CASCADE ENVIRONMENTAL
RESOURCE GROUP LTD

Environmental Overview Assessment:

Galloway Lands

Fernie, BC

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- A Stage 1 – Preliminary Site Investigation (as per the Contaminated Sites Regulations of the Waste Mgt. Act);
- An Environmental Impact Assessment (as per the BC Environmental Assessment Act).

Executive Summary

Handshake Holdings Inc. proposes to develop a parcel of land locally known as the Galloway Lands in Fernie, British Columbia (BC). The purpose of the project is to develop 90 estate lots and to preserve part of the land as part of the Conservation and Recreation Lands. This Environmental Overview Assessment (EOA) identifies the existing environmental conditions, environmental opportunities and constraints, potential impacts, opportunities and mitigation strategies and recommendations and conclusions for the proposed development. Each chapter of this report discusses its relevance to the cultural environment, physical environment, aquatic environment, and terrestrial environment.

Existing Environmental Conditions

Cultural Environment

The cultural environment chapter identifies Indigenous land use, forestry, mining, trapping, anthropogenic values, features and recreational activities within the Galloway Lands.

Indigenous Communities

The Galloway Lands are located on Ktunaxa Nation territory. Discussion with indigenous communities is being conducted by Reto Barrington and Dave Butler Consulting on behalf of Handshake Holdings Inc.

Other Land Uses

The Galloway Lands are located within the Regional District of East Kootenay. The subject property is designated RR (Rural Resource) at the north end and designated RE (Resort Expansion) for the remainder of the property. As per the Elk Valley OCP, an old growth management area and an alluvial and debris flow fan are present on the property. The Elk Valley Floodplain Bylaw No. 829 also specifies a 15 m setback from the highwater mark on Lizard Creek. Two traplines area and three limited entry hunting zones are present on the Galloway Lands. Recreational activities on the Galloway Lands includes Nordic skiing, mountain biking and hiking. There is a designated Ungulate Winter Range (UWR) area within the Galloway Lands

Physical Environment

The Galloway Lands are located in the Elk Valley (ELV) Ecosection, which lies within the Northern Continental Divide Ecoregion, part of the Southern Interior Mountains Ecoprovince. The Elk Valley is located in a rainshadow of easterly moving moist Pacific air, but it is often influence by low pressure systems in Alberta forcing cold air westward in this area. Those systems can increase moisture to occur in the lower Elk River area. High winds can blow from Alberta via the low Elk Valley, creating cold and snow conditions.

The project area is characterized by the Interior Cedar-Hemlock (ICH) Elk Moist Cool variant forest (mk4). The ICHmk4 subzone variant is described by warm, moist summers with wet springs. Winters are cool with moderately deep to deep snowpacks.

The Galloway Lands are part of the Fernie Formation and is underlain by sedimentary rocks including shale, sandstone and limestone from the Mesozoic era. The soils on the Galloway Lands are characterized by a morrisette soil association. The hydrology of the Galloway Lands includes the Elk River and the Lizard Creek Watershed.

Aquatic Environment

Lizard Creek, Boardman Creek and their associated tributary flow through the Galloway Lands. Bull trout and the westslope cutthroat are provincially blue listed species and designated as species of Special Concern under Schedule 1 of the federal *Species at Risk Act* (SARA). Both are known to occur in Lizard Creek.

Terrestrial Environment

The Galloway Lands contains forest ecosystems of the following site series: 101, 103,110 and Fm02. The majority of the site is in a young forest structural stage. Some herb-dominated ecosystems are also present on and along the existing access roads

No rare or endangered plant species have the potential to occur on the Galloway Lands. There is one rare and endangered ecological community of concern that occurs on the Galloway Lands. Cottonwood - spruce-dogwood (Fm02) is provincially blue listed and occurs along Lizard Creek.

Wildlife camera data suggest that the Galloway Lands are heavily use by mule deer and white-tailed deer. A few black bears were detected but no grizzly bears were detected from the camera data. This report described the wildlife habitat for ten rare and endangered species potentially occurring or confirmed on the Galloway Lands. Rare and endangered wildlife species includes:

- Great blue heron
- Evening grosbeak
- Olive-sided flycatcher
- Western screech owl *macfarlanei* subspecies
- Little brown myotis
- Cutthroat trout, *lewisi* subspecies
- Subalpine mountainsnail
- Bull trout
- American badger
- Grizzly bear

The Galloway Lands also provide wildlife tree and wildlife movement for various species.

Environmental Constraints and Potential Impacts

Cultural Environment

The presence of archaeological and cultural sites has yet to be addressed within the Galloway Lands. As the land is privately owned, the Nordic skiing mountain biking trails, traplines and limited hunting entry area present on the Galloway Lands do not represent a constraint to the proposed development. The proposed development will impact 1.07 ha of the old growth management area, 0.56 ha of the alluvial and debris flow fan and 0.09 ha of the Lizard Creek setbacks as per the OCP and floodplain bylaw.

Physical Environment

Vegetation removal has the potential to expose soils and create surface soil erosion. Erosion and Sediment Control (ESC) Best Practice mitigation measures are required for certain areas of disturbance to reduce potential impacts.

Aquatic Environment

Lizard Creek, Boardman Creek, their tributaries and associated riparian zones present a constraint to the proposed development. The current proposed development plan has three creek crossings. Construction and improvement of the creek crossing may impact the watercourses and associated riparian area. However, best management practices and compliance with Provincial standards should limit potential for impact on the aquatic environment. Additionally, replacement of the old creek crossings with new crossings constructed to current standards may eliminate any existing issues.

Terrestrial Environment

Rare and endangered species identified as potentially occurring or confirmed on the Galloway Lands are protected under the provincial *Wildlife Act* from killing, wounding, and taking of individual species. The Olive-sided flycatcher, the western screech owl *macfarlanei* subspecies, the little brown myotis and the

American badger are also protected under Schedule 1 of the *Species At Risk Act* (SARA). SARA contains prohibitions that make it an offence to:

i. *kill, harm, harass, capture, or take an individual of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated;*
ii. *possess, collect, buy, sell or trade an individual of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated;*
iii. *damage or destroy the residence (e.g. nest or den) of one or more individuals of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated, if a recovery strategy has recommended the reintroduction of that extirpated species.*

The proposed development may impact the rare and endangered species identified in this report. However, with implementation of mitigations measures detailed in this report, the impact to rare and endangered species is expected to be minimal. Valued Ecosystem Components within Galloway Lands include wildlife trees and wildlife movement. These Valued Ecosystem Components may be impacted by the proposed development. However, with implementation of the mitigation measures, the impact is expected to be minimized.

Conclusions

Based on the information reviewed, the Galloway Lands appears to be suitable for the proposed development provided that potential adverse impacts arising from construction and operation are mitigated following the strategies and general recommendations described in this report. In addition, the Environmental Overview Assessment has identified several environmental opportunities and constraints. The opportunities and constraints discussed in this report should be considered by the proponent if the development proceeds.

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1 Introduction

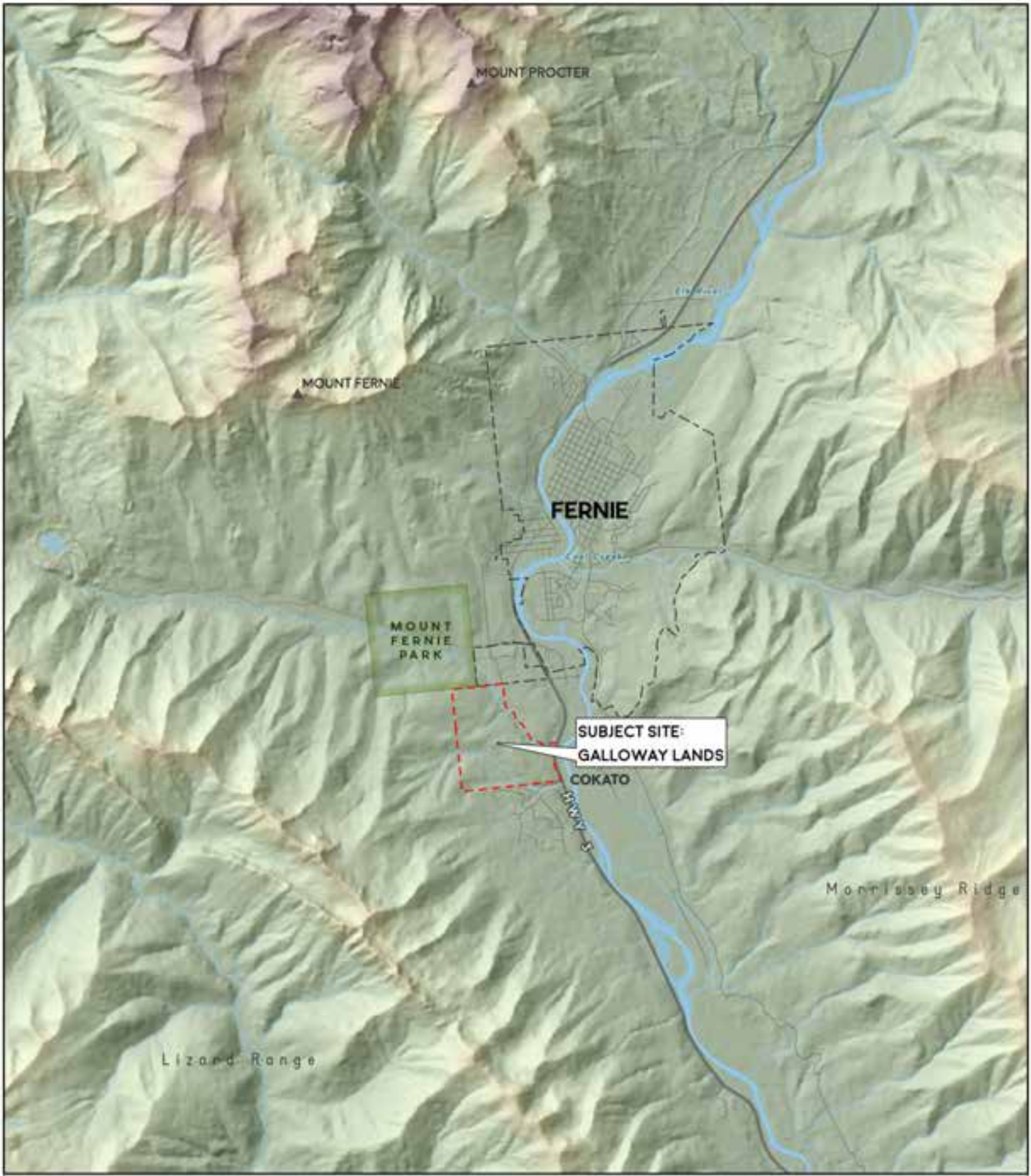
Handshake Holdings Inc. proposes to develop a parcel of land locally known as the Galloway Lands in Fernie, British Columbia (BC). The purpose of the project is to develop 90 estate lots and to preserve part of the land as part of the Conservation and Recreation Lands.

1.1 Project Area

The Galloway Lands are located in the Regional District of East Kootenay. The site is approximately 182.7 ha, ranging in elevation from 982 m to 1,149 m. The Galloway Lands are bordered by Mount Fernie Provincial Park and the Cedars residential development to the north, Highway 3 and Lizard Creek to the east, and the residential development at Fernie Alpine Resort to the south and Fernie Alpine Resort alpine ski trails and Crown lands to the west (Map 1). The Galloway Lands are located on private land comprising four parcels with the following PID's:

- 011-359-471
- 011-359-323
- 011-359-447
- 011-359-404

The proponent proposes to develop approximately 90 estate lots and to create a conservation area in the northwest corner of the property and other lands surrounding the development area known as the Conservation and Recreation Lands (Map 2). The Nordic ski trails and bike trails present on the property will be redirected to accommodate and integrate with the proposed development and the Conservation and Recreation Lands.



GIS Cartographer: Oliver Chew
Date: 2022-10-12
CERG File #: 1082-01-01
Projection: NAD 1983 UTM Zone 10N

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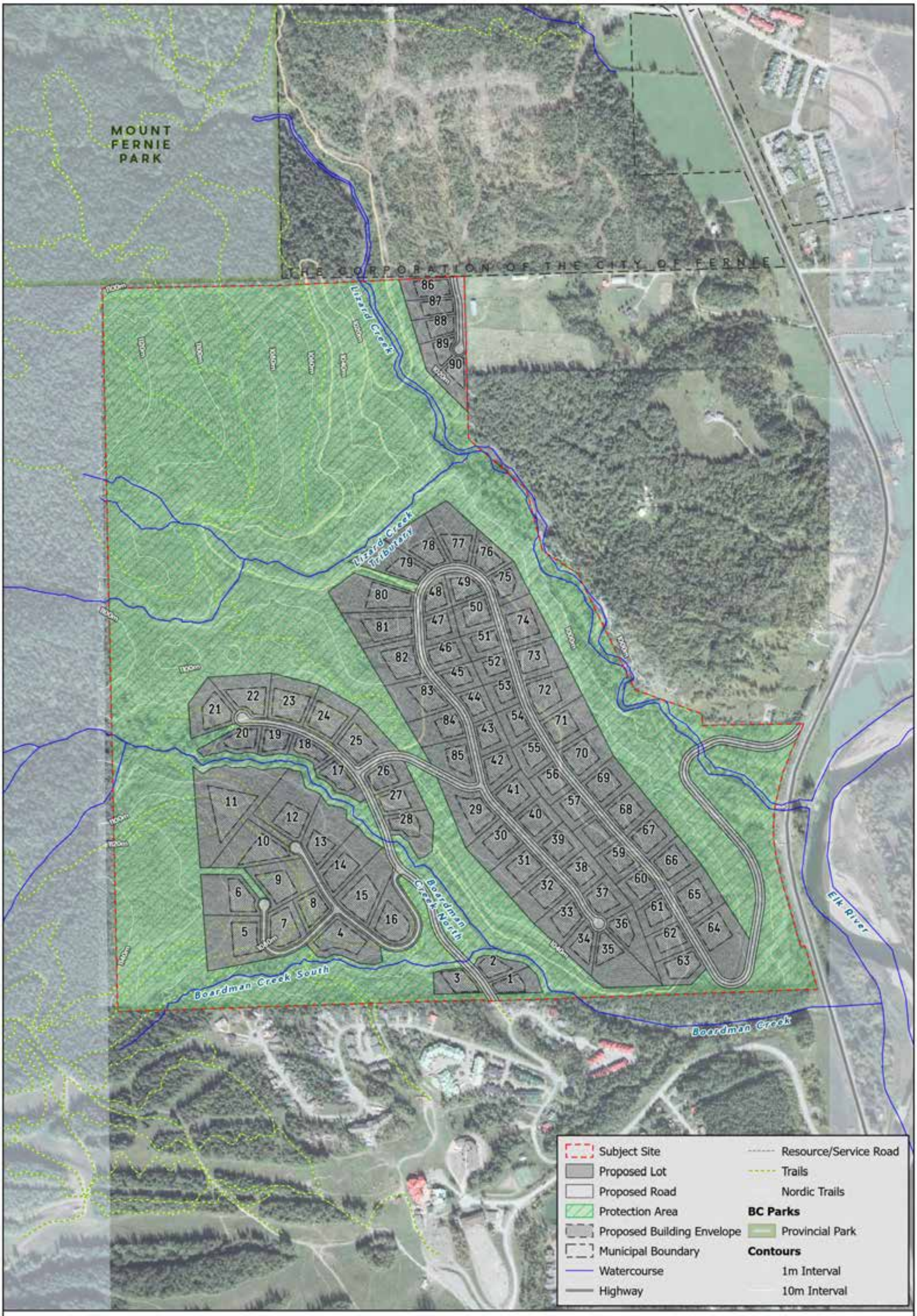
0 0.5 1 2 3 4
Kilometers

Map 1 - Location

Galloway Lands
Fernie
British Columbia



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Date: *2022-10-28*
CERG File #: 1082-01-01
Projection: NAD 1983 CSRS UTM Zone 11N

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0 75 150 300 450 600
Meters

Map 2 - Site

Galloway Lands
Fernie
British Columbia

2 Methodology

This Environmental Overview Assessment (EOA) considered all environmental and cultural attributes identified in consultation with the proponent, and comments from public consultation. This section identifies the attributes and components as well as the approach to understanding the interaction with the project and its potential environmental effects.

2.1 Cultural Environment

2.1.1 Indigenous Communities

Research regarding Indigenous interests in the area included public searches and information provided by the proponent through engagement.

As part of the engagement efforts, Reto Barrington from Handshake Holding Inc. and Dave Butler from Dave Butler Consulting solicited input regarding the project, as well as interests or issues associated with the proposed use of the subject lands, to the following Indigenous communities and corporations:

- Tobacco Plains Indian Band
- Ka·kin Resource Group Corporation (Tobacco Plains Indian Band)

Cascade made an archaeological data request to the Archaeology Branch of FLNRO, requesting information on any documented sites within the Galloway Lands, on September 20, 2022. The Archaeology branch requires up to 75 business days and the results will be provided when available.

2.1.2 Land Use

A shapefile of the proposed area was uploaded to the BC Governments Natural Resource Online Services Explore by Location Tool (BC Government Natural Resource Online Services, 2022). A detailed land use report created of all overlapping land use interests, including forestry, mining, commercial recreation tenures, crown land licence of occupations, reserves and trapline area licences. Other land uses were researched using the Elk Valley Official Community Plan (OCP) (Regional District of East Kootenay, 2014) and the land use provincial data layers on iMap BC (BC Government, 2022).

2.2 Physical Environment

2.2.1 Climate

Climatic conditions of the Galloway Lands were described using the ClimateBC Map database (Wang et al., 2016) and the Biogeoclimatic Ecosystem Classification (BC Government and Ministry of Forests and Range, 2021).

2.2.2 Geology and Geomorphology

Geological and geomorphological conditions were described using the BC Geological Survey MapPlace database (BC Ministry of Energy, Mines and Low Carbon Innovation, 2021), BC Data Catalogue website and GIS information derived through iMap BC (BC Government, 2021a).

2.2.3 Soils

Soils were evaluated and described based on the soil survey results displayed in iMap BC (BC Government, 2021b) and described from Soil Resources of the Lardeau Map Area (Wittneben, 1980). Soil information is based on the 1980 study that was primarily based on aerial photos with field verification of polygons accessible by road or trail (Wittneben, 1980).

2.2.4 Hydrology

Watershed information was collected through the BC Data Catalogue website and the Kootenay Boundary Water Tool (Ministry of Forest, Lands, Natural Resource Operations and Rural Development, 2021).

2.3 Aquatic Environment

A search of the BC Fish Inventories Data Queries (FIDQ) database was carried out to find records of fish observations and stocking programs (BC Government, 2021c). Available information was reviewed concerning fish presence and distribution in the drainages of the study area. The FIDQ database was searched to locate obstacles to fish passage and up-to-date fish occurrence records for the Galloway Lands. Observation of the creeks were made during the field assessment on July 26, 27 and 28, 2022.

2.4 Terrestrial Environment

2.4.1 Vegetation

The classification of terrestrial regions and areas in this EOA utilizes the Biogeoclimatic Ecosystem Classification (BEC) developed by the Province of British Columbia Ministry of Forests (MacKillop, D. and A. Ehman, 2016); (MacKenzie and Meidinger, 2021). The BEC system is a hierarchical classification scheme that combines three classifications: climatic (or zonal), vegetation, and site. Classifications utilized existing Predictive Ecosystem Mapping (PEM) data (BC Government, 2017), in combination with methods outlined in A Field Guide for Site Identification and Interpretation for Southeast British Columbia (MacKillop et al., 2018). Terrestrial Ecosystem Mapping (TEM) standards (RISC, 1998) were used to interpret and delineate the ecosystem units and describe their distribution within the study area. It should be noted that insufficient information was available for compliance with TEM standards. To differentiate between the two, TEM codes are used to refer to Terrestrial Ecosystems (TE).

The Biogeoclimatic zones were determined using the BEC mapping from PEM data. This data was used to delineate TE polygons. BEC mapping was reviewed along with the descriptions of the subzones and variants to determine suitability. The TE polygons were investigated in the field (ground-truthed) on July 26, 27 and 28, 2022, using ground inspection methods to confirm the site vegetation, soils, tree mensuration, and geomorphic features of the study area.

2.4.2 Wildlife and Wildlife Habitat

General wildlife observations were made during the field assessment. In addition, five wildlife cameras were installed throughout the project area. The wildlife cameras were installed on July 26, 2022 and retrieved on September 29, 2022. A Literature search was also conducted to determined wildlife and wildlife habitat occurring on Site.

2.4.3 Rare and Endangered Species

Rare and endangered plant species and ecological communities were identified by conducting a search through the BC Species & Ecosystems Explorer (B.C. Ministry of Environment, 2021). Searches were conducted for the identified project area using the interactive map selection tool. Selected criteria for conservation status or legal designation were Red (Extirpated, Endangered, or Threatened) and Blue (Special Concern) under the BC List and the legal designation of Federal Species at Risk Act (SARA). Search results are displayed in the respective sections for vegetation, wildlife and ecological communities. Results are further delineated by habitat requirements and the likelihood of the presence on the project site is discussed. Critical habitat for federally listed SARA species were researched using the Data BC catalogue in the area.

3 Existing Environmental Conditions

3.1 Cultural Environment

3.1.1 Indigenous Communities

The Fernie area has a history of occupation by Indigenous communities extending back more than 10,000 years (Ktunaxa Nation, 2022). Two First Nations traditionally used the area: the Ktunaxa Nation (1,212, registered population (Government of Canada, 2022a); 1,160 estimate, (BC Treaty Commission, 2021) and the Stoney Nakoda Nations (1,851, registered population (Government of Canada, 2022a); 5,397 estimate (Stoney Nakoda Nations, 2022)) (British Columbia Assembly of First Nations, 2022; Ktunaxa Lands and Resources Agency, n.d.; Native Land Digital, 2022; Stoney Nakoda Nations, 2022).

