

Bingay Main Coal Project: Draft Valued Component Selection Document

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Project No.: 639144

Proponent:



Centermount Coal Ltd.

928 - 1030 West Georgia Street
Vancouver | British Columbia | V6E 2Y3

Prepared for:

British Columbia Environmental Assessment Office

836 Yates Street, 1st Floor
P.O. Box 9426 Stn. Provincial Government
Victoria | British Columbia | V8W 9V1

Prepared By::



SNC • LAVALIN

SNC-Lavalin Inc.

500 - 745 Thurlow Street
Vancouver | British Columbia | V6E 0C5

Preface

Centermount Coal Ltd (Centermount) proposes to construct and operate an open pit coal mine (the “Project”) in the Elk Valley, British Columbia. The Project is undergoing a provincial environmental assessment (EA) led by the British Columbia Environmental Assessment Office (EAO).

The Proponent must obtain an Environmental Assessment Certificate (EAC) from the EAO before any work can be undertaken on the Project. However, prior to submission of an Application for an EAC (Application), EAO must first approve the proposed list of specific values to be studied (referred to as Valued Components).

This draft Valued Component Selection Document presents the proposed Valued Components that will be used to inform the EA and be included in Centermount’s Application. This draft incorporates preliminary feedback received from EAO and its Working Group including government agencies (provincial, federal, and municipal) and Aboriginal groups.

EAO invites the public to comment on this draft Valued Component Selection Document that is available online at <http://www.eao.gov.bc.ca/pcp/index.html>. EAO also invites the public to an Open House(s) related to this public comment period, information on which is available at the same url. The public has from November 2 to December 4, 2017 for the submission of comments on the draft Valued Component Selection Document.

The intention of seeking public comments at this stage of the process is to ensure that the specific values that might potentially be affected by the Project are identified for consideration in the EA. Comments received during the public comment period will be provided to Centermount for consideration in the final Valued Component Selection Document that must be submitted to EAO for approval. After considering Centermount’s responses to public comments and how these comments were considered in the final Valued Component Selection Document, EAO will post the approved Valued Component Selection Document and responses to public comments, to its website. The approved Valued Components and related information presented in the approved Valued Component Selection Document must then be included in the Application Information Requirements (AIR), a document that identifies the detailed information to be provided by Centermount in its Application. The AIR will also be posted to EAO’s website once approved by EAO. Additional information on the EA process administered by EAO is available at www.eao.gov.bc.ca.

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1 Purpose of this Valued Component Selection Document

Centermount Coal Ltd. (Centermount) has initiated the environmental assessment for the Bingay Main Project (the Project) in the Elk Valley of British Columbia. Development of the Project is subject to the *British Columbia Environmental Assessment Act* (BCEAA); the Project is reviewable under the *Reviewable Projects Regulation* because the production capacity of the mine is estimated to be greater than the review threshold of 250,000 tonnes per annum of clean coal.

The purpose of this document is to provide the British Columbia Environmental Assessment Office (EAO) with a list of recommended Valued Components (VCs) that will be assessed in the Environmental Assessment (EA) Certificate Application (Application) and provide rationale for their selection. The approach to Valued Component (VC) selection is premised on the “*Guidelines for Selection of Valued Components and Assessment of Potential Effects*” (EAO 2013), referred to herein as the “Guideline”.

This VC Selection document presents the following required information:

- › An overview of the Project;
- › A description of issues identified through consultation with Aboriginal Groups, stakeholders, and the general public that were relied on to identify Candidate VCs;
- › Screening criteria and evaluation approach that were applied in the selection of VCs including Receptor Valued Components (RVCs) and Intermediate Valued Components (IVCs);
- › An Interaction Matrix showing potential interactions between Project (components and activities) and the Valued Components;
- › A list of selected RVCs and IVCs, and rationale for their selection;
- › Assessment indicators for each RVC and IVC;
- › Proposed RVC and IVC study boundaries (spatial and temporal);
- › Proposed methods for assessing the RVC and IVC; and
- › A list of past, present, and foreseeable future projects.

Comments received on the proposed VCs and other information contained in this draft Valued Component Selection Document will be reviewed and considered in the final Valued Component Selection Document to be submitted to EAO for Approval. Once approved by EAO, the list of VCs will be used in preparation of the Application Information Requirements (AIR) and included in Centermount’s Application¹. Other information requirements, such as results of public and aboriginal consultation, assessment of potential Project effects to Aboriginal Interests, effects of the environment on the Project, the potential for accidents / malfunctions; Project benefits; Project design considerations / alternatives means of undertaking the Project will also be included in the (AIR). For an understanding of typical requirements for an Application, an AIR template is available on EAO’s website at <http://www.eao.gov.bc.ca/guidance.html>.

¹ The project is currently undergoing a federal EA under the Canadian Environmental Assessment Act (2012) as well as a provincial EA. Federal requirements for the EA have been established and are available on the Canadian Environmental Assessment Agency’s website at <http://www.ceaa-acee.gc.ca/050/details-eng.cfm?evaluation=80024>. The provincial and federal EAs are coordinated in accordance with Canada-British Columbia Agreement on Environmental Assessment Cooperation (2004) available on EAO’s website at http://www.eao.gov.bc.ca/EAO_CEEA.html

2 Project Overview

The current Project Description was filed with the EAO on August 16, 2017, and can be accessed on the EAO website (<https://projects.eao.gov.bc.ca/p/bingay-main-coal/docs>). This Project Description was updated to reflect changes in project design including removal of the underground mine component, changes to the rail line location and a proposed reduced daily production capacity².

