Other	
oceanspray	<i>Holodiscus discolor</i>	Grasses spp.	
red-osier dogwood	<i>Cornus sericea</i>	Mosses spp.	
rose	<i>Rosa spp.</i>	Lichens spp.	

Species Name	Latin Name	Species Name	Latin Name
tall Oregon grape	<i>Mahonia aquifolium</i>	Ferns spp.	
willow	<i>Salix spp.</i>		

4.3 Wildlife

The property features open stands of mature ponderosa pine and interior Douglas-fir next to a large lake, which is attractive habitat to many species of wildlife. Low elevation mature forests on warm aspects are key winter ranges for ungulates and spring forage and connectivity for grizzly bears (*Ursus arctos*). At smaller scales, there is a variety of unique site types, including dry rock outcrops, wetland, and shoreline, each having a potential role in supporting a diversity of wildlife. General observations include rodent activity, many songbirds throughout all properties (particularly around the wetland), and bumblebees. A one-time site visit is not sufficient for a comprehensive inventory; however, we documented some species with confirmed or suspected presence on the property through our observations (Table 5).

Table 5. Wildlife species with confirmed or suspected presence on the property.

Common Name	Scientific Name	BC Conservation Status	Comment
American robin	<i>Turdus migratorius</i>	Yellow ¹	Observed in Lot 1.
bald eagle	<i>Haliaeetus leucocephalus</i>	Yellow	Observed flying over Kootenay Lake adjacent to Lot 3.
coyote	<i>Canis latrans</i>	Yellow	Scat observed Lot 4 on Kootenay Lake bedrock shoreline.
common loon	<i>Gavia immer</i>	Yellow	Observed in Kootenay Lake offshore from Lot 4.
mallard duck	<i>Anas platyrhynchos</i>	Yellow	Observed in Lot 4 small, unnamed wetland.
mule deer	<i>Odocoileus hemionus</i>	Yellow	Scat observed throughout subject property, particularly around unnamed wetland. Antler found in Lot 4.
Northern mockingbird	<i>Mimus polyglottos</i>	No Status	Observed in Lot 4 beside Kootenay Lake.
Pacific tree frog	<i>Pseudacris regilla</i>	Yellow	Observed in Lot 4 on Kootenay Lake bedrock shoreline.

¹Yellow listed species include species or ecological communities that are apparently secure and not at risk of extinction. Yellow-listed species may have red- or blue-listed subspecies.

4.3.1 Reptiles and Amphibians

The fractured bedrock, rocky outcrops, crevices, and abundant cover provided by LWD within the riparian areas of Kootenay Lake and the small unnamed wetland provide high-value habitat for snakes and reptiles. Snake and reptile sightings during the site visit were limited to one Pacific tree frog (*Pseudacris regilla*) observed on the foreshore bedrock in Lot 4.

The small unnamed wetland also provides high-value amphibian habitat. No amphibians or egg masses were observed during the site visit; however, these may not have been visible from the fringes of the wetland.

4.3.2 Birds

Both coniferous and deciduous trees provided habitat for birds such as cavity dwellers, songbirds, and raptors. The small unnamed wetland also provides high-value habitat for waterfowl. Many songbirds, including American robin (*Turdus migratorius*) and Northern mockingbird (*Mimus polyglottos*) were observed during the site visit, with a high concentration observed in the margins of the wetland. Waterfowl observed during the site visit included two mallard ducks (*Anas platyrhynchos*) in the wetland and one common loon (*Gavia immer*) fishing on Kootenay Lake. One raptor nest was observed in Lot 4 (UTM 11U 520706. 5464537; Photo 25) and a bald eagle (*Haliaeetus leucocephalus*) flew over Lot 3 during the site visit. The nest appeared in-active; however, raptors may re-use nests and therefore this nest may become active in the future. A standing dead tree was identified as an important wildlife perch tree on Lot 2 (UTM 11U 520516.5464788; Photo 26) for raptors (see Site Plan, Appendix 2). Other standing dead trees observed throughout the subject property provide nesting and feeding habitat for cavity dwellers.



Photo 25. Raptor nest, Lot 4.



Photo 26. Standing dead wildlife perch tree, Lot 2.

4.3.3 Mammals

The riparian area has some suitable habitat for mammals with palatable vegetation including grasses and young saplings. Ungulates and bears most likely use the area to access the water and browse on vegetation. Deer droppings were observed within the property during the site visit.

4.4 Species at Risk

The BC Conservation Data Center (CDC) occurrence data and critical habitat for Federally listed species were queried within iMap BC, using a 10 km buffer around the center point of the subject property. The query results are presented in Table 6. Twelve species at risk were identified within this buffer. Potential occurrence on the property was assessed as likely, possible, unlikely, or unknown, according to known species habitat affinities and the habitat profile of the property, and on proximity to mapped occurrences.

Table 6. Species at risk with potential occurrence based on iMap BC 10 km radius query.

