Development Permit

DP2307E (Levinson)

Date: April 1, 2024

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

1. This Development Permit is issued to Judith Levinson and Jerry Levinson of Nelson, BC as the registered owner (hereinafter called the "Permittee") and shall only apply to those lands within the Regional District of Central Kootenay, in the Province of British Columbia legally described as LOT A DISTRICT LOT 1316 KOOTENAY DISTRICT PLAN NEP85347 (PID: 027-301-656) as shown on the attached Schedules 1 and 2, forming part of this Permit, referred to hereafter as the "said lands".

2. This Development Permit is issued subject to compliance with all of the bylaws of the Regional District of Central Kootenay applicable thereto, except as specifically varied or supplemented by this Permit.

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 (RC)' and are located within a Development Permit Area pursuant to the Electoral Area 'E' Rural Official Community Plan Bylaw No. 2260, 2013 as amended.

5. The Permittee has applied to the Regional District of Central Kootenay to retroactively authorize the destruction/removal of vegetation within the Watercourse Development Permit Area, to construct a single detached dwelling with a secondary suite, install the associated water and wastewater infrastructure/services and to use land and buildings situated on the said lands for this purpose. 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 the proposed development.

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 The Regional District of Central Kootenay Building Department requires that the Permittee obtain a demolition permit and/or building permit prior to the removal of any existing buildings and structures, the renovation, expansion or alteration of any existing building and the construction of any new building.

   6.2 Development is authorized in accordance with the terms described "2205 Bealby Road, Rural Nelson, BC: Riparian Assessment V2.2" prepared by Masse Environmental Consultants Ltd., dated October 9, 2024 hereinafter referred to as "The Report" and attached to this permit as Schedule 3. Compliance with all terms, conditions, guidelines and recommendations is required.

6.3 The development authorized by this permit shall be substantially in accordance with "2205 Bealby Road, Rural Nelson, BC Mitigation and Monitoring Plan V2.2" prepared by Masse Environmental, dated October 9, 2024 hereinafter referred to as "The Mitigation Plan" which is attached to this permit as Schedule 4.

6.4 Environmental Monitoring – In accordance with the recommendations in Section 6 of The Report and Section 4 of the Mitigation Plan:

6.4.1 QEP will be onsite for a pre-construction meeting with Owner and Landscaper to ensure that all parties are aware of environmental sensitivities and familiar with the proposed mitigation measures.

6.4.2 QEP to provide guidance during revegetation, as required

6.4.3 QEP will conduct a post construction site visit once planting is complete to assess compliance and completion of the project and submit an environmental summary report to the RDCK.

6.4.4 QEP will conduct interim effectiveness monitoring inspections annually for a three-year period and provide recommendations to the Owner as required.

6.4.5 A post inspection report will be prepared by the QEP after three growing seasons and submitted to the Owner and RDCK. The following indicators of success of riparian plantings should be documented in this report:

6.4.5.1 Plant composition includes mostly native trees and shrubs.

6.4.5.2 Establishment of >80% of planted riparian species after 3 full years would be a reasonable indication that the mitigation plan has been successfully completed.

7. As a condition of the issuance of this Permit, the Regional District shall hold an irrevocable Letter of Credit submitted by the Permittee in the amount of $25,653 to ensure the landscaping and restoration requirements as set forth in Section 6 are completed and in accordance with the following provisions:

7.1 A condition of the posting of the Letter of Credit is that should the Permittee fail to carry out the works and services as herein above stated, according to terms and conditions of this permit within the time provided, the Regional District may use the Letter of Credit to complete these works or services by servants, agents or contractors, and any surplus shall be paid over to the Permittee. If the amount of funds is insufficient to cover the actual cost of completing the works, then the Permittee shall pay such deficiency to the Regional District immediately upon receipt of the Regional District's bill for same.

7.2 The Permittee shall complete the landscaping works required by this Permit prior to April 7, 2027. Within this time period the required landscaping must be inspected and approved by the Regional District.

7.3 If the landscaping is not approved within this time period, the Regional District has the option of continuing to renew the Letter of Credit until the required landscaping is completed or has the option of drawing from the Letter of Credit to complete the required landscaping. In this event, the Regional District or its agents have the irrevocable right to enter into the property to undertake the required landscaping for which the Letter of Credit was submitted.

7.4 If the landscaping is approved within this time period without the Regional District having to draw the on the Letter of Credit, 90% of the original amount of the Letter of Credit shall be returned to the Permittee.

7.5 A hold back of 10% of the original amount of the Letter of Credit shall be retained until a final inspection is undertaken within 12 months of the date of the original inspection and approval was given to the landscaping. If the landscaping receives approval at final inspection, the 10% hold back will be returned to the Permittee. If after the final inspection, approval of the landscaping is not given, the Regional District has the option of continuing to renew the Letter of Credit until the required landscaping is approved or has the option of drawing on the Letter of Credit the funds to complete the required landscaping. In this event, the Regional District or its agents have the irrevocable right to enter onto the property to undertake the required landscaping for which the Letter of Credit was submitted.

8. 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 as well as any plans and specifications which may, from time to time, be attached to this Permit shall form a part thereof.

9. 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.

10. 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.

11. 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.

12. 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.

13. This Development Permit does not constitute a building permit.

14. 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.

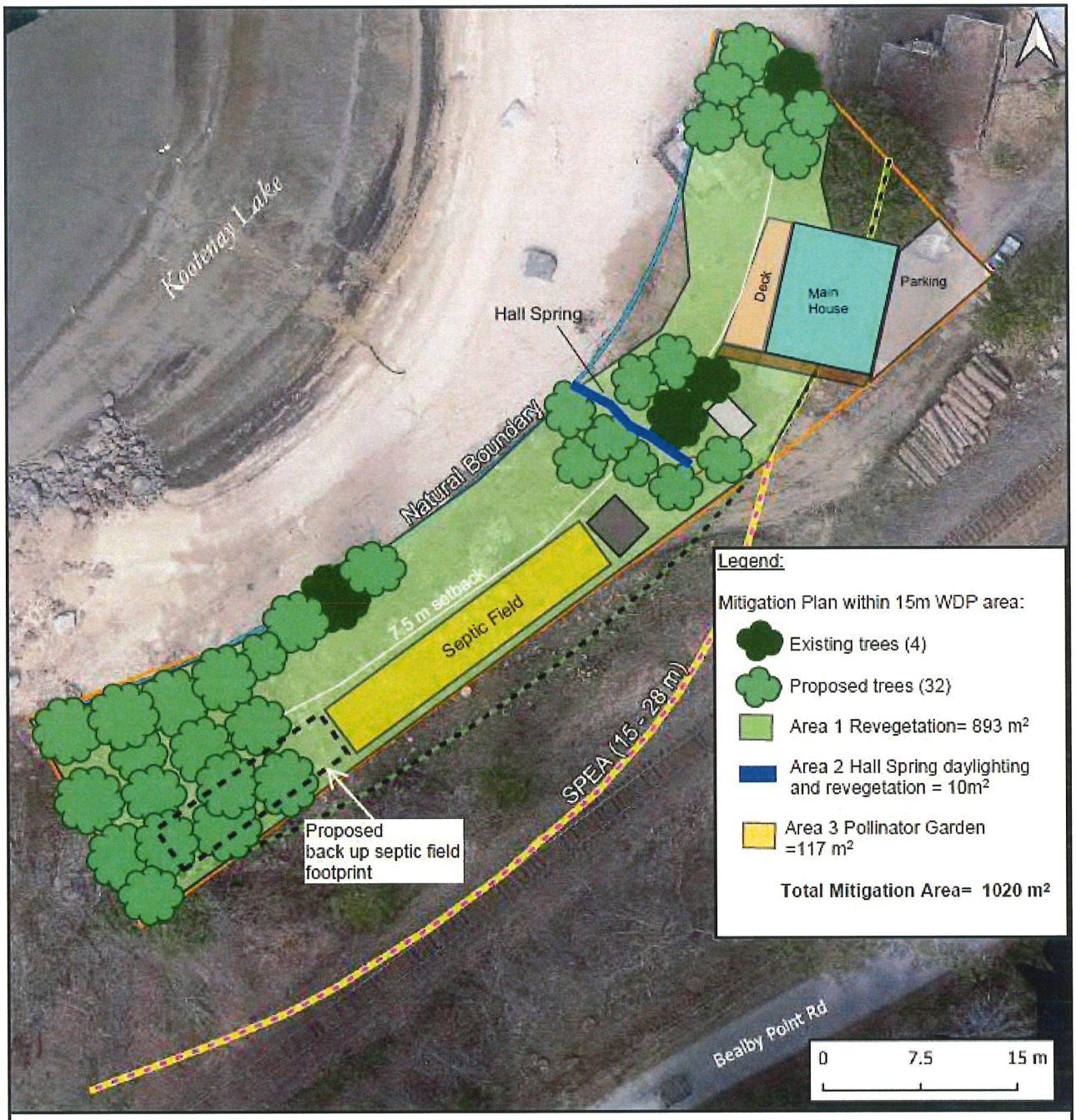
Sangita Sudan, General Manager of Development and Community Sustainability Services

April 8, 2025
Date of Approval (date of review and approval)

April 8, 2025
Date of Issuance (pending receipt of securities)

Schedule 1: Subject Property

Schedule 2: Site and Mitigation Plan



Levinson WDP | Riparian Assessment | SPEA Setbacks

- Property Boundary (PID 027-301-656)
- Natural Boundary
- WDP Area (15 m)
- LWD ZOS and Litterfall ZOS (15 m)
- Shade ZOS (13 - 28 m)
- SPEA ZOS (15 - 28 m)

MASSE ENVIRONMENTAL

Map Date: 08/14/2023
Projection: NAD83 UTM Zone 11
Project: 2023-1034
Map Scale: 1: 500
Orthoimage Date: April 20, 2023
Fortis BC Lake Level: 530.11 m

Schedule 3: "2205 Bealby Road, Rural Nelson, BC: Riparian Assessment V2.2" prepared by Masse Environmental Consultants Ltd., dated October 9, 2024

MASSE ENVIRONMENTAL

2205 Bealby Road, Rural Nelson, BC

Riparian Assessment V 2.2

Prepared for:

Regional District of Central Kootenay

202 Lakeside Drive

Nelson, BC, V1L 5R4

Oct 9, 2024

Riparian Assessment Report Revision History

Version	Date	Description	Author
1.0	Aug 23, 2023	Report finalized and Submitted to RDCK	Fiona Lau
2.0	April 12, 2024	Report and plans revised and re-submitted to RDCK to reduce development from 2 cabins to one main house.	Fiona Lau
2.1	June 12, 2024	Report revised and re-submitted to RDCK. Added Section 2.2.1.3- Hall Spring description	Fiona Lau
2.2	October 9, 2024	Report revised and re-submitted to RDCK to ensure consistencies with proposed development of a single family dwelling with secondary suite	Fiona Lau

Disclosure Statement

This report has been prepared by Fiona Lau B.Tech., AScT. and reviewed by Ico de Zwart, PChem. RP Bio.

