# Development Permit Application

Referral Form – RDCK File DP2403A

Date: June 17, 2024

**You are requested to comment on the attached DEVELOPMENT PERMIT for potential effect on your agency's interests. We would appreciate your response WITHIN 30 DAYS (PRIOR TO July 17, 2024). If no response is received within that time, it will be assumed that your agency's interests are unaffected.**

**LEGAL DESCRIPTION & GENERAL LOCATION:**

129 Boulder Beach Road, Kootenay Bay, Electoral Area 'A'

LOT 5 DISTRICT LOT 4595 KOOTENAY DISTRICT PLAN 811, EXCEPT PARTS INCLUDED IN PLANS 3062, 16541, R127, NEP60734, NEP68076, NEP69201 AND NEP72451 (PID: 011-123-877)

**PRESENT USE AND PURPOSE OF PERMIT REQUESTED:**

The subject property currently has two existing houses adjacent to Kootenay Lake and is 11.12 hectares (ha) in size. The portion of this hooked parcel adjacent to Highway 3A (south side) is currently vacant. The residential portion of the site is 3.5 ha in size with roughly 260 metres of lake frontage adjacent to Kootenay Lake. Cabbage Creek also flows through the subject site (proposed Lot B) in a westerly direction.

A rural subdivision application has been submitted to the Province (Ministry of Transportation and Infrastructure) to create three lots and remainder parcel. Proposed residential Lots A (1.41 ha) and B (1.5 ha) are for residential use, whereas Lot C (0.53 ha) is proposed to provide common access. The applicant seeks to subdivide to recognize the above two existing home sites and provide access to these proposed lots.

An Environmentally Sensitive Development Permit (ESDP) is required prior to any consideration of subdivision approval in accordance with the *Electoral Area 'A' Comprehensive Land Use Bylaw No. 2315*. An unauthorized deck and stairway has been constructed at the north end of proposed Lot A, in addition to some minor beach modifications at the south end of proposed Lot B in the ESDP area.

At the June 13, 2024 Regular Open meeting the Regional Board approved a variance to the *Regional District's Subdivision Bylaw No. 2159* Section 9.01 a. to allow for Type 2 treatment systems for proposed residential Lots A and B. A Type 1 system is proposed for the remainder lot. All other servicing requirements, including proof of water remain in effect for this subdivision proposal.

| AREA OF PROPERTY AFFECTED | ALR STATUS | ZONING | OCP |
|---|---|---|---|
| Approx. 3.4 ha | N/A | N/A | Country Residential (RC) |

**AGENT:** 1068616 BC LTD. c/o Ken Crowe

**OTHER INFORMATION: ADVISORY PLANNING COMMISSION PLEASE NOTE:**

If your Advisory Planning Commission plans to hold a meeting to discuss this Development Permit application, please note that the applicants must be provided with an opportunity to attend such meeting, in accordance with Section 461, subsection (8) of the *Local Government Act*, which reads as follows:

*"If the commission is considering an amendment to a plan or bylaw, or the issue of a permit, the applicant for the amendment or permit is entitled to attend meetings of the commission and be heard."*

**Please fill out the Response Summary on the back of this form. If your agency's interests are 'Unaffected' no further information is necessary. In all other cases, we would appreciate receiving additional information to substantiate**

**your position and, if necessary, outline any conditions related to your position. Please note any legislation or official government policy which would affect our consideration of this permit.**

**Stephanie Johnson, PLANNER**
**REGIONAL DISTRICT OF CENTRAL KOOTENAY**

| | |
|---|---|
| ☒ MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE<br>☒ HABITAT BRANCH (Environment)<br>☒ FRONTCOUNTER BC (MFLNRORD)<br>☒ ARCHAEOLGY BRANCH<br>☐ REGIONAL AGROLOGIST<br>☐ ENERGY & MINES<br>☐ MUNICIPAL AFFAIRS & HOUSING<br>☒ INTERIOR HEALTH, HBE TEAM<br>☐ KOOTENAY LAKES PARTNERSHIP (FORESHORE DEVELOPMENT PERMITS)<br>☐ SCHOOL DISTRICT NO.<br>☐ WATER SYSTEM OR IRRIGATION DISTRICT<br>☒ UTILITIES (FORTIS, BC HYDRO, NELSON HYDRO, COLUMBIA POWER) | REGIONAL DISTRICT OF CENTRAL KOOTENAY<br>DIRECTORS FOR:<br>☒ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H ☐ I ☐ J ☐ K<br>ALTERNATIVE DIRECTORS FOR:<br>☒ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H ☐ I ☐ J ☐ K<br>☒ APHC AREA A<br>☐ RDCK FIRE SERVICES<br>☐ RDCK EMERGENCY SERVICES<br>☒ RDCK BUILDING SERVICES<br>☐ RDCK UTILITY SERVICES<br>☐ RDCK RESOURCE RECOVERY<br>☒ RDCK REGIONAL PARKS<br><br>INSERT COMMENTS ON REVERSE . . . |

The personal information on this form is being collected pursuant to *Regional District of Central Kootenay Planning Procedures and Fees Bylaw No. 2457, 2015* for the purpose of determining whether the application will affect the interests of other agencies or adjacent property owners. The collection, use and disclosure of personal information are subject to the provisions of FIPPA. Any submissions made are considered a public record for the purposes of this application. Only personal contact information will be removed. If you have any questions about the collection of your personal information, contact the Regional District Privacy Officer at 250.352.6665 (toll free 1.800.268.7325), info@rdck.bc.ca, or RDCK Privacy Officer, Box 590, 202 Lakeside Drive, Nelson, BC V1L 5R4.

## RESPONSE SUMMARY
## FILE: DP2403A APPLICANT: KEN CROWE

**Name:** **Date:**

**Agency:** **Title:**

RETURN TO: STEPHANIE JOHNSON, PLANNER
DEVELOPMENT AND COMMUNITY SUSTAINABILITY SERVICES
REGIONAL DISTRICT OF CENTRAL KOOTENAY
BOX 590, 202 LAKESIDE DRIVE
NELSON, BC V1L 5R4
Ph. 250-352-1585
Email: plandept@rdck.bc.ca

# RDCK Map


REGIONAL DISTRICT OF CENTRAL KOOTENAY
Box 590, 202 Lakeside Drive,
Nelson, BC V1L 5R4
Phone: 1-800-268-7325 www.rdck.bc.ca
maps@rdck.bc.ca

**Legend**

- Electoral Areas
- RDCK Streets
- Cadastre
- Address Points

**Map Scale:**

1:4,514

Date: January 22, 2024

# RDCK Map


REGIONAL DISTRICT OF CENTRAL KOOTENAY
Box 590, 202 Lakeside Drive,
Nelson, BC V1L 5R4
Phone: 1-800-268-7325 www.rdck.bc.ca
maps@rdck.bc.ca

**Legend**

- Streams and Shorelines
- Lakes and Rivers
- Electoral Areas
- RDCK Streets
- Cadastre
- Address Points

**Map Scale:**

1:4,514

Date: January 22, 2024

# RDCK Map


REGIONAL DISTRICT OF CENTRAL KOOTENAY
Box 590, 202 Lakeside Drive,
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maps@rdck.bc.ca

## Development Permit Areas

- Environmentally Sensitive
- Residential Cluster

**Legend**

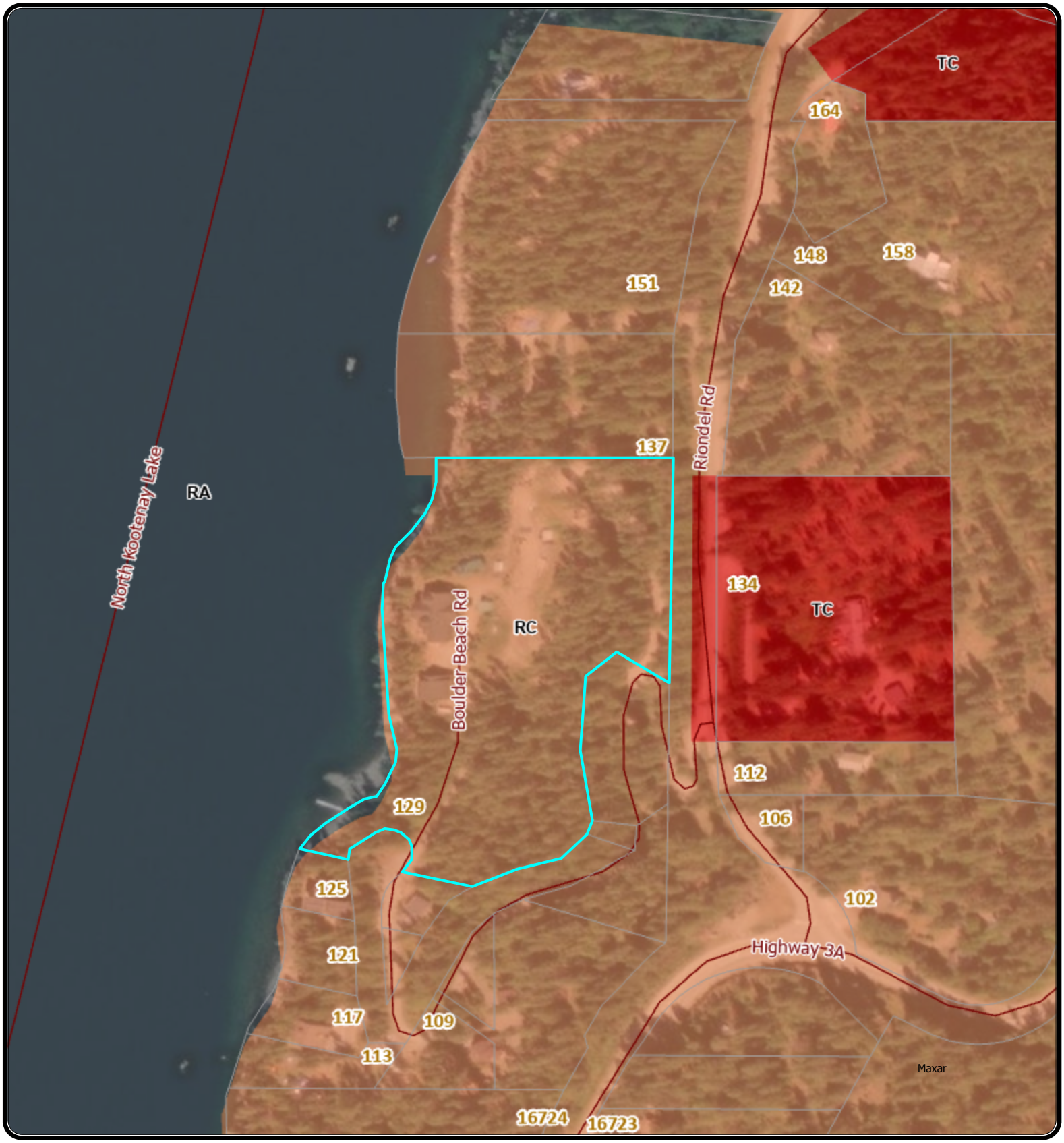
- Electoral Areas
- RDCK Streets
- Cadastre
- Address Points