The Ktunaxa Nation is comprised of six Bands, two of which are located in the United States (British Columbia Assembly of First Nations, 2022; Ktunaxa Nation, 2022). The Ktunaxa Nation Bands located in British Columbia are organized as follows:

- ʔAkisq̓nuk First Nation (Akisqnuk First Nation)
- Yaqan Nukiy (Lower Kootenay Band)
- ʔaq̓am (St. Mary's Indian Band)
- Yaq̓it ʔa·knuqƛi 'it (Tobacco Plains Indian Band)

While the traditional territory of the Iyarhe (Stoney) Nakoda Nations extended into the British Columbia interior, they are now primarily located in Alberta (Stoney Nakoda Nations, 2022). The Stoney Nakoda Nations are organized as follows:

- Bearspaw First Nation
- Chiniki First Nation
- Wesley First Nation

The Ktunaxa Nation treaty table is currently engaged in Stage 5 negotiations with Canada and the Province of British Columbia under the BC Treaty Commission process (BC Treaty Commission, 2021). The Galloway Lands are within the Ktunaxa BC Treaty Area (Ktunaxa Lands and Resources Agency, n.d.). The Stoney Nakoda is one of five First Nations that signed Treaty 7 in southwestern Alberta (Treaty 7 First Nations Chiefs' Association, 2022). While the Galloway Lands are within the Stoney Nakoda traditional territory, it is not included in the Aboriginal Title Land Claim Area (Snow and Associates Inc., 2007; Stoney Nakoda Nations, 2013).

The Elk Valley is within the Ktunaxa traditional district of qukin ʔamakʔis (Land of the Raven)(Ktunaxa Nation, 2015). Ktunaxa law (ʔaknumuȼtitit) states the purpose of the Ktunaxa Nation is to take care of the land and its resources (Ktunaxa Nation, 2010). This is reflected in the Ktunaxa Stewardship Principles for lands and resources, described below:

- Contribute to the betterment of future generations;
- Balance the economic use of land with cultural and spiritual values;
- Follow natural law of taking only what is needed;
- Ensure that long-term sustainability and ecological integrity take precedence;
- Ensure access to, and protection of, traditional foods, medicines, resources, and spiritual sites;
- Maintain, protect, manage and restore healthy and diverse ecosystems;
- Ensure land, air, and water are and will be clean and healthy (Ktunaxa Nation, 2010).

Traditional use of the Fernie area included seasonal movement following vegetation, hunting, and fishing cycles (Ktunaxa Nation, 2022). Cultural/spiritual sites, environmental features, habitation sites,

transportation routes, and subsistence sites have been mapped by Ktunaxa knowledge holders within the Fernie area (Galdamez, 2013; Ktunaxa Nation, 2015).

Handshake Holdings Inc consulted with Core Heritage Consulting Ltd. to determine if archaeological sites are present on the Galloway Lands. Core Heritage Consulting Ltd. confirmed that there are no recorded sites on the Galloway Lands. However, there is also no record of an archeological assessment on the Galloway Lands.

3.1.1.1 Ktunaxa Nation

Discussion with indigenous communities is being conducted by Reto Barrington and Dave Butler Consulting on behalf of Handshake Holdings Inc. The Tobacco Plains Indian Band and the Ka·kin Resource Corporation were contacted on May 20, 2020. A virtual meeting was held on October 7, 2021, during which the Tobacco Plains Indian Band Council and administration indicated an interest in land stewardship and water quality. A public hearing was held on January 13, 2022, regarding the rezoning of the study area (Regional District of East Kootenay, 2022a). A second public hearing was held on May 12, 2022, during which Chief Heidi Gravelle of the Tobacco Plains Indian Band expressed concerns related to the landowner's engagement process, the stewardship of water and lands, road access, fires, and wildlife (Regional District of East Kootenay, 2022b).

3.1.2 Anthropogenic Values and Features

Anthropogenic features on the Galloway lands consist of the bridge crossing Lizard Creek (Photo 1) and the crossing country skiing, mountain biking and hiking trails. Trails are further discussed in Section 3.1.3

Photo 1: View of the bridge over Lizard Creek. July 28, 2022

3.1.3 Recreational Activity

Nordic skiing, mountain biking and hiking are the main recreation activities that take place within the Galloway Lands. The landowner has an informal agreement with the Fernie Nordic Society to permit use of the existing logging roads for Nordic skiing during winter months (Photo 2). A network of mountain bike and hiking trails has also been established on the property in trespass (Photo 3). The mountain bike and hiking trails are not sanctioned and have not been permitted by the property owner.

Photo 2: View of one of the Nordic trail. July 27, 2022

Photo 3: View of hiking and biking trail. July 26, 2022

3.1.4 Other Land Uses

3.1.4.1 Trapline Areas

Trapline areas are granted by the regional manager of the freshwater fisheries and wildlife programs for licensed trappers to trap furbearing animals. Two identified trapline areas are within the Galloway Lands in Map 3. Trapline area identifiers are presented in Table 1.

Table 1: Trapline Areas within the Galloway Lands

Trapline Area#	Trapline Area Identifier#	Location
2751811	TR0423T004	South end of the property
2751815	TR0422T003	North end of the property

3.1.4.2 Limited Entry Hunting Zones

Limited Entry Hunting (LEH) is a service by which hunting authorizations are awarded to resident hunters based on a lottery or random draw. The purpose of LEH is to achieve wildlife management objectives and maintain hunting opportunity. Table 2 presents the three LEH zones within the Galloway Lands (BC Government Natural Resource Online Services, 2022). Map 3 shows the location of the LEH.

Table 2: LEH Zones within the Galloway Lands

LEH Zone ID	LEH Zone	Management Units	LEH Zone Type
611150	T_4-23	4-22	TURKEY
611379	S_4-22A	4-23	MOUNTAIN SHEEP
610752	M_4-23B	4-23	MOOSE

3.1.4.3 Local Government and Official Community Plans

Official Community Plans (OCP) are guiding documents produced by local governments that establish policies that guide decisions on community planning and land use management. The Galloway Lands are located within the Regional District of East Kootenay (RDEK) and falls under the jurisdiction of the Elk Valley OCP Bylaw No. 2532 (Regional District of East Kootenay, 2014). The subject property is designated RR (Rural Resource) at the north end and designated RE (Resort Expansion) for the remainder of the property.

An Old Growth Management Area is located within the Galloway lands as per the Schedule E1: Environmental Sensitive Areas (ESAs) (Map 4). The Section 10.3 (3)(a) of the OCP states:

Future development should minimize disturbance to the integrity of environmentally sensitive areas (ESAs) ESAs within the plan area include, but are not limited to, habitat of red and blue listed species and areas identified on Schedules E1-E3 such as wetlands and riparian areas, grassland ecosystem, old growth forest and wildlife habitat areas.

To minimize disturbance to ESAs in areas zoned for residential land use the OCP encourages the integration of Conservation Subdivision Design principles including identifying and protecting riparian areas and wetlands. Under Section 10.3(2)(a) of the OCP:

> *Development is encouraged to avoid streams, wetlands and riparian areas and to provide appropriate development setbacks and buffer areas.*

An Alluvial and debris flow fan is located at the downstream end of Lizard Creek as per Schedule F1: Flow Hazard of the OCP (Map 4). While the Elk Valley OCP does not include defined setback requirements, the Elk Valley Floodplain Bylaw No. 829 specifies the following setback:

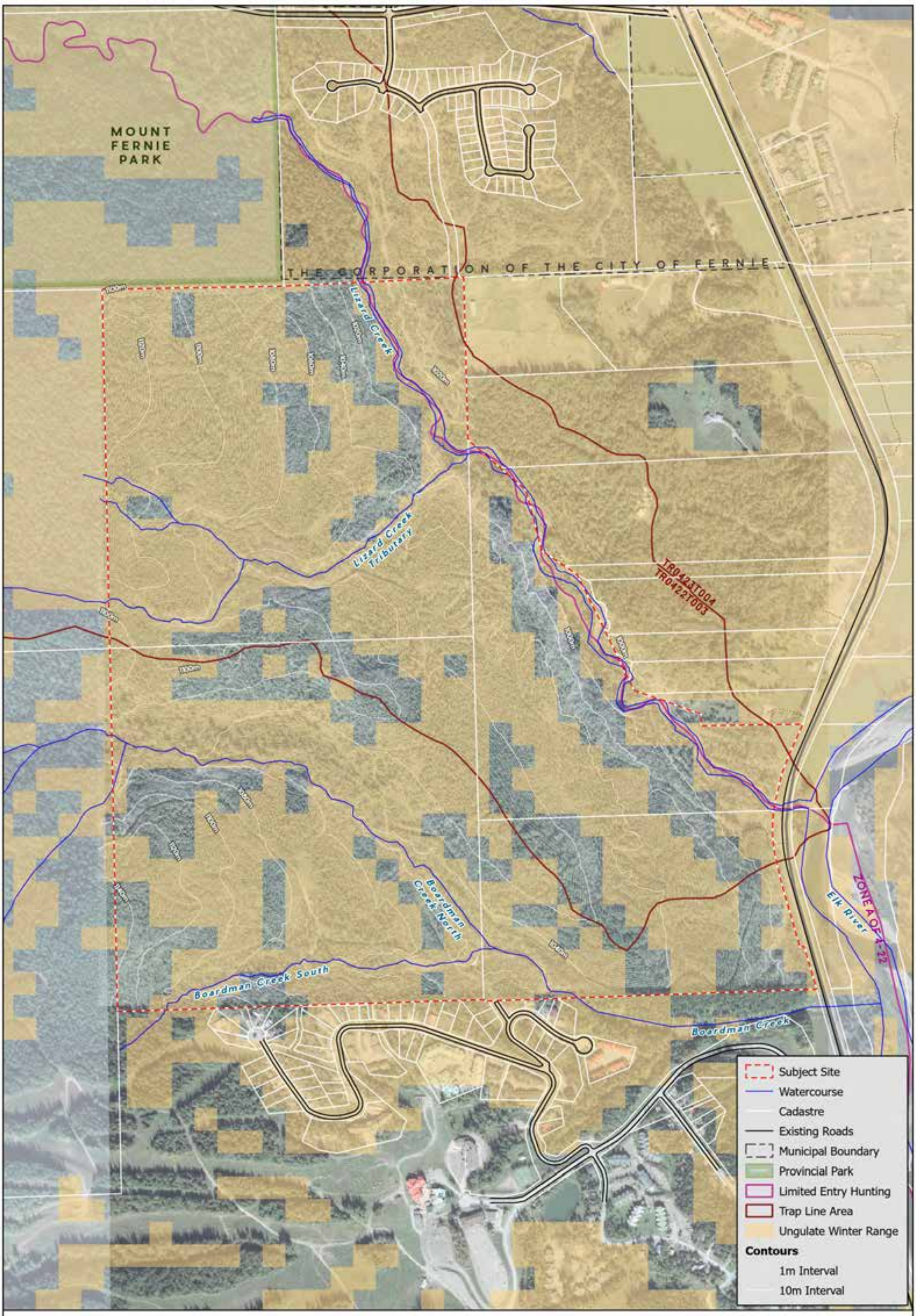
(i) *30.0 metres (98.4 feet) of the ordinary high water mark of Boivin Creek, Brule Creek, Coal Creek, Elk River, Flathead River, Fording River and Michel Creek; or*
(ii) *7.5 metres (24.6 feet) of the ordinary high water mark of any lake, swamp or pond; or*
(iii) *15.0 metres (49.2 feet) of the ordinary high water mark of any other watercourse,*

whichever is farther is designated as a Floodplain Setback area.

3.1.4.4 Ungulate Winter Range Habitat

An Ungulate Winter Range (UWR) is defined as an area that contains habitat that is necessary to meet the winter habitat requirements of an ungulate species and made under the authority of sections 9 and 12 of the *Government Actions Regulation* of the *Forest Range and Practices Act* (FRPA).

One UWR area is located on most of the Galloway Lands: the UWR number u-4-006 (Map 3). This UWR is established for elk, bighorn sheep, mule deer, white-tailed deer, mountain goat and moose (BC Government, 2005).



GIS Cartographer: Nicola Church
Date: 2022-10-12
CERG File #: 1062-01-01
Projection: NAD 1983 CSRS UTM Zone 11N

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0 75 150 300 450 600
Meters

Map 3 - Wildlife Management

Galloway Lands
Fernie
British Columbia

MOUNT FERNIE PARK

THE CORPORATION OF THE CITY OF FERNIE

Lizard Creek

Lizard Creek Tributary

Boardman Creek North

Boardman Creek South

Boardman Creek

Elk River

Subject Site
Floodplain
Flood Torrent Hazard - Alluvial Fan
Proposed Lot
Proposed Road
Proposed Building Envelope
Watercourse
15m Riparian Buffer
Cadastre
Existing Roads
Municipal Boundary

BC Parks

Provincial Park

GIS Cartographer: Oliver Chew
Date: *2022-11-01*
CERG File #: 1082-01-01
Projection: NAD 1983 CSRS UTM Zone 11N

CASCADE ENVIRONMENTAL RESOURCE GROUP LTD

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0 75 150 300 450 600

Meters

Map 4 - OCP

Galloway Lands
Fernie
British Columbia

3.2 Physical Environment

3.2.1 Climate

The Galloway Lands are located in the Elk Valley (ELV) Ecosection, which lies within the Northern Continental Divide Ecoregion, part of the Southern Interior Mountains Ecoprovince. The Elk Valley is located in a rainshadow of easterly moving moist Pacific air, but it is often influence by low pressure systems in Alberta forcing cold air westward in this area. Those systems can increase moisture to occur in the lower Elk River area (Demarchi, 2011). High winds can blow from Alberta via the low Elk Valley, creating cold and snow conditions. (Demarchi, 2011).

The project area is characterized by the Interior Cedar-Hemlock (ICH) Elk Moist Cool variant forest (mk4). The ICHmk4 subzone variant is described by warm, moist summers with wet springs. Winters are cool with moderately deep to deep snowpacks (MacKillop et al., 2018). .

The meteorological records from the Sparwood Weather Station (Canadian Climate Normals 1981 – 2010) which is located approximately 30 km north of the project area, record an annual total precipitation of 411 mm, which mainly falls as rain (Environment and Climate Change Canada, 2013). The total precipitation peaks in the month of June, and is lowest in the month of February, with averages of 67.7 and 12.4 mm of precipitation, respectively. The mean annual temperature is 4.4°C at the Sparwood Weather Station. July is the warmest month, with a mean daily maximum temperature of 23.8°C, and a mean daily temperature of 15.8°C. Conversely, December is the coolest month with a mean daily minimum temperature of -11.3°C, and a mean daily temperature of -7.3°C.

3.2.2 Geology

The Galloway Lands are part of the Fernie Formation and is underlain by sedimentary rocks including shale, sandstone and limestone(BC Ministry of Energy, Mines & Petroleum Resources, BC Geological Survey, 2017). The site is composed of undivided sedimentary rocks from the Mesozoic era (BC Ministry of Energy, Mines & Petroleum Resources, BC Geological Survey, 2017).

3.2.2.1 Mining

No mining occurred on the Galloway Lands.

3.2.3 Geomorphology

The Galloway Lands are located within the Southern Rocky Mountains (BC Ministry of Environment, 1978). The topography is characterized by underlying folded and faulted sedimentary rocks. Erosional land-forms such as cirques, troughs and horns are often asymmetric. They are cut in moderate to steeply dipping strata (BC Ministry of Environment, 1978).

3.2.4 Soils

The soils on the Galloway Lands are characterized by a morrisette soil association (Government of British Columbia, 2022). The soils have development from fine morainal till materials and usually have a thickness of more than 1m (BC Ministry of Environment, 1990). Textures ranges from silty clay loam (most common) to silt loam (BC Ministry of Environment, 1990). Morrisette soils are mostly moderately well drained and slowly to moderately pervious (BC Ministry of Environment, 1990). The soil drainage is moderately well drained (BC Ministry of Environment, 1990). The usual classification is Brunisolic Gray Lusivol (BC Ministry of Environment, 1990)

3.2.5 Hydrology

The Galloway Lands are divided into two major watersheds, the Elk River Watershed which lies to the south and the Lizard Creek Watershed which lies to the north (Map 5). The Elk River Watershed is approximately 10,337 ha out of which 78.2 ha are located on the project area. Within the project area, this watershed, includes Boardman Creek north and south which then merge to form Boardman Creek. The Lizard Creek Watershed is approximately 4,516 ha out of which 105 ha are located on the project area. Within the project area, this watershed, includes Lizard Creek and one tributary.

3.2.5.1 Water Licences

Water licences are held on Lizard Creek by private individuals (BC Government, 2022a). These are listed in Table 3 and displayed in Map 5.

Table 3: Water Licences within the Galloway Lands

Map ID	Licence No	WR Map/Point Code	Stream Name	Purpose	Quantity	Units	Licensee	Water District/ Precinct	Licence Status	Process Status	Priority Date	Issue Date
1	C120187	1832A QQ (PD23537)	Lizard Creek	Lwn, Fairway & Grdn: Res	2479.295	MY	HENNIG ALFRED PO BOX 204 FERNIE BC V0B1M0	FER – FERNIE	Current	N/A	19721027	20050718
2	C122194	1832A (PD80202)	Lizard Creek	Irrigation: Private	9251.1	MY	KNAUF JONATHAN JAMES 2485 LIZARD CREEK RD RR1 FERNIE BC V0B1M1	FER – FERNIE	Current	N/A	20060906	2006120

3.3 Aquatic Environment

Two water course and their associated tributaries are present on site: Lizard Creek and Boardman Creek (Map 5).

3.3.1 Fish and Fish Habitat

The fisheries and aquatic habitat on site can be divided into those within the Lizard Creek Watershed flowing along the east side of the project area and those within the Boardman Creek Watershed flowing along the south side of the project area.

Lizard Creek is known to support the following fish species: Westslope cutthroat trout (*Oncorhynchus clarki lewisi*), brook trout (*Salvelinus fontinalis*), bull trout (*S. confluentus*), longnose sucker (*Catostomus catostomus*), longnose dace (*Rhinichthys cataractae*) and mountain whitefish (*Prosopium williamsoni*) (BC Ministry of Environment, 2022). Cutthroat trout have also been observed on the unnamed tributary to Lizard Creek (Ministry of Environment, 1995). No fish record is available for Boardman Creek.

Lizard Creek is characterized by a wetted width of approximately 5 to 6 m. Substrate is dominated by cobbles with gravel as the subdominant substrate (Photo 4). An unnamed tributary to Lizard Creek was observed (Photo 5). The tributary is characterized by a bankfull width of approximately 2 m with a water depth of 5 cm at the time of the survey. Large cobble was the dominant substrate with smaller cobble as subdominant. A tributary to the tributary coming from the north was observed as well. This secondary tributary was dry during the assessment. Boardman Creek North has a bankfull width of approximately 3 m with a wetted width of 1 m at the time of the assessment (Photo 6). The substrate was dominated by cobble with gravel as subdominant substrate. Boardman Creek South had low flows during the assessment (Photo 7). The bankfull width is 1.5 m while the wetted width was 1 m during the assessment with a water depth of approximately 3 cm. The substrate was dominate by gravel with cobble in lesser amount.

Photo 4: View of Lizard Creek. July 27, 2022.

Photo 5: View of the tributary to Lizard Creek. July 28, 2022.

Photo 6: View of Boardman Creek north. July 27, 2022.

Photo 7: View of Boardman Creek south. July 28, 2022.

3.3.1.1 Rare and Endangered Fish Species

Bull trout and the westslope cutthroat, provincially blue listed species and designated as species of Special Concern under Schedule 1 of the federal *Species at Risk Act* (SARA) are known to occur within Lizard Creek.

3.3.1.1.1 Bull Trout

Bull trout (*Salvelinus confluentus*) are not true trout, but are in fact char. They are often confused with Dolly Varden (*Salvelinus malma*) which have similar markings, skull morphology and distribution (BC Government et al., 2004). Through genetic studies, the separation between the two species was recognized by the American Fisheries Society in 1980 (BC Government et al., 2004). Bull trout are characterized as having a large head and jaw relative to their long, slender body. When compared to Dolly Varden, bull trout have a larger, broader and flatter head and more ventrally flattened body (BC Government et al., 2004). Their colour ranges from green to greyish blue. Some lake residents have silver sides. The dorsal and peduncle regions are spotted with pale yellowish-orange spots. Bull trout are distinguished from other char and trout species native to western Canada by the absence of black spots on the dorsal fin (BC Government et al., 2004).