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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1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by Judith and Jerry Levinson (Owners) to conduct a riparian assessment to accompany an application for a Watercourse Development Permit (WDP) for their waterfront property located at 2205 Bealby Road, Nelson, BC (PID 027-301-656, Lot A, Plan NEP85347, DL 1316, Kootenay Land District (KLD)). The development permit is required for proposed development within the WDP area that includes the demolition and replacement of an existing residential structure, construction of new single family residential home with secondary suite and associated septic and water services. It was also triggered by enforcement action from the Regional District of Central Kootenay (RDCK) when unauthorized removal of riparian vegetation was conducted in preparation for this development without a WDP. The Owner is seeking a site-specific floodplain exemption in order to redevelop the property, which involves a relaxation of the floodplain setback from 15 m to 7.5 m, as the property characteristics present a case of serious hardship.

A site visit was completed on April 26, 2023, by Fiona Lau B.Tech., A.Sc.T., Jennifer Ross, M.Sc., P.Chem., and Chanel Gagnon, B.Sc., B.I.T., to conduct a riparian assessment on the property within the 15 m WDP area. The riparian assessment evaluates the existing conditions of the property and riparian areas, 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:

- RDCK Electoral Area 'E' Rural Official Community Plan Bylaw No. 2260, 2013
- RDCK Floodplain Management Bylaw No. 2080, 2009
- British Columbia Riparian Areas Protection Regulation B.C. Reg. 178/2019
- Kootenay Lake Shoreline Management Guidelines
- British Columbia Water Sustainability Act
- British Columbia Wildlife Act
- Federal Fisheries Act
- Federal Migratory Birds Convention Act
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in B.C.
- Requirements and Best Management Practices for Making Changes In and About A Stream in British Columbia
- A Resource for Kootenay Lake Living – RDCK Kootenay Lake Development Permit Area Resource
- On the Living Edge: Your Handbook for Waterfront Living
- British Columbia FireSmart Homeowners Manual
- A Homeowner's Guide to Stormwater Management

This report has been prepared by Jennifer Ross, M.Sc., P.Chem. and reviewed by Fiona Lau, AScT.

I, Fiona Lau, hereby certify that:

e) 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;
f) I am qualified to carry out this part of the assessment of the development proposal made by Judith and Jerry Levinson which is described in Section 2.3 of this Assessment Report;
g) I have carried out my assessment of the development proposal, and my assessment is set out in this Assessment Report; and
h) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Minister's technical manual to the Riparian Areas Protection Regulation.

2 PROJECT OVERVIEW

2.1 Site Location

The subject property is located in Area E of the RDCK, approximately 700 m northeast of the City of Nelson, BC (see Appendix 1 for Location Map). The property is 0.326 acres (0.13 ha) in size, with ~80 m of frontage on Kootenay Lake. It is located at the end of Bealby Road and is bordered by private properties to the north and southwest, Kootenay Lake to the west, and the Canadian Pacific Railway (CPR) to the southeast.

The project area is within the Interior Cedar-Hemlock dry warm variant 1 (ICHdw1) biogeoclimatic subzone, which occurs at valley bottom elevations around most of Kootenay Lake (MacKillop and Ehman 2016). The ICHdw1 subzone is characterized by moist, warm springs, hot and dry summers, and mild, dry winters with moderately shallow snowpack. Winter rain-on-snow events are frequent and snow-free areas are common, particularly on warm-aspect sites. The ICHdw1 is a highly productive biogeoclimatic unit. Common species include: interior Douglas fir (Pseudotsuga menziesii), Western red cedar (Thuja plicata), Western larch (Larix occidentalis), lodgepole pine (Pinus contorta), paper birch (Betula papyrifera), ponderosa pine (Pinus ponderosa), black huckleberry (Gaylussacia baccata), falsebox (Paxistima myrsinites), Prince's pine (Chimaphila umbellate), queen's cup (Clintonia uniflora), twinflower (Linnaea borealis), and pipecleaner moss (Robust rhytidiopsis) (MacKillop and Ehman 2016).

2.2 Existing Site Conditions

Given the WDP and floodplain setbacks (both 15 m), the subject property has an eligible developable area of 13 % (184 m^2) split between the southwest and east corners (Crowsnest Engineering 2023). Based on the site characteristics and the setback requirements, a case of hardship should be considered by the RDCK for the site-specific floodplain exemption and for the proposed development on this property.

Crowsnest Engineering has proposed that the floodplain setback be reduced from 15 m to 7.5 m in order to support re-development of this property.

The property has a northern aspect and is located along the south shore of the West Arm of Kootenay Lake. The topography onsite slopes steeply (1:1 grade) down from the railway and then transitions to a gentle slope (averaging 10 %) into Kootenay Lake.

At the time of the site visit, >90 % of the native riparian vegetation had been impacted by tree falling (Photo 1 and Photo 2). Cleared trees included ~7 mature black cottonwood (Populus trichocarpa) trees, 3 mature Douglas maple (Acer glabrum) clusters, 2 mature lodgepole pine trees, 1 mature paper birch cluster, and ~12 mature Western redcedar trees (Photo 3 and Photo 4). A total of 25-30 trees were removed from the riparian assessment area with only three trees retained which included two Western redcedars and one lodgepole pine. Some regenerating cottonwood seedlings were also left along the foreshore.

Photo 1. Aerial view of property prior to clearing activities.

Photo 2. Aerial view of property post clearing.

Photo 3. View of cleared trees looking east.

Photo 4. View of cleared trees looking west.

2.2.1 Watercourses

There are two mapped watercourses on the property: Kootenay Lake and Bossuet Creek.

2.2.1.1 Kootenay Lake

Kootenay Lake borders the subject property along the west 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. 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 (late May through July). Lake levels can vary up to 4 m throughout the year, affecting the extent of exposed shoreline.

The natural boundary of Kootenay Lake was staked along the property line at ~534- 535 m elevation (LTSA 2023; Crowsnest Engineering 2023) by unknown surveyors. The natural boundary line shown on the proposed development plans (Appendix 2) will be used as the HWM from which the streamside protection area setbacks will be determined as per the Riparian Areas Protection Regulation.

> "Natural Boundary" 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)."

2.2.1.2 Bossuet Creek

Bossuet Creek (WSC 300-625474-057968) is a 1st order stream with a mapped length of ~1.7 km. It originates on the eastern slopes of the West Arm of Kootenay Lake within the Svoboda Road community and flows northwest into the Kootenay Lake.

Bossuet Creek is mapped within the subject property (Appendix 1), but no evidence of the creek (aside from the presence of a spring (refer to Section 2.2.2) was observed on the property, nor was any evidence of the creek observed along Bealby Road. However, there are three mapped private water licenses on the upper portion of Bossuet Creek (C048794, C100403, C113235). A defined stream channel with flowing water was observed at the Svoboda Road crossing, approximately 500 m upstream of Bealby Road and downstream of the three licensed points of diversion. Based on these findings, it is assumed that Bossuet Creek has either been diverted, or that it flows subsurface by the time it reaches the Bealby Area. It is therefore not considered a "watercourse" within the subject property according to the Area E OCP and Floodplain Management Bylaw definition.

> "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)."

2.2.1.3 Hall Spring

There is spring on the property (Photo 5), mapped as Hall Spring PD27566 which is conveyed via a big-o pipe to Kootenay Lake (Photo 6). The spring currently has no defined stream channel and a watershed area of < 2 km^2. Once the spring is daylighted (which is proposed as part of the development), stream channel dimensions will be approximately 1 m wide with a channel depth of ~ 0.3 m deep. The spring in its current state and once daylighted does not meet the definition of a "watercourse" under the RDCK Floodplain Management Bylaw, as defined above.

2.2.2 Existing Development

Existing development within the riparian assessment area (30 m from the natural boundary of Kootenay Lake) includes a one-bedroom cabin, a travel trailer, and a pump house.

The existing one-bedroom cabin with a raised wooden deck (total footprint ~90 m^2) is located ~10 m from the "natural boundary" at its southwest corner (Photo 7). The wooden cabin is constructed on concrete footings and has an associated pump-out cement septic tank but no existing septic field or grey water

management. A parking area (~40 m^2) wraps the eastern corner of the cabin. This parking area was recently widened to accommodate the tree clearing activities.

A travel trailer with wooden deck (footprint ~35 m^2) was parked near the northern corner of the property (Photo 8). The travel trailer was used for storage and was located on the "natural boundary".

The wooden pumphouse located next to the cabin (footprint ~8 m^2) has been constructed on cement blocks and is located ~9 m from the "natural boundary" (Photo 5 and Photo 7). The pumphouse draws water from an intake line installed into Kootenay Lake (Photo 6). A PVC pipe discharges water of an unknown origin to the lake beside the water intake (Photo 6).

Photo 5. View of Hall Spring (abandoned) southwest of pumphouse

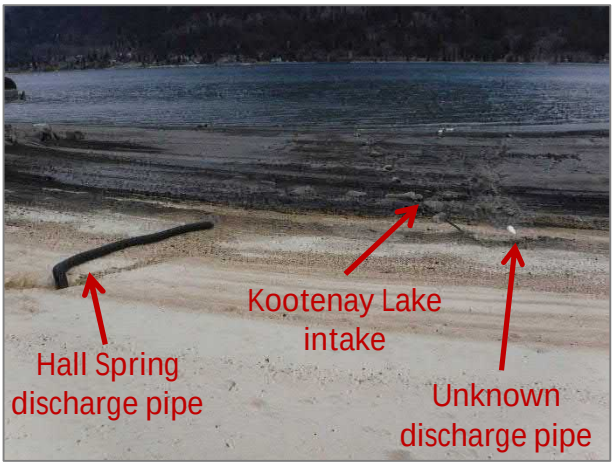

Photo 6. View of two discharge pipes and the water intake line.

Photo 7. View of one-bedroom cabin, deck and pumphouse.

Photo 8. View of travel trailer and deck.

2.3 Proposed Development

The proposed development within the 15 m WDP area of Kootenay Lake includes:

- Removal of the existing residence and affixed deck (~90 m^2).
- Removal of the existing travel trailer and affixed deck (~35 m^2).
- Removal of the existing pumphouse (~8 m^2).
- Decommissioning and removal of pipes capturing water from Hall Spring. Hall spring will become daylighted.
- Construction of a new single family home with secondary suite (55m^2)
- Construction of walkway and deck (33 m^2).
- Construction of a Type 3 Septic System (18 m^2) with two associated septic fields (~117m^2).

The proposed setback distance for the new residence is up to 7.5 m from the "natural boundary", requiring a Site-Specific Floodplain Exemption to permit the proposed works within the 15 m floodplain and a relaxation of the WDP permit area setback. Septic and water service lines shall run along the south property line.

The proposed development footprint will have a total developable area of 223 m^2 compared to the pre-existing development which had a footprint of 133 m^2, causing a net riparian habitat loss of 90 m^2.

Refer to Appendix 2 for the Proposed Site Plan.

2.4 Services

Domestic water for the new residence will be extracted from Kootenay Lake. A water service line will be installed approximately at the mid-section of the property along the general alignment of the existing line. This line will be entrenched into the beach substrate to a depth sufficient to prevent freezing during the winter months.