The Bingay Main property is situated in the Elk River valley in southeastern British Columbia, approximately 21 km north of the community of Elkford³ (Figure 1: Regional Area). The centre of the Project Site is considered to be 644015 m E, 5563563 m N in NAD83 UTM Zone 11N. The proposed Project is comprised of four coal licenses totaling 1,157 hectares (ha). The coal licenses are located within the Enhanced Resource Development Zone defined in the Kootenay/Boundary Land Use Plan (KIAMC 1997) and Southern Rocky Mountain Land Use Plan (MRSM 2003).

The majority of the mine components, including the open pit, waste rock storage areas, coal processing plant, water storage and sedimentation ponds, water treatment facilities, mine administration and maintenance buildings, and access and haul roads will be located on Crown Land on the west side of the Elk River (Figure 2: Project Location). The exception to this is the rail line and the rail load out that would be located on the east side of the Elk River (Figure 2: Project Location). The Project will not require the use of any federal land. Both sides of the valley are readily accessible via existing forest service roads (FSRs). The Elk River FSR is located on the west side of the Elk River, while the Kananaskis Power Line FSR is located on the east side. A 138 kV transmission line is located on the east side of the valley and can be used to service the mine. The Project is estimated to produce metallurgical coal at a maximum production rate of 1 million clean tonnes per annum. The lifespan of the Project is planned for 13 years of coal production at a constant rate using shovel and truck operation open pit mining method.

The Project includes the following components (Figure 3: Project Layout):

- › surface mine pit area;
- › Coal processing plant;
- › Waste rock, coal plant rejects and topsoil storage sites;
- › Materials handling systems for raw coal, coarse and fine coal plant rejects, and clean coal, including plant conveyors, storage bins and stockpiles;
- › An overland conveyor will span across the Elk River and associated floodplain, connecting the plant site located on the west side of the Elk River to the rail load out located on the east side of the Elk River;
- › 27 km of rail line to connect to the existing main CP rail line located to the south on the east side of the Elk River;
- › Rail bridges over the Fording River, and various smaller waterways;
- › Rail load out facility on the east side of the Elk River;
- › 6 km of new forestry service road to bypass the mine operations on the west side of the proposed Project that will serve as an access road for the mine and for forestry and public use north of the Project;

² While the proposed reduction in production capacity does not change the requirement for a provincial EA, the new daily rate does fall below the threshold identified in the *Regulations Designating Physical Activities* for a federal EA. As a result, the federal Minister of Environment and Climate Change is required to make a decision on whether or not the federal EA for the Project will continue. Currently the provincial and federal EAs are coordinated. More information on coordinated EAs is available on EAO's website at: http://www.eao.gov.bc.ca/EAO_CEEA.html.

³ The distance from the Project to local indigenous communities is: St. Mary's (87 km), Akisqnuq First Nation (76km), Tobacco Plains (115 km) and Lower Kootenay (165 km).

- › Improvements to existing Elk River Forestry Services Road to allow the passing of vehicles in designated areas;
- › Surface water management features, including ditches, sedimentation and storage ponds and potential water treatment facilities;
- › Administration, maintenance and storage buildings;
- › Propane storage facilities;
- › Mine haul roads and access roads that include road crossings over Bingay Creek and other smaller watercourses in the Project area;
- › Water supply wells, storage, and distribution systems;
- › Sewage treatment plant;
- › Potable water treatment plant;
- › Fuel and lube storage facilities;
- › Explosive storage facilities and vehicle wash facilities;
- › Magazines; and
- › A 25 kV power line will span the Elk River and associated floodplain from the 138 kV to 25 kV substation on the east side of the Elk River to the 25 kV to 600 kV substation and subsequent site distribution system on the west side of the Elk River.

The majority of the facilities associated with the mine and coal processing, including the open pit, coal processing plant and administration, maintenance and storage facilities, will be located within the Bingay Main licence area held by Centermount (Figure 3: Project Layout). The area identified as a potential rock storage area is located on the Bingay B coal licence area held by Centerpoint Resources, the majority shareholder of Centermount. The rail line, rail load out, access road, and the majority of the power line are located outside of these license areas on Crown Land.

The layout proposed in this VC Selection document is currently considered the preferred general arrangement.