Bull trout fry prefer to stay near substrate to avoid strong current which can sweep them downstream. Juvenile bull trout feed on aquatic insects and amphipods in the benthic, pelagic and littoral zones (BC Government et al., 2004). Some bull trout are stream residents (fluvial) and tend to be smaller than migratory (adfluvial) bull trout. Adfluvial bull trout spawn in tributary streams but reside in lakes or reservoir while fluvial bull trout also spawn in tributaries but live in mainstem rivers. Adfluvial bull trout are also predominantly piscivorous which contributes to their rapid growth rate compared to fluvial bull trout which a predominantly insectivores (BC Government et al., 2004). Bull trout spawn in cool (5-9^{o}C) low gradient (1-1.5%) flowing water (0.03-0.8 m/s) on clean gravel and under cover in the form of undercut banks, overhanging riparian vegetation, debris jams and deep pools (BC Government et al., 2004). The optimal temperature range for bull trout eggs incubation is 2-4^{o}C. Ground water interaction with surface water is needed to create thermal stability at spawning sites and to prevent incubating eggs from freezing during the winter when stream temperatures can dip down to 0^{o}C (BC Government et al., 2004)

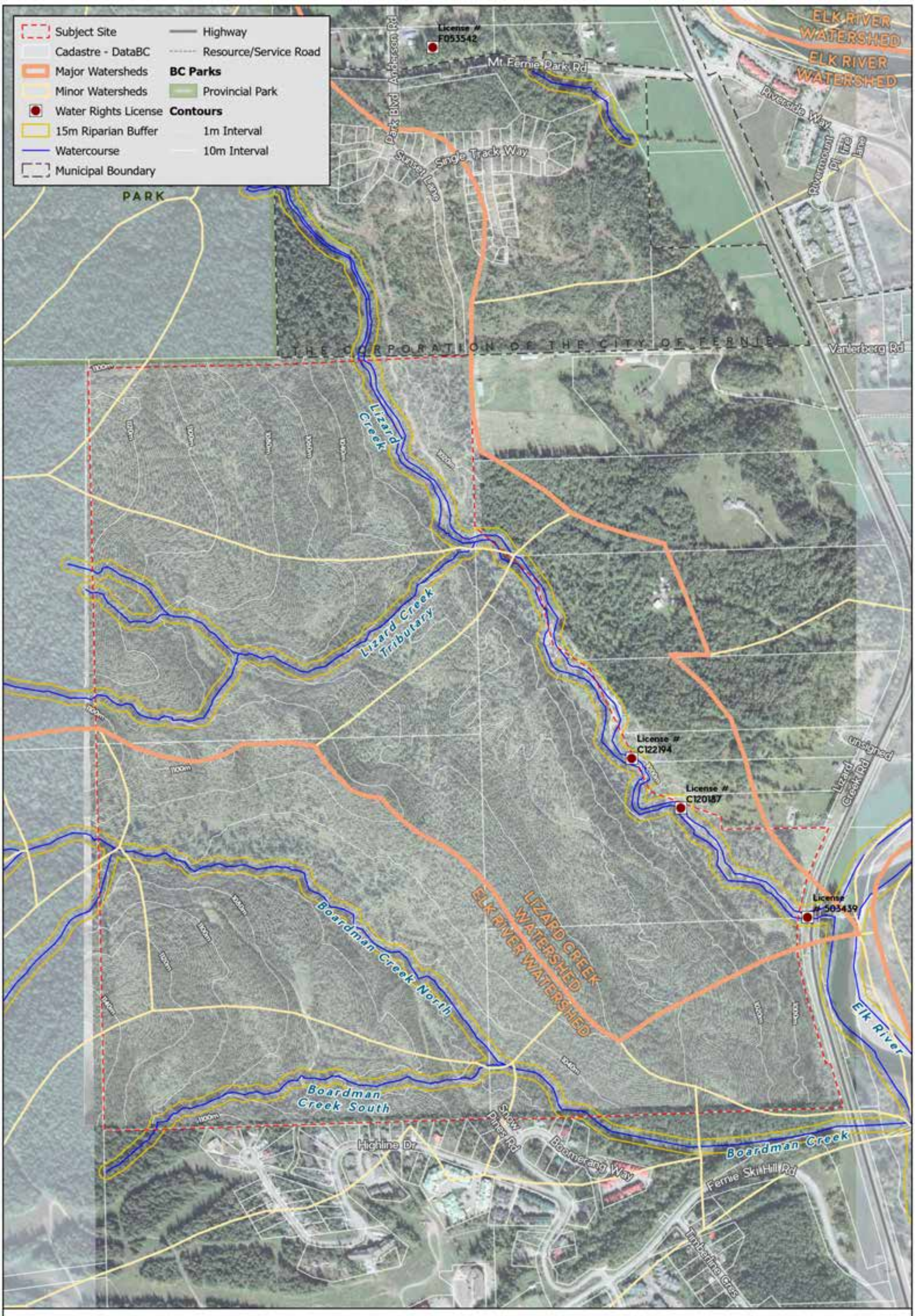
Bull trout are endemic to western Canada and the U.S. Pacific Northwest. In BC they are found in all major drainage basins on the mainland. However, they are on the provincial *Blue List*. Bull trout populations are declining in abundance in Canada and the U.S. (BC Government et al., 2004). In BC, the main threat to bull trout populations is fragmentation due to disruption of the migration patterns by obstructions such as perched culverts, water velocity through culverts and degraded habitats (BC Government et al., 2004). In BC, bull trout are protected under the provincial *Wildlife Act*, the provincial *Fish Protection Act*, the federal *Fisheries Act* and the *Species at Risk Act.*

3.3.1.1.2 Westslope Cutthroat Trout

Westslope cutthroat trout (*Oncorhynchus clarki lewisi*) is one of 14 subspecies of interior cutthroat trout (*O. clarki*). Cutthroat trout are distinguished by a red or orange streak under their jaw. In comparison to other trout, cutthroats have many spots all over the head and sides of the body and occasionally on the belly and fins (BC Government et al., 2004).

Westslope cutthroat is native to southeastern British Columbia and southwestern Alberta, western Montana, northern Idaho. Small disjunct populations are also found in Washington, Oregon and Wyoming (BC Government et al., 2004). Westslope cutthroat are opportunistic feeders and are known to consume terrestrial macroinvertebrates, lake zooplankton other fish and even small mammals. Westslope cutthroat spawn between April and August but peak in May and eggs incubate for 6-7 weeks. Following emergence fry migrate to other habitat or rear they natal streams (BC Government et al., 2004).

In BC, the westslope cutthroat is considered vulnerable and is on the provincial *Blue List*. In BC westslope cutthroat are protected under the provincial *Wildlife Act*, the provincial *Fish Protection Act,* the federal *Fisheries Act* and the *Species at Risk Act.*



GIS Cartographer: Nicola Church
Date: *2022-10-12*
CERG File #: 1062-01-01
Projection: NAD 1983 CSRS UTM Zone 11N

CASCADE ENVIRONMENTAL RESOURCE GROUP LTD

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Map 5 - Aquatic Environments

Galloway Lands
Fernie
British Columbia

3.4 Terrestrial Environment

3.4.1 Vegetation

3.4.1.1 Vegetation Associations

During the field investigations in July 2022, it was determined that the subject site is undeveloped except for the access roads throughout the site. The Galloway Lands were logged in the 1980's, therefore the existing native vegetation on the property mostly consists of young forest (Structural Stage 5). Some herb-dominated (Structural Stage 2b) ecosystems are also present on and along the existing access roads. A description of the structural stages is provided in Table 4. Field investigations identified plant species on site and Terrestrial Ecosystems (TE) was determined based on soil and vegetation assessments.

Table 4: Vegetation Age Class Descriptions

Structural Stage Code	Interpretation
1 Sparse/Bryoid	- Community is in initial stages of primary and secondary development - Bryophytes and lichens often dominant - Times since disturbance typically <20 years but may be 50-100 + years in areas with little or no soil - Shrub and herb cover <20 % of total area - Tree cover < 10 % of total area
2a/b/c/d Herb	- Early successional stage or edaphic herb community - 2a forb dominated - 2b graminoid dominated, including grasses, sedges, reeds and rushes - 2c aquatic plant dominated, but not 2b plants - 2d dwarf shrub dominated, low growing woody shrubs
3a/b Shrub	- Shrub dominated communities maintained by environmental conditions or disturbance - 3a low shrub < 2 metres tall - 3b tall shrub < 10 metres tall - Tree cover <10 %
4 Pole/Sapling	- Densely stocked trees - Self-thinning not yet evident - Time since disturbance usually < 40 years
5 Young Forest	- Stocking density persists - Self-thinning not yet evident - Time since disturbance usually 40-80 years (sometimes begins as early as 30)
6 Mature Forest	- Trees established after the last disturbance have matured - The second cycle of shade-tolerant trees may have become established - Time since disturbance generally 80–250 years
7 Old Forest	- Structurally complex stands composed mainly of shade-tolerant and regenerating tree species - Snags and coarse woody debris in all stages of decomposition typical - Time since disturbance >250 years
Modifiers: B – Broadleaf C – Coniferous M – Mixed	- Broadleaf stands composed of > 75 % broadleaf tree cover - Coniferous stands composed of > 75 % coniferous tree cover - Mixed stands neither coniferous nor broadleaf compose > 75 % of the total tree cover

Table 5: Vegetation Species Occurring on Site

Common Name	***Scientific Name***
Trees	
Western redcedar	*Thuja plicata*
Green alder	*Alnus alnobetula*
Mountain hemlock	*Tsuga mertensiana*
Subalpine fir	*Abies lasiocarpa*
Engelmann spruce	*Picea engelmannii*
Western white pine	*Pinus strobus*
Western larch	*Larix occidentalis*
Douglas-fir	*Pseudotsuga menziesii*
Rocky mountain maple	*Acer glabrum*
Douglas maple	*Acer glabrum*
Trembling aspen	*Populus tremuloides*
Black cottonwood	*Populus balsamifera* ssp. *trichocarpa*
Paper birch	*Betula papyrifera*
Shrubs	
Thimbleberry	*Rubus parviflorus*
Red raspberry	*Rubus idaeus*
Bracted honeysuckle	*Lonicera involucrata*
Mountain-ash	*Sorbus subg. Sorbus*
Soopolallie	*Shepherdia canadensis*
D26erodiegon grape	*Mahonia nervosa*
Falsebox	*Paxistima myrsinites*
Black huckleberry	*Gaylussacia baccata*
Black gooseberry	*Ribes lacustre*
Thimbleberry	*Rubus parviflorus*

Common Name	***Scientific Name***
Bracted honeysuckle	*Lonicera involucrata*
Red raspberry	*Rubus idaeus*
Devil's club	*Opplopanax horridus*
Vaccinium sp.	*Vaccinium sp.*
Pin cherry	*Prunus pensylvanica*
Saskatoon berry	*Amelanchier alnifolia*
Tall Oregon-grape	*Mahonia repens*
Birch-leaved spirea	*Spiraea betulifolia*
Common snowberry	*Symphoricarpos albus*
Baldhip rose	*Rosa gymnocarpa*
Forbs	
Buttercup sp.	*Ranunculus sp.*
Meadow buttercup	*Ranunculus acris*
Prince's pine	*Chimaphila umbellata*
Indian paintbrush	*Castilleja*
Oxeye daisy	*Leucanthemum vulgare*
Clover sp.	*Trifolium sp.*
Thistle sp.	*Cirsium sp.*
American vetch	*Vicia americana*
Annual hawksbeard	*Crepis tectorum*
Heart leaved arnica	*Arnica cordifolia*
Wild ginger	*Asarum sp.*
Wintergreen	*Gaultheria procumbens*
One leaf foamflower	*Tiarella trifoliata L.*
Hookers fairybell	*Disporum hookeri*
Honeysuckle	*Lonicera sp.*

Common Name	***Scientific Name***
Spreading dogbane	*Apocynum androsaemifolium*
Selfheal	*Prunella vulgaris*
Goldenrod	*Solidago*
Birch leaved spirea	*Spiraea betulifolia*
Twinflower	*Linnaea borealis*
Violet sp.	*Viola sp.*
False azalea	*Rhododendron menziesii*
Rough horsetail	*Equisetum hyemale*
Arnica sp.	*Arnica sp.*
Dandelion	*Taraxacum sp.*
Round leaved orchid	*Galearis rotundifolia*
Wild strawberry	*Fragaria vesca*
Wild sarsaparilla	*Aralia nudicaulis*
Sweet-cicely	*Myrrhis odorata*
Lady fern	*Athyrium filix-femina*
Oak fern	*Gymnocarpium dryopteris*
Mountain wood fern	*Dryopteris campyloptera*
False Solomon's-seal	*Smilacina racemosa*
Star flowered false Solomons seal	*Maianthemum stellatum*
Stinging nettle	*Urtica dioica*
Queen's cup	*Clintonia uniflora*
Bunchberry	*Cornus canadensis*
Rattlesnake plantain	*Goodyera oblongifolia*
Pearly everlasting	*Anaphalis margaritacea*
Sweet-scented bedstraw	*Galium triflorum*
American brooklime	*Veronica americana*
Horsetail	*Equisetum hyemale*

Common Name	*Scientific Name*
Timothy grass	*Phleum ppratense*
Redtop grass	*Agrostis gigantea*
Rough fescue grass	*Festuca arundinacea*
Alaska onion grass	*Melica subulata*
Western meadowrue	*Thalictrum occidentale*
Grasses	*Poaceae*
Sedges	*Cyperaceae*
Mosses and Lichens	
Nodding threadmoss	*Pohlia nutans*
Red-stemmed feathermoss	*Pleurozium schreberi*
Other moss	

3.4.1.2 Biogeoclimatic Zone Classification

Biogeoclimatic units represent groups of ecosystems under the influence of the same regional climate. Subzones can be grouped into zones and divided into variants. Each biogeoclimatic subzone has a distinct climax (or near-climax) plant association on zonal sites. The zonal climax vegetation is thought to best reflect the regional climatic conditions of the subzone. Ecosystems within a subzone are influenced by one type of regional climate. Edaphic (soil) and topographic conditions influence the climax vegetation of sites drier or wetter than the zonal condition. Variants are defined due to geographic variation within a subzone and reflect differences in regional climate (BC Ministry of Forests, 2002).

The Galloway Lands are located in the ICHmk4 subzone variant. The ICH Zone occupies the lower slopes of the south-central Columbia Mountains. The ICH has the greatest tree species diversity of all biogeoclimatic zones in British Columbia, commonly called the “Kootenay mix”. Common trees within ICH of all variants are western redcedar, western hemlock, Douglas-fir, western larch, lodgepole pine, western white pine, paper birch, trembling aspen, and black cottonwood. The ICHmk is an unusual subzone with the ICH as the western hemlock is absent and replaced by western redcedar. The ICHmk4 is mostly present on mesic and wetter sites and is uncommon on dried than mesic sites. (BC Ministry of Forests, 2002),(MacKillop et al., 2018) .

The different site series are further classified into TE Units based on the structural stage of the vegetation, the terrain of the site, and subtle changes in microclimate, soil conditions and associated vegetation.

3.4.1.3 Terrestrial Ecosystem Mapping

During the site visits conducted between July 26 and 28, 2022, ground and visual survey plots of the subject site were carried out, collecting soil and vegetation attributes for the area. TE codes for the polygon areas were identified based on the vegetation and soil attributes. The subject site was classified into 10 TE polygons (Map 6). The polygon TEM codes are described in the following sections.

Polygon 1: 110kf5mC

Polygon 1 -Site Series 110 (CwSxw- Oak fern)

POLYGON 1. TE CODE DERIVATION					
Decile	Cool aspect, fine-texture soils			Multistoried	
10	**110**	**kf**	**5**	**m**	**C**
	CwSxw- Oak fern		Young forest		Coniferous

Polygon 1: **110kf5mC** consists of the riparian vegetation located along Lizard Creek, Boardman Creek and their tributaries. Two plots were surveyed within this polygon, one along the tributary to Lizard Creek and one at the downstream end of Lizard Creek (Map 6). Polygon 1 has a subhygric soil moisture regime and a rich soil nutrient regime. These conditions produce a site series is 110 (CwSxw- Oak fern). Soils in Polygon 1 are well drained to moderately well drained with a silty clay loam and sandy loam soil textures (Photo 8).

Tree cover in Polygon 1 ranges from 25 to 30% with the shrub layer ranging from 50 to 80% and the herb layer ranging from 5 to 35 % (Photo 9 to Photo 11). The moss layer was absent near Lizard Creek but represented 20 % of the ground cover near the tributary to Lizard Creek. The tree layer is dominated by Engelmann spruce with western redcedar, paper birch, black cottonwood, trembling aspen, wester white pine and Douglas fir in lesser amount. The shrub layer is composed of common snowberry, rocky mountain maple, Saskatoon, thimbleberry, devil's club, soopolallie, birch-leaved spirea, black huckleberry, Douglas maple, dull Oregon grape, balding rosehip and tall Oregon grape. The herb layer consists of selfheal, sweet scented bedstraw, heart leave arnica, wild ginger, strawberry, one leaf foam flower, queen's cup, hooker's fairy bell, Alaskan onion grass, western rattlesnake plantain, wild sarsaparilla, honey suckle, mountain wood fern, common horsetail, western meadowrue. The moss layer was only present in the plot along the tributary to Lizard Creek and consist of sherber's redstem and common nodding pohlia.

The average tree height ranged from 15 to 26m. An Engelmann spruce was measured at 26 m tall, with a diameter at breast height (DBH) of 42 cm. The age of this tree was measure at 73 years old however the age of the majority of the polygon was estimated at 30 years. Polygon 1 is classified as a Young Forest (Structural Stage 5).

Photo 8: View of the soil in Polygon 2. July 26, 2022.

Photo 9: Typical vegetation Polygon 2. July 26, 2022.

Photo 10: Typical vegetation for Polygon 1. July 26, 2022.

Photo 11: Typical vegetation for Polygon 1. July 27, 2022.

Polygon 2: 103jm5mC

Polygon 2 – TE Site Series 103 (Fd – Douglas maple – Falsebox)

POLYGON 2 TE CODE DERIVATION					
Decile	Gentle slope, medium-textured soils			Multi-storied	
10	**103**	**jm**	**5**	**m**	**C**
	Fd – Douglas maple – Falsebox		Young Forest		Coniferous

Polygon 2: **103jm5mC** is a small polygon located near the northwest corner of the subject site (Map 6). The topography features a gentle slope of 21% with a southwestern aspect. Soil is sandy loam with 5% coarse fragments and is well drained (Photo 12). Soil moisture regime is submesic and soil nutrient regime is medium. These conditions produce a 103 site series (Fd – Douglas maple – Falsebox) association at the site level.

The forest canopy layer covers approximately 20% of the plot and is composed mainly of Douglas-fir with western redcedar, wester white pine and western larch in smaller amount (Photo 13). The shrub layer has a ground cover of 40% and is composed of rocky mountain maple, Saskatoon, falsebox, vaccium species, dull Oregon grape, black huckleberry, baldhip rose, and tall Oregon grape. The herb layer has a ground cover of 10 % consisting of wild strawberry, spreading dogbain, queen's cup, Alaskan onion grass, American vetch, selfheal, bunchberry, birch-leaved spirea, goldenrod, wild sarsaparilla, American brooklime. Only trace amount of moss was observed.

The age of the forest was estimated at 30 years and the average height was measure at 15 m. This forest is classified as Young Forest (Structural Stage 5).

Photo 12: Typical soil of Polygon 2. July 26, 2022.

Photo 13: Typical vegetation of Polygon 2. July 26, 2022

Polygon 3: 101jm5mC

Polygon 3 – TE Site Series 101 (CwSxw-Falsebox)

POLYGON 3 TE CODE DERIVATION					
Decile	Gentle slope, medium-textured soils			Multi-storied	
10	**101**	**jm**	**5**	**m**	**C**
	CwSxw-Falsebox		Young Forest		Coniferous

Polygon 3: **101jm5mC** is in the located in the northwest corner of the subject property (Map 6). The topography is gentle slope of 10%. Soil is medium-textured and is moderately well drained (Photo 14). Soil moisture regime is mesic and soil nutrient regime is medium. These conditions produce a 101 site series (CwSxw-Falsebox) association at the site level.

The forest canopy layer covers 50% of the plot and is composed mainly of western redcedar with lesser amounts of trembling aspen, Engelmann spruce, western white pine, and mountain hemlock (Photo 15). The shrub layer has a ground cover of 50% and is composed of western white pine mountain hemlock, vaccinium species, thimbleberry, soopolallie, birch-leaved spirea, falsebox, dull Oregon grape, tall Oregon grape hooker's fairybell and Douglas maple. The herb layer covers 10% of the ground and consists of Alaskan onion grass, sweet scented bedstraw, rattlesnake plantain, twinflower, queen's cup, prince's pine, mountain sweet sicily, and violet species. The moss and lichen layer was absent

An average western redcedar was measured with a DBH of 35 cm, a height of 20 m and an estimated age of 53 years. This forest is classified as Young Forest (Structural Stage 5).

Photo 14: Typical soil of Polygon 3. July 26, 2022.

Photo 15: Typical vegetation of Polygon 3. July 26, 2022.

Polygon 4: 103jm5mC

Polygo– 4 - TE Site Series 103 (Fd – Douglas maple – Falsebox)

POLYGON 4 TE CODE DERIVATION					
Decile	Gentle slope, medium-textured soils			Multi-storied	
10	**103**	**jm**	**5**	**m**	**C**
	Fd – Douglas maple – Falsebox		Young Forest		Coniferous

Polygon 4: **103jm5mC** is a long narrow polygon located at the west-central portion of the subject site (Map 6). The topography is south-western aspect with a gentle slope of 30%. Soil is medium-textured and is well drained. Soil moisture regime is submesic and soil nutrient regime is poor to medium (Photo 16). These conditions produce a 103 site series (Fd – Douglas maple – Falsebox) association at the site level.

The forest canopy layer covers 50% of the plot and is composed mainly of western redcedar and western white pine with lesser amounts of Englemann spruce paper birch and trembling aspen. (Photo 17). The shrub layer has a ground cover of 50% and is composed of western redcedar, Douglas fir, soopolallie, rocky mountain maple, thimbleberry, birch-leaved spirea, falsebox, Saskatoon berry, mountain ash, false azalia, and pin cherry. The herb layer covers 15% of the plot and consists of queen's cup, bunchberry, hooker's fairybell, wild strawberry, violette species and American vetch. The moss and lichen layer are absent.

The stand height was estimated at 10 m with an estimated age of 30 years. This forest is classified as Young Forest (Structural Stage 5). Deer scat was observed in the polygon.

Photo 16: Typical soil of Polygon 4. July 26, 2022..

Photo 17: Typical vegetation of Polygon 4. July 26, 2022.

Polygon 5: 101km5mC

Polygon 5 – TE Site Series 101 (CwSxw-Falsebox)

POLYGON 5 TE CODE DERIVATION					
Decile	Cool aspect, medium-textured soils			Multi-storied	
10	**101**	**km**	**5**	**m**	**C**
	CwSxw-Falsebox		Young Forest		Coniferous

Polygon 5: **10DHjf6tC** is located in the south-west corner of the subject site (Map 6). The topography is north-eastern aspect with a gentle slope of 25%. Soil is medium-textured and is well drained. Soil moisture regime is mesic and soil nutrient regime is medium (Photo 18). These conditions produce a 101 site series (FdCw – Hazelnut) association at the site level.