The septic plan includes Type 3 septic system designed by Highland Consulting, which includes a (1,350 L/day flow) treatment system, two concrete pumping tanks (1000 IGal and 750 IGal), and two septic fields (combined area 2.4 m x 22.5m) covered with fill and sloped at 2H:1V around the perimeter (~117 m^2 total field size including slopes), all located within the 15 m setback, and outside of 7.5 m setback. The Type 3 system was required due to the reduced horizontal separation setback from Kootenay Lake as per the Sewerage System Standard Practice Manual Version 3 (Ralston and Payne 2014).

3 REGULATORY OVERVIEW

To determine whether the 15 m WDP setback from the High-Water Mark (HWM) of Kootenay Lake 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 Area (SPEA) setbacks. Results for the Zones of Sensitivity (ZOS) and SPEA are presented in Table 1 and Appendix 2.

As per the RAPR, the large woody debris (LWD) and litter ZOS were plotted 15 m inland from the HWM of Kootenay Lake with the shade ZOS plotted 13 m – 28 m from the HWM from Kootenay Lake. The SPEA setback is determined based on the ZOS with the greatest width. Therefore, within the subject property the SPEA from the HWM of Kootenay Lake is 15-28 m.

Table 1. 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	13-28 m	15-28m

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

[2] LWD- large woody debris

[3] SPEA- streamside protection and enhancement area

3.1 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, KLP 2023) were used to help determine site-specific risks for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline. The property is within FIM segment 243.

Table 2. Aquatic and archaeological risk results.

Aquatic Habitat Index Rating (AHI)	Aquatic Sensitivity	Features	Archaeological Risk	Enhanced Engagement Required
Low	Yes	Emergent Vegetation Bossuet Creek	High	Yes

The subject parcel was flagged as high 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). Archaeological Chance Find Procedures are provided in Appendix 4.

4 ENVIRONMENTAL RESOURCES

4.1 Fish and Aquatic Habitat

The foreshore of the property is a sloped beach (~10 % gradient) with substrate consisting mostly of coarse sand with a few large boulders (Photo 9) and some fine gravel. Organic debris from the lake delineated the foreshore areas that were typically under water during high water levels. The in-water substrate was mostly saturated, fine silt and sand. Round boulders, cobbles, and some interspersed gravel pockets were present in the southwestern end of the property (Photo 10) and would be inundated at high water.

Fish habitat along this section of foreshore is juvenile rearing habitat and supports freshwater mussels. Cover habitat (boulders and emergent vegetation) for fish is present at the southwestern end of the property at high water (Photo 11). Multiple areas of groundwater emergence were also observed throughout the property, but suitable shore spawning salmonid habitat was not present due to a lack of suitable gravel substrate below late summer water levels. No known kokanee spawning has been reported in this area (KLP 2023).

Kootenay Lake supports a variety of fish species, including several species of regional interest, such as Kokanee (Oncorhynchus nerka), Rainbow Trout (Oncorhynchus mykiss), Bull Trout (Salvelinus confluentus), White Sturgeon (Acipenser transmontanus), Westslope Cutthroat Trout (Oncorhynchus clarki lewisi), and Burbot (Lota lota). Freshwater mussels (Anodonta sp.) were observed within the lake adjacent to the subject property (Photo 12); however, a complete mussel survey was not conducted as part of the riparian assessment. There is potential for the presence of a mussel bed in deeper water based on the substrate and the known occurrence of a mussel bed <1 km downstream at Red Sands beach.

Photo 9. View of beach looking south from neighbouring property at low water.

Photo 10. View of beach looking northeast from neighbouring property at low water.

Photo 11. Cover habitat for fish at high water (bounders and emergent vegetation).

Photo 12. Freshwater mussels in shallow water (underwater photo).

4.2 Vegetation

Riparian vegetation on the subject property prior to tree removal activities was a mixed conifer and deciduous forest with mature Western redcedar, black cottonwood, lodgepole pine, and paper birch trees (Photo 13). Understorey vegetation, still somewhat intact, consists of Douglas maple, regenerating black cottonwood, alder (Alnus sp.), snowberry (Symphoricarpos albus), rose (Rosa spp.), pussy willow (Salix discolor), tall Oregon grape (Mahonia aquifolium), and red osier dogwood (Cornus sericea). Table 3 provides a list of riparian vegetation species encountered on the property and on the adjacent undisturbed property to the southwest during the site visit.

The pre-existing multi-canopied forest would have provided high-value habitat supporting the features, functions, and conditions beneficial to fish in Kootenay Lake. These include important wildlife habitat features, addition of large organic debris into or around the lake, shade to moderate water temperatures, leaf litter and insect drop providing food, nutrients, and organic matter to Kootenay Lake, root matrices that stabilize soils and minimize erosion, and a buffer to protect Kootenay Lake from pollution and surface runoff from upstream areas.

The adjacent property to the southwest remains intact (Photo 14) and supports an ecologically diverse and functioning riparian system; however, the majority of the riparian area along this section of Kootenay Lake (Bealby Point Community) has been disturbed by development, and supports only young, landscaped forest with sparse (<10 % tree and shrub cover).

Photo 13. View of cut down riparian vegetation on property.

Photo 14. Riparian shrubs natural shoreline southwest of property.

Table 3. Plant species encountered on the property and adjacent property to southwest.

Common Name	Scientific Name	Common Name	Scientific Name
Trees		Shrubs cont.	
black cottonwood	Populus balsamifera	rose sp.	Rosa spp.
black hawthorn	Crataegus douglasii	Oregon grape	Manhonia aquifolium
Douglas-fir	Pseudotsuga menziesii	Herbaceous	
lodgepole pine	Pinus contorta	common wormwood	Artemisia absinthium
paper birch	Betula papyrifera	false Salomon's seal	Maianthemum racemosum
Western redcedar	Thuja plicata	fragile fern	Cystopteris fragilis
Shrubs		large-leaved avens	Geum macrophyllum
alder	Alnus sp.	meadow buttercup	Ranunculus acris
common snowberry	Symphoricarpos albus	scouring rush	Equisetum spp.
Douglas maple	Acer glabrum	mosses & grasses	
pussy willow	Salix discolor	Submergent Vegetation	
red osier dogwood	Cornus sericea	Eurasian water-milfoil	Myriophyllum spicatum

4.3 Wildlife

Wildlife habitat features associated with this ecosystem type (mature black cottonwood and Western redcedar) would have included habitat for a variety of wildlife, including reptiles, songbirds, piciformes (woodpeckers, sapsuckers, flickers, etc.), raptors and mammals.

4.3.1 Reptiles and Amphibians

Reptiles found nearby include northern alligator lizard (Elgaria coerulea), western garter snake (Thamnophis elegans) and wandering garter snake (Thamnophis elegans) (iNaturalist 2023). Garter snakes

are often found in wetland and riparian areas and have high potential to occur on the site. A common gartersnake (Thamnophis sirtalis) was observed ~250 m northeast of the property by C.Gagnon and J.Ross (MEC 2023). Northern alligator lizard is typically found in drier habitats on warm aspects that do not occur in the study area.

There is low potential for amphibians to occur onsite, due to lack of suitable habitat and/or connectivity to breeding habitat.

4.3.2 Birds

Birds are well reported in the area and include many species of shorebirds, open water species, songbirds, piciformes, and raptors. The riparian habitat within the subject property (prior to tree clearing) would have provided excellent bird nesting, foraging, and perching habitat. A songbird nest was located in a shrub ~20 m south of the property (Photo 15), multiple cavities were observed in black cottonwood and paper birch trees, also ~20 m west of the property, and an osprey (Pandion haliaetus) was observed perching in a cottonwood tree south of the property (Photo 16).

Birds observed and/or heard around the property by Masse Environmental included: American crow (Corvus brachyrhynchos), American robin (Turdus migratorius), black-capped chickadee (Poecile atricapillus), Canada goose (Branta canadensis), common loon (Gavia immer), dark-eyed junco (Junco hyemalis), Northern flicker (Colaptes auratus), mallard duck (Anas platyrhynchos), osprey, song sparrow (Melospiza melodia), violet-green swallow (Tachycineta thalassina), and yellow-rumped warbler (Setophaga coronata).

Photo 15. View of songbird nest south of property.

Photo 16. Osprey and perch trees south of property.

4.3.3 Mammals

Based on knowledge of the area and discussions with the owners, mammals that may use the riparian area within the subject property include American black bear (Ursus americanus), American marten (Martes americana), Columbia ground squirrel (Urocitellus columbianus), cougar (Puma concolor), coyote (Canis latrans), North American river otter (Lontra canadensis), raccoon (Procyon lotor), red squirrel (Tamiasciurus hudsonicus), roof rat (Rattus rattus), striped skunk (Mephitis mephitis), white tail deer (Odocoileus virginianus), yellow-bellied marmot (Marmota flaviventris) and a variety of bat species (Myotis spp.).

During the site visit, raccoon tracks were observed on the property (Photo 17). A couple squirrel caches were also observed in the root balls of trees (Photo 18).

Photo 17. Raccoon tracks along foreshore.

Photo 18. Burrow observed on the subject property.

4.4 Species at Risk

BC Conservation Data Center (CDC) occurrence data and critical habitat for Federally listed species at risk were queried within iMap BC (BC 2023), using a 10 km buffer around the center point of the subject property. The query results are presented in Table 4 (Appendix 3). Eight species at risk and/or critical habitat for species at risk were identified within this buffer. The potential occurrence on the property was assessed as likely, possible, unlikely, or very unlikely, according to known species habitat affinities, the habitat profile of the property, and the proximity to mapped occurrences.

Only one of these species was considered to 'possibly' occur on the subject property, the Western Screech Owl (Megascops kennicottii macfarlenei), which is blue-listed in BC and listed as threatened federally (COSEWIC 2012). The Western Screech Owl utilizes riparian forests, specifically with black cottonwood

wildlife trees present. It is a species that uses cavities and holes excavated by larger woodpeckers for nesting and roosting.

Many bats species, not identified in the CDC occurrence data are blue-listed in BC (e.g.: little brown myotis (Myotis lucifugus), Western small-footed myotis (Myotis ciliolabrum), and the Yuma myotis (Myotis yumanensis)). The little brown myotis is also listed as 'endangered' under the Species At Risk Act. The little brown myotis and the Yuma myotis are expected to have a 'likely' occurrence rating on the subject property. Bat roosting habitat includes tall, live or dead trees with crevices, peeling bark, or cavities.

4.5 Archeological and Heritage Resources

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. A review of archaeological resources on this property is outside the scope of this report. Archaeological Chance Find Procedures are provided in Appendix 4 for guidance on which protocols to follow in the event of a chance archaeological find, and to ensure that archaeological sites are documented and protected as required for compliance with the BC Heritage Conservation Act.

5 IMPACT ASSESSMENT

The impact assessment was based on the impacts of unauthorized works and proposed works within the 15 m WDP area. Impacts include permanent loss of current and potential riparian habitat throughout the property. This impacts the health and productivity of Kootenay Lake and aquatic and terrestrial wildlife.