Common Name	Scientific Name	BC Conservation Status	Classification	Likelihood of Occurrence on Subject Property	Comment
American bittern	<i>Botaurus lentiginosus</i>	Blue ¹	Bird	Unlikely	CDC occurrence mapped > 9 km southeast of Lot 4 around the Creston marshlands (Shape ID: 24513, Occurrence ID: 6566). Very limited habitat available at the Site.
American sweet-flag	<i>Acorus americanus</i>	Blue	Vascular Plant	Unlikely	CDC occurrence mapped > 8 km southeast of Lot 4 at the south end of Kootenay Lake (Shape ID: 2460, Occurrence ID: 3146). Aquatic mudflat herb with very limited habitat available at the Site.
caribou (Southern Mountain Population)	<i>Rangifer tarandus pop. 1</i>	Red ²	Mammal	Unlikely	Critical habitat is mapped within the subject property, but caribou are highly unlikely to be present given the small population and extensive habitat fragmentation.
Coeur d'Alene salamander	<i>Plethodon idahoensis</i>	Yellow	Amphibian	Possible	Critical habitat includes seeps, streams, and moist soil. CDC occurrences included two mapped locations nearby ~ 660 m north of Lot 1 boundary (Shape ID: 7250, Occurrence ID: 4805) and ~ 375 m east of Lot 4 boundary on Twin Bays Creek (Shape ID: 38065, Occurrence ID: 7481).
flamulated owl	<i>Psiloscops flammeolus</i>	Blue	Bird	Possible	Cavity nesting mature coniferous forest owl. CDC occurrence mapped ~ 2.3 km southeast of Lot 4 northeast corner (Shape ID: 131672, Occurrence ID: 16427).
Northern leopard frog - Rocky Mountain population	<i>Lithobates pipiens</i>	Red	Amphibian	Unlikely	Critical habitat (ID: 61769) is mapped around Creston, BC ~9 km southeast of Lot 4. Limited habitat available at the Site.
owyhee mudwort	<i>Limosella acaulis</i>	Yellow	Vascular Plant	Unlikely	Habitat is muddy flats along lakeshores. CDC occurrence mapped > 6 km southeast of Lot 4 at the south end of Kootenay Lake (Shape ID: 49115, Occurrence ID: 8268).
pygmy slug	<i>Kootenaia burkei</i>	Blue	Invertebrate	Possible	Habitat is moist, mixed-wood riparian forest. CDC occurrence mapped > 6 km northeast of Lot 4 (Shape ID: 105755, Occurrence ID: 13606).
Western grebe	<i>Aechmophorus occidentalis</i>	Red	Bird	Unlikely	Breeding population known to inhabit Duck Lake (Creston, BC). CDC occurrence mapped > 7 km southeast of Lot 4 at the south end of Kootenay

Western skink	<i>Plestiodon skiltonianus</i>	Blue	Reptile	Likely	Lake (Shape ID: 10489, Occurrence ID: 5209). Very limited habitat available at the Site.
white sturgeon (Upper Kootenay River Population)	<i>Acipenser transmontanus pop. 1</i>	No Status	Fish	Unlikely	Inhabits rocky areas, areas with lots of cover, and slopes with southern exposure. CDC occurrence mapped ~ 2.6 km southeast of Lot 4 northeast corner (Shape ID: 29919, Occurrence ID: 6935). Critical habitat for white sturgeon on Kootenay Lake includes the Creston delta (~7 km southeast), the Duncan delta (~ 94 km north), and Crawford Bay (~ 36 km north).
whitebark pine	<i>Pinus albicaulis</i>	Blue	Vascular Plant	Unlikely	Habitat is subalpine and timberline zones, so it is not expected at the subject site. CDC occurrence mapped ~ 5.3 km northeast of Lot 4 (Shape ID: 112582, Occurrence ID: 14499).

¹Blue-listed species include any native species or ecological community considered to be of 'Special Concern' (formerly Vulnerable) in British Columbia. Species or ecological communities of Special Concern have characteristics that make them particularly sensitive or vulnerable to human activities or natural events. Blue-listed species or ecological communities are at risk, but are not Extirpated, Endangered or Threatened.

²Red-listed species include any native species or ecological communities that have, or are candidates for, 'Extirpated', 'Endangered', or 'Threatened' status in British Columbia. Extirpated species no longer exist in the wild in British Columbia but do occur elsewhere. Endangered species and ecological communities are facing imminent extirpation or extinction. Threatened species and ecological communities are likely to become endangered if limiting factors are not reversed. Not all Red-listed species or ecological communities will necessarily become formally designated. Placing species or ecological communities on these lists flags them as being at risk and requiring investigation.

4.4.1 Fish Species at Risk

Fish species at risk known from the main body of Kootenay Lake include: burbot (red listed), white sturgeon (red listed), bull trout (blue listed), and westslope cutthroat trout (blue listed). No spawning or critical habitat for these species was observed at the subject property.

4.4.2 Wildlife Species at Risk

The ICHxw provides habitat for a number of wildlife species at risk. The subzone experiences very dry and warm conditions, mild winters and provides a variety of vegetation types that support many wildlife species (Mackillop and Ehman 2016). Of the species listed in Table 6, only the Western skink (*Plestiodon skiltonianus*) is likely to inhabit the subject property. The Western skink is blue listed provincially and is a federal species of Special Concern due to its restricted range, low number of occurrences, and threatened habitat. Its greatest threats include habitat loss due to human development. The rubber boa (*Charina bottae*) is a yellow-listed species provincially and also a federal species of Special Concern that shares similar habitat requirements to the western skink. Although there are no official occurrence records in the vicinity of the subject property, rubber boa presence is also considered likely.