The forest canopy layer covers 40% of the plot and is composed mainly of western redcedar and Engelmann spruce with a smaller amount of western larch (Photo 19). The shrub layer has a ground cover of 40% and is composed of western redcedar, Engelmann spruce, prince's pine, mountain ash, honeysuckle, green alder, Saskatoon berry, birch-leaved spirea, false azalia, rocky mountain maple, thimbleberry, vaccinium species, and tall Oregon grape. The herb layer covers 15% of the plot and consists of arnica, horsetail, queen's cup, violette species, one leaf foam flower, rattlesnake plantain, wild sarsaparilla, bunchberry and rough fescue grass. The moss and lichen layer is sparce and covers 5% of the plot. Sherbers redstem moss and other unidentified moss were observed in that layer.

The stand height was estimated at 20m with an estimated stand age of 30 years. This forest is classified as Young Forest (Structural Stage 5). A tree with pileated woodpecker cavities was observed in Polygon 6 during site investigations.

Photo 18: Typical soil of Polygon 5. July 27, 2022.

Photo 19: Typical vegetation found in Polygon 5. July 27, 2022.

Polygon 6: 103jm5mC

Polygo– 6 - TE –Site Series 103 (Fd – Douglas maple – Falsebox)

POLYGON 6 TE CODE DERIVATION					
Decile	Gentle slope, medium-textured soils			Multi-storied	
10	**103**	**jm**	**5**	**m**	**C**
	Fd – Douglas maple – Falsebox		Young Forest		Coniferous

Polygon 6: **103jm5mC** is located in the south-central part of the subject site (Map 6). The topography is a gentle slope of 20%. Soil is medium-textured and is rapidly drained. Soil moisture regime is submesic and soil nutrient regime is medium (Photo 20). These conditions produce an 103 site series (Fd – Douglas maple – Falsebox) association at the site level.

The forest canopy layer covers 50% of the plot and is composed of equal amount of western white pine and Engelmann spruce (Photo 21). The shrub has a ground cover of 30% and is composed of western redcedar, birch-leaved spirea, mountain ash, prince's pine, tall Oregon grape, black huckleberry and thimbleberry. The herb layer covers 10% of the plot and consists of queen's cup, violette species, common horsetail, rattlesnake plantain, bunchberry, twin flowers, sweet scented sicily, hooker's fairybell, pearly everlasting, wild strawberry, Alaskan onion grass, selfheal, mountain wood fern, round-leaved orchis and meadow butter cup. The moss and lichen layer is sparce and is composed of Sherber's redstem moss.

The stand height was estimated at 20m with an estimated stand age of 30 years. This forest is classified as Young Forest (Structural Stage 5).

Photo 20: Typical soil of Polygon 6. July 27, 2022.

Photo 21: Typical vegetation of Polygon 6. July 27, 2022.

Polygon 7: 101km5mC

Polygo– 7 - TE–Site Series 101 (CwSxw-Falsebox)

POLYGON 7 TE CODE DERIVATION					
Decile	Cool aspect, medium-textured soils			Multi-storied	
10	**101**	**km**	**5**	**m**	**C**
	CwSxw-Falsebox		Young forest		Coniferous

Polygon 7: **101km5mC** is a large polygon located in the center of the subject site along Lizard Creek (Map 6). The topography is a cool aspect with a slope of 35%. Soil is medium-textured and is moderately well drained. Soil moisture regime is mesic and soil nutrient regime is rich (Photo 22). These conditions produce a 101 site series CwSxw-Falsebox) association at the site level.

The forest canopy layer covers 35% of the plot and is dominated by Engelmann spruce with lesser amount of western white pine and western redcedar (Photo 23). The shrub layer has a ground cover of 35% and is composed of black cottonwood, western redcedar, mountain ash, rocky mountain maple, brich-leave spirea, Saskatoon berry, tall Oregon grape, vaccinium species and thimbleberry. The herb layer has a ground cover of 20% and consists of wild strawberry, sweet scented sicily, wild arnica, Alaskan onion grass, wild sarsaparilla, hooker's fairybell, meadow buttercup, selfheal and queen's cup. The moss and lichen layer covers 7% of the plot and is composed of Sherber's redstem moss and other unidentified mosses.

The stand height was estimated at 15m with an estimated stand age of 30 years. This forest is classified as Young Forest (Structural Stage 5).

Photo 22: Typical soil of Polygon 7. July 27, 2022..

Photo 23: Typical vegetation of Polygon 7. July 27, 2022.

Polygon 8: Fm02tm5mC

Polygo– 8 - TM Site Series Fm02 (Cottonwood- Spruce- Dogwood)

POLYGON 9 TE CODE DERIVATION					
Decile	terrace, medium-textured soils			Multi-storied	
10	**Fm02**	**tm**	**5**	**m**	**C**
	Cottonwood- Spruce- Dogwood		Young Forest		Coniferous

Polygon 8: **Fm02tm5mC** is located central north of the project site, east of Lizard creek (Map 6). The topography is a terrace, with a gentle slope of 2%. Soil is medium-textured (Photo 24). Soil moisture regime is subhygric to hygric and soil nutrient regime is rich to very rich. These conditions produce an FM02 site series (Cottonwood- Spruce- Dogwood) association at the site level.

The forest canopy layer covers 25% of the plot and is primarily composed of Engelmann spruce, with lesser amounts of red cedar, and black cottonwood (Photo 25). The shrub layer has a ground cover of 80% and is composed of devil's club, thimbleberry, snowberry, salmonberry, rocky mountain maple, dogwood, dull Oregon grape, and gooseberry. The herb layer covers 10% of the plot and consists of Grass sp., sweet scented cicely, false Solomon seal, vetch sp., stinging nettle, dandelion, and oxeye daisy. The moss and lichen layer is absent on this plot. The stand height was estimated at 25m with an estimated stand age of 30 years. This forest is classified as Young Forest (Structural Stage 5).

Photo 24: Typical soil of Polygon 8. July 27, 2022.

Photo 25: Typical vegetation of Polygon 8. July 27, 2022.

Polygon 9: 5.110tm5mM-5.101jm5mM

Polygon– 9 - TE– Site Series 110 (CwSxw- Oak fern) and 101 (CwSxw-Falsebox)

POLYGON 9 TEM CODE DERIVATION					
Decile	terrace, medium-textured soils			Multi-storied	
5	**110**	**tm**	**5**	**m**	**M**
	CwSxw – Oak fern		Young Forest		Mixed
Decile	Gentle slope, medium-textured soils			Multi-storied	
5	**101**	**jm**	**5**	**m**	**M**
	CwSxw-Falsebox		Young Forest		Mixed

Polygon 9: **5.110tm5mM-5.101jm5mM** is a polygon located in the north east corner of the project site (Map 6). The topography is features both terrace and gentle slope. Soil is medium-textured (Photo 26). Soil moisture regime is mesic to subhygric and soil nutrient regime is rich. These conditions produce a 110 site series (CwSxw- Oak fern) association at the site level. However, vegetation on other part of the polygon indicated that the 101 site series (CwSxw-Falsebox) was also present on approximately 50% of the polygon.

The forest canopy layer covers 50% of the plot and is composed mainly of Engelmann spruce, with lesser amounts of alder green, and paper birch (Photo 27 and Photo 28). The shrub has a ground cover of 40% and is composed of mountain ash, snowberry, and thimbleberry. The herb layer has a ground cover of 30% and consists of Viola sp., bunchberry, arnica, false Solomons seal, wild strawberry, lady fern, common horsetail, queens cup, sweet scented bedstraw, and mountain sweet cicely. There is no trace of a moss and lichen layer on this plot. The stand height was estimated at 15m with an estimated stand age of 30 years. This forest is classified as Young Forest (Structural Stage 5).

Photo 26: Typical soil of Polygon 9. July 28, 2022.

Photo 27: Typical vegetation of Polygon 9. July 28, 2022.

Photo 28: Typical vegetation of Polygon 9. July 28, 2022.

Polygon 10: 5.110mm5mM

Polygon–10 - TE–Site Series 110 (CwSxw- Oak fern)

POLYGON 10 TE CODE DERIVATION					
Decile	moderate slope, medium-textured soils			Multi-storied	
5	**110**	**mm**	**5**	**m**	**M**
	CwSxw – Oak fern		Young forest		Mixed

Polygon 10: **110mm5mM** is a small polygon located in the south-east corner of the property (Map 6). The topography features a moderate slope of 35 degrees. Soil moisture regime is subhygric and soil nutrient regime is medium (Photo 29). These conditions produce a 110 site series (CwSxw- Oak fern) association at the site level.

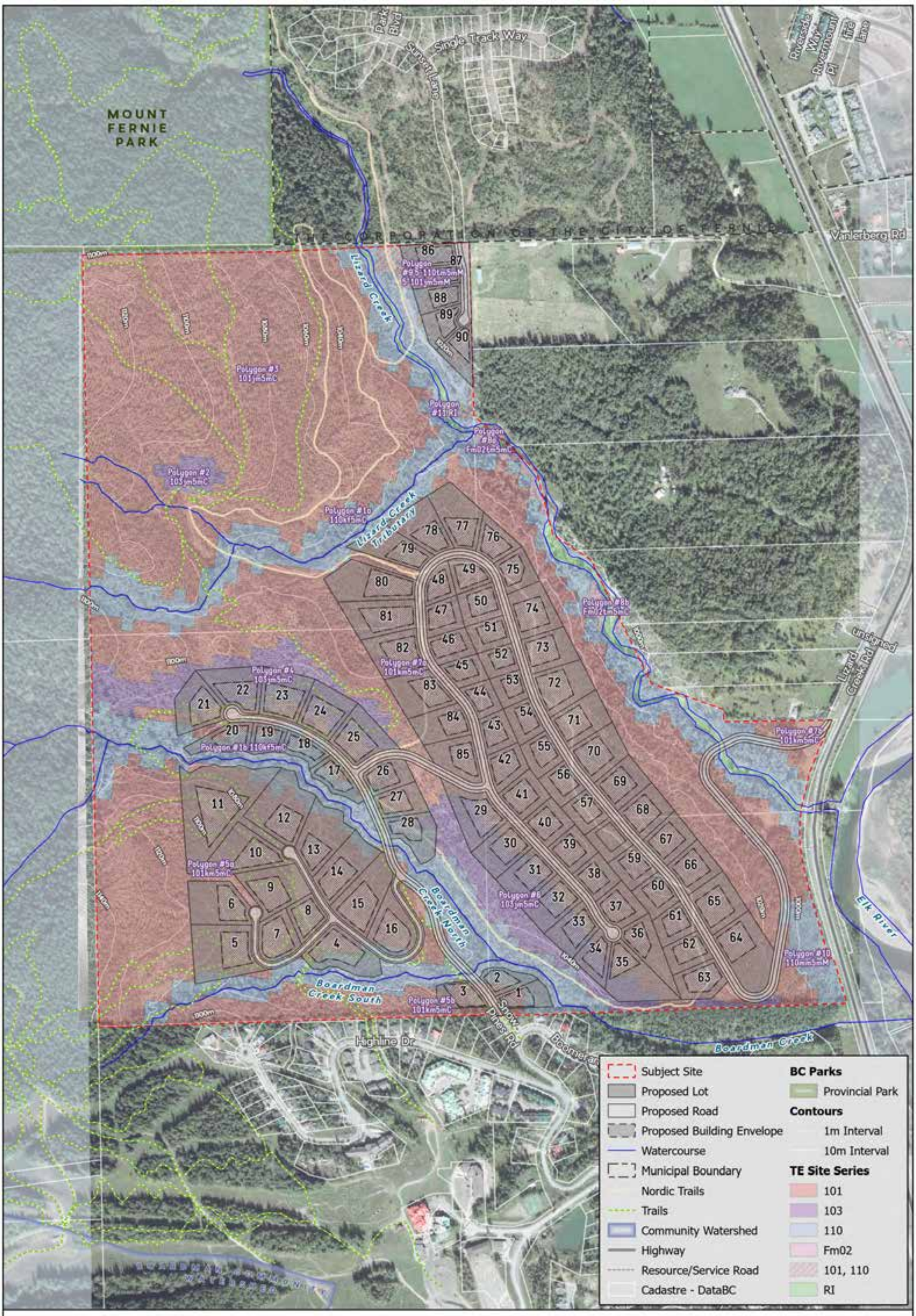
The forest canopy layer covers 50% of the plot and is primarily composed of equal amounts of Western red cedar and paper birch, as well as lesser amounts of western larch, subalpine fir, Engelmann spruce (Photo 30). The shrub layer has a ground cover of 40% and is composed of mountain ash, red-osier dogwood, gooseberry, false box, Saskatoon berry, and thimbleberry. The herb layer has a ground cover of 15% and consists of sweet scented bedstraw, grass sp., Alaskan onion grass, fern lady, sweet scented cicely, heart shaped arnica, star flowered false Solomon, oak fern, meadow buttercup, wild strawberry, and one leaf foam flower. The moss and lichen layer are absent on this plot. The stand height was estimated at 15m with an estimated stand age of 30 years. This forest is classified as Young Forest (Structural Stage 5).

Photo 29: Typical soil of Polygon 10. July 28, 2022.

Photo 30: Typical vegetation of Polygon 10. July 28, 2022.

Polygon 11: RI

Polygon 11: **RI** is characterized by the watercourses present on site. The description of the watercourses can be found in Section 3.3.1



GIS Cartographer: Nicola Church
Date: *2022-10-28*
CERG File #: 1082-01-01
Projection: NAD 1983 CSRS UTM Zone 11N

CASCADE ENVIRONMENTAL RESOURCE GROUP LTD

N

0 100 200 400 600 800
Meters

Map 6 - Terrestrial Ecosystems

Galloway Lands
Fernie
British Columbia

3.4.1.4 Rare and endangered Plant Species and Ecological Communities

In BC, there are two governing bodies involved with the ranking of species and/or ecological communities at risk. At the national level, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) provides advice in regard to the *Species at Risk Act* (SARA), and at the provincial level, the Conservation Data Centre (CDC) manages the BC Status List.

The Canadian government created SARA in 2002 to complement the Accord for the Protection of Species at Risk (a national effort to identify and protect threatened and endangered wildlife and their associated habitats across the country). COSEWIC is the scientific body responsible for assigning the status of species at risk under SARA. This system uses the following terminology:

- Extinct (XX)
- Extirpated (XT)
- Endangel (E)
- Threatened (T)
- Special concern (SC)
- Not at risk (NAR)
- Data deficient (DD)

A species that is listed as Endangered, Extirpated or Threatened is included on the legal list under Schedule 1 of the *Act* and is legally protected under the *Act* with federal measures to protect and recover these species in effect.

The BC CDC designates provincial red or blue list status to animal and plant species, and ecological communities of concerns (B.C. Ministry of Environment, 2022). The red list includes indigenous species or subspecies considered to be endangered or threatened. Endangered species are facing imminent extirpation / extinction, whereas threatened groups or species are likely to become endangered if limiting factors are not reversed. The blue list includes taxa considered to be vulnerable because of characteristics that make them particularly sensitive to human activities or natural events. Although blue listed species are at risk, they are not considered endangered or threatened. Yellow listed species and all others not included on the red or blue lists and may include species which are declining, increasing, common, or uncommon. Table 6 and Table 7 below include the CDC listed (i.e., rare and threatened) species and ecological communities that have the potential to occur on the subject site; species designated as SARA Schedule 1 are also noted. Species with the potential to occur in the study area are based on broad habitat preferences delineated by forest district and biogeoclimatic zone and refined by habitat type available in the subject site

Potential occurrences are then designated as unlikely or possible based upon species specific habitat requirements and an on-site assessment of those habitats.

3.4.1.4.1 Rare and Endangered Plant Species

The CDC iMap BC (BC Government, 2022b) lists one rare and endangered plant species as potentially occurring on the Galloway Lands, the scarlet gaura (*Oenothera suffrutescens*) is provincially blue-listed and is not listed under SARA. The sighting was however not recorded on the Galloway Lands. The species is not known to occur on with the ICHmk4 biogeoclimatic zone. In addition, based on the habitat requirement for the scarlet gaura (Prairie habitat), it was determined that the species is unlikely to occur on the Galloway Lands. The CDC species explorer identified one other potentially occurring plant species at risk in the area of the subject site, whitebark pine (Table 6). However, based on the habitat requirements it was determine that whitebark pine is unlikely to occur on the Galloway Lands as the subject property has a maximum elevation of 1149m

Table 6: Plant Species at Risk Potentially Occurring within Project Area

Common Name *Scientific name*	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA Status		
Whitebark pine *Pinus albicaulis*	Blue	Endangered	Montane forests at or near timberline at an elevation of 1300-3700 m in the sub-alpine zone. Typically found in thin, rocky, cold soils that lack fine material and are well to rapidly drained.	**Unlikely** – Closest known occurrence west of Fernie Alpine Resort, at 1780 m elevation.

Source: (B.C. Ministry of Environment, 2022).

3.4.1.4.2 Rare and Endangered Ecological Communities

The term "ecological" is a direct reference to the integration of biological components with non-biological features such as soil, landforms, climate and disturbance factors. The term "community" reflects the interactions of living organisms (plants, animals, fungi, bacteria, etc.), and the relationships that exists between the living and non-living components of the community. Currently, the most common ecological communities that are known in BC are based on the Vegetation Classification component of the Ministry of Forests and Range, Biogeoclimatic Ecosystem Classification, which focuses on the terrestrial plant association' of BC's native plants.

One ecological community of concern was found to occur within the Galloway Lands (B.C. Ministry of Environment, 2021) as listed below in Table 7.

Cottonwood- spruce-dogwood (Fm02) covers an area of 0.72 ha within the site. Fm02 occurs in cooler, low-mid elevation site in the ICH. Fm02 stands occur on sandy or gravely fluvial materials adjacent to stream and rivers with short spring flood events followed by continual subirrigation. Black cottonwood is dominant in the overstorey with often a smaller amount of spruce. Red-osier dogwood is dominant in the shrub layer.

Table 7: Ecological Communities at Risk Occurring on the Subject Site

Site Series Name Common Name *Scientific name*	Status BC List	BCG Zone	Structural stage	Size of polygon (ha)
black cottonwood - hybrid white spruce / red-osier dogwood *Populus trich–carpa - Picea engelmannii x glauca / Cornus sericea*	Blue	ICHmk4/Fm02	5	0.72

3.4.2 Wildlife

This section discusses a range of species that commonly occur in the vicinity of the Galloway Lands. In addition, species at risk occurring and potentially occurring on the subject property are discussed in section 3.4.2.4

3.4.2.1 Mammals

Within the ICH zone, grizzly bear (*Ursus actor*) and black bear (*Ursus americanus*) are the most common large mammals, while large ungulates such as mule deer (*Odocoileus hemionus*), white-tailed deer

(*Odocoileus virginianus*), and Rocky Mountain elk (*Cervus cana44erodinelsoni*) occur in the drier subzones in the southern portion of the province. Typically, bears and ungulates only use this zone during the summer and fall and migrate to the adjacent Interior Douglas-fir zone for the winter. Caribou (*Rangifer tarandus*), while rare, can occur throughout much of the ICH in the late summer and early fall before they move up in winter to ESSF forests with a deeper, denser snowpack. Moose (*Alces alces)* are scattered throughout this zone in the winter (Ketcheson et al., n.d.).

During the field assessment signs of American beaver (*Castor canadensis*) were observed along Lizard Creek (Photo 31). Deer, moose and black bear scats were also observed (Photo 32 to Photo 34). In addition, moose and deer prints were observed (Photo 35).

A total of 101 animals were observed using the wildlife cameras (Photo 36 to Photo 40). The most abundant species were the white-tailed deer and the mule deer with 42% and 41% of the camera detections respectively. 12% of camera detection were accounted by Rocky Mountain elk. Black bear and red fox accounted for a small percentage of the camera detection (

Figure 1).

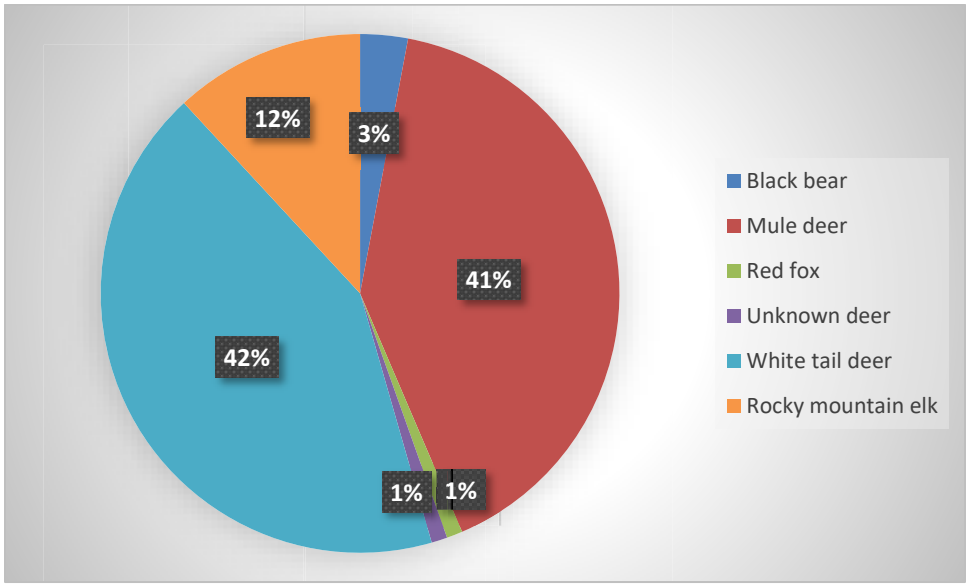


Figure 1: Wildlife observed on the Galloway Land using wildlife cameras

Photo 31: Evidence of beaver activity along Lizard Creek. July 27, 2022

Photo 32: Deer scat. July 28, 2022

Photo 33: Black bear scat. July 26, 2022

Photo 34: Moose scat. July 27, 2022

Photo 35: View of a moose print. July 27, 2022.