The unauthorized removal of riparian vegetation has caused:

- Significant reduction to potential additions of large organic debris into or around the lake, reducing nutrient inputs and cover habitat.
- Significant reduction of shade to moderate the water temperature.
- Significant reduction of leaf litter and insect drop inputs to the lake that provide food, nutrients, and organic matter for the organisms inhabiting the lake.
- Significant reduction of high-value habitat for many varieties of birds, small mammals (including bats), and reptiles such as garter snakes.
- Removal of root matrices that stabilize soils and minimize erosion.
- Elimination of the buffer protecting Kootenay Lake from pollution and surface runoff from upstream areas.
- Increased human presence and activity, which decreases wildlife value and increases human-wildlife conflict.

The proposed development within the WDP area will cause a net riparian habitat loss of 90 m^2 which will add to the cumulative impacts along the Kootenay Lake foreshore. In addition, there is potential for the introduction of sediment into Kootenay Lake from disturbed areas and potential disturbance to nesting birds during construction works.

To help mitigate for the temporary loss of ~820 m^2 of riparian habitat; 1020 m^2 will be restored by replanting of native vegetation, habitat complexing, daylighting of Hall Spring and creation of pollinator gardens over the septic fields. The mitigation plan will be submitted as a stand-alone document.

Provided that the recommended mitigation plan and the measures to protect the SPEA (Section 6) are implemented and followed, the negative impacts associated with the unauthorized works and future use of the property will be minimized and the riparian function within the revegetated area be partially restored over time. The permanent loss of mature riparian vegetation along the foreshore cannot be fully mitigated for as the riparian function has been damaged and the proposed mitigation area will take upwards of 75 plus years to restore riparian function to where it was pre-development.

6 MEASURES TO PROTECT THE INTEGRITY OF THE SPEA

This section provides measures to protect the integrity of the SPEA (entire property) as described in RAPR, as well as recommended best management practices for development and future use of the property.

6.1 Scheduling of Environmentally Sensitive Activities

Demolition and excavation activities, and the installation of the new water intake line should be completed during the low water period for Kootenay Lake (September through early April) in order to minimize the risk associated with the release of deleterious materials into Kootenay Lake. Other mitigation considerations associated with deleterious materials are discussed in Sections 6.7, 6.11 and 6.12.

6.2 Danger Trees

Many of the trees formerly considered to be danger trees were removed from the subject property prior to this assessment. Development should take into account the remaining trees, which should be protected. This includes protection of the large Douglas fir tree, <5 m away from the southern property corner. A certified danger tree assessor was not retained as a part of this assessment. Further assessment of potential danger trees is outside the scope of this project.

6.3 Windthrow

Assessment of windthrow risk is beyond the scope of this report, and any such assessment should be led by a Registered Professional Forester (RPF). Given that >90 % of the riparian vegetation was recently cut down on this property, windthrow risk to the remaining trees could exist.

6.4 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.

6.5 Protection of Trees and Vegetation in the SPEA

Clearing of vegetation for the proposed work has already been completed. The three remaining trees and one mature black hawthorne located within the 15 m WDP area will be protected from all future development activities. The retention of these remaining trees is important in order to maintain the remaining wildlife values, habitat complexity, and shoreline stability around the site.

The following mitigation measures will be implemented to protect these remaining trees:

- No further clearing of vegetation will be permitted.
- Excavation or ground disturbance will be avoided within the root zone of retained trees. Roots of a mature tree typically extend from 1-3 times the height of a tree from the tree's trunk (far beyond the drip line) and are typically located within the upper 0.30 – 0.40 m of soil (MFLNRORD 2019).
- Avoid any change in the grade, ground level, or ground surface characteristics around these trees. This includes compaction of the soils due to parking underneath the vegetation.
- Ensure that these trees are not damaged during construction, damage includes broken branches, torn bark, or wounds to the trunk.
- Avoid changes to the natural drainage of the property.
- Avoid the introduction and establishment of invasive weed species. The best way to do this is to know where imported soils are coming from and to ensure they are weed-free. Know the common invasive species in the area (CKISS) and removed them if they begin to establish before they go to seed.
- Avoid the introduction of pollutants that could contaminate the soil next to the trees (e.g., fuels and oils leaking from construction vehicles). Refer to Section 6.11 for mitigation measures recommended for fuel and equipment.

6.6 Encroachment

The proposed development will encroach into the SPEA up to 7.5 m from the natural boundary of Kootenay Lake. Temporary encroachment up to and beyond the present natural boundary will be required for the installation of the new water intake line.

To delineate development boundaries and protect existing riparian habitat during demolition and construction of the new residence and the associated septic facilities, a snow fence will be installed along the 7.5 m setback line.

Further development beyond that proposed in this report and in the mitigation plan is strongly discouraged. The proposed mitigation plan has been prepared with the goal of preserving as many of the current wildlife values and shoreline stability features as possible, and to promote re-establishment of some of the riparian vegetation.

6.7 Sediment and Erosion Control

In order to prevent erosion of the property and to prevent sediment from entering Kootenay Lake, soil disturbance will be minimized as much as possible and exposed soils will be re-vegetated as soon as possible.

The following mitigation measures should be implemented to reduce the risk of sediment input to Kootenay Lake:

- The water line installation will be scheduled during the lower water period for Kootenay Lake (September through early-April). To the extent possible, all other works construction works within the SPEA should also be conducted within this timing window.
- A sediment fence will be installed below the present natural boundary line of Kootenay Lake during construction of any foundations or footings of the new residence and during construction of the septic facilities. Sediment fencing should be properly keyed into the substrate to a minimum depth of 6”.
- Groundwater and surface water coming into the site will be conveyed around any development area where exposed soils are present. The existing spring will be protected from construction activities using a suitable barrier that can effectively exclude the entry of any deleterious material, including soil and/or sediment.
- During construction, activities should be suspended during periods of heavy rain if there is any risk that continued work could result in sediment delivery to Kootenay Lake. Where required, additional mitigation measures, such as sediment fencing, ditching, check dams, or covering soils

may be required to manage turbid wastewater generated by construction or heavy rain events. Turbid wastewater will not be permitted to leave the construction site.

- During the installation of the water intake line visual monitoring of suspended sediment and turbidity in Kootenay Lake should be conducted. If suspended sediment is generated to the extent that it is migrating away from the property (>30 m), works will be modified to reduce the amount of sediment generated and/or erosion and sediment control measures, such as a sediment curtain, will be installed to contain the sediment.
- Soils will be safely stockpiled in a manner that eliminates the possibility of erosion and sediment transport and stockpiles will be located as far away from Kootenay Lake as possible.
- Disturbed soils should be revegetated as soon as possible after construction.

6.8 Stormwater Management

The proposed development will result in an increase in the total impervious area of the property. The following mitigation measures will help decrease stormwater impacts:

- Groundwater and surface water coming into the site will be conveyed around any area where disturbed/exposed soils may occur.
- Pervious materials (e.g., gravel) are recommended for driveways, parking areas, and pathways. This minimizes stormwater runoff from impervious materials (e.g., asphalt and concrete), which must be managed using natural hydrologic pathways. Storm water will not be permitted to discharge directly to Kootenay Lake.
- 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.
- Stormwater discharges must adhere to the Water Sustainability Act or any other applicable legislation.

6.9 Floodplain Concerns

The proposed development is located within the 15 meter floodplain setback and the 536.5 m flood construction level of Kootenay Lake. A flood assessment was completed by Crowsnest Engineering to support a Site-Specific Floodplain Setback Exemption Application for construction of the single detached dwelling with a secondary suite. The proposal indicates that “permanent encroachment into the floodplain setback for the home is no closer than 7.5 m from the Natural Boundary is geotechnically acceptable” (Crowsnest Engineering 2023).

6.10 Protection of Fish and Wildlife Habitat

To minimize disturbance to fish, wildlife, and their habitat, the following measures will be implemented:

- Adhere to sediment, stormwater, equipment, fuel, and concrete management best practices outlined in this report to ensure that there is no release of deleterious materials into Kootenay Lake.
- The best timing for the proposed development is September to early-April when Kootenay Lake water levels are low (Section 6.1).
- To minimize impacts to fish, the Interim Code of Practice for end-of-pipe fish protection screens for small water intakes in freshwater (DFO 2020) should be followed during the replacement of the water intake line. This includes minimizing the diameter of the water intake line, ensuring that a fish screen is placed at the intake, and installing the water line along a path that minimizes the amount of current and future vegetation disturbance.
- Works in and around the remaining trees and shrubs (particularly large trees with cavities and potential bat habitat) should be monitored for nesting birds or bats if works are to be completed during the songbird breeding season (early-April – mid-August) (ECCC 2023b). Monitoring should be completed by a Qualified Environmental Professional (QEP), who will propose measures to protect any active nests, if found.
- Follow the Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (MOE 2013) if any active raptor nests are discovered within 100 m of the subject property. Active raptor nests are legally protected at all times of the year and some inactive nests (ex: Bald Eagle nests) are similarly protected.
- Avoid any modifications to the beach substrate and preserve the remaining foreshore vegetation and boulders, which provide fish habitat during period of inundation.
- Ensure that any power equipment used is well-maintained and leak free.

6.11 Management of Equipment and Fuel/Lubricant Materials

Deleterious substances degrade water quality and affect fish and fish habitat. A spill prevention and emergency response plan should be developed by the development Contractor(s) 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 for construction.

At a minimum, this plan should:

- Ensure that all construction machinery arrives at the property in a clean condition (preferably steam-cleaned), free of fluid leaks, excess oil or grease, mud, and sediment.

- Retain a heavy equipment contractor that can supply equipment using biodegradable hydraulic oil and greases.
- 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.
- Ensure that leaking equipment is removed from the worksite and repaired offsite whenever possible.
- Park, store, and re-fuel all equipment in a designated area as far away from Kootenay Lake as possible and apply secondary containment (e.g. spill trays) to detect, capture, and contain any potential spills or leaks.
- If a spill occurs immediately abate and contained the spill. Report the spill according to the Spill Reporting Regulation and then clean up. Any contaminated material will be removed from the subject property and disposed of, along with any contaminated soils, in compliance with the Regional District of Central Kootenay Resource Recovery Plan and associated bylaws (RDCK 2023).

6.12 Concrete Management

Fresh concrete and concrete laden water is caustic (causing elevated water pH) and toxic to aquatic organisms.

To minimize impacts to Kootenay Lake, the following measures will be implemented:

- No concrete, or wastewater that has been in contact with fresh concrete will be disposed of onsite.
- Concrete delivery trucks will either be equipped with a wash water recycling system to capture all wash water used to clean the truck, or a wash water containment bin large enough to capture and contain all wash water will be made available for truck washing.
- Tool washing will occur in a designated wash basin.
- Wash basins should be set aside so that solid material has time to settle and harden. Contents should be disposed of in compliance with Appendix 14.6 of the Standards and Best Practices for Instream Works, (MWLAP 2004).

