Initial Project Description: Castle Project

Teck Coal Limited

Fording River Operations

April 2020

Teck

Executive Summary

Introduction

This document is an Initial Project Description (IPD) for the Teck Coal Limited (Teck) Fording River Operations Castle Project (the Castle Project or the Project) under the British Columbia (BC) *Environmental Assessment Act* (BC EAA) (SBC 2018, c 51). Together, the IPD and the Castle Project Engagement Plan (Teck 2020) are used to initiate the Early Engagement Phase of the BC environmental assessment process.

The purpose of the IPD is to provide information for interested parties to understand the Project and provide input to Teck. This allows feedback to be used to help shape the Project. The Engagement Plan includes a summary of all engagement conducted to date and outlines future engagement during the Early Engagement phase. Feedback on the IPD and the Engagement Plan will be used to support the development of a Detailed Project Description (DPD). The DPD will in turn inform the Environmental Assessment Readiness Decision, while providing a degree of Project certainty and additional details from the IPD about project design to inform the Process Planning stage. The Process Planning stage sets the scope, methods and information requirements for the assessment and defines subsequent engagement approaches with interested parties.

Fording River Operations (FRO) is a steelmaking coal mine in the Elk Valley in the East Kootenay Region of southeast BC. Beginning in the mid-2020s, less economically mineable coal will be available from the existing operating areas at FRO. Castle Mountain, located immediately south of the current mining operations at FRO, has extensive deposits of mineable steelmaking coal and represents a logical extension of FRO. Extension of mining to Castle Mountain will allow for continued, economical coal production for FRO and provide for continued contributions to the local and regional economy (the Project). To align as closely as possible with FRO's need for additional coal, the Project proposes that pre-construction would commence in 2023 and production would commence in 2026. Teck anticipates that all coal for FRO would come from the Project by the early 2030s. The Project would extend the life of FRO by several decades.

Teck continues to evaluate the coal deposits within Castle Mountain to understand the best approach to mine the deposits, factors being considered include economics, operational efficiency, safety, as well as environmental and community sustainability.

Project Components and Alternatives

The Project represents an opportunity to advance how Teck approaches mining in the Elk Valley. Potential opportunities include adopting new technologies and approaches from the outset of the Project. These include key learnings and advances from Teck's recent initiatives in biodiversity, water quality management (e.g., Saturated Rock Fill), as well as alternative mining approaches (e.g., along-strike mining). Teck is continuing to evaluate lessons learned from operations in the Elk Valley and investigating new technologies to incorporate into the Project.

As the Project would be an extension to FRO, some of the Project components and activities would be specific to the Project and some would be associated with FRO[1]. The Project would utilize existing FRO access and utilities, as well as offices and maintenance facilities; processing plant and coal product shipment facilities and transportation. The primary Project-specific components would be the Project mine pit or pits, waste rock storage areas, and related activities or facilities (e.g., construction accesses, water management).

The Project is currently at a conceptual level of design. Some Project components, such as those that exist at FRO, are well understood. Other components are currently being evaluated. The design of the Project and evaluation of these components will be informed by engagement and the environmental assessment process. Feedback during the Early Engagement Phase, along with ongoing evaluation of Project components, will allow many of these components to be further refined for the DPD.

Some components and activities for the Project are linked to the layout of FRO and Castle Mountain itself. Others are more closely linked to operational considerations but might have environmental, social, and economic implications. Project components and activities which are currently under evaluation include:

- Project infrastructure (e.g., access, power supply, support buildings)
- pit shell (size and layout of the maximum extent of all material removed)
- mining direction and technique
- waste rock storage areas design and location options
- water quality treatment and source control
- tailings management, location and technology
- material (e.g., coal, waste rock, soil) handling options

Regulatory Framework

Since the Project is currently at a conceptual design stage, Teck has not determined the exact footprint for the Project. To assess the Project against the area-based threshold for an environmental assessment under the BC EAA, Teck created a Conceptual Project Assessment Footprint. This footprint does not represent an actual design nor the final plan for the Project; but is anticipated to be similar in size to the Project once engineering designs and plans are finalized. With a possible disturbance of 2,550 ha of land not previously permitted for disturbance the Project, the Project will require an environmental assessment under the BC EAA.

Teck is in communication with the Impact Assessment Agency of Canada about the Project. Teck's current understanding is that the Project does not meet the thresholds under Section 19(a) of the *Physical Activities Regulations* and the Project does not automatically require an assessment under the *Impact Assessment Act*. Teck will continue to engage with the Impact Assessment Agency of Canada about the Project.

[1] All Project components, both new and existing as part of FRO, would be described and characterized as part of the environmental assessment Application.

Existing Environment

Coal mining related activities have been occurring in the Project region for over 50 years. Fifty years of mining activity has resulted in changes to the biophysical and human environment in the area, including cumulative effects to land, water, wildlife, Indigenous Peoples and local communities. Some of these cumulative effects are understood better than others, and over the years, Teck has been involved in many efforts to understand, minimize, and mitigate the historical and ongoing impacts of mining in the Project region. These include initiatives led by Teck and other initiatives where Teck participates as a member of multi-stakeholder groups. Teck continues to work with stakeholders on these topics and new challenges which are emerging.

The Project is located within the front ranges of the Rocky Mountains where the landscape context is characterized by wide valleys, steep slopes, and long ridgelines spotted with summits. Land cover generally consists of coniferous forests in the valley and more irregular, sparse vegetation and exposed rock at higher elevations. Vegetation in the Project region provides habitat for a variety of wildlife species.

Castle Mountain is bordered by Kilmarnock Creek and the actively mined Eagle Mountain to the north, the Fording River and the Greenhills Range to the west, and Chauncey Creek and the High Rock Range to the east and south. Drainage at Castle Mountain consists of small sized or ephemeral watercourses which eventually report to the Fording River. The Fording River flows generally south and discharges to the Elk River which ultimately flows into to the Koocanusa Reservoir approximately 100 km downstream of the mouth of the Fording River.

A number of environmentally sensitive ecological communities or habitats occur within the Project region. These include important habitats (e.g., bighorn sheep winter range, westslope cutthroat trout habitat), listed ecological communities (e.g., whitebark pine), mature and old growth forests, and wetlands.

The potential effects of the Project on environmental, economic, social, heritage and human health will be assessed as part of the Environmental Assessment Certificate Application. Teck has an extensive history in the Project region and is involved in many studies and impact mitigation programs related to current environmental conditions. Teck will work with the British Columbia Environmental Assessment Office (BC EAO), Indigenous Peoples[2] (including the Ktunaxa Nation Council), other government regulators and agencies, and Communities of Interest[3] to confirm the appropriate Valued Components and assessment methodology for the Project environmental assessment.

[2] Throughout this document, the term ‘Indigenous Peoples’ is used to refer to individual members of all ‘Indigenous Nations’. The term ‘Indigenous Nations’ is used to refer to groupings of individuals with a common heritage, culture, and governance.

[3] Teck defines Communities of Interest as any individuals or groups that may be impacted by or have the ability to influence Teck’s activities. The Engagement Plan (Teck 2020) explores this concept in more detail.

Indigenous Interests

Teck is committed to meaningful consultation and engagement with Indigenous Peoples and their involvement in informing the development of regulatory applications. As described in Teck's Indigenous Peoples Policy[4], Teck respects the rights, cultures, interests, and aspirations of Indigenous Peoples and is committed to building strong and lasting relationships that help us understand each other's perspectives and priorities. As such, Teck has begun engagement activities with affected and potentially affected Indigenous Peoples for the Project as indicated in the Engagement Plan.

Teck acknowledges the Project is within the traditional territory of the Ktunaxa Nation. The Shuswap Indian Band and the Stoney Nakoda Nation have been identified as potentially having an interest in the Project. Should other Indigenous nations be identified by the BC EAO or through self identification, Teck will consider that identification and modify its plan for future engagement.

Potential Project impacts on Indigenous interests will be identified through ongoing engagement. Some possible Project environmental considerations that might impact Indigenous interests that have been identified to date include: cumulative effects; reclamation of existing disturbance; water quality; tributary management; and temporal considerations related to the various possible impacts.

Closing

Through this IPD, Teck is providing an early design-stage overview of the Project, with the intention that this document will form the basis for discussions, which will help to shape the final design of the Project. Once the BC EAO accepts the IPD and Engagement Plan, the 'Early Engagement Phase' of the environmental assessment process formally starts. During this phase, regulators, agencies, Indigenous Peoples, and Communities of Interest have an opportunity to provide feedback on decisions that have been made about the Project, and about factors being considered in the decision-making process for project components that are still being evaluated. The Engagement Plan outlines the actions Teck intends to conduct during this phase.

The next steps in the environmental assessment process will include issuance of a Summary of Engagement by the EAO on day 90 of Early Engagement followed by the preparation of DPD. The DPD will present a more refined design for the Project, reflecting progression by Teck on supporting analysis and design, as well as consideration for input received through the Early Engagement Phase.

[4] https://www.teck.com/responsibility/approach-to-responsibility/our-commitments/policies/indigenous-peoples-policy/

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List of Abbreviations

Abbreviations	Definition
ATV	all-terrain vehicle
AWTF	Active Water Treatment Facility
BC	British Columbia
BC CDC	British Columbia Conservation Data Centre
BC EAA	British Columbia *Environmental Assessment Act*
BC EAO	British Columbia Environmental Assessment Office
BC ENV	British Columbia Ministry of Environment and Climate Change Strategy
BC EMPR	British Columbia Ministry of Energy, Mines and Petroleum Resources
BC FLNRORD	British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development
BC MMO	British Columbia Major Mines Office
C-3 Permit	C-3 Permit issued under the *Mines Act*
CCFR	combined coarse and fine rejects
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DPD	Detailed Project Description
EAC	Environmental Assessment Certificate
EPT	Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera
EV-CEMF	Elk Valley Cumulative Effects Management Framework
EVFFHC	Elk Valley Fish and Fish Habitat Committee
EVO	Elkview Operations
EVWQP	Elk Valley Water Quality Plan
FRO	Fording River Operations
GHG	greenhouse gas
GHO	Greenhills Operations
GIS	geographic information system
HEG	High Elevation Grasslands
HSEC	Health, Safety, Environment and Community
IPD	Initial Project Description
KNC	Ktunaxa Nation Council
LCO	Line Creek Operations
MYAB	Multi-Year Area Based
NO_2	nitrogen dioxide
PAG	potentially acid generating
PM	particulate matter
Project	Castle Project
RAEMP	Regional Aquatic Effects Monitoring Program
SARA	*Species at Risk Act*
SBC	Statutes of British Columbia
SC	Statute of Canada
SO_2	sulphur dioxide
SOR	Statuary Orders and Regulations
SRF	Saturated Rock Fill
TAG	Technical Advisory Group
TBE	Turnbull Mountain East
Teck	Teck Coal Limited
TSF	Tailings Storage Facilities
VC	Valued Component
WBP	Whitebark Pine
WCT	westslope cutthroat trout

List of Units

Units	
%	percent
>	greater than
≤	less than or equal to
$	Canadian dollars
ha	hectare
km	kilometre
km^2	square kilometre
m	metre
m/m	metres per metre
masl	metres above sea level
mm	millimetre
Mmtcc	million metric tonnes of clean coal
t CO2e	tonnes carbon dioxide equivalent
t/d	tonnes per day
t/yr	tonnes per year

Initial Project Description Preparation and Credits

Professionals, reviewers, and authors with primary responsibility for preparing this Initial Project Description are identified in Table 1.

Table 1: Initial Project Description Preparation Team

Company	Name	Role
Teck Coal Limited (Teck)	David Baines, MSc	Technical Reviewer, Integration
	Strahan Loken	Technical Reviewer, Integration
Golder Associates Limited (Golder)	Sara Lancaster, BSc	Technical Reviewer, Integration
	Dicksen Tanzil, PhD	Technical Author, Senior Engineer
	Kyle Knopff, PhD, RPBio	Technical Author, Senior Wildlife Biologist
	Andrew Forbes, MSc, PGeo	Technical Author, Senior Geoscientist
Ecofish Research Ltd.	Andrew Harwood, PhD, RPBio	Technical Author, Senior Fisheries Biologist

1 Introduction

This document is an Initial Project Description (IPD) for the Teck Coal Limited (Teck) Fording River Operations (FRO) Castle Project (the Castle Project or the Project) under the British Columbia (BC) *Environmental Assessment Act* (BC EAA) (SBC 2018, c 51). The BC EAA also requires an Engagement Plan (Teck 2020) that describes how Teck plans to share information about the Project and have discussions during Early Engagement to inform completion of a Detailed Project Description (DPD).

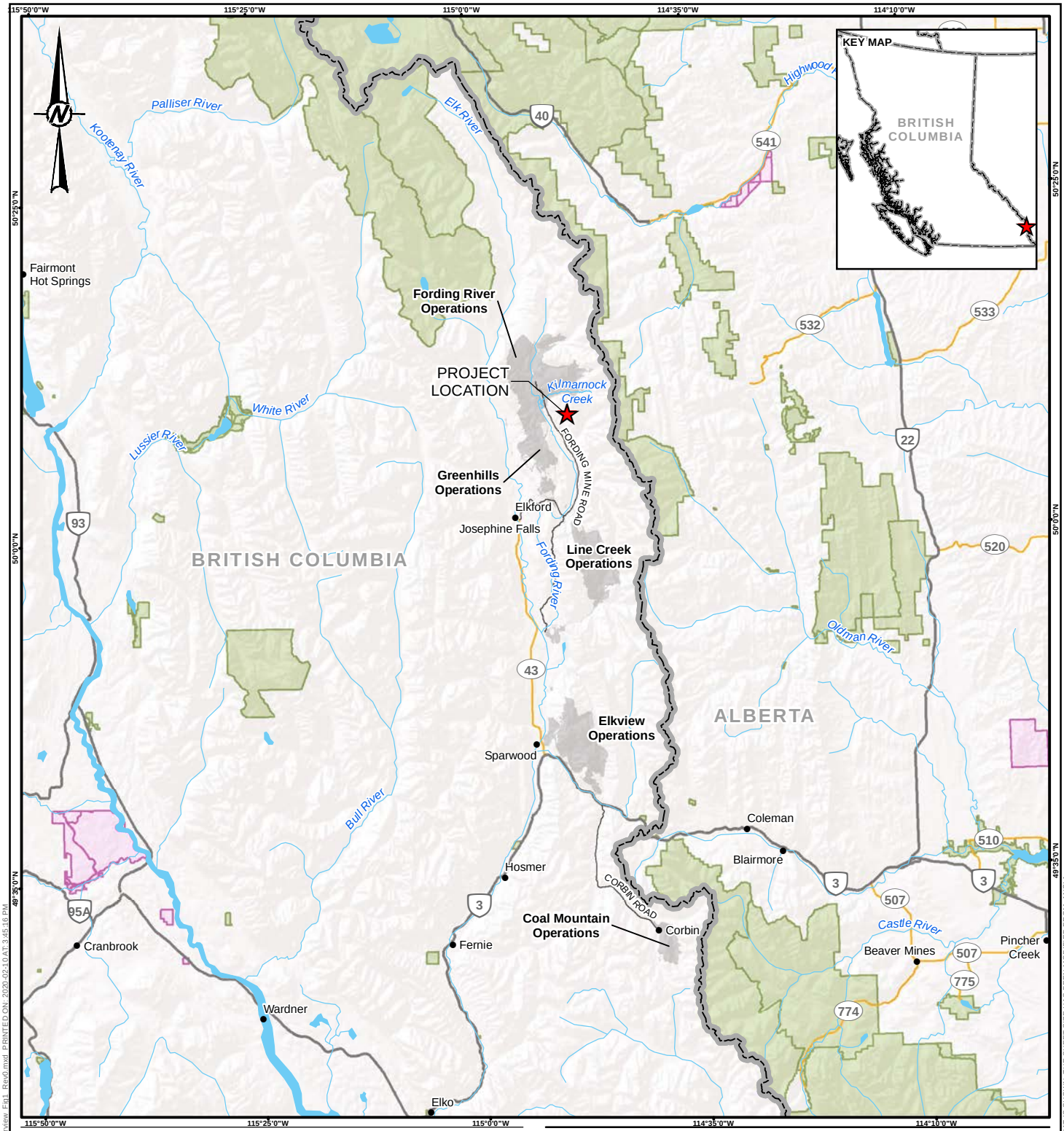
Fording River Operations is a steelmaking coal mine in the Elk Valley of southeast BC. The Project would be an extension to FRO's mining area to extend its lifespan for many decades. The Project would use existing infrastructure at FRO while mining on Castle Mountain. Castle Mountain is located directly south of FRO (Photo 1, Figure 1) Teck's Project is currently at a conceptual level of design. Some Project components, such as those that exist at FRO, are well understood. Other components are currently being evaluated.

The BC Environmental Assessment Office (BC EAO) has provided guidance on the requirements for an IPD (BC EAO 2019). Following BC EAO guidance, this IPD has been written early in the design process before all Project components have been selected[5]. This will allow feedback to be used to help shape the Project.

Together, the IPD and Engagement Plan are used to initiate the Early Engagement Phase of the environmental assessment process. The purpose of the IPD is to provide information for interested parties to understand the Project and provide input to Teck. The Engagement Plan includes a summary of all engagement conducted to date and outlines future engagement. Feedback on the IPD and Engagement Plan will be used to support the development of a DPD. The DPD will in turn be used to inform an Environmental Assessment Readiness Decision while providing a degree of certainty and additional details from the IPD about project design to inform the Process Planning stage which sets the scope, methods and information requirements for the assessment.

Photo 1: Fording River Operations looking southeast (left). Photo to the right shows Fording River Operations coal processing plant and a waste rock storage area (purple shading) with Castle Mountain directly to the south (blue shading).

[5] Section 3.4.2 discusses Project components that are flexible, constrained, selected or rejected



LEGEND

- CITY / TOWN / COMMUNITY
- FRO CASTLE PROJECT
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- ROAD
- WATERCOURSE
- BRITISH COLUMBIA - ALBERTA BOUNDARY
- COAL MINING OPERATION
- FIRST NATIONS RESERVE
- PROVINCIAL PARK / PROTECTED AREA
- WATERBODY

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REFERENCE(S)

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DATUM: NAD 83 PROJECTION: UTM ZONE 11

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

TITLE
REGIONAL LOCATION OF FORDING RIVER OPERATIONS AND THE CASTLE PROJECT (NTS 082G/082J)

Teck

YYYY-MM-DD	2020-02-10
DESIGNED	SH
PREPARED	DR
REVIEWED	LK
APPROVED	DB

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2 Company Information

2.1 Company Overview

Teck Resources Limited is Canada's largest diversified mining company. It has major business units focused on:

- base metals (copper and zinc)
- energy
- steelmaking coal

Teck Coal Limited (Teck), a wholly owned subsidiary of Teck Resources Limited, is the leading North American producer of steelmaking coal. It has five operating open-pit coal mines in Western Canada (Figure 1):

- Fording River Operations
- Greenhills Operations
- Line Creek Operations
- Elkview Operations in the Elk Valley of southeastern BC
- Cardinal River Operations in west-central Alberta

Together, these operations account for an annual production capacity of over 26 million metric tonnes of high-grade steelmaking coal.

Teck has two operations in care and maintenance, Coal Mountain Operations in southeast BC and Quintette in northeast BC.

2.2 Company Contact Information

The Castle Project proponent is Teck. The headquarters and corporate office contact information is as follows:

Headquarters Office:

Teck Resources Limited
Suite 3300, 550 Burrard Street
Vancouver, BC V6C 0B3
T: 604.699.4000 / F: 604.699.4750

Corporate Office:

Teck Coal Limited
Suite 1000, 205 - 9th Avenue SE
Calgary, Alberta T2G 0R3
T: 403.767.8500 / F: 403.265.8794

Website: www.teck.com

For the purposes of the Castle Project Environmental Assessment, the primary contact person is:

David Baines
Senior Lead Regulatory Approvals
Bag 2000
421 Pine Avenue
Sparwood, BC V0B 2G0
T: 250.425.8465 / F: 250.425.9873
Email: David.Baines@teck.com

2.3 Corporate Policies

Teck Resources Limited, and all of its operations, is committed to responsible business practices in all aspects of its activities. The Safety and Sustainability Committee of the Board of Directors provides policy direction and monitoring of the company's environmental, social, and safety performance[6].

Teck's company-wide commitments are outlined in the following key sustainability policy documents.

- The *Code of Sustainable Conduct* and *Our Strategy for Sustainability* outline the company's commitment to sustainable development, focusing on aspects such as community and environmental performance.
- The *Code of Ethics* sets out the company's dedication to upholding high moral and ethical standards, specifying basic business conduct and behavior.
- The *Health and Safety Policy* sets out the company's commitment to providing leadership and resources for entrenching the core value of safety.
- The *Human Rights Policy* sets out the company's commitment to respecting the rights of employees, the communities in which the company operates, and others affected by the company's activities.

[6] https://www.teck.com/responsibility/approach-to-responsibility/our-commitments/policies/

- Teck's *Indigenous Peoples Policy* sets out the company's aim to integrate the perspectives of Indigenous Peoples into company decision-making throughout the mining life cycle and to create lasting benefits that respect their unique interests and aspirations.
- Teck's *Water Policy* sets out the company's commitment to protect water and the life it sustains by being an industry leader in water stewardship, including the safe, efficient and sustainable use, reuse, management, treatment and discharge of water.
- Teck's *Inclusion and Diversity Policy* Sets out the company's commitment to supporting an inclusive and diverse workplace that recognizes and values differences.
- Teck's *Tax Policy* sets out the company's commitment to be transparent, cooperative, compliant, and ethical in all tax matters.
- Teck's *Expectations for Suppliers and Contractors* sets out the company's expectations for suppliers of goods and contractors performing services for or on behalf of Teck.

Teck's Health, Safety, Environment and Community (HSEC) Management System provides a structure for implementing the company's sustainability commitments. The HSEC system includes overarching corporate policies, the HSEC Management Standards, guidelines and site-level policies and procedures.

3 Project Information

This section of the IPD includes a general discussion of the Project. This section focuses on Teck's present understanding of:

- Project purpose and rationale
- Project location and history
- Project description

Teck is seeking feedback on the concepts raised in this IPD. That feedback will inform future decision making on the Project. The BC EAO will provide a list of public comments and issues, to be addressed in the DPD, in the BC EAO Summary of Engagement. Teck will provide a response to the feedback and more concrete Project information in the DPD to be submitted in the future in support of the Environmental Assessment Readiness Decision.

3.1 Purpose and Rationale

The Castle Project would be located at FRO. Fording River Operations is a wholly owned subsidiary of Teck Coal Limited. It has been in operation since 1972. Teck has been the sole owner of FRO since 2008. To date over 280 million metric tonnes (Mmtcc) of primarily steelmaking coal has been produced for sale to consumers around the world (e.g., North America, Europe, Korea, Japan, China, and India). Currently, FRO supports over 1,400 employees and contributes significantly to local economies in BC (i.e., Elkford, Sparwood and Fernie) and Alberta (i.e., Crowsnest Pass). A formal mine-property tax sharing agreement, contributes over $9 million annually to the District of Sparwood, City of Fernie, District of Elkford and Area A of the Regional District of East Kootenay.

The purpose of the Project is to extend the lifespan of FRO by many decades. This would extend the FRO's economic and social benefits throughout this extended lifespan. These benefits are shared by:

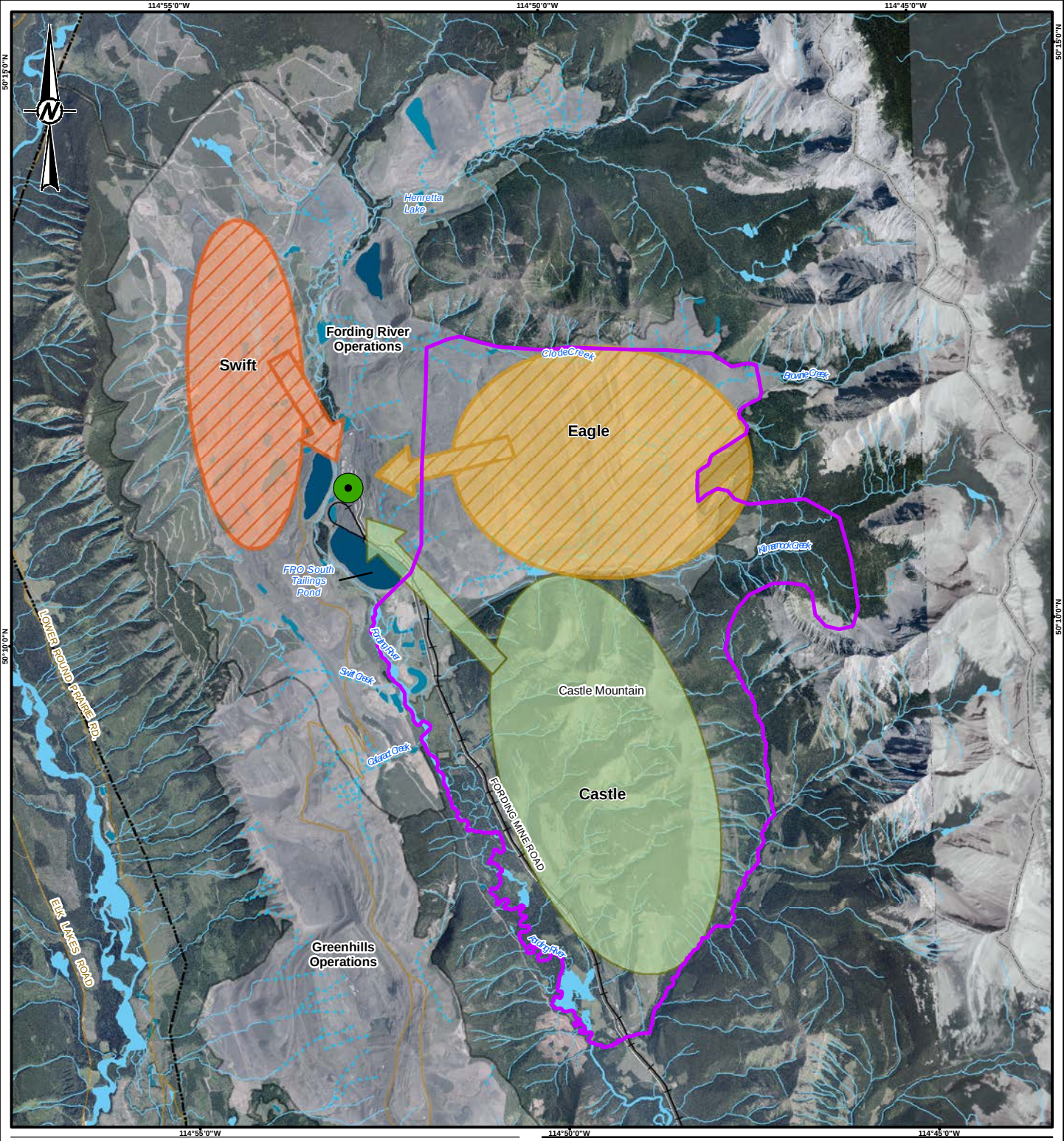
- employees of Teck and their families
- Indigenous Peoples
- local communities
- regional economies
- BC and federal taxpayers

Fording River Operations currently produces coal from the Eagle and Swift operating areas (Figure 2). Beginning in the mid-2020s, less economically mineable coal will be available from these operating areas. Castle Mountain, located immediately south of the current mining operations at FRO, has extensive deposits of mineable steelmaking coal and represents a logical extension of FRO. Extension of mining to Castle Mountain will allow for continued, economical coal production for FRO and provide for continued contributions to the local and regional economy. Teck anticipates that all coal for FRO would come from the Project by the early 2030s (Figure 2).

Fording River Operations currently represents a third of Teck's Coal Business Unit value. The Coal Business Unit represents approximately half of Teck Resources Limited's overall business value. The Project is critical to maintaining the viability of Teck's operations and business in the Elk Valley.

The Project would open a pit (or pits) on Castle Mountain. Castle Mountain has a large coal resource that could allow FRO to operate for many decades. Advantages of FRO mining on Castle Mountain include:

- use of existing FRO disturbance area to limit the Project footprint
- use of existing FRO access roads and power lines to limit the Project footprint
- applying and integrating, where possible, existing and/or planned FRO water management plans and treatment infrastructure to the Project to limit the Project footprint and expedite mitigation of water quality impacts
- applying and integrating, where possible, existing and/or planned FRO combined coarse and fine rejects (CCFR) and tailings materials handling and storage infrastructure to the Project to limit the Project footprint
- incorporation and alignment of Project plans to existing FRO and Teck regional environmental management plans and programs



LEGEND

- RAILWAY
- ROAD - PAVED
- ROAD - UNPAVED
- TRANSMISSION LINE
- SUBSURFACE FLOW WATERCOURSE
- SURFACE FLOW WATERCOURSE
- SEDIMENT POND
- TAILINGS POND
- WATERBODY
- COAL MINING OPERATION
- CONCEPTUAL PROJECT AREA

FRO COAL PROCESSING PLANT

- PLANT SITE

CURRENT FRO COAL PRODUCTION

- COAL FROM SWIFT
- COAL FROM EAGLE

PROJECT FRO COAL PRODUCTION

- COAL FROM CASTLE

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CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

TITLE
PRESENT AND PROPOSED COAL SUPPLY AT FORDING RIVER OPERATIONS (NTS 082J)

Teck

YYYY-MM-DD	2020-02-10
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PREPARED	DR
REVIEWED	LK
APPROVED	DB

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3.2 Project Location

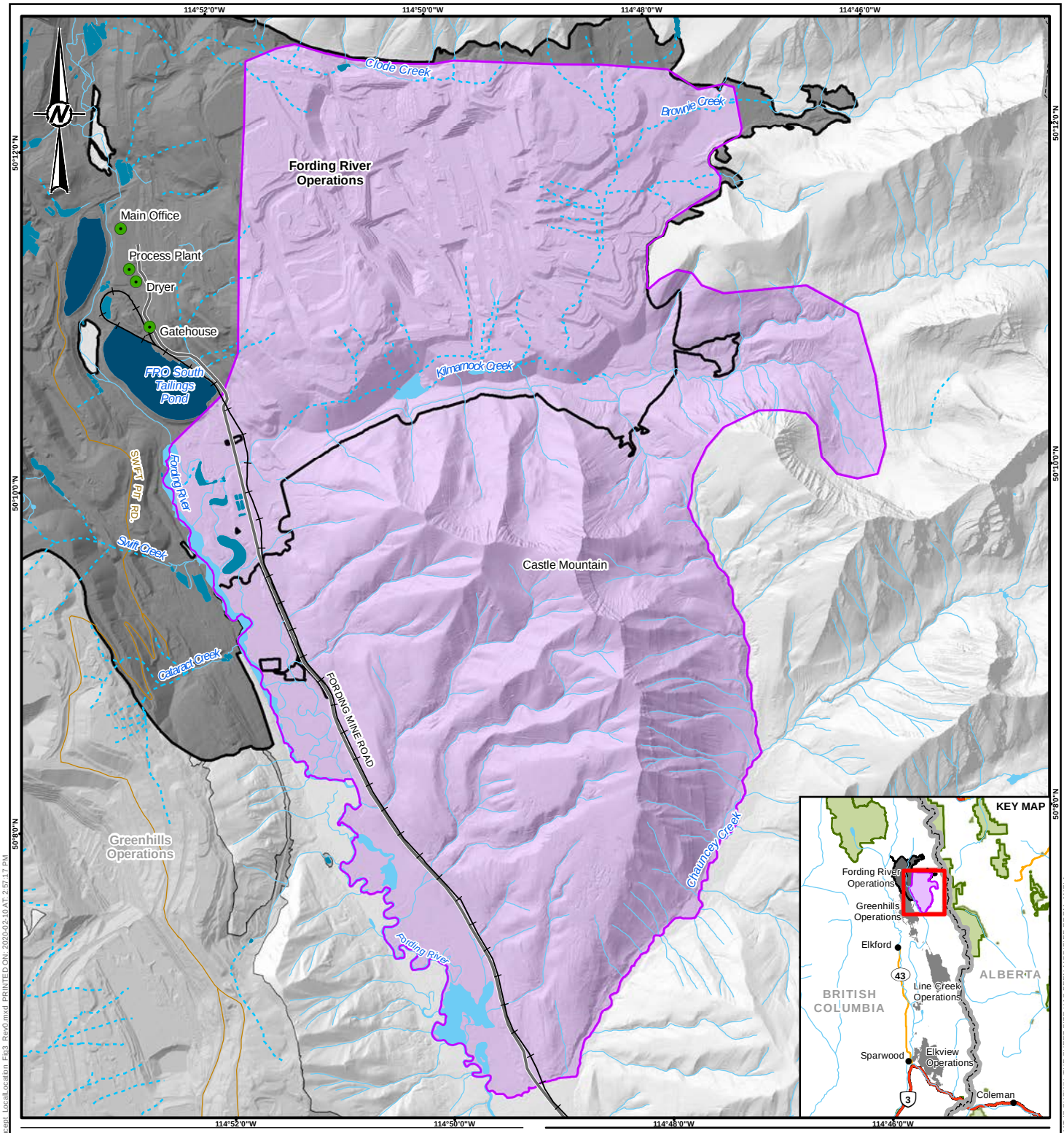
The Project would be located within the East Kootenay Region in southeastern BC (Figure 1). The Project is located in the Regional District of East Kootenay (population 60,439) and in the traditional territory of the Ktunaxa Nation. The closest Elk Valley community is Elkford (population 2,499), located approximately 30 km driving distance southwest of the Project. Sparwood (population 3,784) is the next nearest community (approximately 60 km driving distance from the Project). Fernie (population 5,249) in the Elk Valley and Crowsnest Pass, Alberta (population 5,589) are both approximately 100 km away from the Project. The nearest seasonal residence is a trapper's cabin, located approximately 1.3 km away from the Project.

The Project would be partially located on Castle Mountain and partially within the permitted FRO footprint (Figure 3). Since the Project is currently at a conceptual stage, the conceptual Project area in Figure 3 includes all areas where Project infrastructure and direct impacts could occur. The final Project designs and plans will have a smaller area and will not directly impact all land within the conceptual Project Area.

The conceptual Project area is based on watersheds and existing disturbance. It includes Castle Mountain and portions of the FRO's Eagle operating area. It is bounded on the west and southwest by the Fording River, on the east and southeast by Chauncey Creek, and on the north by the northern edge of FRO's Eagle operating area.

Castle Mountain is bounded on the west and southwest by the Fording River, on the east and southeast by Chauncey Creek and on the north by Kilmarnock Creek. Kilmarnock Creek is also the southern boundary of the existing FRO permitted area (*Mines Act* C-3 Permit area). Kilmarnock and Chauncey creeks are in the Fording River drainage basin, a tributary of the Elk River.

The Project would be located primarily on Crown land coal leases held by Teck, with portions of the Project on fee simple land owned by Teck (Figure 4). Access to the Project is north from Highway 3 via Highway 43 (Elk Valley Highway) from Sparwood to Elkford and then approximately 30 km north on the Fording Mine Road. Section 6.4.1 provides more information on land use and tenure in the Project region.



