REGIONAL DISTRICT OF CENTRAL KOOTENAY

DEVELOPMENT PERMIT

D2103A-05130.000-Waters-DP000108

Date: July 19, 2022

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

1. This Development Permit is issued to Steven & Elizabeth Ryder, Christopher & Elizabeth Waters & Leo Campeau of 15361 Highway 3A, 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 4595 Kootenay District Plan EPP90349 (PID 031-252-818) 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 'Environmentally Sensitive Development Permit Area' and are located within a Development Permit Area pursuant to the Electoral 'A' Official Community Plan Bylaw No. 2315, 2013 as amended.

5. The Permittee has applied to the Regional District of Central Kootenay to remediate un-authorized works 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 aforementioned Works.

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 Works shall be carried out in accordance with Schedule 4 of this Permit and under the guidance of a Qualified Environmental Professional in accordance with the Riparian Areas Protection Regulation.

   6.2 Foreshore installation/construction activities associated with this project, if below the mean annual high water mark will require an application to the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLRORD) pursuant to the Water Sustainability Act, Section 11.

   6.3 Works will be monitored by a Qualified Environmental Professional for 5 years following completion. The Qualified Environmental Professional will provide a monitoring report to the Regional District of Central Kootenay following each year's inspection at the Permittee's expense.

6.4 The Regional District of Central Kootenay Building Department requires that the Permittee obtain building permit prior to any re-location or construction involving land in this location at which time the Permittee shall be required to address sewage disposal issues to the satisfaction of the Interior Health Authority and Regional District of Central Kootenay Senior Building Official.

7. 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 **$37 970.06** to ensure the landscaping and monitoring 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 November 30, 2022 and monitoring of those works will continue to November 2027. Within this time period the required landscaping must be inspected and approved by a Qualified Environmental Professional and the Regional District of Central Kootenay as outlined in Section 6.3 of this permit.

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.

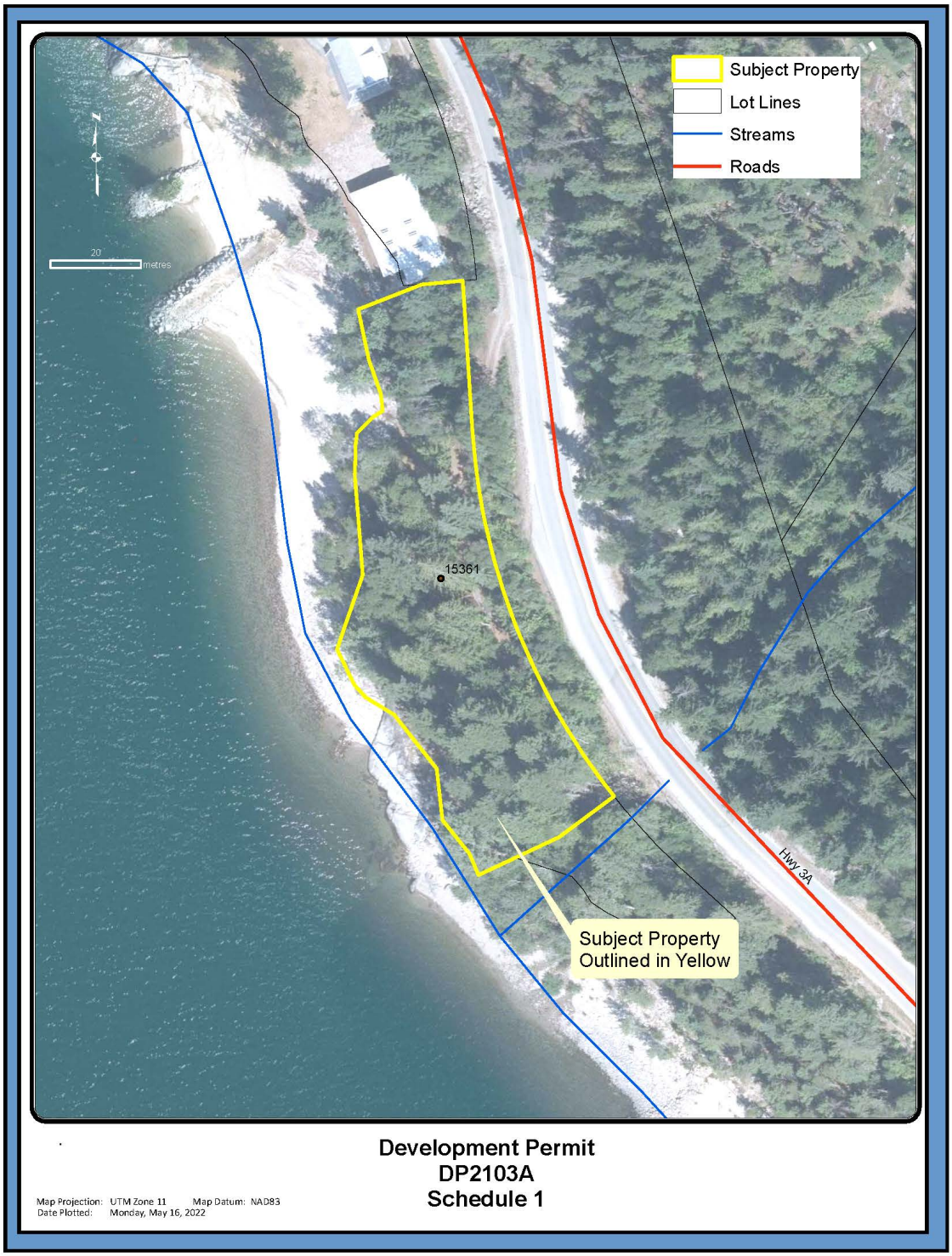
14. This Development Permit shall come into force and effect on the date of issuance.

S Sudan
Sangita Sudan, General Manager of Development Services

May 30, 2022
Date of Approval (date of review and approval)

July 19, 2022
Date of Issuance (pending receipt of securities)

Schedule 1: Subject Property



Schedule 2: Planting Plan

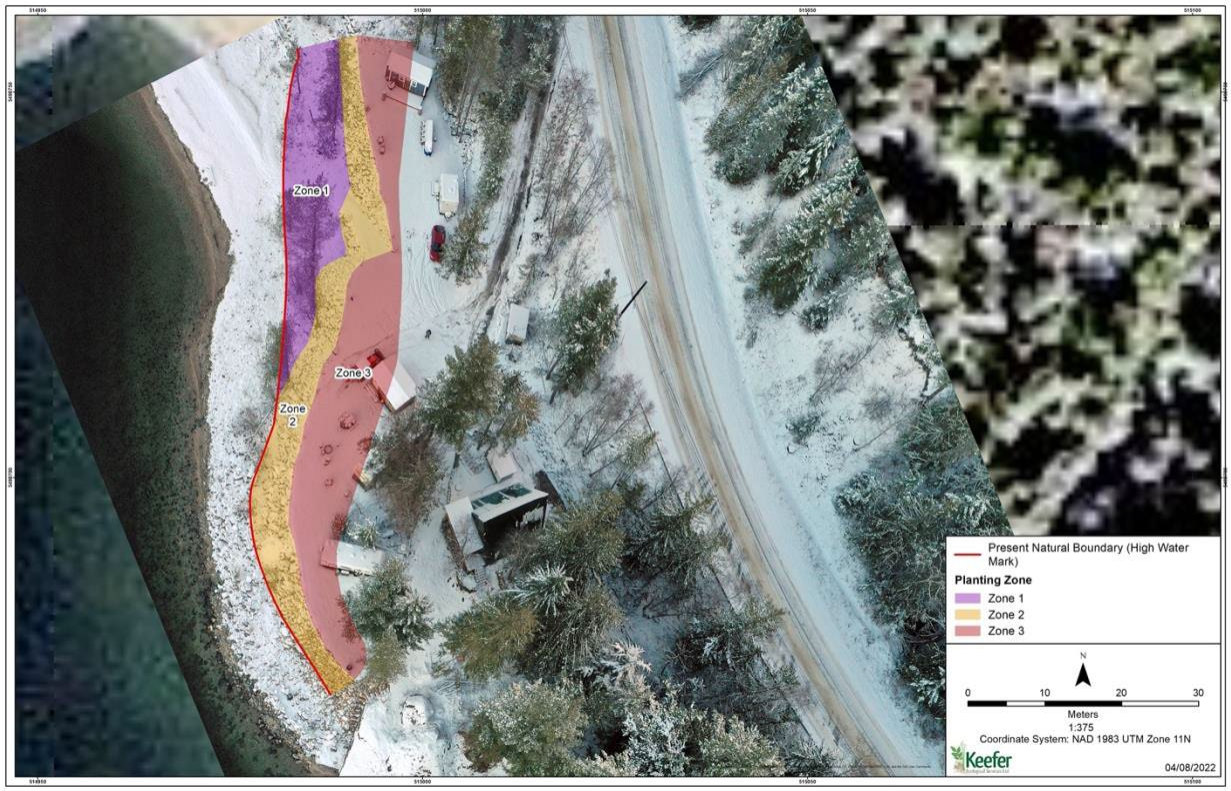


Table 1. Summary of remediation and revegetation plan

ZONE	ACTION	DETAILS
1	Plant live stakes	Plant approximately 6 cottonwood, 12 dogwood, and 12 willow live stakes at 3 m spacing in fall 2022.
1 & 3	Uncover natural ground around existing trees	Remove any added gravel substrate (if present) from around the stems of existing trees (under canopy drip curtain). This applies to trees immediately west of the main residence and in the shoreline area.
2	Plant plugs	Plant approximately 100 Kinnikinnick plugs at a density of 1 plug per 1-2m^2.
2	Narrow walking path	Narrow walking path to approximately 1.3 metres width. Gravel surface should remain as is.
2 & 3	Lower armored rock wall and recontour	Lower wall by 50-150 cm below present surface and recontour area to create a rough and loose surface with a gentle slope up from west to east, suitable for planting. Native surface should remain undisturbed.
2 & 3	Apply topsoil and mulch	Dig holes for container plants - 60 cm diameter x 20 cm depth. Fill with soil, mounding slightly above normal ground surface. Apply 5 cm mulch above soil. Apply in Spring 2022.
3	Light grass seeding	Seed about 500 g prescribed grass mix.
3	Plant container stock	Plant #1 containers of 8 Douglas fir, 8 cedar, 15 lodgepole pine, and 15 Saskatoon at 3 m spacing in spring 2022.

Schedule 3: Riparian Assessment (Masse Environmental Consultants)

15361 HWY 3A
GRAY CREEK, BC

Riparian Assessment

Prepared for:
Regional District of Central Kootenay
202 Lakeside Drive,
Nelson BC, V1L 5R4

Prepared by:
Masse Environmental Consultants Ltd.
812 Vernon St.
Nelson, BC, V1L 4G4

Mar 2, 2021

TABLE OF CONTENTS

List of Tables

List of Appendices

Abbreviations

AHI: Aquatic Habitat Index
DBH: Diameter at Breast-Height
FIM: Foreshore Inventory Mapping
GSC: Geodetic Survey of Canada
HWM: High Water Mark
LWD: Large Woody Debris
FLNRORD: Forests, Lands and Natural Resource Operations and Rural Development
QEP: Qualified Environmental Professional
RAR: Riparian Area Regulation
RDCK: Regional District of Central Kootenay
ROW: Right of Way
SPEA: Streamside Protection and Enhancement Area
WDP: Watercourse Development Permit
ZOS: Zones of Sensitivity

1 INTRODUCTION

Masse Environmental Consultants Ltd. was retained by the Owners, to conduct a riparian assessment to accompany an application for a Waterfront Development Permit on 15361 Hwy 3a (Lot 3, District Lot 4595, Kootenay District Plan 2683, NEP2683; PID: 015-157-849). Under a direct order from the RDCK in the Summer of 2020, the Owners were required to retain an environmental consultant to assess the unauthorized development conducted within the environmentally sensitive development permit (ESDP).