**Map Scale:**

1:4,514

Date: January 22, 2024

# RDCK Map

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Box 590, 202 Lakeside Drive,
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maps@rdck.bc.ca

## Official Community Plan

- Commercial
- Country Residential

**Legend**

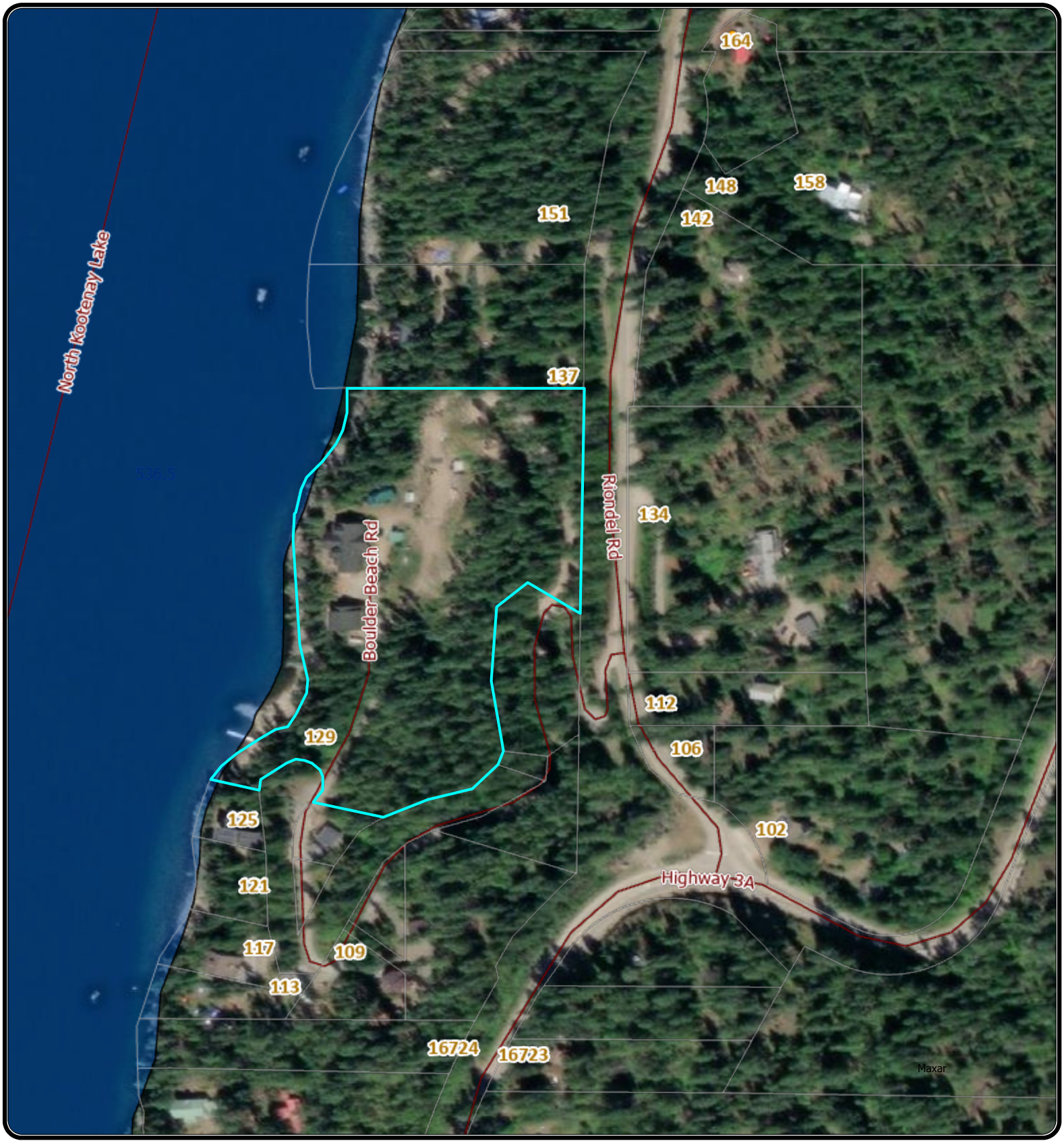
- Resource Area
- Electoral Areas
- RDCK Streets
- Cadastre
- Address Points

**Map Scale:**

1:4,514

Date: January 22, 2024

# RDCK Map

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Box 590, 202 Lakeside Drive,
Nelson, BC V1L 5R4
Phone: 1-800-268-7325 www.rdck.bc.ca
maps@rdck.bc.ca

**Legend**

- Flood Construction Levels - 1990
- Electoral Areas
- RDCK Streets
- Cadastre
- Address Points

**Map Scale:**

1:4,514

Date: January 22, 2024

SUBDIVISION DEVELOPMENT

This proposal summary is quite simple in my mind.

I have two existing houses on a 7-acre sections of land. Both houses are self sufficient with their own hydro and septic in place.

The only work being done is a new access road ordered by MOTI.

There will be no other construction. So, I am basically putting an imaginary line through the property.

This will allow me to sell one of the houses, as no one is interested in buying two.

Both houses will have approximately 3 acres of property.

The 20 acres piece attached to this, is already a separate piece divided by hi-way 3, where I have drilled a well and have type 1 septic approval.

I have done everything by your guidelines and look forward to moving forward.

Respectively

Ken Crowe

# SUBDIVISION APPLICATION PLAN FOR PART OF LOT 5 DL 4595 KD PLAN 811, EXCEPT PARTS INCLUDED IN PLANS 3062, 16541, R127, NEP60734 NEP68076, NEP69201 AND NEP72451.


## LEGEND

Dimensions derived from Plan 811.
All dimensions are in metric.








HANGO LAND SURVEYS
Joshua Hango
BC Land Surveyor
2924 9th Avenue
Castlegar, BC V1N 2Z1
(250) 365-5342
2689-appl
www.hangolandsurveys.com

Drawing date: October 5, 2023

# RDCK Map


Potential hazard tree

Lot 1

Lot Lot 2

Riondel Rd

Boulder Beach Rd

Cabbage Creek

Boulder Beach Rd

129

125

121

LEGEND

- - - - ESDP area and LWD and Leaf Litter ZOS (15 m)

Shade ZOS (0-30 m)

SPEA ( 15m - 30 m)

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maps@rdck.bc.ca

**Legend**

- Electoral Areas
- RDCK Streets
- Cadastre - Legal Parcels
- Address Points

**Map Scale:**

1:2,000

N W E S

Date: August 24, 2023

## 16.0 DEVELOPMENT PERMIT AREAS

**Background**

The OCP may designate Development Permit Areas under the authority of local government legislation. Unless otherwise specified, a development permit must be approved by the Regional Board, or delegate of the Board, prior to any development or subdivision of land within a designated Development Permit Area.

Development Permit Areas allow for implementation of special guidelines for the protection of the natural environment, protection from hazardous conditions, for revitalization of designated areas, or to guide the form and character of development within the Plan Area. Development Permit Areas can also be used to meet targets for carbon emission reductions and energy and water conservation.

Where land is subject to more than one Development Permit Area designation, a single development permit is required. The application will be subject to the requirements of all applicable Development Permit Areas, and any development permit issued will be in accordance with the guidelines of all such Areas.

### Development Permit Area #1: Environmentally Sensitive Development Permit (ESDP) Area

**Category**

The ESDP area is designated under Section 488.1(1) (a) of the *Local Government Act* for the protection of the natural environment, its ecosystems and biological diversity.

**Justification**

The primary objective of this Development Permit Area designation is to regulate development activities in watercourses, lakes and wetlands and their adjacent riparian areas so as to protect aquatic habitat; and to conserve, enhance and, where necessary, restore watercourses and their riparian areas.

**Area**

The ESDP area is comprised of:

1. Riparian assessment areas (Figure 1) for fish and wildlife habitat and drinking water, including:
    a. All areas within 15 metres of the high water mark of a watercourse, including the natural boundary of a lake;
    b. within 15 metres of the top of the ravine bank in the case of a ravine less than 60 metres wide; and
    c. within 5 metres of the top of the ravine bank in the case of a wider ravine that links aquatic to terrestrial ecosystems and includes both existing and potential riparian

vegetation and existing and potential upland vegetation that exerts an influence on the watercourse.

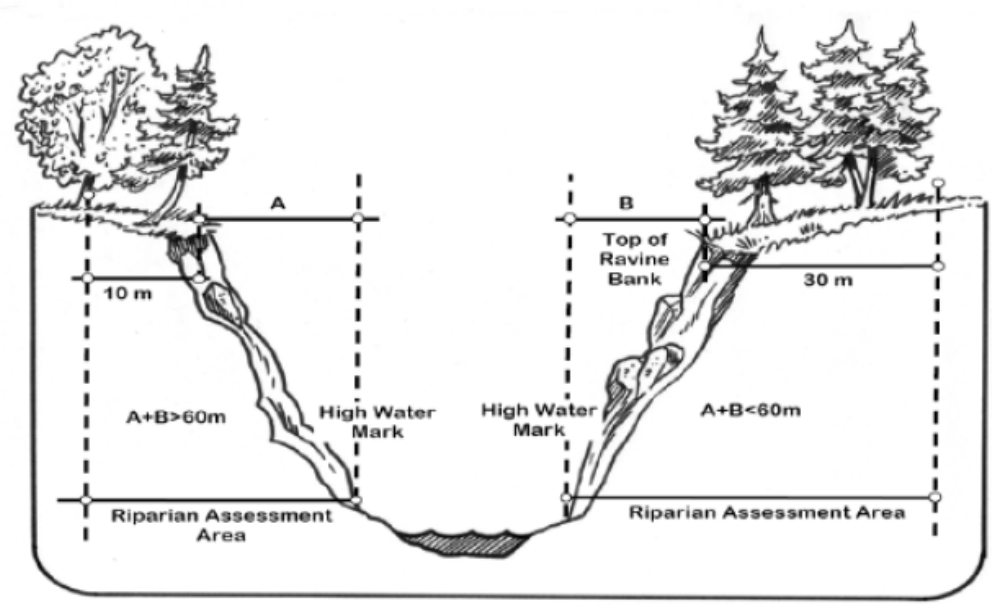


**FIGURE 1**: (for illustrative purposes only) RIPARIAN ASSESSMENT AREA: means the area within 15 m of the high water mark of a watercourse; within 15 m of the top of the ravine bank in the case of a ravine less than 60 m wide; and within 5 m of the top of the ravine bank in the case of a wider ravine that link aquatic to terrestrial ecosystems and includes both existing and potential riparian vegetation and existing and potential upland vegetation that exerts an influence on the watercourse. This DPA applies only to residential, commercial and industrial designations.

Source: British Columbia Ministry of Environment, *Riparian Areas Regulation Implementation Guidebook,* March 2005

Where the following definitions apply:

**High water mark** means the visible high water mark of a watercourse 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 watercourse a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes the active floodplain.

**Lake** means any area of year round open water covering a minimum of 1.0 hectares (2.47 acres) of area and possessing a maximum depth of at least 2.0 metres. Smaller and shallower areas of open water may be considered to meet the criteria of a wetland.

**Top of ravine bank** means the first significant break in a ravine slope where the break occurs such that the grade beyond the break is greater than 3:1 for a minimum distance of 15 m measured perpendicularly from the break, and the break does not include a bench within the ravine that could be developed.