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- RAILWAY
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- ROAD - UNPAVED
- SUBSURFACE FLOW WATERCOURSE
- SURFACE FLOW WATERCOURSE
- CONCEPTUAL PROJECT AREA
- FRO C3 PERMIT BOUNDARY
- GHO C-137 PERMIT BOUNDARY
- SEDIMENT POND
- TAILINGS POND
- WATERBODY

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DATUM: NAD 83 PROJECTION: UTM ZONE 11

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

TITLE
CASTLE PROJECT LOCATION IN RELATION TO LOCAL FEATURES (NTS 082J)

YYYY-MM-DD	2020-02-10
DESIGNED	SH
PREPARED	DR
REVIEWED	LK
APPROVED	DB

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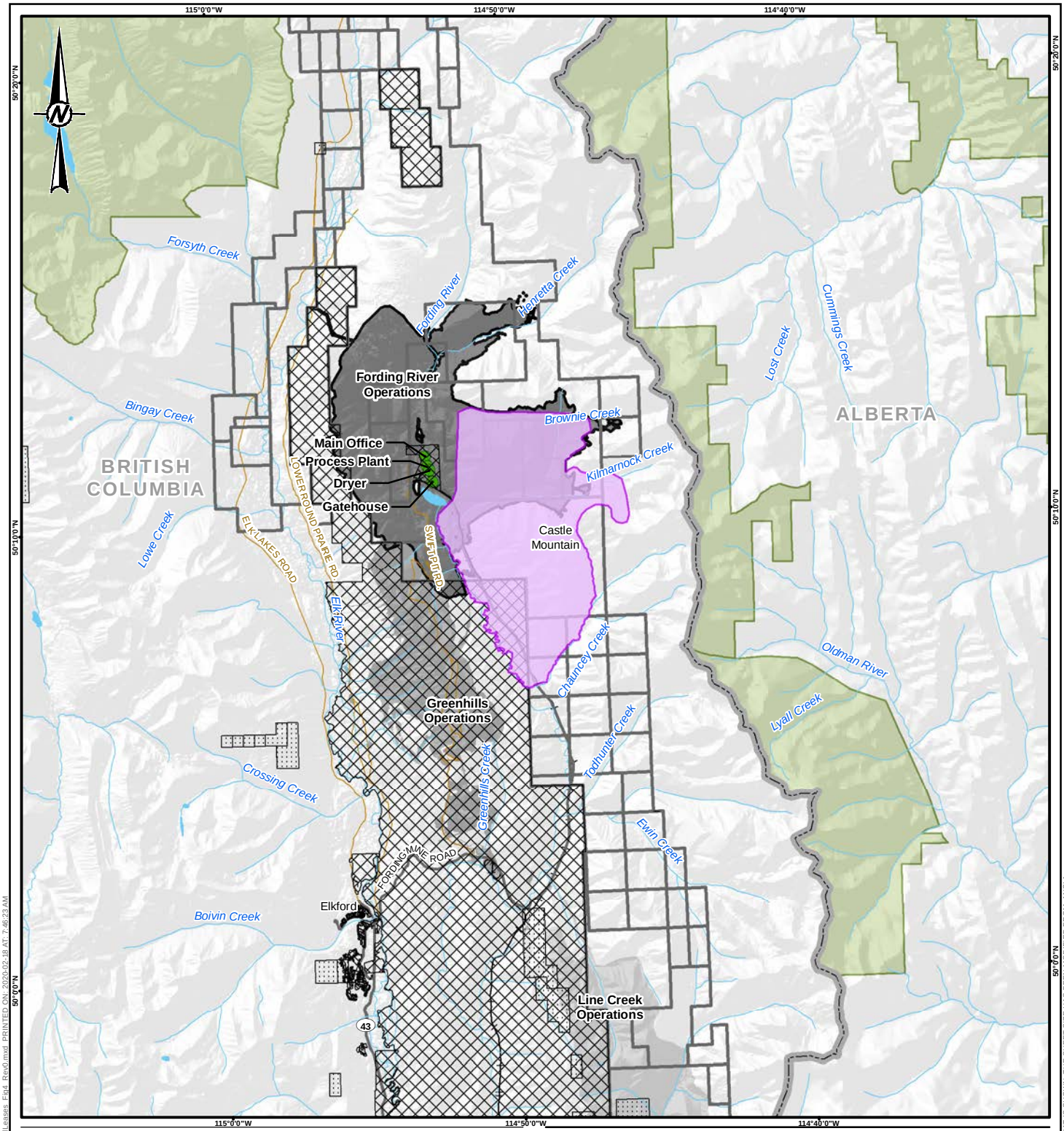

LEGEND

- CITY / TOWN / COMMUNITY
- FACILITY
- RAILWAY
- ROAD - PAVED
- ROAD - UNPAVED
- WATERCOURSE
- BRITISH COLUMBIA - ALBERTA BOUNDARY
- CASTLE PROJECT AREA
- TECK COAL LEASES AND LICENCES
- FRO APPROVED PERMIT BOUNDARY
- GHO APPROVED PERMIT BOUNDARY
- LCO APPROVED PERMIT BOUNDARY
- MINERAL CLAIM TENURE
- PRIVATE OWNERSHIP
- PARK/PROTECTED AREA
- WATERBODY

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REFERENCE(S)

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DATUM: NAD 83 PROJECTION: UTM ZONE 11

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

TITLE
TECK COAL LEASES IN THE PROJECT REGION (NTS 082G/082J)

YYYY-MM-DD	2020-02-18
DESIGNED	SH
PREPARED	DR
REVIEWED	LK
APPROVED	DB

PROJECT NO.	PHASE	REV.	FIGURE
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3.3 Project History and Status

The Castle Project would form part of FRO. Fording River Operations is a wholly owned subsidiary of Teck Coal Limited. Starting in 1969, FRO was owned and constructed by the Canadian Pacific Railway and Cominco. In 2003, FRO became part of the Fording Canadian Coal Trust and Elk Valley Coal Corporation. In 2008, Teck moved from being a shareholder in Elk Valley Coal Corporation, to becoming the full owner of FRO.

The early history of the Project starts when FRO started. Exploration in the Project area started in 1969 in conjunction with exploration for FRO. Additional exploration efforts have occurred through the years since. The middle history of the Project starts when FRO began to include it as a possible part of FRO's future. For example, in 2010 the Project was included in FRO's reserves reporting. The recent history of the Project starts in 2017 when a team was formed to evaluate how to develop the Project. Preliminary engagement on the Project started in 2018. Baseline studies to support an environmental assessment started in 2018. Those studies continued in 2019 and are planned to continue in 2020.

During early scoping of the Project, Teck proposed to extend FRO mining to the Castle and Turnbull Mountain East (TBE) areas. At the time (early scoping), information and feedback from the Ktunaxa Nation Council (KNC) and government agencies, from other project application review processes and various regional initiatives, was available for Teck to review and consider in the context of the Project. Following this internal consideration, Teck evaluated the Castle and TBE mining areas against environmental factors of concern, combined with resource and economic value to the business, to provide a recommendation on the scope of the Project. The outcome of this work was to remove TBE from the Project scope, defer TBE in the FRO mine plan in the interim, and advance the engineering, environmental and regulatory processes for the Castle mining area only.

In 2018 Teck received a Multi-Year Area Based (MYAB) permit (CX-5-022), that approves exploration and geotechnical activities on Castle Mountain[7]. This five-year permit authorizes Teck to conduct:

- exploration and geotechnical drilling
- test pitting
- pad building (for the drill programs)
- road building (to access the drill pads)

Three of the culverts installed as part of the 2019 road building activities required and received approval under the *Water Sustainability Act*. Ongoing exploration under the MYAB permit will require similar approvals in the future.

Prior to beginning each year's activities, the MYAB permit requires Teck to submit that year's work plan to the British Columbia Ministry of Energy, Mines and Petroleum Resources (BC EMPR). At the end of the year, Teck reports on all exploration activity completed.

[7] Feedback received from the KNC during the MYAB permitting process is briefly described in Section 5. It is also discussed in the Engagement plan in Section 6.5.3.

This IPD is the first regulatory submission to the BC EAO related to the Project. The Early Engagement Phase of the environmental assessment process will start once the BC EAO accepts the IPD and the Engagement Plan.

3.4 Project Description

This section of the IPD describes key aspects of the Project and focuses on:

- Project components and activities and a rationale for why some of the components are considered flexible, constrained, selected, or rejected
- waste, emissions and discharges
- public and environmental safety

3.4.1 Summary of Project Components and Activities

The Project would use existing infrastructure at FRO while mining on Castle Mountain. Project planning and design will:

- leverage Teck's coal mining experience in the Elk Valley
- advance the use of new and innovative technologies where they are technically and economically feasible
- evaluate opportunities to avoid potential impacts to important environmental factors such as terrestrial ecosystems and tributaries
- evaluate opportunities to integrate environmental risk management and mitigations directly into Project design and planning
- align with and contribute to addressing regional programs and challenges, including progress around these topics, associated with mining in the Elk Valley (Section 6.1).

As the Project would be an extension to FRO, some of the Project components and activities would be specific to the Project and some would be associated with FRO. The FRO components and activities are part of current mining activities and subject to existing permits and approvals. Section 4.4 discusses the existing permits and approvals for FRO that would need to be amended for the Project. All Project components, both new and existing as part of FRO, would be described and characterized as part of the Project environmental assessment.

New Project specific components and activities include:

- laydown areas and access roads on Castle Mountain
- satellite office(s), warehouses, maintenance and fueling facilities[8]
- linkages to FRO power and utilities[9]
- satellite explosives magazine(s)
- a mine pit or pits on Castle Mountain
- waste rock storage areas
- additional fine tailings storage to augment the existing FRO facilities that would also be used
- water management that aligns with the Elk Valley Water Quality Plan (EVWQP) and meets existing and future permit requirements

Ongoing FRO components and activities that would support the Project include[10]:

- access roads (Fording Mine Road, Highways 3 and 43), rail spur, power and utilities
- office, warehouses, maintenance, and coal processing plant facilities with associated coal stockpiles, tailings and CCFR handling and storage, water treatment and sewage facilities
- explosives storage, manufacturing, and delivery systems
- mining equipment including drills, shovels, and haul trucks
- transport of final coal product via rail to customer markets; including product that travels through port facilities in Vancouver

The Conceptual Project Assessment Footprint discussed in Section 4.1 suggests that the Project would require approximately 2,550 ha outside of the current FRO *Mines Act* C-3[11] Permit boundary. The Project would also require approximately 1,550 ha within the C-3 Permit boundary for placement of waste rock (Section 3.4.2.6). The Conceptual Project Assessment Footprint does not include currently active FRO facilities that would support the Project (Section 3.4.2.3).

Over the proposed two-year pre-construction period, it is estimated that the Project would create several hundred additional direct and / or indirect jobs. It is currently assumed that FRO would remain at approximately 1,400 direct employees through the operational phase of the Project.

[8] Non-potable water for the buildings on Castle Mountain could be supplied from a new water well with a new license.

[9] A short extension, transformers and distribution lines would be required to connect all Project components to the existing FRO power supply.

[10] All Project components, both new and existing as part of FRO, would be described and characterized as part of the Project environmental assessment.

[11] The FRO Mines Act C-3 boundary encompasses an area of 6,933 ha.

3.4.2 Rationale for Project Components and Activities

This section of the IPD includes a general discussion of the rationale for Project components and activities. This section highlights Project components and activities that are:

- flexible – the option is subject to change based on design progress and feedback
- constrained – the option is subject to change based on design progress and feedback, but there are limitations
- selected – the option has been chosen for further design and planning
- rejected – an option will not be included in the Project

As noted in Section 1, Teck will gather feedback on the concepts raised in this IPD. That feedback will inform future decision making on the Project. Teck will provide a response to the feedback and intends to have selected specific options from those discussed below for inclusion in the DPD.

3.4.2.1 Project Mining Area

This section of the IPD provides a brief description of the rationale for the Project mining area (Table 2). Teck has made a decision about Project mining area based on technical considerations as well as feedback received from the KNC, regulators, agencies, and other Communities of Interest.

Table 2: Rationale for Project Mining Area

Mining Area	Considerations	Status
Mining on Castle Mountain and/or the east end of Turnbull Mountain The Project's intent is to supply additional coal to FRO. Coal is available on Castle Mountain. Coal is available on the east end of Turnbull Mountain (Turnbull East or TBE). Development of either area would be within the context of existing regional environmental challenges (Section 6.1).	Castle Considerations: • Castle Mountain has large reserves of economically mineable coal and it might be possible to create a mine with a high ratio of coal produced to disturbance area. • Castle Mountain could support FRO's production rate on its own. TBE Considerations: • TBE has smaller reserves of economically mineable coal (around 10% of Castle Mountain). • TBE could support around one quarter of FRO's production rate and would need to operate in parallel with other pits.	***Selected*** The Project will include mining on Castle Mountain only. ***Rejected*** The Project will not include mining on TBE. Decision informed by previous and ongoing feedback on regional environmental challenges.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

FRO = Fording River Operations; TBE = Turnbull Mountain East; the Project = Castle Project.

3.4.2.2 Project Timing

This section of the IPD provides a brief description of the rationale for Project timing (Table 3). Project timing is closely tied to the timing of FRO's expected decrease in economically mineable coal, Project pre-construction requirements, and final designs for the Project pit(s) (Section 3.4.2.4). The only known seasonal timing constraint on the Project is related to pre-construction activities in terms of when pre-construction can start and when certain pre-construction activities can take place.

Table 3: Rationale for Project Timing

Timing Component	Considerations	Status
Preconstruction Start Prior to production start (mining), pre-construction activities must be complete including: • Construction of local access • Construction of initial water management infrastructure • Stripping of vegetation and soils • Stripping of waste rock • Construction of satellite infrastructure • Connecting to FRO power and utilities	Pre-construction can only begin after all permits and approvals have been received. Regulations and Teck's environmental management policies and practices require that pre-construction takes place during appropriate seasonal windows (e.g., avoiding clearing during nesting season, avoiding soil stripping under frozen or wet conditions). Safety requires that pre-construction takes place when there are low risks from weather, snow, and avalanche conditions. Preconstruction might take two or more construction seasons.	***Constrained*** Pre-construction would start, if possible, more than two years prior to Project start (e.g., in 2023). Pre-construction activities have specific regulatory, environmental, and safety timing constraints.
Production Start Production start is defined as when sufficient pre-construction has occurred to allow coal from the Project to start to supply FRO.	FRO's current coal supply will start to reduce in the mid 2020s. The Project's intent is to make up for this reduction of economically mineable coal.	***Constrained*** Align as closely as possible with FRO's need for additional coal. Production start aiming for 2026.
Operations (Duration) The duration of the operational phase of the Project (from start of production to closure) is dependent on the rate of mining and the available mineable coal.	The production rate at FRO is 10 million metric tonnes clean coal per year. There are no plans at this time to change the production rate at FRO. Any future changes to production rate would be subject to a separate regulatory process. The Project mining rate is intended to meet the permitted FRO production rate. The size of the Project pit or pits is still under assessment (flexible). As such, the duration of the Project is still under assessment. Based on early assessments of the mineable coal reserves on Castle Mountain the Project duration could be several decades.	***Flexible*** The Project duration will be determined once the design and plans for the Project pit or pits are finalized

Table 3: Rationale for Project Timing

Timing Component	Considerations	Status
Active Closure (Duration) The duration of the active closure phase of the Project runs from end of operations to post closure. Active closure includes measures related to site wide water management, measures for the closure of mine waste facilities, and closure/decommissioning of site infrastructure.	Project active closure would be integrated into and aligned with the existing FRO Five Year Mine Reclamation Plan, as updated. Duration for active closure is dependent on the configuration of the operation as it enters the active closure stage. Reclamation activities are expected to take at least five years. Efforts taken during operations including interim and progressive reclamation might reduce the duration of active reclamation.	***Constrained*** The active closure duration is expected to take at least five years depending on configuration of the operation at closure
Post Closure (Duration) The duration of the post closure phase of the Project runs from end of active closure to an alternate future land-use. Post closure possibly includes monitoring, reporting, and, if necessary, further active closure activities.	Project post closure would be integrated into and aligned with the existing FRO Five Year Mine Reclamation Plan, as updated. Duration for post closure is dependent on future monitoring requirements, water treatment requirements, and aligning with future land-use.	***Constrained*** The post closure duration is expected to continue until other uses of the land commence.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

FRO = Fording River Operations; the Project = Castle Project.

3.4.2.3 Use of Existing Infrastructure

This section of the IPD provides a brief description of the rationale for the Project use of existing infrastructure (Table 4). As noted in Section 3.4.1, the Project would be supported by existing FRO infrastructure. Some of that infrastructure would be augmented by satellite facilities located near the proposed mining operations.

Table 4: Rationale for Project use of Existing Infrastructure

Existing Infrastructure Component / Activity	Considerations	Status
Regional road access to the Project Regional road access to the Project would be required for movement of: • Workers • Equipment and supplies	FRO is currently accessed by Highway 3 and 43 and the Fording Mine Road. Castle Mountain is directly south of FRO and adjacent to the Fording Mine Road.	***Selected*** Existing regional road access would meet Project needs.
Regional electrical supply for the Project Regional electrical supply for the Project would be required for: • Buildings and facilities • Electric shovels • Possible haul truck trolley assist • Possible conveyors	Electrical power for FRO is supplied by the Kan-Elk Transmission line via the Britt Creek spur from the northwest. Castle Mountain is directly south of FRO. Preliminary electrical supply assessment indicates that the Project would not require more electricity than can be supplied from the regional system.	***Selected*** Existing FRO electrical supply would meet Project needs.
Project coal processing Coal from the Project would need to be processed prior to distribution to market	The mining rate of the Project is intended to align with the available processing capacity of the FRO coal processing facilities.	***Selected*** Existing FRO coal processing facilities would meet Project needs[(a)].
Project coal distribution Coal from the Project would need to be distributed to market	Coal distribution for FRO uses an existing rail loop and loading facilities Project coal would be processed through the existing FRO Processing Plant.	***Selected*** Existing FRO coal distribution facilities would meet Project needs[(b)].
Raw and processed coal stockpiles Coal stockpiles are required to smooth out variations in mining rate, processing rate, and loading rate. They also allow blending of coal from different parts of the mine.	Coal stockpiles at FRO allow for operational flexibility meeting both processing plant and customer needs. The Project could continue to use the existing stockpiles.	***Selected*** Existing FRO coal raw and processed coal stockpiles would meet Project needs[(c)].

Table 4: Rationale for Project use of Existing Infrastructure

Existing Infrastructure Component / Activity	Considerations	Status
Maintenance shops, warehousing, dry, office, etc The Project will require buildings to house mine support activities including: • Administration • Planning/engineering • Supply • Maintenance	The buildings and infrastructure at FRO provide for the existing operations. The Project could continue to use the existing buildings. The Project might require additional support closer to the proposed mine pit.	***Selected*** Existing FRO buildings would continue to be used with the possible addition of some satellite facilities.
Explosives storage, manufacturing, and delivery The Project will require explosives to mine the waste rock and coal.	The explosives storage, manufacturing, and delivery systems at FRO provide for the existing operations. The Project could rely on the existing manufacturing and delivery systems as well as the main storage facilities. The Project might require an additional explosives magazine closer to the proposed mine pit.	***Selected*** Existing FRO explosives storage, manufacturing, and delivery systems would continue to be used with the possible addition of a satellite magazine.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

(a) See Section 8 for information regarding water use for processing (and other project components).
(b) FRO coal processing components and activities include the processing plant, water supply and management for processing, and processing wastes including fine tailings and CCFR.
(c) Some Project alternatives might require additional stockpiles (Section 3.4.2.9).
FRO = Fording River Operations; the Project = Castle Project.

3.4.2.4 Pit Shell

This section of the IPD provides a brief description of the rationale for the Project pit shell (Table 5). The coal resource in Castle Mountain could support many decades of mining however there are geotechnical, geological, environmental, and social considerations that will be evaluated during the mine design and planning process to determine the size of the pit shell.

Castle Mountain's geology and geotechnical conditions constrain the Project design, including the pit shell. This is due to the Ewin Pass Thrust Fault's relatively central location within the mountain and the steep westerly dipping strata near the height of land (Figure 5).

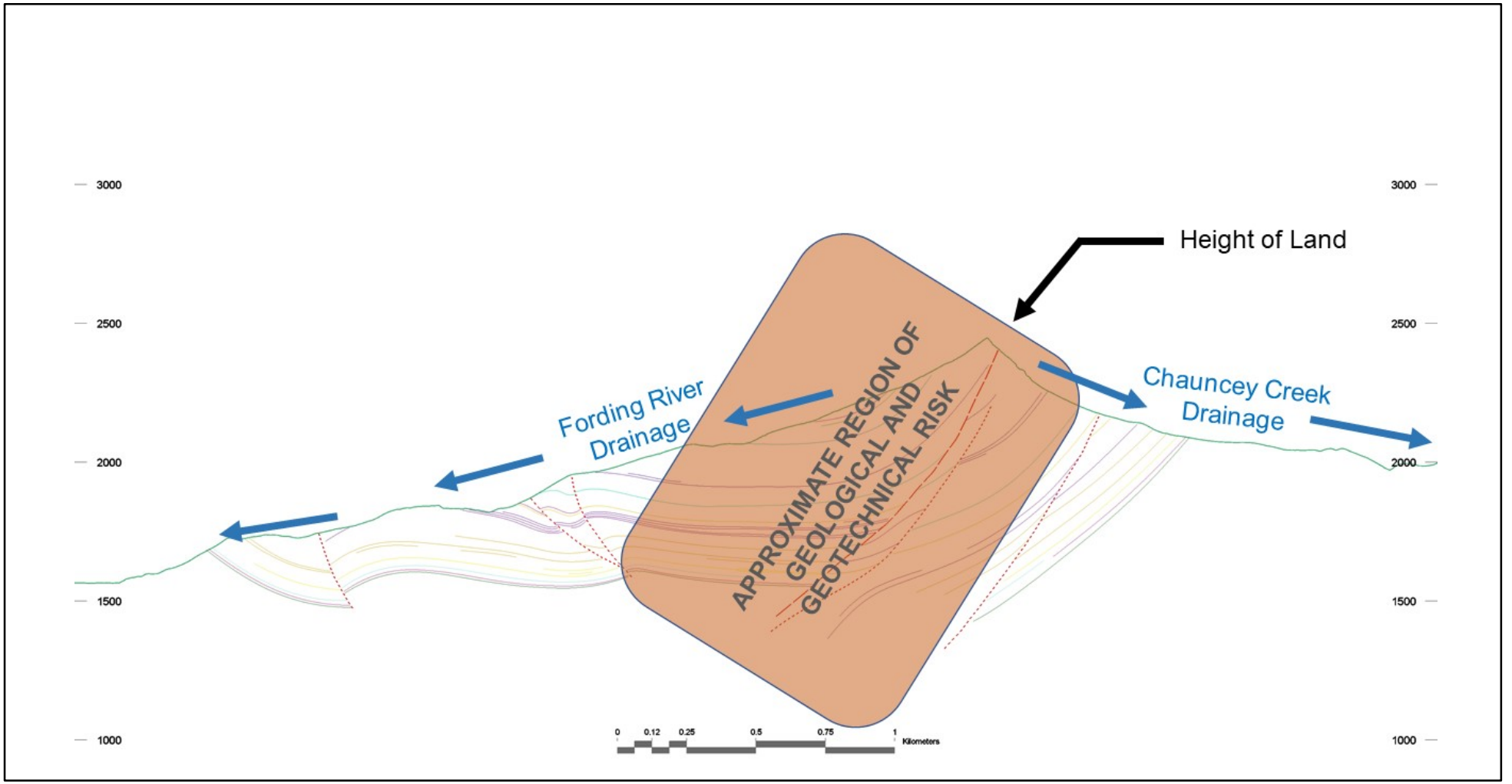
Table 5: Rationale for Project Pit Shell

Pit Shell	Considerations	Status
Pit Shell "Pit shell" is a technical term that describes the size and layout of the maximum extent of all material removed from a mine.	Preliminary assessments show that almost all of the coal in Castle Mountain could likely be economically mined. Environmental and social considerations related to the size and shape of a pit shell on Castle Mountain include: • Possible removal of portions of the Chauncey Creek drainage area.(a) • Possible cast-over and fly rock entering the Chauncey Creek drainage area. • Possible removal of high alpine grasslands and wintering range for Bighorn Sheep.(b) • Water management requirements are larger for a larger pit due to the larger volume of waste rock. Economic and operational considerations related to the size and shape of a pit shell on Castle Mountain include (but are not limited to): • Mine life (and related social and economic benefits) is usually longer for a larger pit. • For a large pit, mining rate is limited by the coal processing capacity at FRO rather than by the configuration of the pit itself. • Options for creative waste rock storage area management and closure landform development is higher for a larger pit. • Design is constrained by geological and geotechnical conditions within the Mountain. Not all pit shapes or sizes would be safe or stable. See Figure 5 and following text for more discussion.	***Flexible*** The Project pit shell continues to be evaluated. Teck is striving to balance environmental and social factors with economics and operational factors. ***Constrained*** Some pit shell design components will be limited by the geological and geotechnical conditions within Castle Mountain (see Figure 5 and following text).
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

(a) Key factors like encroachment and/or impacts in the Chauncey Creek drainage will require assessment and alignment with the objectives of the Tributary Management Plan.

(b) High Alpine Grasslands and Bighorn Sheep wintering range are examples of potential terrestrial environmental impacts including cumulative effects. More discussion on possible Project interactions can be found in Section 7.

FRO = Fording River Operations; the Project = Castle Project.



LEGEND

- Coal seam 10
- Coal seam 20
- Coal seam 30
- Coal seam 40
- Coal seam 50
- Coal seam 70
- Coal seam 90
- Coal seam 100
- Coal seam 110
- Coal seam 130
- Coal seam 160
- Coal seam 170
- Coal seam 180
- Coal seam 190
- Coal seam 200
- Major Faults
- Minor Faults
- Topography
- Approximate region of geological and geotechnical risk

REFERENCE(S)
DATA OBTAINED FROM TECK COAL LIMITED

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

Teck

YYYY-MM-DD	2019-11-25
DESIGNED	SH
PREPARED	SH
REVIEWED	LK
APPROVED	DB

TITLE
CASTLE MOUNTAIN REGION OF GEOLOGICAL AND GEOTECHNICAL DESIGN CONSTRAINTS LOOKING NORTH

PROJECT NO.	CONTROL	REV.	FIGURE
1898444	IPD_002	0	5

The fault and the steeply dipping strata in the height of land between the Fording River drainage and the Chauncey Creek drainage would influence the overall size and shape of the mine pits or pit. The eastern edge of the pit cannot be located in the region where the fault or the steeply dipping strata would make the pit unstable and unsafe or uneconomic.

Design constraints due to the geological and geotechnical conditions include:

- Safety:
    - Near the height of land, the steeply dipping layers of rock are held in place by the material below and to the west of it. A pit to the west of the height of land would mine through the material holding up the height of land. A pit in this area would not be safe.
- Economics:
    - Near the height of land, the angle of the layers of rock is almost as steep as the design for a pit wall. A pit that started near the height of land would be very shallow, expose very little coal, and not be economic.

These constraints can be overcome using two different approaches. The Project could avoid the constraints by locating the eastern edge of the pit west of the height of land. It would need to be quite far west. The Design would require that there is a sufficient mass of horizontally bedded rock left in place below the height of land to ensure the pit wall is stable. The resulting pit would be quite small with a relatively short lifespan.

The Project could also avoid the constraints by locating the eastern edge of the pit to the east of the height of land. It would need to be quite far east (and within the Chauncey Creek drainage). The Design would need to ensure that enough of the steeply bedded and faulted material was removed so that the pit wall is stable. The resulting pit would be quite large with a relatively long lifespan, but would extend into the upper portions of the Chauncey Creek drainage.

3.4.2.5 Mining Direction and Technique

This section of the IPD provides a brief description of the rationale for the Project mining direction and technique (Table 6). Mining direction is linked to the layout of FRO and the Project. Mining technique is more closely linked to operational considerations but might have environmental, social, and economic implications.

Table 6: Rationale for Project Mining Direction and Technique

Mining Component	Considerations	Status
Mining Direction The mine could be opened in one area and then progress towards other areas.	FRO's Coal Processing Plant is closest to the north end of Castle Mountain As discussed in Section 3.4.2.6 the available locations for waste rock storage will also influence where mining starts and progresses.	***Selected*** The mine would start in the north and progress to the south.
Mining Technique Two mining techniques are under consideration: open pit mining and along-strike mining. ***Open pit mining*** Typical coal mines in the Elk valley involve mining a series of interconnected open pits. Mining mostly progresses from the top down through the layers of coal and waste rock. Waste rock is taken out of the pit and placed in a different location. ***Along Strike Mining*** Mining can also progress horizontally along the layers of coal and waste rock. Waste rock is moved within the pit from one side to the other. This approach is called 'along-strike' mining.	**Open pit mining** is operationally simple and Teck is experienced in mining with interconnected open pits. This approach allows a great deal of flexibility for responding to changing conditions. **Along-strike mining** can encounter operational complexities. The mine face has to steadily progress away from the waste rock placement area. Along-strike mining supports: • Short haul distances. • Progressive pit backfilling. • Progressive reclamation. • Small increments of additional disturbance for mine advances.	***Flexible*** The Project mining technique is still being evaluated. Teck intends to balance operational flexibility of typical interconnected open pits with the strengths of along-strike mining. Teck might choose to use a combination of both techniques.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

FRO = Fording River Operations; the Project = Castle Project.

3.4.2.6 Waste Rock Storage Location Options

This section of the IPD provides a brief description of the rationale for Project waste rock storage location options (Table 7). Waste rock is rock that has been removed to allow coal to be mined. Detailed waste rock storage design and planning will occur after the pit shell designs are complete (Section3.4.2.4) and the mining method has been selected (Section 3.4.2.5). The Project's conceptual waste rock storage locations (Figure 6) would be based on two key concepts:

- Maximize backfilling of pits
- Avoid or minimize disturbance of watersheds with no direct mining impacts

Waste rock storage decisions are often based on economics. Waste rock storage areas are typically located wherever there is space a short distance from the pit.

Table 7: Rationale for Project Waste Rock Storage Location Options

Waste rock storage areas Location Option	Considerations	Status
Locate Waste Rock Storage Areas In The Fording River Valley The Project could place a waste rock storage area in the Fording River valley.	The Fording River valley runs along the western side of Castle Mountain. Locating a waste rock storage area into the Fording river valley could lead to: • Short haul distances for waste rock. • Safety challenges placing waste rock above the Fording Mine road and the railway. • Water management challenges collecting water the waste rock storage areas. • Water management challenges if the waste rock storage areas were located on the floodplain. • Additional terrestrial and aquatic disturbance.	***Rejected*** The Project will not locate a waste rock storage area in the Fording River Valley along the west side of Castle Mountain.
Locate Waste Rock Storage Areas in the Chauncey Creek Drainage The Project could place a waste rock storage area in the Chauncey Creek drainage.	The Chauncey Creek drainage runs along the eastern side of Castle Mountain. Chauncey Creek is identified as a high value tributary in the Tributary Management Plan, and limiting impacts to this drainage is important to Indigenous Peoples, Communities of Interest, regulators and agencies. Locating a waste rock storage area in the Chauncey Creek drainage could lead to: • Short haul distances for waste rock. • Water management challenges collecting water from the waste rock storage areas. • Possible water quality impacts to a high value tributary. • Additional terrestrial and aquatic disturbance.	***Rejected*** The Project will not locate a waste rock storage area in the Chauncey Creek drainage.

Table 7: Rationale for Project Waste Rock Storage Location Options

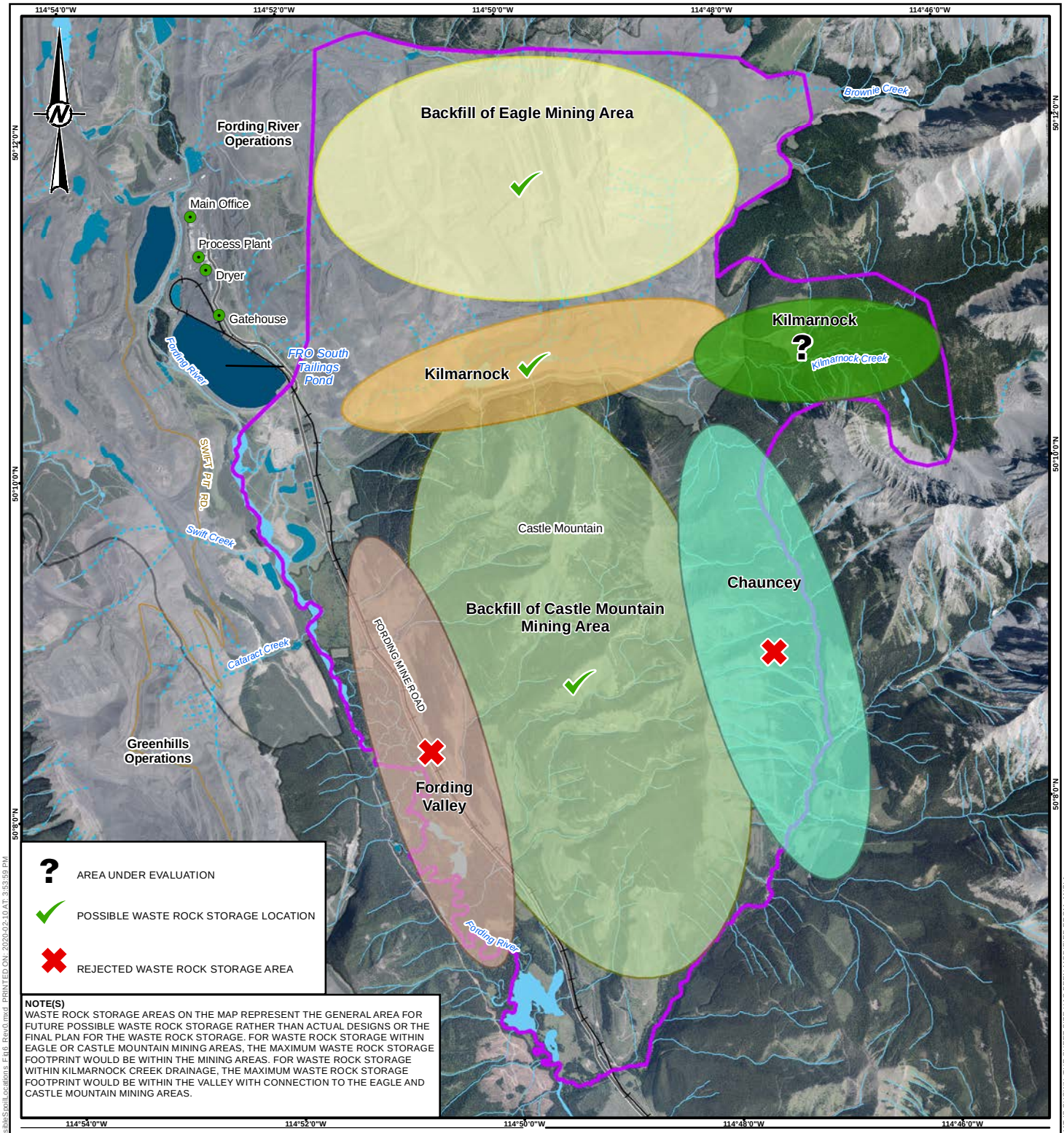
Waste rock storage areas Location Option	Considerations	Status
Locate Waste Rock Storage Areas in the Kilmarnock Creek Drainage The Project could place a waste rock storage area in the Kilmarnock Creek drainage.	The Kilmarnock Creek drainage runs along the north side of Castle Mountain. The Kilmarnock Creek drainage contains historical and active waste rock storage areas from FRO. The upper reaches of the drainage do not have direct impacts from mining such as waste rock storage, surface disturbance, surface water interactions or alteration of groundwater. Locating a waste rock storage area in the Kilmarnock Creek drainage could lead to: • Short haul distances for waste rock early in the Project. Later in the Project the distance would increase. • Creation of a causeway to allow for access from Castle Mountain to backfill the mined-out Eagle Pit at FRO. • Water management linking to existing water management systems including planned treatment at the Fording River South Active Water Treatment Facility. • Low additional terrestrial disturbance. • Interference with the planned Kilmarnock Creek diversion. • Additional assessment, mitigation, and permitting requirements if a waste rock storage area is located in the unimpacted portion of the drainage.	***Selected*** The Project will locate a waste rock storage area in the Kilmarnock Creek drainage along the north side of Castle Mountain. ***Flexible*** The Project continues to evaluate the volume of the waste rock to be located in Kilmarnock Creek Drainage and the area covered by the waste rock storage area.
Locate Waste Rock Storage Areas in the FRO Eagle Pit The Project could place a waste rock storage area in the Eagle Pit at FRO to back fill the pit once mining in that area is complete.	The FRO Eagle Pit is directly across the Kilmarnock Creek drainage from Castle Mountain. FRO Eagle Pit could be accessed directly from Castle Mountain if a waste rock causeway crossed the Kilmarnock Creek drainage. Locating a waste rock storage area into the FRO Eagle Pit could lead to: • Moderate haul distances for waste rock early in the Project. Later in the Project the distance would increase. • Backfilling of the FRO Eagle Pit. • Water management linking to existing water management systems including planned treatment at the Fording River South Active Water Treatment Facility and Saturated Rock Fills within the Eagle Pit. • Water in contact with waste rock storage areas backfilling the Eagle Pit would report to the Kilmarnock Creek drainage and to the Clode Creek drainage. • No additional terrestrial or aquatic disturbance.	***Selected*** The Project will locate a waste rock storage area in the FRO Eagle Pit to backfill the pit. ***Flexible*** The Project continues to evaluate the volume of the waste rock to be located in FRO Eagle Pit and design features of that area.