A site visit was completed on August 7, 2020 by Fiona Lau B.Tech., A.Sc.T. and Beth Newbery Environmental Tech. to conduct a riparian assessment on the property within the 15m ESDP 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 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. 2260, 2013*.
- British Columbia *Riparian Areas Regulation*
- Kootenay Lake Shoreline Management Guidelines
- British Columbia *Water Sustainability Act*
- General BMPs and Standard Project Considerations (Ministry of Environment)
- On the Living Edge: Your Handbook for Waterfront Living
- Develop with Care. Environmental Guidelines for Urban and Rural Land Development in British Columbia
- British Columbia Firesmart Homeowners Manual
- Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting
- BC Tree Replacement Criteria
- A Homeowner's Guide to Stormwater Management.

This report has been prepared by Fiona Lau B.Tech., A.Sc.T., and reviewed by Lisa Pavelich, BSc, PAg.
I, Lisa Pavelich, hereby certify that:

a) I am a qualified environmental professional, 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 Regulation.

2 PROJECT OVERVIEW

2.1 Location

The subject property is in Gray Creek, BC, and is bordered by private property to the north, MoTI ROW to the east, Crown Land to the south and Kootenay Lake to the west. The property covers ~1.04 acres with ~134 m of frontage on Kootenay Lake.

The project area is within the Interior Cedar Hemlock dry warm variant 1 (ICHdw1) biogeoclimatic subzone (MacKillop and Ehman 2016). This moist climatic region is characterized by very hot, moist summers; and very mild winters with light snowfall. Soils generally dry out in late summer for varying extents of time ranging from insignificant to extensive. Snowpacks are very shallow to shallow and of short duration and combined with the mild climate result in no significant soil freezing (MacKillop and Ehman 2016).

2.2 Existing Site Conditions

The subject property appears to have been mostly forested (Photos 1-2) prior to recent development with existing development concentrated on the northern half of the property. According to the Owners and based on historical imagery, development prior to unauthorized activities within the ESDP area included small parking areas, fire pit area on beach, access paths/steps to the beach and small retaining walls. Exact locations and areas of previous development could not be quantified because of recent disturbance and therefore previous development footprints within the ESDP area is largely unknown. Existing development outside of the ESDP area includes a small cabin, outbuildings, septic field and driveway (Photo 3).

In the period of 2019-2020, the Owners developed the northern half of the property within the ESDP area without a development permit (Photos 5 and 6). Development activities within the ESDP area included:

- Removal of riparian vegetation (total area unknown);
- Placement of imported fill material to create a level elevated bench, ranging from1.5 m to 3 m high above the native ground for RV parking and bunkhouses (~1050 m^2);
- Placement of rock armour on the face of the fill along the foreshore to prevent erosion potential; and
- Installation of two bunkhouses (~30 m^2).

During the site visit, the visible high-water mark (HWM) was confirmed to be at ~533.9 elevation on the northern half of the property as shown on the legal survey completed in 2020 by Griffith Surveys (Appendix 2). A few flood tolerant plants were located below the 533.9 m elevation.

Based on the definition of natural boundary, the natural boundary shown on the survey will be used as the HWM from which the streamside protection area setbacks will be determined as per the Riparian Area Protection Regulation.

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

Photo 1. View of foreshore area prior to recent development, looking east.

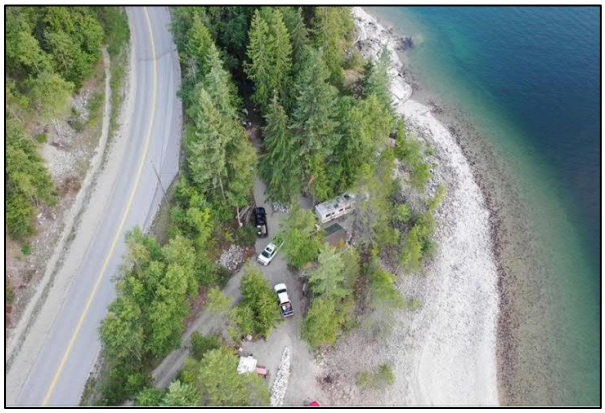


Photo 2. Aerial view of mid property during initial phase of recent development, 2019.

Photo 3. Existing A-frame cabin on property, looking east.

Photo 4. Existing undisturbed riparian area along south portion of property, looking west.

Photo 5. Recent development, imported fill, at north end of property, looking north.

Photo 6. Recent development, imported fill, at north end of property, looking south.

2.3 Proposed Development

The proposed development within the 15 m ESDP area includes:

- Retention of imported fill and rock armour along a portion of the foreshore to accommodate four RV pads, septic tank and parking (600 m^2).
- Restoration of a portion of the riparian area: Fill removal to expose native ground and revegetation at north and south ends of development area (270 m^2) and partial fill removal and revegetation within middle section of development area.
- Re-vegetation along the beach fronting the rock armour (~30m^2).
- Installation of certified septic tank and service lines approved by Interior Health Authority. Refer to Section 2.4.

The imported fill and RV parking area is sited completely within private property boundaries and encroaches within the ESDP area. The bench was constructed with pit run material (mixture of gravel and sand) and capped with a layer of clear crush gravel. The exposed fill slope along the foreshore was armoured with rock to protect the bank from erosion. Modifications to the infilled area are proposed to minimize the footprint and restore a portion of the riparian area through riparian planting along Kootenay Lake. Refer to Section 7 and Appendix 2 for proposed mitigation plan.

2.4 Services

Domestic water for the main house and washroom building is currently extracted from Wilmot Creek with an approved water license. Water service lines will be installed to each RV pad as part of the development and connected to the existing system. The property has an approved existing septic field installed to the south-east of the existing cabin, outside of the ESDP area. The Owner's have obtained permission from the Interior Health Authority for the septic tank, which will be located at least 10 m from any watercourse as per the Sewerage System Standard Practice Manual Version 3 (HPBMOH 2014), with service lines connecting to each RV pad. The tank will be pumped to the existing septic field located behind the cabin.

3 Regulatory Review

3.1 Streamside Protection and Enhancement Area

To determine whether the 15 m ESDP setback from the High Water Mark (HWM) of Kootenay Lake and Wilmot Creek aligns with Riparian Area 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 Figure 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 0-6 m from the HWM. 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 m.

As per the RAPR, the large woody debris (LWD) was plotted at 10 m north from the HWM of Wilmot Creek, litterfall plotted at 15 north of the HWM, and the shade ZOS plotted 0 m from the HWM. The SPEA setback is determined based on the ZOS with the greatest width. Therefore, within the subject property the SPEA from the HWM of Wilmot Creek within the property boundary is 15 m. Refer to Appendix 3 for SPEA map showing ZOS' and SPEA setbacks.

The BC Riparian Areas Regulation (BC 2015) defines "High Water Mark" and "Stream" as follows:

"High Water Mark" means the visible high water mark of a stream 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 stream 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."

"Stream" includes any of the following that provides fish habitat:
(a) a watercourse, whether it usually contains water or not;
(b) a pond, lake, river, creek or brook;
(c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b).

Table 1. Results of detailed RAPR assessment.

Feature Type	SPVT[1]	Zones of Sensitivity			SPEA
		LWD	Litter fall	Shade	
Kootenay Lake	TR	15 m	15 m	0-6m	15 m
Wilmot Creek	TR	10 m	15 m	0 m	15 m

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

3.2 Kootenay Lake Shoreline Management Guidelines

The Kootenay Lake Foreshore Inventory Mapping (FIM) and the Kootenay Lake Shoreline Management Guidelines documents (EEC 2016, KLP 2018) were used to help determine site specific risk for riparian habitat, Ktunaxa Nation cultural values, and archaeological resources along the shoreline. The property is within FIM segment 148 and indicates that the foreshore is located within a cottonwood riparian area, has emergent vegetation and is within white sturgeon spawning habitat (EEC 2016, KLP 2018). Table 2 provides the environmental and archaeological risk results identified in the FIM along the shoreline of the property.

Table 2. Environmental and archaeological risk results.

Aquatic Habitat Index Rating (AHI)	Aquatic Sensitivity	Archaeological Risk	Enhanced Engagement Required
Very high	Yes	Yellow	No

4 RESOURCES

4.1 Fish and Aquatic Habitat

4.1.1 Kootenay Lake

The foreshore along the northern half of the property consists of a gently sloped beach (up to ~10 % gradient) with substrate consisting of gravel and pebbles, with some cobble and small boulders (Photos 7 and 8). Fish habitat along this section of foreshore supports juvenile rearing habitat with coarser substrates providing cover. No known kokanee spawning has been reported in this area; however, habitat is potentially conducive for salmonid shore spawning (EEC 2016).

The foreshore along the southern half of the property consists mostly of steep exposed bedrock outcroppings (~ 65% gradient) with some overlaying boulders (Photo 9). As you head south in front of Wilmot Creek mouth, the foreshore changes into a cobble and boulder beach with a gradient of ~15% (Photo 10). Fish habitat along these sections of foreshore includes deeper water habitat for adult fish, juvenile rearing habitat and feeding habitat at the mouth of Wilmot Creek.

Kootenay Lake supports a variety of fish species, including several species of regional interest, such as rainbow trout, bull trout, kokanee, white sturgeon, Westslope cutthroat trout, and burbot. Mussels were not observed along the foreshore; however, a complete mussel survey was not conducted as part of the initial site visit.

Photo 7. View of foreshore looking southeast.

Photo 8. View of native substrate.

Photo 9. Deep water habitat along foreshore at south end of property, looking north.

Photo 10. Shallow water and feeding habitat at Wilmot Creek Mouth, looking south.

4.1.2 Wilmot Creek

Wilmot Creek is a small stream, ~4.4 km long which flows is an east to west direction from the Purcell Mountain Range into Kootenay Lake (MOE 2020). The creek is located on crown land; ~ 7 m south of the property boundary. The lower reach of the stream has an average bankful width of 5.4 m, gradient of ~16% with step pool morphology (Photo 11). Dominate substrate consists of boulders and cobbles with subdominant fines and gravels (Photo 12). Upstream of the creek mouth the channel is braided with 3 distinct channels for approximately 25 m. Within this section, a flood plain area was observed, characterized by signs of soil erosion and dominant flood tolerant vegetation. No fish have been recorded in Wilmot Creek (MOE 2020); however, this does not indicate that fish are not present. The highway culvert crossing located above the SE property corner, ~40 upstream of the stream mouth appears to be a barrier to fish and restricts upstream movement. Fish habitat with this section includes overhanging vegetation, large woody debris and coarse substrate which provide shade and cover for fish.

Photo 11. Upstream view of Wilmot Creek towards highway culvert crossing.

Photo 12. Downstream view of Wilmot Creek towards Kootenay Lake.