**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 kilometres (0.8 square miles) or more upstream of the point of consideration.

**Wetland** means any areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

**Guidelines**

A development permit is required, except where specified under the exemptions section, for development or land alteration on land identified as a riparian assessment area within the ESDP Area. Where not exempt, development requiring a development permit includes any of the following associated with or resulting from residential, commercial or industrial activities or ancillary activities to the extent that they are subject to local government powers under local government legislation or when triggers by the requirements of a building permit or subdivision approval:

a. removal, alteration, disruption or destruction of vegetation;
b. disturbance of soils;
c. construction or erection of buildings and structures;
d. creation of non-structural impervious or semi-impervious surfaces;
e. flood protection works;
f. construction of roads, trails, docks, wharves and bridges;
g. provision and maintenance of sewer and water services;
h. development of drainage systems;
i. development of utility corridors; and
j. subdivision as defined in section 455 of the *Local Government Act*;

**Development shall be in accordance with the following guidelines:**

2. All development proposals subject to this permit will be assessed by a Qualified Environmental Practitioner (QEP) or Registered Professional Biologist (RP Bio) in accordance with the Riparian Areas Regulation established by the Provincial and/or Federal governments as used elsewhere in the Province;
3. An ESDP shall not be issued prior to the RDCK ensuring that a QEP or RP Bio has submitted a report certifying that they are qualified to carry out the assessment, that the assessment methods have been followed, and provides in their professional opinion that a lesser setback will not negatively affect the functioning of a watercourse or

riparian area and that the criteria listed in the Riparian Areas Regulation has been fulfilled, and;

4. The Riparian Areas Regulation implemented through the ESDP does not supersede other Federal, Provincial and or local government requirements, including that of other development permit areas, building permits, flood covenants, Federal or Provincial authorization. Land subject to more than one development permit area designation must ensure consistency with the guidelines of each development permit area, to provide comprehensive stewardship of both fish and wildlife habitat.

**Exemptions**

The ESDP area does not apply to the following:

5. existing construction, alteration, addition, repair, demolition and maintenance of farm buildings and agricultural activities including clearing of land for agricultural purposes;
6. existing institutional development containing no residential, commercial or industrial aspect;
7. construction, renovation, or repair of a permanent structure if the structure remains on its existing foundation. Only if the existing foundation is moved or extended in to a riparian assessment area would a ESDP be required; and
8. an area where the applicant can demonstrate that the conditions of the ESDP Area have already been satisfied or a development permit for the same area has already been issued in the past and the conditions in the development permit have all been met, or the conditions addressed in the previous development permit will not be affected.

**Development Permit Area #2: Residential Cluster Development Permit (RCDP) Area**

**Designation**

The RCDP area is designated under Section 488.1(1) (a) and (e) of the *Local Government Act* for protection of the natural environment, its ecosystems and biological diversity and the establishment of objectives for the form and character of intensive residential development.

**Area**

The RCDP Area is comprised of all privately owned or leased lands designated as Suburban Residential (RS), Country Residential (RC), Multi-Family Residential (RM), and Mixed Use Residential (RMU) on Schedule 'A.1'.

**Justification**

The intent of the RCDP Area is to ensure that intensive residential development is completed in a manner that is sensitive to the rural character of the Plan area, adjoining lands, the natural environment, and achieves a high standard of appearance. Lands in the Plan Area have not been studied to a high level for their ability to sustain intense development over the long term. It is therefore desirable to allow development to occur in a manner which allows for efficient

MASSE ENVIRONMENTAL

# 129 Boulder Beach Road, Crawford Bay BC
# Riparian Assessment (V1.2)

Prepared for:

**Regional District of Central Kootenay**

202 Lakeside Drive

Nelson, BC, V1L 5R4

November 8, 2023

Prepared by:
Masse Environmental Consultants
812 Vernon Street
Nelson, BC, V1L 4G4

Project Number 2023-1071

Disclosure Statement

This report has been prepared by Fiona Lau BTech., AScT, and reviewed by Ico de Zwart, PhD Chem, RPBio.

I, Fiona Lau, hereby certify that:

a) I am a qualified environmental professional (QEP), as defined in the Riparian Areas Regulation made under the Fish Protection Act;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer;
c) I have carried out my 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 assessment methods set out in the Schedule to the Riparian Areas Protection Regulation.

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.

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## List of Appendices

# 1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Ken Crowe (Owner) to conduct a riparian assessment to accompany an application for an Environmentally Sensitive Development Permit (ESDP) on his waterfront property at 129 Boulder Beach Road, Crawford Bay, BC (PID 011-123-877; Lot 5 Plan NEP811 District Lot 4595 Kootenay Land District Except Plan 3062 16541 R127 NEP60734 NEP68076 NEP69201 NEP72451, Fore Foreshore See 786-04737.101). The ESDP is being triggered as the Owner is proposing the following:

- Subdivision of the 27.5 acre property into three parcels - Lot 1 (~4.3 ac), Lot 2 (~4.3 ac) and Lot 3 (~18.9 ac); and
- Authorization of a newly constructed access stairway and deck at the north end of proposed Lot 1 within the 15 m ESDP area of Kootenay Lake.

A site visit was completed on July 26, 2023, by Fiona Lau, B.Tech., AScT., to conduct a riparian assessment of the property. The riparian assessment evaluates the existing conditions of the riparian area (up to 30 m from the natural boundary of Kootenay Lake), identifies habitat values, assesses potential environmental impacts, and recommends measures to mitigate or compensate for the alteration of the riparian area to maintain environmental values. It is based on the following regulatory framework and best management practices documents:

- Electoral Area 'A' Rural Official Community Plan Bylaw *No. 2315, 2013*
- British Columbia Riparian Areas Protection Regulation
- Kootenay Lake Shoreline Management Guidelines
- British Columbia Water Sustainability Act
- Federal Migratory Birds Convention Act
- General BMPs and Standard Project Considerations (Ministry of Environment)
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in British Columbia
- On the Living Edge: Your Handbook for Waterfront Living

# 2 PROJECT OVERVIEW

## 2.1 Site Description

### 2.1.1 Location

The subject property is located at 129 Boulder Beach Road in Area A of the Regional District of Central Kootenay (RDCK), approximately 3.3 km west of Crawford Bay, BC (see Appendix 1 for Location Map). The property is ~27.5 acres, with ~260 m of frontage on the Main Arm of Kootenay Lake. The foreshore portion

of the property (proposed Lots 1 and 2) is bordered by private properties to the north and south, MoTI Right of Way (RoW) to the east, and Kootenay Lake to the west. The upland portion of the property (proposed Lot 3) is located across Hwy 3A.

The property within the assessment area (proposed Lots 1 and 2) has a western aspect, with elevations ranging from 534 to 600 m and is located along the east shore of the Main Arm of Kootenay Lake. The property is steep (up to 75%) along the rocky shoreline and flattens out with more gentle slopes ~15-18 m east from the natural boundary.

The area falls within the Very Dry Warm Interior Cedar Hemlock (ICHxw) biogeoclimatic subzone. The ICHxw is a relatively small subzone occurring at low elevations in the southernmost parts of the Columbia Basin in BC (MacKillop and Ehman 2016). The climate is characterized by very hot, very dry summers and mild dry winters (MacKillop and Ehman 2016). The ICHxw subzone contains forests with a diverse assemblage of tree and shrub species and a disproportionately large number of wildlife and plant species at risk (MacKillop and Ehman 2016).

### 2.1.2 Watercourses

Two watercourses were identified on the subject property: Kootenay Lake (Photo 1) and Cabbage Creek (Photo 2).

Kootenay Lake

Kootenay Lake borders the subject property along the western boundary; it is a long, narrow and deep lake with a surface area of approximately 400 $km^2$. Kootenay Lake's main inflows include the Lower Duncan River to the north and the Kootenay River to the south and drains through the West Arm into the Kootenay River. Lake levels can vary up to 4 m throughout the year, affecting the extent of the exposed shoreline.

The foreshore of the property consists of a rocky shoreline with a varying beach gradient of 12-35 % slope. Substrate consists of boulders and exposed bedrock, with angular cobble and gravel intermixed (Photo 1, Photo 7 and Photo 8).

The visible natural boundary of Kootenay Lake was observed to be approximately along the western property line (Parcelmap BC 2023). The natural boundary is commonly referred to as the "high water

mark" around a lake or wetland. Based on the definition of high water mark[1], the property boundary shown on the site plan (Appendix 2) will be used to delineate the 15 m RDCK ESDP area and streamside protection and enhancement area (SPEA) setbacks in accordance with the Riparian Area Protection Regulation (RAPR).

Cabbage Creek

Cabbage Creek flows through the subject property in a westerly direction, is ~550 m in length, has an average bed depth of ~ 0.15 cm (6"), and has a watershed area of ~ 0.16 km$^2$. Cabbage Creek flows in the spring (~late March to July) and becomes wetted again in the fall (October-November). The channel is defined along certain sections and some sections flow subsurface during drier periods (Photo 2).

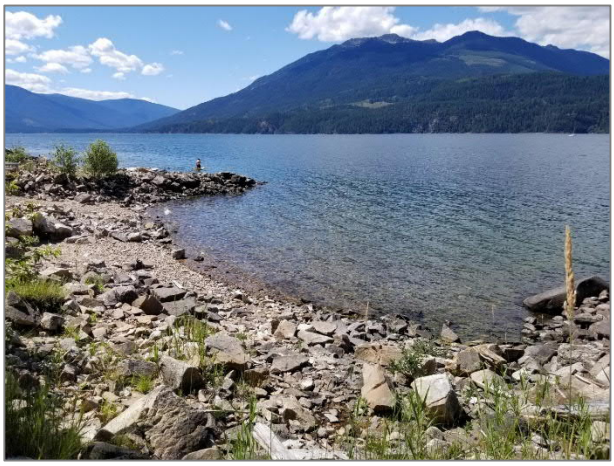

Photo 1. Kootenay Lake foreshore along the west side of the property (July 26, 2023).

Photo 2. Cabbage Creek showing a section of the creek where flows were subsurface at the time of the site visit (July 26, 2023).

### 2.1.3 Riparian Vegetation

The riparian area is relatively undisturbed with existing development sited largely outside of the 15 m ESDP area. The riparian area along Kootenay Lake foreshore is steep and rocky, with a shallow topsoil layer and supports a mix of both mature and young native trees, shrubs and herbaceous species (Photos 3-5). Trees species consist of Interior Douglas-fir (Pseudotsuga menziesii), lodgepole pine (Pinus contorta),

[1] High water mark means the visible high water mark of a watercourse 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 watercourse a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself, and includes the active floodplain (RDCK 2013).

paper birch (Betula papyrifera), Western redcedar (Thuja plicata) and regenerating black cottonwood (Betula occidentalis) on the beach. The shrub community includes bebbs willow (Salix bebbiana), Douglas maple (Acer glabrum), kinnikinnick (Arctostaphylos uva-ursi), mountain alder (Alnus incana), red-osier dogwood (Cornus sericea), rose sp (rosa sp), soopalallie (Shepardia canadensis) and thimbleberry (Rubus parviflorus). Herbaceous species include bracken fern (Pteridium aquilinum), common wormwood (Artemisia absinthium) and grass spp. (Poa spp.). The riparian vegetation provides shade, litterfall and insect drop that benefit aquatic organisms in Kootenay Lake.