Regional Area

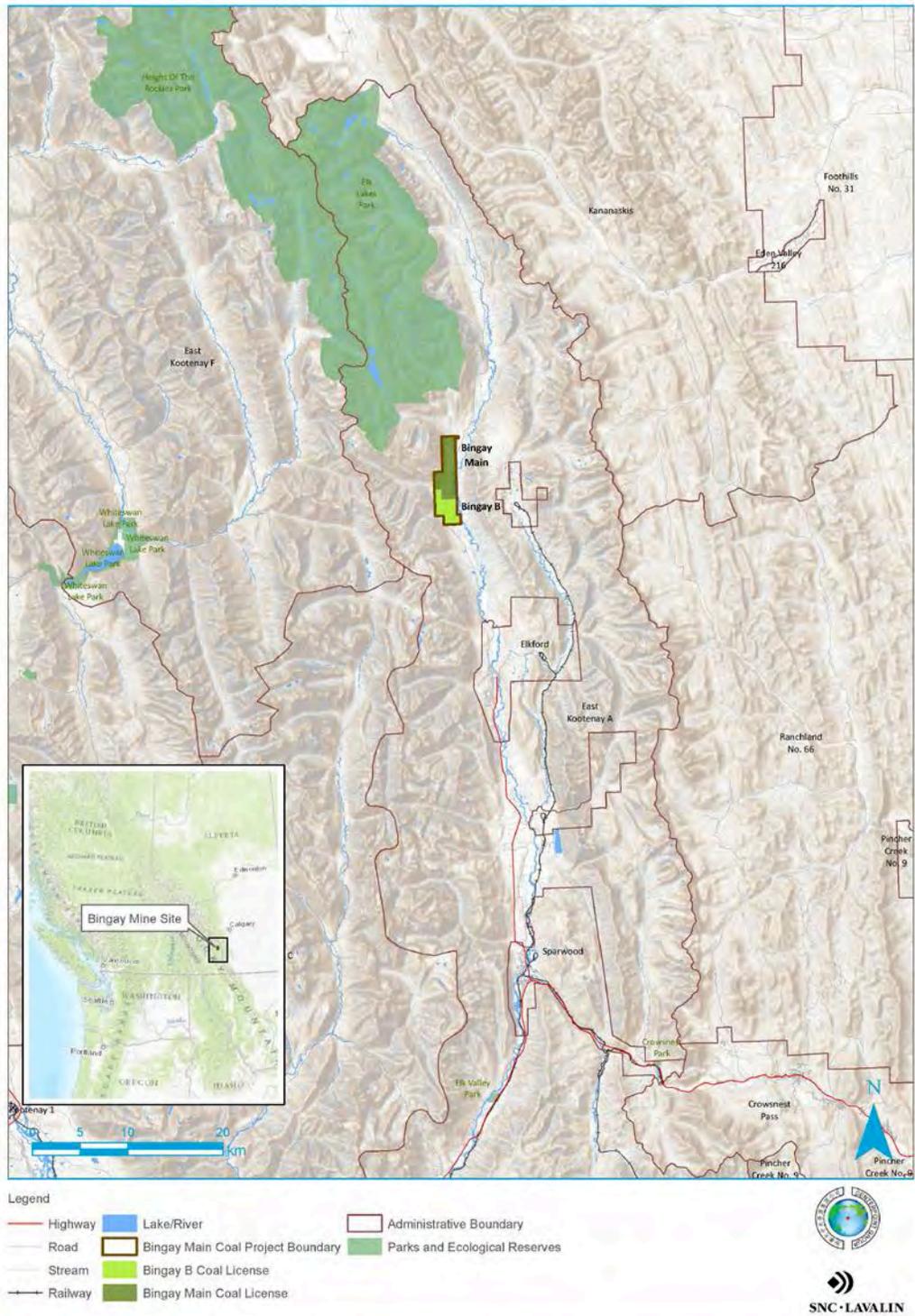


Figure 1: Regional Area

Project Location

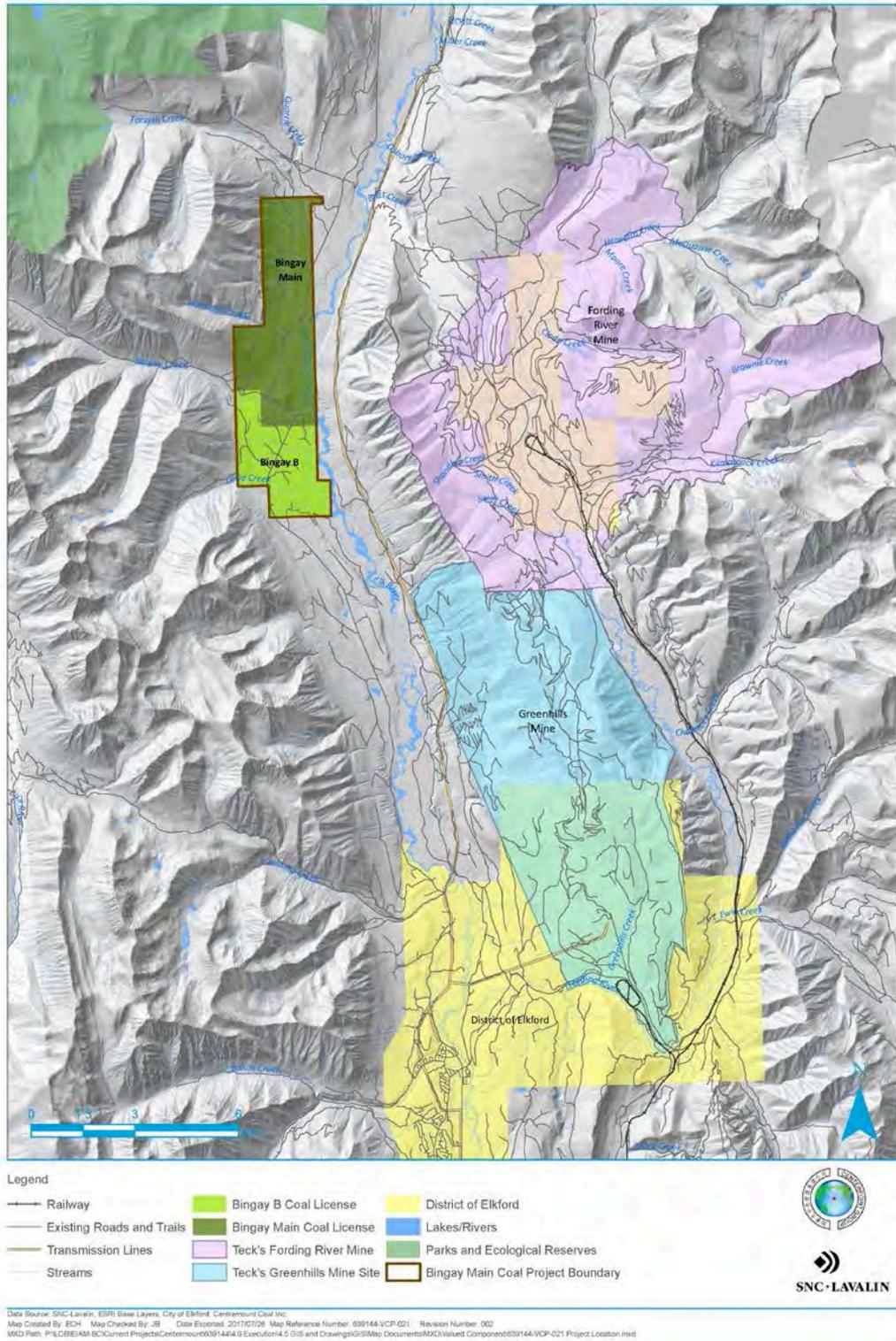


Figure 2: Project Location

3 Valued Component Selection Process

Valued Components (VCs) are those components of the natural and human environment that are considered by a proponent, public, First Nations and Aboriginal groups, scientists and other technical specialists, and government agencies involved in the assessment process to have scientific, ecological, economic, social, cultural, archaeological, historical, or other importance (EAO 2013). Valued Components form the analytical basis for the EA. All Valued Components may be either an Intermediate Valued Component or a Receptor Valued Component based on updated guidance provided by EAO. This updated guidance is discussed further in section 4.10 below.

Before development of the AIR for the Project, the EAO required that Centermount recommend a set of VCs that would be used in the Application.

The VCs must be relevant to the reviewable Project, representative of the important features of the natural and human environment likely to be affected by the Project, responsive to the potential effects of the Project, concise (so the nature of the Project-VC interaction can be understood, while avoiding overlapping or redundant analysis), and, taken together, comprehensive to enable a full understanding of the important potential environmental, economic, social, heritage, and health effects of a reviewable Project. Valued Components were selected using a four-step process that was based on the Guideline:

1. Issues scoping;
2. Identification of Candidate VCs;
3. Screening/Evaluation of Candidate VCs; and
4. Selection of VCs.

4 Issues Scoping⁴

The issues scoping process (Step 1) followed the issues scoping procedures described in the Guideline, to identify environmental, economic, social, heritage, and health issues related to the Bingay Project. The process and inputs / sources included the following:

- › Review and compilation of available information on the existing biophysical and socio-economic baseline information in the local and regional areas, including previously conducted baseline studies and provincial databases.