The Coeur d'Alene salamander (*Plethodon idahoensis*), flammulated owl (*Psiloscops flammeolus*), and pygmy slug (*Kootenaia burkei*) each have the potential to use the subject property based on their habitat preferences.

4.5 Archaeological Resources

Kootenay Lake is part of the traditional territory of the Sinixt, Okanagan, and Ktunaxa First Nations and archaeological evidence is documented at multiple shoreline sites. A non-permit preliminary field reconnaissance (PFR) assessment was completed by Tipi Mountain Eco-Cultural Services (TMECS) on August 11, 2020 (Tipi 2020). Three areas of high archaeological potential (HAP) were identified on the subject property. These areas are mapped in Appendix 2.

5 MEASURES TO PROTECT THE INTEGRITY OF SPEA

This section provides measures to protect the integrity of the SPEA as described in RAPR, as well as recommended best management practices. The SPEA was determined to be at a 15 m setback from the natural boundary of Kootenay Lake and from 15 m to 30 m from the HWM of the wetland (Refer to Appendix 2).

5.1 Danger Trees

A Registered Professional Forester (RPF) was not retained to assess danger trees; however, a quick assessment for potential danger trees was conducted by the QEP within the property. One standing dead fir tree (UTM 11U.520558. 5464778) was identified as a hazard tree within the proposed Lot 2.

5.2 Windthrow

Clearing activities within the development footprint may increase the risk of windthrow on the property. A few recently uprooted ponderosa pine trees were noted within the proposed Lot 3 along the existing access trail. An RPF should be consulted about potential windthrow during any development planning.

5.3 Slope Stability

No hazard indicators for slope stability listed in Table 3.8 of the RAPR Technical Assessment Manual (VIU 2019) were observed. Further assessment of geotechnical hazard is beyond the scope of this report, and any such assessment should be led by a Professional Geologist or a Professional Engineer.

5.4 Protection of Trees and Vegetation in the SPEA

Protection of trees and other vegetation in the SPEA can be achieved by implementing the following measures:

- The SPEAs will be located and clearly marked on the ground by a registered surveyor prior to subdivision. The SPEAs will be identified as no-construction zones to protect the root systems of all vegetation within the SPEA and maintain shoreline stability and habitat complexity.
- Limit staging and access within each subdivided lot to previously disturbed areas of the site.
- Maintain the natural drainage of the site as much as possible.
- Remove invasive weed species throughout the properties.
- Ensure that no pollutants are allowed to contaminate the soil within the development area next to the SPEA.

5.5 Encroachment

The proposed subdivision does not involve encroachment within the SPEA outside of the existing developments covered in Section 2.2.2. Future encroachment within the SPEA of Kootenay Lake and the small unnamed wetland is discouraged. Any future development (i.e., structures, foreshore access, landscaping, vegetation/tree removal) proposed within the SPEA will require a RAPR assessment conducted by a QEP and an RDCK Watercourse Development Permit.

5.6 Sediment and Erosion Control

The proposed subdivision does not involve any development to any of the proposed lots and no existing erosion and sediment concerns were identified. Future developments will require erosion and sediment control plans to reduce the risk of sediment input to Kootenay Lake and into the small unnamed wetland.

At a minimum, these plans should:

- Limit the disturbance of native vegetation throughout each subdivided lot to the extent possible and ensure disturbed/exposed soils are revegetated with native vegetation as soon as possible.

- Safely stockpile any erodible materials in a manner that eliminates the possibility of erosion and sediment transport. This may require covering the stockpiles with tarps or with a vegetative cover.
- During construction, install mitigation measures such as ditching, detention/setting ponds, check dams, etc. as necessary to manage turbid wastewater generated by heavy rain events. Turbid wastewater will not be permitted to leave the construction site.

5.7 Stormwater Management

The proposed subdivision does not involve any development to any of the proposed lots. Future developments will require stormwater management plans.

At a minimum, a stormwater management plan should:

- Control storm water surface runoff and direct it away from disturbed/exposed soils.
- Promote the installation of permeable surfaces that permit rainwater infiltration into the ground to moderate the flow of overland storm water.
- Design roof rainwater collection systems that direct rainwater into suitable landscape features which can absorb and utilize runoff. Roof runoff will not be permitted to discharge directly to Kootenay Lake and/or the small unnamed wetland.

5.8 Floodplain Concerns

There were no floodplain concerns observed on the subject property.