Non-native species observed within the riparian area included chicory (Cichorium intybus), Himalayan blackberry (Rubus armeniacus; Photo 6), spotted knapweed (Centaurea stoebe), oxeye daisy (Leucanthemum vulgare) and scotch broom (Cytisus scoparius). These species were present along the foreshore access path.

Photo 3. Shallow soil with mixed

Photo 4. Herbaceous vegetation sited at the mouth of the unnamed tributary.

Photo 5. View of riparian vegetation along the foreshore at the south end of the site.

Photo 6. Patch of Himalayan blackberry within the riparian area below the access road.

### 2.1.4 Aquatic Habitat

Fish habitat along this section of foreshore consists of both shallow water and pelagic (deeper) water habitat (Photo 7 and Photo 10). Shallow foreshore areas are used for rearing by smaller fishes and broadcast spawning by non-sport fish species (i.e peamouth chub (Mylocheilus caurinus) and northern pikeminnow (Ptychocheilus oregonensis)). Several species of regional interest reside in Kootenay Lake including Kokanee (O. nerka), Rainbow Trout, Bull Trout (Salvelinus confluentus; BC-Blue-Listed; SARA Special Concern), White Sturgeon (Acipenser transmontanus pop.1; BC Red-Listed, SARA Endangered), Westslope Cutthroat Trout (O. clarki lewisi; BC Blue-Listed; SARA Special Concern), and Burbot (Lota lota pop.1; BC-Red-Listed).

Mussel beds have been identified along the shoreline of Kootenay Lake in multiple locations both on the West Arm and main body of the lake. No evidence of mussels was seen on the shoreline (ie. mussel shells). A mussel survey was not conducted to determine presence or absence, as no works are proposed below the HWM.

Photo 7. Shallow waters looking north at south end of property.

Photo 8. View of shallow shelf along foreshore edge, moving to deeper water.

### 2.1.5 Wildlife Habitat

Riparian ecosystems offer important habitat features for wildlife, affording them essential resources like water, shelter, and food. These areas frequently serve as migration corridors connecting aquatic, riparian, and upland environments, playing a pivotal role in the life cycles of numerous species.

Mature conifer and deciduous trees along the shoreline provide suitable perch and nesting habitat for raptors, while wildlife snags provide ideal nesting and feeding habitat for cavity dwellers and bats. The

riparian habitat, specifically along the southern portion of the property provides suitable songbird nesting habitat, as the forest was denser and provided more protection to nesting birds.

Warm rocky sites provide suitable habitat for reptiles such as garter snakes (Thamnophis spp.), Northern alligator lizard (Elgaria coerulea), Northern rubber boa (Charina bottae), and Western skink (Plestiodon skiltonianus). Rocky outcrops with warm exposure along the foreshore provide basking sites, food sources and cover habitat for reptiles. The site supported all the above habitat features.

During the site assessment the following wildlife observations were documented:

- White tailed deer (Odocoileus virginianus) droppings on the beach.
- Pileated woodpecker (Dryocopus pileatus) feeding cavities on a western red cedar at the south end of the property outside of the SPEA (Photo 9).
- Small migratory songbird nest made of grass and small sticks in Interior Douglas fir tree at the south end of the property outside of SPEA (Photo 10).

Photo 9. Pileated woodpecker cavities on cedar tree at south end of property (proposed Lot 2).

Photo 10. Small grass nest in Interior Douglas fir tree at south end of property (proposed Lot 2).

### 2.1.6 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. In addition, the Wildlife Species Inventory observation points within iMap BC and INaturalist were also queried for nearby observations within a 5 km buffer around the property.

The search identified three species at risk that have potential occurrence likelihoods of 'possible' or 'likely' on the property:

1) Western skink (BC blue listed; COSEWIC and SARA Special Concern) recorded observation near Pilot Bay Provincial Park ~4.6 km away. Subject property provides potential skink habitat.
2) Banded tigersnail (Angusoira kochi; BC blue listed) recorded observations at Kootenay Bay ~1.2 km away and Crawford Bay ~3.5 km away. Subject property provides potential habitat for snails along Cabbage Creek.
3) Northern rubber boa (COSEWIC and SARA Special Concern) recorded observation near Pilot Bay ~4.6 km away.

The subject property is within the Southern Mountain Caribou (Rangifer tarandus; BC Red listed; SARA Endangered) critical habitat polygon (Matrix Range 2; EC 2014). Matrix range is the area adjacent to core habitat that has periodic or low use by caribou but supports primary prey and associated predators that have the potential to affect the caribou subpopulation. Critical habitat attributes for matrix range are those that provide "ecological conditions that allow for low predation risk, defined as wolf population densities of < 3 wolves/1000km$^2$" (EC 2014).

### 2.1.7 Invasive Species

Central Kootenay Invasive Species Society (CKISS) manages invasive species using a prioritized approach. The management strategy for a specific species is based on a number of factors including the phase of invasion and the potential impacts of the species (CKISS 2023). Priority species lists can be found at https://ckiss.ca/species/invasive-plant-priority-lists/. It is recommended that species identified for Prevention (1), Eradication (2) and Containment (3) as per the Priority List developed by CKISS be managed accordingly within the SPEA. Based on the CKISS 2023 Priority List, both Himalayan blackberry and Scotch broom were identified as Priority Level 3 species.

Refer to Section 5.105.10 for recommended invasive species management within SPEA.

## 2.2 Existing Development

The property is mostly undeveloped within the 15 m ESDP area with the exception of the existing access trail (Photo 11), two water lines and recent unauthorized stairway and deck construction at the north end of the property (Photo 12). This work has been halted until the Development Permit has been approved.

Existing development beyond the 15 m ESDP area but within the 30 m riparian assessment area consists of two existing homes and a driveway (Photo 13). Existing work located on Crown Land within Kootenay

Lake includes a dock and some minor beach modifications at the south end of the property (relocation of larger cobble and boulders to create a small beach area and construction of two rock groynes (Photo 1).

Each house is serviced by their own waterline extracted from Kootenay Lake and their own septic field located east of the homes outside of the 30 m setback. Refer to Appendix 3 for existing site plan of the waterline and septic field locations.

Photo 11. View of access trail down to foreshore at south end of property (July 26, 2023).

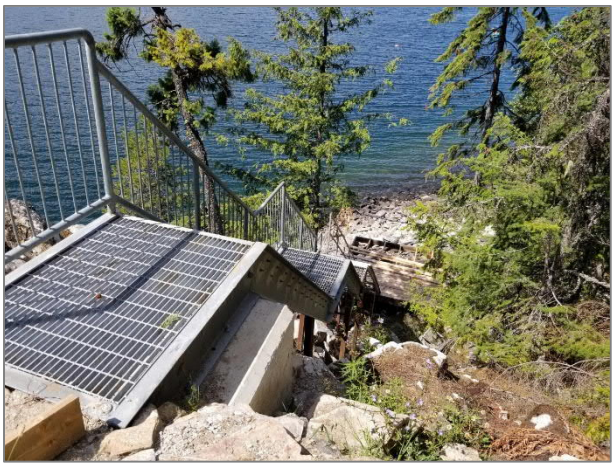

Photo 12. View of partially constructed metal grate stairway and deck (July 26, 2023).

Photo 13. View of two homes within the 30 m riparian assessment area (July 26, 2023).

### 2.3 Proposed Development

The Owner is seeking approval for a 3-lot subdivision and the authorization of the foreshore access (stairway and deck) on proposed Lot 1. The foreshore access includes:

- An elevated stairway (15 m long by 1 m wide) with a total area of 15 $m^2$. The stairway is located over a steep rocky embankment down to the foreshore. It is constructed with metal grate and handrail, steel posts and concrete footings.
- An elevated wood deck (3.5 m x 3.5 m) with a total area of 12.25 $m^2$ located within the property boundaries and above the natural boundary.

Both the stairway and deck will be the only foreshore access for proposed Lot 1, once the property has been subdivided. Refer to Appendix 2 for proposed stairway and deck location.

### 2.4 Archeological and Heritage Resources

The subject property was flagged as moderate archaeological risk; however, further assessment of archaeological risk is beyond the scope of this report. For further information please consult the Kootenay Lake Shoreline Guidance Document (KLP 2020).

Kootenay Lake is part of the traditional territory of the Ktunaxa, Sinixt and Syilx (Okanagan) First Nations and archaeological evidence is documented at multiple sites along the shoreline and mountain sides of Kootenay Lake. Archaeological Chance Find Procedures are provided in Appendix 4 for guidance on which protocols to follow in the event of a chance archaeological find to ensure that archaeological sites are documented and protected as required for compliance with the BC Heritage Conservation Act.

## 3 Regulatory Overview

### 3.1 Cabbage Creek Regulatory Review

Cabbage Creek was assessed to determine whether it met the definition of a “watercourse” and or “stream” under the Electoral Area ‘A’ Rural Official Community Plan Bylaw No. 2315, 2013 and BC Water Sustainability Act. The streams characteristics were compared to the definitions of a “stream” or “watercourse” under the applicable legislation (Table 1).

Table 1. Unnamed stream observations and comparison with legislation

| Criteria | Observations | Conclusion |
|---|---|---|
| RDCK Area A OCP enabled under the Local Government Act:<br>"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. | It was confirmed that the stream flows at least 6 months of the year; however, the stream banks are not all well-defined and have an average bed depth of ~0.15 cm. Some areas of the stream flow subsurface. The drainage area is 0.16 $km^2$ km. | The unnamed stream does not meet the definition of a "watercourse". |
| Water Sustainability Act:<br>A "stream" means (a) a natural watercourse, including a natural glacier course, or a natural body of water, whether or not the stream channel of the stream has been modified, or (b) a natural source of water supply, including without limitation, a lake, pond, river, creek, spring, ravine, gulch, wetland or glacier, whether or not usually containing water, including ice, but does not include an aquifer. | Cabbage Creek is a natural drainage which contains water and flows >6 months a year. At the time of the site visit, some sections of the creek had water and other sections were flowing subsurface. | Cabbage Creek meets the definition of a "stream" under the Water Sustainability Act. |

Based on stream characteristics, Cabbage Creek does not meet the definition of a "stream" under the Area A OCP; however, it is considered a stream under the BC Water Sustainability Act. Any works below the high water mark (HWM) of Cabbage Creek will require a Section 11 Notification or Approval through Front Counter BC.

### 3.2 Riparian Area Protection Regulation (RAPR) Review

The 15 m ESDP setback from the stream boundary of Kootenay Lake was compared with the Riparian Area Protection Regulation (RAPR) criteria by conducting a detailed assessment of the subject property in order to calculate the Streamside Protection and Enhancement Area (SPEA) setback. Results for the Zones of Sensitivity (ZOS) and SPEA are presented in Table 2 and Appendix 2.

As per the RAPR, the SPEA from the natural boundary of Kootenay Lake is 15-30 m. The majority of the SPEA within the subject property is 15 m with exception to the southwest corner which extends up to 30 m.