6.13 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 on site:

- All equipment should be thoroughly washed and inspected before entering the project site to prevent the import of new invasive plant seeds and root fragments.
- The amount of soil disturbance should be minimized and exposed soils should be re-vegetated immediately following construction.
- Manage new invasive weeds (e.g. hand pulling) on the property according to guidance from the Central Kootenay Invasive Species Society (CKISS) to prevent establishment and spread. Note that no terrestrial priority invasive species were documented during this assessment.
- Eurasian water milfoil (Myriophyllum spicatum) is a priority species for the CKISS region that listed for "containment" action. Given that this plant spreads through fragmentation of the plant, containment actions would include avoiding excavation for the new water intake line within areas that are invaded and limiting boats with components (e.g. propellors) that could fragment the plant in invaded areas.

7 Mitigation and Monitoring Plan

A separate document for site mitigation and monitoring has been prepared by Masse. Refer to Mitigation and Monitoring Plan (Masse 2023).

8 Conclusion

Based on the characteristics of the subject property and the setback requirements (15 m for both the WDP and floodplain), only ~13 % (184 m^2) of the property is available for development and this area is split between the southwest and east corners (Crowsnest Engineering 2023). This presents a case of "serious hardship" and the Owner is requesting a reduction to the floodplain setback and a relaxation of the WDP permit area setback for the proposed development on this property. The proposed setback distance is 7.5 m from the present natural boundary.

Overall, the unauthorized removal of riparian vegetation and the proposed development along the foreshore of Kootenay Lake has and will cause the direct loss of 223 m^2 of high-value riparian habitat within the WDP area. The proposed mitigation plan and the measures to protect SPEA outlined in this report will help mitigate some of the riparian habitat loss; however, the loss of riparian vegetation and proposed development within the SPEA will add to the cumulative impacts along the foreshore.

9 CLOSURE

This report has been prepared by a Qualified Environmental Professional (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.

If you have any comments or questions, please do not hesitate to contact the undersigned.

Sincerely,

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

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

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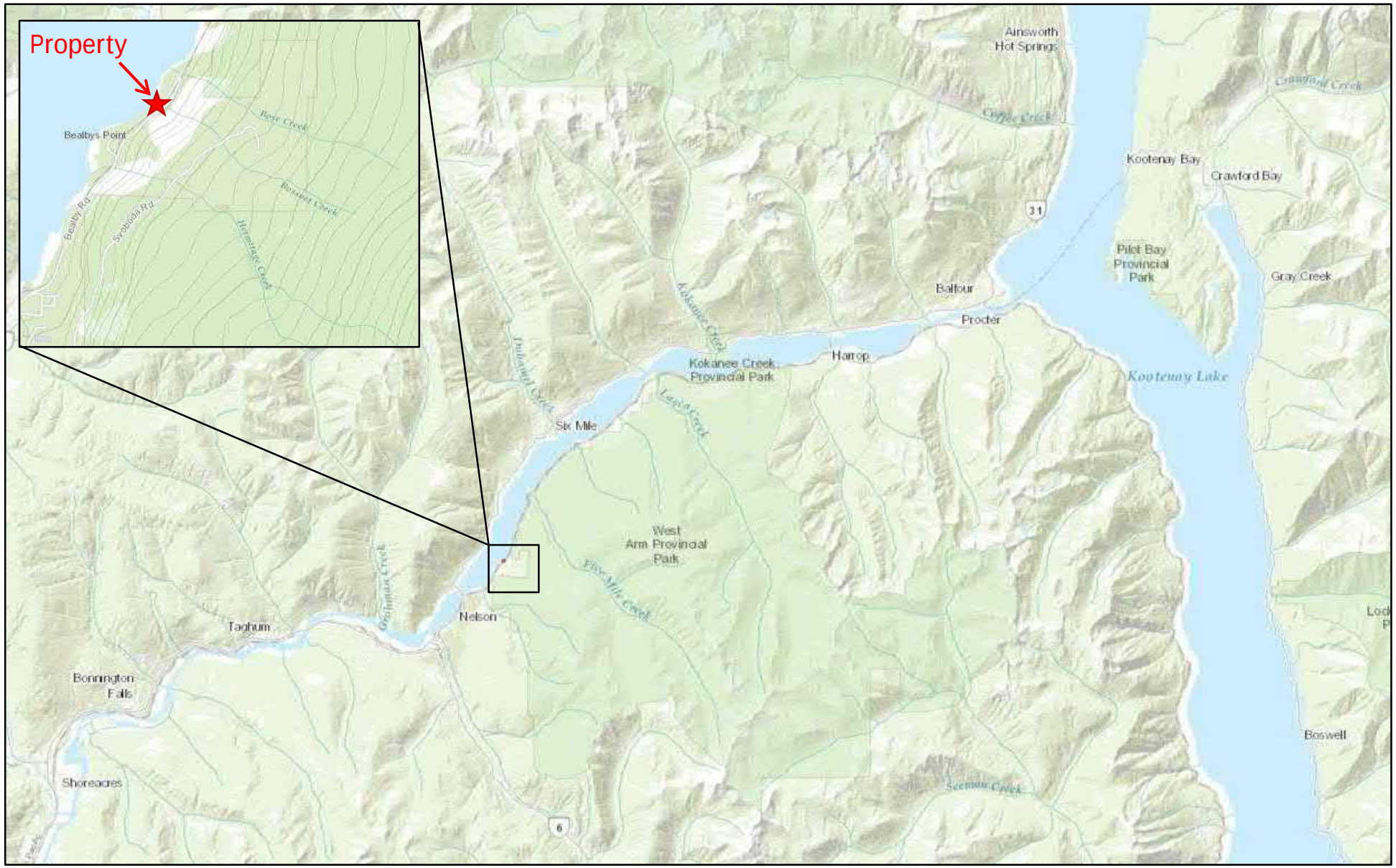
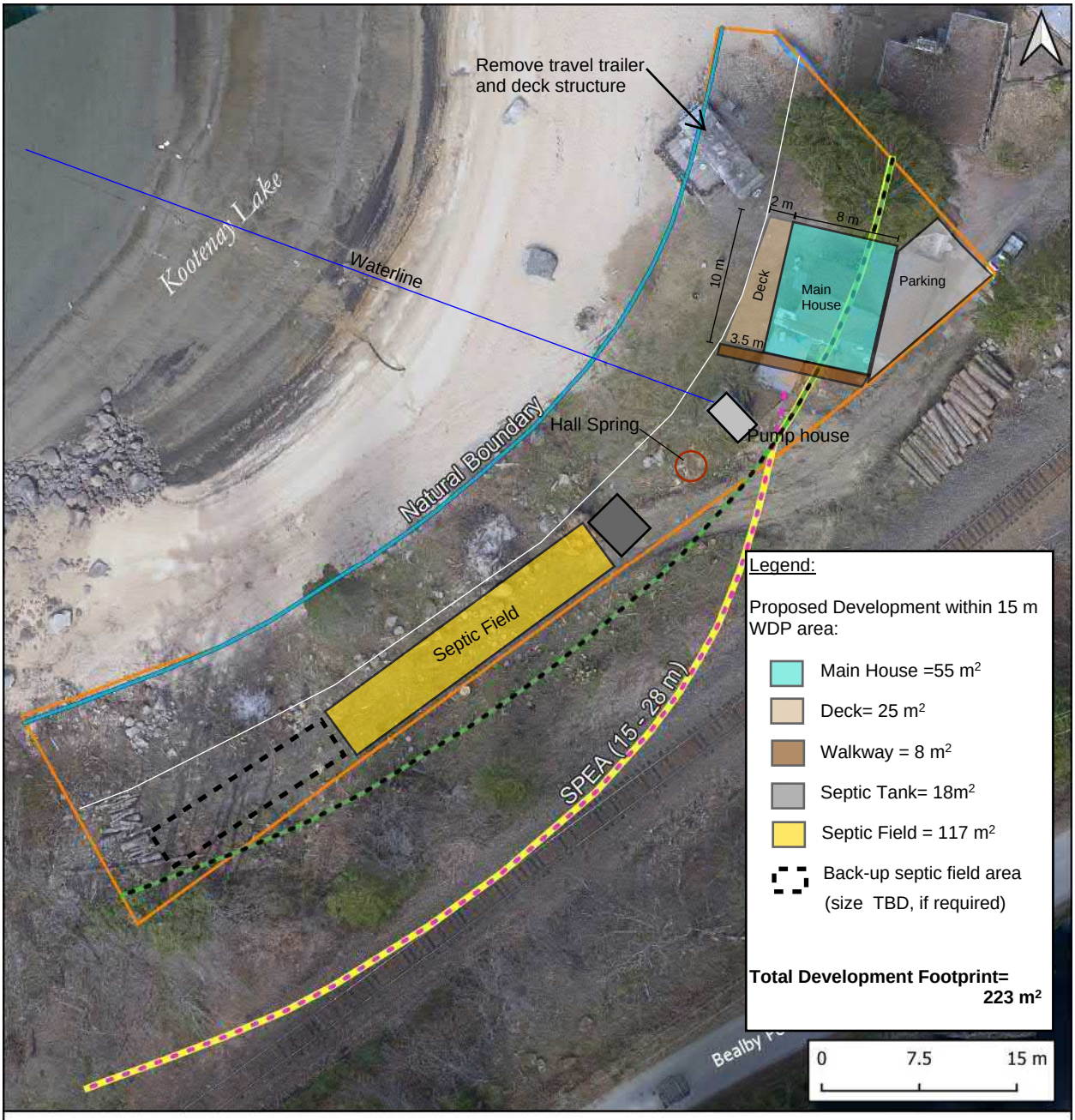
APPENDIX 1. LOCATION MAP

LOCATION MAP – 2205 BEALBY ROAD, RURAL NELSON, BC



APPENDIX 2. PROPOSED SITE PLAN WITH SPEA SETBACKS



Levinson WDP | Riparian Assessment | SPEA Setbacks

- Property Boundary (PID 027-301-656)
- Natural Boundary
- WDP Area (15 m)
- LWD ZOS and Litterfall ZOS (15 m)
- Shade ZOS (13 - 28 m)
- SPEA ZOS (15 - 28 m)

MASSE ENVIRONMENTAL

Map Date: 08/14/2023
Projection: NAD83 UTM Zone 11
Project: 2023-1034
Map Scale: 1: 500
Orthoimage Date: April 20, 2023
Fortis BC Lake Level: 530.11 m

APPENDIX 3. SPECIES AT RISK WITH POTENTIAL OCCURRENCE BASED ON IMAP BC 10 KM RADIUS QUERY

Table 4. Species at risk with potential occurrence based on iMap BC 10 km radius query.