Photo 36: View of a black bear caught a on wildlife camera on the Galloway Lands. August 20, 2022.

Photo 37: : View of a Rocky mountain elk caught on a wildlife camera on the Galloway Lands. July 28, 2022.

Photo 38: View of two white-tailed deer caught on a wildlife camera on the Galloway Lands. September 17, 2022.

Photo 39: View of a red fox caught on a wildlife camera on the Galloway Lands. September 12, 2022.

Photo 40: View of two mule deer caught on wildlife camera on the Galloway Lands. Date unknown due to camera mal function.

3.4.2.2 Reptiles and Amphibians

Within the ICH zone, most of the amphibian and reptile species occur in the warmer valley bottoms, commonly adjacent to riparian areas, but they often spend long periods in damp forest litter or moist forest clearings. The long-toed salamander (*Ambystoma macrodactylum*), western toad (*Anaxyrus boreas*), pacific treefrog (*Pseudacris regilla*), and Oregon spotted frog (*Rana pretiosa)* may occur in the Columbia Mountains and adjacent highlands. Reptile distribution is even more restricted in this zone. Only the common garter snake (*Thamnophis sirtalis*) is widely distributed, in riparian areas and damp forest litter in the major valleys. The western terrestrial garter snake (*Thamnophis elegans*) is found only in wetlands and riparian areas in the southern portion of the Columbia Mountains. The western skink (*Plestiodon skiltonianus*), northern alligator lizard (*Elgaria coerulea*) and rubber boa (*Charina bottae*), are found along the valley bottoms in the southernmost portion of the ICH (Ketcheson et al., n.d.).

3.4.2.3 Birds

Bird species potentially occurring in the Galloway lands are presented in Table 8 (Ketcheson et al., n.d.). A pileated woodpecker and a red-breasted nuthatch were audibly observed during the field survey. A cedar waxwing was visually observed.

Table 8: Bird species potentially occurring in the Galloway Lands.

Common Name	***Scientific Name***
Red-breasted Nuthatch	*Sitta canadensis*
White-winged Crossbill	*Loxia leucoptera*
Black-backed Woodpecker	*Picoides arcticus*
Bohemian Waxwing	*Bombycilla garrulus*
Golden-crowned Kinglet	*Regulus satrapa*
Pine Grosbeak	*Pinicola enucleator*
Pine Siskin	*Spinus pinus*
Red Crossbill	*Loxia curvirostra*
Steller's Jay	*Cyanocitta stelleri*
Varied Thrush	*Ixoreus naevius*
Winter Wren	*Troglodytes hiemalis*
Yellow-rumped Warbler	*Setophaga coronata*
Blackcapped Chickadee	*Poecile atricapillus*
Hairy Woodpecker	*Leuconotopicus villosus*
Downy Woodpecker	*Picoides pubescens*
Evening Grosbeak	*Coccothraustes vespertinus*
Gray Jay	*Perisoreus canadensis*
Great Horned Owl	*Bubo virginianus*
House Wren	*Troglodytes aedon*
Lewis' Woodpecker	*Melanerpes lewis*
Long-eared Owl	*Asio otus*
Northern Pygmy Owl	*Glaucidium californicum*
Olive-sided Flycatcher	*Contopus cooperi*
Pileated Woodpecker	*Dryocopus pileatus*

Common Name	*Scientific Name*
Saw-whet Owl	*Aegolius acadicus*
Townsend's Solitaire	*Myadestes townsendi*
Townsend's Warbler	*Setophaga townsendi*
Veery	*Catharus fuscescens*
Western Bluebird	*Sialia mexicana*
Western Wood-Pewee	*Contopus sordidulus*
Yellow-bellied Sapsucker	*Sphyrapicus varius*

3.4.2.4 Rare and Endangered Wildlife Species

A search was conducted for potentially occurring rare and endangered wildlife species through the BC Conservation Data Centre iMap species and ecosystems explorer (B.C. Ministry of Environment, 2022) . Details on the classification system for at-risk species can be found in section 3.4.1.4. The CDC iMap identifies the subject site as being part of the American badger habitat polygon (BC Government, 2022b). The Galloway Lands shapefile boundary was uploaded to the CDC explorer tool and results produced based on the geographic area. The results of the search are provided in Table 9 (BC Government, 2022b). Wildlife species were then given a possible occurrence based on known available habitat and habitat ranges within the Galloway Lands. The search resulted in a total of 80 wildlife species potentially present on the Galloway Lands. Of those, 10 species were determined to be possible or confirmed occurrences from known available habitat in the area (Table 9). Detailed descriptions of the known species at risk in the area are provided in detail below. This includes the following species:

- Great blue heron
- Evening grosbeak
- Olive-sided flycatcher
- Western screech owl *macfarlanei* subspecies
- Little brown myotis
- Cutthroat trout, *lewisi* subspecies
- Subalpine mountainsnail
- Bull trout
- American badger
- Grizzly bear

Table 9: Wildlife Species at Risk Potentially Occurring on the Subject Site.

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Northern Goshawk, atricapillus subspecies *Accipiter gentilis atricapillus*	Blue		uncommon resident and breeder throughout the province. Although primarily a bird of mixed, open and dense forests, it has been recorded in almost every forest type In BC. nests in dense mature and old growth coniferous stands	Unlikely-No suitable habitat on site
Western Grebe *Aechmophorus occidentalis*	Red	Special concern	Coastal forests of BC, especially central and northern coastal islands. Habitat is characterized by marshes, lakes, and bays. Nests on large inland bodies of water.Known to occur in Fernie	Unlikely- No suitable habitat on site
Western Toad *Anaxyrus boreas*	Yellow	Special concern	Various upland habitats around ponds, lakes, reservoirs, and slow-moving rivers and streams.	Unlikely- No suitable habitat on site
Banded Tigersnail *Anguispira kochi*	Blue		Found on river bluffs, as well as upland woods at or near the base of limestone cliff, among leaf litter. In moist, well-vegetated forests, often near shores of lakes and streams	Unlikely- Nearest record near Kimberley
Great Blue Heron herodias subspecies *Ardea erodias herodias*	Blue		Known to occur in the following habitats: Cultivated field, hedgerow, pasture, old field, moist and wet conifer forest. Deciduous and broadleaf forest. mixed forest, grassland, shrub, meadow, lake, pond, open water, riparian forest and river	**Possible**-Known to occur in Sparwood and Little Sand Creek
Vivid Dancer *Argia vivida*	Blue	Special concern	Rare. Associated with cool or hot springs. Montane. Southern B.C. from the Coast Mountains to the Rockies.	Unlikely- No suitable habitat on site
Rocky Mountain Tailed Frog *Ascaphus montanus*	Blue	Threatened	Clear, cold swift-moving mountain streams with coarse substrate. Requires microclimatic and microhabitat conditions are more common in older forests.	Unlikely- No old growth forest on site.
Short-eared Owl *Asio flammeus*	Blue	Special concern	In general, any area that is large enough, has low vegetation with some dry upland for nesting, and that supports suitable prey may be considered potential breeding habitat, although many will not have breeding short-eared owls. Nearby water is a requirement for nesting habitat.	Unlikely- No suitable habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Albert's Fritillary *Boloria alberta*	Blue		Alpine ridges, tundra, and windswept scree slopes. Larval host is probably Mountain avens	Unlikely- No suitable habitat on site
American Bittern *Botaurus lentiginosus*	Blue		Breeding occurs in lowland marshes in lakes, ponds, and rivers in south and central interior British Columbia and in the lower Fraser Valley.	Unlikely- No suitable habitat on site
Rough-legged Hawk *Buteo lagopus*	Blue		Grasslands, field, marshes, sagebrush flats, and open cultivated areas; sometimes rat-infested garbage dumps. Nests on cliffs (typically) or in trees in arctic and subarctic, in tundra, mountain sides, forests with plenty of open ground. Winters in low vallies of southern BC.	Unlikely- No suitable habitat on site
Swainson's Hawk *Buteo swainsoni*	Red		Savanna, open pine-oak woodland and cultivated lands (e.g., alfalfa and other hay crops, and certain grain and row croplands) with scattered trees	Unlikely- No suitable habitat on site
Green Heron *Butorides virescens*	Blue		Aquatic areas, especially slow moving, shallow waters with good riparian cover. Swamps, mangroves, marshes, and margins of ponds, rivers, lakes, and lagoons. Eggs are laid in platform nest in tree, thicket, or bush over water or sometimes in dry woodland or orchard; nests in both freshwater and brackish situations	Unlikely- only known to occur in the lower mainland and Vancouver island
Northern Rubber Boa *Charina bottae*	Yellow	Special concern	Rubber Boas are most often associated with low elevation mountainsides. Here they can take advantage of warm aspect slopes	Unlikely- No suitable habitat on site
Lark Sparrow *Chondestes grammacus*	Blue		Breeding range extends from extreme southern British Columbia and eastern Washington. Thrives in grazed habitats, disturbed areas, and ecotones. Agriculture may increase edge habitat.	Unlikely- No suitable habitat on site
Common Nighthawk *Chordeiles minor*	Blue	Threatened	Mountains and plains in open coniferous forest, savanna, grassland and towns. Nesting occurs on the ground on a bare site in an open area.	Unlikely- No suitable habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Northern Painted Turtle *Chrysemys picta*	No Status	Endangered/Special Concern	Painted turtles live in slow-moving, shallow waters with soft bottoms, basking sites, and aquatic vegetation: streams, marshes, swamps, ponds, lakes, and reservoirs. They may colonize seasonally flooded areas near permanent water	Unlikely- No suitable habitat on site
Northern Painted Turtle - Intermountain - Rocky Mountain Population *Chrysemys picta pop. 2*	Blue	Special concern	Occurs in the following type of habitat: Lake, pond, gravel bar, riparian forest and wetlands	Unlikely- No suitable habitat on site
Hairy-necked Tiger Beetle *Cicindela hirticollis*	Blue		Associated with sand beaches	Unlikely- No suitable habitat on site
Evening Grosbeak *Coccothraustes vespertinus*	Yellow	Special concern	Coniferous (primarily spruce and fir) and mixed coniferous- decidouous woodland, second growth, and occasionally parks; in migration and winter in a variety of forest and woodland habitats, and around human habitation.	**Possible-** Suitable habitat on site and known to occur in Fernie.
Olive-sided Flycatcher *Contopus cooperi*	Yellow	Threatened	Mixed coniferous-deciduous forest with old growth snags along forest edges.	**Possible**- Suitable habitat on site and known to occur in Fernie.
Rocky Mountain Sculpin *Cottus sp. 9*	Red	Special concern	Occurs in the lower 28 km of the Flathead River in British Columbia, Canada	Unlikely-Site located outside of distribution range
Coeur d'Alene Oregonian *Cryptomastix mullani*	Blue		Near streams, under rocks, vegetation, leaf litter and logs in forests	Unlikely- No known occurrence near Fernie
Eastern Tailed Blue *Cupido comyntas*	Blue		A great variety of open, brushy to lightly wooded, generally dry, habitats with any of the many native and exotic legumes used by the larvae	Unlikely- No known occurrence near Fernie
Black Swift *Cypseloides niger*	Blue	Endangered	Nests behind or next to waterfalls and wet cliffs, on sea cliffs and in sea caves. Along BC coast, Vancouver Island, southern BC and interior.	Unlikely- No suitable habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Monarch *Danaus plexippus*	Red	Special concern	Element occurrence records for the Monarch are mainly from the southern interior regions of BC, although periodic occurrences from the coast are observed, including the lower Fraser Valley and Vancouver Island. In BC, they feed on showy milkweed (*Asclepias speciosa*).	Unlikely- No suitable habitat on site
Bobolink *Dolichonyx oryzivorus*	Red	Threatened	Breeding is locally distributed in the main valley bottoms in the southern and central interior, east to Creston. This species generally selects habitat with moderate to tall vegetation, moderate to dense vegetation, and moderately deep litter, lacking woody vegetation.	Unlikely- No suitable habitat on site
Silver-spotted Skipper *Epargyreus clarus*	Blue		Pretty much any place with lots of the major foodplants which are usually *Robinia* or *Amorpha* whether wild or cultivated, native or not	Unlikely- No suitable host plant observed on site
Silver-spotted Skipper, clarus subspecies *Epargyreus clarus clarus*	Blue		All records are from the southeastern BC including Cranbrook, Gen'lle, Pend-d'Oreille, Castlegar, Seven Mile Dam, Elko, Brilliant, Trail and Murphy Creek. Associated with black locust trees.	Unlikely- No suitable host plant observed on site
Variegated Fritillary *Euptoieta claudia*	Blue		An uncommon migrant found at all elevations in southeastern BC. It has no habitat preferences in the province because it does not breed here	Unlikely- Doesn't breed in BC
Prairie Falcon *Falco mexicanus*	Red		The provincial population was down to one known active nesting site south of Williams Lake. The species has been extirpated from its historic core area of the province, the Okanagan Valley, for almost a decade. Bred in cliff habitats.	Unlikely- No suitable habitat on site
Peregrine Falcon *Falco peregrinus*	No Status	Special concern	Cliff edges near water, interior rivers and wetlands.	Unlikely- No suitable habitat on site
Prairie Fossaria *Galba bulimoides*	Blue		Physical barriers, particularly for flowing water, is presence of upland habitat between water connections. High waterfalls and anthropogenic barriers to water flow such as dams are barriers as they limit movement in an upstream direction.	Unlikely- No suitable habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Dusky Fossaria *Galba dalli*	Blue		Physical barriers, particularly for flowing water, is presence of upland habitat between water connections. High waterfalls and anthropogenic barriers to water flow such as dams are barriers as they limit movement in an upstream direction.	Unlikely- No suitable habitat on site
Wolverine *Gulo gulo*	No Status	Special concern	A range of habitat types from valley bottoms to alpine meadows, strongly associated with the presence of large ungulate prey. This species shows preference for high elevation and high latitude	Unlikely- Site not located at high elevation.
Wolverine, luscus subspecies *Gulo gulo luscus*	Blue	Special concern	A range of habitat types from valley bottoms to alpine meadows, strongly associated with the presence of large ungulate prey. This species shows preference for high elevation and high latitude	Unlikely- Site not located at high elevation.
Star Gyro *Gyraulus crista*	Blue		Habitat is freshwater.	Unlikely- Nearest record in Jaffray BC
Pale Jumping-slug *Hemphillia camelus*	Blue		In dry to moist coniferous forests, on and around mossy stumps, rocks and logs; also in leaf litter in Southeastern BC.	Unlikely- Nearest record in Kimberley, BC
Barn Swallow *Hirundo rustica*	Yellow	Threatened	Open areas, fields, ponds with vertical nesting habitat, especially buildings.	Unlikely- No suitable habitat on site
Pygmy Slug *Kootenaia burkei*	Blue	Special concern	All sites are forested and adjacent to a perennial water body. Found on forest floor mostly, either on or under woody debris, mats of moss, or deciduous tree leaves.	Unlikely- Nearest record south of Cranbrook, BC
California Gull *Larus californicus*	Red		Seacoasts, bays, estuaries, mudflats, marshes, irrigated fields, lakes, ponds, dumps, cities, and agricultural lands.	Unlikely- No suitable habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Hoary Bat *Lasiurus cinereus*	Blue		Habitat includes primarily deciduous and coniferous forests and woodlands, including areas altered by humans. Foraging habitat includes various open areas, including spaces over water and along riparian corridors. Individuals may forage around lights in nonurban situations. Roost sites are usually in foliage of large deciduous or coniferous trees	Unlikely- Nearest record north of Cranbrook, BC
Short-billed Dowitcher *Limnodromus griseus*	Blue		Mudflats, estuaries, shallow marshes, pools, ponds, flooded fields and sandy beaches. Prefers shallow salt water with soft muddy bottom, but visits various wetlands during migration.	Unlikely- No suitable habitat on site
Northern Leopard Frog *Lithobates pipiens*	Red	Endangered	Breeding habitat in shallow (20-30 cm deep) water near the shores of herbaceous wetlands within the Creston Valley Wildlife Management Area	Unlikely- No suitable habitat on site
Bronze Copper *Lycaena hyllus*	Blue		Marshes, sedge meadows, moist to wet grassy meadows, ditches, fens, streamside or pondshore wetlands, or roads and right of ways through marshlands	Unlikely- No suitable habitat on site
Magnum Mantleslug *Magnipelta mycophaga*	Blue	Special concern	Under moist logs, pieces of bark, in depressions in moist earth and within talus in cool, moist coniferous forests. Associated with older forest (>100 years)	Unlikely- Only young forest present on site.
Western Screech-Owl, macfarlanei subspecies *Megascops kennicottii macfarlanei*	Blue	Threatened	Associated with riparian habitat.	**Possible**- Suitable habitat onsite
Lewis's Woodpecker *Melanerpes lewis*	Blue	Threatened	Breeds primarily in open forested areas at low elevations where an abundance of large snags provides suitable nesting sites and an open, grassy understory supports high populations of flying insects. Found east of coast mountains.	Unlikely- No open canopy forest on site
Surf Scoter *Melanitta perspicillata*	Blue		Primarily marine littoral areas, less frequently in bays or on freshwater lakes and rivers. Nests in brushy tundra, in freshwater marsh, or in wooded area near pond, bog, or stream	Unlikely- No suitable habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Little Brown Myotis *Myotis lucifugus*	Blue	Endangered	These bats use a wide range of habitats and often use human-made structures for resting and maternity sites; they also use caves and hollow trees. Foraging habitat requirements are generalized. Widespread across BC.	**Possible**- Foraging habitat only
Double-crested Cormorant *Nannopterum auritum*	Blue		Lakes, ponds, rivers, lagoons, swamps, coastal bays, marine islands, and seacoasts; usually within sight of land. Nests on the ground or in trees in freshwater situations, and on coastal cliffs	Unlikely- No suitable habitat on site
Long-billed Curlew *Numenius americanus*	Yellow	Special concern	Prairies and grassy meadows, generally near water.	Unlikely- No suitable habitat on site
Jutta Arctic, chermocki subspecies *Oeneis jutta chermocki*	Blue		Jutta Arctic occur across northern BC and in scattered locations through the Rockies and the Cariboo. Breed in wetlands with open-canopy black spruce forest.	Unlikely- No suitable habitat on site
Cutthroat Trout, lewisi subspecies *Oncorhynchus clarkii lewisi*	Blue	Special concern	Small mountain streams, main rivers, and large natural lakes; requires cool, clean, well-oxygenated water; in rivers, adults prefer large pools and slow velocity areas	**Confirmed**- Known to occur in Lizard Creek
Mountain Goat *Oreamnos americanus*	Blue		Alpine and subalpine habitat; steep grassy talus slopes, grassy ledges of cliffs, or alpine meadows. Usually at timberline or above. In winter can move to lower elevations where snow is not as deep and more food is available.	Unlikely- No suitable habitat on site
Subalpine Mountainsnail *Oreohelix subrudis*	Blue		Under logs, rocks and vegetation in forests and subalpine meadows	**Possible**- Suitable habitat on site and known to occur near the Fernie Alpine Resort

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Bighorn Sheep *Ovis canadensis*	Blue		There is a natural absence of Bighorn Sheep from heavily forested and high snowfall ranges such as the Coast, Purcell and Selkirk mountains. Habitats include open grasslands, alpine, subalpine, shrub-steppe, rock outcrops, cliffs, meadows, moist draws, stream sides, talus slopes, plateaus, deciduous forest, clearcut or burned forest, and conifer forest, all on moderately steep to steep slopes.	Unlikely- No suitable habitat on site
Old World Swallowtail, dodi subspecies *Papilio machaon dod'*	Red		Baird's Swallowtails inhabit open, dry grass slopes along the Peace River canyon, the dry grasslands of the Southern and Central Interior, and the east Kootenay	Unlikely- No suitable habitat on site
Band-tailed Pigeon *Patagioenas fasciata*	Blue	Special concern	Interior populations nest in mountains, with highest densities between 1,600 and 2,700 m in areas dominated by ponderosa pine and oak, but are also found in lodgepole pine , pine-Douglas-fir forests, and spruce-Douglas-fir-fir	Unlikely- No suitable habitat on site
American White Pelican *Pelecanus erythrorhynchos*	Red		Nests are built on islands in lakes with little natural or human disturbance. Forages in slow-moving streams and rivers, lakes, permanent or semi-permanent marshes, reservoirs and, to a limited extent during migration, coastal bays, estuaries, and near-shore marine sites	Unlikely- No suitable nesting habitat
Red-necked Phalarope *Phalaropus lobatus*	Blue	Special concern	Primarily pelagic, sometimes occurring in migration on ponds, lakes, open marshes, estuaries, and bays.	Unlikely- No suitable habitat on site
Rotund Physa *Physella columbiana*	Red		A large-river species probably restricted to relatively pure, deep, well-oxygenated water in areas normally covered by several feet or more of water	Unlikely- Nearest records in Castc'urrd BC
Coeur d'Alene Salamander *Plethodon idahoensis*	Blue	Special concern	Occupies steep gradient creeks, waterfall splash zones, rock walls or caves with seepages, deep, wet talus, and avalanche paths where there is fissured bedrock associated with moisture	Unlikely- No suitable habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
American Golden-Plover *Pluvialis dominica*	Blue		Short grasslands, pastures, golf courses, mudflats, sandy beaches, and flooded fields	Unlikely- No suitable habitat on site
Eared Grebe *Podiceps nigricollis*	Blue		Marshes, ponds and lakes; in migration and winter also salt lakes, bays, estuaries and seacoasts	Unlikely- No suitable habitat on site
Tawny-edged Skipper, themistocles subspecies *Polites themistocles themistocles*	Blue		Usually found in moist grass areas around small lakes or springs in dry grassland habitat, which are frequently impacted by cattle grazing	Unlikely- No suitable habitat on site
Checkered Skipper *Pyrgus communis*	Blue		Transient species in a great variety of dry disturbed situations and some more natural ones such as short grass prairies. Low vegetation, flowers, and patches of bare ground are probably important. Strays can turn up in almost any open situation. Caterpillar hosts includes several plants in the mallow family	Unlikely – No suitable host plant on site
Caribou (Southern Mountain Population) *Rangifer tarandus pop. 1*	Red	Threatened	Late-winter activity is mainly within open stands dominated by Subalpine Fir and having abundant arboreal lichen. Spring habitat is defined by the presence of patches of ground where aspect, exposure, elevation or the presence of meltwater cause snow to melt sufficiently to allow foraging on ground-based foods. Summer habitats are typically in or adjacent to old forests dominated by Subalpine Fir or Engelmann Spruce. For all seasons, the strongest predictor of caribou habitat is landscapes dominated by old forest	Unlikely- No suitable habitat on site
American Avocet *Recurvirostra americana*	Blue		Lowland marshes, mudflats, ponds, alkaline lakes, and estuaries	Unlikely- No suitable habitat on site
Bull Trout *Salvelinus confluentus*	Blue		The bottom of deep pools in cold rivers and large tributary streams, often in moderate to fast currents with temperatures of 45-50 F; also large coldwater lakes and reser–oirs.	**Confirmed** - Known to occur in Lizard Creek
Aphrodite Fritillary, whitehousei subspecies *Speyeria aphrodite whitehousei*	Blue		Occurs at the bottom of the Rocky Mountain Trench in very xeric habitat.	Unlikely- No suitable habitat on site

Common Name Scientific name	Status		Habitat Requirements	Potential Occurrence
	BC List	SARA		
Striated Fingernailclam *Sphaerium striatinum*	Blue		Thrives in both lotic and lentic environments and on mud, sand, gravel and rock substrates and is most abundant at water depths of less than 2 m	Unlikely- Nearest record near Penticto' BC.
Williamson's Sapsucker *Sphyrapicus thyroideus*	Blue	Endangered	In BC, *thyroideus* breeds from Manning Provincial Park near the U.S.A. border, north to the Lytton, Cache Creek and Kamloops areas, through the Okanagan Highlands and east as far as Greenwood.	Unlikely- Site located outside of the breeding range
Widelip Pondsnail *Stagnicola traski*	Blue		This species is found in relatively broad habitat types in south eastern BC. However, there are only 5 known records	Unlikely- only five records in BC
American Badger *Taxidea taxus*	Red	Endangered	Badgers in British Columbia are found in many biog–oclimatic zones - from hot, dry grassland valley bottom to alpine tundra. However, preferences seem to be for grasslands/fields or open-canopied forests	**Possible** - Subject site located within know badger habitat
Grizzly Bear *Ursus arctos*	Blue	Special concern	Non-forested or partially forested sites with a wide range of foraging opportunities and choice of habitats.	**Confirmed** - GPS collared data show occurrence of grizzly bear on the subject site
Glossy Valvata *Valvata humeralis*	Red		In lakes, ponds, marshes and slow perennial streams on muddy bottoms, commonly in dense vegetation	Unlikely- No suitable habitat on site
Threeridge Valvata *Valvata tricarinata*	Red		Found among vegetation only in perennial-water habitats including lakes, kettle lakes, rivers, streams and muskeg pools	Unlikely- Nearest record in Crankbrook BC.