Table 2. Results of detailed RAPR assessment for Kootenay Lake.

| Feature Type | SPVT[1] | Zones of Sensitivity | | | SPEA[3] |
|---|---|---|---|---|---|
| | | LWD[2] | Litter fall | Shade | |
| Kootenay Lake | TR | 15 m | 15 m | 0-30 m | 15-30 m |

[1] SPVT: site potential vegetation type (TR-tree)

[2] LWD- large woody debris

[3] SPEA- streamside protection and enhancement area

## 3.3 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Integrated Management Planning (FIMP; Schleppe and McPherson 2022), the Foreshore Inventory Mapping (FIM; KLP 2023) and the Kootenay Lake Shoreline Management Guidelines (KLP 2020) were used to help determine site-specific risks for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline (Table 3). The property is within FIM segment 134.

Table 3. Aquatic and archaeological risk results

| Aquatic Habitat Index Rating (AHI) | Aquatic Sensitivity | Archaeological Risk | Enhanced Engagement Required (Work below HWM) |
|---|---|---|---|
| Moderate | Non-Sensitive | Moderate | Yes |

# 4 IMPACT ASSESSMENT

The impact assessment considered the existing site conditions, construction of the stairway / deck and the proposed subdivision. Effects of the proposed development included the minor removal of riparian vegetation within the stairway footprint (15 $m^2$), and permanent loss of riparian habitat within the deck area (12.5 $m^2$), totalling a potential impact area of 27.5 $m^2$.

The stairway is elevated approximately 1 meter above the ground and utilizes steel grating as the decking material, which allows light to penetrate through for the benefit of vegetation growth. This design also provides passage underneath for small animals. Larger mammal migration is not expected to be impacted as the riparian area is very steep within this section and mammals would most likely use the beach area below or the plateau above for lateral movement within the riparian area. Construction-related impacts are expected to be minimal, with a projected construction duration of approximately one day to complete the decking and no further vegetation removal or soil disturbance.

The property owner chose an appropriate alignment for the stairway and deck to minimize the impact on riparian vegetation, including the preservation of mature trees and shrubs. Effects to fish and fish habitat

are expected to be minimal due to the small footprint of the development; however, any permanent loss of riparian vegetation adds to the cumulative impacts around Kootenay Lake and the reduction of both wildlife and fish habitat.

Considering the relatively small overall footprint of the project and the implementation of protective measures outlined below, any adverse effects on the SPEA are expected to be minimal. Furthermore, there are no foreseen impacts associated with the proposed subdivision of the property since all necessary service infrastructure within the SPEA was already installed during a previous development phase.

# 5 Measures to Protect the Integrity of the SPEA

This section provides measures to protect the integrity of the SPEA as described in the RAPR, as well as recommended best management practices.

## 5.1 Danger Trees

No danger trees were identified within the SPEA; however a danger tree assessor was not retained.

## 5.2 Windthrow

Fallen trees were observed along the shoreline; most likely due to shallow root structure and strong winds. Further assessment of windthrow risk is beyond the scope of this report, and any such assessment should be led by a Registered Professional Forester (RPF).

## 5.3 Slope Stability

No slope stability hazard indicators were observed during the site visit. Further assessment of geotechnical hazard is beyond the scope of this report, and any such assessment should be led by a P.Geo, or P.Eng.

## 5.4 Protection of Trees and Vegetation in the SPEA

No further clearing of vegetation is proposed for the completion of the stairway and the deck. The stairway and deck were constructed within an area with very little vegetation.

## 5.5 Encroachment

Additional development on the site should occur outside of the SPEA (see Appendix 2) as there is ample space on both lots. If future development within the 15 m ESDP is proposed, a new ESDP application will be required prior to any construction.

### 5.6 Sediment and Erosion Control

There are no erosion and sediment control concerns.

### 5.7 Stormwater Management

There are no stormwater management concerns.

### 5.8 Floodplain Concerns

There are no floodplain concerns observed on the subject property.

### 5.9 Fish and Wildlife Protection

There are no measures required to protect fish or wildlife. The stairway and deck are located on steep rocks and are elevated off the ground and allows wildlife to traverse the area.

### 5.10 Invasive Plant Management

It is recommended that Himalayan blackberry and Scotch broom, both identified as Priority Level 3 species by CKISS (2023) are managed within the SPEA to help contain and reduce their further establishment and proliferation. Management procedures for each species is provided in Appendix 5.

## 6 Mitigation and Monitoring Plan

The Shoreline Management Guidelines for Kootenay Lake outlines general principles for shoreline development in order to achieve a "No Net Loss" of habitats present. The principle is achieved by applying the following priority sequence of mitigation options: 1. Avoidance of environmental impacts; 2. Minimization of unavoidable impacts; 3. On-site restoration; and 4. Offset residual impacts that cannot be minimized through compensation (KLP 2018).

The proposed development within the SPEA has demonstrated the principle of "Minimization". The SPEA on the property remains mostly undisturbed; therefore, on-site restoration to compensate for the permanent loss of habitat within the deck footprint is limited to the recommended invasive plant management within SPEA (Section 5.10). Invasive plant management will need to be an ongoing effort by the Owner and immediate results are not anticipated. The construction of the stairway and deck are substantially complete; therefore, additional monitoring and/ or post inspection are not proposed.

## 7 CONCLUSION

There are no expected impacts with the proposed subdivision of the property as all the service infrastructure within the SPEA has already been installed during previous development. Provided that measures to protect the SPEA are followed, any negative impacts from the proposed authorization of the stairway and deck are anticipated to be minimal.

Sincerely,

Fiona Lau, BTech., AScT
fiona@masseenvironmental.com

Reviewed by:

Ico de Zwart, PChem, RPBio
Masse Environmental Consultants

# 8 REFERENCES

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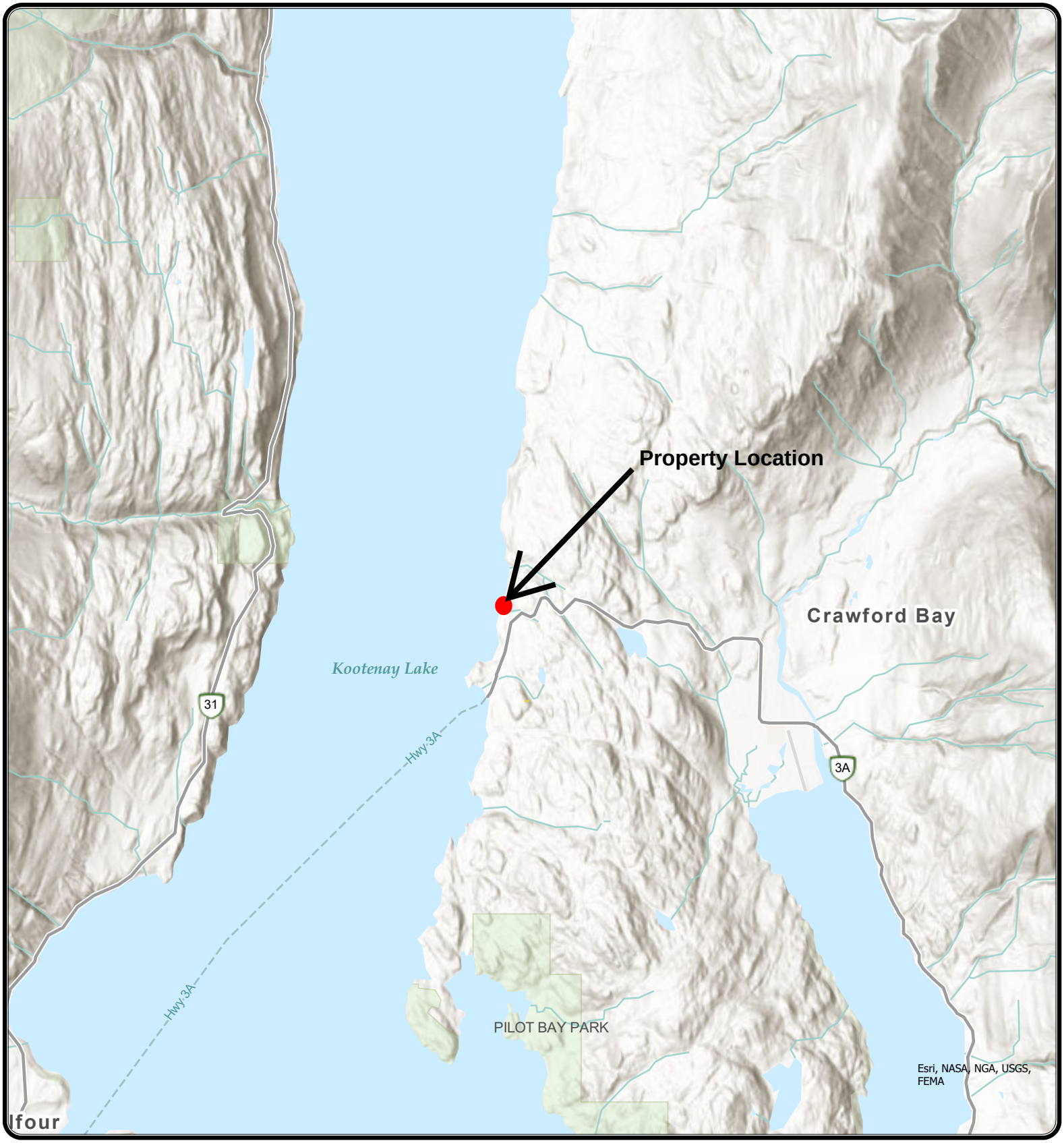
APPENDIX 1. SITE LOCATION MAP AND SUBDIVISION PLAN

RDCK Map




REGIONAL DISTRICT OF CENTRAL KOOTENAY
Box 590, 202 Lakeside Drive,
Nelson, BC V1L 5R4
Phone: 1-800-268-7325 www.rdck.bc.ca
maps@rdck.bc.ca