4.2 Riparian Vegetation

4.2.1 Kootenay Lake

The northern portion of the property along Kootenay Lake has been highly disturbed by the removal of coniferous and deciduous trees, shrubs and herbaceous species. A few lodgepole pine (*Pinus contorta*) and red osier dogwood (*Cornus stolinifera*) were retained along the foreshore below the fill, as well asfour white pine (*Pinus monitcola*) and one Interior Douglas fir (*Pseudotsuga menziesii*) that were retained in front of the existing cabin within the ESDP area. Unfortunately, backfill has been placed around these five trees with approximately ~0.5 m of fill material, which is slowly suffocating the root systems. The fill material does not provide any growing medium potential for natural plant recruitment in the area.

The southern portion of the property along Kootenay Lake remains undeveloped and supports an ecologically diverse and functioning riparian system including a mixture of varying stand age conifers, mature black cottonwood (*Populus balsamifera)* (Photo 15), paper birch (*Betula papyrifera)*, with several species of under-storey vegetation. The Kootenay Lake foreshore has large, exposed rock outcroppings with sparse tree cover,sporadic drought tolerant shrubs and abundant moss (Photo 16). Upland riparian habitat changes into a more densely colonized forest, with deeper topsoil layers and plant root systems.

4.2.1 Wilmot Creek

Riparian vegetation along the southern portion of the property north of Wilmot Creek is undeveloped and consists of variety of mixed conifer and deciduous tree species with abundant understorey vegetation. A flood plain area along the lower section of Wilmot Creek supports more flood tolerant species (ie. common horsetail (*Equisetum arvense*), red osier dogwood (*Cornus stolonifera*), thimbleberry (*Rubus parviflorus*) and mountain alder (*alnus incana*) graduating to more upland riparian species (ie. interior Douglas fir, Douglas maple (*Acer glabrum*), pin cherry (*Prunus pensylvanica*) and saskatoon (*Amelanchier alnifolia*).

A list of plant species observed on site is presented in Table 3

Photo 13. Retained riparian vegetation along foreshore at north portion of property.

Photo 14. Backfill placed around conifer trees in front of existing cabin at north portion of property.

Photo 15. Mature black cottonwood along foreshore.

Photo 16. View of typical riparian vegetation along foreshore.

Photo 17. View of riparian vegetation within floodplain area of Wilmot Creek.

Photo 18. View of riparian vegetation along Wilmot Creek, looking downstream.

Table 3. Plant species encountered on the property.

Common Name	Scientific Name	Common Name	Scientific Name
Trees		Herbaceous and Low Shrubs	
Douglas-fir	*Pseudotsuga menziesii*	fireweed	*Chamaenerion angustifolium*
western white pine	*Pinus monticola*	bracken fern	*Pteridium aquilinum*
western redcedar	*Thuja plicata*	common wormwood	*Artemisia absinthium*
black cottonwood	*Populus balsamifera*	Scotch broom	*Cytisus scoparius*
water birch	*Betula occidentalis*	green wintergreen	*Pyrola chlorantha*
paper birch	*Betula papyrifera*	dandelion species	*Taraxacum sp.*
lodgepole pine	*Pinus contorta*	horsetail	*Equisetum arvense*
western hemlock	*Tsuga heterophylla*	great mullein	*Verbascum thapsus*
Tall Shrubs		kinnikinnick	*Arctostaphylos uva-ursi*
willow	*Salix sp.*	lady fern	*Athyrium filix-femina*
black gooseberry	*Ribes lacustre*	spotted knapweed	*Centaurea stoebe*
Douglas maple	*Acer glabrum*	tufted vetch	*Vicia cracca*
mountain alder	*Alnus incana*	wall lettuce	*Mycelis muralis*
nootka rose	*Rosa nutkana*	golden rod	*Solidago canadensis*
paper birch	*Betula papyrifera*	spreading dogbane	*Apocynum androsaemifolium*
red-osier dogwood	*Cornus stolonifera*	Mosses	
saskatoon	*Amelanchier alnifolia*	red-stemmed feather moss	*Pleurozium schreberi*
soopolallie	*Shepherdia canadensis*	moss sp.	
thimbleberry	*Rubus parviflorus*		
mountain ash	*Sorbus sp.*		
black hawthorn	*Crataegus douglasii*		
pin cherry	*Prunus pensylvanica*		
twin berry	*Lonicera involucrata*		

4.2.2 Reptiles and Amphibians

The rock outcrops and vegetated riparian areas provide habitat for northern alligator lizard (*Elgaria coerulea*), western skink *(Plestiodon skiltonianus)*, garter snakes (Thamnophis spp.) and potentially the Couer d'Alene salamander.

4.2.3 Birds

No birds were observed during the survey; however, the subject property is likely visited by songbirds, waterfowl, and raptors. No nests were observed during the site assessment, although the vegetation at the south end of the property provides suitable nesting habitat for songbirds. The mature black cottonwood trees provide both perch and nesting habitat for raptors and nesting sites for sapsuckers and cavity dwellers.

4.2.4 Mammals

The property provides potential forage habitat for ungulates, bears and small mammals within the south undeveloped portion of the property. The undeveloped crown land located to the south provides unrestricted access to the property for animals migrating along the foreshore.

4.3 Species at Risk

A 10 km buffer around the subject property was used to query BC Conservation Data Center records using the CDC iMap tool. Based on this query, four species at risk occurrences are known within the 10 km of the project area:

1) The Upper Kootenay River white sturgeon (*Acipenser transmontanus*) population. The property is located adjacent to the white sturgeon Critical Habitat Area within the Crawford Creek Delta (Environment Canada 2014).
2) Western skink (*Plestiodon skiltonianus*) recorded observation near Pilot Bay Provincial Park ~4.6 km away. Subject property provides good skink habitat.
3) Coeur d'alene salamander (*Plethodon idahoensis)* recorded observations near Crawford Bay are as close as 1.1 km from the subject property. Subject property provides potential habitat for Coeur d'Alene salamander.
4) Rocky Mountain painted turtle (*Chrysemys picta* pop.2) recorded observation in Fraser Lake, ~5.7 away. Subject property does not provide suitable habitat for turtles.

4.4 Archaeological Resources

Kootenay Lake is part of the traditional territory of the Sinixt, Okanagan and Ktunaxa First Nations and archaeological evidence is documented at multiple shoreline sites. A review of archaeological resources on this property is outside the scope of this report.

5 IMPACT ASSESSMENT

The proposed project footprint includes an elevated area of imported fill above the native ground, RV pads, and septic tank partially located within the SPEA of Kootenay Lake, which equals a total loss of ~600 m^2 of riparian habitat. The previous removal of riparian vegetation within the SPEA decreased the riparian vegetation function which maintains the health and productivity of aquatic ecosystems. This includes future loss of large woody debris recruitment, shade potential and water temperature regulation and nutrient input including litter fall and insect drop.

In addition, the removal of riparian vegetation and increased human activity within the riparian area reduces wildlife habitat for birds, mammals and amphibians, increased noise and light disturbance to local wildlife, increased sediment and erosion potential, and increased stormwater runoff.

Provided that measures to protect the SPEA are followed and the recommended mitigation plan is implemented, negative wildlife impacts from the development will be minimized and riparian function partially restored over time.

6 MEASURES TO PROTECT THE INTEGRITY OF SPEA

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

6.1 Danger Trees

Overall tree cover in the northern portion of site is sparse; however, no hazard tree indicators were observed. A certified danger tree assessor was not retained as a part of this assessment.

6.2 Windthrow

There is potential windthrow risk to trees located in the SPEA due to the clearing activities that were completed in 2019/2020. 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).

6.3 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.

6.4 Protection of Trees and Vegetation in the SPEA

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

- Staging and access should only occur in previously disturbed areas of the site.
- A QEP should visit the site with the construction contractor prior to development to identify areas of vegetation to be retained.
- No further removal of existing vegetation.
- In addition to identifying vegetation retention areas, the QEP may make other recommendations regarding material handling and equipment storage to ensure that remaining riparian vegetation is not impacted.
- Excavation to remove part of the imported fill should be monitored closely to ensure that the native ground is exposed but not further disturbed. This will ensure the native soils and seedbank are retained to help in re-establishing riparian vegetation within the SPEA.
- No pollutants should be allowed to contaminate the soil around trees in the SPEA.

6.5 Encroachment

As the proposed development occurs within the SPEA, further development beyond the previously disturbed areas and restoration areas is discouraged to preserve the function of the remaining riparian vegetation, and to promote re-establishment of riparian vegetation.

Any future development proposed within the SPEA will require a QEP review and an Environmentally Sensitive Watercourse Development Permit.

6.6 Sediment and Erosion Control

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

- Any surface runoff should be controlled and directed away from exposed soils.
- In the event of heavy rainfall, additional mitigation measures such as ditching or covering soils may be required to ensure turbid wastewater does not leave the construction site.
- Excavation to remove part of the imported fill should be monitored closely to ensure that the native ground is exposed but not further disturbed.
- Soil should be safely stockpiled in a manner that eliminates the possibility of erosion and sediment transport.
- Disturbed soils should be revegetated as soon as possible after construction.

6.7 Stormwater Management

The proposed development has resulted in an increase in the total impervious area of the property from surfaces of recreation vehicles. The following mitigation measures will help decrease stormwater impacts:

- Downspouts from RV's should direct rainwater into suitable landscape features which can absorb and utilize runoff.
- Stormwater discharges must adhere to the *Water Sustainability Act* or any other application legislation.

6.8 Floodplain Concerns

The proposed development is located within the 15 meter floodplain setback of Kootenay Lake; however no permanent habitable structures are located within the floodplain setback. The proposed four RV pads and bunkhouses are located on an elevated bench above the typical HWM of Kootenay Lake (~533.75 m) at an elevation of ~536 -536.5 m.

6.9 Scheduling of Environmentally Sensitive Activities

Works should be scheduled to avoid impacts to SPEA vegetation, aquatic habitat, and nesting birds. The best timing for proposed work is September-April when Kootenay Lake water levels are low. Works in and around existing trees and shrubs should be monitored for nesting birds (April 15-August 15), to minimize disturbance.

6.10 Protection of Fish Habitat

Protection of fish habitat shall be implemented by:

- Limit beach modification to permitted areas and preserve foreshore vegetation and boulders which provide fish habitat during periods of inundation.
- Adhere to sediment, stormwater, and waste management best practices outlined in this report to ensure that there is no release of deleterious materials into Kootenay Lake.

6.11 Management of Equipment and Fuel/Lubricant Materials

The most likely source of any contaminant is from equipment or vehicles used or stored on-site, either during fueling or from unanticipated leaks or the failure of a hydraulic hose. To minimize the likelihood and impact of a spill within the riparian area, ensure that:

- Each piece of heavy equipment will be equipped with its own spill response kit.
- All staff will be familiar with the use of spill kits and their contents. The contents of the kits will be replaced immediately after use.
- Equipment will be stored in a designated area as far from Kootenay lake as possible and secondary containment will be utilized to capture any potential spills or leaks.

6.12 Invasive Plant Management

Construction activities can potentially increase 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.
- Amount of soil disturbance should be minimized.
- All exposed soils should be re-vegetated immediately following construction.