5.9 Protection of Wildlife Habitat

Riparian zones allow wildlife to travel between habitat “islands” by providing migration corridors between upland areas and water, as well as along the foreshore. They also help circulate nutrients between terrestrial and aquatic ecosystems. The proposed subdivision is expected to have minimal impact on habitat availability and quality if the following recommendations are followed:

- Retain the raptor nest tree identified on Lot 4 and implement the following protection measures:
 - a) Maintain a development free buffer of at least 50 m around the raptor nest site identified on Lot 4, if deemed active by a qualified environmental professional (QEP). This determination will need to be made during the construction proposal phase within the active nesting period (February- August). Buffer shown on Site Plan (Appendix 2) (BC 2013). A covenant around the nest is not required.
 - b) Maintain a minimum 100 m disturbance free buffer (i.e., noise, construction, etc.) around the raptor nest during the active nesting period (February -August) (BC 2013), if deemed active. Buffer shown on Site Plan (Appendix 2).
 - c) Avoid blasting during courtship and egg-laying periods for raptors if nest is deemed active (BC 2013).

- Maintain a 15 m development free buffer around the wildlife perch tree identified on Lot 2. Buffer shown on Site Plan (Appendix 2). This is to ensure that the tree does not become a hazard to development and is retained.
- Live and dead trees, especially deciduous trees, over 30 cm diameter at breast height (DBH) should be retained, unless considered a hazard.
- To protect nesting bird species, any clearing of trees and vegetation should be conducted outside of the songbird breeding season (April 1-August 15). If clearing is to occur during the songbird breeding season a QEP should be retained to evaluate the presence of any active nests within areas to be cleared and propose measures to protect these nests.
- Design access to the foreshore to allow for wildlife movement across the riparian area.

5.10 Protection of Fish Habitat

Development of the property should protect fish habitat by adhering to all of the considerations outlined in Section 5. In addition to previous recommendations, water intake pipe diameters should be minimized and fish screens should be installed at the lake end of the intake.

All works in and about Kootenay Lake will require a *Water Sustainability Act* Change Approval or Notification application.

5.11 Management of Equipment and Fuel/Lubricant Materials

Deleterious substances degrade water quality and affect fish and fish habitat. To minimize the likelihood and impact of a spill of a deleterious substance, such as fuels, oils, and lubricants contained in equipment or vehicles used or stored on-site, a spill response plan should be developed.

At a minimum, this plan should:

- Ensure that each piece of heavy equipment is equipped with its own spill response kit that is appropriate to the types and quantities of fluids stored within. The contents of each kit must be replaced immediately after use.
- Ensure that all equipment operators are familiar with the use of spill kits and their contents.
- Store all equipment in a designated area as far from Kootenay Lake and the small unnamed wetland as possible. If equipment cannot be stored > 30 m away from these watercourses, secondary containment will be utilized to capture any potential spills or leaks.

5.12 Invasive Plant Management

Construction activities can potentially increase the prevalence of invasive plant species which can out-compete native riparian vegetation, causing damage to habitat and ecosystem function. The following mitigation measures are recommended to reduce the establishment and proliferation of invasive plant species:

- All equipment should be thoroughly washed and inspected before entering the subject property to prevent the import of new invasive plant seeds and parts.
- Minimize the amount of vegetation clearing and soil disturbance.
- Revegetated all exposed soils immediately following construction.
- Hand-pull common tansy (*Tanacetum vulgare*) and spotted knapweed (*Centaurea stoebe*) located within the SPEA of Kootenay Lake and the small unnamed wetland.

6 CONCLUSION

Most of the subject property proposed for subdivision has been minimally disturbed by historic development activities with most of the riparian areas intact. The proposed subdivision, if completed in accordance with the mitigation measures proposed in this report will be of low magnitude. However, some sensitive habitats were identified on the property including riparian areas and wildlife trees. It is recommended that the proposed riparian setbacks and buffer areas around the raptor nest and perch tree be maintained as no-construction zones, with the possible exception of foreshore access. Any activities proposed within the riparian setbacks should be assessed by a QEP prior to construction.

7 CLOSURE

This report has been prepared by a QEP who has not acted for, or as an agent(s) of the RDCK and was at the expense of the property owner.

I, Fiona Lau, certify that I am qualified to carry out this assessment; and that the assessment methods under the *Regulation* have been followed; and that, in my professional opinion:

- (i) if the development is implemented as proposed, or
- (ii) if the streamside protection and enhancement areas identified in the report are protected from the development, and
- (iii) if the developer implements the measures identified in the report to protect the integrity of those areas from the effects of the development,

then there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area.

Sincerely,



Jennifer Ross, M.Sc., P. Chem.
Masse Environmental Consultants

Reviewed by:



Fiona Lau, A.Sc.T., B.Tech.
Masse Environmental Consultants

8 REFERENCES

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[VIU] Vancouver Island University. 2019. Riparian Areas Protection Regulation Technical Assessment Manual, Version 1. Prepared by the Natural Resources Extension program of Vancouver Island University for the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Fish and Aquatic Habitat Branch, November 2019.