Common Name (Scientific Name)	Likelihood of Occurrence on Subject Property	Comment	BC Conservation Status[1]	COSEWIC[2] / SARA[2]
Red-tailed Chipmunk (Neotamias ruficaudus simulans)	Unlikely	CDC occurrences mapped ~8.4 km southwest of the subject property in forested and logged habitat between Sand and Giveout Creeks (Shape ID: 129556, Occurrence ID: 16128).	Blue	NS
Monardella (Monardella odoratissima ssp. Discolor)	Unlikely	Subject property is within the CDC shapefile. Historical occurrence mapped in the Nelson area (Shape ID: 7836, Occurrence ID: 1244).	Unknown	NS
Caribou (Southern Mountain Population) (Rangifer Tarandus pop. 1)	Very unlikely	Historically inhabited the Southern Selkirk Mountains, with mapped critical habitat including the subject property. This population has been extirpated (Shape ID: 10261, Occurrence ID: 3979, Habitat IDs: 21275, 21276, 21277, 21281, 21288, 21289, 21290).	Red	E/T
Painted Turtle (Intermountain – Rocky Mountain Population) (Chrysemys picta pop.2)	Unlikely	CDC occurrences mapped as close as ~4.5 km southwest of the subject property on the south shore of the West Arm of Kootenay Lake (Shape ID: 96321, Occurrence ID: 12177).	Blue	SC
Western Screech-Owl (Megascops kennicottii macfarlenei)	Potential	CDC historical occurrence mapped ~700 m southwest of the subject property in the Nelson area (Shape ID: 1186, Occurrence ID: 4733).	Blue	T
Western Skink (Plestiodon skiltonianus)	Unlikely	CDC occurrences mapped as close as ~1.1 km from the subject property on the north side of the West Arm of Kootenay Lake (Shape IDs: 28837, 29940, Occurrence IDs: 6942, 6943).	Blue	SC
Whitebark Pine (Pinus albicaulis)	Very unlikely	Critical habitat (alpine) mapped as close as 2.8 km from the subject property on both sides of the West Arm of Kootenay Lake (Habitat IDs: 101029, 101220, 101518, 101695, 140407, 140408, 140411, and 140430).	Blue	E
White Sturgeon (Upper Kootenay River Population) (Acipenser transmontanus pop. 1)	Unlikely	Found in the mainstem of Kootenay Lake, known to use the Creston Delta, Duncan Delta, and Crawford Bay (Shape ID: 1370, Occurrence ID: 4745).	Red	E

[1]Red = Species that is at risk of being lost (extirpated, endangered, or threatened) within British Columbia. Blue = Species considered to be of special concern within British Columbia. [2](E) Endangered = Facing imminent extirpation or extinction. (T) Threatened = Likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction. (SC) Special concern = May become a threatened or an endangered species because of a combination of biological characteristics and identified threats. (NS) No Status. Information sources: British Columbia Conservation Data Centre, and personal sightings.

APPENDIX 4. ARCHAEOLOGICAL CHANCE FIND PROCEDURE

Archaeological Chance Finds Management Procedures
Kootenay Boundary Region

The intent of this document is to provide direction on the appropriate action, as delegated to the Archaeology Branch by the Minister of Forests under the Provincial Heritage Conservation Act (HCA), should archaeological resources be identified (before, during and/or post authorization activities), weighing the preservation and proper management of such sites against the needs of the project.

When working directly with a professional archaeologist and/or First Nation member(s) on an authorized project, the proponent may be asked to use a different procedural document. While proponents are encouraged to have direct conversations with First Nations, the Province must remain neutral and, therefore, cannot endorse any other as they often contain opinions and political positions that are contrary either to neighbouring First Nations who also claim the area as their traditional territory, or are otherwise not in alignment with the most current Provincial legislation. It is strongly recommended that this document be considered first and foremost, especially when direction is counter to the Provincial legislation and policies in place. If the proponent has any questions or concerns around this, please reach out to the Provincial contact for the project or the Archaeology Branch to discuss further.

In 2024, the Province of British Columbia has collected data on more than 62,000 recoded archaeological sites (with more being added to the provincial inventory every year). Archaeological sites are protected by provincial legislation under the *Heritage Conservation Act* (HCA), which specifies that an individual (or corporation) must not "damage, excavate, dig in or alter, or remove any heritage object" from a heritage site, except in accordance with a Permit issued by the Minister". The HCA confers automatic protection upon all heritage sites that pre-date AD 1846, regardless of whether they are recorded in the Provincial Heritage Register, and regardless of whether they are located on Crown land or private property. Certain sites, including human burials and rock art sites are automatically protected regardless of their age.

It's important to note that all heritage sites, regardless of their condition, are protected under the HCA and does not distinguish between "intact" (*i.e.*, those sites which are in a pristine, or in an undisturbed state) and "disturbed" (*i.e.*, those sites which have been subject to alteration, permitted or otherwise). The following information has been provided to assist you with recognizing the archaeological site types most identified and most easily recognizable to non-professionals within the KBR.

Common Archaeological Site Types in BC and the Kootenay Boundary Region (KBR)

Most archaeological site types in BC are related to habitation areas, resource exploitation, tool making or repair, rock art, and ceremonial or ritual activities, such as burials. Preservation of organic materials is extremely poor in many places, because of acidic soil and previous forest fire history, and usually only small amounts of bone, antler, and wooden tools are found outside of coastal or other continuously wet areas, such as the edge of dammed water ways.

Lithic or Stone Tools

A "lithic" is the result of a human intentionally striking or otherwise modifying a rock, usually in the pursuit of tool manufacture or repair. These tools or "flakes" look different from naturally occurring rocks in the same area and tend to be small, angular, or pointed rather than smooth, and can look like they have been broken in an intended way or appear to resemble arrow heads or spear points. Most often the material is of a certain type or grade that may appear different than others in the same area, and the pieces found may have semicircular rings or bumps, which occur when rock is hit in a very particular way (Figure 1).

Figure 1: Examples of lithic or stone artifacts found in the KBR

Lithic sites are the most common site types identified in BC and are often all that is left of cultural activities that took place over hundreds or thousands of years ago. These artifact types can provide a wealth of information, including dates and the species being utilized, if studied in their original location and with the use of modern technology (such as radiocarbon dating adjacent organic material or blood residue analysis on the artifact itself).

Lithics can occur separately or in combination with other site types and tend to be located on specific landforms including knolls, eskers, ridges, rocky outcrops, relatively flat spots (terraces or riverbanks), areas used as travel corridors, quarries, hunting lookouts, or camping and village

locations. Lithic sites may contain thousands of years of information in the top metre of soil with many artifacts having eroded and exposed on the surface.

Cultural Depressions and Tipi Rings

Cultural depressions are the indentations left on the ground, usually in the form of pithouses and cache (storage) pits. Where the cache pits are relatively small and often identified in relation to trails and travel corridors, pithouses, and specific hunting areas, pithouses, tend to be in "clusters" on more level and open terrace features where there is relatively easy access to a potable water source.

Pithouses were occupied in both summer and winter (Figure 2). These sub-terranean dwellings are identified in all areas of the KBR, except in the area farther east of Kootenay Lake and to the BC-Alberta border and northward to around the Columbia Lake area and where tipi rings reflect a more nomadic occupation.

Figure 2: Example of a Winter Pithouse

Pithouses are most often circular depressions that vary in depth and circumference, but almost always have a ridge or berm around the outer edge and charcoal or fire altered rock, representing a hearth, in the bottom. Tipi rings are circular outlines of transported rocks (Figure 3) that would have been used to weigh the structure and hide ends at the bottom.

Figure 3: Tipi Ring Made of Transported Rock

Rock Art Sites

"Rock art" refers to pictures or symbols that indicate a direction or geographic area. Petroglyphs are pictures made by cutting or hitting/pecking rock repeatedly, while pictographs are painted using a combination of ground red ochre mineral with a base such as egg white. Many of the rock art sites in the KBR are pictographs that are found on rock faces along waterways, but they can also be found elsewhere, indicating an area of cultural and spiritual significance. Referred to most often as panels, rock art can form a singular picture (Figure 4) or be part of a multi-image panel.

Figure 4: Example of a Pictograph Found in the KBR

Human Remains

In BC, "modern" human remains, and their designated areas of land (cemeteries and other recorded areas) are protected under the *Cremation, Interment and Funeral Services Act*, while older human remains, both archaeological and historical in age and regardless of ethnicity, are protected under the HCA:

> **12.1** (2)Except as authorized by a permit issued under section 12.2 or 12.4 or an order issued under section 12.3, a person must not do any of the following:
>
> (b)damage, desecrate or alter a burial place that has historical or archaeological value or remove human remains or any heritage object from a burial place that has historical or archaeological value;

Pre-modern burial sites are any places where the body (or bodies) of an expired human has been placed or otherwise left. Burials consists of the partial or intact remains of at least one individual but may also contain whole or part of multiple individuals. In the KBR the burial types that are most likely to be identified are subsurface burials where bodies are placed in a foetal position along or facing a water body – sometimes these are then covered with piles of rock or "cairns" placed on top (Figure 5), mounded earth burials, cave or rock shelter burials, or those found along the edge of talus slopes.

Figure 5: Example of a Rock Cairn Burial

If you see bones which you know to be or suspect to be human, such as large bones that you do not recognise as animal remains, you should treat the area as a burial site by first securing the area and then immediately contacting the Archaeology Branch. The Archaeology Branch will then notify the Coroner's Office, the local policing authority, and may also arrange for a qualified anthropologist or archaeologist to provide an assessment of the remains should the Coroner's Office determine they are of archaeological significance.

If the remains are positively identified as archaeological in nature, the Archaeology Branch will work with the affected First Nations to arrange for their respectful handling in a culturally appropriate manner. Generally, if remains are still buried and are under no immediate threat of further disturbance, they will not be excavated or removed, however, if they have been partially or completely removed, the Archaeology Branch will facilitate the removal and reburial.

Guidance for Chance Finds Management

The HCA applies equally on private and Crown lands. Finding archaeological remains within the property or project boundaries does not mean that you will be automatically prohibited from continuing, rather it means that specific processes must be followed to ensure that the resource is handled in an appropriate manner. Please following these steps should you identify archaeological resources immediately:

1. If suspected archaeological materials or features are encountered, stop work in the immediate vicinity of the find and secure the area (rope or fence off, cover any larger holes, etc.);
2. Do not undertake further work that could disturb the find, including moving any soil from the adjacent or surrounding area of the site, including the removed materials;
3. Do not collect the artifacts on the surface as their distribution pattern may be important; and
4. Contact the Archaeology Branch for further direction.

Based on the nature of the incident, it may be determined that there are no further concerns and activities may continue, or further assessment or mitigation may be required. However, if an archaeological site is confirmed, coordinated discussions between the Archaeology Branch, the proponent, the provincial ministry who authorized the work, and all First Nations identified as having asserted the area as theirs. Once a consensus has been reached, the appropriate management option will be chosen and under direction from the Archaeology Branch, one or more of the following could happen:

- Avoidance through partial maintenance activity redesign or relocation. This results in minimal impact to the archaeological site and is the preferred option from a cultural resource management perspective. It is usually the least expensive option from a maintenance activity perspective as well;
- If human remains are identified and are determined to be forensic (*i.e.*, not archaeological), the local policing authority and Office of the Coroner will be contacted by the Archaeology Branch on your behalf;
- Application of temporary and/or permanent site protection measures as approved by the Archaeology Branch (e.g., fencing off the site, capping with soil) could be determined as the best option. An archaeological impact assessment to identify site boundaries and archaeological monitoring to verify the effectiveness of protective measures may be required;
- Archaeological mitigation, consisting of controlled excavations of the site; or
- Archaeological monitoring under a site alteration permit during construction by a professional archaeologist may be considered necessary.