7 MITIGATION 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). Avoidance was not achievable with the existing and proposed development as the disturbance has already occurred; therefore, mitigation measures to minimize and restore the riparian area are being recommended and are described in the following sections. The extent of the riparian area to be restored was determined by the landowners. Refer to Appendix 2 for mitigation and proposed site plan.

Bunkhouse Relocation- Avoidance

The two bunkhouses presently sited within the SPEA will be relocated to outside the SPEA. Bunkhouse #1 will be relocated directly east into a partially disturbed area. Some trees and shrubs may need to be removed to accommodate this relocation; however, it is outside of the SPEA. Bunkhouse #2 will be relocated to the northeast from its current location to a previously disturbed area at the base of the driveway.

Area 1 - North: Minimize and restore

Restoration within this area involves full pull back of the imported fill from ~6m m at the existing toe of slope to 13 - 15 m at the proposed toe of slope (measured from the HWM) to expose the native beach substrate. A new rock wall will be constructed along the new toe of fill at 1:1 slope. The ramp will be re-constructed parallel to the new rock wall completely within the SPEA. The re-exposed native beach area will be revegetated with flood tolerant native species and the native soil will be exposed to allow for natural recruitment from the existing seed bank (Appendix 2 Section A). This will allow the floodplain area to re-naturalize along the foreshore of Kootenay Lake. The footprint of the disturbed area within the SPEA will be reduced by ~150 m^2 in Area 1.

Area 2 - Middle: On-site restoration

On-site restoration within this area involves revegetating the imported fill slope in place. This will be achieved by regrading the top portion of the fill slope to 2:1, removing half of the rock armor and adding vegetation. The revegetated area will measure 3.5 m between the existing rock armour and the RV pad. It will be trenched, lined with commercial grade landscape fabric, filled with top soil mixed with peat moss and re-vegetated with native species (Appendix 2 Section B). The footprint of the disturbed area within the SPEA will remain the same however the volume of imported fill will be reduced and replaced with native vegetation in Area 2.

Area 3 - South: Minimization and on-site restoration

On-site restoration within this area involves removal of fill from around the conifer trees to match the natural gradient and partial removal of the rock wall. The area between the existing rock armour and the conifer trees will be re-vegetated with native species (Appendix 2 Section C). Beach access will be maintained via a trail and steps. The footprint of the disturbed area within the SPEA will be reduced by ~120 m^2 in Area 3.

Area 4 – Beach: On-site restoration

On-site restoration within this area involves riparian planting to be completed along the toe of the rock wall with flood tolerant shrubs (Appendix 2 Section C). This will help revegetate the floodplain along the foreshore of Kootenay Lake.

7.1 Revegetation

The proposed revegetation is designed with a focus on naturalizing the appearance of the rock wall and creating a vegetation buffer between the development and foreshore area. The vegetation prescription will include a combination of native potted stock (1 and 2 gallon pot size), 4" pots and plugs and a specifically formulated seed blend to promote shrub habitat establishment. The recommended plant species list is provided in Table 4. The revegetated areas will require ongoing maintenance (ie. irrigation and weeding), until they become naturalized over the moderate to long term.

As part of the proposed development, revegetation of disturbed areas will include:

Area 1 and Area 4

- Plant a minimum 40 flood tolerant shrubs within the restored beach area and 6 lodgepole pine and paper birch along the toe of the fill in Area 1.
- Shrubs should be clumped together (3-5 plants per clump) and spaced at 1 m plant spacing and trees to be planted a minimum of 3 m apart.
- Rake back native beach substrate around each plant (~2-3" deep), to protect soil from erosion.

Area 2 and Area 3

- Rake top 2 inches of planting area to loosen soil. Spread seed mix on soil at a rate of 25 kg/Ha. Refer to Table 5 for recommended seed mix.
- Cover slope in Area 2 with biodegradable coir matting and secure with stakes as per supplier instructions. The coir matting shall have a functional life of 4 to 6 years. Recommended coir matting is available in 4m by 50m rolls at Northlink Supply https://northlinksupply.ca/temporary-erosion-control/#section4. Similar product can be substituted.
- Plant a minimum of 5 trees (#1 or #2 gallon pot size) at 3 meter spacing in Area 3. Refer to Table 4 for recommended plant species and quantities.
- Plant 340 trees, shrubs, and bunch grasses (plugs or 4" pot size) in Areas 2 and 3. Plants to be planted at 0.5m spacing. Refer to Table 4 for recommended plant species and quantities.
- Coir matting can be cut at plant locations to accommodate planting and folded back around the plants.
- Lightly mulch around planted potted stock in Area 3.

General Planting and Maintenance Guidelines

- Planting should not occur during periods of hot dry weather unless they are irrigated daily.
- Native riparian seed blend, specially formulated for riparian area application is available at Interior Seed & Fertilizer https://interiorseedandfertilizer.ca (Table 5).
- Locally adapted native plants are preferable to those collected or grown outside the region. The species listed in Table 4 are available from Sagebrush Nursery in Oliver https://sagebrushnursery.com , or Tipi Mountain Native Plants http://tmnp.tipimountain.com/ near Kimberley.

- Planting holes shall be a minimum of 3 times the size of the pot.
- Specific locations of plants shall be directed by a QEP or professional landscaper.
- Use transplant fertilizer (ie. Mykes Mycorrhizae Tree and Shrub or similar) 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.).

Table 4. Recommended plant list

Common Name	Latin Name	Pot size Plugs or 4 inch	Pot size #1 or #2
Area 1 North and Area 4 Beach			
paper birch	*Betula papyrifera*		4
lodgepole pine	*Pinus contorta*		2
red osier dogwood	*Cornus stolonifera*		15
Pacific willow	*Salix lucida*		5
sandbar willow	*Salix exigua*		15
nootka rose or prickly rose	*Rosa nootkana or Rosa acicularis*		5
Area 2 Middle and Area 3 South			
paper birch	*Betula papyrifera*	10	
Western white pine	*Pinus monticola*	10	2
Interior Douglas fir	*Pseudotsuga menziesii*	10	3
red osier dogwood	*Cornus stolonifera*	30	5
Pacific willow	*Salix lasiandra*	5	
scoulers willow or sitka willow	*Salix scouleriana and/or Salix sittchensis*	25	5
Douglas maple	*Acer glabrum*	30	5
nootka rose or prickly rose	*Rosa nootkana or Rosa acicularis*	25	5
mallow ninebark	*Physocarpus malvaceus*		5
Saskatoon	*Amelanchier almifolia*	25	5
oceanspray	*Juniperus communis*		4
common Juniper	*Holodiscus discolor*	15	6
common Snowberry	*Symphoricarpos albus*	30	10
birch leaved spirea	*Spirea douglasii spp. menziesii*	25	5
bluebunch wheatgrass	*Pseudogenaria spicata*	25	
junegrass	*Koeleria macrantha*	25	
yarrow	*Achillea millefolium*	25	
golden rod	*Solidago canadensis*	25	

Table 5. Recommended seed mix blend

Native Riparian Blend 1	% weight	% by species
slender wheatgrass	25.0%	18%
streambank wheatgrass	25.0%	18%
fringed brome grass	24.7%	9%
northern wheatgrass	20.0%	14%
sheep fescue	3.0 %	10%
tufted hairgrass	1.0 %	11%
fowl bluegrass	1.0 %	9%
yarrow	0.3 %	3%

8 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 Contractor 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 planting is complete to assess compliance and completion of the project.
- QEP will prepare an environmental summary report and submit to the RDCK.

Further effectiveness monitoring of mitigation measures may also be required. The following indicators of success of riparian plantings should be documented:

- Plant composition includes only 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.

9 CONCLUSION

Overall, the mitigation plan as proposed will help mitigate some of the environmental impacts caused by unauthorized activities within the SPEA. The proposed development within the SPEA has caused loss of riparian habitat; however, as the restoration areas become established with native species, the riparian function will be partially restored along the foreshore. If you have any comments or questions, please do not hesitate to contact the undersigned.

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

(i) if the development is implemented as proposed, or

(ii) if the streamside protection and enhancement areas identified in the report are protected from the development, and

(iii) if the developer implements the measures identified in the report to protect the integrity of those areas from the effects of the development,

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

Sincerely,

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

Reviewed by:

Lisa Pavelich, P.Ag, BSc.
Masse Environmental Consultants

11 REFERENCES

[BC] Province of British Columbia. 2015. Riparian Areas Regulation. Victoria, British Columbia, Canada.

[EEC] Ecoscape Environmental Consultants. 2016. Kootenay Lake Foreshore Inventory and Mapping and Aquatic Habitat Index. Prepared for: Kootenay Lake Partnership & Fisheries and Oceans Canada.

Environment Canada. 2014a. Recovery Strategy for White Sturgeon (*Acipenser transmontanus*) in Canada. Environment Canada, Ottawa.

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Mackillop, D. and Ehman, A. 2016. A Field Guide to site classification and identification for southeast: the southeast Columbia Mountains. Province of B.C., Victoria, B.C. Land Management Handbook 70.

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[MV] Metro Vancouver. N.D. A Homeowner's Guide to Stormwater Management.

[MOA] BC Ministry of Agriculture. 2012. Riparian Factsheet No. 6 – Riparian Plant Acquisition and Planting.

[MOE] BC Ministry of Environment. 2014. Develop with Care. Province of British Columbia. Victoria, British Columbia, Canada.

[MOE] BC Ministry of Environment. 2015. General BMPs and Standard Project Considerations. Victoria, British Columbia, Canada.

[MOE] BC Ministry of Environment. 2016. Provincial Water Sustainability Act. Victoria, British Columbia, Canada.

[MOE] BC Ministry of Environment. Habitat Wizard. 2020.

[MOH] Health Protection Branch of the BC Ministry of Health. 2014. Sewerage System Standard Practice Manual – Version 3.

[MFLNRO] BC Ministry of Forests Lands and Natural Resource Operations. N.D. Firesmart Homeowner's Manual.

[RDCK] Regional District of Central Kootenays. 2013. Electoral Area 'E' Rural Official Community Plan Bylaw No. 2260, 2013.

APPENDIX 1
LOCATION MAP

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

15361 Hwy 3A, Gray Creek

Map Scale:

1:72,224

Date: March 5, 2021

The mapping information shown are approximate representations and should only be used for reference purposes. The Regional District of Central Kootenay is not responsible for any errors or ommissions on this map.

APPENDIX 2
SITE PLAN AND MITIGATION PLANS

Reference Plan of Lot 3, Plan 2683, District Lot 4595, Kootenay District and accreted land, showing photo locations and direction and cross–section locations.

(Pursuant to Section 100(1)(b), Land Title Act.)

Scale 1:300 — 0 10 20 30 40 50 — BCGS 82.F???

The intended plot size of the plan is 864 mm in width by 559 mm in height (D size sheet) when plotted at a scale of 1:300.

Legend

Grid bearings are derived from GNSS observations and are referred to the central meridian of UTM Zone 11.

All distances are in metres unless otherwise noted and are ground level horizontal distances.
To compute grid distances, multiply ground–level distances by the average combined factor of 0.999521.
The average combined factor has been determined based on an ellipsoidal elevation of 518.3 metres.

The UTM co–ordinates and estimated horizontal positional accuracy achieved are derived from dual frequency GNSS observations using the Precise Point Positioning (PPP) service of Natural Resources Canada.