APPENDIX 1
LOCATION MAP

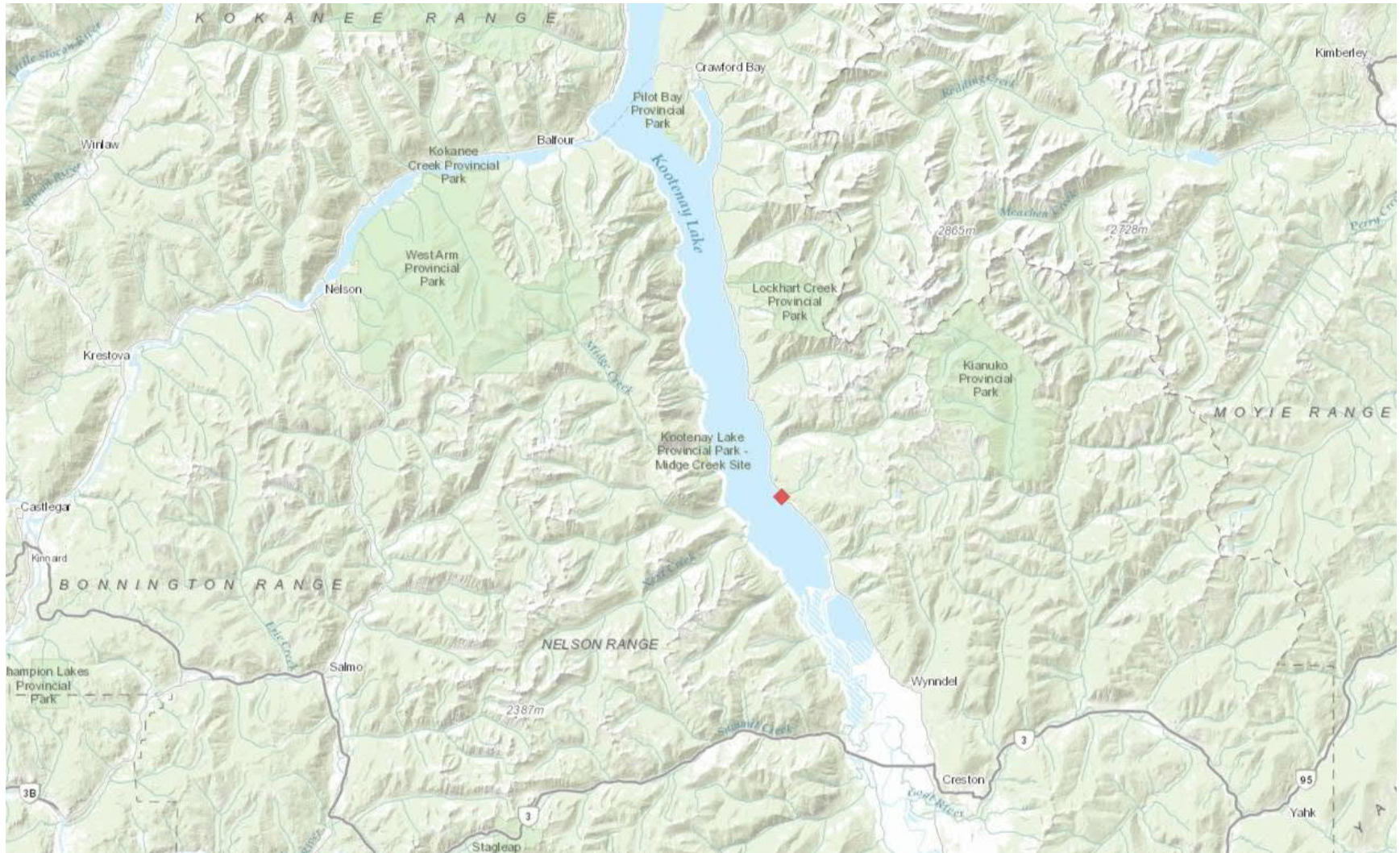


Figure 1. Location Map – 10141 Highway 3A

APPENDIX 2
SITE PLANS

Plan NEP 71491
 Deposited in the Land Title Office at Kamloops B. C.,
 this 28th day of June 2002

I.C.B. Smith
 Registrar

PH 1
 73818

SEE LOT SUBDIVISION PLAN

Plan of Subdivision of Parcel D (RP 115825i), except part included in Plan 8528, District Lot 2637, and of Lot 1, Plan 8323, District Lots 2636B and 15821, Kootenay District.

Scale 1:2000 0 20 40 80 120 160 200 240 B.C.G.S. 82F.037

Legend
 Bearings are Astronomic and are derived from Plan 8528.
 All distances are in metres unless otherwise noted.

- standard concrete post found.
- standard rock post found.
- standard iron post found.
- standard iron post placed.

LEGEND

Kootenay Lake

- ESDP Area (30 m)
- Shade ZOS (0 m - 4 m)
- Litterfall and LWD ZOS (1.5m)
- SPEA (15 m)
- Proposed septic fields
- ★ Wildlife values
- ★ HAP (High Archaeological Potential) Sites

Unnamed wetland

- ESDP Area (30 m)
- Shade ZOS (15-30 m)
- Litterfall and LWD (15 m)
- SPEA (15 - 30 m)

The registered owner designated hereon hereby declares that it has entered into conditions or covenants with Her Majesty the Queen in right of the Province of British Columbia as represented by the Ministry of Health Services and the Regional District of Central Kootenay under Section 219 of the Land Title Act.