Table 7: Rationale for Project Waste Rock Storage Location Options

Waste rock storage areas Location Option	Considerations	Status
Locate Waste Rock Storage Areas in the Castle Mountain Pit The Project could place waste rock storage areas into the Castle Mountain Pit to backfill the pit once space becomes available.	The Castle Mountain Pit could be backfilled with waste rock once there is sufficient space.[(a)] Locating a waste rock storage area in the Castle Mountain Pit could lead to: • Short haul distances for waste rock. • Backfilling of the Castle Mountain Pit. • Water management linking to Project water management systems that would be designed into the mine as it's constructed. • Water in contact with waste rock backfilling Castle Mountain Pit would report to the Kilmarnock Creek drainage and to the Fording River drainage (Section 3.4.2.7). • No additional terrestrial or aquatic disturbance.	***Selected*** The Project will locate waste rock storage areas in the Castle Mountain Pit to backfill the pit. ***Flexible*** The Project continues to evaluate the volume of the waste rock to be located in Castle Mountain Pit and design features of that area.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

(a) Early Project construction activities would involve moving quantities of rock and placing it in temporary locations to be mined through later (e.g., fill below a haul road in steep terrain). These sites would be part of the overall water management plan for the Project, but will not, for the sake of this IPD, be considered a waste rock storage areas.

FRO = Fording River Operations; the Project = Castle Project.



NOTE(S)
WASTE ROCK STORAGE AREAS ON THE MAP REPRESENT THE GENERAL AREA FOR FUTURE POSSIBLE WASTE ROCK STORAGE RATHER THAN ACTUAL DESIGNS OR THE FINAL PLAN FOR THE WASTE ROCK STORAGE. FOR WASTE ROCK STORAGE WITHIN EAGLE OR CASTLE MOUNTAIN MINING AREAS, THE MAXIMUM WASTE ROCK STORAGE FOOTPRINT WOULD BE WITHIN THE MINING AREAS. FOR WASTE ROCK STORAGE WITHIN KILMARNOCK CREEK DRAINAGE, THE MAXIMUM WASTE ROCK STORAGE FOOTPRINT WOULD BE WITHIN THE VALLEY WITH CONNECTION TO THE EAGLE AND CASTLE MOUNTAIN MINING AREAS.

LEGEND

- FACILITY
- RAILWAY
- ROAD - PAVED
- ROAD - UNPAVED
- SUBSURFACE FLOW WATERCOURSE
- SURFACE FLOW WATERCOURSE
- SEDIMENT POND
- TAILINGS POND
- WATERBODY
- COAL MINING OPERATION
- CONCEPTUAL PROJECT AREA

POSSIBLE WASTE ROCK STORAGE

- BACKFILLING EAGLE MINING
- BACKFILLING MINED OUT CASTLE PIT AREAS
- CHAUNCEY DRAINAGE (NOT SELECTED)
- FORDING VALLEY ADJACENT TO THE RAILWAY, HIGHWAY, AND FORDING RIVER (NOT SELECTED)
- KILMARNOCK DRAINAGE (UNIMPACTED SECTION)
- KILMARNOCK DRAINAGE (IMPACTED SECTION)

0 1 2
1:60,000 KILOMETRES

REFERENCE(S)
2019 IMAGERY OBTAINED FROM TECK COAL. BASE DATA OBTAINED FROM TECK COAL LIMITED AND GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. DATUM: NAD 83 PROJECTION: UTM ZONE 11

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

TITLE
PROJECT WASTE ROCK STORAGE LOCATION OPTIONS (NTS 082J)

YYYY-MM-DD	2020-02-10
DESIGNED	SH
PREPARED	DR
REVIEWED	LK
APPROVED	DB

PROJECT NO.	PHASE	REV.	FIGURE
1898444	IPD_008	0	6

3.4.2.7 Water Quality Source Control and Treatment

This section of the IPD provides a brief description of the rationale for the Project water quality source control (Table 8) and treatment options (Table 9). Water which contacts areas of mining (pits, waste rock) is called contact water (mine-influenced); water which contacts disturbances (road construction, clearing) but not mining areas is also called contact water, but only has sediment-influence. Water which is kept from contacting mining activities is called non-contact water. The dissolved chemicals and nutrients that are found in water are called constituents. Mining activities can change the constituents of water which it comes into contact with. Source control minimizes the opportunity for mining related water quality constituents to enter surrounding streams and groundwater. Treatment refers to efforts made to reduce the concentration of mining-related constituents from contact water (mine-influenced) before it enters the environment.

Detailed water quality source control and treatment design and planning will occur after the waste rock storage area designs are complete (Section 3.4.2.6). The Project's conceptual source control and treatment designs and plans are based on several key concepts:

- avoid or reduce impacts to water
- manage water so that discharge(s) from the Project is compliant with release criteria
- integrate with FRO and regional water management infrastructure
- plan for water management early in Project design efforts
- adopt a best achievable technology approach

Table 8: Rationale for Project Water Quality Source Control

Water Quality Source Control Component/ Activity	Considerations	Status
Source Control for Nitrates The Project could incorporate efforts to reduce nitrates entering water	Nitrates can enter water when nitrate rich explosives come into contact with water. Teck has recently implemented source control efforts for Nitrates. These efforts involve changing blasting practices to minimize interactions between the explosives and water. Teck anticipates that these efforts will reduce nitrogen loading from mining and waste rock storage areas.	***Selected*** The Project will adopt source control for nitrates.

Table 8: Rationale for Project Water Quality Source Control

Water Quality Source Control Component/ Activity	Considerations	Status
Source Control for Selenium The Project could incorporate efforts to reduce selenium entering water	Selenium can enter water when waste rock is exposed to air (specifically oxygen) and water. Water can contact the waste rock through precipitation, runoff, surface water flow, or groundwater flow. Air can contact the waste rock by passing through spaces between the rocks. Source control efforts for selenium involve reducing or eliminating the passage of water or air through the waste rock. being investigated for their ability to offer source control include: • Capping the waste rock storage areas (essentially putting a partial seal on top of the waste rock). • Constructing the waste rock storage areas from the bottom up in layers. This can create layers that impede air and water moving through the waste rock. • Adding a cap between layers in a bottom-up dump. Fine tailings, CCFR or other materials could be used to further impede air and water moving through the waste rock. Waste rock storage area design can be constrained by topography and other factors.	***Flexible*** The Project continues to evaluate the best options for source control for selenium.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

CCFR = combined coarse and fine rejects; the Project = Castle Project.

Table 9: Rationale for Project Water Quality Treatment

Water Quality Treatment Component/ Activity	Considerations	Status
Active Water Treatment Facility (AWTF) AWTFs are a form of water treatment that pumps water through mechanical, chemical, and/or biological treatment processes. The Project could incorporate AWTFs to reduce the constituents within mine-influenced contact water.	Teck has experience designing, constructing, and operating an AWTF. AWTFs are considered a proven technology. AWTFs can take a long time to permit, construct, commission, and start operating.	***Flexible*** The Project continues to evaluate AWTFs.
Saturated Rock Fills (SRF) SRFs are a form of water treatment that pumps water through saturated waste rock (e.g., a mined out pit full of waste rock and water). As the water passes through the SRF, natural processes capture and hold constituents within the SRF and the water outflow has improved water quality. The Project could incorporate SRFs to reduce the constituents within mine-influenced contact water.	Teck has experience operating an SRF and is in the process of planning and permitting more. SRFs appear to be an effective means of water treatment. SRFs are relatively simple to construct, commission, and bring into operation. Consideration of SRFs early in Project design could allow for early implementation and integration into Project water management.	***Flexible*** The Project continues to evaluate SRFs and how they could be fully integrated into the Project plans as well as how they could be implemented early.
In-Situ Treatment The Project could incorporate in-situ treatment into waste rock storage design to reduce the constituents within mine-influenced contact water	Waste rock storage areas could be designed to that intercepts water that passes through the waste rock. The SRF could be constructed below the waste rock or at the toe of the storage area. The SRF could be constructed before the waste rock storage area is constructed or added later.	***Flexible*** The Project continues to evaluate in-situ treatment.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

AWTF = Active Water Treatment Facility; SRF = Saturated Rock Fill; the Project = Castle Project.

3.4.2.8 Tailings Handling and Storage Options

This section of the IPD provides a brief description of the rationale for the Project tailings handling (Table 10) and storage options (Table 11). The Project would generate fine tailings at FRO (Section 3.4.3.1). The existing FRO Tailings Storage Facilities (TSF) would have capacity to manage some, but not all, of the Project's anticipated fine tailings. Currently, FRO fine tailings management involves slurried fine tailings stored in the South Tailings Pond TSF[12]. Material is dredged from this pond as necessary and relocated to the Turnbull South TSF[13]. CCFR is stored within specific locations in FRO waste rock storage areas.

Teck considers tailings to be an important subject and will be applying a Best Achievable Technology approach to assessing how the Project will manage tailings. Teck will continue to assess the tailings options and intends to have selected a single option, with consideration of COI input, for inclusion in the DPD.

For context, less than 10% of material moved for the Project would be raw coal that is then processed at FRO. In the raw coal, approximately 30% is CCFR and fine tailings. Of this, approximately 10% is fine tailings. Overall, this means that fines tailings constitute less than 0.3% of all material handled by the Project.

Table 10: Rationale for Project Tailings Handling Options

Tailings Handling Component/ Activity	**Considerations**	**Status**
Tailings Slurry The Project could handle fine tailings as a slurry. For the purposes of this discussion, a slurry is a mixture of water and particles with approximately 95% water by weight. This is the condition of tailings as they come out of the FRO Processing Plant.	Teck has experience working with tailings slurry at FRO. No additional equipment or energy would be required to transform the tailings slurry into another form. Transporting slurry requires large pipelines and pumps. FRO's Processing Plant relies on recycled water from the existing TSF. Placing tailings slurry elsewhere could make relying on recycled water more challenging.	***Constrained*** The Project continues to evaluate tailings slurry, however any slurry approach would need to ensure that water could be recycled by FRO.

[12] The FRO South Tailings Pond TSF involves a tailings dam.

[13] The Turnbull South TSF is located in a mined out pit.

Table 10: Rationale for Project Tailings Handling Options

Tailings Handling Component/ Activity	**Considerations**	**Status**
Thickened Tailings The Project could handle fine tailings after thickening them by removing some water. For the purposes of this discussion, a thickened tailings is a mixture of water and particles with approximately 20 to 60% water by weight. A thickened tailings mixture would have a similar consistency to toothpaste. There are a number of proven thickening technologies that remove water from a slurry.	Teck has experience handling thickened tailings when rehandling tailings that have naturally thickened over time within a tailings pond (for slurry). The thickening process requires specialized equipment and energy inputs. Transporting thickened tailings requires large pipelines and specialized pumps. FRO's Processing Plant relies on recycled water from the existing TSF. Thickening the tailings would recovers some of the water from the tailings for re-use in the plant.	***Flexible*** The Project continues to evaluate thickened tailings.
Dry Tailings The Project could handle fine tailings in a dry form after removing almost all of the water. For the purposes of this discussion, a dry tailings is a mixture of water and particles with less than 20% water by weight. A dry tailings mixture would have a similar consistency to moist sand or soil. There are a number of drying technologies that remove water from a slurry. Often dry tailings are mixed with CCFR.	The drying process requires specialized equipment and significant energy inputs (highest greenhouse gas considerations of any tailings type). Transporting dry tailings can be done by truck or conveyor. FRO's Processing Plant relies on recycled water from the existing TSF. Dry the tailings would recover almost all of the water from the tailings for re-use in the plant. There are some innovative applications for dry tailings that Teck will consider. Research indicates that in some situations dry tailings might be useful as a soil amendment for reclamation. Similarly, it might be useful as an addition to bottom-up spoils as part of source control (Section 3.4.2.7)	***Flexible*** The Project continues to evaluate dry tailings.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

CCFR = combined coarse and fine rejects; FRO = Fording River Operations; the Project = Castle Project; TSF = Tailings Storage Facilities.

Table 11: Rationale for Project Tailings Storage Options

Tailings Storage Component/ Activity	Considerations	Status
Tailings Dams The Project could store fine tailings behind a purpose-built dam. Both slurry and thickened tailings can be stored behind a dam.	Tailings dams are well understood tailings storage concepts with known risks. Constructing a tailings dam would require geotechnical and hydrogeological knowledge of the site. The location for a new tailings dam would be constrained by appropriate available space. The Conceptual Project Assessment Footprint does not include a tailings dam. If the Project were to include a tailings dam, the Project footprint would need to be adjusted and additional environmental data collected as appropriate. The area required for a Project tailings dam would likely be less than 100 ha and would not change how the Project assesses against regulatory triggers.	***Constrained*** The Project continues to evaluate tailings dams; however, an appropriate location would need to be available and incorporated into the Project footprint as appropriate.
Placing Tailings in a Mined Out Pit The Project could store fine tailings within a mined out pit. Slurry, thickened, and dry tailings can be stored within a mined out pit.	Storing tailings in a mined out pit would not require additional Project footprint. The pit might, depending on hydrogeological conditions, contain water and fines from the tailings. Storing tailings in a mined out pit might reduce the availability of space for other uses such as Saturated Rock Fill water treatment or storage of waste rock.	***Constrained*** The Project continues to evaluate placement of tailings in mined out pits, however, the location would need to not limit other key mine features such as potential SRFs or storage of waste rock.
Placing Tailings in Waste Rock Storage (In Pit) The Project could store fine tailings within a waste rock storage facility that is located inside a mined out pit. Slurry, thickened, and dry tailings can be stored with waste rock within a mined out pit.	Waste rock storage is well understood. Including tailings within that storage could occur in layers, distributed throughout the waste rock, or in distinct pockets of tailings. The pit might, depending on hydrogeological conditions, contain water and fines from the tailings. Storing tailings in waste rock within a mined out pit would require no additional Project footprint.	***Flexible*** The Project continues to evaluate placement of tailings in waste rock within mined out pits.

Table 11: Rationale for Project Tailings Storage Options

Tailings Storage Component/ Activity	Considerations	Status
Placing Tailings in Waste Rock Storage (Out of Pit) The Project could store fine tailings within a waste rock storage facility that is not located within a mined out pit. Slurry, thickened, and dry tailings can be stored with waste rock outside a mined out pit.	Waste rock storage is well understood. Including tailings within that storage could occur in layers, distributed throughout the waste rock, or in distinct pockets of tailings. Storing tailings in waste rock outside a mined out pit would require no additional Project footprint. Introducing fluids to a waste rock storage facility would alter its geotechnical characteristics. Slurry or thickened tailings could make the waste rock storage facility unstable. Water and fines from slurry or thickened tailings could migrate through the waste rock storage facility requiring additional water collection and management efforts.	***Constrained*** The Project continues to evaluate placement of tailings in waste rock storage facilities outside mined out pits, however any option would need to be geotechnically safe (stable).
Placing Dry Tailings in a Stand-Alone Facility The Project could store dry tailings within a dedicated dry tailings storage facility that is outside a mined out pit.	Dry tailings can be deposited on their own and eventually be shaped into a component of the closure landscape. Typically these are located near to the processing plant within areas already disturbed by mining activities. A stand-alone facility would most likely be located within FRO and not require additional footprint.	***Flexible*** The Project continues to evaluate placement of dry tailings in a dedicated storage facilities outside mined out pits.
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

the Project = Castle Project

3.4.2.9 Material Handling Options

This section of the IPD provides a brief description of some Project material handling options (Table 12). The Project will use FRO equipment fleet for mining and material handling, including electric shovels, diesel haul trucks; a variety of earth moving equipment such as dozers, excavators, and graders; drilling equipment; and a fleet of light duty (pick-up) trucks.

Materials handling generates a large portion of mine emissions (Section 3.4.3.2) and influences mine and waste rock storage areas design. Equipment is retrofitted and replaced as required, which reduces emissions over time. Teck is evaluating several innovative approaches to materials handing that might reduce Project emissions.

Table 12: Rationale for Project Materials Handling Options

Materials Handling Option	Considerations	Status
Haul Trucks The Project could use typical diesel-powered haul trucks.	FRO's has a fleet of diesel-powered haul trucks. Diesel combustion is a large portion of mining emissions.	***Flexible*** The Project continues to evaluate the use of typical haul trucks
Autonomous Haul Trucks The Project could use haul trucks that have some level of self driving capability	Teck is piloting the use of autonomous haul trucks. Industry experience with autonomous haul trucks is that they improve: • Safety • Efficiency and reduction in emissions Autonomous haul trucks require additional infrastructure to be incorporated into mine plans. Autonomous haul trucks would require consideration of reskilling opportunities for existing employees.	***Flexible*** The Project continues to evaluate the use of autonomous haul trucks
Trolley Assist for Haul Trucks The Project could use infrastructure to connect haul trucks to an external source of electrical power	Diesel-powered haul trucks use the diesel engine to generate electricity. The electricity is used to move the truck. Trolley assist is a system that connects haul trucks to an overhead electrical cable system. When the truck is connected to the cable, the diesel engine goes to idle. This reduces the amount of diesel consumed and the related emissions. Typically Trolley assist is installed on long uphill or downhill grades. Trolley assist requires wider haul roads to create room for the electrical cables and poles.	***Flexible*** The Project continues to evaluate the use of trolley assist for haul trucks

Table 12: Rationale for Project Materials Handling Options

Materials Handling Option	Considerations	Status
Conveyors The Project could use a conveyor system to move waste rock or coal.	Electrically powered conveyors can move material safely and efficiently. Some material would need to be crushed to reduce its size prior to conveying. Crushing and conveying would require additional stockpiles. Conveyors are used in combination with haul trucks. The trucks do short complex flexible routes to and from the conveyor and the conveyor does the long stable route. Conveyor systems, used in combination with haul trucks, have lower emissions than haul trucks alone. Mine planning must account for the use of conveyors allowing their route to be efficient and not require frequent adjustment. Teck is evaluating implications of crushing waste rock on: • Geochemical characteristics (i.e., do smaller rocks leach more constituents?).[(a)] • Geotechnical characteristics (i.e., do smaller rocks pack tighter in a waste rock storage areas and have less air and water flow?).[(a)]	***Flexible*** The Project continues to evaluate the use of conveyors
Status categories include: • **flexible** – the option is subject to change based on design progress and feedback • **constrained** – the option is subject to change based on design progress and feedback, but there are limitations • **selected** – the option has been chosen for further design and planning • **rejected** – an option will not be included in the Project		

(a) For more discussion refer to Section 3.4.2.7

FRO = Fording River Operations; the Project = Castle Project.

3.4.3 Waste and Emissions

This section of the IPD includes a general discussion of anticipated direct project emissions to land, air, and water, including estimated greenhouse gas (GHG) emissions. Since the Project is an extension of FRO, much of the waste and emissions for the Project are understood and reflected within the existing environmental conditions as described in Section 6. FRO provides regulators and agencies with regular reporting on emissions and waste (and GHG) as required by existing permits, legislation and regulations. The following sections provide discussion of Project emissions to land, air and water including those that represent ongoing operation of FRO.

3.4.3.1 Project Waste

Project waste would be the same as FRO's wastes and no new types of waste will be produced. Waste will be managed following FRO waste management processes. The following discussion provides additional information on key types of waste that would be generated by the Project.

Key types of waste associated with the Project include:

- waste rock (which must be removed to mine coal)
- FRO Processing Plant waste when processing Project raw coal, which includes CCFR and tailings
- other wastes from both hazardous and non-hazardous sources (e.g., office / domestic waste and vehicle maintenance wastes)
- sewage
- contaminated soil (in the event of spills or leaks)

The Project will generate additional waste rock. Waste rock for the Project would be similar to what Teck has encountered mining at FRO. This will continue to be evaluated. Project waste rock would be placed in waste rock storage areas as discussed in Section 3.4.2.6[14].

The Morrissey Formation has been identified as potentially acid generating (PAG). Waste rock that is PAG can have potential environmental consequences. The Morrissey Formation is usually not impacted by mining because it is below the main coal seams. However, if the coal directly overlying the PAG formation is mined, special care must be taken to manage waste rock. Teck is sampling this formation and others potentially impacted by the Project (Elk and Mist formations).

Teck's current understanding of the likelihood of encountering PAG indicates that less than 1% of the Project waste rock might be PAG. There is a reasonable chance that almost no PAG would be encountered on Castle. Any rock units that are PAG will be identified in mine plans. Any mining of PAG material will be managed under FRO's approved PAG Management Plan following a continuous improvement approach in collaboration with BC EMPR and Indigenous nations as interests warrant.

Raw coal from the Project would be handled by the FRO Processing Plant. Waste generated during coal processing at FRO includes CCFR and tailings. Combined Coarse and Fine Rejects consist of 100 mm to 0.05 mm size washed rock and minor amounts of coal. Tailings consist of water and fine coal along with trace quantities of processing chemicals. As there is no planned changes to the currently permitted FRO coal production rate, the CCFR production rate would be expected to be the same as current operations.

Currently, FRO uses tailings ponds to settle the fines out of the fine tailings. Water from the tailings ponds is recycled back to the processing plant. Combined Course and Fine Rejects are stored in specific locations within waste rock storage areas.

[14] Source control related to waste rock storage areas is discussed in Section 3.4.2.7

Teck is evaluating using CCFR and fine tailings in waste rock storage area construction to possibly improve water quality (refer to Section 3.4.2.7). As there are no planned changes to the currently permitted FRO coal production rate, the tailings production rate would largely be the same as current operations.

Project related non-hazardous wastes would be managed through the existing FRO waste management and recycling program. Liquid wastes generated as a result of the Project would be collected and either reused within the mining process or disposed of at an appropriate on-site[15] or offsite facility. Sewage would be collected and disposed of in the permitted FRO sewage treatment facility. Sewage produced by the Project is expected to be the same rate as currently produced.

3.4.3.2 Project Air Emissions and Greenhouse Gases

Project air emissions and GHGs would vary by stage.

During the construction stage, FRO would continue to operate as normal with the addition of Project construction emissions and GHGs. These additional emissions and GHGs would come from the combustion of fossil fuels in the construction equipment. Construction is expected to take approximately two years. The amount of equipment required for construction is under evaluation.

During the operational stage, FRO's plant would continue to operate as normal with the mining fleet working on Castle Mountain instead of where it is now. Some additional GHG emissions would be anticipated from the exposure of coal in the new pit(s). Methane gas is often trapped in coal, and mining of coal allows this gas to release. Other changes to emissions and GHGs during operations would be based on changes to haul distance and strip ratio. Overall, Teck anticipates the change to emissions and GHGs to be minor (either a very small increase or a very small decrease).

The Project would meet appropriate emissions and GHG regulations and requirements. The Project will also align with Teck's effort to reach carbon neutrality (Section 6.1.2). Teck is evaluating material handling measures for the Project including conveyance or trolley assist that would lower total emissions and GHGs for FRO once the Project is in operation (Section 3.4.2.9). Teck intends to have more information on possible GHG mitigation plans and options for inclusion in the DPD.

Current air emissions and GHGs from FRO (Table 13) are reported through a number of regulatory processes and publications[16]. The Project would extend FRO air emissions and GHGs through the life of the Project (several decades). As discussed in Section 3.4.2.2, the duration for the Project is still uncertain. Teck intends to have more information on air emissions and GHG emissions, including their duration, for inclusion in the DPD. A qualitative discussion of existing conditions, which include FRO's emissions, is provided in Section 6.1.

[15] On-site landfill cells could be incorporated into existing or future waste rock storage areas. This would require amendment of Waste Discharge Permit – Refuse AMS7726.

[16]. https://www2.gov.bc.ca/gov/content/environment/climate-change/data/industrial-facility-ghg (2017, SFO tab, row 74) or https://www.teck.com/media/Teck-2018-Sustainability-Report.pdf

Table 13: FRO Air Emissions and GHGs

Emission	2018 (tonnes)	2017 (tonnes)
Sulphur Dioxide	15.8	21.7
Total GHG Emissions - All t CO2e [metric]	673,000	612,000

t CO2e = tonnes carbon dioxide equivalent

3.4.3.3 Project Discharges

The BC EAO uses the term discharge to cover water releases including water which will contact areas of project or mining activities (contact water) and water which does not contact any project or mining activities (non-contact water). Project discharges would be different during construction than during operation.

During Project construction, FRO's Processing Plant and existing mine pits would continue to operate as normal with the addition of Project sediment-influenced contact water discharges. These additional discharges would be from areas stripped of vegetation and soil. Water management infrastructure would be required to capture water discharged from cleared areas and treat it for total suspended solids. During construction, there would be no new discharges of mine-influenced contact water. Project sediment-influenced contact water discharges would meet discharge criteria.

The design and location of water management infrastructure during Project construction is being assessed. The Project design philosophy for total suspended solids treatment is to re-use existing infrastructure, with appropriate modifications, if practicable. A new discharge location, for surface water treated for total suspended solids to be released towards the Fording River, might be required for the south end of the mountain. The additional discharge location would be required for water draining from the south portion of the Project, where it may not be feasible to direct the water to the north (uphill) to the existing discharge location.

During Project operation, FRO's plant would continue to operate as normal with the additional Project mine-influenced contact water discharges. These additional discharges of mine-influenced contact water would be from mining on Castle Mountain and from waste rock storage areas. Water management infrastructure would be required to capture this and ensure that, through appropriate mitigation or treatment, water quality meets discharge criteria.

The design and location of water management infrastructure during Project operations and eventual closure for contact water is being assessed. The Project design philosophy for mine effected water is to re-use existing infrastructure, with appropriate modifications, if practicable. All contact water would be discharged to the Kilmarnock drainage, the Clode drainage, or through a new discharge in the Fording drainage[17]. Section 3.4.2.7 discusses contact water treatment options being considered for the Project. All water discharges would meet discharge criteria.

[17] Natural runoff in the Chauncey Creek drainage might come into contact with cast-over or fly rock.

3.4.4 Public and Environmental Safety

Fording River Operations has Emergency Response Plans in place for potential malfunctions or accidents including slope failures in the pits or waste rock storage areas and containment failure at tailings storage facilities.

During operation of the Project, there would be no substantive change to the risks to public and environmental safety at FRO due to malfunctions or accidents. Slope failure of the pits and waste rock storage areas for the Project would be addressed through site selection, design, and incorporation into FRO emergency response plans. Site selection and design alternatives for the Project pit or pits and waste rock storage areas is discussed in Section 3.4.1. Containment failure at tailings storage facilities would be addressed either through site selection, design, and monitoring of a future possible tailings dam or selection of a future tailings storage approach that does not require a dam (Section 3.4.2.8).

Over the proposed two-year pre-development construction period, the Project related traffic due to the movement of workers, equipment and supplies could cause a temporary increase in the risk to public and environmental safety.

For more information on Teck's planned engagement associated with Project safety, please see the Engagement Plan, Section 3 (Teck 2020).

4 Regulatory Framework

This section of the IPD includes a discussion of:

- thresholds for an environmental assessment under the BC EAA and how the Project relates to those thresholds
- thresholds for an impact assessment under the Canadian *Impact Assessment Act* and how the Project relates to those thresholds
- other potential federal approvals that might be required by the Project
- other potential provincial permits and approvals that might be required by the Project
- a preliminary schedule for the Project to complete an environmental assessment

4.1 British Columbia Environmental Assessment Act

According to Section 3(2), Section 10(1), and Table 6 of the *Reviewable Projects Regulation*, proposed modification of an existing coal mine is a reviewable project under the BC EAA if:

a) the existing project that is subject to the modification has a production capacity in excess of 250,000 t/y of clean coal or raw coal or both
b) the modification will result in the disturbance of an area of land that was not previously permitted for disturbance and that is at least 50% of the area of land that was previously permitted for disturbance at the existing project

According to Section 4(1), Section 10(1), and Table 6 even if the thresholds under Section 3 are not met, a project is proscribed as a reviewable project if:

a) the existing project that is subject to the modification has a production capacity in excess of 250,000 t/y of clean coal or raw coal or both
b) the clearance of 600 ha or more of land, unless the clearance has been authorized by the minister, or delegate, under the *Resort Timber Administration Act*

The Project does not include a change to FRO's current production capacity of 10 Mmtcc per year. Given FRO's current production rate is higher than the threshold in the *Reviewable Projects Regulation,* the Project would be reviewable if either the percent change in area or total area exceeds the thresholds (per Section 3(2) and Section 4(1) respectively) noted above.

Since the Project is still conceptual, Teck has not determined the exact footprint for the Project. To assess the Project against the area-based thresholds in the *Reviewable Projects Regulation*, Teck created a Conceptual Project Assessment Footprint[18]. This Conceptual Project Assessment Footprint does not represent an actual design or the final plan for the Project; but is anticipated to be similar in size to the Project once designs and plans are finalized.

The Conceptual Project Assessment Footprint was developed using the following principles:

- a mine pit capable of producing a total of 350 Mmtcc (chosen as a mid-range in the various options under evaluation)
- space for haul roads, water management infrastructure, laydowns, maintenance facilities.
- possible waste rock storage area locations (Section 3.4.2.6)
- possible mining through the crest of Castle Mountain and removal of a portion of the Chauncey drainage to highlight that this remains a design option under consideration (Section 3.4.2.4) and acknowledging that additional evaluation of impacts would be required under the Tributary Management Plan
- possible location of infrastructure (e.g., water management, office buildings) within the Fording River floodplain

The percent change in area or total area associated with the Conceptual Project Assessment Footprint (Figure 7) is summarized in Table 14. With a possible disturbance of 2,550 ha of land not previously permitted for disturbance and an increase of the area of mine operations of 36.5%, the Project does not meet the percentage change threshold under Section 3, but does meet the total area threshold under Section 4. This means that the Project will require a provincial environmental assessment.

[18] Figure 3 and other sections of the IPD use a conceptual Project area rather than a Conceptual Project Assessment Footprint. As discussed in Section 3.2, the conceptual Project area includes all areas where Project infrastructure and direct impacts could occur. The final Project designs and plans will have a smaller area and will not directly impact all land within the conceptual Project Area. The Conceptual Project Assessment Footprint introduced in Section 4.1 represents an estimate of the smaller area in a possible final design.

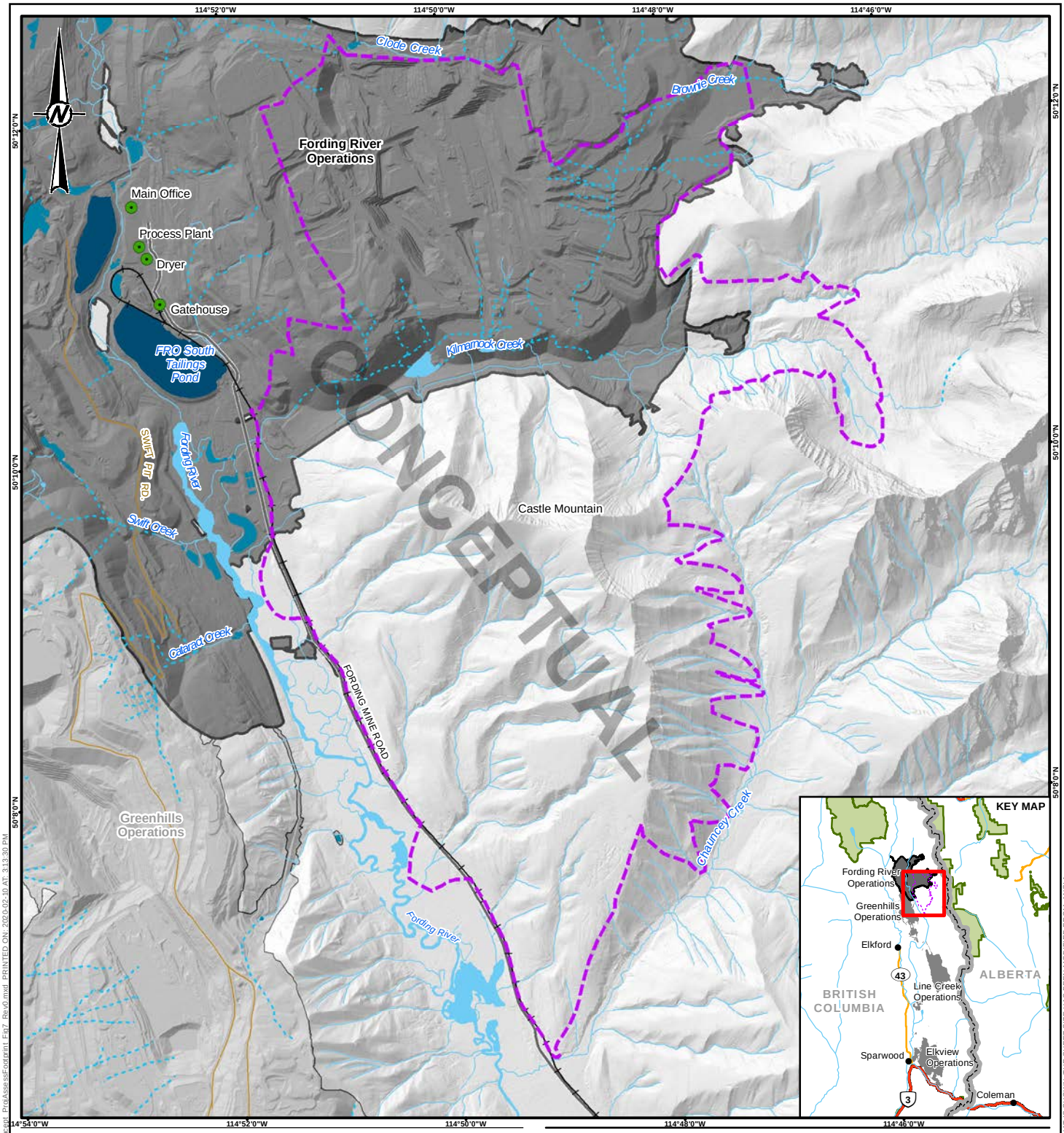
There are some Project options that might require a small (approximately 100 ha) increase in Conceptual Project Assessment Footprint (Section 3.4.2). There are also some buffer areas included in the Conceptual Project Assessment Footprint that might not be required. If they are not required, it would reduce the size of the Conceptual Project Assessment Footprint. Overall, the Conceptual Project Assessment Footprint should be representative of the Project and any future changes should not alter how the Project assesses against regulatory thresholds.

Table 14: Conceptual Project Assessment Footprint Disturbance Areas

Conceptual Disturbance Type	Disturbance Location	Disturbance Area (ha)
Disturbance of land related to the Project not previously permitted for disturbance (new disturbance)	Outside the FRO C-3 Permit Area	2,550
Disturbance of land related to the Project previously permitted for disturbance[19]	Inside the FRO C-3 Permit Area	1,550
	Total:	**3,100**
Existing FRO area of mine operations	FRO C-3 Permit Area	6,993
Percent new disturbance compared to current area of mine operations: New disturbance/existing area of mine operations = 2,550 ha / 6,993 ha		**36.5%**

Note: Areas presented in this table are based on a Conceptual Project Assessment Footprint that does not represent an actual design or the final plan for the Project.
FRO = Fording River Operations; ha = hectare.

[19] Area previously permitted for FRO disturbance based on Mines Act Permit (C-3). This area includes all areas currently under active disturbance, all areas permitted for disturbance to construction and operation of specific mine infrastructure and future mine infrastructure included in prior EAC approvals (e.g., mining in Swift). Teck will confirm this approach with BC EAO.



LEGEND

- FACILITY
- RAILWAY
- ROAD - PAVED
- ROAD - UNPAVED
- SUBSURFACE FLOW WATERCOURSE
- SURFACE FLOW WATERCOURSE
- CASTLE CONCEPTUAL PROJECT FOOTPRINT
- FRO C3 PERMIT BOUNDARY
- GHO C-137 PERMIT BOUNDARY
- SEDIMENT POND
- TAILINGS POND
- WATERBODY

0 1 2

1:60,000 KILOMETRES

REFERENCE(S)

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DATUM: NAD 83 PROJECTION: UTM ZONE 11

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

TITLE
CONCEPTUAL PROJECT ASSESSMENT FOOTPRINT (NTS 082J)
The conceptual footprint does not represent an actual design or the final plan for the Project. It is only intended to evaluate the potential magnitude of the Footprint for comparison with regulatory triggers.