- ● standard iron post found.
- ○ standard iron post placed.
- ◉ standard concrete post found.
- ● non–standard 1" diam pipe post found.
- ◬ angle iron found.

set in rock

Datum NAD83 (CSRS) 2002.0
UTM North 5498828.50
UTM East 515031.10
Combined scale factor 0.999521.
Estimated horizontal positional accuracy is 0.02 m.

63° 02' 35" 16.166

set in rock 1948

P.I. 12 + 59 77

57.327 174°

Parcel 1
P.P. 97316i

15 meter SPEA setback

2,3 — 2 — 90° 00' 00" 10.477 — E=533.9 — 84° — 46' 3.048

12.7

Bunkhouse #1

Existing location of bunkhouse1

174' 46' 32.979 29"

12.5 E=533.7 — 2.5 — 10.0 E=533.1

Beach Area

15 — A' — 3

Refer to Section A for conceptual profile.

15.2

RV PAD

Present

Ramp

9.9

E=532.8

12.3

9.2

Bunkhouse #2

Proposed Septic Tank

16

10.9

Existing location of bunkhouse 2

RV PAD

Refer to Section B for conceptual profile.

5.6

133.612

RV PAD

Bathroom building

11.3

Construct small retaining wall to hold fill around RV pad.

5

6.4

17

RV PAD

Existing House

00" 00' 00' 7.4

Natural

B

Existing Septic Field

9.7

B'

Refer to Section C for conceptual profile.

Beach trail/steps

Kootenay Lake

18

9.0

20.8 E=535.0

10.2

E=535.1

8

25.3 E=534.9

District Lot 4595

11.5

9

E=534.9

8–11

10

30.9

15 meter SPEA setback

boundary

11

19

8.6

12

35.6 E=534.3

4.3

39.522 90° 00' 00"

E=533.5

1.000

Plan 2683

Highway 3A

Plans R127 and NEP21008

59.070 29"

55'

130° 26.194 35' 29"

13"

11.572

19'

16.031

Falls

Wilmot Creek –HWM

This plan lies within the Regional District of Central Kootenay.

Parcel A

12" 36.583

R.P. 7386(

Datum NAD83 (CSRS) 2002.0
UTM North 5498650.84
UTM East 515089.10
Combined scale factor 0.999521.
Estimated horizontal positional accuracy is 0.02 m.

LEGEND

Mitigation and Riparian Planting Areas

Area 1, North: Remove existing rock armour and fill from riparian area to natural beach gradient (~150m²). Re-construct rock wall between 13 m-15 m setback at 1:1 slope. Re-construct ramp so that it is parallel to new wall. Re-vegetate beach area.
Refer to Section A for restoration prescription for this area.

Area 2, Middle : Remove half of rock armour and fill, re-grade slope above at 2:1 and re-vegetate area (~150 m²).
Refer to Section B for restoration prescription.

Area 3, South: Remove existing fill and portion of rock armour to natural gradient and re-vegetate area (~120 m²). Refer to Section C for restoration prescription.

Area 4, Beach: Riparian planting below wall (~30m²). Refer to Section B and C for restoration prescription.

Onsite restoration (Removal of fill and riparian planting) = ~270 m²
Onsite restoration (Riparian planting) = ~180 m²
Total encroachment area (Fill placement and rock walls) = ~600 m² within SPEA

Existing trees and shrubs

Proposed trees to be planted within riparian area.

GRIFFITH SURVEYS
R. Griffith Land Surveying Inc.
Box 158, Creston, BC, V0B 1G0
Telephone: (250) 428 – 5810
MM18081_Photos

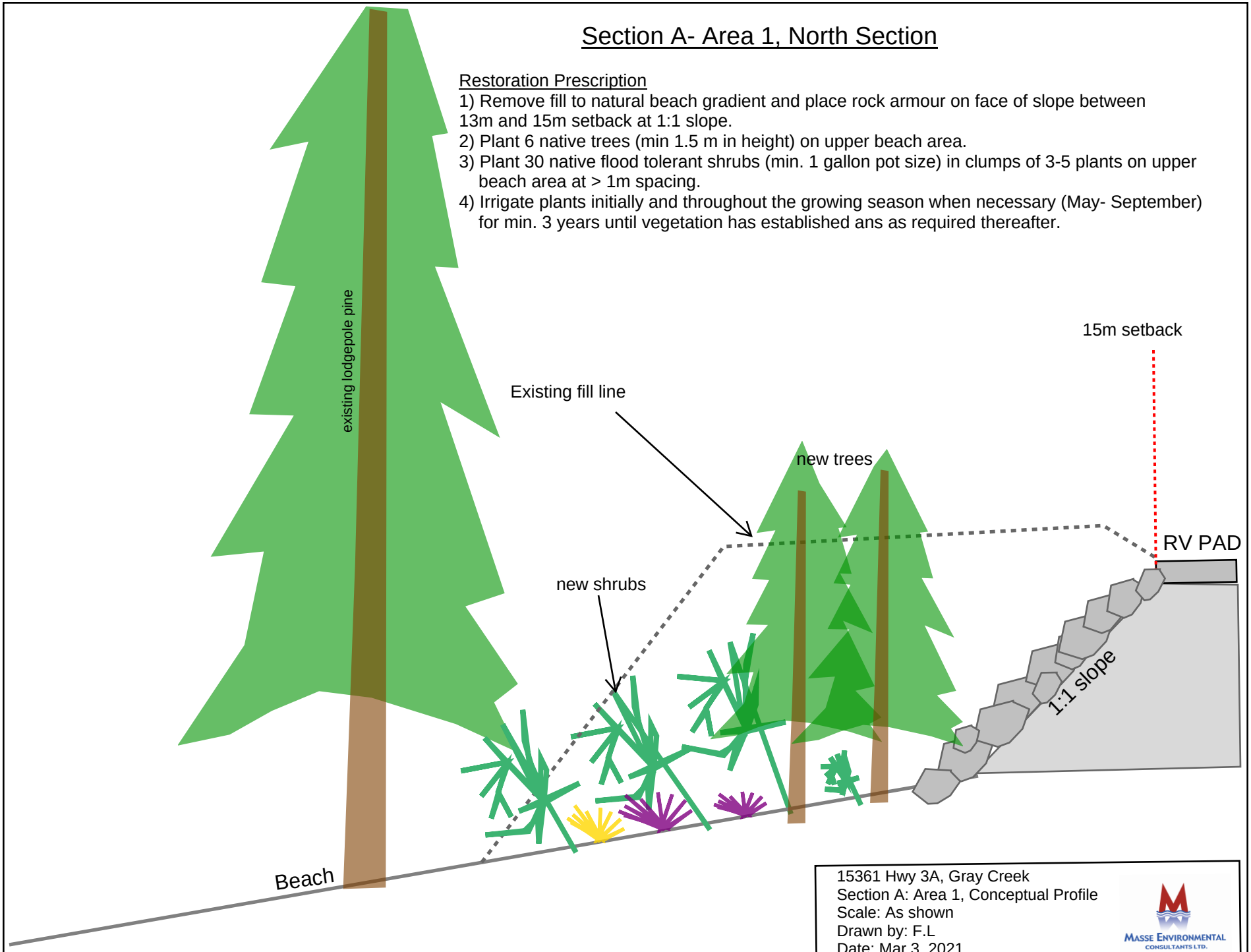
15361 Hwy 3A, Gray Creek
Proposed Site Plan
Scale: As shown
Drawn by: F.L
Date: Mar 3, 2021

MASSE ENVIRONMENTAL CONSULTANTS LTD.

Section A- Area 1, North Section

Restoration Prescription

1) Remove fill to natural beach gradient and place rock armour on face of slope between 13m and 15m setback at 1:1 slope.
2) Plant 6 native trees (min 1.5 m in height) on upper beach area.
3) Plant 30 native flood tolerant shrubs (min. 1 gallon pot size) in clumps of 3-5 plants on upper beach area at > 1m spacing.
4) Irrigate plants initially and throughout the growing season when necessary (May- September) for min. 3 years until vegetation has established ans as required thereafter.



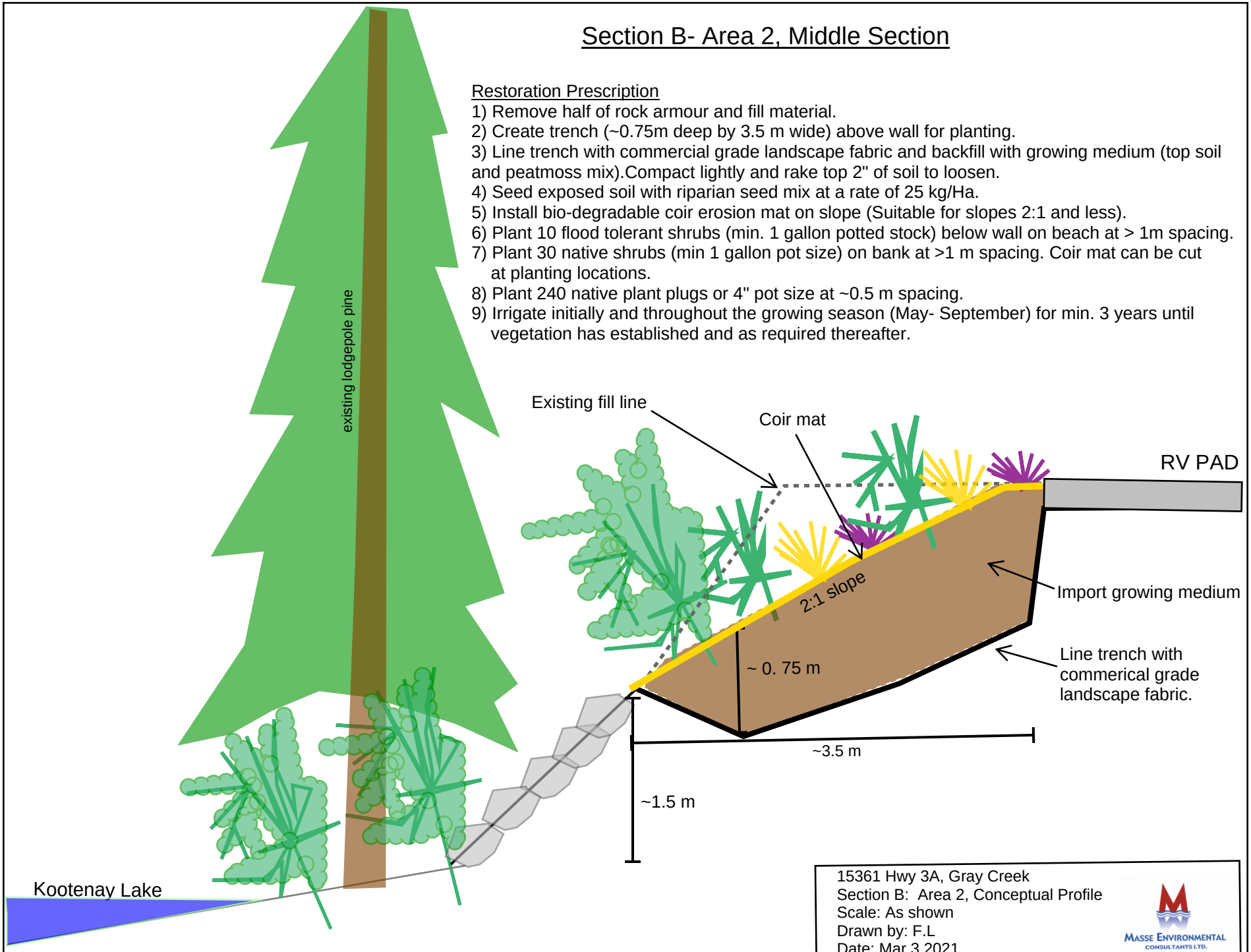
15361 Hwy 3A, Gray Creek
Section A: Area 1, Conceptual Profile
Scale: As shown
Drawn by: F.L
Date: Mar 3, 2021

Masse Environmental Consultants Ltd.