- › Review of the Project Description, which includes the proposed Project activities, scheduling, engagement activities, and potential effects.
- › Initial engagement with the Ktunaxa Nation Council (KNC) and inclusion of documented KNC issues that were identified for coal projects located in the Elk Valley.
- › Initial consultation with local stakeholders and governmental agencies.
- › Review of publically available VC Selection Documents for other projects situated in the Elk Valley.
- › Review of relevant provincial and federal guidance documents.
- › Use of professional judgment and engagement with specialists in a variety of disciplines with local knowledge.
- › Evaluation of potential Project-environment interactions and effects pathways.
- › Review of public input received during the two public comment periods held in 2012 and 2013 under the federal EA review process conducted under the *Canadian Environmental Assessment Act (2012)*.

4.1 Ktunaxa Nation Council Engagement

Centermount has initiated consultation with the KNC. Consultation has been undertaken with the assistance of meetings, presentations, informal discussions, phone calls, emails, and letters. The KNC was first approached regarding the Project prior to the most recent exploration activity and a meeting was held in March 2010. Five meetings with the KNC regarding the Project have taken place since then, in April 2010, June 2011, December 2016, August 2017 and September 2017. These meetings were held at the KNC offices in Cranbrook. In addition, a representative from KNC took part in a tour of the Project site in August 2017. During the course of these scoping activities, the parties have identified several issues of concern. These issues include potential impacts to water quality in the Elk River, the proximity of the mine pit to the river, and potential impacts to wildlife (ungulate) movement. Other issues identified by the parties include recreational access in the Elk River Valley as well as the housing and employment challenges of the valley.