The registered owner designated hereon hereby declares that it has entered into conditions or covenants with Her Majesty the Queen in right of the Province of British Columbia as represented by the Ministry of Water, Land and Air Protection and the Regional District of Central Kootenay under Section 219 of the Land Title Act.

Registered Owner
 Premier Resorts Ltd., Reg. No 10521A

Sharie Lynne Miller
 Authorized Signatory

SHARIE LYNNE MILLER
 Printed Name of Above Authorized Signatory

Authorized Signatory

Printed Name of Above Authorized Signatory

Michael Macauley Jamison
 Witness to the above signature(s) of
 Premier Resorts Ltd.
 Name: MICHAEL MACAULEY JAMISON
 Occupation: LAWYER
 Address: 2503-17th Street SW
 CALGARY, ALBERTA
 T2T 5G3

I, Robert A. Griffith, a British Columbia Land Surveyor, of Creston in British Columbia, certify that I was present at and personally superintended the survey represented by this plan, and that the survey and plan are correct. The survey was completed on the 27th day of June, 2002.

Robert A. Griffith

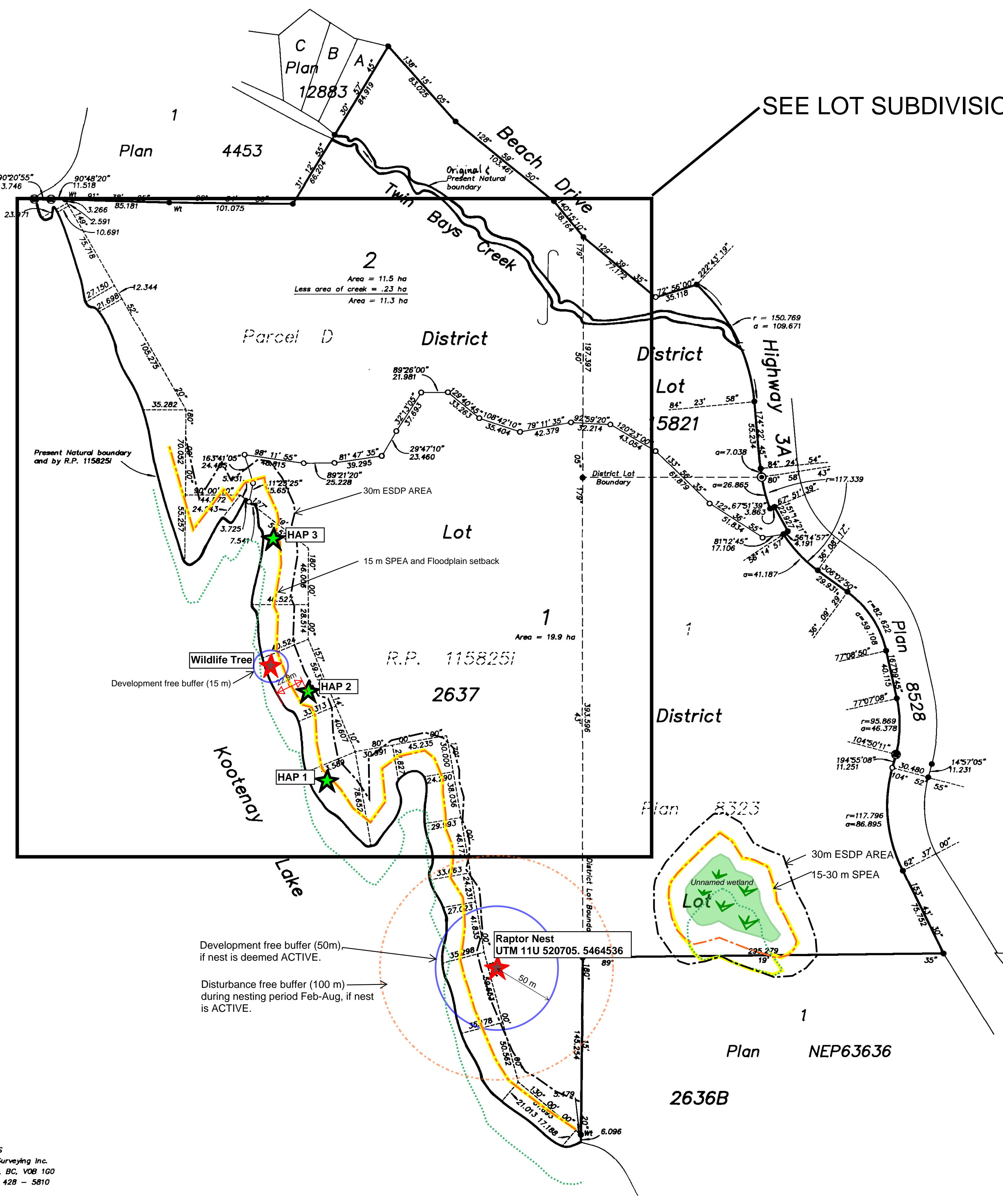
Approved under the Land Title Act
 this 28 day of JUNE 2002