Section B- Area 2, Middle Section

Restoration Prescription

1) Remove half of rock armour and fill material.
2) Create trench (~0.75m deep by 3.5 m wide) above wall for planting.
3) Line trench with commercial grade landscape fabric and backfill with growing medium (top soil and peatmoss mix).Compact lightly and rake top 2" of soil to loosen.
4) Seed exposed soil with riparian seed mix at a rate of 25 kg/Ha.
5) Install bio-degradable coir erosion mat on slope (Suitable for slopes 2:1 and less).
6) Plant 10 flood tolerant shrubs (min. 1 gallon potted stock) below wall on beach at > 1m spacing.
7) Plant 30 native shrubs (min 1 gallon pot size) on bank at >1 m spacing. Coir mat can be cut at planting locations.
8) Plant 240 native plant plugs or 4" pot size at ~0.5 m spacing.
9) Irrigate initially and throughout the growing season (May- September) for min. 3 years until vegetation has established and as required thereafter.



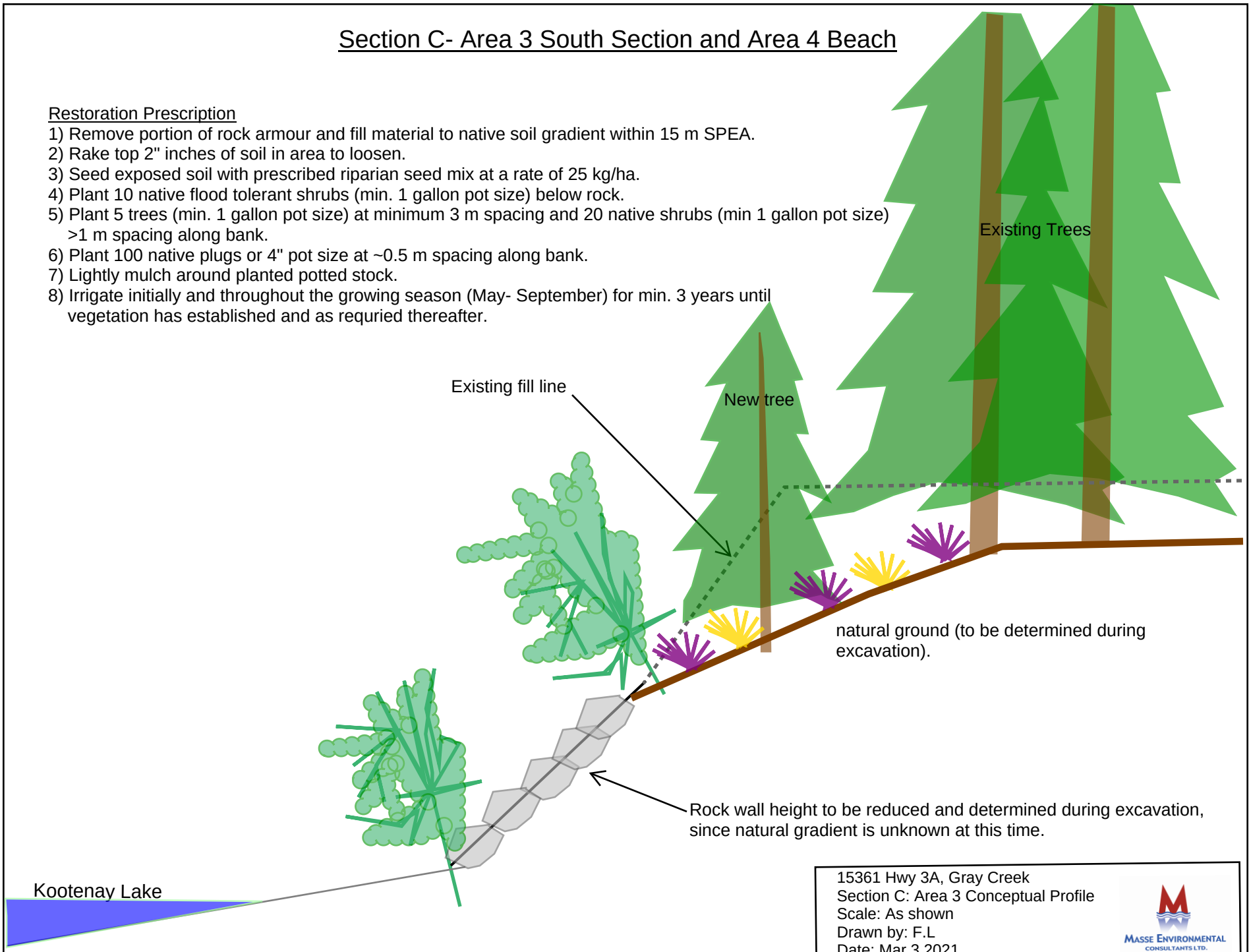
15361 Hwy 3A, Gray Creek
Section B: Area 2, Conceptual Profile
Scale: As shown
Drawn by: F.L
Date: Mar 3 2021

Masse Environmental Consultants Ltd.

Section C- Area 3 South Section and Area 4 Beach

Restoration Prescription

1) Remove portion of rock armour and fill material to native soil gradient within 15 m SPEA.
2) Rake top 2" inches of soil in area to loosen.
3) Seed exposed soil with prescribed riparian seed mix at a rate of 25 kg/ha.
4) Plant 10 native flood tolerant shrubs (min. 1 gallon pot size) below rock.
5) Plant 5 trees (min. 1 gallon pot size) at minimum 3 m spacing and 20 native shrubs (min 1 gallon pot size) >1 m spacing along bank.
6) Plant 100 native plugs or 4" pot size at ~0.5 m spacing along bank.
7) Lightly mulch around planted potted stock.
8) Irrigate initially and throughout the growing season (May- September) for min. 3 years until vegetation has established and as requried thereafter.



15361 Hwy 3A, Gray Creek
Section C: Area 3 Conceptual Profile
Scale: As shown
Drawn by: F.L
Date: Mar 3 2021

Masse Environmental Consultants Ltd.

APPENDIX 3
SPEA MAP AND EXISTING SITE PLAN

Reference Plan of Lot 3, Plan 2683, District Lot 4595, Kootenay District and accreted land, showing photo locations and direction and cross–section locations.

(Pursuant to Section 100(1)(b), Land Title Act.)

Scale 1:300 — 0 10 20 30 40 50 — BCGS 82.F???

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Legend

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- ○ standard iron post placed.
- ◉ standard concrete post found.
- ● non–standard 1" diam pipe post found.
- ◬ angle iron found.

set in rock

Datum NAD83 (CSRS) 2002.0
UTM North 5498828.50
UTM East 515031.10
Combined scale factor 0.999521.
Estimated horizontal positional accuracy is 0.02 m.

63° 02' 35" 16.166

set in rock

1948

P.I. 12 + 59 77

57.327 174°

Parcel 1

R.P. 97316i

15 m ESDP setback/ SPEA Setback
15 m LWD ZOS
15 m litter fall ZOS

Shade ZOS

2,3

2

90° 00' 00" 10.477

84° 23.915

46' 3.048

29" 12.192

E=533.9

12.7

12.5 E=53

2.5 10.0 E=533.1

Beach Area

15 A'

3

15.2

Present

9.9

ramp

Bunkhouse #1 (10' x 16')

RV PAD

174° 46' 32.979

29"

A

84° 46' 29"

Rock armour ~1:1 slope and up to 3 m high in places.

12.3

9.2

16

Fill placement

10.9

Bunkhouse #2 (10' x 16')

8.2

7.1

5.6

133.612

RV PAD

Bathroom building

11.3

5

RV PAD

6.4

00" 00' 00"

17

Existing House

r = 160.770
a = 88.260

B

7.4

natural

9.7

B'

Existing Septic Field

5- Existing conifer trees

10.7

Steps

16.1

Kootenay Lake

18

9.0

20.8 E=535.0

E=535.1

8

25.3 E=534.9

Plan 2683

District Lot 4595

10.2

11.5

9

8–11

E=534.9

10

30.9

19

12

11

boundary

8.6

35.6 E=534.3

19

1.000

Two large cottonwood trees

4.3

39.522 90° 00' 00" E=533.5

Central Kootenay.

Road by Plans R127 and NEP21008

Highway 3A

59.070 29"

1

150.396 161°

Plan NEP21008

55'

Parcel A

12" 36.583

R.P. 7386(

130° 26.194 35' 29"

13"

15 m ESDP setback/ SPEA setback
15 m litter fall ZOS

10 m LWD ZOS

11.572

19'

16.037

Falls

Wilmot Creek – HWM

Datum NAD83 (CSRS) 2002.0
UTM North 5498650.84
UTM East 515089.10
Combined scale factor 0.999521.
Estimated horizontal positional accuracy is 0.02 m.

GRIFFITH SURVEYS
R. Griffith Land Surveying Inc.
Box 158, Creston, BC, V0B 1G0
Telephone: (250) 428 – 5810
MM18081_Photos

15361 Hwy 3A, Gray Creek
SPEA Map and Existing Site Plan
Scale: As shown
Drawn by: F.L
Date: Mar 2, 2021

MASSE ENVIRONMENTAL CONSULTANTS LTD.

Schedule 4: Remediation and Offsetting Plan (Keefer Ecological Services)

Remediation & Offsetting Plan

15361 Highway 3A, Gray Creek, British Columbia

Michael Keefer, MSc, PAg
William Popov, M.Eng, EIT
Baylie Sjodin, MA, EPt
Emma Cooke, BSc, BIT

19 May 2022

Keefer Ecological Services Ltd.
220 Cobham Ave W
Cranbrook, BC, V1C 6T3
(250) 489-4140
www.keefereco.com

Executive Summary

The assessed property is located at 15361 Highway 3A, Gray Creek, British Columbia, on the east shore of Kootenay Lake. This report has been prepared to support the application for development permit DP2103A as required under section 920 of the Local Government Act and will be filed on the title of the assessed property. This report is also in response to a notice from the Regional District of Central Kootenay (RDCK) requiring the property owner to retain an environmental consultant to assess the development conducted within the environmental development permit area (EDPA) and to outline remedial actions. As all proposed work is above the high-water mark and does not disturb any species at risk, no additional permits are required under federal or provincial legislation.

Communication, remediation, and offsetting plans have been prescribed to remediate impacts to the Streamside Protection Enhancement Area (SPEA) on the assessed property. In particular, this plan includes:

- The removal of existing structures within the SPEA;
- Recontouring fill based on natural site topography;
- Planting of native vegetation; and
- Monitoring to ensure that remediation goals are achieved in the next five growing seasons.

As a Qualified Environmental Professional (QEP), I hereby provide my professional opinion that if the remediation is implemented as proposed by this plan, 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 in which the remediation is proposed.