**Legend**

**Location Map:**

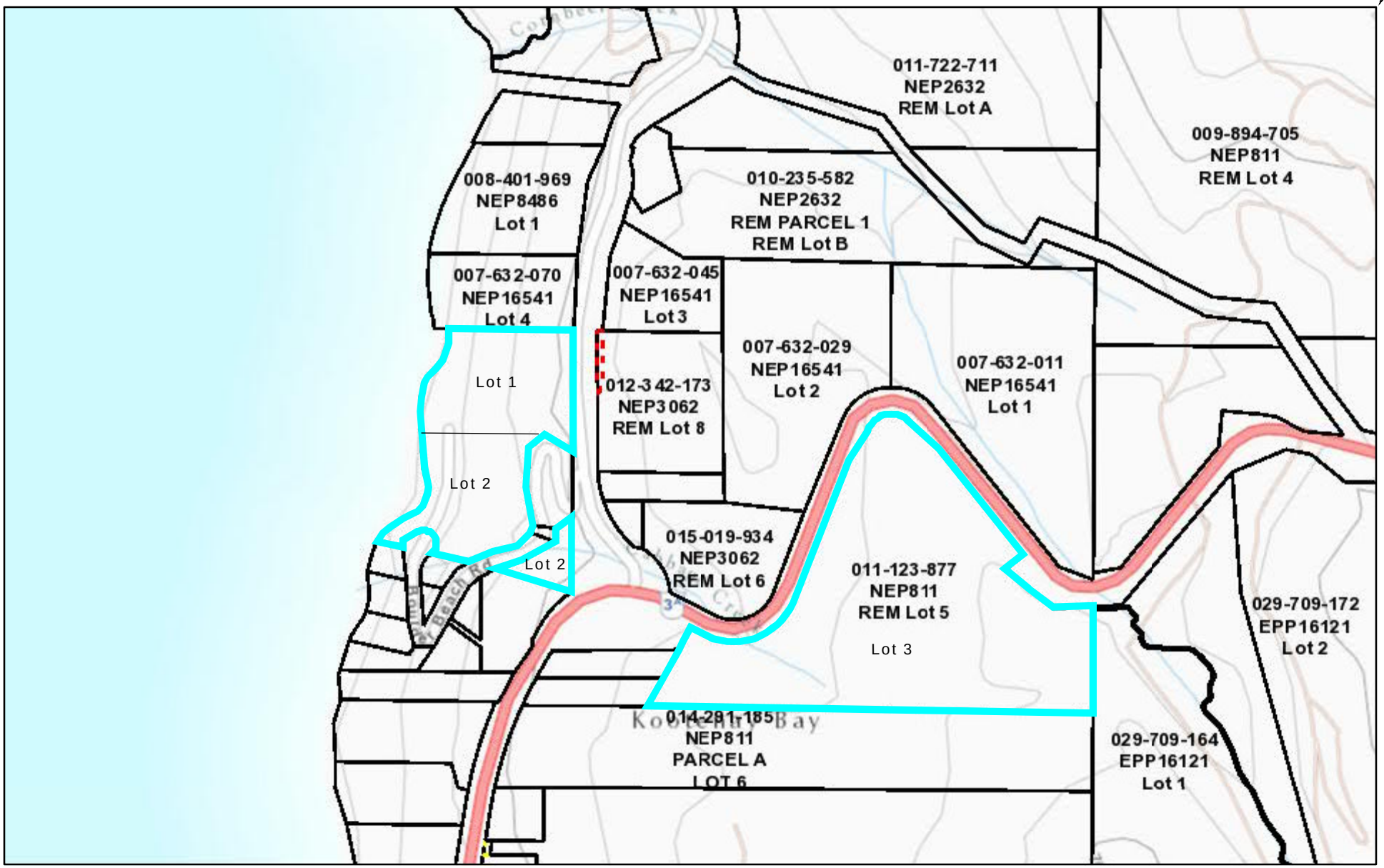
**129 Boulder Beach Road**
**Crawford Bay BC**

**Map Scale:**

1:100,000

Date: August 29, 2023

# ParcelMap BC Print Report




August 24, 2023

**WARNING: MAP IS NOT PRINTED TO SCALE**

Interest

Road

**Parcel Boundaries**

Ownership

APPENDIX 2. PROPOSED SITE PLAN AND SPEA SETBACKS

# RDCK Map


Potential hazard tree

Lot 1

Lot Lot 2

Riondel Rd

Boulder Beach Rd

Cabbage Creek

Boulder Beach Rd

129

125

121

LEGEND

- - - - ESDP area and LWD and Leaf Litter ZOS (15 m)

Shade ZOS (0-30 m)

SPEA ( 15m - 30 m)

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Box 590, 202 Lakeside Drive,
Nelson, BC V1L 5R4
Phone: 1-800-268-7325 www.rdck.bc.ca
maps@rdck.bc.ca

**Legend**

- Electoral Areas
- RDCK Streets
- Cadastre - Legal Parcels
- Address Points

**Map Scale:**

1:2,000

N W E S

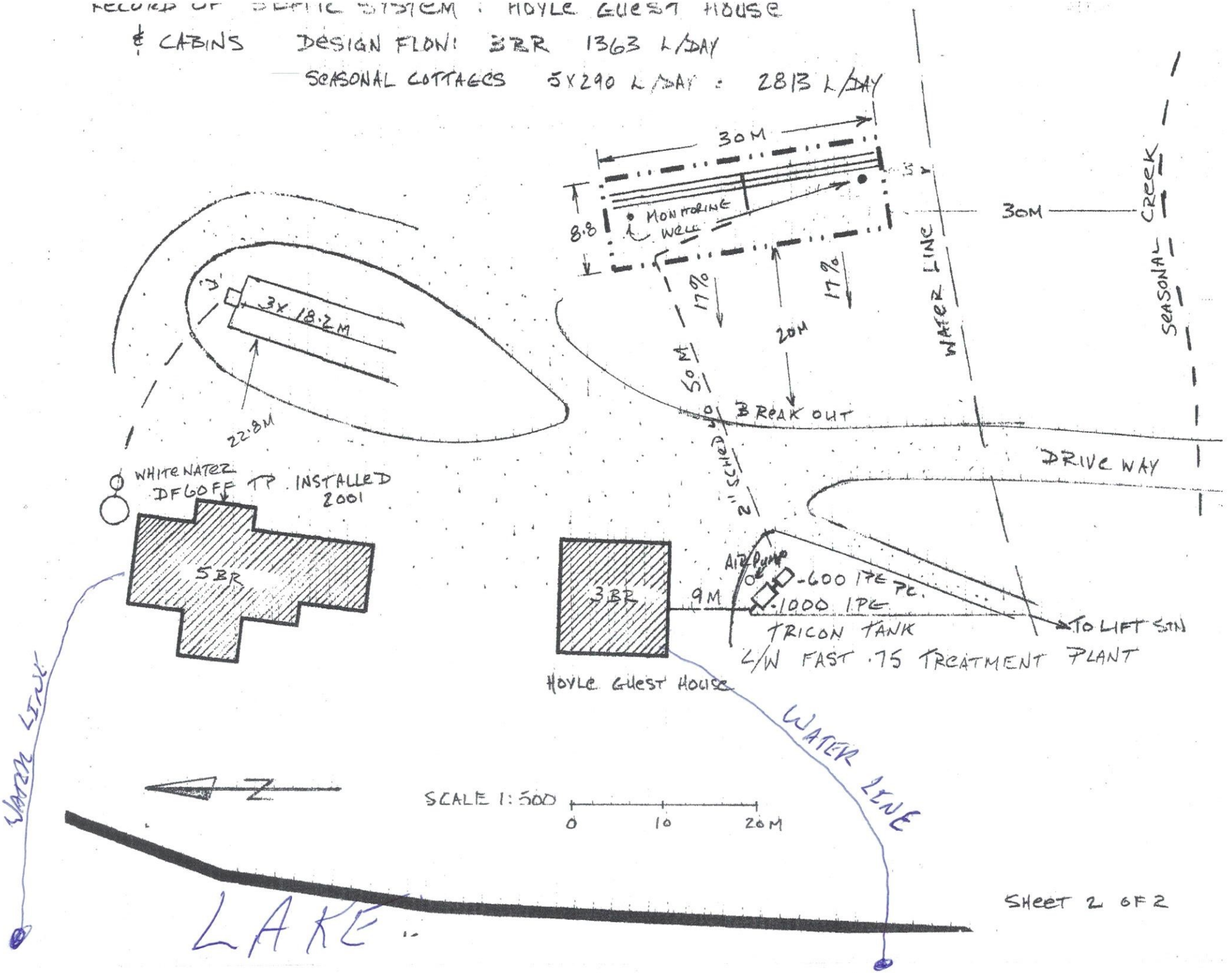
Date: August 24, 2023

APPENDIX 3. SEPTIC AND WATER SERVICE AS BUILT

RECORD OF SEPTIC SYSTEM : HOYLE GUEST HOUSE & CABINS

DESIGN FLOW: 3BR 1363 L/DAY

SEASONAL COTTAGES 5 X 290 L/DAY = 2813 L/DAY



# APPENDIX 4. ARCHAEOLOGICAL CHANCE FIND PROCEDURES

KTUNAXA NATION

Ktunaxa Nation Council
7825 Mission Road
Cranbrook, BC V1C 7E5
tel: 250-489-2464
fax: 250-489-2438

visit us at:
www.ktunaxa.org

# Chance Find Procedures for Archaeological Material

This document provides information on how a developer and/or their contractor(s) can manage for potential archaeological material discoveries while undertaking construction and/or maintenance activities. This document can provide assistance to in-field contractors in the identification of archaeological remains and the procedures to follow if a discovery is made. The discovery of human remains initiates a different course of action and is outlined separately.

Under the provincial *Heritage Conservation Act (HCA)*, archaeological sites that pre-date 1846 are automatically protected whether on public or private land. Protected sites may not be damaged, altered or moved in any way without a Section 12 or 14 Permit as issued through the *HCA*. It is illegal to collect or remove any heritage object from an archaeological site unless authorized to do so under permit.

## 1. Activities occurring outside of known Archaeological Sites:

When archaeological material is encountered outside of known archaeological site areas work in the vicinity must stop immediately no matter what type of material or feature has been identified. Alteration to an archaeological site can only occur under a Section 12 (Site Alteration Permit) or Section 14 (Heritage Inspection Permit) *Heritage Conservation Act* permit. Such permit applications should be prepared by a professional archaeologist.

If archaeological material is discovered during the course of construction activities:

1.1 **Stop Work:** Halt all work in the area of the discovery and safely secure the area. Contact the project manager or site foreman.

1.2 **Contact an Archaeologist:** An archaeologist should be contacted as soon as possible. For a list of qualified archaeologists in the area, the proponent is directed to the BC Association of Professional Consulting Archaeologists website: www.bcapa.ca. The proponent may also wish to contact the Ktunaxa Nation Council's Archaeology Technician Nathalie Allard for direction (1-250-426-9549; nallard@ktunaxa.org).

1.3 **Archaeologist provides guidance:** The archaeologist will direct the proponent on the next courses of action, which will include notifying the Archaeology

Branch and First Nations with interest in the area.

**2. Activities Occurring within Known Archaeological Site Boundaries:**
Land altering activity within a previously recorded archaeological site must be conducted under a Section 12 HCA Site Alteration Permit (SAP), in some cases with an onsite archaeological monitor. It is common for additional archaeological material and features to be encountered during activities occurring within previously recorded archaeological sites. Minor finds (lithic flakes, diffuse charcoal or fire altered rock) may not require work to stop, however significant finds require a level of assessment by a professional archaeologist, and it is up to the onsite project manager to determine the level of significance based on criteria presented below.

**2.1 Significant Cultural Finds that Require a Professional Archaeologist (described in detail in Section 4)**

- Intact archaeological features, which can include but are not limited to hearths, cultural depressions (e.g. cache pits, house depressions) and rock alignments or forms (e.g. tipi rings, cairns, blinds)
- Significant archaeological materials, which include but are not limited to, the presence of formed lithic tools (e.g. projectile point, microblade core, scraper), a dense concentration of lithic waste flakes, or artistic items
- Human Remains (described in detail in Section 3)

**2.2 Archaeological Site Management Options**

2.2.1 **Site Avoidance**: If the boundaries of a site have been delineated, redesign the proposed development to avoid impacting the site. Avoidance is normally the fastest and most cost effective option for managing archaeological sites. Site avoidance could also be achieved through minimizing ground disturbance by looking for alternative constructive methods.