YYYY-MM-DD	2020-02-10
DESIGNED	SH
PREPARED	DR
REVIEWED	LK
APPROVED	DB

PROJECT NO.	PHASE	REV.	FIGURE
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4.2 Impact Assessment Act (Federal)

Teck is in communication with the Impact Assessment Agency of Canada about the Project. Teck's current understanding is that the Project does not meet the thresholds under Section 19(a) of the *Physical Activities Regulations* (SOR/2019-285) and the Project does not automatically require an assessment under the *Impact Assessment Act* (SC 2019, c 28).

The Impact Assessment Agency of Canada has provided written policy guidance[20] on where the Minister may choose to designate a Project for assessment that does not fall under the *Regulations*. Under Section 9(1) of *Impact Assessment Act*, the Minister may exercise this authority for any Project that has potential effects within the legislative authority of Parliament or that could result from a federal decision about the designated project.

Teck will continue to engage with the Impact Assessment Agency of Canada about the Project.

4.3 Other Federal Approvals

The Project would not require any major approvals or permits under federal legislation. Teck will consult with federal regulatory agencies to confirm this understanding, and if necessary identify, make application for, and comply with all relevant federal permits, approvals, and requirements. Depending on the final configuration of the Project, some approvals or permits might be required such as:

- *Fisheries Act* (R.S.C., 1985, c. F-14) authorization might be required:
    - if the Project includes waste rock storage in the unimpacted portion of Kilmarnock Creek (Section 3.4.2.6)
    - if the Project results in water flow changes in potentially fish bearing tributaries of the Fording River along the edge of Castle Mountain
    - if the Project require inlets or outfalls on water courses related to water treatment facilities
- *Explosives Act* (R.S.C., 1985, c. E-17) permits might be required for temporary storage explosives magazines on Castle Mountain
- *Coal Mining Effluent Regulations* (pending) authorization might be required once the regulations come into force

4.4 Other Permits and Approvals Required for the Project

A summary of the key authorizations or permits possibly required for the Project are provided in Table 15. There are a number of permits which authorize the existing FRO that will require amendment for the Project. There are also new permits that might be required. Teck would consult with provincial agencies to identify, make application for, and comply with all relevant permits, approvals and requirements.

[20] *Operational Guide: Designating a Project under the Impact Assessment Act*, Impact Assessment Agency of Canada website, accessed September 25, 2019. https://www.canada.ca/en/environmental-assessment-agency/services/policy-guidance/designating-project-impact-assessment-act.html

Teck would as part of the environmental assessment process under the BC EAA (SBC 2018, c 51), develop a Permitting Plan in collaboration with the relevant provincial agencies which will be prepared and submitted as part of the Detailed Project Description.

Table 15: Summary of Key Authorizations or Permits Possibly Required for the Project

Statute	Agency	Authorization or Permit	Project Component or Activity	Project Requirements
Mines Act	BC EMPR	Mines Act C-3 Permit	Facilities and infrastructure within the Mines Act Permit area	Amend FRO permit for Project pits, waste rock storage areas, water management structures, infrastructure, and project footprint
Coal Act	BC EMPR	Coal Lease Multiple	Long term production of coal	Conversion of coal licences to coal leases within the Project area. Project area includes both leases and licences.
Environmental Management Act	BC ENV	Waste Discharge Permit – Effluent AMS424[(a)]	Land disturbance for construction activities. Tailings storage might be addressed through separate permitting process	Amend FRO permit for Project discharges during construction (sediment control) and operations.
Environmental Management Act	BC ENV	Waste Discharge Permit – Effluent AMS107517[(b)]	Effluent discharge to the land and water from five coal mine sites located in the Elk Valley.	Amend Teck area-based permit for Project discharges of contact water.
Environmental Management Act	BC ENV	Waste Discharge Permit – Refuse AMS7726[(a)]	Disposal of office and shop waste (e.g., domestic garbage)	Amend FRO permit for Project-related waste disposal sites and waste volumes.
Environmental Management Act	BC ENV	Waste Discharge Permit –Air Emissions AMS1501[(a)]	Emissions discharge to the air.	Amend FRO permit if Project requires updates related to dust control or monitoring.
Water Sustainability Act	BC FLNRORD	Water licence C133241[(a)] C133242[(a)] C133243[(a)]	Beneficial use of water from multiple sources	Amend FRO permits if Project requires updates related to water requirements for dust control
Heritage Conservation Act	BC FLNRORD	Site Alteration Permits Multiple	Alteration, recovery or destruction of archeological sites	Obtain new permits as required for Project disturbance

Notes: BC EMPR = British Columbia Ministry of Energy, Mines and Petroleum Resources; ENV = British Columbia Ministry of Environment and Climate Change; BC FLNRORD = British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

(a) current FRO authorization or permit

(b) current Teck area-based permit that includes FRO

BC EMPR = British Columbia Ministry of Energy, Mines and Petroleum Resources; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC FLNRORD = British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development; FRO = Fording River Operations; the Project = Castle Project.

4.5 Proposed Environmental Assessment Schedule and Project Milestones

A preliminary schedule, assuming positive regulatory decisions, for major environmental assessment activities and milestones for the Project is presented in Table 16. This schedule was developed prior to the COVID-19 global health emergency, and as such, is subject to change.

Table 16: Proposed Environmental Assessment Schedule and Project Milestones

Milestone/Activity	Start	End
Engage with Ktunaxa Nation Council, BC agencies, and Communities of Interest about the Project and potential regulatory processes.	2018	Ongoing
Engage with Federal agencies about the Project and potential regulatory processes.	2019	Ongoing
Submit IPD and Engagement Plan to BC EAO in fulfilment of requirements of BC EAA (SBC 2018, c 51).		2020 Q1
BC EAO accepts IPD and Engagement Plan, formally starting the Early Engagement Phase of the BC environmental assessment process.		2020 Q1
Engage with Ktunaxa Nation, BC and federal agencies, and Communities of Interest about the IPD.	2020 Q1	2020 Q2
BC EAO releases a Summary of Engagement and direction for a Detailed Project Description.		2020 Q2
Submit Detailed Project Description to BC EAO in fulfilment of requirements of BC EAA (SBC 2018, c 51)		2020 Q3
BC EAO releases an Environmental Assessment Readiness Decision		2020 Q4
Engage with Ktunaxa Nation, BC and federal agencies, and Communities of Interest about the environmental assessment Process	2020 Q4	2021 Q1
BC EAO releases Process Order		2021 Q1
Submit Draft Environmental Assessment Certificate Application		2021 Q4
BC EAO releases Direction for Final Application		2022 Q2
Submit Final Environmental Assessment Certificate Application		2022 Q4
Submit provincial permit applications		2022 Q4
BC EAO releases Assessment Report		2023 Q1
BC EAO releases Certificate Decision		2023 Q1
Provincial agencies release permit application decisions		2023 Q2
Preconstruction activities	2023 Q2	2026 Q1
Start of mining operations		2026 Q1

BC EAA = British Columbia *Environmental Assessment Act;* BC EAO = British Columbia Environmental Assessment Office;
BC EAO = British Columbia Environmental Assessment Office.

4.6 Other Agreements

Agreements that will facilitate meaningful Project engagement between the Government of British Columbia and the KNC include the following (Government of British Columbia 2019):

- Ktunaxa Nation Strategic Engagement Agreement (2019)
- Ktunaxa Nation Economic and Community Development Amendment Agreement (2017)
- BC, Montana, Ktunaxa Nation Council, Confederated Salish and Kootenay Tribes Memorandum of Understanding and Cooperation on Environmental Protection, Climate Action and Energy (2010)

Agreements that will facilitate meaningful Project engagement between the Government of British Columbia and the Shuswap Indian Band include the following (Government of British Columbia 2019):

- Shuswap Band Forest Consultation and Revenue Sharing Agreement (2018)
- Secwépemc Government to Government Letter of Commitment [Qwelminte] on Reconciliation (2019)

More information about how these agreements apply to the Project is provided in Sections 6.5.2, 6.6.2 and 6.7.2 of the Engagement Plan (Teck 2020)).

Agreements that will facilitate meaningful Project engagement between the Government of British Columbia and other governments include:

- Impact Assessment Cooperation Agreement between Canada and British Columbia (September 3, 2019)
- Memorandum of Understanding and Cooperation on Environmental Protection, Climate Action and Energy between The Province of British Columbia and The State of Montana (February 10, 2010)

5 Indigenous Interests and Location

The Project would be located within the East Kootenay Region in southeastern BC, within proximity to potentially interested Indigenous nations (Figure 8). This section of the IPD includes a discussion of Teck's understanding of Indigenous interests and how the Project might interact with those interests.

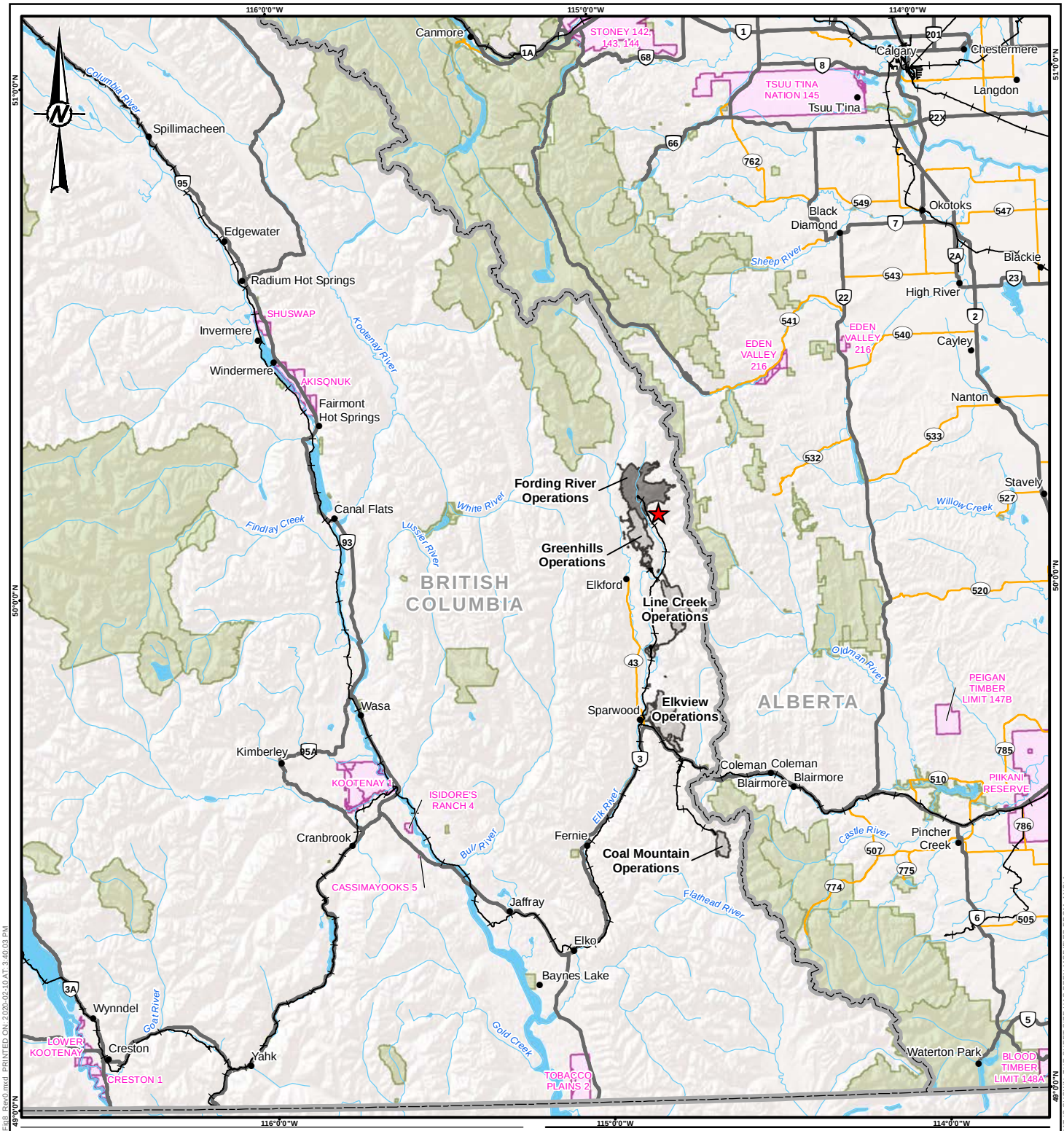
Teck is committed to meaningful consultation and engagement with Indigenous Peoples and their involvement in the development of regulatory applications. As described in Teck's Indigenous Peoples Policy, Teck respects the rights, cultures, interests, and aspirations of Indigenous Peoples and is committed to building strong and lasting relationships that help us understand each other's perspectives and priorities. As such, Teck has begun engagement activities with affected and potentially affected Indigenous nations for the Project. Teck's approach to engaging Indigenous nations is described in the Engagement Plan.

Teck will continue to engage the Ktunaxa Nation consistent with the Impact Management and Benefits Agreement (Section 6.5.2 of the Engagement Plan; Teck 2020) which acknowledges Ktunaxa laws, customs, policies and governance structures and creates a framework for consultation and engagement.

Teck acknowledges:

- that the Project is within the traditional territory of the Ktunaxa Nation and
- the rights of the Ktunaxa Nation in the Elk Valley.

The Shuswap Indian Band and the Stoney Nakoda Nation have also been identified as potentially having an interest in the Project. Should other Indigenous nations be identified by the BC EAO or through self-identification, Teck will consider that identification and modify its plan for future engagement. Additional details regarding Teck's engagement activities with each respective Indigenous nation are discussed in the Engagement Plan .



LEGEND

- CITY / TOWN / COMMUNITY
- PROJECT LOCATION
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- RAILWAY
- WATERCOURSE
- BRITISH COLUMBIA - ALBERTA BOUNDARY
- COAL MINING OPERATION
- FRO APPROVED PERMIT BOUNDARY
- FIRST NATIONS RESERVE
- PROVINCIAL PARK / PROTECTED AREA
- WATERBODY

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1:1,200,000 KILOMETRES

REFERENCE(S)

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DATUM: NAD 83 PROJECTION: UTM ZONE 11

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

TITLE
PROXIMITY TO INDIGENOUS NATIONS (NTS 082G/082J)

Teck

YYYY-MM-DD	2020-02-10
DESIGNED	SH
PREPARED	DR
REVIEWED	LK
APPROVED	DB

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The Project lies within ʔamakʔis Ktunaxa, the territory of the Ktunaxa Nation. The Ktunaxa Nation is comprised of the ʔakinǩumɬasnuqɬiʔit (Tobacco Plains Band), ʔaq'am (St. Mary's Band), yagan nuʔkiy (Lower Kootenay Band), and ʔakisq'nuk First Nation (Columbia Lake Band). Teck also recognizes that there are two Ktunaxa communities in the United States of American; Ḵupawiȼq̓nuk (Confederated Salish & Kootenai Tribes) in Elmo, Montana and ʔaq̓anqmi (Kootenai Tribe of Idaho) in Bonners Ferry, Idaho.

The Ktunaxa Nation has a strong cultural heritage associated with the Elk Valley that includes language, knowledge, sacred values, sense of place, intergenerational transmission of knowledge and practices, and other values of importance. Traditional land and resource use in the Elk Valley has included habitation, hunting, fishing, harvesting, cultivation and processing, use of the area for cultural practices, and creation and use of trails and travel corridors that connect the valley to other areas. The Elk Valley and surrounding area is subject to ongoing treaty negotiations between the Ktunaxa Nation, the Province of BC and the Government of Canada.

Traditional use including plant and animal harvesting and fishing occurs within the region (Teck 2015). Castle Mountain is currently accessible to Indigenous Peoples, as well as the general public, but with restrictions for motorized vehicles. As part of the Project, the existing no unauthorized entry boundary around the FRO site would be extended to include the Project to maintain public safety during operations. Access to the area following operations would be planned as part of the reclamation and closure plan for the Project.

Representatives of the KNC are engaged on implementation of Teck's EVWQP, Aquatic Monitoring Program, Research and Development updates and Teck's biodiversity program. The KNC also holds a seat on the Environmental Monitoring Committee, which is an independent body established under the Elk Valley *Environmental Management Act* Permit 107517 (Section 6.1.2).

Shuswap Indian Band (Kenpesq't) is the furthest south eastern community of the Secwepemc Nation. The Shuswap Indian Band are situated on the north end of Lake Windermere, and near the town of Invermere, between the Rocky and Purcell mountain ranges within the Columbia Valley. The Shuswap Indian Band asserts the Elk Valley as a shared territory with the Ktunaxa Nation including the Project region.

The Stoney Nakoda Nation is made up of three bands, the Bearspaw, Chiniki, and Wesley and are signatories of Treaty 7. The Stoney Nakoda Nation's traditional territory is found in southern Alberta; however, Stoney has asserted rights and title in southeastern BC through a Supreme Court of British Columbia Writ of Summons filed in 2004.

Potential Project impacts on Indigenous interests will be identified through ongoing engagement. Indigenous interests that have been brought forward by the KNC on previous projects or through discussions related to the Project, including the Castle MYAB (Section 3.3), are summarized in Table 17.

Table 17: Indigenous Interests Related to the Project

Indigenous Interest	Status	Actions
Cumulative Terrestrial Effects (TCE)	Teck has heard concern about current and future levels of terrestrial disturbance in the Elk Valley and how this has cumulative terrestrial effects. The Project would have TCE considerations.	**Current Actions:** • Teck is taking actions to address TCE through a number of initiatives including Teck's Net Positive Impact approach to biodiversity, involvement in the Elk Valley Cumulative Effects Management Framework, and Biodiversity Management Technical Advisory Group. Examples of regional actions include: High Elevation Grassland (HEG) research and regional plan, consideration of HEG offsets, Whitebark Pine (WBP) research, Management Plan development, and disease resistant seed collection and germination (see Section 6.1.2 and 6.1.3). **Potential Project Actions** • Teck anticipates discussing options for design components (Section 3.4.2) that have an influence on TCE as part of early engagement. • Incorporation of WBP and HEG Management Plans into design considerations for the Project. • Teck anticipates discussing TCE with the Technical Advisory Committee while acknowledging other processes working on the issue on a regional basis. • The Project environmental assessment will include TCE.
Reclamation Progress	Teck has heard concern that more land is being disturbed than is being reclaimed. The Project would disturb more land.	**Current Actions:** • Teck's efforts to address TCE take reclamation progress into account. Specific regional actions are described in Section 6.1.2 and 6.1.3. **Potential Project Actions** • Teck anticipates discussing reclamation progress as part of early engagement. • Incorporation of WBP and HEG Management Plan outcomes into design considerations for the Project. • Teck anticipates discussing regional reclamation progress with the Technical Advisory Committee while acknowledging other processes working on the issue on a regional basis. • The Project will include progressive and interim reclamation.

Table 17: Indigenous Interests Related to the Project

Indigenous Interest	Status	Actions
Water Quality	Teck has heard concern that water quality is being impacted by current and future mining activities. A number of constituents, including Selenium, are seen as real challenges. The Project could have water quality impacts.	**Current Actions:** • Teck is taking actions to address water quality through a number of regional programs and commitments, including the Elk Valley Water Quality Plan, the Elk Valley Permit (Permit 107517), and the Tributary Management Plan. Specific regional actions are described in Section 6.1.2 and 6.1.3. **Potential Project Actions** • Teck anticipates discussing options for design components (Section 3.4.2) that have an influence on water quality as part of early engagement. • Incorporation of source control procedures (e.g., blast procedures) and design measures for the Project. • Include research findings on nickel into design considerations. • Teck anticipates discussing water quality through the Technical Advisory Committee while taking into account other processes (including those noted above) working on the issue on a regional basis. • The Project environmental assessment will include water quality, source control, and water treatment.
Protection and Rehabilitation of Tributaries	Teck has heard concern that tributaries to the Fording River should be protected from mining impacts or rehabilitated if they are already impacted. The Project could impact impacted tributaries (i.e., Kilmarnock Creek) and unimpacted tributaries (i.e., Chauncey Creek).	**Current Actions:** • Teck's Tributary Management Plan is discussed in Section 6.1.2. **Potential Project Actions** • Teck anticipates discussing options for design components (Section 3.4.2) that have an influence on tributaries as part of early engagement. • Teck anticipates discussing protection and rehabilitation of tributaries with the Technical Advisory Committee while acknowledging the regional processes, including the Tributary Management Plan and the Elk Valley Fish and Fish Habitat Committee (Section 6.1.2). • The Project environmental assessment will include potential impacts to tributaries.

Given the early stage of the environmental assessment process, Project-specific mitigations are still in development. More information on Teck-led initiatives and regional programs, developed with contributions from stakeholders, that help advance or manage these topics are outlined in Section 6.1.2.

Additionally, Teck will work with the Technical Advisory Committee that is formed as part of the environmental assessment process and the KNC to further identify and assess potential approaches to address these issues.

Teck has heard from the KNC that they do not have any specific Indigenous stewardship plans, territorial plans or other relevant Indigenous initiatives that should be considered for the environmental assessment.

6 Existing Environment

This section of the IPD includes a general discussion of existing environmental conditions in the Project region. Potential Project Impacts are discussed in Section 7. This section focuses on conditions as they are today and in the recent past. The discussion represents a high-level summary of existing conditions to provide context for this IPD and it covers:

- Regional Environmental Context
- Physical Environment
- Biological Environment
- Human Environment

Teck will work with the BC EAO, Indigenous Peoples (including the Ktunaxa Nation), other regulators and agencies, and other Communities of Interest to confirm the appropriate Valued Components (VCs) and assessment methodology for a possible future environmental assessment. During the Early Engagement Phase of the BC environmental assessment process, Teck will gather feedback on potential VCs and assessment methodology. Teck will then provide proposed tailored Application Information Requirements, including VCs, in the Detailed Project Description.

6.1 Regional Environmental Context

6.1.1 Historical Regional Environmental Context

Coal mining related activities have been occurring in the Project region for over 50 years. Fording River Operations started producing coal in 1972 and has gone through several expansions. Greenhills Operations (GHO) started producing coal in 1983 and has also gone through several expansions. The two mines now border each other (Figure 4). In 2003 Teck took full ownership of FRO. In 2008 Teck acquired 80% of GHO and is the current operator of the mine.

Fifty years of mining activity in the Project region, combined with other activity including forestry, urban and rural development, transportation infrastructure, agriculture, and more, has resulted in changes to the biophysical and human environment in the area.

6.1.2 Regional Environmental Initiatives

Over the years, Teck has been involved in many efforts to understand, minimize, and mitigate the effects of mining in the Project region. Teck also collaborates in various multi-stakeholder regional initiatives that include regulators, agencies, the KNC, and other Communities of Interest. A list of studies and programs with more detail is found in Appendix A.

Some examples of Teck led and multi-stakeholder initiatives include:

- The **Elk Valley Water Quality Management Plan** (EVWQP): In April 2013, the BC Minister of Environment issued Ministerial Order No. M113, which required Teck to prepare an area-based management plan for the Elk River watershed and the Canadian portion of the Koocanusa Reservoir. In this plan, Teck was required to identify the actions it will take to manage water quality downstream of its five mines. Teck developed an area-based management plan, called the Elk Valley Water Quality Plan (EVWQP, Teck 2014). This plan guides water quality management in the Elk Valley and included an Initial Implementation Plan that outlined the mitigation planned to achieve water quality targets for selenium, sulphate, nitrate and cadmium in surface water at specific locations throughout the Elk Valley and in Koocanusa Reservoir. Teck had input from the public, First Nations, provincial and federal governments, technical experts, and other stakeholders. Teck recently issued an adjustment to the Initial Implementation Plan. The 2019 Implementation Plan Adjustment is a revised implementation plan developed to achieve the site performance objectives and water quality compliance limits in the EVWQP and *Environmental Management Act* Permit 107517 (see below).
- **The Elk Valley Permit (Permit 107517):** Following the approval of the EVWQP, the Ministry of Environment issued *Environmental Management Act* Permit 107517 - often called the Elk Valley Permit. Many of the actions and commitments described in the EVWQP were included as requirements in the permit[21], including the target concentrations for water quality.

  Teck has substantially complied with the water quality limits set out in the permit and continues to be in substantial compliance. Exceedances of water quality limits have largely occurred at two of 15 monitoring stations in winter months, under low flow conditions. Teck is on track for meeting the schedule for implementing water quality treatment set out in the 2019 Implementation Plan Adjustment, and continues to investigate options, including source control, to address projected near-term water quality concentrations from exceeding limits.
- **Environmental Monitoring Committee:** The Environmental Monitoring Committee established to review monitoring submissions required by *Environmental Management Act* Permit 107517 prepares an annual report summarizing monitoring activities reviewed by the committee. Read the most recent Environmental Monitoring Committee public report at the following link.
- **Tributary Management Plan:** The Tributary Management Plan was developed to meet requirements of the *Environmental Management Act* Permit 107517. This plan details protection and rehabilitation goals for tributaries (creeks and streams) within the Elk Valley. The plan provides guidance for the environmental management of tributaries to be taken into consideration during future mine planning. The Tributary Management Plan complements the EVWQP and supports its objectives.

[21] Other permits incorporate other aspects of the EVWQP

The 2017 Tributary Management Plan was approved. The Ministry of Environment and Climate Change Strategy did not accept the 2018 update of the plan and requires Teck to submit a new update by July 31, 2020. ENV has requested that Teck address several specific items in the July 2020 update:

- revised definition of "protection" that reflects Environmental Monitoring Committee input
- identification of prioritized tributaries for permanent protection and for rehabilitation
- an implementation plan for protection and restoration/rehabilitation for the next three years
- inclusion of relevant groundwater monitoring work, how the TMP will be considered in mine planning, further responses to EMC advice, and relevant supporting information

- **The Elk Valley Fish and Fish Habitat Committee (EVFFHC):** The Elk Valley Fish and Fish Habitat Committee (EVFFHC) is a multi-agency group that works in a collaborative manner to discuss technical information related to Teck's fisheries obligations in the Elk Valley. The EVFFHC includes membership from the KNC, BC FLNRORD, Fisheries and Oceans Canada and Teck. EVFFHC is an outstanding example of a multi-agency approach that works in an inclusive manner to advance mitigation planning for fish habitat throughout the Elk Valley. Read more about the EVFFHC here.
- **Net Positive Impact:** In 2011, Teck established a long-term vision of achieving a net positive impact on biodiversity in areas affected by our activities. For Teck, net positive impact means that ecosystems and biodiversity are better off at the end of mining than when we found them. Working towards net positive impact happens throughout the mining life cycle, and it starts with determining the key elements relative to a pre-mining baseline. Read more about Teck's approach to net positive impact here.
- **Elk Valley Cumulative Effects Management Framework (EV-CEMF):** As a condition in the EAC for the Line Creek Operations Phase II Extension Project, Teck and the KNC held a multi-stakeholder workshop to address broader cumulative landscape and land use pressures in the Elk Valley. As an outcome of this workshop, the EV-CEMF was launched. A diverse Working Group consisting of the KNC, industry, community organizations, and provincial government ministries provides guidance and oversight on EV-CEMF activities. Find out more about the EV-CEMF here.
- **Biodiversity Management Technical Advisory Group (TAG):** As a condition in the EAC for the FRO Swift Project, Teck, the KNC, BC FLNRORD, and BC EMPR established the Biodiversity Management Technical Advisory Group (TAG). The primary function of the TAG is to share scientific, technical and Ktunaxa knowledge, and to provide input on Teck's Biodiversity Program, including input to operation-specific biodiversity management plans and the regionally focused Terrestrial Cumulative Effects Management Framework. The objective of the TAG is to advise on the selection and inclusion of ecosystem and biodiversity elements, the risk ranking process carried out for these ecosystem and biodiversity elements, and any ensuing biodiversity mitigation strategies (i.e., species-specific action plans) and actions for Teck's operations in the Elk Valley.

- **Carbon Neutrality 2050:** As part of our commitment to climate action and responsible resource development, Teck has committed an objective to be carbon neutral across all operations and activities by 2050. Teck has set out an initial roadmap to achieve carbon neutrality by first avoiding emissions and then eliminating or minimizing emissions. This will include looking at alternative ways of moving materials at our mines, using cleaner power sources, and implementing efficiency improvements, among other measures. Read about Teck's goal to become Carbon Neutral and other climate change actions at the following links:
  - Teck Announces Goal of Carbon Neutrality
  - Taking Action on Climate Change

6.1.3 Regional Environmental Challenges

Some of the environmental challenges in the Project region are of note to Indigenous Nations, Communities of Interest, regulators and agencies. Teck has received feedback and information on these challenges through engagement on prior project application review processes, various regional initiatives, and engagement on the Project prior to submitting this IPD. Table 18 provides a selection of these challenges, their current status, and current and proposed actions to address each.

The Project plans and designs will consider these challenges and work to minimize Project effects in the area while working with broader initiatives (Section 6.1.2) to understand and address the challenges.

Table 18: Recent Environmental Challenges in the Project Region

Environmental Factor	Status	Actions
Cumulative Terrestrial Effects (TCE)	Cumulative loss of habitat such that protection of remaining habitat is seen to be important for maintaining several regional values, including: • Bighorn sheep • Grizzly bear • Old growth and mature forests • High elevation grasslands • Whitebark pine	**Current Actions:** • TCE Management Plan, individual species management plans • Reclamation and restoration research • Consideration of adjustments to mine design and reclamation strategy for existing and future impacts • Consideration of enhancements in degraded habitat until reclamation in other areas complete • Consideration of offsets **Potential Project Actions** • Include TCE Management Plan, individual management plans into design considerations for the Project • Consideration of adjustments to mine design and reclamation strategy for Project

Table 18: Recent Environmental Challenges in the Project Region

Environmental Factor	Status	Actions
High Elevation Grasslands (HEG)	Mining mountains removes HEG which are seen to be rare and important within BC	**Current Actions:** • HEG Management Plan • Research HEG reclamation and restoration • Possible adjustments to mine design and reclamation strategy for existing and future impacts • Possible offsets **Potential Project Actions** • Include HEG Management Plan into design considerations for the Project
Whitebark Pine (WBP)	Mining mountains removes WBP which are rare and under stress due to disease and other factors.	**Current Actions:** • WBP Management Plan • Research WPB • Gather disease resistant seeds • Germination and planting in currently reclaimed areas **Potential Project Actions** • Include WBP Management Plan into design considerations for the Project
Westslope cutthroat trout (WCT)	Recent surveys (fall 2019) show a drop in the numbers of westslope cutthroat trout in the upper Fording River	**Current Actions:** • Operational changes at FRO and GHO to reduce the potential for additional stress to the population • Establishment of a WCT Working Group that includes Teck, BC and KNC. • Collaborate with the KNC, regulators, government agencies, and experts to evaluate the cause of the change • Bi-weekly meetings with KNC and government agencies **Potential Project Actions** • Include outcomes from actions above, including outcomes from WCT Working Group, into design considerations for the Project, as relevant

Table 18: Recent Environmental Challenges in the Project Region

Environmental Factor	Status	Actions
Water Quality	Instream concentrations are not meeting permit limits at all locations	**Current Actions:** • Expediting the design and commissioning of water quality mitigation within the bounds of what is technically feasible • Implementation of source control (e.g., change in blasting procedures to reduce nitrate residuals in waste rock) • Ongoing evaluation and research on constituent impacts, treatment, and source control • Adjusting Teck's Implementation Plan (updated every three years) to achieve compliance with the EVWQP and Permit 107517 • Include source control into design considerations for new projects **Potential Project Actions** • Include source control into design considerations for the Project (Section 3.4.2.7)
Water Quality Emerging Issues	Ongoing water quality improvement efforts and research have identified that nickel may also be a water quality constituent of concern.	**Current Actions:** • Research on nickel impacts, treatment, and source control. **Potential Project Actions** • Include research findings on nickel into design considerations for the Project, as available

6.2 Physical Environment

The Project would straddle portions FRO and portions of Castle Mountain in the Fording River Valley (Figure 1). The Project has a continental cold climate with elevation, slope, aspect, and proximity to the Fording River representing important influences on temperature, precipitation, and wind speed. Snowfall in the Fording River Valley is generally consistent from November through March, while rainfall is generally moderate in the summer months. Average annual precipitation increases with elevation. Wind through the region is mainly channeled through the Fording River Valley, meaning that the predominant winds are from the south-southeast and south (winds from the northwest are also common).

Air emissions from FRO are primarily made up of particulate matter (PM), sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and GHG (RWDI 2019, Teck 2019a). The PM emissions arise from mining activities such as drilling, blasting, and material handling. The SO_2 and NO_2 emissions are produced by the combustion of fossil fuels in vehicles, equipment, and coal dryers. Sources of GHG include fossil fuel combustion as well as fugitive coalbed methane.

Mining activities that generate noise include coal extraction, material handling and stockpiling, and activities associated with blasting, shovels, haul trucks, drills and auxiliary equipment.

Castle Mountain is bordered by Kilmarnock Creek and the actively mined Eagle Mountain to the north, the Fording River and the Greenhills Range to the west, and Chauncey Creek and the High Rock Range to the east and south (Figure 1). The topography along the upper portions of Castle Mountain is steep, with typical slopes of approximately 0.4 metres / metre (m/m) or 40%. The topography along the lower portion of the west side of Castle Mountain (facing the Fording River) includes shallower slopes of approximately 0.1 m/m or 10%. Elevations near the Project range from approximately 1,550 metres above sea level (masl) at the valley floor near the Fording River to approximately 2,550 masl at the peak of Castle Mountain. The Project area consists primarily of forested terrain with some exploration disturbance. Mining disturbance (i.e., waste rock storage) exists in the Kilmarnock Creek watershed.

Drainage at Castle Mountain consists of a network of relatively small-sized watercourses, in some cases ephemeral watercourses, which collect runoff from the surrounding terrain. Flows from these channels report to the Fording River. The Fording River flows generally south and discharges to the Elk River. The Elk River flows generally southwest and discharges to Koocanusa Reservoir approximately 100 km downstream of the mouth of the Fording River.

The drainage network at Castle Mountain is summarized as follows:

- Runoff from the north side of the mountain drains to Kilmarnock Creek, which flows west toward the Fording River and passes through an approximately 3 km long channel located under waste rock storage areas immediately north of the Project. Approximately 30% of the Kilmarnock Creek watershed has been disturbed by historical and active mining activities. These mine disturbance areas are located primarily in the lower half of the watershed[22].
- Runoff from the east and south sides of Castle Mountain drains to Chauncey Creek, which flows southwest toward the Fording River. The Chauncey Creek watershed is unaffected by direct impacts from mining activities and includes major tributaries from the High Rock Range extending to the Continental Divide.
- Runoff from the west side of Castle Mountain drains to a series of small tributary channels[23] that drain to the Fording River. The tributary channels are primarily unaffected by mining activities.

Surface water quality data collected by Teck has shown that mine influenced water at FRO can be generally characterized as slightly alkaline with concentrations of nitrate, sulphate, and selenium that are higher than in creeks without mining development. Water quality in the Fording River upstream of existing operations is low in nutrient and trace element concentrations. Nitrate, selenium, and sulphate concentrations increase in the river downstream of Cataract, Swift, Clode and Kilmarnock creeks (all of which are influenced by mining activities), but concentrations within the Fording River are lower than those observed in the mine-influenced tributaries.

[22] The active water treatment facility currently being constructed at FRO will have Kilmarnock Creek as one of its sources.

[23] Recent assessment of these tributaries indicates that a number of them are ephemeral (only have surface water flow some of the time in direct response to rainfall or snowmelt).

Soils in the Project area are influenced by topographic relief, parent materials, local climate, and vegetation. In general, Brunisols develop on relatively coarse-textured parent materials at low to mid-elevations while Humo-Ferric Podzols and Ferro-Humic Podzols occur on moderately steep slopes at mid- to high elevations on medium to coarse-textured colluvial or morainal deposits. Brunisolic Gray Luvisols occur at mid- to lower elevations on fine-textured morainal and fluvial parent materials. Regosols occur as shallow lithic soils at high elevations (Lacelle 1990). Mesisols may be present in association with graminoid fens in the area.