The report has been prepared for and at the expense of the assessed property owner in accordance with the Riparian Areas Regulation. I, the authoring QEP, am qualified to assess this property and confirm that appropriate assessment methods have been followed. I have not acted for or as an agent of the RDCK.

Sincerely,

Michael Keefer, MSc, PAg
President

Table of Contents

List of Tables

List of Figures

1. Property Description

The assessed property is approximately 0.41 hectares (ha) in size and is located at 15361 Highway 3A, Gray Creek, British Columbia, on the east shore of Kootenay Lake (watershed code 340). The legal description for the assessed property is Lot A Plan EPP90349 District Lot 4595 Land District 26. The Parcel Identification Number (PID) is 031-252-818. The current owners of the assessed property are Steven & Elizabeth Ryder, Christopher & Elizabeth Waters, and Leo Campeau, who purchased the property in August 2018. The property is bordered to the east by BC Highway 3A, to the south by Crown Land, to the west by Kootenay Lake, and the north by private property. The property is located in the West Kootenay Dry Warm Interior Cedar – Hemlock (ICHdw1) biogeoclimatic subzone. This zone is characterized by moist, warm springs; hot to very hot, dry summers; and mild, dry winters with a moderately shallow snowpack. Snowpacks usually persist from January through March, although snow-free areas are common on warm-aspect sites (MacKillop and Ehman 2016).

2. Existing Site Conditions

This report describes plans for ecological restoration on approximately the northern half of the property to ameliorate the effects of grading and filling work completed within the 15 m Environmental Development Permit Area (EDPA) in 2019. This work included:

- Removal of vegetation,
- Addition of fill to create a level bench area 2 - 3 m above the native ground surface
- Addition of two bunkhouses
- Rock armouring along the lakeside face of the fill for erosion control

The property contains an A-frame cabin at its center and an associated septic field to the cabin's southeast. The shoreline of the assessed property was observed to be scoured, consisting primarily of gravelly beach on the northern half of the property and of exposed, steeply sloped bedrock on the southern half. No woody debris was observed along the shoreline either below or above the HWM. This observation is consistent with adjacent properties to the north. There were no pools, turbulent water features (e.g., riffles, cascades), large boulders, undercut banks, or in-stream vegetation over the northern half of the assessed property's shoreline or adjacent properties to the north. The southern half of the property was not assessed for these features since it has not been recently developed or altered. Adjacent properties to the north have constructed two large (~10m length) breakwater structures perpendicular to the shoreline.

Masse Environmental Consultants (Masse) completed a detailed Riparian Area Protection Regulation (RAPR) assessment in a report dated March 2, 2021, confirming that the 15 m EDPA zone aligns with the RAPR Streamside Protection and Enhancement Area (SPEA). The assessments completed by Masse are not repeated here. Surveying work completed by R. Griffith Land Surveying Inc. confirmed the 15 m EDPA boundary location within the property.

The riparian area vegetation of the assessed property and adjacent properties is predominantly conifer forest (with some deciduous species) which extends to the HWM but does not overhang the waterbody. Much of the riparian area vegetation on approximately the northern half of the assessed property and neighbouring properties have been modified through clearing activities. The southern half of the assessed property remains undeveloped.

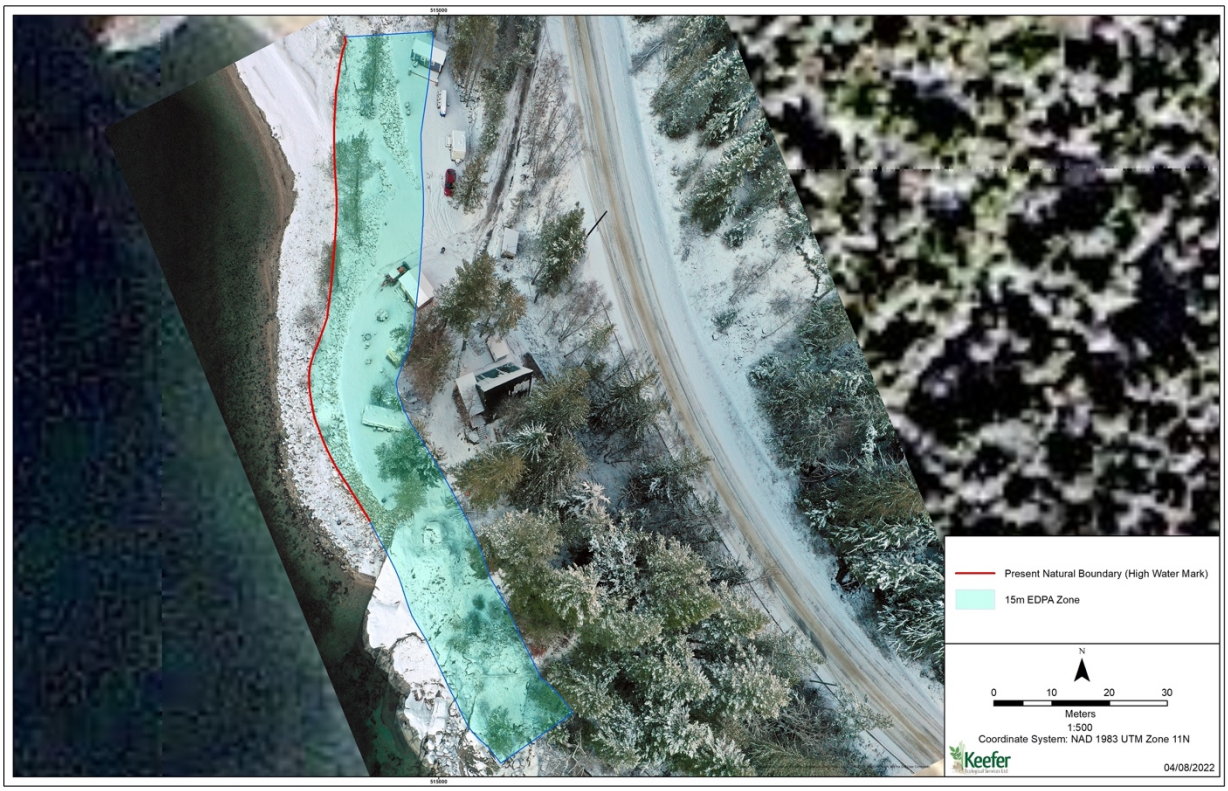

Figure 1. Overview map of the assessed property

The Kootenay Lake Shoreline Guidance Document mapping polygons (Kootenay Lake Partnership, 2020) indicate that this shoreline segment is likely to accommodate several fish habitat types. However on-site observations (mentioned above) of the assessed property were inconsistent with the Kootenay Lake Partnership mapping observations and noted a scoured shoreline with minimal fish habitat value. Rearing and spawning habitats are commonly characterized by the presence of pools, large woody debris, boulder cover, and overhead cover (Johnston & Slaney, 1996); none of which were observed along the segment of shoreline for the assessed property. This inconsistency is likely due to the spatial coarseness of the mapping polygons and the influence of streams entering Kootenay Lake to the south of this property within the same polygon.

Evidence of impacts to aquatic and terrestrial habitats exist predominantly in the form of vegetation clearing and the alteration of the gravel substrate and topography of the shoreline; however, no evidence of ongoing impacts (e.g. erosion or sedimentation concerns) was observed.

It is noted that all affected areas of the property are of a similarly low habitat quality. Outside of minimizing deleterious effects to the shoreline itself (see details in next section), no specific ecological or restoration prioritization of any area of the property is required.

3. Proposed Remediation Measures

Construction Environmental Management & Communication

Personnel participating in earthworks, revegetation efforts, and follow-up monitoring will be made aware of remediation and conservation priorities at the assessed property. If necessary, operators should take precautions to avoid impacting bank stability and to work above the high-water mark. If bank stability becomes an issue during restoration activities, silt fencing should be installed as a short-term solution to avoid sediment loading in Kootenay Lake.

In addition, cleaning procedures should be implemented for all incoming equipment, including footwear, to avoid the introduction of both terrestrial and marine invasive plant species. This is particularly important during the revegetation process before grasses have established as recently disturbed soils are highly vulnerable to invasion. Personnel working on the assessed property should receive the tools required to identify potential invasive species for treatment. In particular, Scotch broom (*Cytisus scoparius*), spotted knapweed (*Centaurea stoebe*), and bull thistle (*Cirsium vulgare*) are common in the area and should be controlled if observed. Lastly, training on live stake and seedling maintenance and watering will be provided to the property owners following revegetation to aid in reaching survivorship targets.

Remediation Plan

The overall goals of the remediation plan for the assessed property are modification of the topography to support establishment of native species and the development of a more heterogeneous structural landscape to provide important terrestrial-riparian habitat components.

In the area shown in Figure 2, the buildings within the EDPA zone should be moved outside this zone. The fill addition should be lowered at its western edge (the armored rock surface) by 50 to 150 cm (closer to 50 cm where wall is lower, closer to 150 cm where wall is higher) and sloped at a sufficiently gentle grade to minimize erosion. Fill material should not be scraped to the natural ground surface in order to minimize negative impacts on riparian habitat and to provide additional substrate for establishment of native vegetation. Additionally, the fill should be recontoured based on natural site topography from the western edge of the disturbed zone eastward to the 15 m EDPA boundary, creating a rough and loose surface for the establishment of prescribed vegetation, which will slope gently upward from west to east. The tree bases on the southern end remain undisturbed and should be used as guidance for slope. Fill should be removed from the SPEA to an appropriate disposal location and should be examined for any signs of contamination (oily spots, odours, etc.) prior to disposal.

The northern end of the property is adjacent to a ditch which has historically served as an overflow channel for the nearby creek. Consequently, this ditch should remain in place and appropriately sized

aggregate and vegetation should be used as riprap to armor the ditch for flood protection and erosion mitigation.

The shoreline access ramp should be narrowed to a width of approximately 1.3 m and retain its gravel surface to ensure that foot traffic and wheelchair access to the shoreline is maintained and continues to be directed away from vegetation. An overview of the proposed revegetation zones on the assessed property is provided in Figure 3.