4.2 Public Consultation

To date, public consultation has consisted of informal meetings with interested and potentially affected parties, including recreational groups and environmental groups, and one formal public meeting held in Elkford in October 2012. The public meeting was held prior to the exploration program to discuss the Project, the field program, and local concerns. In addition, two public comment periods have been held as part of the federal EA process. These discussions and input from previous public comment periods have

⁴ The Ktunaxa Nation Council, local, provincial and federal government agencies are also members of the Advisory Working Group providing technical advice to EAO on the EA of the Project including the proposed selection of VCs. The Advisory Working Group has reviewed earlier drafts of this document and their input has been considered and incorporated.

helped identify a range of issues associated with the Project, and have allowed Centermount to adjust the mine plan to address many of these concerns. Further engagement with local stakeholders, via both formal and informal meetings, has been ongoing since February 2017 and issues raised have included water quality impacts, wildlife impacts, recreational access, employment, and housing. Adjustments to project design to address some of these concerns include maintaining riparian setbacks and avoiding directly impacting streams, incorporating wildlife corridors and considering options to ensure public access beyond the mine. Centermount has employed a Community Relations Manager who is based within the community of Elkford and readily accessible for community engagement. Information continues to be cascaded to local community members and all are encouraged to communicate freely. Centermount has developed a Public Consultation Plan to help guide further public consultation through the Environmental Assessment process available on EAO's website at <https://projects.eao.gov.bc.ca/p/bingay-main-coal/docs>.

Centermount has identified stakeholders including local governments, communities, and organizations representing recreational, commercial and public interests and has communicated with many of these stakeholders. These stakeholders include (but are not limited to):

1. Local Governments
 - BC MLA, Kootenay East – Tom Shypitka*
 - City of Fernie
 - District of Elkford
 - District of Sparwood
 - Federal MP, Kootenay – Columbia – Wayne Stetski
 - Municipality of Crowsnest Pass
 - Regional District of East Kootenay
2. Communities
 - Crowsnest Pass
 - Elkford
 - Fernie
 - Sparwood
3. Recreational Interest
 - BC Chapter of Back Country Hunters & Anglers
 - Elk River Fly Fishing Guides*
 - Elkford ATV Club
 - Elkford Nordic Ski Club*
 - Elkford Rod and Gun Club
 - Elkford Snowmobile Association
 - Fernie Rod and Gun Club
 - Fernie Trails Alliance*
 - Ride The Divide*
 - Rocky Mountain Wilderness Hiking Excursion
 - Sparwood & District Fish and Wildlife Association
 - Sparwood Rod and Gun Club
 - Sparwood Trails Alliance*
 - Trails BC*
 - TransCanada Trail
4. Commercial Interest
 - BC Hydro*
 - Canadian Pacific Rail*
 - Canfor
 - CoalMont/CanAus *

- Crowsnest Pass Chamber of Commerce
 - Elk Valley Bighorn Outfitters(Fontana's Guide Outfitting)
 - Elk Valley Economic Initiative
 - Elkford Chamber of Commerce
 - Fernie Chamber of Commerce
 - Fortis*
 - Jemi Fibre Corp. (CanWel)
 - Mining Association of British Columbia*
 - Mining Association of Canada*
 - Sparwood Chamber of Commerce
 - Teck Resources
 - Tourism Fernie*
5. Public Interest Groups
- Canadian Parks and Wilderness Society*
 - College of the Rockies*
 - Dogwood Initiative*
 - East Kootenay Conservation Program
 - Elk River Alliance
 - Elk Valley Stewardship Society
 - Elkford 50+ Club
 - Elkford Lions Club
 - Hornady Wilderness Society
 - Nature Conservancy Canada*
 - Sierra Club of BC*
 - United Steelworkers (Elkford #7884)
 - Wildsight
 - Yellowstone to Yukon Conservation Initiative*

*Stakeholders identified (but not yet contacted)

4.3 Regional Government Engagement

Centermount has engaged with the District of Elkford since 2010. A formal presentation to the Elkford, Sparwood, and Fernie Councils occurred on January 23 and 24, 2012, to introduce the proposed Project and obtain feedback on various aspects of the Project. The following issues were identified during meetings with the District of Elkford Council:

- › The Council identified the issue of hauling coal by truck through the town from a safety / noise / dust perspective. Centermount responded by identifying hauling options that include building a rail line on the east side of the Elk River, away from Elkford.
- › The Council identified the concern of their water table being altered affecting Elkford potable water. Centermount responded with additional hydrogeological drilling program and analysis to confirm the location and direction of fault lines.
- › The Council identified the housing shortage issue and potential effect on affordability of rental and housing market. Centermount responded by participating in their Housing Strategy Sessions and identifying the option of a Private / Public housing development.
- › The Council identified the issue of the current trend of transient workers not residing in the Elk Valley. Centermount responded by exploring options to encourage workers to reside in Elkford. These options include mortgage assistance and adjusting the work schedule to suit families living close by.