EMERGENCY CONTACTS:

Please fill out the table and provide this document, *in its entirety*, to the ground crew conducting the work in the field, as well as to anyone else who may need to refer to its guidance.

Should you identify archaeological resources at any time, please take pictures (using a tape measurer or other at hand item for scale) and secure the immediate and adjacent area to ensure the integrity of the find and contact the Archaeology Branch at the first available opportunity.

If there is a professional archaeologist onsite working under an existing HCA permit, they should be the on to contact the Archaeology Branch on your behalf. A non-comprehensive list of professional archaeologists can be found under the "Find a Consultant" tab on the **BC Association of Professional Archaeologists here:** https://www.bcapa.ca/

General Contact	Name of Organization	Name of Contact	Telephone Number	Email Address
Archaeology Branch	Front Desk/ Reception		250-953-3334	
Proponent/ Lead Contractor				
Ministry Contact/ Project Lead				
Project Consulting Archaeologist				
First Nation Organization				
First Nation Organization				
First Nation Organization				

Schedule 4: "2205 Bealby Road, Rural Nelson, BC Mitigation and Monitoring Plan V2.2" prepared by Masse Environmental, dated October 9, 2024

2205 Bealby Road, Rural Nelson, BC

Mitigation and Monitoring Plan V2.2

Prepared for:

Regional District of Central Kootenay

202 Lakeside Drive

Nelson, BC, V1L 5R4

Oct 9, 2024

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

Project Number 2023-1034

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1 INTRODUCTION

On behalf of Judith and Jerry Levinson (Owners), Masse Environmental Consultants Ltd. (Masse) has prepared this Revegetation Plan to accompany the Riparian Assessment Report prepared for 2205 Bealby Road, Rural Nelson, BC. Both documents form the principal components of a Watercourse Development Permit (WDP) Application for unauthorized works and proposed development within the WDP area of Kootenay Lake. Unauthorized works included the removal of mature riparian forest in preparation for the proposed development, which includes the demolition and replacement of an existing residential structure, its associated septic facilities, and the associated water intake from Kootenay Lake.

The Mitigation Plan provides the details and prescriptions recommended for helping to restore the ecological values of the property (to the extent possible) following development. It is designed to be used in conjunction with the Riparian Assessment Report and does not aim to repeat the information presented in that document unless to simplify or clarify a mitigation measure or best management practice.

2 IMPACT ASSESSMENT OVERVIEW AND MITIGATION PLAN STRATEGY

All of the unauthorized works and >90 % of the proposed development have occurred or will occur within the WDP area and the Streamside Protection and Enhancement Area (SPEA) according to the Riparian Areas Protection Regulation (RAPR) criteria (MFLNRORD 2019). Refer to Appendix 2 of the Riparian Assessment Report for the SPEA Map and Proposed Site Plan.

The Shoreline Management Guidelines for Kootenay Lake (KLP 2020) 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 of unavoidable impacts; and 4. Compensation for residual impacts.

Given the small size of the property and that unauthorized works have already occurred, it is not possible to achieve a "No Net Loss" development plan. This Mitigation Plan therefore focuses on onsite restoration of impacted areas. To help mitigate for the temporary loss of ~820 m^2 of riparian habitat; 1020 m^2 (Ratio (~1.2:1) will be restored by replanting of native vegetation, habitat complexing, daylighting of Hall Spring and creation of pollinator gardens over the septic fields.

A back-up septic field area located west of the primary septic field was identified by Highland Consulting (shown on the mitigation plan in Appendix 1). If this backup field is needed in the future, it will affect the

restoration area, and a Watercourse Development Permit Application will be necessary to carry out the work, as it falls within the 15-meter WDP zone.

Provided that the recommendations in this plan and the measures to protect the SPEA outlined in the Riparian Assessment Report are implemented and followed, the negative impacts associated with the unauthorized works, proposed development, and future use of the property will be minimized and the riparian function within the revegetated areas will be partially restored over time. However, the permanent loss of mature riparian vegetation along the foreshore cannot be fully mitigated for as the riparian function has been damaged and the proposed mitigation area will take upwards of 75 plus years to restore riparian function to where it was pre-development.

3 HABITAT COMPLEXING

Habitat complexing will involve the daylighting of Hall Spring and placement of large woody debris (LWD) within the riparian area.

Daylighting of Hall Spring will involve the decommissioning and removal of the Big "O" pipes, construction of a shallow gravel/cobble lined channel (~1.0 m wide and 0.3 m deep; Figure 1) and revegetation along the channel is described in Section 4.1.2.

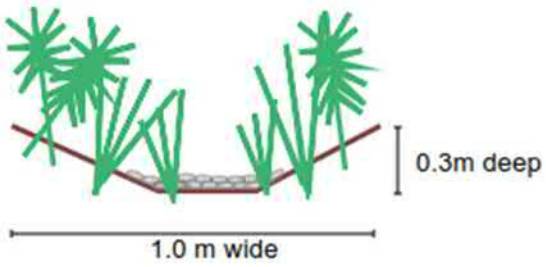

Figure 1. Cross Section of Hall Spring Channel Profile

Prior to revegetation activities commencing, salvaged large woody debris from clearing activities will be scattered around the revegetation area at the direction of the QEP.

4 REVEGETATION PRESCRIPTION

The proposed revegetation is designed with a focus on naturalizing the foreshore and creating a vegetation buffer between the development and foreshore area. The revegetation prescription includes three specific planting areas: Riparian, Hall Spring and Pollinator Gardens.

Revegetation will include planting of 32 native trees and a variety of native and ornamental shrubs, forbes, grasses and sedges along the foreshore of Kootenay Lake. Quantities of plant species will be determined by the QEP once development is complete and natural re-establishment of native vegetation has been assessed. Refer to Appendix 1 for the Proposed Site Plan. Revegetation prescriptions are outlined in Table 1.

Table 1. Revegetation Plan Prescription

Restoration Area	Size (m^2)	Prescription
Area 1: Riparian	~893	• Retain topsoil and existing plants to promote natural regeneration of the species remaining in this area. • Additional topsoil placement will be required in some areas to support replanting[1]. • Plant 26 trees and a mixture of shrubs, perennials, and grasses[2] between existing plants (Table 2).
Area 2: Hall Spring	~10	• Retain topsoil and existing plants to promote natural regeneration of the species remaining in this area. • Plant a mixture of perennials, sedges and rushes[2] along the spring channel (Table 3).
Area 3: Pollinator Gardens	~117	• Apply 3" of premium topsoil over the septic field area and spread pollinator-friendly wildflowers seed mix at a rate of 500 seeds/m^2 (Table 4).

[1] Topsoil volume and placement to be determined by QEP once residential development is complete.
[2].Quantities of plants will be determined by the QEP once residential development is complete.

4.1 Recommended Plant Species

4.1.1 Area 1- Riparian Revegetation

A list of trees, shrubs, forbes, and grasses that will be used for site-wide revegetation is provided in Table 2. This list was developed in consultation with the Owners with the goal of incorporating native riparian species with high ecological value back into the property. Plant selection will be dependent on nursery stock and species availability and may be substituted with approval from the QEP. Alternative species that may be substituted are listed in Appendix 2.

Table 2. Recommended plant species for site-wide revegetation.

Common Name	Latin Name	Suggested Pot Size (for planting)
Trees		
Douglas maple	Acer glabrum	5 gallon
lodgepole pine	Pinus contorta	5 or 10 gallon
White pine	Pinus monitocola	5 or 10 gallon
paper birch	Betula papyrifera	5 gallon

Common Name	Latin Name	Suggested Pot Size (for planting)
water birch	Betula occidentalis	5 gallon
Western red cedar	Thuja plicata	5 or 10 gallon
Shrubs		
common lilac	Syringa vulgaris	TBD
dappled willow	Salix integra 'Hakuro Nishiki'	TBD
Oakleaf hydrangea	Hydrangea quercifolia	TBD
mallow ninebark	Physocarpus malvaceus	1 gallon
mock orange	Philadelphus sp.	1 gallon
nootka rose	Rosa nutkana	1 gallon
red-flowering currant	Ribes sanguineum	1 gallon
Red osier dogwood	Cornus stolonifera	1 gallon
sandbar willow	Salix exigua	1 gallon
smoke bush	Cotinus coggygria	TBD
snowberry	Symphoricarpos albus	1 gallon
Forbes		
shrubby penstemon	Penstemon fruticosus	1 gallon
Grasses		
Elijah blue fescue	Festuca glauca	1 gallon
Karl foerster feather reed grass	Calamagrostis acutiflora	1 gallon

These species were selected based on their suitability for the property (ecoregion, exposure, and moisture regime) and based on the following resources:

- Conservation, Restoration and Stewardship of Low Elevation Brushland (GB), Grassland (Gg) and Dry Forest Ecosystems in the West Kootenay Region (McKenzie and Hill 2023).
- British Columbia FireSmart Landscaping Guide
- Invasive Species Council of BC Grow Me Instead Guide
- The EcoGarden Project Plant List for West Kootenay Gardens (CKISS N.D.)
- Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting (Ministry of Agriculture 2012).
- Pollinator planting guide for the Columbia Mountains and Highlands Ecozone (the David Suzuki Foundation Butterflyway Project)
- A Resource for Kootenay Lake Living

4.1.2 Area 2 -Hall Spring Revegetation

Hall Spring PD27566 is an abandoned and daylighted spring on the property. It discharges water to Kootenay Lake via an underground big-o pipe. Moisture-tolerant forbes, sedges and rushes will be planted along and within the Hall Spring Channel. Refer to Table 3. Recommended plant species for Hall Spring revegetation. for recommended species.

Table 3. Recommended plant species for Hall Spring revegetation.

Common Name	Latin Name	Suggested Pot Size (for planting)
Baltic rush	Juncus balticus	4”
Columbian sedge	Carex aperta	4”
fairybells	Prosartes spp.	4”
foamflower	Tiarella trifoliata	4”
Kellogg’s sedge	Carex lenticularis	4”
lady fern	Athyrium filix-femina	1 gallon
oak fern	Gymnocarpium dryopteris	1 gallon
thick headed sedge	Carex Pachysyachya	4”
twinflower	Linnaea borealis	4 “

4.1.3 Area 3 - Pollinator Gardens

KinSeed Ecologies was consulted in order to assemble a species list of pollinator-friendly native wildflowers that would be suitable for revegetating a sand mound septic field with a north to northwest aspect, natural seepage in the area, and tolerance to some amount of shade. The recommended species are provided in Table 4. KinSeed Ecologies assists with ecological gardening and restoration in the West Kootenays and provides custom seed mixes for sowing made from seeds that originate in the Kootenays.