6.3 Biological Environment

6.3.1 Ecosystems and Vegetation[24]

Human activities over the past century have had an influence on ecosystems and vegetation in the Elk Valley, with increased intensity at lower elevations. Forestry and coal mining development have occurred in this area for more than 100 years. Other influences in the region surrounding the Project include, but are not limited to, power lines, well sites, pipelines, railways, highway, rural development, and the communities of Sparwood, Elkford, and Fernie (see Figure 1 for the Project regional location).

The Project is situated in the Elk Valley Ecosection and the Rocky Mountain Forest District. There are two main biogeoclimatic zones in the footprint: Engelmann Spruce – Subalpine Fir zone and Montane Spruce zone.

The Engelmann Spruce-Subalpine Fir zone occurs throughout the East Kootenay Region at mid- to high elevations and is generally mountainous, steep and rugged. Steep mountain sides (snow covered in winter months) are have old growth spruce and subalpine fir forests. This zone also contains meadows, grasslands and whitebark pine[25] habitat. Herbaceous species such as subalpine daisy, common red paintbrush, western meadow rue, Sitka valerian and Indian hellebore are common in meadows in this zone. Grasslands[26] in the zone contain rough fescue, Idaho fescue, pinegrass, timber oatgrass, diverse-leaved cinquefoil, yellow beard-tongue, and thread-leaved sandwort (MacKillop et al. 2018).

Avalanches are natural disturbances in the Engelmann Spruce-Subalpine Fir zone that result in small patches of unique communities adjacent to larger patches of different ecosystem types, increasing regional diversity (Quinn and Phillips 2000). Plant species present in avalanche paths are often similar to those found in the surrounding landscape, but the communities differ in composition and structure because succession is stalled and soil moisture is higher, favoring shade-intolerant species and shrubs and herbs over trees (Bebi et al. 2009; Quinn and Phillips 2000).

[24] Information regarding ecosystems within the Project area was summarized from *Special Report Series 6: Ecosystems of British Columbia* (Meidinger and Pojar 1991), *Land Management Handbook No. 20: A Field Guide to Site Interpretation for the Nelson Forest Region* (Braumandl and Curran 2002) and *Land Management Handbook No. 71: A Field Guide to Ecosystem Classification and Identification for Southeast British Columbia: The East Kootenay* (MacKillop et al. 2018), unless otherwise cited.

[25] Refer to Appendix B for scientific names of the vegetation species listed in this document.

[26] A discussion of red-listed Grasslands is provided in Section 6.3.4.1.

The Montane Spruce zone occurs in the East Kootenay Region at low to mid-elevations with a growing season that tends to be warm and dry. The vegetation of the Montane Spruce zone has tree stands dominated by hybrid Engelmann x white spruce[27], subalpine fir, Douglas-fir and western larch. Prominent shrub species include false azalea, Utah honeysuckle, soopalallie and falsebox. The herb layer frequently contains grouseberry, twinflower, pinegrass and heart-leaved arnica. Red-stemmed feather moss and step moss are the dominant moss species. One of the most distinctive features of the landscape is the extensive, young and maturing stands of lodgepole pine that have formed following wildfire.

6.3.2 Wildlife and Wildlife Habitat

The Project area provides habitat for a variety of wildlife species. For example, the conifer forests, grasslands and whitebark pine stands provide habitat for wildlife such as red squirrel, snowshoe hare, marten, pine siskin and Clark's nutcracker. Stands of lodgepole pine provide summer and fall range, as well as cover, for moose and mule deer. Birds such as the three-toed woodpecker that forage on bark-inhabiting insects are also common in the pine forests.

Avalanche tracks that occur within the Project area provide summer range for ungulates like deer and moose, and spring and summer habitats for grizzly and black bears. Bird species generally occurring in these habitats include fox sparrow, American robin, dusky grouse, rufous hummingbird, and red-tailed hawk.

High elevation grasslands provide habitat for a variety of species in the Elk Valley, including overwintering habitat for bighorn sheep[28], and, important foraging habitat for numerous other wildlife. The meadows and steep-sloped grasslands in the Project area provide forage for elk, bighorn sheep, mule deer, moose, black bear and grizzly bear. Columbian ground squirrel and golden-mantled ground squirrel are the common small mammals in these habitats; American badger which preys on these species is also potentially present.

American dipper, spotted sandpiper and harlequin duck are known to use streams within the general vicinity of the Project. American dipper is a year-round resident whereas spotted sandpiper and harlequin duck are summer migrants. Amphibians such as Columbia spotted frog, wood frog, western toad and long-toed salamander may also use riparian and wetland habitats in the general vicinity of the Project.

The local climate is important to wildlife habitat use patterns in the area. The climate is characterized by cool wet winters and dry warm summers. Snowfall generally begins accumulating in December with greater depths occurring at higher elevations between January and March. Snow conditions influence the habitat conditions used by many animal species, particularly ungulates, during winter.

[27] The notation "Engelmann x white spruce" means a tree species that is a hybrid, essentially a cross breed, between an Engelmann spruce and a white spruce.

[28] Refer to Appendix B for scientific names of wildlife species listed in this document.

As with ecosystems and vegetation, anthropogenic and natural influences (e.g., forestry, fire, pests, disease) have affected wildlife habitat in the Elk Valley. In addition to habitat alteration from forestry and coal mining development over the past century, a smaller impact due to hunting, which has occurred for a much longer period and continues today, affects wildlife presence and distribution on the landscape. Other infrastructure (transmission lines, well sites, pipelines, railways, roads) and communities in the region also affect wildlife habitat availability, suitability and use in the Elk Valley.

6.3.3 Fish and Fish Habitat

The Fording River originates in the Rocky Mountains of BC between the Greenhills and High Rock Ranges and flows generally south to where it joins the Elk River between Elkford and Sparwood, BC. The river is approximately 75 km long and drains an area of about 620 km^2. The Project is located in the upper Fording River drainage, which is defined as the section of the Fording River watershed located upstream of Josephine Falls and a series of cascades. Fish habitat that could be affected by the Project includes the mainstem of the Fording River between Clode Creek and Ewin Creek, as well as a number of tributaries, including Kilmarnock Creek, Chauncey Creek and unnamed tributaries to these creeks and the Fording River.

Most tributaries in the vicinity of the Project area are high-gradient first and second order (tributary) streams. Typically, these tributary streams are very steep in their headwaters and steadily decline to where they meet another stream or river (e.g., the Fording River). Such streams are usually fish-bearing in the lower reaches where the gradient is ≤15%; however, some of the streams within the Project area have been altered, in accordance with applicable authorizations, to accommodate nearby mining activities (e.g., relocated, converted to rock drains, fragmented by waste rock storage areas, pit development).

Westslope cutthroat trout are the only known fish species to occur in the upper Fording River above Josephine Falls which acts as a barrier to upstream fish movement (Teck 2013; Cope et al. 2013; Golder 2014; Cope et al. 2016; Minnow and Lotic 2018). High value WCT habitat, such as Chauncey Creek, is discussed further in Section 6.3.5.6.

The WCT population status in the upper Fording River has been studied intensively from 2012 onwards by Westslope Fisheries Ltd. (Cope et al. 2013, 2016, 2017). These studies have assessed the population in terms of abundance, genetic differentiation, mortality rates, condition factors, age class, growth rate, life history strategies, movement patterns, and habitat use/availability. This information is used to estimate the size of the WCT population and monitor trends in the population over time in relation to mining activities. To date, the following key findings have been identified:

- The genetic integrity study indicates a genetically isolated, pure strain of WCT.
- The WCT habitat availability was estimated at 57.5 km in the upper Fording River mainstem with an additional 59 km of tributary habitat.
- Overwintering and tributary habitat were defined as critical and limiting for WCT based on fish use and habitat availability.
- Spawning habitat was identified in both the tributaries and the mainstem and high-density juvenile rearing habitat was identified in the tributaries.

- Three core WCT habitat areas have been identified in the upper Fording River mainstem:
  - 6.5 km of stream between Henretta Pit Lake and the multi-plate culvert (including Clode Flats)
  - 7 km of stream adjacent to Castle Mountain including the oxbow pools and groundwater reach, a side-channel to the Fording River and Chauncey Creek
  - 6.3 km of stream south of GHO, including Greenhills Creek and Dry Creek
- Telemetry results have confirmed both migratory and resident WCT life history forms use the upper Fording River watershed. Recent survey results have identified a reduction in the WCT population (refer to Section 6.1.3 for further discussion).

In addition to directly monitoring the WCT population Teck monitors the benthic invertebrate community, which acts as an important food source for fish and other aquatic wildlife, within the Fording River and its tributaries through the Regional Aquatic Effects Monitoring Program (RAEMP). Benthic invertebrate abundance, diversity, community composition and tissue selenium concentrations are monitored in mine-exposed and reference locations throughout the Elk Valley to assess potential mine-related effects on the aquatic ecosystem. Benthic invertebrate communities sampled in reference areas within the Elk Valley are composed mainly of mayflies, stoneflies and caddisflies. Recent monitoring under the RAEMP has shown that the most common effects of mine exposure on benthic invertebrate communities are reductions in the abundance of certain sensitive families (notably mayflies), and increased tissue selenium concentrations.

6.3.4 Species at Risk

Species at risk information in BC is available from both provincial and federal sources. Provincially, the BC ENV maintains conservation information on the BC Species and Ecosystems Explorer for several thousand species in the province (BC ENV 2019a). Data on known species at risk occurrences (referred to as element occurrences) are available through the BC Conservation Data Centre (BC CDC 2019). The BC CDC assigns a provincial rank or listing of red, blue or yellow to a species or ecosystem based on its conservation status within BC. Red-listed species or ecosystems are considered to be at risk of being lost (i.e., Extirpated, Endangered or Threatened) in BC. Blue-listed species or ecosystems are considered to be of Special Concern (formally Vulnerable) in BC. Yellow-listed species or ecosystems includes any species or ecosystems that are at the least risk of being lost.

Federally, species ranking is conducted by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), established under Section 14 of the *Species at Risk Act* (SARA). Under the COSEWIC system, species are ranked as Extinct, Extirpated, Endangered, Threatened, Special Concern, Data Deficient, or Not at Risk. Schedule 1 of SARA provides the official list of species at risk. The prohibitions of the Act apply only to those species ranked as Endangered, Threatened or Extirpated (if there is a recovery strategy in place and these species are afforded protection of critical habitat as defined in the relevant recovery strategy). The SARA typically applies only on federal land. On private or provincially owned lands, only aquatic species as defined by the federal *Fisheries Act* and migratory birds also listed under the federal *Migratory Birds Convention Act, 1994* are protected under SARA, and critical habitat protection on non-federal lands is afforded only to aquatic species, unless ordered by the Governor in Council if it is deemed that provincial or voluntary measures do not adequately protect a species.

A definition of each federal and provincial conservation status is provided in Table 19.

Table 19: Conservation Status Definitions

Agency	Status	Definition
COSEWIC (federal)	Endangered	A species facing imminent extirpation (no longer exists in Canada) or extinction (no longer exists).
	Threatened	A species likely to become Endangered if limiting factors are not reversed.
	Special Concern	A species that is particularly sensitive to human activities or natural events, but is not Endangered or Threatened.
BC CDC (provincial)	Red	Any indigenous species, subspecies or plant community that is Extirpated, Endangered, or Threatened in BC
	Blue	Any indigenous species, subspecies or community considered to be of special concern in BC. Blue-listed elements are at risk, but are not Extirpated, Endangered, or Threatened.
	Yellow	Any indigenous species or subspecies that is apparently secure and not at risk of extinction.

Source: BC CDC (2019).
BC CDC = British Columbia Conservation Data Centre; COSEWIC = Committee on the Status of Endangered Wildlife in Canada.

6.3.4.1 Plants at Risk

A query of the BC CDC was completed in January 2020 for federally/provincially listed plants at risk that have potential to occur in the Rocky Mountain Forest District. The results were further refined using information on the biogeoclimatic subzones that occur in the Project vicinity (Engelmann Spruce – Subalpine Fir dry cool, Montane Spruce dry cool and Montane Spruce dry warm subzones) to identify species at risk that have the potential to be affected by the Project. Thirty-six vascular, 19 non-vascular, and three lichen red- or blue-listed plants were identified as having the potential to occur within the Project vicinity based on the above criteria (Appendix C). Additional plants at risk that have been documented in the Project vicinity, and Elk Valley more broadly, were also included and are identified in Table 20.

Table 20: Plant Species at Risk Documented within the Project Vicinity

Common Name	BC List[a]	SARA[b]
Vascular Plants		
Abbreviated bluegrass	Blue	—
sweet-flowered fairy-candelabra	Blue	—
bent-flowered milk-vetch	Blue	—
Buff daisy	Blue	—
Limber pine	Blue	—
Rocky Mountain willowherb	Blue	—
Rough-leaved aster	Red	—
Short-rayed aster	Red	—
whitebark pine	Blue	Endangered
Wolf's trisetum	Blue	—
Wyoming kitten-tails	Blue	—
Parry's townsendia	Red	—

Table 20: Plant Species at Risk Documented within the Project Vicinity

Common Name	BC List[a]	SARA[b]
Non-vascular Plants		
Arizona calcareous moss	Blue	—
Barbula amplexifolia	Red	—
Cephaloziella rubella	Red	—
Donn's grimmia	Blue	—
Hygroamblystegium varium	Blue	—
Pseudoleskea incurvata var. *gigantea*	Blue	—
Short-tooth hump-moss	Blue	—
Slender smoothcap	Red	—
Tortula leucostoma	Blue	—
Fungi		
Blue-footed pixie	Blue	—
Boreal horsehair	Blue	—
Peltigera "scotteri" (previously undescribed)	-	-

Note: Species scientific names can be found in Appendix B.
Source: Teck VPro Master Database; Teck 2016a,b; Poole and Smyth 2014: Integral 1997-2010; Golder Database.
(a) Red = Extirpated, Endangered, or Threatened; Blue = Special Concern (BC CDC 2019).
(b) SARA (*Species at Risk Act*) Schedule 1; — = not listed (Government of Canada 2019).

Of the provincially at risk plant species identified through the BC CDC query, the only species currently federally listed under Schedule 1 of SARA is whitebark pine (Endangered).

6.3.4.2 Wildlife at Risk

A query of the BC CDC was completed in February 2020 for federally/provincially listed wildlife at risk that have potential to occur in the Rocky Mountain Forest District. The results were further refined using information on the biogeoclimatic zones/subzones that occur within the Project vicinity. Fifty-five red- or blue-listed wildlife species were identified as having the potential to occur within the Project vicinity based on the above criteria, 14 of which are also federally listed under Schedule 1 of SARA (Appendix D). Five additional species that are provincially yellow-listed (not at risk) are federally listed under Schedule 1 of SARA (Appendix D). In total the list includes 11 mammal species, 17 bird species, two amphibian species, 11 gastropod species and 19 insect species.

Wildlife at risk that have been documented within the Project vicinity from previous investigations are listed in Table 21.

Table 21: Wildlife Species at Risk Documented within the Project Vicinity

Common Name	BC List[a]	SARA[b]
Mammals		
Grizzly bear	Blue	Special Concern
American badger	Red	Endangered
Bighorn sheep	Blue	—
Birds		
Prairie falcon	Red	—
Northern goshawk	Blue	—
Olive-sided flycatcher	Blue	Threatened
Barn swallow	Blue	Threatened
Bank swallow	Yellow	Threatened
Amphibians		
Western toad	Yellow	Special Concern
Insects		
Gillette's checkerspot	Red	—

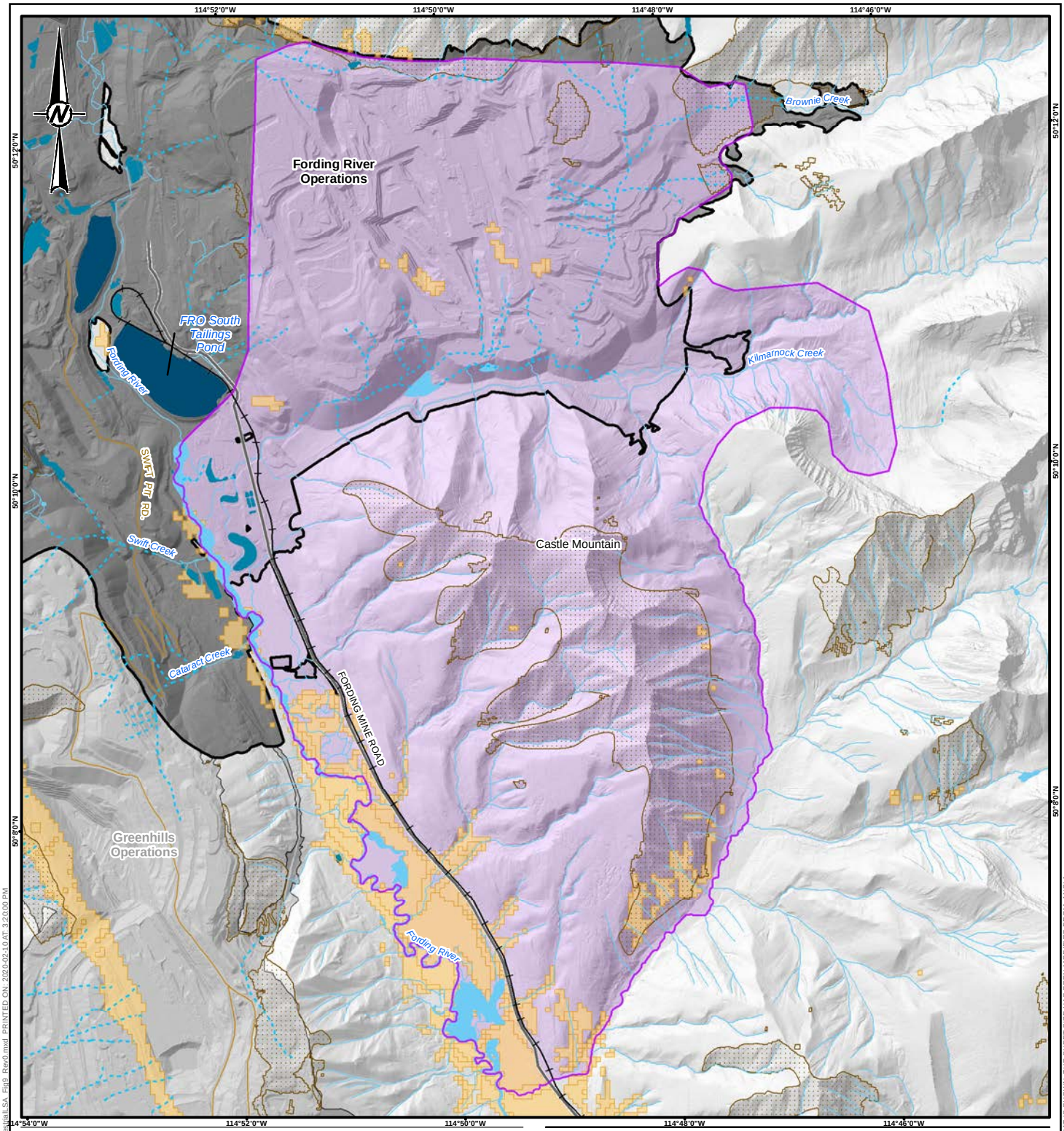
Note: Species scientific names can be found in Appendix B.
(a) Red = Extirpated, Endangered, or Threatened; Blue = Special Concern (BC CDC 2019).
(b) SARA (*Species at Risk Act*) Schedule 1; — = not listed; (Government of Canada 2019).
Sources: Matrix 2014, 2015; Golder 2018.

6.3.4.3 Fish at Risk

As noted in Section 6.3.3, WCT are the only fish species occurring in the Project vicinity due to a fish barrier downstream on the Fording River (Josephine Falls). The species is designated as Special Concern by COSEWIC and listed as Special Concern under Schedule 1 of SARA. Additionally, this species is blue-listed in BC.

6.3.5 Environmentally Sensitive Areas

Several key environmentally sensitive areas that have been mapped in the Project vicinity or within the broader region are depicted on Figure 9. Those within the Project vicinity are discussed below. Some environmentally sensitive areas have not been mapped, but are also discussed below if they are within the Project vicinity.



LEGEND

- RAILWAY
- ROAD - PAVED
- ROAD - UNPAVED
- SUBSURFACE FLOW WATERCOURSE
- SURFACE FLOW WATERCOURSE
- CASTLE PROJECT AREA
- FRO C3 PERMIT BOUNDARY
- GHO C-137 PERMIT BOUNDARY
- SEDIMENT POND
- TAILINGS POND

ENVIRONMENTALLY SENSITIVE AREAS

- BIGHORN SHEEP WINTER RANGE
- UNGULATE WINTER RANGE
- WATERBODY

0 1 2

1:60,000 KILOMETRES

REFERENCE(S)

BASE DATA OBTAINED FROM TECK COAL LIMITED AND GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
DATUM: NAD 83 PROJECTION: UTM ZONE 11

CLIENT
TECK COAL LIMITED

PROJECT
FORDING RIVER OPERATIONS CASTLE

TITLE
ENVIRONMENTALLY SENSITIVE AREAS IN THE PROJECT VICINITY (NTS 082J)

Teck

YYYY-MM-DD	2020-02-10
DESIGNED	SH
PREPARED	DR
REVIEWED	LK
APPROVED	DB

PROJECT NO.	PHASE	REV.	FIGURE
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6.3.5.1 Wetlands

Several wetlands occur in the vicinity of the Project along the Fording River and Kilmarnock Creek. Wetlands are biologically diverse habitats, and the ecological functions provided by wetlands to maintain terrestrial and freshwater biodiversity is disproportionate to their size and the area that they occupy on the landscape. In the Elk Valley, wetlands provide habitat used by a large number of species at some point in their life cycle, and many of BC's species of conservation concern depend on wetlands. In the Elk Valley, wetlands are **relatively** uncommon and may have undergone substantial conversion due to agriculture, rural development, mining, and other development activities.

6.3.5.2 Mature and Old Growth Forests

Mature and old growth forests occur in the vicinity of the Project area. Mature forests are not yet considered old growth, but provide important buffer sites, provide some of the values associated with old forest ecosystems, and are recruitment sites for old forests. Old growth forests and legal and non-legal Old Growth Management Areas are stands greater than 250 years old, except in subzones that experience stand-initiating disturbance; in these cases old forest stands are typically around 140 years old (BC MOF and MELP 1995).

6.3.5.3 Ecological Communities at Risk

Thirteen ecological communities at risk have been documented within the Project vicinity (BC CDC 2019):

- Idaho fescue – sulphur buckwheat – sandwort (Gg14), a red-listed grassland in BC
- Rough fescue – sulphur buckwheat – sandwort (Gg16), a red-listed grassland in BC
- Idaho fescue – bluebunch wheatgrass – sulphur buckwheat – thread-leaved sandwort (Gg17), a blue-listed grassland in BC
- Saskatoon - soopolallie - common juniper (Gb20), a blue-listed brushland in BC
- Timber oatgrass – grouseberry – thread-leaved sandwort – compact selaginella (Ag01), a red-listed alpine grassland in BC

A complete list of ecological communities at risk with potential to occur in the Project vicinity is provided in Appendix C. Ecological communities at risk are of conservation concern due to their limited distribution on the landscape and sensitivity to development.

6.3.5.4 Whitebark Pine Habitat

Whitebark pine is a shade-intolerant coniferous tree species that prefers open habitats (such as grassland and forb-dominated ecosystems) in subalpine and alpine climates (Keane and Parsons 2010; Klinkenberg 2014). In the Elk Valley, whitebark pine habitat consists primarily of high-elevation areas that are sparsely vegetated and rocky (Teck 2016b).

Improving mapping and inventory of whitebark pine, identifying the extent of whitebark pine blister rust infection across the range, and identifying rust resistant whitebark pine trees and trees that are cone producing is considered essential for supporting the recovery of whitebark pine (ECCC 2017). Teck has a Whitebark Pine Species Management Plan that is implemented to mitigate potential adverse effects to whitebark pine at operations in the Elk Valley.

6.3.5.5 Bighorn Sheep Winter Range

Bighorn sheep winter range was mapped using information provided by the Elk Valley Cumulative Effects Management Framework (Bighorn Sheep Expert Team 2017). High-elevation grasslands in the Project vicinity are considered important for bighorn sheep because they are used as overwintering habitat from November through April. These areas typically consist of native forage on warmer aspects where snow is removed by wind and solar radiation and where escape terrain occurs nearby. Bighorn sheep also use other high-elevation habitats as winter range, including alpine meadow and alpine tundra. Winter range in the Elk Valley is considered the most critical factor limiting bighorn sheep populations since they are not adapted to forage and travel in deep snow. Summer range for bighorn sheep is extensive and is not considered to be limiting in the Elk Valley (Bighorn Sheep Expert Team 2017).

Unlike bighorn sheep winter range, deer, elk and moose winter lower in the valleys. Formal legal establishment of ungulate winter range and associated objectives is undertaken by the BC ENV under the *Forest and Range Practices Act* (BC ENV 2019b).

6.3.5.6 Westslope Cutthroat Trout Habitat

Critical habitat for WCT in the upper Fording River has been identified as overwintering and tributary habitat based on fish use and information in the literature; these habitats were found to be limited in the upper Fording River based on habitat availability and the scale of historic habitat loss and lost connectivity (Cope et al. 2016). Three core areas within the upper, middle and lower watershed upstream of Josephine Falls have been identified. Two of these core areas, which include important spawning, overwintering and rearing areas, may be affected by the Project. These areas consist of the following:

- 6.5 km of stream channel between Henretta Pit Lake and the multi-plate culvert (including Clode Flats), lower Henretta Creek, Henretta Pit Lake, Fish Pond (of this core area, only the portion downstream of Clode Creek may be affected by the Project)
- 7.0 km of stream channel adjacent to Castle Mountain including the oxbow pools and groundwater reach, a side-channel to the Fording River and Chauncey Creek

In addition to the core areas, Chauncey Creek was identified as the only tributary habitat available for a portion of the upper Fording River WCT population residing within a 10 km reach upstream and downstream of Chauncey Creek (Cope et al. 2016). Currently, the upper reaches of Chauncey Creek, which contain many preferred or high-quality habitat attributes, are not accessible to fish resident in the Fording River as the Fording Road culvert installed by the BC Ministry of Transportation and Infrastructure acts as a barrier to upstream fish migration (Cope et al. 2016). Given its status as a watershed unimpacted by mining activities, and having reference level water quality, Chauncey Creek is regionally important WCT habitat. Through a separate regulatory process, Teck is working towards restoration of connectivity by replacing the Fording Road culvert with a clear span bridge.

6.4 Human Environment

The following section provides a discussion of all known sensitive economic, social, heritage, or health values in the Project vicinity that might be affected by the Project.

6.4.1 Land Use and Tenure

The Project would be located on Crown land coal leases held by Teck and on fee simple land owned by Teck (Figure 4). Access to the Project site is via the Fording Mine Road which extends from Highway 43 east of the community of Elkford. The mining portion of the Project is outside of the current FRO mine permit boundary (C-3 Permit). Lands associated with the Project area are zoned for Rural Resource under the Elk Valley Zoning Bylaw No. 829 of the Regional District of East Kootenay. The Rural Resource designation allows agricultural, rural residential, and rural resource land uses and also recognizes the use of these lands for public utility use, resource extraction, green space and outdoor recreation. Land use is further discussed in Section 9.

Strategic land use planning for the Project area includes a variety of land use objectives within the East Kootenay Region, including those addressing commercial resource development. Under the Kootenay-Boundary Land Use Plan and Higher Level Plan (1997, 2002), the Project area is within the Coal Enhanced Resource Development Zone which represents lands with priority management emphasis on coal resources and their exploration, development and production and provides long-term commitment to coal mining exploration and development. Coal Enhanced Resource Development Zones are located exclusively in the East Kootenay Region and encompass areas of known coal reserves, existing coal mining facilities and infrastructure, as well as areas for potential expansion. Teck is not aware of any Indigenous Land Use Plans which overlap the Project area.

Coal mining and processing has been a primary economic driver in the Elk Valley since the first coal mine was established at Coal Creek near Fernie in the late 1890s. Other land and resource uses within and surrounding the Project include oil and gas exploration, timber harvest, trapping, guided hunting and fishing, and outdoor recreation related activities such as golfing, wildlife viewing, camping, hiking, horseback riding, hunting, fishing, snowmobiling, all-terrain vehicle (ATV) riding, and skiing. An active petroleum and natural gas lease belonging to the Elk Valley Corporation covers the Project area.

Forestry takes place on Crown land and on private managed forest land that are adjacent to FRO. Forest tenures overlap the Project and FRO area and tenure holders have agreements with Teck. There is a network of Forest Service Roads that overlap the Project area which are owned and managed by Canadian Forest Products Ltd.

The Project area is located within Wildlife Resource Management Unit 4-23 of the Kootenay Region. Although several commercial guides and outfitters operate in the Kootenay Region, there are no guiding tenures within the Project area. The nearest guide outfitting tenure is located approximately 8 km northwest of the Project, with FRO and Greenhill's Ridge separating the Project from the tenure.

A no unauthorized entry boundary exists for FRO north of the Project and is established around the active operating areas to maintain public safety. All persons (including hunters and anglers) must have permission to access Teck property. The Project would change the no unauthorized entry boundary to include the Project.

Limited entry hunting permits are available for elk and mountain goat, and hunting for upland game birds is permitted within Management Unit 4-23 outside restricted areas. While the Elk Valley provides world class fly fishing in the Elk River, fishing opportunities are limited within and adjacent to the Project region due to access restrictions associated with FRO no authorized entry boundary and a recreational fishing closure on the Fording River above Josephine Falls.

Trapline tenures overlap the Project; with permission from Teck, access to traplines through Teck properties is provided while maintaining public safety. Species trapped in this area include lynx, mink, wolf and coyote. The closest trapping cabin to the Project site is located approximately 1.3 km southeast of the Project.

Outdoor recreation is highly valued by local residents and visitors to the Elkford area and is considered an important lifestyle attraction of the Elk Valley. Numerous outdoor recreational opportunities exist in areas where access is permitted surrounding FRO, including ATV and snowmobile riding, mountain biking, horseback riding, camping, hiking, fishing, and hunting. The Elkford ATV Club manages several ATV and snowmobiling trails surrounding Teck's FRO and GHO areas. Registered angler guides attract an international clientele to fish along the Elk River. Recreational fishing is also popular on the Fording River downstream of Josephine Falls, although upstream of the falls has been closed to recreational fishing since 2010. Public use of the existing FRO area is restricted within the no shooting / no unauthorized entry boundary.

6.4.2 Visual Aesthetics

The Project is located within the front ranges of the Rocky Mountains where the landscape context is characterized by wide valleys, steep slopes, and long ridgelines spotted with summits. From a visual perspective, landcover generally consists of coniferous forests in the valley and more irregular, sparse vegetation and exposed rock at higher elevations. The topography along the upper portions of Castle Mountain is steep with the peak reaching approximately 2,550 masl. Lower slopes are shallower, trending mainly westward towards the Fording River valley.

Land cover in the valleys generally comprises montane spruce forests with inclusions of Douglas fir, lodgepole pine and wester larch. At higher elevations land cover is characterized by Engelmann Spruce - subalpine fir forest interspersed with grasslands and shrublands on steep warm aspect slopes. At the highest elevations alpine grasslands remain on steep warm aspect slopes with stunted subalpine fir and inclusions of Engelmann spruce, whitebark pine and subalpine larch.

Industrial uses of the broader area include open-pit coal mining that has visibly modified the landscape at GHO and FRO sites, and to the southeast at Teck's Line Creek Operations. Forestry activity is also visible in both the Fording River Valley and the Elk Valley with vegetation established at various stages of regeneration in previously logged cutblock and access road areas.

The Project area would include portions that are impacted by industrial uses (within FRO) and portions that are lightly impacted by industrial uses (Castle Mountain). Castle Mountain has some forestry activity and mine exploration activity visible.

Given the Elk Valley's regional attraction for outdoor recreation-based tourism, aesthetic quality of the landscape is typically valued as a setting for year-round recreational activities. Scenic areas established in the Kootenay-Boundary Higher Level Plan indicate landscape management guidance for scenic areas related to the design of timber harvesting, forest management and mineral exploration that reflect the importance of front country landscapes to communities, recreation and tourism. While some of the scenic areas established under Objective 9 of the Kootenay-Boundary Higher Level Plan were cancelled in the transition from the *Forest Practices Code of BC Act* to the *Forest Range and Practices Act*, visual quality objectives have been established for many scenic areas along Highway 43 south of Elkford.

6.4.3 Economics and Socio-Community Health

The Project is located in the Regional District of East Kootenay (population 60,439) and in the traditional territory of the Ktunaxa Nation. The Elk Valley communities of Fernie (population 5,249), Sparwood (population 3,784), Elkford (population 2,499) and Crowsnest Pass, Alberta (population 5,589) are nearby, with Elkford being the closest community to FRO.

The closest services to the Project are located in the closest community of Elkford, Elkford currently has a preschool, elementary and secondary schools operated by the BC Ministry of Education and School District #5. The District of Elkford supplies water, sewer and solid waste services to the community with water drawn from three wells near the community. Basic fire and emergency services available in Elkford are also supplied by the District of Elkford. The basic health care facility in Elkford is operated by BC Interior Health, with the closest Trauma Center (Level 1 Hospital) being the Elk Valley Hospital in Fernie. The nearest provincial parks to the Project are:

- the Don Getty Wildland Provincial Park and Beehive Natural Area located approximately 5 km east of the Project in Alberta, on the east side of the continental divide); and
- Elk Lakes Provincial Park is the nearest provincial park in BC, located approximately 17 km northwest of the Project.

Portions of the Project area fall in the Chauncey Todhunter Access Management Area, designated under the BC *Wildlife Act's Motor Vehicle Prohibition Regulations.* In the Elk Valley Teck employs over 4,700 people including 1,400 at FRO, many of whom are from the local communities, and contributes to the local and provincial economy and tax base. In 2018, 55% of Fording River employees were from local communities and 96% of senior management roles were filled by locals.

Over the proposed two-year pre-development construction period, it is estimated that the Project would create several hundred additional construction related jobs. Housing for the construction work force is anticipated to be Teck's Elk Valley Lodge work camp located in Elkford BC[29].

The existing FRO workforce is planned to remain in place as FRO's focus shifts to the operational phase of the Project and away from other mining areas at FRO. No additional workers or housing are anticipated for the operational phase.

The Project will extend the life of the mine operations at Fording River, thereby helping to meet market demands for metallurgical coal, when existing operations would otherwise begin to decline. It is anticipated that the existing direct and indirect employment and economic benefits associated with FRO will be sustained as a result of the Project.

Coal has been mined in the Elk Valley since the late 1890s, with the Elk Valley coalfield being one of the major coal-producing areas in Canada. Parts of the Elk Valley area have experienced increased economic diversity over the past 10 years with the rise of the tourism sector. Employment in retail trade more than tripled from 2011 to 2016 in Fernie, and the economies of both Fernie and Crowsnest Pass diversified into the construction and manufacturing sectors. Coal mining remains the focus of the Sparwood and Elkford economies.

[29] For the camp to be available for the Castle construction workforce, it would require an extension to the municipal permit.

6.4.4 Archaeological Resources

As noted previously, the Project is located within the traditional territory of the Ktunaxa Nation. The area has been subject to an Archaeological Overview Assessment (Choquette and Tamasi 2018), consisting of a background synthesis of available data as well as map and aerial photograph analysis. A total of 21 landform-based geographic information system (GIS) polygons were mapped within the Project area as having potential to contain archaeological sites, each with a 100 m buffer zone. The archaeological potential of the polygons is based on criteria derived from pre-contact land and resource use models developed for the middle Elk River drainage area and the southern Canadian Rocky Mountains.

The polygons of archaeological potential represent areas where archaeological resources may be adversely affected by developments involving ground disturbance or capping with waste rock storage areas. As such, they represent areas that will be subject to more intensive archaeological field investigation in the form of an Archaeological Impact Assessment pursuant to Section 14 of the BC *Heritage Conservation Act* (Government of British Columbia 1996). Upon ground-truthing of the high potential polygons, additional areas may be identified which require assessment.

7 Effects of the Environment on the Project

The Project could be affected by a number of environmental factors from a business perspective and from a physical infrastructure perspective. From the business perspective, the metallurgical coal market will be influenced by global efforts to respond to climate change. From the physical infrastructure perspective climate change and natural hazards could directly interact with Project facilities and operations.