3.4.2.4.1 Great blue heron *herodias* subspecies

Two subspecies of great blue heron occur in BC. The *herodias* subspecies occurs in the southern interior regions of the province and the *fannini* subspecies occurs only on the Pacific coast (Vennesland, 2004). Important foraging habitat include aquatic areas such as tidal mudflats, riverbanks, lakeshores and wetlands (Vennesland, 2004). The most important food source are shallow water fish species. Inland fields are also considered important foraging habitat for the coastal subspecies (Vennesland, 2004). However, it is unknown if the interior subspecies use non-aquatic foraging habitat (Vennesland, 2004). Nesting can occur in young, mature and old growth forest in contiguous or fragmented forest and solitary trees (Vennesland, 2004). The most common tree species used for breeding is black cottonwood

(Vennesland, 2004). Douglas-fir, western white pine, spruce, ponderosa pine, western redcedar and western hemlock can also be used for nesting (Vennesland, 2004).

Those habitat attributes for both foraging and breeding are present on the Galloway Lands. The nearest confirmed records are in Sparwood and Little Sand Creek (BC Government, 2022b). Other anecdotal observations have been recorded in Fernie but not on the subject site (ebird, 2022). Therefore, the species may be present on the Galloway Lands.

3.4.2.4.2 Evening grosbeak

The evening grosbeak is found throughout most of BC. In the interior, the species is found in stands of Douglas-fir, ponderosa pine, spruce, and trembling aspen, with understorey vegetation dominated by Douglas maple, chokecherry, pin cherry, Saskatoon or red-osier dogwood (COSEWIC, 2016). Habitat selection appears to be closely related to high density of berries and seeds, with breeding abundance closely linked to densities of western spruce budworm (*Choristoneura occidentalis*) (COSEWIC, 2016)

Even though the Galloway Lands are located outside of the optimal habitat range as modeled by the Boreal Avian Modeling Project (COSEWIC, 2016), the species may still be present on the Galloway Lands as suitable habitat is present and numerous anecdotal observations have been recorded in Fernie (ebird, 2022)

3.4.2.4.3 Olive-sided flycatcher

The olive-sided flycatcher is most often associated with natural forest openings; forest edges near natural openings (such as wetlands) or open to semi-open forest stands and will use human-made openings (such as clear-cuts). The species will use early successional forest, although the presence of tall snags and residual live trees for foraging and nesting is essential (Environment Canada, 2016).

Habitat requirements are present on the Galloway Lands. In addition, anecdotal observation have been recorded in the Fernie Alpine Resort and the Mount Fernie Provincial Park (ebird, 2022). Therefore, the Olive-sided flycatcher may occur on the subject property. Should the Galloway Lands provide habitat for the species, only breeding habitat would be present as wintering habitat is only present in central and south America (COSEWIC, 2018).

3.4.2.4.4 Western screech owl *macfarlanei* subspecies

Th western screech owl is found from Alaska to Mexico and in BC the species is found along the coast and in the interior (COSEWIC, 2012). The *macfarlanei* subspecies occurs in the southern interior of BC with know occurrence between Pemberton and Cranbrook (COSEWIC, 2012). The *macfarlanei* subspecies is restricted to the lower elevations of southern valleys. Known sites are associated with bunchgrass (21.4%), interior cedar hemlock (11.0%), interior Douglas-fir (37.2%) and ponderosa pine (32.9%) biogeoclimatic zones (COSEWIC, 2012). The *macfarlanei* subspecies is strongly associated with mature riparian woodland habitats dominated by water birch (*Betula occidentalis*), black cottonwood or trembling aspen (COSEWIC, 2012) . The western screech owl nest in cavities made by northern flickers or pileated woodpeckers in large diameter deciduous trees such as black cottonwood, trembling aspen, paper birch, and water birch with a diameter at breast height larger then 25 cm (COSEWIC, 2012).

Suitable habitat was observed along Lizard Creek where large black cottonwood are present. With the nearest *macfarlanei* subspecies recorded in Cranbrook, it is possible that the subspecies also occurs on the Galloway Lands.

3.4.2.4.5 Little brown myotis

The little brown myotis overwinters in cold and humid hibernacula typically in caves and mines. During the summer, females establish maternity colonies, often in buildings or large-diameter trees. Foraging occurs over water, along waterways, forest edges, and in gaps in the forest (COSEWIC, 2013).

No mines or caves were observed during the assessment therefore the Galloway Lands are unlikely to provide overwintering habitat. However, foraging habitat is present on the subject property along the streams. Therefore, the little brown myotis may use the Galloway land for foraging only.

3.4.2.4.6 Cutthroat trout, *lewisi* subspecies

This species was addressed in Section 3.3.1.1.2

3.4.2.4.7 Subalpine mountainsnail

The distribution and abundance of the subalpine mountainsnail are poorly known (Ovaska and Lennart, 2007). The species is thought to occupy streamside habitats rather than rocky slopes (Ovaska and Lennart, 2007). The subalpine mountainsnail have been documented along a small creek and seepage area in open and dry subalpine habitat (Ovaska and Lennart, 2007).

The subalpine mountainsnail was recorded in a patch of dense shrubs and herbaceous vegetation by a small stream in the Fernie Alpine Resort in 2007. The nearby record in conjunction with the presence of suitable habitat on the Galloway Lands, indicates that the species may occur on the subject property.

3.4.2.4.8 Bull trout

This species was addressed in Section 3.3.1.1.1

3.4.2.4.9 American badger

As of 2012, it is estimated that there are 100-160 badgers within the eastern subpopulation (Rocky Mountain Trench, Elk Valley and Cresten/Yahk) (Environment and Climate Change Canada, 2021). Suitable habitat for the American badger is highly dependent on prey habitat (i.e. ground squirrel, yellow-bellied marmot or microtine rodents). Badgers can use areas that have been modified by humans and tolerate some level of human activity (Newhouse and Kinley, 2000). The American badger required diggable soils consisting of unconsolidated material cohesive enough to allow burrowing for both badgers and prey species (Environment and Climate Change Canada, 2021). These soil typically belong to the following orders: Brunisol, regisol, chernozem, gleysol and gray luvisol (Environment and Climate Change Canada, 2021). In addition, suitable areas for foraging are needed (Environment and Climate Change Canada, 2021). Foraging habitat is characterized by grasslands, wet meadows, shrub-steppe, seeded dryland pastures and open canopy forest with prey species such as Columbia ground squirrel (*Spermophilus columbianus*), yellow-bellied marmot (*Marmota flaviventris*), northern pocket gopher (*Thomomys talpoides*), muskrat (*Ondatra zibethicus*), red-backed vole (*Clethrionomys gapperi*), and meadow vole (*Microtus pennsylvanicus*) (Environment and Climate Change Canada, 2021). Badger burrow distribution in BC found that most (>75%) were within 50 m of areas used by Columbian ground squirrels, and within 50 m of a road (Kinder Morgan Canada Inc., 2017)

The Galloway Lands are located within the core critical habitat polygon for the American badger (Environment and Climate Change Canada, 2021). In addition suitable soils (Brunisol gray luvisol) are recorded on site (Government of British Columbia, 2022). Suitable foraging habitat on the Galloway Lands is limited to the existing access roads and Nordic skiing trails. The rest of the property is characterized by dense forest which would not be suitable for American badger foraging. No signs of badger, ground squirrels or ground squirrels burrow were observed during the field assessment. Therefore, the American badger is unlikely to occur on the Galloway Lands in large numbers.

3.4.2.4.10 Grizzly bear

The grizzly bear is one of eight species of the bear family, Ursidae (BC Government, 2004). Grizzly bears live in a variety of habitats, including coastal rain forests, alpine tundra, mountain slopes, upland boreal forest, taiga, and dry grasslands. A grizzly bear's use of habitat tends to vary between seasons and is often dependent on vegetation growth and prey concentrations. Home range sizes vary based on habitat quality. Neither males nor females are territorial (Office of the Auditor General of British Columbia, 2017). Grizzly bears consume a wide variety of foods, including roots and green vegetation, small and large mammals, fish, and insects. In the interior grizzlies feed mainly on the roots of *Hedysarum spp.*, spring beauty (*Claytonia lacneolata*), and/or avalanche lily (Erythronium grandiflorum) depending on local abundance, and on carrion in the early spring. As the green vegetation emerges the bears begin to graze on grasses, horsetails, rushes, and sedges and prey on ungulates on their calving grounds. During the summer, bears feed on cow-parsnip (*Heracleum* spp.). They also obtain early ripening fruits beginning in mid-July mainly in riparian forests and productive low elevation seral forests, such as pine-soopolallie terraces. In late-summer and fall (August–October) high elevation berries are the dominant food source, mainly soopolallie, blueberries, and huckleberries. Mountain ash or kinnickinnick, vaccinium, and on the roots of hedysarum is the dominant food during late fall. Throughout the active season, interior grizzlies will prey on small mammals, especially ground squirrels (*Spermophilus* spp.) fish, roots, pine nuts, or bulbs, and insects are important whenever they are available (BC Government, 2004).

Grizzly bears tend to forage mostly in non-forested sites, or sites with partial forest, or sites with many tree gaps in older forest. Security habitat and day bedding areas (for heat relief, rain interception, or warmth) are more often located in closed forest sites near higher quality foraging sites (BC Government, 2004). In the interior, hibernation will take place from October to May (BC Government, 2004).

The Galloway Lands are located within the South Rockies Bear Population Unit (GBPU) (BC Government, 2022c). The South Rockies GBPU was estimated at 116 grizzly bears and the overall threat on the population is high (BC Government, 2022c). This population connects the grizzly bear population further south, in the Northern Continental Divide Ecosystem of Montana, with the continuous population to the north (Smit et al., 2020). The telemetry data from Lamb (2022) show low to medium habitat use of the Galloway Lands compared to the surrounding area. The data show few bears moving through the site while the majority of the movement occurs south east of the Town of Fernie (Lamb, 2022). Using the biophysical attributes of the site and the telemetry data, Lamb (2022) created a Resource Selection Function (RSF Model) to assess habitat quality. The model shows an isolated high quality habitat patch in May-July surrounded by low quality habitat. Medium quality between August and November and low denning quality habitat. No grizzly bear were observed on the wildlife cameras.

Using the telemetry data and RSF model, Lamb (2022) determined that Galloway Lands are commonly used as a movement corridor for grizzly bears. However, Proctor *et al* (Proctor et al., 2015) used telemetry and an RSF model to identify movement corridors. The study identified the southeast corner of the Galloway Lands as moderate movement potential while most of the site has low movement corridor potential. Proctor *et al* (2015) studied movement corridors on a larger scale throughout southeastern British Columbia and identified linkages between high quality core habitat while Lamb (2022) assessed movement on a smaller scale by focusing on the Fernie area with a landscape buffer.

3.4.3 Valued Ecosystem Components

Valued Ecosystem Components are natural features identified as valuable for wildlife survival. The valued ecosystem components identified in the Galloway Lands include wildlife trees and wildlife movement.

3.4.3.1 Wildlife Trees

Wildlife trees were observed during the field assessment (Photo 41). However, as the majority of the site is characterized by a young forest, wildlife trees are expected to occur in low numbers. Wildlife trees

include significant standing snags, veteran trees, and trees with broken tops, holes or cavities. These trees are important for various reasons such as perching, foraging, and nesting sites for birds and mammals.

Photo 41: View of a wildlife tree with pileated woodpecker cavities. July 26, 2022.

3.4.3.2 Wildlife Movement

Wildlife tend to use routes with specific features when moving across the landscape to forage for food, disperse, find mates, or locate breeding sites. These features can include such things as cover, shade, vegetation, water, or surface characteristics.

Scale is also a significant factor in determining the suitability of a landscape; larger animals with home ranges covering hundreds of kilometres (e.g., grizzly bear) have far different connectivity corridor requirements than smaller animals, whose corridor requirements can be measured in metres. During the field survey, numerous wildlife trails were observed (Photo 42 and Photo 43). The presence of scat and prints on the wildlife trails combined with the wildlife camera data indicates that the property is heavily used by mule deer and white-tailed deer. Moose prints were also observed on the wildlife trails. Grizzly bear movement was addressed in Section 3.4.2.4.10

Photo 42: View of a wildlife trail in Polygon 1. July 26, 2022.

Photo 43: View of a wildlife trail in Polygon 2. July 26, 2022.

4 Environmental Opportunities and Constraints

4.1 Cultural Environment

4.1.1 Indigenous Communities

Indigenous communities' valued ecosystem components may include special places, culturally modified features, biophysical resources, and places of traditional use. These valued components of Indigenous physical and cultural heritage may be any of the following:

- burial sites;
- cultural landscapes;
- oral histories;
- cultural values and experiences of being on the land;
- Indigenous governance systems and Indigenous laws tied to the landscape;
- sacred, ceremonial or culturally important places, plants, animals, objects, beings or things; and
- archaeological potential and/or artefact places (Government of Canada, 2020).

Valued places within the Fernie area identified by the Ktunaxa Nation include:

- environmental features;
- transportation routes;
- habitation sites;
- subsistence sites;
- cultural/spiritual sites (Galdamez, 2013; Ktunaxa Nation, 2015).

The presence of archaeological and cultural sites has yet to be addressed within the Galloway Lands. The results of an archaeological data request to the Archaeology Branch of FLNRO, requesting information on any documented sites within the study area, will be provided when available.

4.1.2 Anthropogenic Values and Features

The existing Lizard Creek bridge and trails are not a constraint to the proposed development. Trails are further discussed in Section 4.1.3

4.1.3 Recreational Activities

As the land is privately owned, the Nordic skiing and mountain biking trails present on the Galloway Lands do not represent a constraint to the proposed development. However, the development plan includes the existing Nordic trails. Some will be rerouted to accommodate the proposed development and environmentally sensitive areas. The proponent will also enter into communication with the local mountain biking association following the rezoning plan. A third party will be retained by the proponent to develop a trails plan on the Galloway Lands. Some trails may be decommissioned or re-routed to accommodate the proposed development and environmentally sensitive areas.

4.1.4 Other Land Uses

4.1.4.1 Trapline Areas

The trapline areas are located on private land. Therefore, a licenced trapper would only be allowed to trap on the Galloway Lands with the written permission of the property owner (BC Government, 2022d). The presence of trapline areas on the subject property should not be a constraint to the proposed development.

4.1.4.2 Limited Entry Hunting Zones

Two LEH zones are present on the Galloway Lands. However, hunting on private property is only allowed with the written permission of the landowner. Therefore, the LEH zone should not be a constraint to the proposed development.

4.1.4.3 Local Government and Official Community Plans

The Old Growth Management Area, the alluvial and debris flow fan and creek setbacks discussed in Section 3.1.4.3 may be a constraint to the proposed development.

4.1.4.4 Ungulate Winter Range

UWRs are orders issued under FRPA. FRPA does not apply to private land. Therefore, the presence of the UWR on the Galloway Lands should not be considered a constraint to development.

4.2 Physical Environment

4.2.1 Climate

Climate should not be a constraint to the proposed development as change in precipitation and temperature are not expected to impact a residential development.

4.2.2 Geology

The geology of the site does not appear to present any constraints to proposed development. Geotechnical issues associated with the project should be addressed in a separate report.

4.2.3 Soils

A constraint to soils on the Galloway Lands is sediment erosion due to surface disturbance. Construction activities resulting in vegetation removal and exposed soils will require mitigation measures to reduce sediment erosion within the proposed development. In British Columbia, the *Environmental Management Act* provides standards for allowable turbidity of waters that impact aquatic life. The BC *Water Sustainability Act* also prohibits the introduction of debris or contaminants in any watercourse or waterbody. Water runoff from site must not impact the water quality in entering Boardman Creek, Lizard Creek and their tributaries.

4.2.4 Hydrology

Two watershed and associated watercourses are present on the Galloway Lands. The location of the watercourse is considered a constraint to the development.

4.3 Aquatic Environment

All identified waterbodies within the Galloway Lands and their associated riparian zones present a constraint to the project. Any disturbance below the top of bank of these watercourses must comply with the *Water Sustainability Act* (Province of British Columbia, 2014), the *Fish Protection Act* (Province of British Columbia, 1997), and the Federal *Fisheries Act* (Government of Canada, 2016). The RDEK has not adopted the Riparian Area Protection Regulation (RAPR). However, the riparian area is subject to setback under the OCP as discussed in Section 3.1.4.3. Retention of riparian vegetation protects stream banks from erosion and subsequent downstream siltation. In addition, the riparian vegetation helps to maintain lower water temperatures in summer, and provides a potential food source for downstream fish (i.e. terrestrial insects falling into the stream).

4.3.1 Fish and Fish Habitat

The main constraint to the project from fish and fish habitat are based on rare and endangered fish species presented in the Section 4.3.1.1.

4.3.1.1 Rare and Endangered Fish Species

Westslope cutthroat and bull trout are present in Lizard Creek and may be present on the other watercourse within the Galloway Lands as well as. Both species are protected under the provincial *Wildlife Act*, the provincial *Fish Protection Act*, the federal *Fisheries Act* and the *Species at Risk Act.* These species require intact riparian areas, cool and clean waters with ground water up-welling specifically for spawning, incubation, and early life stage rearing. As such, fish habitat and associate riparian area are a constraint to the project.

4.4 Terrestrial Environment

4.4.1 Vegetation

4.4.1.1 Old Growth Forest

As per the OCP, an Old Growth Management Area is present on the Galloway Lands and can be constraining to the proposed development.

4.4.1.2 Rare and Endangered Plant Species

No rare and endangered plant species have the potential of to occur on the Galloway Lands. Therefore, rare and endangered plant species should not be a constraint to the proposed development.

4.4.1.3 Rare and Endangered Ecological Communities

There is one Provincially listed rare and endangered ecological communities of concern in the Galloway Lands. There is currently no legal protection of provincially red listed ecological communities in BC. However due to its provincial importance this ecosystem at risk may be a constraint to the development

4.4.2 Wildlife

4.4.2.1 Rare and Endangered Species

4.4.2.1.1 Great blue heron

The great blue heron is blue listed (special concerns) and is protected under Section 34 of the *Wildlife Act* (BC Government, 1996). Section 34 states:

A person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys:

(a)a bird or its egg,
(b)the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl, or
(c)the nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg.

Should the presence of the great blue heron be confirmed on the Galloway Lands, the species and its nest would be a constraint to development.

4.4.2.1.2 Evening grosbeak

The evening grosbeak is yellow listed provincially (least risk of being lost) and listed as special concerns under *SARA.* Similarly, to the great blue heron, the evening grosbeak and its active nest are also protected under Section 34 of the *Wildlife Act.* Should the presence of this species be confirmed on the Galloway Lands, the species and its nest would be a constraint to development.