John Murchland
 Approving Officer
 Ministry of Transportation

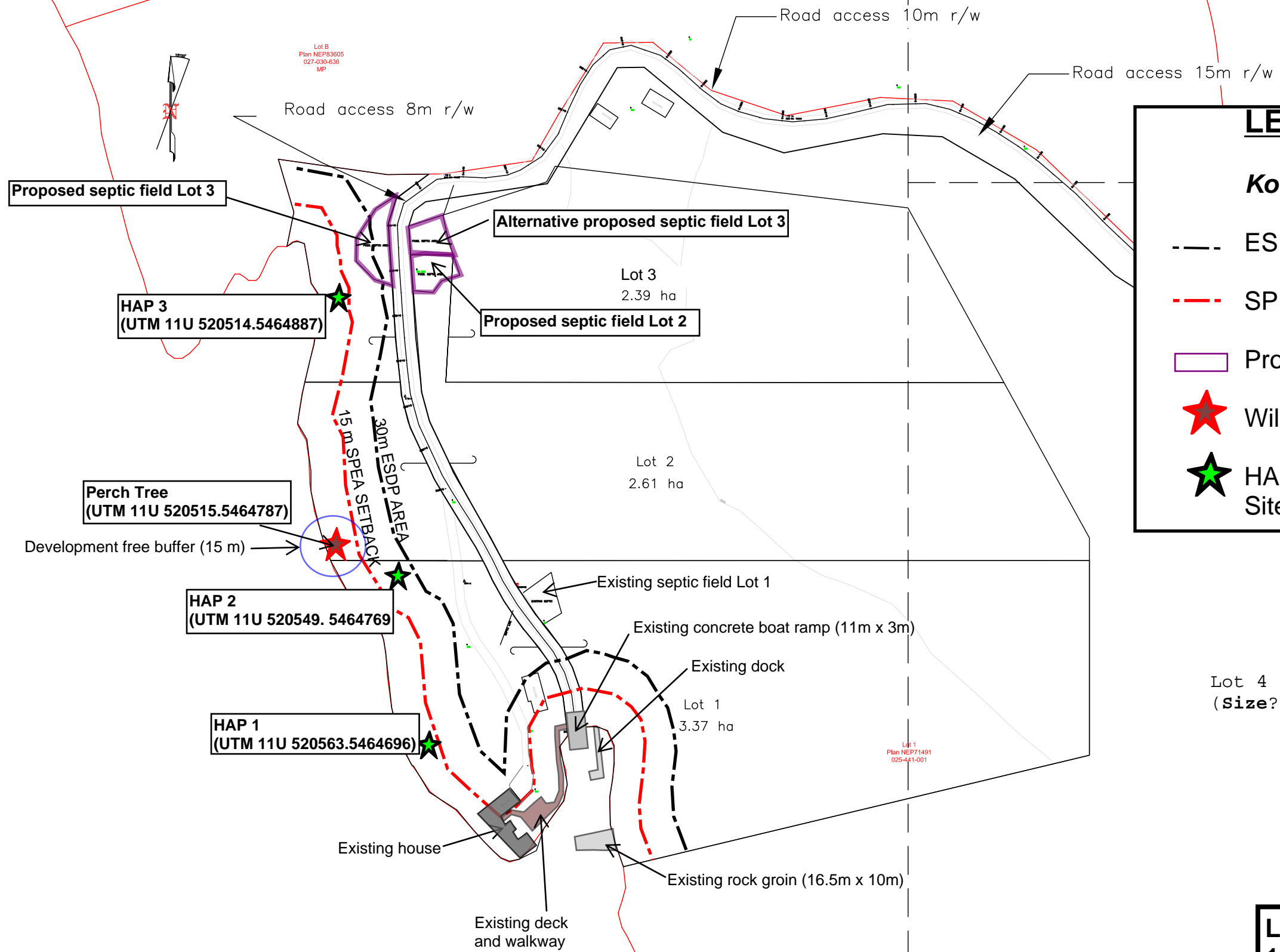
This plan need not comply with Section 75(1)(c) of the Land Title Act.
 Dated this 28 day of JUNE 2002

John Murchland
 Approving Officer
 Ministry of Transportation

Regional District.



GRIFFITH SURVEYS
 R. Griffith Land Surveying Inc.
 Box 158, Creston, BC, V0B 1G0
 Telephone: (250) 428 - 5810
 98081



LEGEND

Kootenay Lake

- ESDP Area (30 m)
- SPEA (15 m)
- Proposed septic fields
- ★ Wildlife values
- ★ HAP (High Archaeological Potential) Sites

Lot Subdivision Plan 10141 Hwy 3a, Kootenay Lake

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	SCALE: 1: 2000	FILE NO. PROJECT NO.	UTM 5464834 N, 520713 E, ZONE 11	P. ENG
	Twin Bays Proposed Subdivision Holbrook Falls	PLAN DETAILS		
East Shore Kootenay Lake	DWG.NO. 1	SHEET 1 OF 1	DATE	REVISION
			INTL	APPR
			DATE	DATE
			(C)	(B)
			(A)	(A)
			DESIGN BY:	DESIGN DATE:
			DRAWING BY:	DESIGN CHECK:

APPENDIX 3
SEPTIC ASSESSMENT LETTER

STEEL WHEELS

562166 BC LTD
PO BOX 266
CRAWFORD BAY, BC
V0B 1E0

Telephone 250 354 8498
Email: dsh.16440@gmail.com

August 19, 2019

To: whom this may concern.