The following environmental factors could lead to environmental effects on the Project's physical infrastructure:

- climate change:
    - warmer and dryer climate in summer could lead to more frequent wildfires
    - higher precipitation, especially in winter, could lead to more frequent flooding
    - earlier peak spring flow and other potential hydrological changes, which need to be accounted for by the Project water management facilities
- natural hazards, including:
    - natural seismic events
    - volcanic events
    - avalanche events
    - extreme weather events
    - fire

Climate change is leading to a focus on reducing carbon intensity and the implementation of carbon taxes. The Project is well positioned for both of these factors.

When it comes to carbon-competitiveness, based on data reported by the International Council on Mining and Metals[30], Teck's steelmaking coal business has among the lowest carbon intensities in the world for the production of steelmaking coal. The Project will produce high quality steel making coal that during steel production requires less coal than lower grades of coal. The majority (93%) of the grid electricity in BC that feeds the Project is clean and renewable energy, and it is almost entirely generated by hydro sources. Teck continues to evaluate other opportunities to reduce the carbon footprint of the Project, such as material handling options which may reduce emissions (e.g., Section 3.4.2.9).

Unlike other global producers of steel making coal, all of Teck's coal mines are currently subject to a carbon tax. When other jurisdictions implement carbon taxes, the Project's coal will have a competitive advantage.

Additionally, Teck plans to achieve an objective to be carbon neutral across all operations by 2050. Teck has set out an initial roadmap to achieve carbon neutrality by first avoiding emissions and then eliminating or minimizing emissions. This will include looking at alternative ways of moving materials at our mines, using cleaner power sources, and implementing efficiency improvements, among other measures.

Becoming carbon neutral by 2050 builds on Teck's work to date in reducing emissions and advocating for climate policies. Since 2011, Teck has implemented projects and initiatives to reduce GHG emissions at our operations by 289,000 tonnes, which is the equivalent to taking over 88,000 combustion engine cars off the road.

Risks associated with climate change and natural hazards would be assessed in the environmental assessment and appropriate mitigations incorporated into the Project designs and plans. The Project would also follow FRO's design standards and practices that mitigate these risks. An example of this is FRO's avalanche forecasting, work requirements, and rescue procedures.

8 Water Use

As the Project would be an extension to FRO, some of the Project water use would be specific to the Project and some would be associated with FRO (Table 22). The Project water use would support mining only. The FRO water use would be for coal processing.

[30] https://www.teck.com/media/Portfolio-Resilience-in-the-Face-of-Climate-Change.pdf

Table 22: Water Use Specific to the Castle Project and the FRO Activities Related to the Project

Water Use	Castle Project Water	FRO Water Related to the Project
Processing Water Non-potable water used in the Coal Processing Plant at FRO	No processing water will be used at the Castle Project site. All processing for the Project will occur at FRO.	There would be no change to the processing water use at FRO due to the Project (no additional volume required) because the processing rates would remain unchanged by the Project. Processing water needs at FRO would continue to be met by recycling water from the FRO south tailings pond.
Potable Water Bottled water for human consumption	Potable water needs at the Project site would be met by a third party supplier.	There would be no change to potable water use at FRO due to the Project Potable water needs at FRO would continue to be met by a third party supplier.
Domestic Water Non-potable water for domestic use in offices and mechanical shops etc.	Domestic water needs at the Project site would be limited to the satellite offices and mechanical shops etc. Teck will evaluate trucking water from FRO, local groundwater wells, or use of and possibly storage of surface water. Domestic water for the Project might require amendment to FRO's existing water licences (Section 4.4) or obtaining new licences for groundwater wells or surface water use and possibly storage.	There would be no change to domestic water use at FRO due to the Project Domestic water needs at FRO would continue to be met by existing licenced groundwater wells.
Dust Control Water Non-potable water for sprayed on roads, stockpiles or other areas to reduce dust entering the air.	Dust control water needs at the Project site could be met by trucking water from FRO, local groundwater wells, or use of and possibly storage of surface water. Dust control water for the Project might require amendment to FRO's existing water licences (Section 4.4) or obtaining new licences for groundwater wells or surface water use and possibly storage.	There would be no change to dust control water use at FRO's plant site due to the Project. Dust control water needs at FRO's plant site would continue to be met by existing licenced surface water sources.
Drilling Water For the purposes of this discussion, drilling water is non-potable used to operate drills for construction and mining.	Drilling water needs at the Project site could be met by trucking water from FRO, local groundwater wells, or use of and/or storage of surface water. Dust control water for the Project might require amendment to FRO's existing water licences (Section 4.4) or obtaining new licences for groundwater wells or use of and/or storage of surface water.	It is highly unlikely that there would be any drilling water use at the FRO plant site due to the Project.

FRO = Fording River Operations; the Project = Castle Project.

9 Land Use Plans

A number of land use plans apply in the Project region (Table 23). Teck is not aware of any Indigenous Land Use Plans which overlap the Project region.

Table 23: Land Use Plans and Area Specific Regulations

Land Use Plan	Zoning Consideration	Potential Amendments Required
Kootenay-Boundary Land Resource Management Plan Implementation Strategy Kootenay Inter-Agency Management Committee 1997	Portions of the Project would fall into the: • Coal Enhanced Resource Development Zone • Enhanced Resource Development Zone	Project is consistent with the Land Use Plan. No amendments would be required for the Project.
Elk Valley Zoning Bylaw No. 829, 1990 Regional District of East Kootenay	Portions of the Project would fall into the: • Rural Resource Zone RR-60	Project is consistent with the bylaw. No amendments would be required for the Project.
District of Elkford Zoning Bylaw No. 737, 2013 District of Elkford	Portions of the Project would fall outside of the District of Elkford. The District of Elkford includes much of FRO.	The District of Elkford might need to be amended to add the Project.
Motor Vehicle Prohibition Regulation BC Wildlife Act	Portions of the Project would fall into the: • Chauncey Todhunter Access Management Area	The Motor Vehicle Prohibition Regulation might need to be amended to remove the Project from the Chauncey Todhunter Access Management Area

FRO = Fording River Operations; the Project = Castle Project.

10 Potential Project Related Environment and Social Effects

This section of the IPD includes a general discussion of possible Project related environmental and social effects. This section focuses on possible future conditions if the Project proceeds. The discussion addresses how the Project might interact with the:

- Physical Environment
- Biological Environment
- Human Environment

The potential effects of the Project on environmental, economic, social, heritage and human health will be assessed as part of the EAC Application (refer to Section 4.1 for discussion on the environmental assessment process).

An environmental assessment for the Project would include assessment of specific VCs selected in collaboration with Indigenous Nations, Communities of Interest, regulators and agencies.

The assessment of potential effects to VCs would include consideration of:

- mitigation measures and plans to avoid, minimize, rehabilitate or offset impact
- integration with existing FRO and regional permits and programs
- residual incremental and cumulative effects associated with the Project and reasonably foreseeable developments

Teck has an extensive history in the Project region and is involved in many studies and impact mitigation programs related to current and past coal mining in the Project region (Appendix A). Existing environmental conditions in the Project region are summarized in Section 6. Early review of the Project indicates the potential project-environment interactions outlined in Table 24. Teck has received feedback and information on these potential project-environment interactions through engagement on prior project application review processes, various regional multi-stakeholder initiatives, and engagement on the Project prior to submitting this IPD.

Table 24: Preliminary Identification of Potential Project Effects

Environment Component	Issue/Potential Effect	Examples of Potential Mitigations
Physical Environment		
Geology, Soils and Terrain	• Loss of soil profile and changes to terrain from vegetation removal, overburden removal, storage of waste rock and development of open-pit mine. • Changes to soil quality due to changes in soil chemical and physical characteristics during mining and reclamation activities.	• Management practices for soil erosion control and soil contamination mitigation. • Implement a reclamation and closure plan incorporating soil salvage plans and targeted end land use objectives. • Soil salvage, soil stockpile, and soil placement management.
Hydrogeology	• Changes to groundwater quality and quantity from mining interaction with the groundwater table resulting from changes to topography including disturbance to bedrock and surficial materials. • Changes to groundwater quality from water infiltration through waste rock, pit walls, mine pits, etc. • Changes to groundwater quality interactions between groundwater and mine-influenced surface water.	• Implementation of erosion control and spills management plans. • Early investigations to plan intakes and outfalls and implement Project-specific surface water quality management plans (e.g., water treatment). • Implement groundwater monitoring plans during construction and operation and adapt to findings. • Implement a reclamation and closure plan, including a closure water management plan.
Hydrology and Water Quality	• Changes in flow regime and sediment loading in streams and rivers. • Erosion/deposition associated with changes in surface water flow regime. • Changes in water quality in streams and rivers resulting from release of selenium and other water quality constituents from waste rock and CCFR storage areas. • Changes in groundwater/surface water interactions.	• Implement surface water management plans during construction and operation. • Integrate the commitments in the EVWQP and incorporate the Project into the implementation plan. This may include Project-specific water quality treatment initiatives such as using existing and/or proposed infrastructure (e.g., Fording River Active Water Treatment Facility South), to treat contact water and/or implementation of other technologies (e.g., SRFs or new water treatment facilities). • Integrate water management into reclamation and closure planning.

Table 24: Preliminary Identification of Potential Project Effects

Environment Component	Issue/Potential Effect	Examples of Potential Mitigations
Air Quality, Noise and Vibrations	• Fugitive dust emissions from material handling and processing can result in increases in ambient particulate matter concentrations that can negatively affect human and wildlife health; increases in dustfall deposition can affect vegetation and waterbodies. • Combustion emissions from vehicles and equipment can result in increases in ambient concentrations of nitrogen dioxide, sulphur dioxide and other contaminants that can negatively affect human health and vegetation. • Increases in greenhouse gas emissions have the potential to affect climate change. • Noise and/or vibrations from blasting, vehicles and Project activities.	• Implementation of an air quality and dust control plan. • Efficient operation of the vehicle fleet, and equipment/coal dryer to minimize greenhouse gas emissions. • Use of noise minimization equipment where appropriate. • Investigation of other options to reduce air emissions/ consideration of alternative technologies (e.g., electric vehicles)
Biological Environment		
Terrestrial Resources	• Direct loss, temporal loss, or change in quality, quantity of vegetation and wildlife habitat. • Sensory disturbance to wildlife. • Disruption of wildlife movement patterns in regional landscape. • Accidental direct mortality to wildlife due construction, operations, traffic. • Displacement of wildlife • Health effects on vegetation and wildlife due to changes in air, water and soil quality. • Increased wildlife habitat and protection for certain species. • Health effects to aquatic resources (e.g., water birds and amphibians) due to changes in water quality.	• Implement appropriate management practices and ecosystem/species management plans. • Avoid and/or minimize Project interaction with sensitive and at risk ecosystem and biodiversity elements (reduce the size and timing of impacts). • Minimize mine footprint through phased operation, maximized backfill waste deposition, and progressive and interim reclamation. • Implement a reclamation and closure plan integrating Teck's Biodiversity Program and vision of working to achieve net positive impact on biodiversity in areas affected by our activities. • Devise an offset strategy targeting the improvement and/or protection of sensitive ecosystem and biodiversity elements in the Elk Valley (e.g., Teck conservation lands in the Elk Valley likely provide opportunities to apply habitat enhancement actions). • Identify offsetting opportunities as quantified through loss-gain accounting and through engagement with government and Indigenous Peoples.

Table 24: Preliminary Identification of Potential Project Effects

Environment Component	Issue/Potential Effect	Examples of Potential Mitigations
Aquatic Resources	• Direct loss or change in quantity or quality of aquatic habitat resulting from pit development, placement of waste rock, and other mine infrastructure • Change in quantity and quality of aquatic habitat resulting from alteration of stream flows. • Change in quality of aquatic habitat resulting from deposition of calcite and sediment loading. • Health effects to aquatic resources and aquatic dependant species (e.g., fish, benthic invertebrates, amphibians, birds) due to changes in water quality. • Direct loss of riparian and wetland habitats affecting quality of fish habitat.	• Avoid and/or minimize Project direct loss of aquatic habitat through selection of mine pit and waste rock storage locations that do not directly interact with fish bearing waterbodies • Implement appropriate management practices and environmental management plans. • Minimize mine footprint through phased operation and maximize backfill waste deposition. • Implement appropriate management practices (e.g., Standards and Practices for Instream Works) and environmental management plans (e.g., Erosion and Sediment Control Plan). This includes monitoring water quality per current plans and adapting to findings. • Implement a habitat offset plan to compensate for unavoidable harmful alteration, disruption or destruction of fish habitat. • Implement water quality management plans to meet requirements of the EVWQP and incorporate the Project into future implementation plans (see Hydrology and Water Quality).
Human Environment		
Archaeology	• Effects to archaeological resources due to land clearing, mining, logging and waste rock storage areas.	• Conduct archaeological impact assessment and implement management plans including chance find procedures.
Economy and Socio-community	• Changes to and/or maintenance of population in local communities. • Provincial and local economic stimulus. • Employment, income, local revenue generation and gross domestic product effects. • Worker and public health and safety. • Changes to local housing demand. • Changes to demand for local services and infrastructure. • Changes to and/or maintenance of community and individual health and well-being. • Effects that specifically impact a sub-group within the Elk Valley, such as Indigenous People, women, low income, under or unemployed, disabled, seniors and vulnerable groups.	• Implement local employment policies and planning. • Planning for local procurement of goods and services. • Local skills inventory, training and skills development programs. • Environment, Health, Safety and Community plans. • Support to local initiatives to address demand for housing and local services such as health services and education. • Targeted initiatives to address effects that specifically impact a sub-group within the Elk Valley.

Table 24: Preliminary Identification of Potential Project Effects

Environment Component	Issue/Potential Effect	Examples of Potential Mitigations
Land Use	• Potential for loss and/or disruption of area use and access for commercial (e.g., forestry, guide outfitting, trapping) and non-commercial (e.g., trails) land uses due to mining activity and extension of the FRO no unauthorized entry zone. • Potential indirect impacts to wildlife harvesting activities (e.g., trapping, hunting, fishing) from direct effects of mining activity to wildlife and fish habitat and abundance. • Potential for change to environmental setting and quality of experience of commercial tourism (e.g., guided outfitters) and non-commercial recreational use (e.g., hiking) from effects of dust, noise, and visual disturbance.	• Access and use arrangements or agreements with resource users. • Management practices and environmental management plans for Ecosystems, Species, Aquatic Health, Air Quality, Noise, and Visual Quality. • Ongoing engagement and communication with stakeholders related to access and use. • Development of end land use objectives in reclamation and closure planning.
Visual Aesthetics	• Visual disturbance resulting from vegetation removal, the progressive alteration of landforms, and introduction of built features (e.g., facilities, linear corridors) that are inconsistent with the current natural landscape character. • Indirect effects to cultural, recreational, and tourism values that are related to visual quality and the enjoyment of scenic values.	• Project design and mitigations and best practices to address potential visual effects. • Management practices and environmental management plans for vegetation, air quality and dust control. • Development and implementation of landscape design in reclamation and closure planning.
Human and Terrestrial Wildlife Health		
Human and Terrestrial Wildlife Health	• Increased particulate matter concentrations (i.e., $PM_{2.5}$ and PM_{10}), which may cause health risk to local communities. • Deposition of dust to plants and soil, which can result in uptake of metals, metalloids and PAHs from coal dust to plants which are then consumed by people and wildlife which may impact their health. • Water runoff may contribute to changes in water quality to downstream waterbodies which may impact health of humans, fish, and wildlife.	• Implementation of an air quality and dust control plan • Implementation of a Site Water Management Plan and the EVWQP

EVWQP = Elk Valley Water Quality Plan; PM_{10} = particulate matter less than 10 µm (micrometres) in diameter; $PM_{2.5}$ = particulate matter less than 2.5 µm (micrometres) in diameter; PAH = polycyclic aromatic hydrocarbon; FRO = Fording River Operations; the Project = Castle Project.

11 Closing

Castle Mountain, located immediately south of the current mining operations at Fording River Operations, has extensive deposits of mineable steelmaking coal and represents a logical extension of FRO. Extension of mining to Castle Mountain will allow for continued economic contributions to the local and regional economy. Teck continues to evaluate the coal deposits within Castle Mountain to understand the best approach to mine the deposits. Factors being considered include economics, operational efficiency, safety, as well as environmental and community sustainability.

The Project represents an opportunity to advance how Teck approaches mining in the Elk Valley. Extensions of mining to a new area provide opportunities to adopt technologies and approaches at the outset of the Project. These include key learnings and advances from Teck's recent initiatives in biodiversity, water quality management (e.g., the use of saturated rock fill technology), as well as alternative mining approaches (e.g., along-strike mining). Teck is continuing to evaluate lessons learned from all of our Elk Valley operations and investigating new technologies to incorporate into the Project.

Through this IPD, Teck is providing an early design-stage overview of the Project, with the intention that this document will form the basis for early engagement that will help to shape the final design of the Project. Once the EAO accepts the IPD, the Early Engagement Phase of the assessment process is initiated. During this phase regulators, agencies, Indigenous Peoples, and other communities of interest have an opportunity to provide feedback on decisions that have been made about the Project, and about factors being considered in the decision making process for project components that are still being evaluated. The Engagement Plan includes a summary of all engagement conducted to date and outlines Teck's plans for future engagement.

The next step in the environmental assessment process will be the preparation of Detailed Project Description. The Detailed Project Description will present a more refined design for the Project, reflecting progression by Teck on supporting analysis and design, as well as consideration for input received through the Early Engagement Phase.

Please provide feedback to the EAO or directly to Teck.

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12 References

BC CDC (British Columbia Conservation Data Centre). 2019. BC Conservation Data Centre. Available at: https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre [last accessed August 2019].

BC EAO (British Columbia Environmental Assessment Office). 2019. Early Engagement Policy.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2019a. BC Species and Ecosystems Explorer. Available at: https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre/explore-cdc-data/species-and-ecosystems-explorer. Accessed on August 22, 2019.BC ENV. 2019b. Ungulate Winter Ranges. Available at: http://www.env.gov.bc.ca/wld/frpa/uwr/. [accessed August 2019].

BC MOF and MELP (British Columbia Ministry of Forests and Ministry of Environment, Lands and Parks). 1995. Biodiversity guidebook, September 1995. Forest Practices Code of British Columbia. Victoria, BC. Available at: http://ilmb-www.gov.bc.ca/ilmb/lup/srmp/background/docs/LUGuide.pdf.

BC Treaty Commission. 2019. Ktunaxa Kinbasket Treaty Council. Available at: http://www.bctreaty.ca/ktunaxa-kinbasket-treaty-council. Accessed October 2019.

Bebi, P., D. Kulakowski and C. Rixen. 2009. Snow avalanche disturbances in forest ecosystems—State of research and implications for management. Forest Ecology and Management 257:1883-1892.

Bighorn Sheep Expert Team. 2017. Bighorn Sheep Cumulative effects report for the Elk Valley Cumulative Effects Management Framework. Draft for Review – Version 6. 64 pages.

Braumandl, T. and G. Curran. 2002. Land Management Handbook No. 20: A Field Guide to Site Interpretation for the Nelson Forest Region. MoF Research Branch. Vancouver, BC.

Choquette, Wayne T, and Ian Tamasi. 2018. *Archaeological Overview Assessment of Teck Coal Ltd. Fording River Operations: Castle MYAB*. Prepared for Teck Coal Ltd. On file at Tipi Mountain Eco-Cultural Services Ltd.

Cope, S. C.J. Schwarz, J. Bisset and A. Prince. 2013. Upper Fording River Westslope Cutthroat Trout (Oncorhynchus clarkii lewisi) population assessment and telemetry project annual report: 2012-2013 (Interim Report 1). Consultant's report Prepared for Teck Coal Ltd. by Westslope Fisheries Ltd., Cranbrook, B.C. 108p+ appendices.

Cope, S. C.J. Schwarz, A. Prince and J. Bisset. 2016. Upper Fording River Westslope Cutthroat Trout (Oncorhynchus clarkii lewisi) population assessment and telemetry project: Final Report. Consultant's report prepared for Teck Coal Ltd. by Westslope Fisheries Ltd. Cranbrook, B.C. 264p.

Cope, S., C.J. Schwarz, and A. Prince. 2017. Upper Fording River Westslope Cutthroat Trout Population Monitoring Project: 2017. Report prepared for Teck Coal Limited, Sparwood, BC. Report prepared by Westslope Fisheries Ltd., Cranbrook, BC. 40 p. + 1 app.

ECCC (Environment and Climate Change Canada). 2017. Recovery Strategy for the Whitebark Pine (*Pinus albicaulis*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. viii + 54 pp.

Golder (Golder Associates Ltd.). 2014. Fording River Operations Swift Project Environmental Assessment Certificate Application. Annex G - Fish and Fish Habitat Baseline Report. Consultant's report prepared for Teck Coal Limited. Fording River Operations by Golder Associated. November 2014. 120p + appendices.

Golder. 2018. Fording River Operations Turnbull West Project Wildlife Baseline Report. Submitted to Teck Coal Limited, Fording River Operations, April 2018. 85 pp. + appendices.

Government of British Columbia. 1996. *Heritage Conservation Act,* Revised Statutes of British Columbia (RSBC) Chapter 187.

Government of British Columbia. 2019. Ktunaxa Nation. Available at: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/consulting-with-first-nations/first-nations-negotiations/first-nations-a-z-listing/ktunaxa-nation. Accessed October 2019.

Government of Canada. 2019. Species at risk public registry. Accessed August 2019. Available at: https://wildlife-species.canada.ca/species-risk-registry/sar/index/default_e.cfm

Integral (Integral Ecology Group Limited). 1997-2010. Fording River Operations Swift Project – Plot Data Excel Database.

Interior Reforestation (Interior Reforestation Co. Ltd.). 2000. Reconnaissance (1:20,000) Fish and Fish Habitat Inventory of the Upper Elk Watershed WSC: 349-248100 Phases IV to VI. Report prepared for Crestbrook Forest Industries Ltd. by Interior Reforestation Co. Ltd. Cranbrook, B.C.

Keane, R.E. and R.A. Parsons. 2010. Restoring whitebark pine forests of the northern Rocky Mountains, USA. Ecological Restoration 28: 56-70.

Klinkenberg, B. 2014. *Pinus albicaulis*. In: E-Flora BC: Electronic Atlas of the Flora of BC. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. Accessed March 2018. Available at: http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Pinus%20albicaulis

Lacelle, L.E.H. 1990. Biophysical resources of the East Kootnay area: Soils. Wildlife technical monograph TM-1. Report No 20. British Columbia Soil Survey. Habitat Inventory Section, Wildlife Branch. British Columbia Ministry of Environment, Victoria. 359 pp.

Mackillop, D., A. Ehman, K. Iverson, and E. McKenzie. 2018. A Field Guide to Ecosystem Classification and Identification for Southeast British Columbia: The East Kootenay. Province of BC., Victoria, BC. Land Management Handbook 71.

Matrix (Matrix Solutions Incorporated). 2014. Fording River Operations – Swift Project Wildlife and Wildlife Habitat Baseline Report. Submitted to BC Environmental Assessment Office by Teck Coal Limited – Fording River Operations as Annex J of the Fording River Operations Swift Project Environmental Assessment Certificate Application, November 2014.

Matrix. 2015. Wildlife Baseline Report - Greenhills Operations Cougar Pit Extension Project. Prepared for Teck Coal Limited, Greenhills Operations. July 2015.

Meidinger, D. and J. Pojar. 1991. Ecosystems of British Columbia. B.C. Min. For., Victoria, BC. Spec. Rep. Series 6.

Minnow (Minnow Environmental Inc.). 2018. Elk River Watershed Regional Aquatic Effects Monitoring Program (RAEMP) Report, 2015-2016. Prepared for Teck Coal Limited by Minnow Environmental Inc. January 2018.

Minnow and Lotic (Minnow Environmental and Lotic Environmental). 2018. Fording River Operations Local Aquatic Effects Monitoring Program (LAEMP) Report, 2017. Consultant's report prepared for Tech Coal Limited. By Minnow Environmental Inc. and Lotic Environmental. May 2018. 79p + appendices.

Poole K. G. and Smyth C. 2014. Elk Valley Bighorn Sheep Study. Prepared for: BC Ministry of Forests, Lands and Natural Resource Operations 205 Industrial Road G. Cranbrook, BC V1C 7G5.

Poole, K.G., R. Serrouya, I.E., Teske, and K. Podrasky. 2016. Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*) winter habitat selection and seasonal movements in an area of active coal mining. Canadian Journal of Zoology 94:733–745.

Quinn, M.S. and J. Phillips. 2000. Avalanche Paths in TFL14: Inventory, Description, Classification and Management. Final report to Crestbrook Forest Industries Inc. University of Calgary, AB, April 2000.

RWDI. 2019. Annual Teck Coal Ltd. Regional Air Monitoring Program Report 2019-03-31. 2018 Annual Report. Prepared March 29, 2019 by RWDI. 69pp.

Teck (Teck Coal Limited). 2013. Upper Fording River Westslope Cutthroat Trout Study- May 2013 Update. 2p.

Teck 2015. Refs - Section C of the Elkview Operations Baldy Ridge Extension Environmental Assessment Certificate Application.

Teck. 2014. Elk Valley Water Quality Plan. Available at: https://www.teck.com/media/2015-Water-elk_valley_water_quality_plan_T3.2.3.2.pdf

Teck. 2016a. Parry's Townsendia (*Townsendia parryi*) Species Management Plan Line Creek Phase II. Prepared December 2016 by Teck Resources Limited. 27 pp.

Teck. 2016b. Whitebark Pine (*Pinus albicaulis*) Species Management Plan EVO, FRO, GHO, LCO. Prepared December 2016 by Teck Resources Limited. 44 pp.

Teck. 2019a. Permit 1501 – Fording River Operations Annual Report. Prepared March 29, 2019 by Teck Resources Limited. 273 pp.

Teck. 2020. Engagement Plan for the Fording River Operations Castle Mountain Project. 37 pp.

Appendix A

List of Studies and Programs in the Project Region

The lists of studies and programs in the Castle Project (the Project) area presented below are intended to provide an initial assessment of available information relevant to the Project area for early engagement. These lists are not intended to be considered complete; searches for more information and studies will be re-run and will be updated in concert with baseline data collected in the field, as well as through collaboration and engagement with stakeholders and regulators, as the project progresses (for example, for valued component selection, the detailed project description, assessment, etc.).

1 Physical Environment

Ecofish Research Limited. 2018. Fording River Operations Active Water Treatment Facility South - Screening Assessment Report (Draft V1).

Elk Valley Coal Corporation (Fording River Operations). 2003. Henretta Ridge Pushback and Spoil Development Section 10 Permit Application. Submitted to The BC Ministry of Energy and Mines. September 2003.

Golder Associates Limited. 2010. Gap Analysis for the Fording River Operations – Greenhills North and Lake Mountain Project. Prepared for Teck Coal Limited, Fording River Operations. Submitted March 2010. 18 pp. + Appendix.

Golder Associates Limited. 2011. Evaluation of Selenium Attenuation, Fording River Operations. Submitted to Teck Coal Ltd. August 2011.

Golder Associates Limited. 2012. Environmental Gap Analysis for the Greenhills Operation West Spoil Expansion. Submitted to Teck Coal Limited, Greenhills Operation on March 14, 2012. 13 pp. + Appendices.

Golder Associates Limited. 2012. Hydrogeological Testing Program. Technical memorandum submitted to Teck Coal Ltd, dated March 6, 2012.

Golder Associates Limited. 2012. Turnbull South Pit Tailings Storage Facility Assessment. Report submitted to Teck Coal Ltd., dated March 21, 2012.

Golder Associates Limited. 2013. Teck Fording River Operations – Site-Wide Groundwater Monitoring Review. Report submitted to Teck Coal Ltd., dated April 2013.

Golder Associates Limited. 2014. Fording River Operations Swift Project Environmental Assessment. Hydrogeology Baseline Report. Submitted to Teck Coal Ltd., dated November 2014.

Golder Associates Limited. 2015. 2013 Annual Groundwater Monitoring Report. Teck Coal Fording River Henretta Project. Report submitted to Teck Coal Ltd., dated February 2015.

Golder Associates Limited. 2015. Coal Mountain Phase 2 Project: Annex E - Surface Water Hydrology Baseline Report.

Golder Associates Limited. 2015. Elkview Operations Baldy Ridge Extension Project: Annex E - Surface Water Hydrology Baseline Report.

Golder Associates Limited. 2015. Hydrogeology Baseline Report; Cougar Pit Extension Project. Report submitted to Teck Coal Ltd., dated September 30, 2015.

Golder Associates Limited. 2015. Operational Site Water Balance Model (2014).

Golder Associates Limited. 2015. Teck Coal Limited Greenhills Operations Cougar Pit Extension Project - Hydrology Baseline Report.

Golder Associates Limited. 2015. Teck Coal Limited Greenhills Operations Cougar Pit Extension Project Vegetation and Ecosystems Baseline Report. Submitted to Teck Coal Limited, Greenhills Operations on August 4, 2015. 39 pp. + Appendices.

Golder Associates Limited. 2015. Terrestrial Ecosystem Mapping Update for Teck Coal Limited Greenhills Operations and Fording River Operations. Submitted to Teck Coal Limited December 2015. 23 pp.

Golder Associates Limited. 2016. Swift Project: Hydrogeological Testing Program, December 2012 – January 2013. Technical memorandum dated February 10, 2016.

Golder Associates Limited. 2016. Fording River Operations Turnbull West and North Project. Appendix C - Gap Analysis Details. Prepared for Teck Coal Limited, Fording River Operations. Submitted December 2016.

Golder Associates Limited. 2017. LCO Dry Creek Flow Model Update.

Golder Associates Limited. 2018. Assessing Quality of High Elevation Grasslands in the Elk Valley, BC – Draft. Submitted to Teck Coal Limited November 1, 2018. 14 pp + Appendices.

Golder Associates Limited. 2018. Fording River Operations Castle and Turnbull East - Project Boundaries and LiDAR Data.

Golder Associates Limited. 2018. Fording River Operations North Active Water Treatment Facility Design Basis - Water Quantity Data Assessment.

Golder Associates Limited. 2018. Fording River Operations Turnbull West Project - Hydrology Baseline Report.

Golder Associates Limited. 2018. Fording River Operations Turnbull West Project Terrain, Surficial Geology and Soils Baseline Report Submitted to Teck Coal Limited April 2018. 62 pp.

Integral Ecology Group. 2018. Applications of quantitative ecohydrological analysis for reclamation monitoring and planning. Prepared for Teck Resources Limited. January 19, 2018.

Kerr Wood Leidal Limited. 2017. Elk Valley Water Quality Plan Permit Implementation - 2017 Metadata Summary Update.

Kerr Wood Leidal Limited. 2017. Regional Surface Flow Monitoring Plan.

Kerr Wood Leidal Limited. 2017. Teck Flow Monitoring Protocol.

Kerr Wood Leidal Limited. 2018. 2017 FRO Hydrometric Program.

Lacelle, L.E.H. 1990. Biophysical resources of the East Kootenay area: Soils. Wildlife technical monograph TM-1. Report No 20. British Columbia Soil Survey. Habitat Inventory Section, Wildlife Branch. British Columbia Ministry of Environment, Victoria. 359 pp.

Mackillop, D., A. Ehman, K. Iverson, and E. McKenzie. 2018. A Field Guide to Ecosystem Classification and Identification for Southeast British Columbia: The East Kootenay. Province of BC., Victoria, BC. Land Management Handbook 71.

Matrix Solutions Inc. 2007. Annual Mine Reclamation Report

Matrix Solutions Inc. 2010. Fording River Operations Greenhills North and Lake Mountain Expansion Project Terrestrial Ecosystems Work Plan. Submitted to Teck Coal Limited, Fording River Operations on June 10, 2010.

Matrix Solutions Inc. 2014. Fording River Operations – Swift Project Soils Baseline Report. Submitted to BC Environmental Assessment Office by Teck Coal Limited – Fording River Operations as Annex J of the Fording River Operations Swift Project Environmental Assessment Certificate Application, November 2014.

Norecol Environmental Consultants Limited. 1990. Henretta Dragline Project Stage 1 Report: Mine Plan and Environmental Impact Assessment: Volume 2 – Appendices Section 2. Prepared for Fording Coal Limited. December 1990.

Piteau Associates Engineering Ltd. 2012. Hydrogeological Assessment of Groundwater Supply Source. Greenhouse Groundwater Supply Fording River Operations. Report prepared for Teck Coal Ltd., dated July 2012.

Ryan, B.D. and M. Dittrick. 2001. Selenium in the Mist Mountain Formation of southeastern British Columbia. In Geological Fieldwork 2000, BC. Ministry of Energy and Mines, Paper 2001-1, pages 337-362.

Ryder, J.M. 1981. Biophysical resources of the East Kootenay area: Terrain. APD Bulletin 7. Terrestrial Studies Branch, Assessment and Planning Division, province of British Columbia Ministry of Environment, Victoria.

SNC-Lavalin Inc. 2015. Elk Valley Regional Groundwater Monitoring Program. Prepared for Teck Coal Ltd., report dated July 31, 2015.

SNC-Lavalin Inc. 2015. Elk Valley Regional Groundwater Synthesis Report. Prepared for Teck Coal Ltd. October 2015.

SNC-Lavalin Inc. 2015. Fording River Operations – Site Wide Groundwater Monitoring Program (2015 Update), Report prepared for Teck Coal Ltd., dated October 2015. SNC-Lavalin Inc. 2016. 2015 Annual Report, Regional Groundwater Monitoring Program. Dated March 31, 2016.

SNC-Lavalin Inc. 2017. 2016 Annual Report, Regional Groundwater Monitoring Program. Dated May 16, 2017.

SNC-Lavalin Inc. 2017. 2017 Field Program Results for Turnbull West Project Hydrogeology Baseline. Report prepared for Teck Coal Ltd., dated December 18, 2017.

SNC-Lavalin Inc. 2017. Hydrogeological Assessment Fording River Operations, Elkford, BC. Report prepared for Teck Coal Ltd., dated June 5, 2017.

SNC-Lavalin Inc. 2017. Regional Groundwater Monitoring Program, Elk Valley, BC. Prepared for Teck Coal Limited, dated September 29, 2017.

SNC-Lavalin Inc. 2018. 2017 Annual Groundwater Monitoring Report, Fording River Operations. Report prepared for Teck Coal Ltd., dated March 28, 2018.

SNC-Lavalin Inc. 2018. Field Guidance Document for Solinst Leveloggers. Prepared for Teck Coal Ltd., dated September 19, 2018.

SNC-Lavalin Inc. 2018. Fording River Operations 2017 Site Specific Groundwater Monitoring Program Update Report. Prepared for Teck Coal Ltd., dated October 31, 2018.

SRK Consulting Canada Inc. 2011. Line Creek Operations Phase II Report. Baseline Geochemical Characterization. Report prepared for Teck Coal Ltd. December 2011.

SRK Consulting Canada Inc. 2014. Metal Leaching and Acid Rock Drainage Characterization, Teck Coal Fording River Operations Swift Project. Report prepared for Teck Coal Ltd. November 2014.

SRK Consulting Canada Inc. 2014. Mine Waste Geochemical Characterization Program Coal Mountain Operations. Report prepared for Teck Coal Ltd. May 2014.

SRK Consulting Canada Inc. 2015. Metal Leaching and Acid Rock Drainage Characterization, Teck Coal Elkview Operations Baldy Ridge Extension Project. Report prepared for Teck Coal Ltd. January 2015

SRK Consulting Canada Inc. 2015. Metal Leaching and Acid Rock Drainage Characterization, Teck Coal Greenhills Operations Cougar Pit Extension Project. Report prepared for Teck Coal Ltd. September 2015

SRK Consulting Canada Inc. 2016. Selenium Geochemistry Study. Elk Valley and Cardinal River Phase 3 Implementation, 2015 Update Report. Report prepared for Teck Coal Ltd. April 2016

SRK Consulting Canada Inc. 2017. Geochemical Source Term Methods and Inputs for the 2017 Update of the Elk Valley Regional Water Quality Model. Report prepared for Teck Coal Limited, October 2017.

SRK Consulting Canada Inc. 2018. Fording River Turnbull West Geochemistry Baseline Report. Report prepared for Teck Coal Ltd. May 2018.

SRK Consulting Canada Inc. 2018. GHO Mine Expansion Project – Structural Investigations and Geotechnical Hazard Assessment. Prepared for Teck Coal Ltd. October 2018.