4.4.2.1.3 Olive-sided flycatcher

The olive-sided fly catcher is yellow listed provincially and listed as threatened under *SARA.* Similarly, to the great blue heron, the olive-sided fly catcher and its active nest are also protected under Section 34 of the *Wildlife Act.* In addition, a species that is listed as Endangered, Extirpated or Threatened within Schedule 1 of *SARA* is legally protected under the Act by certain prohibitions.

SARA contains prohibitions that make it an offence to:

i. *kill, harm, harass, capture, or take an individual of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated;*
ii. *possess, collect, buy, sell or trade an individual of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated;*
iii. *damage or destroy the residence (e.g. nest or den) of one or more individuals of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated, if a recovery strategy has recommended the reintroduction of that extirpated species.*

Should the presence of this species be confirmed on the Galloway Lands, the species and its nest could be a constraint to development.

4.4.2.1.4 Western screech owl macfarlanei subspecies

The western screech owl is blue listed provincially and listed as threatened under *SARA*. Similarly, to the olive-sided flycatcher, the western screech owl and its nest are protected under Section 34 of the *Wildlife Act.* The nest would be protected even when not in use. In addition, the western screech owl received protection under *SARA.*

Should the presence of this species be confirmed on the Galloway Lands, the species could be a constraint to development.

4.4.2.1.5 Little brown myotis

The little brown myotis is blue listed provincially and listed as endangered under *SARA.* The little brown myotis is protected under Section 26 of the *Wildlife Act.* In addition, the little brown myotis, its roost and hibernacula are protected under *SARA.*

Should the presence of this species be confirmed on the Galloway Lands, the species could be a constraint to development.

4.4.2.1.6 Bull trout

The bull trout is protected under the provincial *Wildlife Act*, the provincial *Fish Protection Act*, the federal *Fisheries Act* and the *Species at Risk Act.* The presence of the bull trout should be considered a constraint to development.

4.4.2.1.7 Cutthroat trout, lewisi subspecies

The cutthroat trout is protected under the provincial *Wildlife Act*, the provincial *Fish Protection Act*, the federal *Fisheries Act* and the *Species at Risk Act.* The presence of the cutthroat trout should be considered a constraint to development.

4.4.2.1.8 Subalpine mountainsnail

The subalpine mountainsnail is blue listed provincially. This species is protected under Section 26 of the *Wildlife Act*.

Should the presence of this species be confirmed on the Galloway Lands, the species could be a constraint to development.

4.4.2.1.9 American badger

The American badger is red listed provincially and listed as endangered under *SARA.* The American badger is protected under Section 26 of the *Wildlife Act.* In addition, the American badger and its den are protected under *SARA.*

Should the presence of this species be confirmed on the Galloway Lands, the species could be a constraint to development.

4.4.2.1.10 Grizzly bear

Grizzly bears are known to occur on the Galloway Lands (Lamb, 2022). Grizzly bears are protected under the provincial *Wildlife Act* from killing, wounding, and taking. In addition, the grizzly bear is also listed as Special Concern under SARA. A species that is listed as Endangered, Extirpated or Threatened within Schedule 1 of SARA is legally protected under the Act by certain prohibitions.

Wildlife habitat for endangered species are protected through Wildlife Management Areas (WMAs) under section 4(2) of the *Wildlife Act* (BC Government, 1996). No WMAs are located within the Galloway Lands.

The occurrence of the species on the Galloway Lands may be a constraint to development.

4.4.3 Valued Ecosystem Components

4.4.3.1 Wildlife Trees

No specific legal protection exists for wildlife trees. However, wildlife trees may provide den habitat for *SARA* listed species (e.g. little brown myotis, grizzly bear, etc.). In that instance the wildlife tree should be protected. In addition, many bird species may use wildlife trees for nesting. Therefore, wildlife trees providing residence to *SARA* listed species or nesting birds, may be constraining to the proposed project. Residence by *SARA* listed species would present a long-term constraint as the residence is protected from damage or destruction under *SARA*. However, protection of a wildlife tree occupied by a non-*SARA* listed bird species would not preclude development from taking place. The nest of a bird would be a short term constraint as per Section 34 of the *Wildlife Act* (BC Government, 1996).

4.4.3.2 Wildlife Movement

The Galloway Lands provides wildlife movement for grizzly bear (Lamb, 2022), black bears and ungulates. The movement path does not have legal protection on private land. However, due to their importance for wildlife, movement path should be maintained where possible. Therefore, wildlife movement may be a constraint to development

5 Potential Impacts

5.1 Cultural Environment

5.1.1 Indigenous Communities

The Tobacco Plains Indian Band has expressed concerns regarding impacts to water, lands, and wildlife within the Galloway Lands. More information regarding Indigenous peoples' valued components within the Galloway Lands is required. It is understood that the proponent continues to engage the local Indigenous communities, including consultation with the Ktunaxa Lands and Resources Agency (Regional District of East Kootenay, 2014).

5.1.2 Recreational Activities

The Galloway Lands development will result in the closure of some mountain biking trails. The mountain bike trails are an unsanctioned trail network on private land. As the mountain bike trails were not planned or sanctioned, they are relatively high-density network throughout most of the property area. Existing trails will be rerouted wherever possible, and the development is committed to retaining a meaningful mountain bike network. Therefore, recreation pressure on these trails is not expected to significantly increase due to this trail retention design. Trails will not be rerouted within the Lizard Creek riparian area preserving wildlife habitat in this sensitive riparian area. The development also offers the opportunity to construct the rerouted mountain bike trails with the Fernie Trail Alliance to provincial trail standards to help mitigate recreation use impacts on surrounding habitat. As existing trails were constructed without approval, they likely do not meet provincial trail standards and the development offers an opportunity to upgrade the trail quality.

The development plan includes the existing Nordic trails. Some will be rerouted to accommodate the proposed development and environmentally sensitive areas.

5.1.3 Other Land Uses

5.1.3.1 Trapline Areas

The trapline areas may be impacted by the proposed development. However, the traplines are located on private land. Therefore, the property owner has the right to revoke permission to use the area for trapping.

5.1.3.2 Limited Entry Hunting Zones

The LEH zones may be impacted by the proposed development. However, the LEHs are located on private land. Therefore, the property owner has the right to revoke permission to use the area for hunting.

5.1.3.3 Local Government and Official Community Plans

The proposed development is generally consistent with the OCP. The proposed development is outside of the 15m floodplain setback for Lizard Creek as defined by the RDEK with the exception of the bridge crossing Lizard Creek. This will impact 0.56 ha of the alluvial and debris flow fan as per Schedule F1 of the OCP. In addition,, the proposed development intrudes in the old growth management area on lot 73 to 76 and the road crossing Lizard Creek. A total of 1.07 ha will be impacted by the building envelope and the road development..

5.1.3.4 Ungulate Winter Range

A total of 28.60 ha of the ungulate winter range will be impacted by the building envelopes and roads. However, UWR does not apply on private land (BC Government, 2005).

5.2 Physical Environment

5.2.1 Climate

No anticipated adverse impacts to the local climate are identified in this Overview Assessment.

5.2.2 Geology and Geomorphology

No anticipated significant adverse impacts to the local geology or geomorphology of the Galloway Lands are identified in this Overview Assessment.

5.2.3 Soils

Vegetation removal has the potential to expose soils and create surface soil erosion. Erosion and Sediment Control (ESC) Best Practice mitigation measures are required for certain areas of disturbance to reduce potential impacts. The purpose of ESC is to decrease the erosive effects of rain drop impact on soil particles, decrease runoff velocity and volumes, and promote water infiltration into the soil (Ministry of Forest, Lands, Natural Resource Operations, 2018).

The development will likely involve vegetation removal, grubbing and potential terrain adjustments (sloping, compaction). The vegetation disturbance during construction is expected. Exposed soils and soil erosion may occur. Water infiltration in soil may be affected as the development will increase impervious surface. Mitigation measures will reduce the ESC impacts. ESC will prevent turbid runoff into watercourses.

5.2.4 Hydrology

No risk to existing hydrological flow or patterns is identified in this Overview Assessment.

5.3 Aquatic Environment

The current proposed development plan has three creek crossings, one on Lizard Creek, one on Boardman Creek North and one on Boardman Creek South. The existing Lizard Creek bridge will not be modified by the proposed development. Therefore, the existing Lizard Creek bridge is not considered in this potential impact analysis.

The creek crossing on Boardman Creek North is existing but will be improved. Construction and improvement of the creek crossing may impact the watercourses they cross and the downstream fish bearing watercourse they drain into, thereby potentially impacting water quality, fish, fish habitat and other water users. However, best management practices and compliance with Provincial standards should limits potential for impact on the aquatic environment. Additionally, replacement of the old creek crossings with new crossings constructed to current standards may eliminate any existing issues.

Any changes to water quality or disturbance within the riparian areas adjacent to the drainages on site could affect the fisheries potential of downstream fish bearing watercourses and downstream human water usage.

5.4 Terrestrial Environment

5.4.1 Vegetation

5.4.1.1 Rare and Endangered Ecological Communities

One rare and endangered ecological community exists on the Galloway Lands. Black cottonwood - hybrid white spruce / red-osier dogwood (ICHmk4/Fm02). is associated with the flood plain of Lizard Creek (Polygon 8- Map 6).

The current development plan is not anticipated to impact the rare and endangered ecological community.

5.4.1.2 Invasive Plant Species

The Galloway Lands contains disturbed areas such as the remanent logging roads/Nordic trails and unsanctioned mountain bike trails. As invasive species tend to prosper in open, disturbed sites, the Galloway Lands likely contains invasive species. Invasive species are non-native species that become well established because they have no natural predators or controls. They may spread quickly and can out compete native species, negatively affecting the biodiversity of an area.

Invasive species control in the project area is managed by the East Kootenay Invasive Species Council (EKISC). Invasive plant species observed on the Galloway Lands includes oxeye daisy and Canada thistle.

Mitigation measures should be implemented during the construction phase to minimize spread of invasives species. Cleaning of construction equipment and vehicles will prevent and/or reduce the spread of invasive species of the study area. The construction and operations within the Galloway Lands provides opportunity for invasive species removal through mechanical controls and increased identification and reporting to EKISC.

5.4.1.3 Vegetation Loss

The proposed development is anticipated to cause some loss of trees and vegetation. The building envelope combined with road development will result in a loss of 35.19 ha or 19.55 % of the vegetation present on the Galloway Lands. The details of each site series impacted can be found in Table 10.

Table 10: Terrestrial ecosystems affected by the proposed development

TE Site Series	Structural Stage	Total Area on site (ha)	Area affected (ha)	Percent of Affected TE Site Series
Lot Building Envelopes				
ICHmk4/ 101	5	130.77	20.59	15.75
ICHmk4/ 103	5	13.17	2.32	17.62
ICHmk4/ 110	5	32.15	1.26	3.92
ICHmk4/101-110	5	3.22	0.97	30.12
ICHmk4/ Fm02	5	0.72	0	0
Roads				
ICHmk4/ 101	5	130.77	8.35	6.39
ICHmk4/ 103	5	13.17	0.04	0.30
ICHmk4/ 110	5	32.15	1.26	3.92

TE Site Series	Structural Stage	Total Area on site (ha)	Area affected (ha)	Percent of Affected TE Site Series
ICHmk4/101-110	5	3.22	0.40	12.42
ICHmk4/ Fm02	5	0.72	0	0
Total			**35.19**	**19.55% of the vegetation of the site**

5.4.2 Wildlife

5.4.2.1.1 Great blue heron *herodias* subspecies

As the proposed development will have minimal impact on the aquatic environment of the Galloway Lands, the potential great blue heron foraging habitat is unlikely to be impacted. The proposed development has the potential to impact nesting habitat. Human disturbance was shown to be detrimental to great blue heron nesting (Mitchell, 2012). Herons may leave their nest when disturbed by humans (Mitchell, 2012). Nesting habitat could occur anywhere on the Galloway Lands but is more likely to occur along Lizard Creek where large black cottonwood were observed. Most of the development will not result in direct loss of habitat along Lizard Creek. However, the proposed road crossing Lizard creek may result in removal of large black cottonwood and cause loss of habitat. In addition, , the habitat may be impacted during construction due to noise disturbance.

5.4.2.1.2 Evening grosbeak

The management plan for the evening grosbeak identifies residential development as a low threat to the species (Environment and Climate Change Canada, 2022). This low level threat has a slight severity and a high timing. (Environment and Climate Change Canada, 2022) Residential development is expected to reduce the species population by 1 to 10% with the impact taking place immediately (Environment and Climate Change Canada, 2022).

The evening grosbeaks often visit feeders making the species susceptible to collisions with nearby windows (Environment and Climate Change Canada, 2022). The evening grosbeak is among the top ten species most frequently killed by residential window strikes (Environment and Climate Change Canada, 2022). However, feeders may also have beneficial impacts by providing a supplementary food source during harsh winters, potentially offsetting some of the negative impacts of this threat (Environment and Climate Change Canada, 2022).

In addition, suitable habitat may be present on site and the proposed development could result in the loss of habitat. However, the habitat has been modeled as sub-optimal for the species (COSEWIC, 2016) .

5.4.2.1.3 Olive-sided flycatcher

The habitat loss or degradation is likely affecting the breeding habitat of the olive-sided flycatcher through forest harvesting, anthropogenic disturbance such as development, and changes in fire regimes (COSEWIC, 2018). These are likely to reduce habitat quality and affect nest success (COSEWIC, 2018). Therefore, the proposed development may impact the flycatcher and its habitat.

5.4.2.1.4 Western screech owl *macfarlanei* subspecies

The Recovery Strategies for the Western Screech Owl identifies urban, agricultural, and hydroelectric developments as the most significant threat to the species (Western Screech-Owl, macfarlanei subspecies Recovery Team, 2008). Urban and agricultural developments have destroyed and degraded a considerable amount of mature riparian habitat over the past century and the remaining habitat is highly fragmented (Western Screech-Owl, macfarlanei subspecies Recovery Team, 2008). Potential habitat for the western screech owl is only likely to occur along Lizard Creek where large cottonwood are present.

Most of the development will not result in direct loss of habitat along Lizard Creek. However, the proposed road crossing Lizard creek may result in removal of large black cottonwood and cause loss of habitat. In addition,, the habitat quality may be impacted during construction due to noise disturbance.

5.4.2.1.5 Little brown myotis

The Galloway Lands are unlikely to provide overwintering habitat. In addition, foraging habitat is unlikely to be impacted as the stream on the Galloway Lands and associated riparian area will be preserved. Therefore, the proposed development is unlikely to impact the little brown myotis.

5.4.2.1.6 Bull trout

Habitat characteristics alteration was identified as one of the threats to bull trout in BC (Hammond, 2004). The proposed Lizard Creek bridge will result in the loss of riparian habitat. Riparian vegetation is an important factor in the maintenance of bull trout habitat (Hammond, 2004). In addition, potential impacts discussed in Section 5.3 such as change in water quality during the construction phase may also impact the bull trout.

5.4.2.1.7 Cutthroat trout, *lewisi* subspecies

Riparian areas provide many ecological functions that are beneficial to westslope cuthroat trout such as bank stabilization, creation and maintenance of deep, narrow channels with undercut banks, root wads and a source of instream woody debris; improvement and maintenance of water quality; provision of overhead cover from predators; maintenance of low stream temperatures through shading; and provision of terrestrial insects as an important food source for the species (Alberta Riparian Habitat Management Society, 2011).

In addition, the westslope cutthroat trout recovery strategy associates higher road densities with reduced population densities of cutthroat trout (Government of Canada, 2019). Roads are also identified as the principal source of fine sediments to streams which can result in habitat degradation (Government of Canada, 2019). The recovery strategy also identified pollution from run-off such as road salt as a threat to the species (Government of Canada, 2019).

The loss of riparian vegetation associated with the bridge construction over Lizard Creek may reduce the function of the riparian habitat and reduce the habitat quality of the westslope cutthroat trout. However only 0.09 ha of riparian area will be impacted by the road associated with the Lizard Creek clear span bridge. This represents 1.19 % of the Lizard Creek riparian area contained within and or adjacent to the Galloway Lands. The Lizard Creek bridge may also contribute to the threat identified in the recovery strategy. Potential impacts discussed in Section 5.3 such as change in water quality during the construction phase may also impact the species. However most of these impacts can be mitigated as discussed in section 6.3.

5.4.2.1.8 Subalpine mountainsnail

The subalpine mountainsail has the potential to occur along the stream in the Galloway Lands. The current development proposes to protection the streams of the Galloway Lands and their associated riparian areas with the exception of the bridge over Lizard Creek. Therefore, the proposed development may impact the subalpine mountainsnail.

5.4.2.1.9 American badger

The recovery strategy for the American badger identifies residential development as a low threat to the species with a moderate-slight severity and a high timing (Environment and Climate Change Canada, 2021). Residential development is expected to reduce the species population by 1 to 30% with the impact taking place immediately (Environment and Climate Change Canada, 2021).

Road mortality is the single greatest threat to American Badgers in British Columbia as American badgers are most active at night and often cross highways several times per night (Environment and Climate Change Canada, 2021). In addition, urban areas, industrial activities, and cultivation agriculture were identified as the most significant sources of habitat loss to American badgers in British Columbia (Environment and Climate Change Canada, 2021). This loss includes burrowing and foraging habitat as well as impact to habitat connectivity (Environment and Climate Change Canada, 2021).

No major or high-speed roads are proposed in the development plan. Therefore, the proposed development is not expected to increase the risk of mortality if the American badger presence is confirmed on the Galloway Lands. However, the development may impact the potential American badger habitat and the abundance of prey species.

5.4.2.1.10 Grizzly bear

The proposed development may impact grizzly bear foraging habitat. Berry production was shown to be a limiting factor for grizzly bear densities (Smit et al., 2020). Huckleberry and soopolallie were observed throughout the Galloway Lands. These plants would provide foraging habitat for grizzly bear during the summer month. However, the forest on site is characterized by young stand. This type of forest has a dense canopy. Therefore, the forest on the Galloway Lands is not expected to provide as much foraging opportunity as an old growth or mature forest with open canopies. As the Galloway Lands doesn't not provide suitable denning habitat (Lamb, 2022), no impact to grizzly bear denning is expected.

Human presence is known to negatively affected grizzly bear densities (Smit et al., 2020). An increase in human presence resulting from the development, may reduce habitat attractiveness as bears move to lower quality habitats and display higher movement rates in response to human activity avoidance. This can reduce the net energy available for growth and reproduction.

Increased human presence in the Galloway Lands may also result in an increase in grizzly bear-human interaction. Some of these interactions may have negative impacts on grizzly bears. The increased human presence may increase bear habituation to humans. Herrero (2005) suggests that habituation may increase the efficiency of bear habitat use by reducing displacement and minimizing the frequency of energy-demanding response. However, habituated grizzly bear are subject to higher mortality rates in all future years (Herrero, 2005).

The cumulative effects simulation conducted by Mowat *et al.* (Mowat et al., 2018) in the elk valley, determined that development rate may have a relatively small effect on the habitat availability and suitability of grizzly bear. Increased road density and loss of high-quality habitat such as young (<20 years) and open-canopy forest were identified by Mowat *et al.* (2018) as the two main cumulative effects to grizzly bear. As no young forest or open canopy forest were identified within the Galloway Lands the proposed development is unlikely to contribute to the cumulative effects on grizzly bear in that regard.

The proposed development may reduce grizzly bear movement through the Galloway Lands. Impact on the movement of grizzly bear is discussed in Section 5.4.3.2

5.4.3 Valued Ecosystem Components

5.4.3.1 Wildlife Trees

Wildlife trees may be impacted, but the extent of the impact is unknown as the location and number of wildlife trees potentially providing habitat for SARA listed species and cavity nesting birds is unknown.

5.4.3.2 Wildlife movement

The Galloway Lands are expected to provide low movement opportunities for grizzly bears, black bears, and high movement opportunities for ungulates. Maintaining connectivity of habitat is a key element for future grizzly bear survival (Office of the Auditor General of British Columbia, 2017). Connectivity within

the southern Rocky Mountains is hindered by linear human development in valley bottoms, where high mortality rates limit connectivity between populations on either side of the valleys. The corridor along Highway 3 in the Elk Valley has much greater development than any other corridor through the Canadian Rocky Mountains and is the main connectivity fracture for grizzly bears and other wildlife populations in the Canadian Rocky Mountains (Smit et al., 2020)

A minimum width is required for a wildlife corridor to be effective. The minimum corridor width will vary based on the wildlife species of interest. If the width of the corridor decreases below the minimum requirement for a certain wildlife species, a reduction in that species' ability to move across the corridor can be expected. Ford *et al.* (2020) showed that the zone of influence from residential areas on grizzly bear can range from 4000 to 8000 m with 6000 m being the median size. The report suggests that grizzly bears would be negatively impacted by residential developments in a corridor with a width of less then 6000 m. However, this does not signify that the animals would be absent from the corridor. Currently the forest between the Fernie Alpine Resort and the closest development on the northeast side of Lizard Creek is approximately 720m wide. This would indicate that grizzly bears currently using the Galloway Lands to move across the landscape are already influenced by residential development in the area. This is supported by the telemetry data which shows low levels of use by grizzly bears (Lamb, 2022). In addition, Ford *et al.* (2020) also showed that trails can have a zone of influence on grizzly bears ranging from 21 to 8000 m with a median of 628 m. Therefore, the existing trails in the Galloway Lands further reduce the effective corridor width. The proposed development has the potential to increase the zone of influence for grizzly bear and other wildlife and may reduce the wildlife movement in the vicinity of the development. However, the animals using the Galloway Lands to move across the landscape may be used to human presence and their movement is already impacted by the existing highway. These animals may continue using the Galloway Lands once development is complete. In addition, the proposed road connecting to the Lizard Creek bridge would bisect the Protection and Recreation Area. This may restrict movement along the Protection and Recreation Area associated with Lizard Creek but impact is expected to be low as data suggests that few grizzly bears currently move across the Galloway Lands. Black bears will likely shift their behavior as a result of the development and move through the development during the night (Zeller et al., 2019).