Re: **PROPOSED SUBDIVISION OF LOT 1, Plan NEP 71491, DL 2636B, KLD & DL 2637, 15821.**

It is proposed that this 19.86 ha. property be subdivided into 4 lots; 3, 2 ha. lakeside and the Remainder of approximately 13 ha.

The property is characterized by outcrops of granitic rocks with pockets of loamy sands and sands. Some pockets show evidence of seasonal high water due to impoundment by these rocky out crops. Subsequently most of the sewer discharge should be pressurized at grade or above grade in sand mounds, the most feasible solution.

Proposed LOT 1 has been developed and has a documented primary field in place some 60m from Kootenay lake. The area for this field is adequate for further sewage discharge. Soil samples by auger indicate a medium sand deposit greater than 120 cm. A creek indicated on the RDCK map does not exist.

Percolation rates for LOT 1 indicate a Hydraulic Loading Rate (HLR) of 30 L/D/m² and thus using a 4-bedroom Daily Design Flow (DDF) of 1600 L/Day the Infiltrative Area (AIS) required is 1600 L/Day divided by 30 L/D/m² = 53.3 m².

For 2 areas 106.6 m² is required and a trench-based system could be done with 8 lines 0.9 m x 15 m on 1.2 m centres. The site slopes at 4 – 5% to the south so with 10% added for construction the area required would be 9.2m deep and 16.5 m wide for a total area of 152 m². The available space is 194 m².

Proposed LOT 2

An undeveloped parcel characterized by rocky bluffs and little space for sewage discharge. An area 36 m from the lake was investigated and while space exists for one discharge area there is not enough for two. The area is a long thin pocket 6m x 21m which could be served by a pressurized sand mound. The basal are for such a mound would be based on a type 2 effluent with an HLR of 45 L/D/m².

The proposal of a panhandle to a discharge area near Lot 3 solves this dilemma. See discussion under Lot 3.

Proposed LOT 3

Also undeveloped but with adequate area for sewage discharge. Two areas were identified for discovery. Area 1 west of the access road is 32m from the lake and another, Area 2 across the road is 50+ m from Kootenay Lake. The space closest to the lake could support a single discharge area.

Area 1

$$\text{HLR} = 23 \text{ L/D/m}^2$$

Vertical separation in this proposed area is challenged by restrictive layers at between 70 and 80 cm but this is overcome by even distribution at grade with 60 cm of native soil (SPM 3 Table II- 15).

A pressurized seepage bed is recommended (Table II- 6) and would require 69.5 m². This would be laid out as 4m x 18m plus 10% for a total of 4.4m x 19.8m. The Linear Loading Rate of 90 L/D/ m² requires a minimum length of 17.7m and thus can be met. The discharge area = 87.1 m², 109 m² is available.

Area 2

$$\text{HLR} = 15 \text{ L/D/m}^2$$

With an HLR of 15 L/D/m² and a DDF of 1600 L/D the AIS = 106.6 m². As with area 1 reduced vertical separation due to limiting layers at 50 cm require even distribution with an additional 10 cm of sand.

This area has enough alternate areas for both Lots 2 and 3 with 234 m² available there. The Linear Loading Rate will have to be addressed using either a Toe Blanket (SPM 3 Table III- 5.6.7.1) or Sand Mantle sand mound (SPM 3 Table III- 5.6.7.2).

Remainder

The remainder is approximately 13 ha and has a suitable location for sewage discharge adjacent to HWY 3A, a former campground. The land slopes gently to the north at - 3% and loamy sands prevail. At between 90 - 100 cm a limiting layer with high rock content (Greater than 35%) will require some adjustment to the HLR. Coarse fragment content is estimated at 50% and so the formula in SPM3 Table II- 6 requires a factor of $1 - (0.55 - 0.35) = 0.85$ be applied to the HLR. The adjusted HLR is $23 \text{ L/D/m}^2 \times 0.85 = 19.5 \text{ L/D/m}^2$.

A trench-based system could be constructed using 0.9 m wide trenches on 1.2 m centers with an additional 10% for construction. A LLR of 90 L/D/m requires a minimum length of 17.7 m.

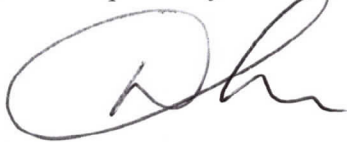
Therefor AIS = $(\text{DDF } 1600 \text{ L/D}) / (\text{HLR} = 19.5 \text{ L/D/m}^2) = 82.05 \text{ m}^2$.

For two systems 10 lines of 0.9 m x 18.2 m plus 10% would require 11.9 m x 20 m for a space of 238 m².

Conclusion

These proposed lots present challenges for trench-based sewage discharge on lots 2 and 3 but pressurization to sand mounds can overcome these obstacles. The remainder presents no such challenges. All proposed septic areas on Lots 2 & 3 shall be covenanted.

Respectfully submitted,



Dave Hough, BSc, ROWP