Summit Environmental Consultants Incorporated. 2013. Teck Coal Limited Greenhills Operations West Spoil Expansion Terrestrial Resource Assessment: Baseline Work Plan. Submitted to Teck Coal Limited, Greenhills Operations, April 2013. 19 pp. + Appendix.

Teck Coal Ltd. 2010. Baldy Ridge Development Reclamation Plan. 16 pp. April 2010.

Teck Coal Ltd. 2010. Line Creek Operations Phase II Project Draft Application Information Requirements. Dated February 2010.

Teck Coal Ltd. 2011. Line Creek Operations Phase II Project - Surface Water Hydrology Baseline Report.

Teck Coal Ltd. 2011. Line Creek Operations Phase II Project Environmental Assessment Certificate Application - Section B2.2.3 Surface Water Hydrology.

Teck Coal Ltd. 2013. Valley-Wide Selenium Management Action Plan for Teck Coal Limited Operations in the Elk Valley Summary Report.

Teck Coal Ltd. 2014. Elk Valley Water Quality Plan. Submitted to the British Columbia Minister of Environment on July 22, 2014.

Teck Coal Ltd. 2014. Elk Valley Water Quality Plan: Annex D.3 - Hydrology Report.

Teck Coal Ltd. 2014. Fording River Operations Swift Project Environmental Assessment Certificate Application. Submitted to the British Columbia Environmental Assessment Office in November 2014, amended January 2015.

Teck Coal Ltd. 2015. Elkview Operations Baldy Ridge Extension Project Environmental Assessment Certificate Application - Section B2.2.3 Surface Water Hydrology.

Teck Coal Ltd. 2015. Joint Application for a Mines Act Permit Amendment and an Environmental Management Act Permit Amendment.

Teck Coal Ltd. 2015. Metal Leaching and Acid Rock Drainage Management Plan Coal Mountain Operations. June 2015.

Teck Coal Ltd. 2015. Metal Leaching and Acid Rock Drainage Management Plan Greenhills Operations. October 2015.

Teck Coal Ltd. 2016. 2015 Annual Site-Specific Groundwater Report – Fording River Operations. Report dated March 31, 2017.

Teck Coal Ltd. 2016. 2015 Permit 424 Annual Report.

Teck Coal Ltd. 2016. Air Quality and Noise Control Management Plan. Plans submitted with the Swift Environmental Assessment Certificate (EAC) Application in January 2015, amended September 2016.

Teck Coal Ltd. 2016. Baldy Ridge Extension Environmental Assessment Application. Available at https://projects.eao.gov.bc.ca/p/baldy-ridge-extension. Accessed August 10, 2018.

Teck Coal Ltd. 2016. Fording River Operations 2015 Annual Site Effluent Discharge Permit 424 Monitoring Report.

Teck Coal Ltd. 2016. Joint Application for an Amendment to Mines Act C-3 Permit and Environmental Management Act Permit 424 for the North Spoil Rehandle Project. Submitted to the BC Mine Review Committee by Teck Coal Limited – Fording River Operations on May 6, 2016.

Teck Coal Ltd. 2016. Permit 107517 Annual Report.

Teck Coal Ltd. 2016. Surface Water Management Plan, Teck Coal Limited, Fording River Operations. Report dated December 27, 2016.

Teck Coal Ltd. 2017. 2016 Annual Site-Specific Groundwater Report – Fording River Operations. Report dated March 31, 2017.

Teck Coal Ltd. 2017. 2016 Permit 424 Annual Report.

Teck Coal Ltd. 2017. 2017 Elk Valley Regional Water Quality Model Update - Overview Report.

Teck Coal Ltd. 2017. 2017 Regional Water Quality Monitoring (RWQM) Update

Teck Coal Ltd. 2017. Coal Mountain Operations Care and Maintenance Integrated Water Management Plan.

Teck Coal Ltd. 2017. Fording River Operations 2016 Annual Site Effluent Discharge Permit 424 Monitoring Report.

Teck Coal Ltd. 2017. Fording River Operations Annual Reclamation Report for 2016. Prepared March 31, 2017.

Teck Coal Ltd. 2017. Permit 107517 Annual Water Quality Monitoring Report. Report dated March 31, 2017.

Teck Coal Ltd. 2017. Regional Water Quality Model Update Overview Report and Supporting Appendices. Submitted to the British Columbia Ministry of Environment in October 2017 by Teck Coal Ltd.

Teck Coal Ltd. 2017. Soil Salvage Management Plan. June 2017.

Teck Coal Ltd. 2017. Teck Fording River Operations Swift Water Licence Monitoring Program.

Teck Coal Ltd. 2018. 2017 Permit 424 Annual Report - Fording River Operations.

Teck Coal Ltd. 2018. Fording River Operations 2017 Annual Site Effluent Discharge Permit 424 Monitoring Report. Draft.

Teck. 2018. Fording River Operations Operational Environmental Monitoring Plan. Monitoring Plan for Consumptive Water Licences C133241, C133242 and C133243. December 2018. 53 p.

Teck Coal Ltd. 2018. Joint Application for a Mines Act Permit Amendment and an Environmental Management Act Permit Amendment for the Fording River Operations Turnbull West Project. Submitted to the BC Ministry of Energy, Mines and Petroleum Resources and Ministry of Environment and Climate Change Strategy by Teck Coal Limited, Fording River Operations, May 2018.

Teck Coal Ltd. 2018. Metal Leaching and Acid Rock Drainage Management Plan Elkview Operations. March 2018.

Teck Coal Ltd. 2018. Metal Leaching and Acid Rock Drainage Management Plan Line Creek Operations. April 2018.

Teck Coal Ltd. 2018. Water Quality database.

Teck Coal Ltd. 2019. Elk Valley Water Quality Plan 2019 Implementation Plan Adjustment. February 2019.

Teck Coal Ltd. 2019. Fording River Operations Metal Leaching and Acid Rock Drainage Management Plan – Interim. February 2019.

Tetra Tech. 2015. Detailed Geotechnical Evaluation. Fording River Operations Active Water Treatment Facility – South Project. Project No. A9TW. Document No. A9TW-0000-210-RP-004 Rev.B. October 14, 2015.

Tetra Tech. 2015. Residuals Landfill Drilling Progress Report. Fording River Operations Active Water Treatment Facility – South Project. Project No. A9TW. Document No. A9TW-6800-210-RP-001 Rev.A. August 14, 2015.

2 Biological Environment

Apps, C., J.L. Weaver, P.C. Paquet, B. Bateman and B. McLellan. 2007. Carnivores in the Southern Canadian Rockies: Core Areas and Connectivity across the Crowsnest Highway. Wildlife Conservation Society Canada Conservation Report No. 3. Toronto, ON.

Arnett, T. and J. Berdusco. 2008. 2007 Kilmarnock Creek Fisheries Habitat Assessment. Draft Report. April 2008. Consultant's report Prepared for Elk Valley Coal Corporation. Fording River Operations. Elkford, BC. 21p + appendices.

Bighorn Sheep Expert Team. 2017. Bighorn Sheep Cumulative Effects Assessment Report for the Elk Valley Cumulative Effects Management Framework – Draft November 2017 Version 6.

Bovee, K.D. 1982. A guide to stream habitat analysis using the instream flow incremental methodology. Instream Flow Information Paper 12, USDI Fish and Wildlife Services, Office of Biology Services: Washington DC.

Cannings, R. J. 2004. Gillett's Checkerspot (Euphydryas gillettii). Accounts and Measures for Managing Identified Wildlife. Identified Wildlife Management Strategy, Ministry of Water, Land & Air Protection, Victoria, BC. <http://www.env.gov.bc.ca/wld/frpa/iwms/documents/Invertebrates/i_gillettscheckerspot.pdf>.

Cope, S. and A. Prince. 2018. Harmer and Grave Creek Westslope Cutthroat Trout Habitat and Population Assessment: Interim Report 1. Report prepared for Teck Coal Limited, Sparwood, B.C. Report prepared by Westslope Fisheries Ltd., Cranbrook, B.C. 107 p. + 2 app.

Cope, S. C.J. Schwarz, A. Prince and J. Bisset. 2016. Upper Fording River Westslope Cutthroat Trout (Oncorhynchus clarkii lewisi) population assessment and telemetry project: Final Report. Consultant's report prepared for Teck Coal Ltd. by Westslope Fisheries Ltd. Cranbrook, B.C. 264p.

Cope, S. C.J. Schwarz, J. Bisset and A. Prince. 2013. Upper Fording River Westslope Cutthroat Trout (Oncorhynchus clarkii lewisi) population assessment and telemetry project annual report: 2012-2013 (Interim Report 1). Consultant's report Prepared for Teck Coal Ltd. by Westslope Fisheries Ltd., Cranbrook, B.C. 108p+ appendices.

Cope, S., C.J. Schwarz, and A. Prince. 2017. Upper Fording River Westslope Cutthroat Trout Population Monitoring Project: 2017. Report prepared for Teck Coal Limited, Sparwood, BC. Report prepared by Westslope Fisheries Ltd., Cranbrook, BC. 40 p. + 1 app.

Davidson, A., H. Tepper, J. Bisset, K. Anderson, P.J. Tschaplinski, A. Chirico, A. Waterhouse, W. Franklin, W. Burt, R. MacDonald, E. Chow, C. van Rensen, and T. Ayele. 2018. Aquatic Ecosystems Cumulative Effects Assessment Report Elk Valley – Draft for Review Only Version 6. Prepared March 21, 2018.

Dulc, S., and J. Hobbs. 2013. Gillett's Checkerspot Inventory and Monitoring in the Flathead River Basin. 2012 Surveys - Final Report. Prepared For: Great Northern Landscape Conservation Cooperative.

East Kootenay Invasive Species Council (EKISC). 2016. Annual Operating Plan. Appendix X: 2016 Invasive Plant Priority Lists by IPMA. Available at: https://www.ekisc.com/ekisc-publications. Accessed October 2018.

EBA Engineering Consultants Limited. 2003. Wildlife Habitat Assessment for the Henretta Ridge Pushback. Submitted to Elk Valley Coal Corporation – Fording River Operations. September 2003.

EBA Engineering Consultants Limited. 2005. Wildlife Habitat at the Elk Valley Coal Corporation – Fording River Operations Mine 1982-2005. Submitted to Elk Valley Coal Corporation – Fording River Operations. February 2005.

Ehman, A., D. MacKillop, A. Cagel, K. Iverson. 2015. Cranbrook PEM 2015 – Elk Valley Updated Grassland and Associated Mapping for the Cumulative Effects Area. Submitted November 3, 2015. 4pp.

Ehman, A., D. MacKillop, R. Davies, A. Cagel, K. Iverson. 2017. Updates to the Cranbrook 2015 PEM Product – Updated Grassland and Associated Mapping for the Cumulative Effects Area (Elk Valley). Prepared August 21, 2017. 9 pp.

Fording Coal Limited. 1996. Fording River Operations Henretta Ridge Development Preliminary Estimates of Ungulate Habitat Mitigation Requirements and Proposal Outline for a Mitigation Program. April 1996. 14 pp.

Golder Associates Limited. 2007. Selenium Status Report 2005/2006. Elk River Valley, BC. Prepared for the Elk Valley Selenium Task Force (EVSTF). Final Draft: May 2007. 67p.

Golder Associates Limited. 2010. Gap Analysis for the Fording River Operations – Greenhills North and Lake Mountain Project. Prepared for Teck Coal Limited, Fording River Operations. Submitted March 2010. 18 pp. + Appendix.

Golder Associates Limited. 2010. Selenium status report 2008/2009, Elk River Valley, BC. Prepared by Golder Associates Ltd. for the Elk Valley Selenium Task Force (EVSTF). September 2010.

Golder Associates Limited. 2012. Environmental Gap Analysis for the Greenhills Operation West Spoil Expansion. Submitted to Teck Coal Limited, Greenhills Operation on March 14, 2012. 13 pp. + Appendices.

Golder Associates Limited. 2013. Greenhills Operations Cougar North Extension Project Wildlife and Wildlife Habitat Baseline Work Plan: Song Birds and Riverine Birds. Submitted to Teck Coal Limited, Greenhills Operations on September 6, 2013. 17 pp.

Golder Associates Limited. 2014. Development of the Westslope Cutthroat Trout Habitat Suitability Index Model. Attachment A to the Preliminary Fisheries Offsetting Plan for Fording River Operations Swift Project Environmental Assessment. Consultant's report prepared for Teck Coal Ltd. Fording River Operations by Golder Associates Ltd. November 2014.

Golder Associates Limited. 2014. Elk Valley Water Quality Plan. Annex E. Benchmark Derivation Report for Selenium. Consultant's report prepared for Teck Coal Ltd. Fording River Operations by Golder Associated. July 2014. 27p + appendices.

Golder Associates Limited. 2014. Fording River Operations Swift Project Environmental Assessment Certificate Application. Annex G - Fish and Fish Habitat Baseline Report. Consultant's report prepared for Teck Coal Ltd. Fording River Operations by Golder Associated. November 2014. 120p + appendices.

Golder Associates Limited. 2015. Elkview Operations Baldy Ridge Extension Project Wildlife and Wildlife Habitat Baseline Report. Submitted to Teck Coal Limited, Elkview Operations, October 2015.

Golder Associates Limited. 2015. Teck Coal Limited Greenhills Operations Cougar Pit Extension Project Vegetation and Ecosystems Baseline Report. Submitted to Teck Coal Limited, Greenhills Operations on August 4, 2015. 39 pp. + Appendices.

Golder Associates Limited. 2015. Terrestrial Ecosystem Mapping Update for Teck Coal Limited Greenhills Operations and Fording River Operations. Submitted to Teck Coal Limited December 2015. 23 pp.

Golder Associates Limited. 2016. Fording River Operations Turnbull West and North Project. Appendix C - Gap Analysis Details. Prepared for Teck Coal Limited, Fording River Operations. Submitted December 2016.

Golder Associates Limited. 2017. Fording River Operations Turnbull West Project Wildlife Baseline Work Plan. Submitted to Teck Coal Limited, Fording River Operations in May 2017.

Golder Associates Limited. 2017. Terrestrial Cumulative Effects Management Planning for Teck Coal Mining Operations in the Elk Valley. Submitted to Teck Coal Limited November 14, 2017.

Golder Associates Limited. 2018. Aquatic Health Baseline Report, Fording River Operations Turnbull West Project (Draft). Submitted to Teck April 2018.

Golder Associates Limited. 2018. Assessing Quality of High Elevation Grasslands in the Elk Valley, BC – Draft. Submitted to Teck Coal Limited November 1, 2018. 14 pp + Appendices.

Golder Associates Limited. 2018. Fish and Fish Habitat Baseline. Fording River Operations Turnbull West Project. Consultant report submitted to Teck Coal Ltd. Fording River Operations April 2018. 74p. + appendices.

Golder Associates Limited. 2018. Fording River Operation Turnbull West Project Vegetation and Ecosystems Baseline Report - Draft. Submitted to Teck Coal Limited March 2018. 98 pp.

Golder Associates Limited. 2018. Fording River Operations Turnbull West Project Wildlife Baseline Report. Submitted to Teck Coal Limited, Fording River Operations, April 2018. 85 pp. + appendices.

Golder Associates Limited. 2018. Technical Memorandum - Winter Track Survey and Wildlife Camera Deployment for GHO Phase 8, FRO Turnbull East, and FRO Castle. Submitted to Teck Coal Limited, March 2018.

Golder Associates Limited. 2018. Teck Coal's Elk Valley Regional Wildlife Monitoring Program: 2018 Remote Camera Interim Report. Submitted to Teck Coal Limited, March 16, 2018.

Golder Associates Limited. 2018. Year 2 Fish and Fish Habitat Survey and Assessment Update, Fording River Operations Turnbull West Project. Technical Memorandum. Submitted to Teck November 2, 2018.

Grizzly Bear Expert Team. 2017. Grizzly Bear Cumulative Effects Assessment Report for the Elk Valley Cumulative Effects Management Framework – Draft December 2017 Version 8.

Grizzly Bear Inventory Team. 2008. Grizzly Bear Population and Density Estimates for Alberta Bear Management Unit 6 and British Columbia Management Units 4-1, 4-2, and 4-23 (2007). Prepared for the Alberta Sustainable Resource Development, Fish and Wildlife Division, British Columbia Ministry of Forests and Range, British Columbia Ministry of Environment, and Parks Canada. August 2008.

Halko, R. and K. Hebert. 2000. Southern East Kootenay Goat Aerial Survey. Prepared for Columbia Basin Fish and Wildlife Compensation Program. December 2000.

Harding L.E., M. Graham and D. Paton. 2005. Accumulation of selenium and lack of severe effects on productivity of American dippers (Cinclus mexicanus) and spotted sandpipers (Actitis macularia). Archives of Environmental Contamination and Toxicology 48: 414-423.

Hobbs, J. 2008. Gillette's Checkerspot Survey -2008. Prepared for Ministry of Environment (B.C.) and Tembec. 26pp. December 2008.

Hobbs, J. 2012. Gillett's Checkerspot Inventory and Monitoring in the Flathead River Basin. 2011 Surveys - Final Report. Prepared for Great Northern Landscapes Conservation Cooperative.

Hobbs, J., and C. Goldberg. 2017. Environmental DNA Protocol for Freshwater Aquatic Ecosystems. BC Ministry of Environment, Victoria, BC.

Hobbs, J., E. Vincer and C. Goldberg. 2017. Standard Operating Procedure, Environmental DNA Protocol for Freshwater Aquatic Ecosystems Version 2.2. BC Ministry of Environment, Ecosystems Branch, Victoria, BC.

Holroyd, S. L., V. J. Craig, and P. Govindarajulu. 2016. Best Management Practices for Bats in British Columbia, Chapter 1: Introduction to the Bats of British Columbia. Ministry of Environment. <http://a100.gov.bc.ca/pub/eirs/finishDownloadDocument.do?subdocumentId=10325>.

Integral Ecology Group Limited. 1997-2010. FRO Swift Plot Data Excel Database.

Integral Ecology Group Limited. 2014. Cougar Pit Expansion Project Greenhills Operations Ecosystems Work Plan 2014 (Revised). Prepared by Teck Coal Resources, June 25, 2014. 13 pp.

IR. 2001. Fish and Fish Habitat Monitoring in the Henretta Creek Drainage. Prepared for Fording Coal Ltd.

Jeffersonii Badger Recovery Team. 2008. Recovery Strategy for the Badger (Taxidea taxus) in British Columbia. Prepared for the BC Ministry of Environment, Victoria, BC.

Johnston, N.T. and P.A. Slaney. 1996. Fish habitat assessment procedures. B.C. Min. Environ., Lands and Parks and B.C. Min. For., Watershed Restoration. Program., Victoria, BC. Tech. Circ. No. 8 (rev. Apr. 1996).

Jowett, I.G., Payne, T.R., and Milhous, R.T. 2014. SEFA-System for Environmental Flow Analysis. Software Manual. Version, 1.

Ketcheson, M.V. 2013. Cranbrook TSA (PEM) Update Post External Accuracy Assessment Final Report. Prepared for Deb MacKillop, Ministry of Forests, Lands and Natural Resources, March 26, 2013.

Lewis, A., T. Hadfield, B. Chilibeck, C. Roberts. 2004. Assessment Methods for Aquatic Habitat and Instream Flow Characteristics in Support of Applications to Dam, Divert, or Extract Water from Streams in British Columbia. Prepared for Ministry of Water, Land and Air Protection and Ministry of Sustainable Resource Management – Final Version. Available online at: http://www.env.gov.bc.ca/wld/documents/bmp/assessment_methods_instreamflow_in_bc.pdf. Accessed December 4, 2018.

Loeb, S. C., T. J. Rodhouse, L. E. Ellison, C. L. Lausen, J. D. Reichard, K. M. Irvine, T. E. Ingersoll, J. T. Coleman, W. E. Thogmartin, and J. R. Sauer. 2015. A plan for the North American bat monitoring program (NABat).

Lotic Environmental. 2011. Kilmarnock Creek Diversion Fisheries Assessment. Prepared for Kerr Wood Leidal by Lotic Environmental. January 2011.

Lotic Environmental. 2013. Swift Creek and Clode Creek Fish Habitat Assessments - Letter Reports, November 2013. Prepared for Teck Coal Ltd.

Mackillop, D., A. Ehman, K. Iverson, and E. McKenzie. 2018. A Field Guide to Ecosystem Classification and Identification for Southeast British Columbia: The East Kootenay. Province of BC., Victoria, BC. Land Management Handbook 71.

Mahon, T. 2009. Northern Goshawk (Accipiter gentilis) Habitat Model for the Mist Mountain Project. Wildfor Consultants Ltd. Report prepared for Matrix Solutions Inc. 54 pp

Matrix Solutions Inc. 2010. Fording River Operations Greenhills North and Lake Mountain Expansion Project Terrestrial Ecosystems Work Plan. Submitted to Teck Coal Limited, Fording River Operations on June 10, 2010.

Matrix Solutions Inc. 2010. Fording River Operations Greenhills North and Lake Mountain Expansion Project Wildlife Work Plan. Submitted to Teck Coal Limited, Fording River Operations on June 10, 2010.

Matrix Solutions Inc. 2013. Cougar North Extension Project Baseline Work Plan – Wildlife. Submitted to Teck Coal Limited, Greenhills Operations on July 2013. 17 pp.

Matrix Solutions Inc. 2014. Fording River Operations – Swift Project Wildlife and Wildlife Habitat Baseline Report. Submitted to BC Environmental Assessment Office by Teck Coal Limited – Fording River Operations as Annex J of the Fording River Operations Swift Project Environmental Assessment Certificate Application, November 2014.

Matrix Solutions Inc. 2015. Wildlife Baseline Report - Greenhills Operations Cougar Pit Extension Project. Prepared for Teck Coal Limited, Greenhills Operations. July 2015.

Matrix Solutions Inc. Unpub. Coal Mountain Operations – Phase 2 Wildlife Baseline Report. Unpublished Draft Report.

McDermid, G.J. and I.U. Smith. 2008. Mapping the distribution of whitebark pine (Pinus albicaulis) in Waterton Lakes National Park using logistic regression and classification tree analysis. Journal of Remote Sensing 24(4): 356-366.

Ministry of Environment and Climate Change Strategy for the Resources Information Standards Committee. 2018. DRAFT Inventory Methods for Bats. Standards for Components of British Columbia's Biodiversity No. 20.

Minnow Environmental and Lotic Environmental. 2018. Fording River Operations Local Aquatic Effects Monitoring Program (LAEMP) Report, 2017. Consultant's report prepared for Tech Coal Ltd. By Minnow Environmental Inc. and Lotic Environmental. May 2018. 79p + appendices.

Minnow Environmental Inc. 2013. 2012 Biological Monitoring Program for Coal Mines in the Elk River Valley, B.C. Consultant report submitted to Teck Coal Ltd. by Minnow Environmental Inc. Georgetown, ON and Victoria, BC. August 2013. 817p.

Minnow Environmental Inc. 2016. Data Report for the Tributary Evaluation Program (Draft). Consultant's report prepared for Teck Coal Ltd. by Minnow Environmental Inc. Georgetown, ON. March 2016. 148p + appendices.

Minnow Environmental Inc. 2016. Study design for the Fording Swift Local Aquatic Effects Monitoring Program (LAEMP). Consultant's report prepared for Teck Coal Ltd. by Minnow Environmental Inc. Georgetown, ON. May 2016. 36 p.

Minnow Environmental Inc. 2018. Elk River Watershed Regional Aquatic Effects Monitoring Program (RAEMP) Report, 2015-2016. Submitted to Teck January 2018.

Minnow Environmental Inc. 2018. Lentic Area Supporting Study, Draft 2018 Data Summary. Submitted to Teck December 2018.

Minnow Environmental Inc. 2018. Study design for the Lentic Area Supporting Study, 2018 to 2020. Consultant report prepared for Teck Coal Ltd. Sparwood, BC. March 2018 79p.

Minnow Environmental Inc. 2018. Study Design for the Regional Aquatic Effects Monitoring Program, 2018 to 2020. Final. Prepared for Teck Coal Ltd. Sparwood BC. March 2018. 286 p.

Minnow Environmental Inc. 2018. Updated Sampling Design for 2018 FRO LAEMP. Letter to Carla Fraser, Manager, Regional Water Monitoring, Teck Coal Ltd. May 31, 2018. 8p.

Mowat, G., M. Efford, B. McLellan, and S. Nielsen. 2013. South Rockies and Flathead grizzly bear monitoring final report 2006-2011.

Nelson, J.R., 1985. Rare plant surveys: techniques for impact assessment. Natural Areas Journal, pp.18-30.

Norecol Environmental Consultants Limited. 1990. Henretta Dragline Project Stage 1 Report: Mine Plan and Environmental Impact Assessment: Volume 2 – Appendices Section 2. Prepared for Fording Coal Limited. December 1990.

Norecol Environmental Consultants Limited. 1990. Henretta Dragline Project Stage 1 Report: Mine Plan and Environmental Impact Assessment: Volume 2 – Appendices Section 2. Prepared for Fording Coal Limited. December 1990.

Old and Mature Forest Expert Team. 2018. Old and Mature Forest Cumulative Effects Assessment Report –Elk Valley Kootenay-Boundary Region - Draft Version 9. Prepared July 2018. 98 pp.

Penny, J. and R. Klinkenberg. 2013. Protocols for Rare Plant Surveys. In: Klinkenberg, Brian (Editor). E-Flora BC: Electronic Atlas of the Flora of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. Available at: [http://ibis.geog.ubc.ca/biodiversity/eflora/ProtocolsforRarePlantSurveys.html].

Pigott, D., R. Moody, and A. Clason. 2015. Promoting Whitebark Pine Recovery in British Columbia. Society for Ecosystem Restoration in North Central British Columbia and BC Ministry of Forests, Lands and Natural Resource Operations. Available at: http://sernbc.ca/uploads/library/sern_literature/Promoting_Whitebark_Pine_Recovery_in_BC.pdf

Poole, K.G. and C. Smyth. 2014. Elk Valley Bighorn Sheep Study. Prepared for BC Ministry of Forests, Lands and Natural Resource Operations and Teck Coal Ltd. December 23, 2014.

Poole, K.G., R. Serrouya, I.E. Teske, and K. Podrasky. 2016. Rocky Mountain bighorn sheep (Ovis canadensis canadensis) winter habitat selection and seasonal movements in an area of active coal mining. Canadian Journal of Zoology 94:733–745.

Proctor, M.F., S.E. Nielsen, W.F. Kasworm, C. Servheen, T.G. Radandt, A.G. Machutchon, and M.S. Boyce. 2015. Grizzly bear connectivity mapping in the Canada-United States trans-border region. Journal of Wildlife Management 79:544-558.

Resources Inventory Standards Committee (RISC). 2008. Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Site Card Field Guide. Available at: https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/standards-guidelines/risc/sitecard20.pdf

Robinson, M.D. and R.J. MacDonald. 2014. Teck Coal Ltd 2013 Calcite Monitoring Program – Elk Valley operations summary report. Prepared by Lotic Environmental Ltd. 12 pp + appendices.

Russel, E.J.A. and G.G. Oliver 1996. Fish-Stream Identification in the Upper Elk River Drainage. Consultant's report prepared for BC Ministry of Environment, Lands and Parks (W.T. Westover, Senior Fisheries Biologist) by Interior Reforestation Co. Ltd. Cranbrook, BC. January 1996. 99p.

Shepard, J., and C. Guppy. 2001. Butterflies of British Columbia: Including Western Alberta, Southern Yukon, the Alaska Panhandle, Washington, Northern Oregon, Northern Idaho, and Northwestern Montana. Canadian First edition. UBC Press.

Shepherd, B., B. Jones, R. Sissons, J. Cochrane, J. Park, C. M. Smith, and N. Stafl. 2018. Ten years of monitoring illustrates a cascade of effects of white pine blister rust and focuses whitebark pine restoration in the Canadian Rocky and Columbia Mountains. Forests 2018, 9, 138. doi: 10.3390/f9030138

Smith, C.M., B. Shepherd, C. Gillies, and J. Stuart-Smith. 2013. Changes in blister rust infection and mortality in whitebark pine over time. Canadian Journal of Forest Research 43: 90-96. dx.doi.org/10.1139/cjfr-2012-0127

Stent, P. 2008. 2008 Rocky Mountain Elk Population Estimate in the Elk Valley. Ministry of Environment, Kootenay Region. 2008.

Summit Environmental Consultants Incorporated. 2013. Teck Coal Limited Greenhills Operations West Spoil Expansion Terrestrial Resource Assessment: Baseline Work Plan. Submitted to Teck Coal Limited, Greenhills Operations, April 2013. 19 pp. + Appendix.

Szkorupa, T. and G. Mowat. 2010. A population review for elk in the Kootenay region. Ministry of Environment, Kootenay Region, 2010.

Teck and Compass Sustainability Services. 2017. Permit 107517 Environmental Monitoring Committee 2017 Public Report. 125 p. + App.

Teck Coal Ltd. 2010. Line Creek Operations Phase II Project Draft Application Information Requirements. Dated February 2010.

Teck Coal Ltd. 2011. Line Creek Operations Phase II Project Vegetation and Ecosystems Baseline Report. Submitted to BC Environmental Assessment Office, Victoria, BC as Annex I of the EAC Application. Submitted December 2011.

Teck Coal Ltd. 2011. Line Creek Operations Phase II Project Wildlife and Wildlife Habitat Baseline Report. Submitted to BC Environmental Assessment Office, Victoria, BC as Annex J of the EAC Application. Submitted December 2011.

Teck Coal Ltd. 2013. Upper Fording River Westslope Cutthroat Trout Study- May 2013 Update. 2p.

Teck Coal Ltd. 2014. Elk Valley Water Quality Plan (EVWQP). Prepared by Teck Coal Ltd. 290 pp. + appendices. Available online at: https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/area-based-man-plan/evwq_full_plan.pdf

Teck Coal Ltd. 2014. Fording River Operations Swift Project Environmental Assessment Certificate Application Annex I - Vegetation Baseline Report. Submitted to BC Environmental Assessment Office by Teck Coal Limited – Fording River Operations as Annex I of the Fording River Operations Swift Project Environmental Assessment Certificate Application, November 2014.

Teck Coal Ltd. 2014. Fording River Operations Swift Project Environmental Assessment Certificate Application. Submitted to BC Environmental Assessment Office, Victoria, BC. Submitted November 2014.

Teck Coal Ltd. 2015. Biodiversity Program: Regional Fish Habitat Management Plan Draft. July 2015. 50p.

Teck Coal Ltd. 2015. Bird Guidance. Internal guidance document prepared by Teck Coal Ltd. December 23, 2015. 54 pp.

Teck Coal Ltd. 2015. Elkview Operations Baldy Ridge Extension Project Environmental Assessment Certificate Application. Submitted to BC Environmental Assessment Office, Victoria, BC. Submitted November 2015.

Teck Coal Ltd. 2015. Greenhills Operations Biodiversity Management Plan. Prepared December 2015 by Teck Coal Ltd. 32 pp.

Teck Coal Ltd. 2015. Greenhills Operations Cougar Pit Expansion Joint Application for a Mines Act Permit Amendment and an Environmental Management Act Permit Amendment. Submitted to the BC Mine Review Committee by Teck Coal Limited – Greenhills Operations on November 18, 2015.

Teck Coal Ltd. 2016. American Badger (Taxidea taxus jeffersonii) Species Management Plan. December 2016.

Teck Coal Ltd. 2016. Baldy Ridge Extension Environmental Assessment Application. Available at https://projects.eao.gov.bc.ca/p/baldy-ridge-extension. Accessed August 10, 2018.Teck Coal Ltd. 2016. Compact Grimmia (Schistidium confertum) Species Management Plan Elkview Operations. Prepared December 2016 by Teck Resources Limited. 21 pp.

Teck Coal Ltd. 2016. Fish and Fish Habitat Offsetting and Effectiveness Monitoring Plan: Line Creek Operations Phase 2. Submitted by Teck, May 2016.

Teck Coal Ltd. 2016. Fish and Fish Habitat Offsetting and Effectiveness Monitoring Plan: Fording Swift Project. Submitted by Teck, September 2016.

Teck Coal Ltd. 2016. Fording River Operations Biodiversity Management Plan. Prepared December 2016 by Teck Resources Limited. 32 and 34 pp.

Teck Coal Ltd. 2016. Gillette's Checkerspot (Euphydryas gillettii) Species Management Plan. December 2016.

Teck Coal Ltd. 2016. Grizzly Bear Denning Management Plan. Version 2.0. September 2016

Teck Coal Ltd. 2016. Joint Application for an Amendment to Mines Act C-3 Permit and Environmental Management Act Permit 424 for the North Spoil Rehandle Project. Submitted to the BC Mine Review Committee by Teck Coal Limited – Fording River Operations on May 6, 2016.Teck Coal Ltd. 2016. Montana wildrye (Elymus albicans) Species Management Plan Elkview Operations. Prepared December 2016 by Teck Resources Limited. 21 pp.

Teck Coal Ltd. 2016. Parry's Townsendia (Townsendia parryi) Species Management Plan Line Creek Phase II. Prepared December 2016 by Teck Resources Limited. 27 pp.

Teck Coal Ltd. 2016. Whitebark pine (Pinus albicaulis) Species Management Plan EVO, FRO, GHO, LCO. Prepared December 2016 by Teck Resources Limited. 44 pp.

Teck Coal Ltd. 2017. Elkview Operations Wildlife Mitigation Management Plan. Version 2.0 February 2017.

Teck Coal Ltd. 2018. Castle Mountain Water Quality Monitoring Locations Map. July 31, 2018.

Teck Coal Ltd. 2018. Elk Valley Regional Wildlife Monitoring Program: Remote Camera Deployment and Data Entry Manual. Internal guidance document prepared by Teck Coal Ltd. October 2018. 28 pp.

Teck Coal Ltd. 2018. Fording River Operations Castle Project Mine Plan.

Teck. 2018. Fording River Operations Operational Environmental Monitoring Plan. Monitoring Plan for Consumptive Water Licences C133241, C133242 and C133243. December 2018. 53 p.

Teck Coal Ltd. 2018. Joint Application for a Mines Act Permit Amendment and an Environmental Management Act Permit Amendment for the Fording River Operations Turnbull West Project. Submitted to the BC Ministry of Energy, Mines and Petroleum Resources and Ministry of Environment and Climate Change Strategy by Teck Coal Limited, Fording River Operations, May 2018.

Teck Coal Ltd. 2018. Tributary Management Plan Prioritized List. February 15, 2018. 20 p.

Teck Coal Ltd. 2018. Tributary Management Plan. March 1, 2018. 535 p.

Teck Coal Ltd. 2018. Turnbull Mountain Water Quality Monitoring Locations Map. July 31, 2018.

Teck Coal Ltd. B.C. Ministry of Environment and Climate Change Strategy, B. Kilgour, Ktunaxa Nation Council. 2017. Permit 107517 Environmental Monitoring Committee 2017 Public Report. 125 p + appendices.

Tomback, D.F., R.E. Keane, W.W. McCaughey, and C. Smith. 2005. Methods for Surveying and Monitoring Whitebark Pine for Blister Rust Infection and Damage. Whitebark Pine Ecosystem Foundation, Missoula, MT. 30 pp.

Whitton, J., J. Fenneman, and A. Garani. 2015. Guidance for designing mitigation strategies for rare and at-risk plants. Unpublished report prepared for Teck Resources Limited. iv + 25 pp

Windward, Minnow, and CH2M Hill (Windward Environmental, Minnow Environmental, and CH2M Hill). 2014. Elk River Watershed and Lake Koocanusa, British Columbia Aquatic Environment Synthesis Report 2014. Consultant’s report prepared for Teck Coal Limited by Windward Environmental, Minnow Environmental Inc., and CH2M Hill Ltd. October 2014. 223p.

Wood, J.A. and R.J. Berdusco. 1999. Fording River revisited: A review of environmental projects at Fording Coal Limited's operations at Fording River over the last 25 years. Proceedings of the 23rd Annual British Columbia Mine Reclamation Symposium, Kamloops, BC.

3 Human Environment

Braumandl, et al. 1992. A Field Guide for Site Identification and Interpretation for the Nelson Forest Region. Land management handbook no. 20. Ministry of Forests, Forest Science Program.

Chan L, O Receveur, D Sharp, H Schwartz, A Ing, and C Tikhonov. First Nations Food, Nutrition and Environment Study (FNFNES): Results from British Columbia (2008/2009). Prince George: University of Northern British Columbia, 2011.