The proposed development may also impact ungulate movement throughout the site. However, ungulates are large and highly mobile. They are likely to adapt to predictable human disturbance through behavioral adaptations that can mitigate negative consequences on vital rates (Polfus and Krausman, 2012). This could result in a positive effect. Some species can have a higher survival rate in close proximity to residential development due to a decrease in predation or increase availability of fertilized yards (Polfus and Krausman, 2012). As ungulate movement trails were observed throughout the site, the Conservation and Recreation Lands are expected to preserve some of the movement path and habitat used by ungulate on the Galloway Lands (Map 2).

6 Opportunities/Mitigation Strategies

6.1 Cultural Environment

6.1.1 Indigenous Communities

Additional engagement is required to identify sites of potential cultural interest to Indigenous peoples within the Galloway Lands. To avoid impact to Indigenous interests, the proponent should continue to develop relationships with, and seek input from communities. The following opportunities/mitigation strategies are recommended:

- Submit an archeological and cultural request to the Ktunaxa Lands and Resources Agency, in accordance with the Elk Valley Official Community Plan and Ktunaxa Nation Council guidelines for Archeological Assessment and Engagement in Ktunaxa territory (Ktunaxa Nation Council, 2014; Regional District of East Kootenay, 2014).
- Continue to engage local Indigenous communities (Tobacco Plains Indian Band) and corporations (Ka·kin Resource Corporation) to identify issues or concerns with the proposed use of the lands.
- Identify and buffer from activity and disturbance any culturally sensitive sites.
- Accommodate seasonal use of lands for cultural and spiritual activities.
- Discuss potential accommodation of Indigenous peoples by promoting capacity building within the communities.

6.1.2 Recreation Activities

The proposed development will explore opportunities to re-design and or re-route the Nordic ski and bike trail network within the Galloway Lands

6.1.3 Other Land Uses

6.1.3.1 Local Government and Official Community Plans

The proposed development should minimize the amount vegetation clearing within the old growth management area.

6.1.3.2 Ungulate Winter Range

The UWR does not apply on private land. However, efforts should be made to preserve forests where possible.

6.2 Physical Environment

6.2.1 Climate

The proposed development is not expected to have adverse impacts on the climate. Therefore, no mitigation measures are recommended.

6.2.2 Geology and Geomorphology

The proposed development is not expected to have adverse impacts on the geology or geomorphology. Therefore, no mitigation measures are recommended.

6.2.3 Soils

Identified areas of concern with respect to soils on the site relate to erodible soils and sediment control. Mitigation measures for erosion and sediment control during construction and trail building should be applied wherever vegetation is cleared, and soil is exposed. Soil erosion is one of the most frequent types of environmental impact. Soil erosion can increase maintenance costs and decrease plant and wildlife habitat quality.

An Environmental Management Plan (EMP) should be prepared prior to construction. The EMP should include all pertinent Best Management Practices (BMP). Erosion and sediment control mitigation measures should be applied for construction. The following recommendation should minimize the impact of soils on the environment:

- BMPs for protection of soils from erosion should be implemented during construction and integrated into the Erosion and Sediment Control Plan (ESCP). ESCP will be appended to the EMP.
- Tree preservation will be maximized where feasible to help stabilize soil on site.
- Stockpiles left for extended periods will be covered with polyethylene film to prevent surface soil mobilization.
- The Environmental Monitor (EM) will work with the geotechnical engineer to ensure the fill slope is revegetated and restored to functional habitat as soon as possible.
- All sediment and erosion control measures will be applied in a timely manner to minimize erosion and impacts to quality of soil and surface water bodies.
- The ESCP should include controls in anticipation of sediment mobilization by both water and wind transport.
- A Hazardous Waste Management and Spill Plan (HWMSP) will be appended to the EMP and implemented in case of spills or leaks during construction.
- The EM will be responsible for ensuring compliance with the ESCP and HWMSP.
- All disturbed soils should be revegetated. This will occur as soon as possible, post-construction.
- Landscaping trees, or preferably existing healthy trees, should be incorporated into landscaping to the maximum extent possible while conforming to FireSmart design, to safeguard stability of slopes.

6.2.4 Hydrology

Minimal risk is anticipated to watercourses on the Galloway Lands provided riparian buffers are respected and best management practices for work in and around watercourses are adhered to.

The overall effect on hydrology of the area should not be altered by the proposed development. As such, no additional mitigation measures are recommended.

6.3 Aquatic Environment

Riparian buffers will be maintained as discussed in Section 6.1.3.1 which should minimize impact to the aquatic environment. One of the key objectives in erosion and sediment control is to intercept and manage off and onsite runoff, thereby preventing the transport of sediment into streams. This includes reducing erosion of onsite ditches and watercourses and preventing sediment laden runoff from entering watercourses.

Watercourses should be protected from erosion by one, or preferably more, of the following methods:

- Riparian buffers will be retained adjacent to all watercourse within the site.
- Silt fencing will be installed along the perimeter of riparian buffers to protect watercourse and stabilize drainage ways during development.

- Exposed soils should be replanted with native vegetation in a timely manner; Particularly, remediation of the disturbed riparian buffer, post culvert installation, should take place as soon as possible (in spring or fall).

Protection of water quality is an essential component to healthy ecosystems. Throughout construction activities, water quality sampling should be conducted in all water courses that may be impacted by the proposed development. This should be done to assure that water quality meets provincial water quality guidelines for the protection of aquatic life. In order to accurately assess water quality, a temporal component to the sampling should be integrated with the spatial distribution of sampling sites. This will be detailed in the EMP.

To avoid water quality problems, the following BMPs will be implemented:

- Protect watercourses through the maintenance of buffers and healthy riparian areas;
- Minimize the discharge of stormwater into natural watercourses;
- Apply erosion protection measures under the direction of the EM and in accordance with a site-specific Erosion and Sediment Control Plan;
- Regularly inspect erosion and sediment measures for efficiency of operation during weather events or sensitive construction activities;
- Ensure that erosion and sediment measures and structures are repaired and maintained for their effective operation on an ongoing basis;
- Ensure that completed sites are protected from erosion through the prompt revegetation of exposed soils;
- Revegetate in accordance with the EM's recommendations;
- Ensure fuel is stored in appropriate contains at least 30 m from watercourse.
- Ensure that fueling of machines and servicing equipment will not take place within 30 m of any water course and spill kits will be readily available on site.
- The use of lime containing construction materials such as concrete, cement, grout, mortar, and or asphalt should not result in contact with the surface or ground water sources.

A Water Quality Management Plan (WQMP) will be developed as part of the EMP and will include measurements of sediment levels as well as nutrients, metals, and hydrocarbons. The WQMP will include the following:

- An EM will be retained to conduct water quality monitoring
- The EM will take baseline turbidity samples upstream and downstream of the development site on the watercourses
- Weekly turbidity sampling will be carried out for the duration of the construction phase and will include one sample period during a precipitation event and one sample period during dry conditions if flowing water is present
- The EM will conduct full time monitoring during creek crossing works, conduct visual assessments and constant turbidity samples during instream works.
- The EM will be empowered to stop construction if sediment levels are not within turbidity guidelines at any time.
- Creek crossing works will require an application for changes in and about a stream (Section 11 of the *Water Sustainability Act*).

The development will result in the loss of permeable ground. Therefore, activity-specific Stormwater Management Plan components should be developed to address stormwater drainage and appended to an Environmental Management Plan. The Stormwater Management Plan should be developed to reduce the peak flow during storm and run-off events, and should include plans to:

- Minimize disturbance of natural areas where possible, especially riparian vegetation buffers.

- Minimize the creation of impervious areas and surfaces (structure development, concrete or paved surfaces)
- Maximize revegetation of disturbed areas,
- Direct stormwater into natural infiltration areas (landscaped areas or rain gardens), and/or run excess water through bio-filtration swales prior to discharging into natural drainages.

Snow management should incorporate the following considerations:

- Snow and road salt should not be deposited into watercourses;
- Snow storage areas should not drain directly into aquatic habitat or watercourses;
- Snow should not be piled on vegetation or in riparian buffer areas; and

Proper cleared snow storage areas should be identified, where sediment can be contained, and removed after snowmelt has occurred.

6.4 Terrestrial Environment

6.4.1 Vegetation

6.4.1.1 Rare and Endangered Plant Species

No rare and endangered plant species was identified as potentially occurring on the Galloway Lands. Therefore, no mitigation measures are recommended.

6.4.1.2 Rare and Endangered Ecological Communities

The one rare plant communities identified on the Galloway Lands is not anticipated to be affected by the proposed development. As such, no specific mitigation measures are suggested.

6.4.1.3 Invasive Plant Species

Several invasive plants are identified on the Galloway Lands. The proponent should be vigilant, identifying and destroying invasive plants as they are discovered. Based on the recovery strategy, the following mitigation measures are suggested:

- Identify suspected invasive plant species within project area.
- Report invasive species to the EKISC at 1-888-553-5472, or a report can be submitted through www.ekisc.com.
- Ensure construction equipment is clean before arriving and leaving the Galloway Lands.

6.4.1.4 Vegetation Loss

Loss of trees and ground cover vegetation will occur as a result of the development. Vegetation should be retained wherever possible.

6.4.2 Wildlife

6.4.2.1.1 Great blue heron *herodias* subspecies

Vegetation clearing should be avoided during the nesting season between January 15 to September 15. A pre-construction sweep should be conducted prior to any vegetation removal or ground disturbance at any time of the year. Should a nest be identified between January 15 and September 15, a 300 m buffer would be required and no blasting should occur within 1000 m from a colony during the nesting window (BC Government, 2014). Outside of this window only the nest itself would be protected.

6.4.2.1.2 Evening grosbeak

Vegetation clearing should be avoided during the nesting season between April 15 to August 15 (Government of Canada, 2022b). Should vegetation clearing be required during the nesting season, A pre-construction sweep should be conducted to ensure compliance with the *Wildlife Act.*

6.4.2.1.3 Olive-sided flycatcher

Vegetation clearing should be avoided during the nesting season between April 15 to August 15 (Government of Canada, 2022b). Should vegetation clearing be required during the nesting season, A pre-construction sweep should be conducted to ensure compliance with the *Wildlife Act*.

6.4.2.1.4 Western screech owl *macfarlanei* subspecies

The breeding period of western screech-owl is from mid-March to May, and young become independent about 2 months afterwards (Caskey et al., 2013). Additionally, the Guidelines for Raptor Conservation during Urban and Rural Land Development in BC (Caskey et al., 2013) state that avoidance of activities that may disturb breeding start a minimum of 1 month prior to western screech-owl's breeding period (i.e., mid-February) in order to account for nest-initiation and courtship behaviours. Clearing and construction is recommended to avoid the sensitive nesting and fledging period for western screech-owl (approximately mid-February to August). In the event that activities are scheduled within this sensitive period, a pre-construction sweep should be conducted to identify active nests that may be affected by the proposed development. Should an active nest be identified between, a 300 m buffer would be required with an additional 200 m during breeding season (Caskey et al., 2013).

6.4.2.1.5 Little brown myotis

As the proposed development is unlikely to impact the little brown myotis, no mitigation measures are recommended.

6.4.2.1.6 Bull trout

Mitigation measures for bull trout were addressed in the Aquatic Environment section (6.3)

6.4.2.1.7 Cutthroat trout, *lewisi* subspecies

Mitigation measures for cutthroat trout were addressed in the Aquatic Environment section (6.3).

6.4.2.1.8 Subalpine mountainsnail

A survey should be conducted to determine the presence of the subalpine mountainsnail. Should development be required where the presence of the species is confirmed, the development should be re-designed if possible. If relocation of part of the development is not feasible, a salvage permit under the BC *wildlife act* should be obtained and a salvage permit should be conducted.

6.4.2.1.9 American badger

Pre-construction sweeps for active American badger burrows should be conducted if development occurs within the existing road/Nordic trail network. Pre-construction sweeps should be conducted from April 1 to July 15 to identify active maternal and summer dens. Maternal dens are utilized for longer periods of time with young typically dispersing by mid-July (Kinder Morgan Canada Inc., 2017). Occupancy is difficult to determine in winter dens. Therefore, if clearing and construction activities are scheduled to be initiated in the winter, a pre-construction survey should be conducted prior to snowfall to identify potential dens that have evidence of recent use (Kinder Morgan Canada Inc., 2017).

6.4.2.1.10 Grizzly bear

Grizzly bears are known to use the area. This report identified potential effects ranging from loss of habitat due to development, the presence of humans reducing habitat attractiveness and impaired movement throughout the Galloway Lands. The following approach is suggested to avoid impacts through design and best management practices or to mitigate potential effects:

- Mountain biking is a risk for negative bear-human interaction. Due to the fast speed and quiet nature of bikers, it can result in sudden and unexpected encounters. Herrerro and Herrerro suggest that grizzly bears are more likely to attack if a human is closer than 50 m before being detected (Herrero and Herrero, 2000). Reduction of the bike trails on the Galloway Lands may reduce the potential for negative bike-bear interactions.
- To minimize the impact on the habitat loss and the potential reduction in movement, the Conservation and Recreation Landsand riparian setbacks along all streams will be preserved
- To minimize negative human bear encounters, a grizzly bear education and signage program should be implemented with a goal of ensuring that all visitors and public are aware of the risks and impacts associated with human-bear interactions. The program should include best practices to reduce negative human-bear interactions. Signage should include, but is not limited to, designated trails locations, and on leash - dog areas, sensitive times of the year as it relates to wildlife use, trail etiquette, etc.
- Given the impact of off-leash dogs on wildlife, dogs should be kept on-leash at all times on any trails within the Galloway Lands. No pets, or a leashed pets policy, should be considered to prevent negative interactions with wildlife.
- To avoid bear habituation, grizzly bear attractants should be avoided in the landscaping of the development.
- To minimize impact to grizzly bears, a Wildlife Management Plan section should be incorporated in the EMP. This plan should include a wildlife human interaction prevention plan that will address workers behavior around wildlife. Workers should be taught adequate behavior around wildlife to prevent wildlife harassment or attraction.

6.4.3 Valued Ecosystem Components

6.4.3.1 Wildlife trees

Wildlife trees may need to be removed for safety reasons. However, their ecosystem value is recognized and prior to removal the following measure will mitigate the impact of their loss.

- Surveys should be conducted to determine location of wildlife trees near any proposed works that may be providing residence habitat for SARA listed species and avoid impact to those trees.
- Pre-construction bird nest surveys should be conducted if timber is to be removed between April 15 to August 15, in order to comply with the *Wildlife Act*.

6.4.3.2 Wildlife movement

The Conservation and Recreation Landsand riparian setbacks along all streams will be preserved. This will preserve some of land used for movement and minimize the impact to wildlife movement.

7 Recommendations and Conclusions

In addition to the mitigation opportunities and measures presented in section 6 Opportunities/Mitigation Strategies, a number of additional recommendations are presented herein in an effort to further avoid or reduce potential adverse impacts that may be associated with the project.

7.1 Cultural Environment

7.1.1 Indigenous Communities

Follow the recommended mitigation measures presented in section 6.1.1. Most importantly, continue to engage local Indigenous communities to investigate opportunities for collaboration and capacity building.

Subject to the outcome of formal consultation by the province and ongoing engagement by the proponent, no adverse effects are identified in this Overview Assessment.

7.1.2 Recreational Activities

Section 6.1.2 discusses mitigation measures for reducing impact on public recreation. Recreation activities should be managed to protect wildlife and wildlife habitat. A comprehensive signage program for environmental education should be developed.

The impact to the recreation activities should not be a constraint to the proposed development as the Galloway Land are located on private land.

7.1.3 Other Land Uses

7.1.3.1 Trapline Areas

The impact to the trapline area should not be a constraint to the proposed development as the Galloway Lands are located on private land.

7.1.3.2 Local Government and Official Community Plan

The proposed development will impact 1.07 ha of the old growth management area, 0.56 ha of the alluvial and debris flow fan and 0.09 ha of the Lizard Creek setbacks as per the OCP.

7.1.3.3 Ungulate Winter Range

The impact to the UWR should not be a constraint to the proposed development as the Galloway Lands are located on private land.

7.2 Physical Environment

7.2.1 Climate

There are no impacts identified and no additional recommendations at this time. Climate and climate change is not expected to have an impact on the proposed development.

7.2.2 Geology and Geomorphology

Geotechnical studies may be required for the proposed development which is outside the scope of the EO.

7.2.3 Soils

Recommendations for mitigating impacts associated with soil erosion are addressed in section 6.2.3. Soil erosion from the disturbance associated with the project can be mitigated through best practices.

7.2.4 Hydrology

Risks to hydrology and water quality can by mitigated through maintaining riparian buffers and adhering to best management practices for the protection of water quality. This includes minimizing stream crossings, maintaining natural drainage patterns and protecting riparian buffers.

The overall effect on hydrology and of the project area should not be altered by the proposed development, provided appropriate management planning is implemented.

Water quality for all watercourses within the Galloway Lands as well as downstream fish bearing waters should be similarly unaffected.

7.3 Aquatic Environment

The potential impacts to water quality arising from ground disturbance can be avoided by protecting riparian and by using sound, environmentally prudent construction techniques. Any riparian vegetation that is disturbed as a result of a stream crossing should be replanted using native riparian shrubs and trees.

Stream crossings should be minimized. If stream crossings are required, the proponent should consider installing clear span bridges rather than culverts. Riparian vegetation removal should be minimized.

Implement stormwater management plans that use BMPs to protect the ecological values of receiving waters. In addition to the operational storm-water management, a drainage plan should also be developed to deal with concerns related to construction activities. This plan should adhere to the Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC Ministry of Environment, 2012).

With the implementation of the mitigation measures, impact to the aquatic environment would be minimized. However, a residual impact to the riparian vegetation of 0.09 ha. associated with the Lizard Creek Bridge is expected.

7.4 Terrestrial Environment

7.4.1 Vegetation

7.4.1.1 Rare and Endangered Plant Species

No rare and endangered plant species has the potential to occur on the Galloway Lands. Therefore, no additional recommendations are proposed. No impact to rare and endangered plant species is expected.

7.4.1.2 Rare and Endangered Plant Communities

Rare and Endangered Plant Communities should be protected during development of the Galloway Lands. The current development will not impact the rare and endangered plant community present on the Galloway Lands.

7.4.1.3 Invasive Plant Species

The proposed development should ensure that no spread of invasive plant species occurs. With adequate measures, the proposed development is not expected to contribute to the spread of invasive species.

7.4.1.4 Vegetation Loss

The proposed development should strive to minimize all losses of vegetation. Vegetation loss is inevitable. However only young second growth forest will be impacted.

7.4.2 Wildlife

Identified species at risk are considered below.

7.4.2.1 Great blue heron *herodias* subspecies

The great blue heron may be present on the Galloway Lands. Should the presence of the species be confirmed on site, the location of the Lizard Creek bridge may have to be adjusted to avoid impact to great blue heron nests. If mitigation measures presented in this report are implemented, the impact to great blue heron should be minimal.

7.4.2.2 Evening grosbeak

The evening grosbeak may be present on the Galloway Lands. However, if mitigation measures presented in this report are implemented, the impact to evening grosbeak should be minimal.

7.4.2.3 Olive-sided flycatcher

The olive-sided flycatcher may be present on the Galloway Lands. However, if mitigation measures presented in this report are implemented, the impact to olive-sided flycatcher should be minimal.

7.4.2.4 Western screech owl *macfarlanei* subspecies

The western screech owl may be present on the Galloway Lands. Should the presence of the species be confirmed on site, the location of the Lizard Creek bridge may have to be adjusted to avoid impact to western screech owl nests. If mitigation measures presented in this report are implemented, the impact to western screech owl should be minimal.

7.4.2.5 Little brown myotis

The proposed development is unlikely to impact the little brown myotis

7.4.2.6 Bull trout

The bull trout is known to occur in Lizard Creek. The loss of riparian vegetation associated with the Lizard Creek bridge may have a residual impact on the bull trout population. With the implementation of the mitigation measures presented in the Aquatic Environment Section, the impact should be minimized.

7.4.2.7 Cutthroat trout, *lewisi* subspecies

The cutthroat trout is known to occur in Lizard Creek. The loss of riparian vegetation associated with the Lizard Creek bridge may have a residual impact on the cutthroat trout population. With the

implementation of the mitigation measures presented in the Aquatic Environment Section, the impact should be low.

7.4.2.8 Subalpine mountainsnail

Presence of the subalpine mountainsnail on the Galloway Lands should be determined. Should the presence of the species be confirmed along Lizard Creek, the proposed development may impact the habitat. Implementation of the mitigation measures presented in this report would minimize the impact to the subalpine mountainsnail.

7.4.2.9 American badger

The Galloway Lands are located within identified American Badger habitat. However, the presence of the badger is not confirmed. If mitigation measures presented in this report are implemented, the impact to American badger should be minimal.

7.4.2.10 Grizzly bear

The Galloway Lands are located within identified grizzly bear habitat. However, GPS collared data and wildlife camera data suggest that the habitat use is low. The proposed development may impact the grizzly bear foraging habitat and movement, but with the implementation of the mitigation measures presented in this report, the impact should be minimized.

7.4.3 Valued Ecosystem Components

7.4.3.1 Wildlife trees

Few wildlife trees were observed during the field assessment. With the implementation of the mitigation measures presented in this report, the impact to wildlife trees should be minimal.

7.4.3.2 Wildlife Movement

Wildlife movement through the Galloway Lands is likely already impacted by the adjacent developments. With the addition of the proposed development, wildlife movement potential may be further reduced for the limited number a grizzly bear using the site. However, the creation of the Conservation and Recreation Lands and the protection of the riparian setback may minimize the impact to wildlife movement.

7.5 General Conclusions

Based on the information reviewed, the Galloway Lands appears to be suitable for the proposed development provided that potential adverse impacts arising from construction and operation are mitigated following the strategies and general recommendations described in sections 6. In addition, the Environmental Overview Assessment has identified a number of environmental opportunities and constraints. The opportunities and constraints discussed in this report should be considered by the proponent if the development proceeds.

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