Meetings were also convened with the Elkford Mayor & Council and Sparwood Mayor & Council on May 15, 2017, with the Mayor of Fernie and the Director of Operational Services on May 16, 2017, and with the Mayor of Crowsnest Pass and the Chief Administrative Officer, and a Director of the Regional District of East Kootenay on May 16, 2017. The purpose of the meetings was to re-introduce the Project, provide details on technical aspects and invite and respond to questions. Questions related to Project timelines, number of staff, shift patterns, transport of staff, positive economic benefits and increasing populations, coal transportation, potential water impacts, and mining process were raised during these visits.

4.4 Provincial Government Engagement

A variety of provincial agencies have been notified of the Project to date. Several agencies were involved in the exploration stages of the Project, and additional meetings have been held to introduce the Project and obtain input and advice on Project issues and the assessment process. Agencies contacted to date include:

- › Environmental Assessment Office;
- › Interior Health Authority;
- › Ministry of Forest, Lands, Natural Resource Operations & Rural Development;
- › Ministry of Environment and Climate Change Strategy;
- › Ministry of Energy, Mines & Petroleum Resources;
- › Ministry of Transportation and Infrastructure;
- › Ministry of Agriculture; and
- › Ministry of Jobs, Trade and Technology.

4.5 Federal Government Engagement

The CEA Agency corresponded via email and telephone to provide direction on the requirements of the Project Description. Other federal agencies that will be involved in the assessment process include:

- › Fisheries and Oceans Canada;
- › Natural Resources Canada;
- › Environment and Climate Change Canada;
- › Transport Canada; and
- › Health Canada.

4.6 Applicable Laws and Regulations

The following legislation is applicable to the Project and forms the legal constraints that were considered in the VC selection process:

- › Federal Legislation:
 - Canadian Environmental Assessment Act;
 - Canadian Rail Safety Act;
 - Canadian Transportation Act;
 - Explosives Act;
 - Fisheries Act;
 - Navigation Protection Act;
 - Migratory Birds Convention Act; and
 - Species at Risk Act.

- › Provincial Legislation:
 - Coal Act;
 - Explosives Act;
 - Environmental Assessment Act;
 - Heritage Conservation Act;
 - Drinking Water Protection Act;
 - Environmental Management Act;
 - Forest Act;
 - Forest and Range Practices Act;
 - Heritage Conservation Act;
 - Mines Act;
 - Land Act;
 - Water Sustainability Act;
 - Wildfire Act; and
 - Wildlife Act.

4.7 Applicable Initiatives

4.7.1 Elk Valley Water Quality Plan

In 2014, the Minister of the Environment approved an Area Based Management Plan for the Elk Valley to remediate water quality effects of past coal mining and to guide future development. The Elk Valley Water Quality Plan provides an area-based approach to managing water quality for selenium, nitrate, sulphate, and cadmium in the Elk Valley, including short-term, medium-term, and long-term water quality targets at locations in the Elk and Fording Rivers and Lake Koochanusa. Centermount recognizes that any future development will need to consider this Plan, including any local watershed modeling when considering cumulative effects.

4.7.2 Cumulative Effects Management Framework

Centermount is aware of the Elk Valley Cumulative Effects Management Framework (EV CEMF), which is a provincial government-led process that seeks to assess and manage cumulative effects in the Elk Valley. Centermount will work with the Ministry of Forest, Lands, Natural Resource Operations and Rural Development, Ministry of Environment & Climate Change Strategy, the EAO and any other regulatory agencies and First Nations to learn more about the EV CEMF and how it may apply to the cumulative effects assessment in the Application.

4.8 Issues Identified in Previous Consultation Completed for the Bingay Project

Table 1 summarizes the issues that were scoped through previous consultation activities conducted prior to the development of this document.

Table 1: Issues Scoping Summary from Bingay Project Consultation

Source	Consultation By Way Of	BCEAA Pillar	Issue
Public	Response to CEAA Public Comment Period on the Project Description (December 2012) and on draft EIS guidelines (January-February 2013)	Environment	Old growth forest, wildlife habitat, fish and fish habitat, Bull trout and Westslope cutthroat trout habitat, ungulate winter range, grizzly bear habitat, mountain goats, bird species, amphibians and small mammals, water quality, selenium, nitrate, water quantity, waste management, closure and reclamation, air quality and climate change, cumulative effects, riparian habitat, greenhouse gas emissions.
		Social	Outdoor recreational opportunities, dark sky, and traffic.
		Economic	Economic impacts, employment, tourism.
		Health	Noise and dust.
First Nations	Discussion with KNC – Land and Resource Agency	Environment	Groundwater, calcite, selenium, cadmium, nickel, wildlife habitat, grizzly bear mortality, and biodiversity (especially in riparian and floodplain ecosystems).
		Social	Housing
			Recreational access
Economic	Employment		
Local Government	Letter from District of Elkford	Environment	Water quality and quantity, use of aquifers.
		Health	Potable water
US Government	Response to CEAA	Environment	Selenium

4.9 Issues Identified for Neighbouring Projects

Table 2 summarizes the issues that were identified through review of other EAs conducted in proximity to the Project Area. These included the Baldy Ridge Extension Project (Teck 2015a), Crown Mountain Coking Coal Project (NWP Coal Canada, 2016), Coal Mountain Phase 2 Project (Teck 2015b), and Fording River Operations Swift Project (based on the Application).