Choquette, Wayne T. 1973 Archaeological survey in the middle Elk River drainage. Heritage resources impact assessment of proposed coal developments in the East Kootenay region of British Columbia.

Choquette, Wayne T. 1979 Heritage resources impact assessment of proposed coal developments in the East Kootenay Region of British Columbia.

Choquette, Wayne T. 1990. Heritage Resources Impact Assessment of the proposed Fording Coal Ltd. Henretta Dragline Pit. Ministry Library, Ministry Responsible for Archaeology, Victoria.

Choquette, Wayne T. 1992. Results of Conservation Excavations at EbPr 2, Henretta Creek, Fording River Valley, B.C. Permit 1991-0064. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 1993. Archaeological Resource Overview for the Nelson Forest Region. On file, Archaeology Branch, Ministry of Forests, Lands, Resource Operations and Rural Development.

Choquette, Wayne T. 2002. Archaeological Overview Assessment of proposed expansion of Henretta Spoil. Consultant’s report prepared for Fording Coal Limited, Elkford, B.C. September 4, 2003. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 2003. Archaeological Overview Assessment of Landscape Unit C21. On file at Ktunaxa Nation Council.

Choquette, Wayne T. 2004. Archaeological Overview Assessment of Managed Forest 27. Consultant's report prepared for Tembec Industries Inc. British Columbia Division, Kootenay East Region.

Choquette, Wayne T. 2005. Archaeological Overview Assessment of proposed Brownie limestone quarry. Consultant's report prepared for Elk Valley Coal Fording River Operations, Elkford, B.C. August 3, 2005.

Choquette, Wayne T. 2006. Henretta Creek Site 2/EbPq-2 Conservation Excavation. Permit 2004-0222. Ministry Library, Ministry Responsible for Archaeology, Victoria.

Choquette, Wayne T. 2008. Archaeological Overview Assessment of proposed exploration drilling, Cougar North Extension. Consultant's report prepared for Elk Valley Coal Corporation Greenhills Operations, Elkford, B.C. August 6, 2008.

Choquette, Wayne T. 2009. Archaeological Assessment of proposed Greenhills Operations Cougar North Pit Expansion. Consultant's report prepared for Elk Valley Coal Corporation Greenhills Operations, Elkford, B.C. September 9, 2009.

Choquette, Wayne T. 2009. Archaeological Assessment of proposed Greenhills Operations Phase 6 Expansion. Consultant's report prepared for Elk Valley Coal Corporation Greenhills Operations, Elkford, B.C. September 9, 2009.

Choquette, Wayne T. 2010. Archaeological Overview Assessment of proposed Greenhills North and Lake Mountain expansion projects. Consultant's report prepared for Teck Coal Ltd. Fording River Operations, Elkford, B.C. May 17, 2010.

Choquette, Wayne T. 2010. Archaeological Review of proposed Henretta Ridge pushback. Consultant's report prepared for Teck Coal Ltd. Fording River Operations, Elkford, B.C. May 31, 2010. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 2011. Archaeological Overview Assessment of land within C-3 boundary, proposed Kilmarnock Creek diversion. Consultant's report prepared for Teck Coal Ltd. Fording River Operations, Elkford, B.C. January 15, 2011. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 2011. Archaeological Field Review of proposed pipeline and work area, Kilmarnock Diversion. Consultant's report prepared for Teck Coal Ltd. Fording River Operations, Elkford, B.C. July 27, 2011. On file at Tipi Mountain Eco-Cultural Service S Ltd.

Choquette, Wayne T. 2011. Archaeological Monitoring of excavation for retaining walls at CPR Keevil Siding. Consultant's report prepared for Rural Roads Construction Ltd., High River Alberta, 5th December 2011. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 2011. Archaeological Field Review of proposed Fording River fish compensation test pit program. Consultant's report prepared for Teck Coal Ltd. Fording River Operations, Elkford, B.C. September 30, 2011. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 2011. Archaeological Office Review of proposed Fording River fish compensation test pit program. Consultant's report prepared for Teck Coal Ltd. Fording River Operations, Elkford, B.C. September 16, 2011. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 2011. Archaeological Office Review of proposed settling pond, Mickelson Creek. Consultant's report prepared for Teck Coal Ltd. Greenhills Operations, Elkford, B.C. May 6, 2011.

Choquette, Wayne T. 2011. Archaeological Overview Assessment of proposed Greenhills Coarse Coal Rejects areas. Consultant's report prepared for Teck Coal Ltd. Greenhills Operations, Elkford, B.C. April 23, 2011

Choquette, Wayne T. 2011. Archaeological Overview Assessment of proposed Greenhills Cougar North Exploration area. Consultant's report prepared for Teck Coal Ltd. Greenhills Operations, Elkford, B.C. April 14, 2011

Choquette, Wayne T. 2011. Archaeological Review of proposed 2011 Henretta North exploration program. Consultant's report prepared for Teck Coal Ltd. Fording River Operations, Elkford, B.C. September 8, 2011. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 2012. Archaeological Overview Assessment of proposed Teck Coal Greenhills West Spoil. Consultant's report prepared for Teck Coal Ltd. Greenhills Operations, Elkford, B.C. January 30, 2012.

Choquette, Wayne T. 2012. Archaeological Overview Assessment of the proposed Teck Coal Greenhills West Spoil, Consultant's report prepared for Teck Coal Ltd. Greenhills Operations, Elkford, B.C. August 2, 2012

Choquette, Wayne T. 2012. Archaeological Overview Assessment of the proposed Turnbull South Pit Tailings Storage Facility. Consultant's report prepared for Teck Coal Ltd. Greenhills Operations, Elkford, B.C. February 23, 2012

Choquette, Wayne T. 2014. Archaeological Overview Assessment of the Turnbull Mountain MYAB Polygon. Consultant's report prepared for Teck Coal Ltd. Fording River Operations, Elkford, B.C. May 2, 2014. On file at Tipi Mountain Eco-Cultural Services Ltd.

Choquette, Wayne T. 2015. Archaeological Overview Assessment of Teck Coal Operating Areas, Southeast British Columbia, non-permit report produced for Teck Coal Ltd.

Franck, I. 2011. Archaeological Impact Assessment of Teck Coal's proposed Swift Mining Project. Permit 2010- 0434 report. Ministry Library, Ministry Responsible for Archaeology, Victoria.

Franck, I. N.D. Archaeological impact assessment of the proposed Kilmarnock Creek Diversion Project for Teck Coal Ltd. Permit 2011-0186. Site records on file, Ministry Responsible for Archaeology, Victoria.

Golder Associates Limited. 2011. Line Creek Operation Phase II Project Environmental Assessment Certificate Application. Document on File at Golder Associates Ltd.

Golder Associates Limited. 2013. Greenhills Operations (GHO) West Spoil Expansion Bridging Permit. Document on File at Golder Associates Ltd.

Golder Associates Limited. 2014. Fording River Operations Swift Environmental Assessment Certificate Application. Document on File at Golder Associates Ltd.

Golder Associates Limited. 2015. Elkview Operations Baldy Ridge Extension Environmental Assessment Certificate Application. Document on File at Golder Associates Ltd.

Golder Associates Limited. 2015. Greenhills Operations (GHO) Cougar Pit Extension Project Joint Application for a Mines Act Permit Amendment and an Environmental Management Act Permit Amendment. Document on File at Golder Associates Ltd.

Golder Associates Limited. 2015. Greenhills Operations GHO Cougar Pit Expansion Visual Aesthetic Assessment. Document on File at Golder Associates Ltd.

Golder Associates Limited. 2017. Elk Valley Social Baseline and Impact Assessment Report and Database. Document on File at Golder Associates Ltd.

Massey, N.W.D., D.G. MacIntyre, P.J. Desjardins and R.T. Cooney. 2005. Digital Geology Map of British Columbia: Tile NM11 Southeast B.C. Ministry of Energy and Mines, Geofile 2005-4.

Ramboll Environ US Corporation. 2016. Evaluation of Ktunaxa Preferred Ingestion Rates and Discussion of Risks of Dietary Intake of Country Foods, Prepared for Tieck Col Limited, September 14, 2016.

Regional District of East Kootenay (RDEK). 2014. Elk Valley Official Community Plan Bylaw No. 2532. Available at ftp://ftp.rdek.bc.ca/planningbylaws/bl2532elkvalleyocp/2532_EV_OCP_Consolidation_December_1_2017.pdf. Accessed September 2018

Tamasi, I. 2008. Rocky Mountain Forest District, 2007 Harvesting Areas. Permit 2007-0099. Ministry Library, Ministry Responsible for Archaeology, Victoria.

Tamasi, I. 2012. Teck Coal Ltd. Fording River and Line Creek Operations Fish Compensation Program Phase II. Permit 2011-0276. On file at Tipi Mountain Eco-Cultural Services Ltd.

Tamasi, I. 2013. Teck Coal Ltd. Fording River and Line Creek Operations Fish Compensation Program Phase II. Permit 2011-0276. On file at Tipi Mountain Eco-Cultural Services Ltd.

Tamasi, I. 2013. Teck Coal Ltd. Fording River Operations Turnbull Tailings. Permit 2011-0276. On file at Tipi Mountain Eco-Cultural Services Ltd.

Tamasi, I. 2015. Teck Coal Limited Fording River Operations Turnbull Mountain. Permit 2011-276. On file at Tipi Mountain Eco-Cultural Services Ltd.

Tamasi, I. 2016. Archaeological impact assessment for Teck Coal's Fording River Operations – Henretta Creek Access Road (Fish Habitat Offset Project). Permit 2015-0152

Tamasi, I. 2016. Fording River Operation Eagle 6 Spoil Push-Back, interim report. In Archaeological Inspection of Mining-Related Developments 2011 through 2014 for Teck Coal Ltd. Permit 2015-0152. On file at Tipi Mountain Eco-Cultural Services Ltd.

Tamasi, I. 2017. Archaeological impact assessment for Teck Coal Ltd. Fording River Operations Turnbull West Gap analysis. Permit 2015-0152. On File at Tipi Mountain Eco-Cultural Services Ltd.

Teck Coal Ltd. 2010. Line Creek Operations Phase II Project Draft Application Information Requirements. Dated February 2010.

Teck Coal Ltd. 2011. Line Creek Operations Phase II Project Environmental Assessment Certificate Application.

Teck Coal Ltd. 2014. Fording River Operations Swift Project Environmental Assessment Certificate Application. Submitted to the British Columbia Environmental Assessment Office in November 2014, amended January 2015

Teck Coal Ltd. 2015. Elkview Operations Baldy Ridge Extension Project Environmental Assessment Certificate Application.

Teck Coal Ltd. 2015. Greenhills Operations Cougar Pit Expansion Joint Application for a Mines Act Permit Amendment and an Environmental Management Act Permit Amendment.

Teck Coal Ltd. 2016. Baldy Ridge Extension Environmental Assessment Application. Available at https://projects.eao.gov.bc.ca/p/baldy-ridge-extension. Accessed August 10, 2018.The Firelight Group. 2013. Phase 2 Preliminary Results of the Ktunaxa Diet Study Prepared for Ktunaxa Nation Council, Technical Memorandum. March 19, 2013.

Teck. 2018. Fording River Operations Operational Environmental Monitoring Plan. Monitoring Plan for Consumptive Water Licences C133241, C133242 and C133243. December 2018. 53 p.

Teck Coal Ltd. 2018. Joint Application for a Mines Act Permit Amendment and an Environmental Management Act Permit Amendment for the Fording River Operations Turnbull West Project. Submitted to the BC Ministry of Energy, Mines and Petroleum Resources and Ministry of Environment and Climate Change Strategy by Teck Coal Limited, Fording River Operations, May 2018.

The Firelight Group. 2015. Ktunaxa First Nation Diet Study. Prepared for Ktunaxa Nation Council. August 4, 2015

United States Department of the Interior (USDI). 1986. Visual Resource Inventory. Bureau of Land Management Manual Handbook H-8410-1, Rel. 8-28. Washington, DC.

Wood, B. 2001. An Archaeological Impact Assessment of the Chauncey Creek Fan for Proposed Gas Well Drilling Sites in the Fording River Valley of Southeastern BC. Permit 2000-0345. Ministry Library, Ministry Responsible for Archaeology, Victoria.

Wood, B. 2004. Archaeological Impact Assessment, Fording River Operation Turnbull Project. Ministry Library, Ministry Responsible for Archaeology, Victoria, B.C.

Appendix B

List of Scientific Names

Common Species Names with Scientific Names Included

Table B-1: List of Scientific Names

Common Name	Scientific Name
American badger	*Taxidea taxus jeffersonii*
American dipper	*Cinclus mexicanus*
American robin	*Turdus migratorius*
bank swallow	*Riparia riparia*
barn swallow	*Hirundo rustica*
bent-flowered milk-vetch	*Astragalus vexilliflexus* var. *vexilliflexus*
bighorn sheep	*Ovis canadensis*
black alpine sedge	*Carex nigricans*
black bear	*Ursus arctos* and *U. americanus*
black cottonwood	*Populus trichocarpa*
black huckleberry	*Vaccinium membranaceum .*
bluebunch wheatgrass	*Pseudoroegneria spicata*
bluejoint reedgrass	*Calamagrostis canadensis*
Clad lichens	*Cladonia* spp
Clark's nutcracker	*Nucifraga columbiana*
Columbia spotted frog	*Rana luteiventris*
Columbian ground squirrel	*Urocitellus columbianus*
common nighthawk	*Chordeiles minor*
common hook moss	*Drepanocladus aduncus*
common red paintbrush	*Castilleja miniata*
common snowberry	*Symphoricarpos albus*
compact selaginella	*Selaginella densa*
coyote	*Canis latrans*
diverse-leaved cinquefoil	*Potentilla diversifolia*
Douglas-fir	*Pseudotsuga menziesii*
Drummond's willow	*Salix drummondiana*
dusky grouse	*Dendragapus obscurus*
Engelmann spruce	*Picea engelmannii*
false azalea	*Menziesia ferruginea*
falsebox	*Paxistima myrsinites .*
fox sparrow	*Passerella iliaca*
Gillette's checkerspot	*Euphydryas gillettii*
golden-mantled ground squirrel	*Callospermophilus lateralis*
grouseberry	*Vaccinium scoparium*
hard-stemmed bulrush Deep Marsh	*Schoenoplectus acutus* Deep Marsh
harlequin duck	*Histrionicus histrionicus*
heart-leaved arnica	*Arnica cordifolia*
Homosekikaic pixie-cup	*Cladonia homosekikaica*
hybrid Engelmann x white spruce	*Picea glauca x engelmannii*
Idaho fescue	*Festuca idahoensis*
Indian hellebore	*Veratrum viride*
junegrass	*Koeleria macrantha*
juniper	*Juniperus communis*
lodgepole pine	*Pinus contorta*

Table B-1: List of Scientific Names

Common Name	Scientific Name
long-toed salamander	*Ambystoma macrodactylum.*
low bilberry	*Vaccinium myrtillus*
lynx	*Lynx canadensis*
Magnum mantleslug	*Magnipelta mycophaga*
marten	*Martes americana*
mink	*Neovison vison*
Monarch	*Danaus plexippus*
moose	*Alces americanus*
mule deer	*Odocoileus hemionus*
olive-sided flycatcher	*Contopus cooperi*
one-leaved foamflower	*Tiarella trifoliate var. unifoliata*
Parry's townsendia	*Townsendia parryi*
peregrine falcon, anatum subspecies	*Falco peregrinus anatum*
pine grass	*Calamagrostis rubescens*
pine siskin	*Spinus pinus*
pinegrass	*Calamagrostis rubescens*
red deer	*Cervus elaphus*
red squirrel	*Tamiasciurus hudsonicus*
red-stemmed feather moss	*Pleurozium schreberi*
red-tailed hawk	*Buteo jamaicensis .*
Rocky Mountain tailed frog	*Ascaphus montanus*
rose	*Rosa* spp.
rough fescue	*Festuca campestris*
rufous hummingbird	*Selasphorus rufus*
Rusty blackbird	*Euphagus carolinus*
Saskatoon	*Amelanchier alnifolia*
Scheuchzer's cotton grass Herbaceous Vegetation	*Eriophorum scheuchzeria* Herbaceous Vegetation
scrub birch	*Betula nana*
short-eared owl	*Asio flammeus*
slender sedge	*Carex lasiocarpa*
snowshoe hare	*Lepus americanus*
soopalallie	*Shepherdia canadensis*
spotted sandpiper	*Actitis macularius*
step moss	*Hylocomium splendins*
subalpine daisy	*Erigeron peregrinus*
subalpine fir	*Abies lasiocarpa*
sulphur buckwheat	*Eriogonum umbellatum*
sweet-flowered fairy-candelabra	*Androsace chamaejasme* ssp. *lehmanniana*
sandwort, thread-leaved sandwort	*Eremogone capillaris*
three-toed woodpecker	*Picoides dorsalis*
timber oatgrass	*Danthonia intermedia*
twinflower	*Linnaea borealis*
Utah honeysuckle	*Lonicera utahensis*
water sedge	*Carex aquatilis*
western larch	*Larix occidentalis*

Table B-1: List of Scientific Names

Common Name	Scientific Name
western meadow rue	*Thalictrum occidentale*
western meadow rue sitka valerian	*Valeriana sitchensis*
western pasqueflower	*Anemone occidentalis*
western toad	*Anaxyrus boreas*
westslope cutthroat trout	*Oncorhynchus clarkii lewisi*
whitebark pine	*Pinus albicaulis*
Williamson's sapsucker	*Sphyrapicus thyroideus*
wolf	*Canis lupus*
wolverine	*Gulo gulo*
wood frog	*Lithobates sylvaticus*
Wyoming kitten-tails	*Synthyris wyomingensis*
yarrow	*Achillea borealis*
yelllow beard-tongue	*Penstemon confertus*

Appendix C

Plant Species and Ecological Communities with Potential to Occur in the Project Vicinity

The tables below were developed from a search of the British Columbia Conservation Data Centre, accessed in January 2020, and some previously collected data. The tables are intended to provide initial information regarding listed species and ecological communities with the potential to occur in the Project vicinity for early engagement. These lists are not intended to be comprehensive; searches will be re-run and species and ecological communities will be updated in concert with baseline data collected in the field, as well as through collaboration and engagement with stakeholders and regulators, as the project progresses (for example, for valued component selection, the detailed project description, assessment, etc.).

Table C-1: Listed Plants with Potential to Occur in the Project Vicinity

Scientific Name	Common Name	Provincial/ Global Status[a]	BC List[b]	COSEWIC[c]	SARA[d]
Vascular Plants					
Androsace chamaejasme ssp. *lehmanniana*	sweet-flowered fairy-candelabra	S2S3/G5T5	Blue	-	-
Astragalus crassicarpus	ground plum milk-vetch	S1/G5	Red	-	-
Astragalus drummondii	Drummond's milk-vetch	S1/G5	Red	-	-
Brickellia grandiflora	large-flowered brickellia	S1/G5	Red	NAR	-
Carex paysonis	Payson's sedge	SH/G4G5	Red	-	-
Cirsium scariosum var. *scariosum*	elk thistle	S3/G5T5?	Blue	-	-
Claytonia megarhiza[e]	alpine springbeauty	S3/G5	Blue	-	-
Crepis acuminata ssp. acuminata	long-leaved hawksbeard	S1/G5T4T5	Red	-	-
Delphinium bicolor ssp. *bicolor*	Montana larkspur	S3/G4G5T4T5	Blue	-	-
Epilobium saximontanum	Rocky Mountain willowherb	S1S3/G5	Blue	-	-
Erigeron ochroleucus	Buff daisy	S2S3/G5	Blue	-	-
Eriogonum androsaceum	androsace buckwheat	SH/G4G5	Red	-	-
Eurybia radulina[e]	rough-leaved aster	S2/G4G5	Red	-	-
Gentiana calycosa	mountain bog gentian	S2?/G4	Blue	-	-
Graphephorum wolfii	Wolf's trisetum	S3/G4	Blue	-	-
Lupinus sulphureus	sulphur lupine	S2S3/G5	Blue	-	-
Oenothera suffrutescens	scarlet gaura	S2/G5	Red	-	-
Papaver pygmaeum	dwarf poppy	S2/G3	Red	-	-
Penstemon nitidus var. nitidus	shining penstemon	S1/G5T5	Red	-	-
Phacelia lyallii	Lyall's phacelia	S2S3/G3	Blue	-	-
Pinus albicaulis	whitebark pine	S2S3/G3G4	Blue	E	1-E
Pinus flexilis	limber pine	S2/G4	Red	E	-
Plantago canescens	arctic plantain	S1/G4G5	Red	-	-
Poa abbreviate ssp. *pattersonii*[e]	abbreviated bluegrass	S3/G5T5	Blue	-	-
Polemonium elegans	elegant Jacob's-ladder	S3?/G4	Blue	-	-
Polygonum austiniae	Austin's knotweed	S1/G5T4	Red	-	-
Polygonum engelmannii	Engelmann's knotweed	S1/G5T3T5	Red	-	-
Potentilla glaucophylla var. perdissecta	diverse-leaved cinquefoil	S3?/G5T4	Blue	-	-
Potentilla ovina var. ovina	sheep cinquefoil	S2?/G5?T5?	Red	-	-
Prenanthes sagittata	arrow-leaved rattlesnake-root	S1/ G4	Red	-	-
Senecio hydrophiloides	sweet-marsh butterweed	S3/G4G5	Blue	-	-
Senecio megacephalus	large-headed groundsel	S2S3/G4	Blue	-	-

Table C-1: Listed Plants with Potential to Occur in the Project Vicinity

Scientific Name	Common Name	Provincial/ Global Status[a]	BC List[b]	COSEWIC[c]	SARA[d]
Symphyotrichum frondosum[e]	short-rayed aster	S2	Red	-	-
Synthyris wyomingensis	Wyoming kitten-tails	S2S3/G5	Blue	-	-
Thalictrum dasycarpum	purple meadowrue	S2/G5	Red	-	-
Townsendia parryi	Parry's townsendia	S2/G4?	Red	-	-
Non-vascular Plants					
Atrichum tenellum	Not available	S2/G4G5	Red	-	-
Bryobrittonia longipes	Not available	S3/G3G4	Blue	-	-
Bryum uliginosum	Not available	S2S3/G3G5	Blue	-	-
Cephaloziella rubella	Not available	SH/GNR	Red	-	-
Didymodon subandreaeoides	Not available	S1S3/G4G5	Red	-	-
Encalypta spathulate	Not available	S3/G4	Blue	-	-
Hygroamblystegium noterophilum	Not available	S2S4/G5T4	Blue	-	-
Hygroamblystegium varium[e]	Not available	S3/G5	Blue	-	-
Hygrohypnum alpinum	Not available	S3/G4G5	Blue	-	-
Mnium arizonicum	Not available	S2S3/G5?	Blue	-	-
Orthotrichum pallens	Not available	S3/G5	Blue	-	-
Physcomitrium pyriforme	Not available	S3/G5	Blue	-	-
Pohlia longicollis	Not available	S2/G4G5	Red	-	-
Pseudoleskea incurvate var. *gigantea*	Not available	S3/G5TNR	Blue	-	-
Racomitrium pygmaeum	Not available	S2/Gu	Blue	-	-
Schistidium atrichum	Not available	S2S2/GNR	Red	-	-
Schistidium robustum	Not available	S3/GNR	Blue	-	-
Tortula leucostoma[e]	Not available	S3	Blue		
Warnstorfia pseudostraminea	Not available	S3/G3G4	Blue	-	-
Lichen					
Bryoria kockiana[e]	Boreal horsehair	S3/GNR	Blue	-	-
Cladonia cyanipes[e]	Blue-footed pixie	S2S4/G5	Blue	-	-
Peltigera "sotterii"[e]	(Previously undescribed species)	-	-	-	-

a) S = Provincial; G = Global; T = Species Variety Ranking; 1 = Critically Imperilled; 2 = Imperilled; 3 = Vulnerable; 4 = Apparently Secure; 5 = Secure; ? = Not Certain; H = Historical (possibly extirpated); NR = Not Ranked; U = Unrankable.

b) Red = Extirpated, Endangered, or Threatened; Blue = Special Concern.

c) COSEWIC (Committee on the Status of Endangered Wildlife in Canada); - = not listed; E = Endangered; NAR = Not at Risk (Government of Canada 2018).

d) SARA (*Species at Risk Act*); - = not listed; 1-E = Endangered species listed on Schedule 1 (Government of Canada 2020).

Source: BC CDC (2020). Search criteria (30 January 2020): Forest District = Rocky Mountain Forest District AND BGC Zone = IMA, ESSFdk, MSdw, and MSdk. Search restricted to Red, Blue, and legally designated species.

e) Augmented with observations of plant species at risk obtained from Teck's historical dataset and previous reports.

Table C-2: Listed Ecological Communities with Potential to Occur in the Project Vicinity

English Name	Scientific Name	Biogeoclimatic Unit/ Site Series	Provincial/ Global Status[a]	BC List[b]
Brushland and Grassland				
Rough fescue (bluebunch wheatgrass) - Yarrow – clad lichens	*Festuca campestris (Psudoroegneria spicata) - Achillea borealis – Cladonia* spp.	Gg10/Gg12	S1S2/GNR	Red
Idaho fescue - sulphur buckwheat - sandwort	*Festuca idahoensis - Eriogonum umbellatum - Eremogone capillaris*	Gg14	S2/GNR	Red
Rough fescue - sulphur buckwheat - sandwort	*Festuca campestris - Eriogonum umbellatum - Eremogone capillaris*	Gg16	S1/GNR	Red
Idaho fescue - bluebunch wheatgrass - sulphur buckwheat	*Festuca idahoensis - Pseudoroegneria spicata - Eriogonum umbellatum*	Gg17	S2S3/GNR	Blue
Saskatoon - soopolallie - common juniper	*Amelanchier alnifolia - Shepherdia canadensis - Juniperus communis*	Gb20	S3/GNR	Blue
Riparian Flood				
Drummond's willow / bluejoint reedgrass	*Salix drummondiana / Calamagrostis canadensis*	Fl05	S2S3/G3	Blue
Black cottonwood / common snowberry – roses	*Populus trichocarpa / Symphoricarpos albus - Rosa spp.*	Fm01	S1/GNR	Red
Wetlands				
scrub birch / water sedge	*Betula nana / Carex aquatilis*	Wf02	S3/G4	Blue
slender sedge / common hook-moss	*Carex lasiocarpa / Drepanocladus aduncus*	Wf05	S3/G3	Blue
hard-stemmed bulrush Deep Marsh	*Schoenoplectus acutus* Deep Marsh	Wm06	S3/G5	Blue
Alpine				
Timber oatgrass – Grouseberry – Thread-leaved sandwort – Compact selaginella	*Danthonia intermedia – Vaccinium scoparium – Eremogone capillaris – Selaginella densa*	Ag01	S2/GNR	Red

a) S = Provincial; G = Global; T = Species Variety Ranking; 1 = Critically Imperilled; 2 = Imperilled; 3 = Vulnerable; 4 = Apparently Secure; 5 = Secure; ? = Not Certain; H = Historical (possibly extirpated); NR = Not Ranked; U = Unrankable.

b) Red = Extirpated, Endangered, or Threatened; Blue = Special Concern.

Source: BC CDC (2020). Search criteria (30 January 2020): Forest District = Rocky Mountain Forest District AND BGC Zone = IMAun, ESSFdk1, ESSFdk2, ESSFdkp, ESSFdkw, MSdk, MSdk1, MSdk2, MSdw. Search restricted to Red and Blue listed ecological communities. Augmented with observations of ecological communities at risk obtained from Teck's previous projects.

References

BC CDC (British Columbia Conservation Data Centre). 2020. BC Species and Ecosystems Explorer. Accessed January 2020. Available at: http://a100.gov.bc.ca/pub/eswp/

Appendix D

Wildlife Species at Risk with Potential to Occur in the Project Vicinity

Appendix D

Wildlife Species at Risk with Potential to Occur in the Project Vicinity

The tables below were developed from a search of the British Columbia Conservation Data Centre, accessed in February 2020, and some previously collected data. The tables are intended to provide initial information regarding listed wildlife species with the potential to occur in the Project vicinity for early engagement. These lists are not intended to be comprehensive; searches will be re-run and species and ecological communities will be updated in concert with baseline data collected in the field, as well as through collaboration and engagement with stakeholders and regulators, as the project progresses (for example, for valued component selection, the detailed project description, assessment, etc.).

Table D-1: Wildlife Species at Risk with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Provincial/Global Status[a]	BC List[b]	COSEWIC[c]	SARA[d]
Mammals					
American Badger	*Taxidea taxus*	S2/G5	Red	E	1-E
Bighorn Sheep	*Ovis canadensis*	S3?/G4	Blue	-	-
Fisher	*Pekania pennanti*	S3/G5	Blue	-	-
Grizzly Bear	*Ursus arctos*	S3?/G4	Blue	SC	1-SC
Least Chipmunk, oreocetes subspecies	*Neotamias minimus oreocetes*	S3/G5T3	Blue	-	-
Least Chipmunk, selkirki subspecies	*Neotamias minimus selkirki*	S1/G5T1	Red	-	-
Little Brown Myotis	*Myotis lucifugus*	S4/G3	Yellow	E	1-E
Mountain Goat	*Oreamnos americanus*	S3/G5	Blue	-	-
Red-tailed Chipmunk, ruficaudus subspecies	*Neotamias ruficaudus ruficaudus*	S2/G4G5T4	Red	-	-
Southern Red-backed Vole, galei subspecies	*Myodes gapperi galei*	S3S4/G5T5	Blue	-	-
Wolverine, luscus subspecies	*Gulo gulo luscus*	S3/G4T4	Blue	SC	1-SC
Birds					
American Avocet	*Recurvirostra americana*	S2S3B/G5	Blue	-	-
American Bittern	*Botaurus lentiginosus*	S3B, SNRN/G5	Blue	-	-
Bank Swallow	*Riparia riparia*	S4B	Yellow	T	1-T
Barn Swallow	*Hirundo rustica*	S3S4B/G5	Blue	T	1-T
Black Swift	*Cypseloides niger*	S2S3B/G4	Blue	E	1-E
Common Nighthawk	*Chordeiles minor*	S4B	Yellow	T	1-T
Eared Grebe	*Podiceps nigricollis*	S3B/G5	Blue	-	-
Evening Grosbeak	*Coccothraustes vespertinus*	S5/G5	Yellow	SC	1-SC
Great Blue Heron, herodias subspecies	*Ardea herodias herodias*	S3?/G5T5	Blue	-	-
Northern Goshawk, atricapillus subspecies	*Accipiter gentilis atricapillus*	S3S4/G5T5	Blue	NAR	-
Olive-sided Flycatcher	*Contopus cooperi*	S3S4B/G4	Blue	SC	1-T
Peregrine Falcon, anatum subspecies	*Falco peregrinus anatum*	S2?/G4T4	Red	NAR	1-SC
Prairie Falcon	*Falco mexicanus*	S1/G5	Red	NAR	-
Rusty Blackbird	*Euphagus carolinus*	S3S4B/G4	Blue	SC	1-SC
Short-eared Owl	*Asio flammeus*	S3B,S2N/G5	Blue	SC	1-SC
Swainson's Hawk	*Buteo swainsoni*	S2B/G5	Red	-	-
Williamson's Sapsucker	*Sphyrapicus thyroideus*	S3B/G5	Blue	E	1-E

Table D-1: Wildlife Species at Risk with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Provincial/Global Status[a]	BC List[b]	COSEWIC[c]	SARA[d]
Amphibians					
Rocky Mountain Tailed Frog	*Ascaphus montanus*	S2S3/G4	Blue	T	1-T
Western Toad	*Anaxyrus boreas*	S4	Yellow	SC	1-SC
Fish					
Westslope Cutthroat Trout	*Oncorhynchus clarkii lewisi*	S2/S3	Blue	SC	1-SC
Gastropods					
Coeur d'Alene Oregonian Snail	*Cryptomastix mullani*	S3/G4	Blue	-	-
Dusky Fossaria	*Galba dalli*	S3S4/G5	Blue	-	-
Glossy Valvata	*Valvata humeralis*	S1S3/G5	Red	-	-
Magnum Mantleslug	*Magnipelta mycophaga*	S2S3/G3	Blue	SC	1-SC
Pale Jumping-slug	*Hemphillia camelus*	S3/G4	Blue	-	-
Prairie Fossaria	*Galba bulimoides*	S3?/G5	Blue	-	-
Sheathed Slug	*Zacoleus idahoensis*	S3?/G3G4	Blue	SC	1-SC
Star Gyro	*Gyraulus crista*	S3S4/G5	Blue	-	-
Subalpine Mountainsnail	*Oreohelix subrudis*	S3/G5	Blue	-	-
Threeridge Valvata	*Valvata tricarinata*	S1S2/G5	Red	-	-
Widelip Pondsnail	*Stagnicola traski*	S3S4/G3G4	Blue	-	-
Insects					
Albert's Fritillary	*Boloria alberta*	S3/G3	Blue	-	-
Aphrodite Fritillary, manitoba subspecies	*Speyeria aphrodite manitoba*	S3/G5T5	Blue	-	-
Aphrodite Fritillary, whitehousei subspecies	*Speyeria aphrodite whitehousei*	S2S3/G5T4	Blue	-	-
Bronze Copper	*Lycaena hyllus*	S3/G5	Blue	-	-
Checkered Skipper	*Pyrgus communis*	S3/G5	Blue	-	-
Dione Copper	*Lycaena dione*	S2/G5	Red	-	-
Eastern Tailed Blue	*Cupido comyntas*	S2S3/G5	Blue	-	-
Gillette's Checkerspot	*Euphydryas gillettii*	S2/G3	Red	-	-
Hairy-necked Tiger Beetle	*Cicindela hirticollis*	S2S4/G5	Blue	-	-
Jutta Arctic, chermocki subspecies	*Oeneis jutta chermocki*	S3/G5T4Q	Blue	-	-
Mead's Sulphur	*Colias meadii*	S3/G5	Blue	-	-
Monarch	*Danaus plexippus*	S3B/G4	Blue	E	1-SC
Mormon Fritillary, eurynome subspecies	*Speyeria mormonia eurynome*	S1S3/G5TNR	Red	-	-
Nevada Skipper	*Hesperia nevada*	S3S4/G5	Blue	-	-
Old World Swallowtail, dodi subspecies	*Papilio machaon dodi*	S1/G5T4T5	Red	-	-
Silver-spotted Skipper	Epargyreus clarus	S3/G5	Blue	-	-
Silver-spotted Skipper, clarus subspecies	Epargyreus clarus clarus	S3/G5T5	Blue	-	-

Table D-1: Wildlife Species at Risk with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Provincial/Global Status[a]	BC List[b]	COSEWIC[c]	SARA[d]
Tawny-edged Skipper, themistocles subspecies	Polites themistocles themistocles	S3/G5TNR	Blue	-	-
Variegated Fritillary	Euptoieta claudia	S3N/G5	Blue	-	-

Source: BC CDC (2020). Search criteria: Forest District = Rocky Mountain Forest District AND BGC Zone = ESSF, MS. Search restricted to Red, Blue, and legally designated species.

a) S = Provincial; G = Global; T = Species Variety Ranking; 1 = Critically Imperiled; 2 = Imperiled; 3 = Vulnerable; 4 = Apparently Secure; 5 = Secure; ? = Not Certain; H = Historical (possibly extirpated); NR = Not Ranked; U = Unrankable; B = Breeding; N = Non-breeding.

b) Red = Extirpated, Endangered, or Threatened; Blue = Special Concern; Yellow = Not at Risk.

c) COSEWIC (Committee on the Status of Endangered Wildlife in Canada); - = not listed; E = Endangered; T = Threatened; SC = Special Concern; NAR = Not at Risk (Government of Canada 2019).

d) SARA (*Species at Risk Act*); - = not listed; Schedule 1 status: E = Endangered T = Threatened; SC = Special Concern (Government of Canada 2019).

References

BC CDC (British Columbia Conservation Data Centre). 2020. BC Species and Ecosystems Explorer. http://a100.gov.bc.ca/pub/eswp/ [accessed February 2020].

Government of Canada. 2019. Species at Risk Public Registry. https://wildlife-species.canada.ca/species-risk-registry/sar/index/default_e.cfm. [accessed February 2020].