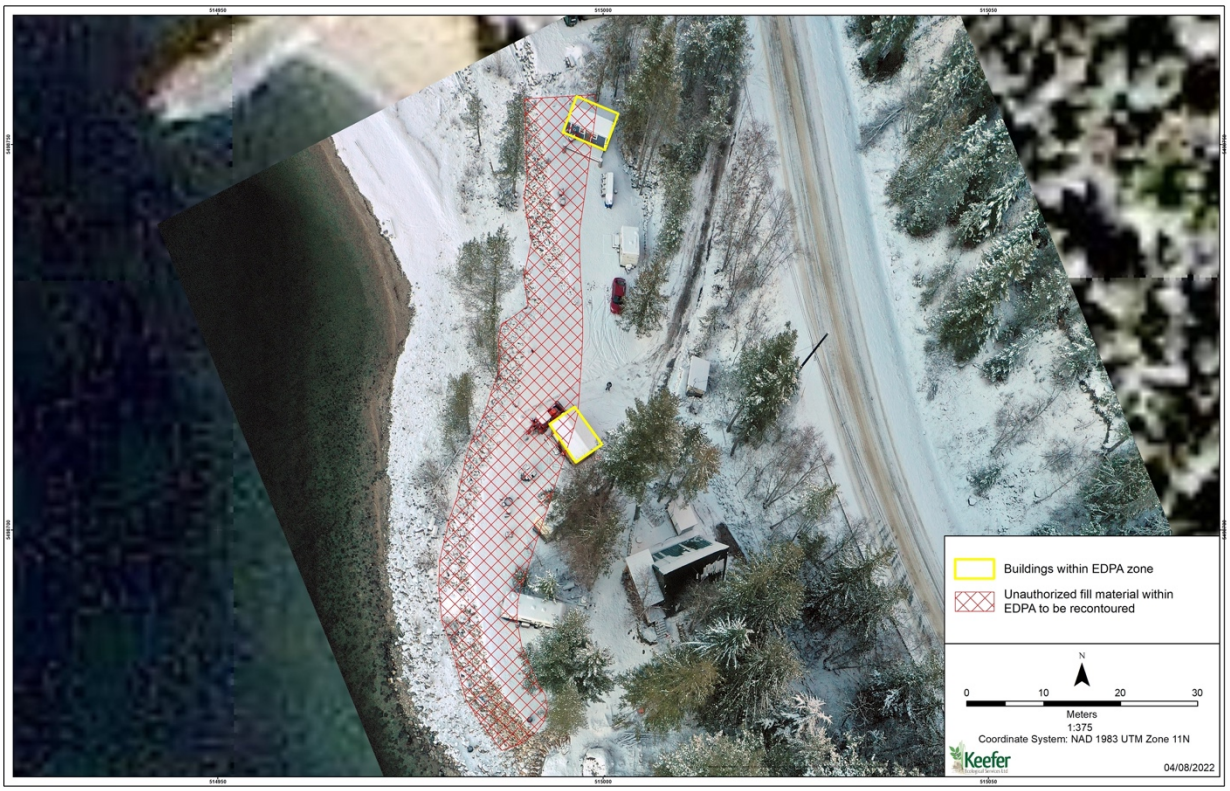

Figure 2. Overhead view of the assessed property with area to be re-contoured and buildings to be moved identified

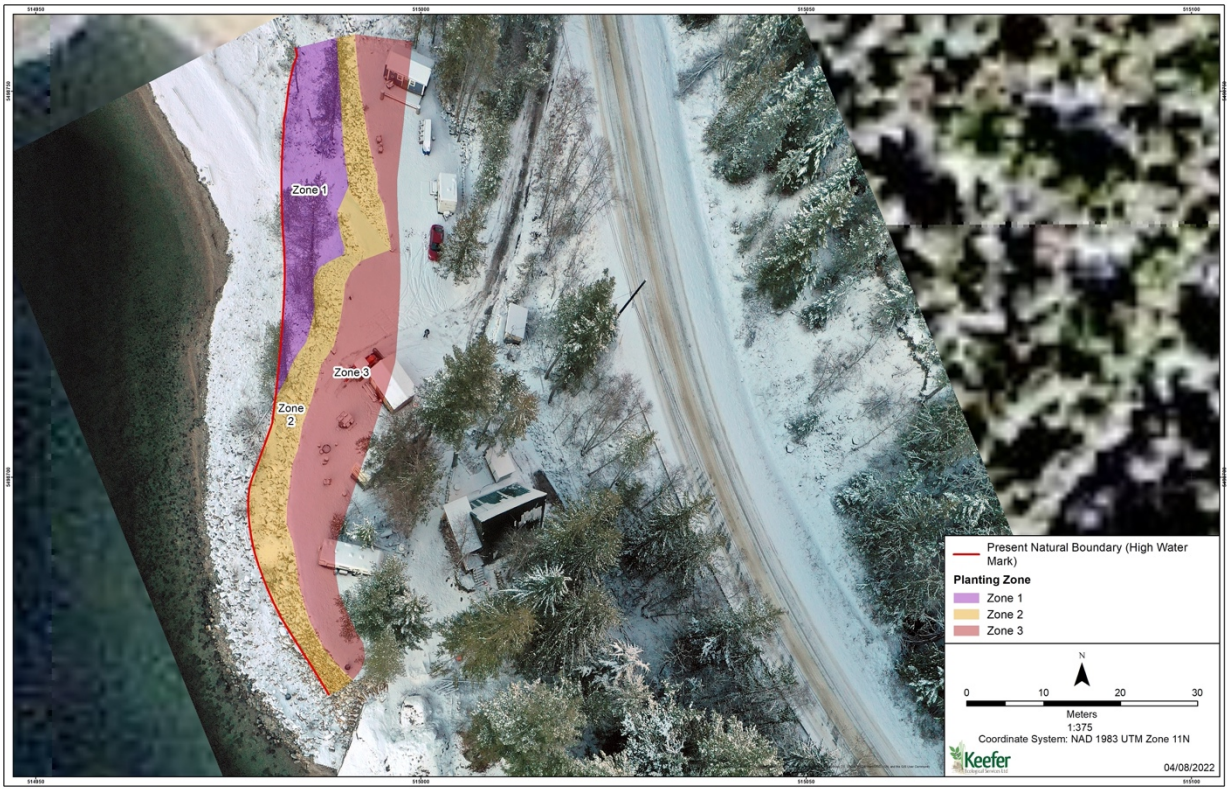

Figure 3. Overhead view of the assessed property with revegetation zones identified.

In order to facilitate the restoration process, the following revegetation plan is recommended. It should be noted that the site will be deliberately over-planted to account for expected mortality of juveniles, and over-seeded to account for dispersal and failed germination of native grass seeds.

The riparian interface (Zone 1, Figure 3) is composed of coarse rock fragments with pockets of finer rock material. All existing trees should be retained and added fill material should be removed when present within the canopy drip curtains of existing trees. Additionally, cottonwood (*Populus balsamifera*), red osier dogwood (*Cornus sericea*), and willow (*Salix sp*.) live stakes should be planted at 3 m spacing throughout the Zone, as dictated by acceptable substrate. Pilot holes made by hammering ¾ in. rebar into soil may be required for planting live stakes in gravelly or compacted soil areas. The exact species mix for the live stakes will be determined based on availability and should not affect the restoration outcomes.

In the armored transition area, (Zone 2, Figure 3) topsoil will be placed between and under the rock armor and planted with kinnikinnick (*Arctostaphylos uva-ursi*) plugs at a density of one plug per square meter. As mentioned above, the slope will be sufficiently gentle to minimize soil erosion. The terrain should also be sufficiently heterogeneous for localized areas of sedimentation to be captured by micro- to mesoscale terrain features.

Atop the armored rock wall (Zone 3, Figure 3), within the recontoured area, all existing trees should be retained and added fill material should be removed when present within the canopy drip curtains of existing trees. Zone 3 will be planted with 50% lodgepole pine, 25% cedar, and 25% Douglas fir at 3 m spacing throughout the zone, in addition to about 15 Saskatoon bushes spread throughout the zone. All of Zone 3 should be lightly seeded with the prescribed grass mix (5 kg/hectare). The prescribed grass seed mix contains 52% bluebunch wheatgrass (*Pseudoroegneria spicata*), 25% Idaho fescue (*Festuca idahoensis*), and 23% prairie junegrass (*Koeleria macrantha*).

To support successful establishment of vegetation, all live stakes of cottonwood, dogwood, and willow should be planted in fall of 2022. Shrubs and juvenile trees should be planted as container stock in early summer or fall of 2022. In addition, any added topsoil should be covered with mulch to prevent erosion and to maintain sufficient soil moisture. A summary table of all prescribed remediation activities can be found below (Table 1).

Table 1. Summary of remediation and revegetation plan

ZONE	ACTION	DETAILS
1	Plant live stakes	Plant approximately 6 cottonwood, 12 dogwood, and 12 willow live stakes at 3 m spacing in fall 2022.
1 & 3	Uncover natural ground around existing trees	Remove any added gravel substrate (if present) from around the stems of existing trees (under canopy drip curtain). This applies to trees immediately west of the main residence and in the shoreline area.
2	Plant plugs	Plant approximately 100 Kinnikinnick plugs at a density of 1 plug per 1-2m^2.
2	Narrow walking path	Narrow walking path to approximately 1.3 metres width. Gravel surface should remain as is.
2 & 3	Lower armored rock wall and recontour	Lower wall by 50-150 cm below present surface and recontour area to create a rough and loose surface with a gentle slope up from west to east, suitable for planting. Native surface should remain undisturbed.
2 & 3	Apply topsoil and mulch	Dig holes for container plants - 60 cm diameter x 20 cm depth. Fill with soil, mounding slightly above normal ground surface. Apply 5 cm mulch above soil. Apply in early summer 2022.
3	Light grass seeding	Seed about 500 g prescribed grass mix.
3	Plant container stock	Plant #1 containers of 8 Douglas fir, 8 cedar, 15 lodgepole pine, and 15 Saskatoon at 3 m spacing in early summer or fall 2022.

4. Monitoring

Monitoring of the site is recommended to take place for five growing seasons following completion of the revegetation plan. It should consist of one site assessment in seasons 1, 2, 3, and 5 by a qualified person. The targeted survivorship rates are as follows and are based on observations of adjacent vegetation:

- 50% survival of live stakes in year 1, 25% survival in year 2.
- 50% survival of Douglas fir, lodgepole pine, and cedar.
- 75% survival of Saskatoon.
- 40% grass cover in the lightly seeded zones.

Monitoring for invasive species will also take place. The absence of Scotch broom and spotted knapweed in years 1 and 2 is a priority as they can negatively affect the establishment of the targeted native plant species. Species identification support and removal processes will be provided to the property owners as per the communication plan.

5. Offsite Compensation

To help ensure that riparian habitat productivity lost at the property is restored to an equivalent or higher level, a donation of $6,435.00 should be made to the Nature Conservancy of Canada (NCC) to aid in their Kootenay Lake riparian habitat restoration efforts. This is pursuant to information provided by NCC indicating that restoration of high-quality riparian habitat costs about $5.85 per m^2. The assessed site is predicted to regain full riparian functioning within 20 years of the proposed works. An offsetting amount of 1,100 m^2 is being proposed to compensate the time difference between the initial works within this plan and a full recovery of the SPEA.

Table 2. Summary of costs associated with the remediation and revegetation plan

Container Plants (131)	$	2,182.42
Live Stakes (30)	$	1,000.00
Seeds	$	30.00
Annual Inspections for Years 1, 2, 3, and 5	$	4,250.00 (total cost)
Earthworks	$	22,913.63
Nature Conservancy of Canada Donation	$	6,435.00
Total	**$**	**36,811.05**

6. References

Johnston, N.T. and P.A. Slaney. 1996. Fish Habitat Assessment Procedures. Watershed Restoration Technical Circular No. 8. Watershed Restoration Program Ministry of Environment, Lands and Parks and Ministry of Forests

Kootenay Lake Foreshore Inventory and Mapping Document - http://www.rdck.ca/assets/Services/Sustainability~and~Environmental~Initiatives/Documents/2017-05-16-KLP_FIM%20AHI%20Report.pdf

MacKillop, D.J. and A.J. Ehman. 2016. A field guide to site classification and identification for southeast British Columbia: the south-central Columbia Mountains. Prov. B.C., Victoria, B.C. Land Manag. Handb. 70

Masse Environmental Consultants. “15361 HWY 3A GRAY CREEK, BC - Riparian Assessment.” 2 March 2021.