Table 2: Issues Scoping Summary from Neighbouring Projects

Source	BCEAA Pillar	Issue
KNC	Environment, Health	Groundwater quality
		Water quality and aquatic health effects in the watershed associated with water runoff and leaching from waste rock
	Environment, Social	Effects to fish populations from reduction or alteration of fish habitat (e.g., waste rock placement, calcite formation, water management infrastructure)
		Effects on biodiversity from loss of habitat and changes to populations
	Environment, Health	Wildlife health effects associated with changes to air, water, and soil quality
		Human health risk associated with changes to air, water, soil, and country food quality
	Environment, Economic, Social	Assessment of pre-development conditions
	Heritage	Effects to archaeological resources and traditional sites
Environment, Social, Heritage, Health	Effects to traditional hunting and gathering areas	
Economic, Social, Health	Effects to the aboriginal workforce	

Table 2 (Cont'd): Issues Scoping Summary from Neighbouring Projects

Source	BCEAA Pillar	Issue
Local stakeholders and government	Environment, Health, Social	Dust from operations
	Environment, Social	Noise and vibration from operations
	Social, Economic	Visual effect to landscape
Local stakeholders	Economic, Social	Access to affordable childcare
	Economic, Social	Housing affordability and availability
	Economic, Social	Provision and maintenance of local services and infrastructure
	Social, Health	Transportation safety
Provincial regulators, KNC	Environment, Social	Effects to wildlife from changes to wildlife corridors, wildlife habitat
Federal regulators	Environment	Effects to wildlife and water quality

4.10 Summary of Issues Identified During Scoping

All issues identified during issues scoping (Step 1) are presented in Table 2, categorized by BCEAA Pillar. These issues were carried forward as Candidate VCs and the following eight (8) criteria derived from the Guideline were applied against them to assess their appropriateness:

1. Presence of the Candidate VC in the local or regional Project area;
2. Potential for Project interaction with, and effect on, the Candidate VC;
3. The need for a detailed assessment due to the existence of a legally binding government requirement such as a permit, authorization, or regulation;
4. Relevance to legislative or regulatory requirement or government management priority (e.g., 'species at risk' or 'identified wildlife');
5. Relevance to Aboriginal interests, including claimed or proven Aboriginal rights (including title) and Treaty rights;
6. Potential for significant adverse cumulative effect;
7. Particular concern expressed by the public, Aboriginal Groups, or government; and
8. Sensitivity or vulnerability to disturbance.

The Candidate VCs that remained after this first screening step were further screened against the following two criteria (9 and 10) derived from the Guideline, which aim at minimizing redundancy and duplication in the effects assessment:

9. Can the potential effects on the Candidate VC be measured?
10. Can the potential effects on the Candidate VC be effectively considered within the assessment of another VC?

The application of screening criteria 9 and 10 were applied in two steps. The first step was used to identify situations where Candidate VCs are better represented and assessed under a surrogate Candidate VC and the second step was to combine Candidate VCs into broader Candidate VCs with the aim of creating a manageable number of VCs for effects assessment, while ensuring that the issues will continue to be assessed in the EA. The approach applied to VC selection was to promote a comprehensive, efficient, and defensible effects assessment.

The Candidate VCs that remained after this screening step were further assessed to determine whether the selected VCs would be considered Intermediate Value Components (IVCs) or Receptor Value Components (RVCs) in the EA as directed by EAO:

- › Is information about the Candidate VC needed to support the effects assessment of another Candidate VC?
- › Is the Candidate VC an IVC or final RVC in an effects pathway?

The term ‘effect pathway’ refers to the cause-effect linkage between a project and components of the natural or human environment. In some cases, the pathway between a project and a component of the natural or human environment is direct, while in others the project may affect the component indirectly, by causing changes in the natural or human environment on which the component depends. An example of a simplified effect pathway is shown in Figure 4: Pathway of Effects, Intermediate Valued Components and Receptor Valued Components. Understanding the effect pathways helps to clarify the relationship between candidate VCs.

An intermediate valued component is a component of the natural or human environment that is measurably changed by a reviewable project, and the change then causes an effect on another component of the natural or human environment. Intermediate valued components tend to comprise abiotic physical media, such as air, water, soil / sediment, terrain, or oceanographic conditions (e.g., temperature, salinity, waves, currents). These physical media may be altered by a project, but the importance of those changes is generally evaluated and understood in relation to the consequential effects of those changes on other, typically biotic or human, receptor valued components farther along an effect pathway.

A receptor valued component is a component of the natural or human environment that is measurably affected by a reviewable project, directly or indirectly, and which forms an endpoint of a given effect pathway.

Table 3 lists the Candidate VCs that will be represented in the effects assessment by a surrogate Candidate VC as a result of the application of the 12 criteria derived from the Guideline. The rationale for each Candidate VC that will be assessed under a Surrogate VC or to be excluded is presented in Table 4. As referenced earlier, the Advisory Working Group provided input regarding proposed candidate VCs by way of review of earlier drafts of this document. The Advisory Working Group also provided advice on effects pathways, study methodology, study area boundaries, project interactions and the preliminary list of projects for consideration in cumulative effects assessment.