2.2.2 **Mitigation**: If it is not feasible to avoid the site through project redesign, it is necessary to conduct systematic data collection and analysis within the site prior to its loss. This could include surface collection and/or excavation. This work can be time-consuming and therefore expensive to conduct.

2.2.3 **Protection**: It may be possible to protect all or portions of the site which will be impacted through installation of barriers during the development period and possibly for a longer period of time. Methods for barrier construction could include fencing around site boundaries or applying

geotextile to the ground surface and capping it with fill. The exact method used would be site-specific.

**3. Chance Find Procedures for Identified Human Remains**

Procedures in the event of the discovery of human remains during construction are covered in depth by an Archaeology Branch Policy Statement, found on their website at www.for.gov.bc.ca/archaeology, and are summarized below.

3.1 Stop all construction activities immediately in the area of found or suspected human remains and contact the RCMP and/or Office of the Coroner.

3.2 The coroner must determine whether the remains are of contemporary forensic concern or archaeological/aboriginal.

3.3 If the remains are found to be of aboriginal ancestry then the next step involves the relevant First Nations collaboratively determining the appropriate treatment of those remains.

The key to respectfully dealing with ancient aboriginal remains is to involve the appropriate First Nations as early as possible in the process. However this must be done in a manner that does not interfere with the coroner's office ability to conduct their business in the manner that they see fit.

**4. Site Identification Guide**

The following are characteristics typical to site types found within the Ktunaxa Traditional Territory.

4.1 Artifact Scatters

Lithic (stone) scatters from the production and maintenance of stone tools are the most common type of archaeological site found in the region. Other materials that may be represented in artifact scatters are Fire Broken Rock (FBR), bone, antler and tooth.

Lithics: What to look for

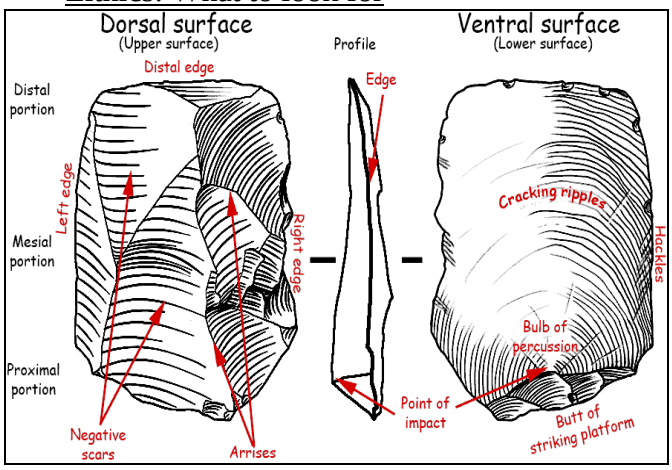



Image 1: Basic flake morphology


Image 2: Examples of lithic flakes

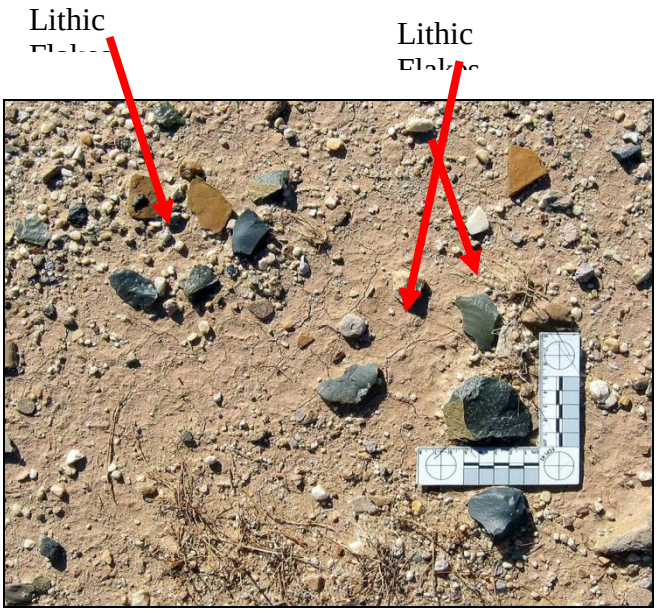



Image 3: Example of lithic scatter found on ground surface

Image 4: Example of formed lithic artifacts

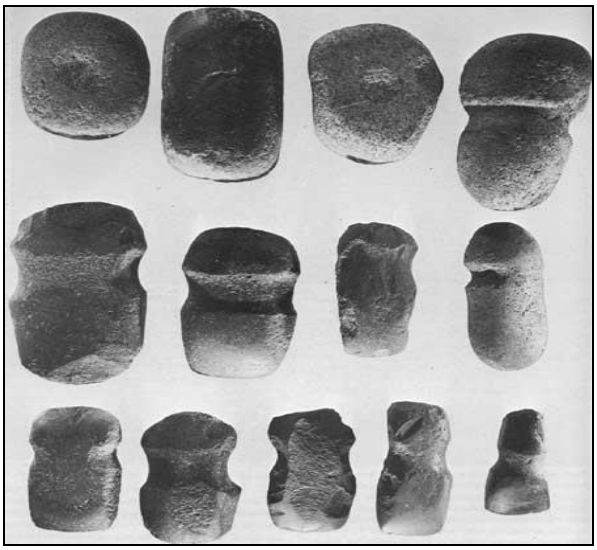


Image 5: Ground stone artifacts

Bone, Tooth and Antler Artifacts: What to Look For

- Obvious shaping
- Incising
- Unnatural holes

Image 6: Bone and Antler artifacts

4.2 Fire Broken Rock and Hearths

Fire-broken rock (FBR) results from the use of fire during cooking, heating and processing activities. FBR is often associated with other features including hearths and cultural depressions, but can also be thinly scattered in concentrations away from the features with which they were first associated.

When looking for FBR, note concentrations of roughly fractured rock from rapid heating and cooling, rock showing signs of burning or oxidation and/or reddening or blackening of surrounding matrix.


Image 7: Example of FBR; note the zig/zag pattern of breakage common to FBR

A hearth feature is evidence of a fire pit or other fireplace feature of any period. Hearths were used for cooking, heating, and processing of some stone, wood, faunal, and floral resources and may be either lined with a wide range of materials like stone or left unlined. Occasionally site formation processes (e.g., farming or excavation) deform or disperse hearth features, making them difficult to identify without careful study.

Hearths: What to look for

- FBR
- reddening or blackening of the associated soil/sediment
- charcoal
- layering of FBR and charcoal, and
- depressions in the earth associated with FBR, reddened or blackened matrix and charcoal.

Image 8: Example of a hearth uncovered along the wall of an excavation unit

### 4.3 Cultural Depressions

Any depression seen on the ground surface that appears to have been excavated by man can be a cultural depression and have archaeological significance. These "pits" were dug for a variety of reasons such as for food storage, cooking or as a base for a dwelling. They can range in size from 1m across to 7-10m across, and are usually found associated with other artifacts such as FBR and lithic scatters.

To identify a cultural depression, look for:

- Subtle to deep scours on the ground surface that are circular to rectilinear in shape
- A raised rim along the edge of a depression
- Depressions associated with artifacts and FBR
- Depressions associated with fire reddening and blackening of the matrix

Image 9: Example of a large cultural depression in a natural setting

4.6 Rock Alignments

There are several types of rock alignments that occur within the culture area, which include tipi rings, medicine wheels, cairns and blinds. When attempting to identify rock alignments, look for a group of rocks that look purposefully placed as in a circle, pile or line; isolated groups of rock that do not seem to belong to that landscape; and/or rocks which form a pattern.

Image 10: Example of a Cairn or piling of rocks

Image 11: Example of a tipi ring in a natural setting

# APPENDIX 5. HIMALAYAN BLACKBERRY AND SCOTCH BROOM FACT SHEETS

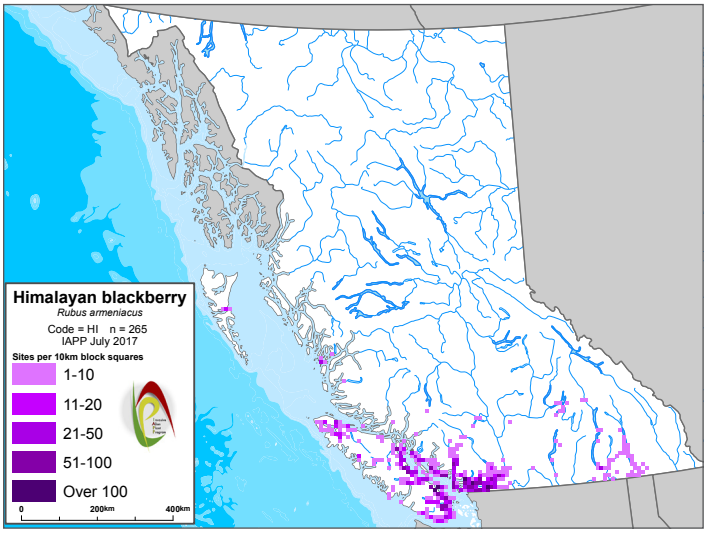

Invasive Species Council of BC

**FACTSHEET**
**MARCH 2019**

# Himalayan Blackberry *Rubus armeniacus*

## Legal Status

Community Charter




## Distribution

Currently in BC in the Lower Mainland, Sunshine Coast, Fraser Valley, Gulf Islands, Central to Southern Vancouver Island.

## Identification

**Flowers:** Small (2.5 cm diameter), white to pinkish, stalked, 5-petalled, arranged in clusters of 5-20; flower stalks are wooly and prickly.


**Stems:** Robust, stiff, 5-angled stems (canes) that support large, flattened, and hooked or straight prickles. Canes grow to 3 m in height and up to 12 m in length. First year canes produce leaves only and can root at the tips, producing daughter plants. Second year canes grow from the axils of first year canes and produce flowers and fruits.

**Leaves:** Evergreen, predominantly large, rounded or oblong, toothed leaflets radiate from the end of the leaf stem. Leaves are generally grouped in fives on first-year canes and threes on flowering (second-year) canes.

**Fruits:** Fruits (drupelets) are up to 2 cm in diameter, oblong to spherical, black and shiny, and hairless. They form on second year canes and ripen from mid-summer to fall. Each berry produces numerous seeds that have a hard, impermeable coat.

**Similar Native Species:** (i) Trailing blackberry (*Rubus ursinus*) is a smaller and less robust trailing plant with a smaller stem size (0.5 cm), white waxy stem coating, deciduous leaves found in groups of three, and a tendency to lie on the ground; (ii) salmonberry (*Rubus spectabilis*) has smaller zigzagged stems, red-pink flowers, and reddish or yellowish edible berries.

**Similar Non-Native Species:** Cut-leaf or evergreen blackberry (*Rubus laciniatus*) has deeply incised leaflets. Note: Himalayan blackberry is a variable species with several cultivars, thus making identification difficult.

## Ecological Characteristics

**Habitat:** Found on disturbed sites, along roadsides and right-of-ways, in pastures, along river and stream banks, freshwater wetlands, riparian areas, forest edges, and wooded ravines. Prefers rich, well-drained soils, but can grow well on a variety of barren, infertile soil types, a wide range of soil pH and textures, and is tolerant of periodic flooding by brackish or fresh water. Prefers full sunlight, but can survive in varied light conditions.