Table 4. Native Pollinator Seed Mixture for Septic Field

Common Name	Latin Name	Common Name	Latin Name
autumn sunshine	Helenium autumnale	pink fairies	Clarkia pulchella
brown-eyed Susan	Gaillardia aristata	scarlet gilia	Ipomopsis aggregata
common harebell	Campanula rotundifolia	showy daisy	Erigeron speciosus
golden-aster	Heterotheca villosa	silverleaf phacelia	Phacelia hastata
golden tickseed	Coreopsis tintoria	spikelike goldenrod	Solidago simplex
grand collomia	Collomia grandiflora	threadleaf phacelia	Phacelia linearis
Lewis blue flax	Linum lewisii	yarrow	Achillea millefolium
narrow-leaved skullcap	Scutellaria angustifolia	yellow penstemon	Penstemon confertus

4.2 General Planting and Maintenance Guidelines

- Final plant selection and quantities shall be completed in consultation with the QEP.
- Planting should not occur during periods of hot dry weather unless they are irrigated daily.
- Avoid disturbance of existing plant roots established within the revegetation area.
- Trees shall be planted at >2.5 m spacing, shrubs shall be planted at >0.5m spacing and forbes and grasses shall be planted at >0.25m spacing.
- Locally adapted native plants are preferable to those collected or grown outside the region. The species listed in Table 2 and Table 3 are available from Sagebrush Nursery in Oliver https://sagebrushnursery.com .

- Planting holes shall be a minimum of 3 times the size of the pot, unless they are plugs.
- Mix in 25% compost with native soils into each planting hole.
- Specific locations of plants shall be directed by a QEP or landscaper.
- Use transplant fertilizer (i.e. Mykes Mycorrhizae Tree and Shrub or similar), bone meal and blood meal mix as per manufacturers specifications in each planting hole.
- Plantings which do not survive should be replaced to ensure complete establishment of native plants, and exclusion of exotic plants.
- Ensure the objective of the restoration is to naturalize the riparian area and not create a landscaped garden.
- Regularly irrigate new plantings during the plant establishment period for a minimum of 5 years and thereafter as required.
- Pull any invasive weeds on a yearly basis prior to going to seed.
- Replanting of riparian vegetation around buildings should adhere to principles of rural residential fire protection (for more information see the FireSmart Homeowner's Manual MFLNRO N.D.).

4.3 Environmental Monitoring

The anticipated effort for environmental monitoring and professional guidance on this project includes the following:

- QEP will be onsite for a pre-construction meeting with Owner and Landscaper to ensure that all parties are aware of environmental sensitivities and familiar with the proposed mitigation measures.
- QEP to provide guidance during revegetation, as required.
- QEP will conduct a post construction site visit once development and revegetation is complete to assess compliance and completion of the project and submit an environmental summary report to the RDCK.
- QEP will conduct interim effectiveness monitoring inspections annually for a three-year period and provide recommendations to the Owner as required.
- A post inspection report will be prepared by the QEP after three growing seasons and submitted to the Owner and RDCK. The following indicators of success of riparian plantings should be documented in this report:
  - Plant composition includes mostly native trees and shrubs.
  - Establishment of >80% of planted riparian species after 3 full years would be a reasonable indication that the mitigation plan has been successfully completed.

5 CLOSURE

If you have any comments or questions, please do not hesitate to contact the undersigned.

Sincerely,

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

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

6 REFERENCES

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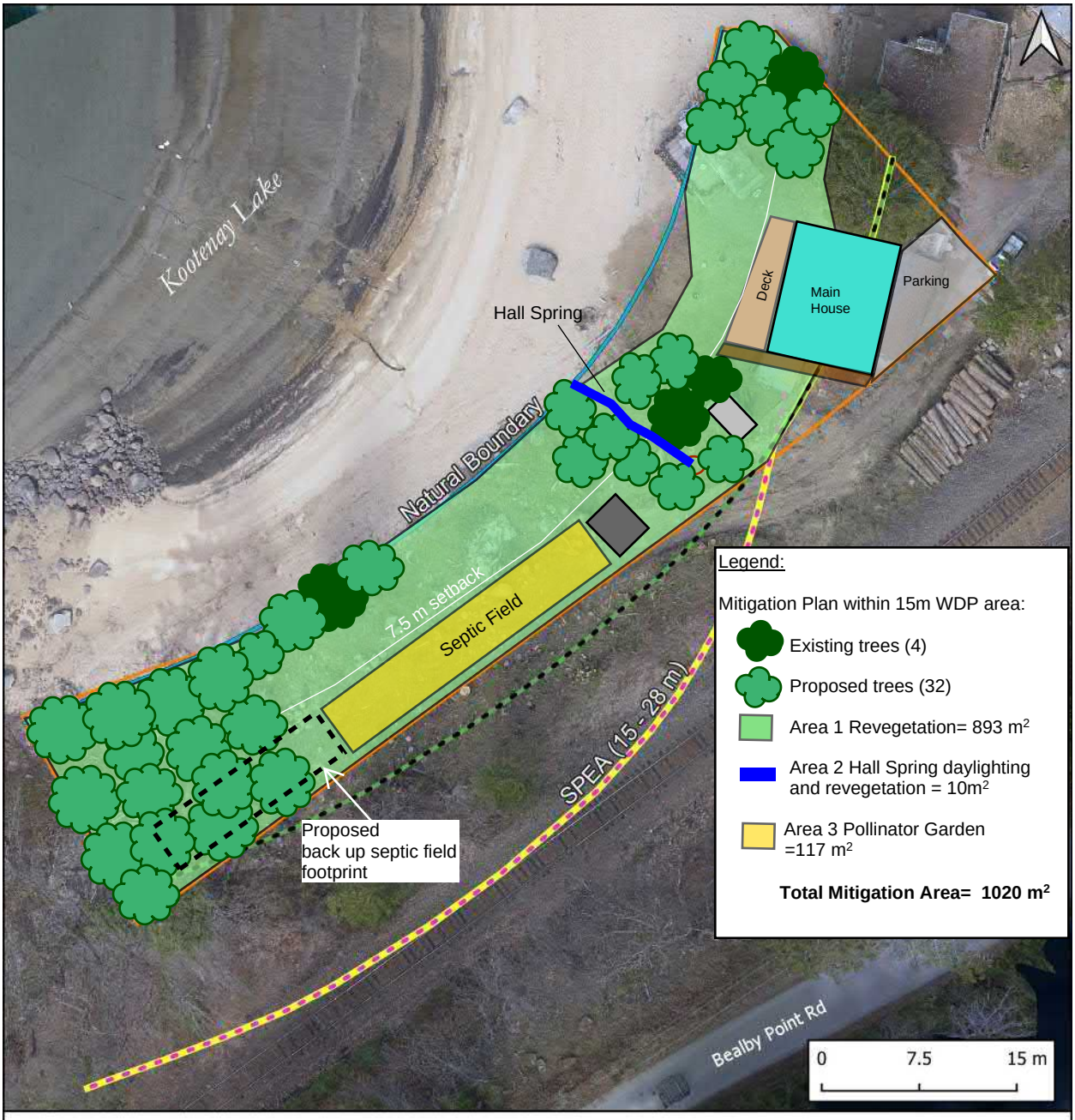
APPENDIX 1. MITIGATION PLAN DRAWING



Levinson WDP | Riparian Assessment | SPEA Setbacks

- Property Boundary (PID 027-301-656)
- Natural Boundary
- WDP Area (15 m)
- LWD ZOS and Litterfall ZOS (15 m)
- Shade ZOS (13 - 28 m)
- SPEA ZOS (15 - 28 m)

MASSE ENVIRONMENTAL

Map Date: 08/14/2023
Projection: NAD83 UTM Zone 11
Project: 2023-1034
Map Scale: 1: 500
Orthoimage Date: April 20, 2023
Fortis BC Lake Level: 530.11 m

APPENDIX 2. COMPLETE LIST OF RECOMMENDED ALTERNATIVE SPECIES FOR REVEGETATION

Common Name	Latin Name	Sun/Shade	Water Requirement
Trees			
Douglas maple	Acer glabrum	fs-psh	low
lodgepole pine	Pinus contorta	fs	low
water birch	Betula occidentalis	fs-psh	high
Western red cedar	Thuja plicata	fs-psh	medium
Shrubs			
Red alder	Alnus rubra	fs-psh	medium
Baldhip rose	Rosa gymnocarpa	fs-psh	low
Beaked hazelnut	Corylus cornuta	fs-psh	low
birch-leaved spirea	Spiraea betulifolia	fs	low
black huckleberry	Vaccinium membranaceum	fs-psh	low-medium
Common juniper	Juniperus communis	fs-psh	low
common lilac	Syringa vulgaris	fs-psh	low
Common ninebark	Physocarpus opulifolius	fs-psh	low
common snowberry	Symphoricarpos albus	fs-psh	low
elderberry	Sambucus spp.	fs-psh	low
falsebox	Paxistima myrsinites	fs-psh	low
fragrant sumac	Rhus aromatica	fs-psh	very low
Oakleaf hydrangea	Hydrangea quercifolia	fs-psh	medium
kinnikinnick	Arctostaphylos uva-ursi	fs-psh	very low
mallow ninebark	Physocarpus malvaceus	fs-psh	low
mock orange	Philadelphus lewisii	fs-psh	low
nootka rose	Rosa nutkana	fs-psh	low
oceanspray	Holodiscus discolor	fs-psh	medium
Oregon grape	Mahonia spp.	fs-psh	low
potentilla	Potentilla fruticosa	fs-psh	low
red-flowering currant	Ribes sanguineum	fs-psh	medium
Purple spirea/hardhack	Spiraea douglasii	fs-psh	medium
Red osier dogwood	Cornus stolonifera	fs	low
sandbar willow	Salix exigua	fs-psh	high
saskatoon	Amelanchier alnifolia	fs-psh	low
shrubby penstemon	Penstemon fruticosus	fs	low
smoke bush	Cotinus coggygria	fs	low
Smooth sumac	Rhus glabra	fs-psh	low
soopolallie	Shepherdia canadensis	fs	low
thimbleberry	Rubus parviflorus	fs-psh	medium
Wood's rose	Rosa woodsii	fs-psh	medium
Forbes			
Canada goldenrod	Solidago canadensis or lepida	fs	low
common camas	Camassia quamash	fs	medium
Douglas's aster	Symphyotrichum subspicatum	fs	medium
fireweed	Chamerion augustifolium	fs-psh	low
Hairy false Golden aster	Heterotheca villosa???	fs-psh	low
lamb's ear	Stachys byzantina	fs	low
Large-leaved lupine	Lupinus polyphyllus	fs-psh	medium
Butterfly milkweed	Asclepias tuberosa	fs-psh	low
nodding onion	Allium cernuum	fs-psh	low
showy daisy	Erigeron speciosus	fs-psh	low
silky lupine	Lupinus sericea	fs-psh	low

Common Name	Latin Name	Sun/Shade	Water Requirement
pearly everlasting	Anaphalis margaritacea	fs	low
purple coneflower	Echinacea purpurea	fs-psh	medium
pussytoes	Antennaria spp.	fs-psh	low
spreading dogbane	Apocynum androsaemifolium	fs-psh	low
sticky geranium	Geranium viscosissimum	fs-psh	low
twinflower	Linnaea borealis	fs-psh	medium-high
Wild sarsaparilla	Aralia nudicaulis	fs-psh	medium
wild strawberry	Fragaria virginiana	fs-psh	low-medium
Grasses			
fescues	Festuca spp.	fs-psh	variable
Pine grass	Calamagrostis rubescens	fs-psh	low