**Reproduction:** Reproduces by seed and vegetatively by rooting at stem tips to form daughter plants, and sprouts from root buds. Plants begin flowering in spring with fruit ripening in midsummer to late August. Thickets can produce 7,000-13,000 seeds per square meter, and seeds can remain viable in the soil for several years. Fruiting stems generally die back at the end of the season, but non-fruiting stems may persist for several years before producing fruit.

**Dispersal:** Primarily dispersed by root and stem fragments. Birds and omnivorous mammals, such as foxes, bears, and coyotes can consume berries and disperse seeds. Humans also contribute to blackberry spread by purposefully planting canes.

## Impacts

**Ecological:** Outcompetes low growing native vegetation through shading and build-up of leaf litter and dead stems. Can prevent the establishment of shade intolerant trees such as Garry oak and ponderosa pine. Himalayan blackberry forms large, dense, impenetrable thickets that limit the movement of large animals, takes over stream channels and stream banks, and reduces sight lines along right-of-ways. Thickets increase flooding and erosion potential by preventing the establishment of deep-rooted native shrubs that would otherwise provide bank stability.

## Integrated Pest Management

*IPM is a decision-making process that includes identification and inventory of invasive plant populations, assessment of the risks that they pose, development of well-informed control options that may include a number of methods, site treatment, and monitoring.*

### Prevention

- Monitor for Himalayan blackberry on both disturbed and undisturbed areas.
- Do not purchase, trade, or grow Himalayan blackberry. Instead, grow regional native plants as they are naturally adapted to the local environment and are non-invasive.
- Ensure soil, gravel, and other fill material are not contaminated.
- Avoid unloading, parking, or storing equipment and vehicles in infested areas.
- Remove plants, plant parts, and seeds from personal gear, clothing, pets, vehicles, and equipment. Wash vehicles, including tires and undercarriage, and equipment at designated cleaning sites before leaving infested areas.
- Bag or tarp plants, plant parts, and seeds before transporting to a designated disposal site (e.g. landfill).
- Take special care when controlling Himalayan blackberry near streams or ditch lines, to prevent the movement of plant parts downstream.
- Maintain or establish healthy plant communities that are resistant to invasion by invasive plants.

### Mechanical Control

- Mowing, including the use of riding mowers and tractor-mounted mowers, can be very effective, but can also harm desirable species. If roots are not manually removed, mowing several times per year over several years is necessary to exhaust root reserves. If mowing or cutting is only done once per year, it should be done when the plants begin to flower. Do not mow where soil is highly susceptible to compaction or erosion, or where soil is very wet.
- Persistent cultivation (tillage) or cutting in combination with mowing can be very effective. Because mechanical control can stimulate strong regrowth, follow-up with either spot applications of herbicide or hand digging to remove the entire root system.
- Grazing by goats has proven effective.
- Monitor controlled infestations during growing season.
- Disposal: If plants are cut, all plant material must be collected in bags or tarps and incinerated or bagged and deeply buried at a landfill. Care should be taken to ensure that plant parts are not distributed during transport.

### Biocontrol

- There are no biocontrol agents for Himalayan blackberry. The release of herbivorous insects has not been undertaken due to the risk these insects may pose to closely related, commercially important Rubus species.

### Chemical Control

Herbicide recommendations and use must consider site characteristics and be prescribed based on site goals and objectives. Herbicide labels and other sources of information must be reviewed before selecting and applying herbicides.

- Ensure that chemical treatments do not injure or kill susceptible, non-target vegetation.
- The following herbicides provide effective control for Himalayan blackberry: dicamba, glyphosate, triclpyr or metsulfuron methyl alone. Triclopyr + aminopyralid is alo effective.
- Application of pesticides on Crown land must be carried out following a confirmed Pest Management Plan (Integrated Pest Management Act) and under the supervision of a certified pesticide applicator. https://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management/managing-pests

## References/Links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*Thank you to the BC Ministry of Environment and the BC Ministry of Transportation and Infrastructure for providing project funding, and to those who advised the development of these management recommendations*

Eric Coombs, Oregon Department of Agriculture, Bugwod.org

Invasive Species Council of BC

**FACTSHEET**
**APRIL 2019**

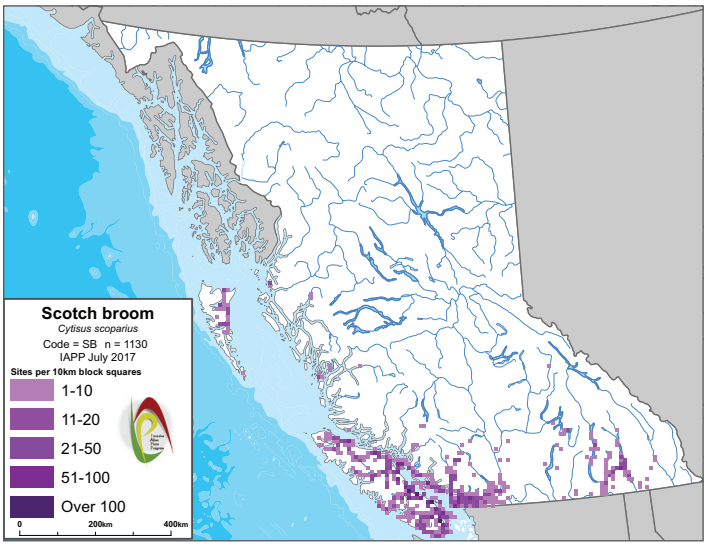
# Scotch Broom *Cytisus scoparius*

## About Scotch Broom

Native to the Mediterranean areas of Europe, Scotch broom was introduced to BC's Vancouver Island in the mid-19th century as an ornamental plant. Its spread continued following widespread planting as a bank stabilizer during road development, and as discarded crate packing materials for gold camps along the west coast.

## Legal Status

Invasive Plants Regulation, Forest and Range Practices Act; Community Charter, Spheres of Concurrent Jurisdiction - Environment And Wildlife Regulation.




## Distribution

Currently distributed on the Pacific and Atlantic coasts of North America. It is common west of the Coast-Cascade Mountains in southwest BC and is concentrated at the southern end of Vancouver Island. It has also been reported on the Queen Charlotte Islands and in parts of the Kootenays and North Okanagan–Shuswap areas.

## Identification

**Flowers:** Yellow and pea-like; may have a red marking in the middle.

**Stems:** Woody and 5-angled; 1–3 m tall shrub.

**Leaves:** Stalked lower leaves are composed of three leaflets; un-stalked upper leaves are simple.

Eric Coombs, Oregon Department of Agriculture, Bugwod.org

**Fruits:** Flat, hairy seedpods that are initially green, turn brown to black in color.

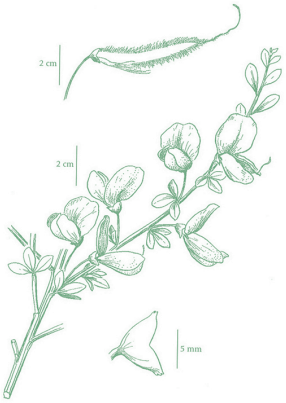
**Similar Species:** Spanish broom (*Spartium junceum*), a non-native species, has flowers that' grow at the tips of stems (crowning the plant), whereas Scotch broom flowers grow along stems.

## Ecological Characteristics

**Habitat:** This escaped garden ornamental invades exposed, well-drained mineral soil and is shade-intolerant.

**Reproduction:** Perennial species that reproduces by seed and lateral bud growth. Mature plants can produce up to 3500 pods, each containing 5–12 seeds.

**Dispersal:** As seedpods dry they split and spiral, expelling the contained seeds up to 5 metres. The plant can also spread to new disturbed areas through seed transport by vehicles and machinery. Due to its affinity for light dominated, disturbed areas, any disturbance activity such as road construction near infested areas, can enhance spread.

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# Impacts

**Economic:** Invades rangeland, replacing forage plants, and can be a serious competitor to conifer seedlings. Douglas fir plantation failures in Oregon and Washington have been credited to infestations by this plant. High density infestations can: (i) increase wildfire fuel loads, thereby escalating wildfire intensity; and (ii) obstruct sight lines on roads, resulting in increased maintenance costs for removal.

**Ecological:** Can produce dense, impenetrable thickets that may be impacting Garry oak woodlands in southwestern BC and limiting the movement of large animals, wild or domestic. Possesses photosynthetic stems to enable year round growth, leading to displacement of native plant species.

# Integrated Pest Management

*IPM is a decision-making process that includes identification and inventory of invasive plant populations, assessment of the risks that they pose, development of well-informed control options that may include a number of methods, site treatments, and monitoring.*

## Prevention

- Minimize soil disturbance in areas directly adjacent to existing infestations and contain or localize seed spread.
- Remove broom before it flowers (late winter, early spring) to prevent seed maturation.
- After mechanical treatment, promptly re-vegetate with an appropriate seed mix, followed by an application of phosphorous-rich fertilizer and wood mulch. Contact local seed suppliers to determine an appropriate seed mix.
- Promptly establish competitive shrubbery, including snowberry, salmonberry, thimbleberry, and Oregon grape, as well as red alder trees for shading and competition for nitrogen, to reduce broom growth.

## Mechanical Control

- Minimizing soil disturbance, cut larger plants below ground level before flowering and seed set. Plants with stems less that 1.5 cm in diameter may be hand pulled, preferably in late spring when the plant is directing its energy into flower and seed production.
- Due to enormous 'seed banking' and re-sprouting potential (stumps and roots), mechanical treatments may need to be repeated over a 3 to 5 year period.
- Mechanical control is most effective if all of the plant is removed, no seeds are dropped and soil disturbance is minimized.
- Hand pulling may encourage broom growth due to the high level of soil disturbance. If pulling will result in soil disturbance, plants can be cut as close to the ground as possible.
- Burning is not an effective control method as broom seeds germinate following a burn.

## Biocontrol

- There are currently no approved biocontrol agents for BC; however, seed-feeding beetles released in Washington State have moved north adventitiously, and two other agents released in the US are close to our border and suspected to have arrived in BC. Further surveys will seek to confirm their existence.
- Grazing by goats and consumption of seeds by chickens have been shown to reduce broom infestations.

## Chemical Control

Herbicide recommendations and use must consider site characteristics and be prescribed based on site goals and objectives. Herbicide labels and other sources of information must be reviewed before selecting and applying herbicides.

- Triclopyr or glyphosate application treatments include: foliar, low-volume thinline, basal cut stump, cut stump, and basal bark. (Refer to labels for specific instructions and rates)
- Selective spot spraying, basal stem injection, or cut surface application methods are recommended to minimize non-target damage.
- Triclopyr mixed with aminopyralid or 2,4-D applied foliar provides good control.
- Picloram alone as a foliar application provides good control but is not recommended in coastal, high rainfall areas due to persistence and mobility of the herbicide.
- Application of pesticides on Crown land must be carried out following a confirmed Pest Management Plan (Integrated Pest Management Act) and under the supervision of a certified pesticide applicator. https://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management

# References/Links


- BC Ministry of Forests, Lands, and Natural Resource Operations, Invasive Alien Plant Program (IAPP). www.for.gov.bc.ca/hra/Plants/application.htm
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Additional Comntact info