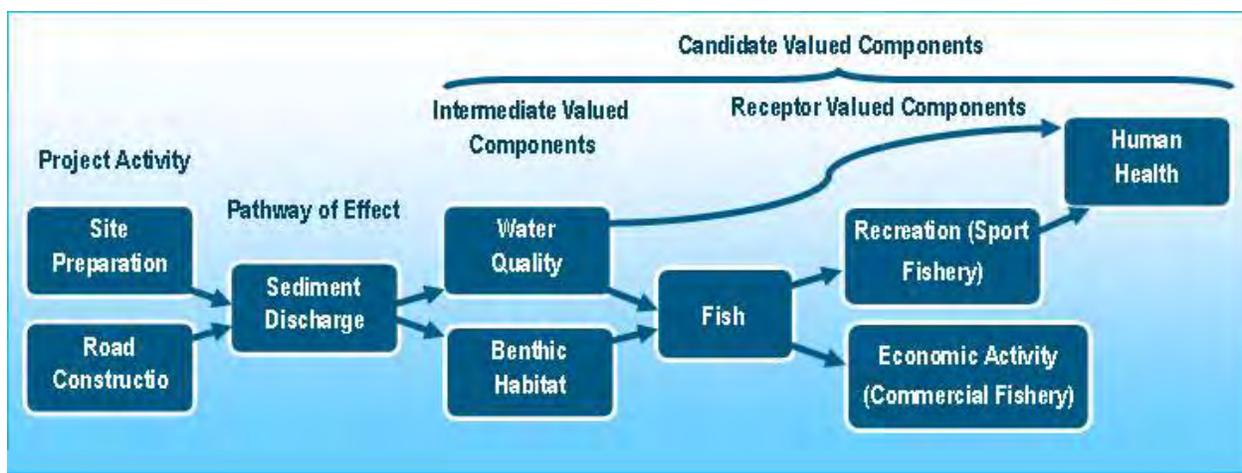


Figure 4: Pathway of Effects, Intermediate Valued Components, and Receptor Valued Components

Table 3: Candidate VC Screening Summary

BCEAA Pillar	Issues Identified During Issues Scoping / Candidate VC	Will the Candidate VC be represented by a Surrogate or Excluded?	Is the Candidate VC an IVC?	Is the Candidate VC a RVC? ⁵
Environment	› Air Quality	NO	YES	
	› Climate	YES (See Table 4 - GHG)		
	› Climate Change	YES (See Table 4 - GHG)		
	› GHG Emissions	YES (See Table 4 - GHG)		
	› GHG	NO	NO	
	› Noise Levels	YES (Noise and Vibration)		
	› Vibration Levels	YES (Noise and Vibration)		
	› Noise and Vibration	NO	YES	
	› Terrain	NO	YES	
	› Avalanche Paths	YES (Terrain)		
	› Landforms	YES (Terrain)		
	› Soil Quality	YES (Soil)		
	› Soil Quantity	YES (Soil)		
	› Soil	NO	YES	
	› Acid Rock Drainage and Metal Leaching Potential (ARD/ML)	YES (Surficial Geology)		
	› Surficial Geology	NO	YES	
	› Sediment Quality	YES (Surface Water)		
	› Surface Water Quality	YES (Surface Water)		
	› Surface Water Quantity	YES (Surface Water)		
	› Surface Water	NO	YES	
	› Groundwater Quantity	YES (Groundwater)		
	› Groundwater Quality	YES (Groundwater)		
	› Groundwater	NO	YES	
	› Aquatic Resources	NO	NO	YES
	– westslope cutthroat trout (<i>Oncorhynchus clarkii lewisii</i>)	NO	NO	YES
	– bull trout (<i>Salvelinus confluentus</i>)	NO	NO	YES
	– mountain whitefish (<i>Prosopium williamsoni</i>)	NO	NO	YES
	– longnose sucker (<i>Catostomus catostomus</i>)	NO	NO	YES
	– longnose dace (<i>Rhinichthys cataractae</i>)	YES (See Table 4 - Bull trout, westslope cutthroat trout, long nose sucker, mountain whitefish)		
	– redbside shiner (<i>Richardsonius balteatus</i>)	YES (See Table 4 - Bull trout, westslope cutthroat trout, long nose sucker, mountain whitefish)		
	– eastern brook trout (<i>Salvelinus fontinalis</i>)	YES (See Table 4 - Bull trout, westslope cutthroat trout, long nose sucker, mountain whitefish)		
	– burbot (<i>Lota lota</i>)	YES (See Table 4 - Bull trout, westslope cutthroat trout, long nose sucker, mountain whitefish)		
	– northern pikeminnow (<i>Ptychocheilus oregonensis</i>)	YES (See Table 4 - Bull trout, westslope cutthroat trout, long nose sucker, mountain whitefish)		
	– peamouth chub (<i>Mylocheilus caurinus</i>)	YES (See Table 4 - Bull trout, westslope cutthroat trout, long nose sucker, mountain whitefish)		
– kokanee (<i>Oncorhynchus nerka</i>);	YES (See Table 4 - Bull trout, westslope cutthroat trout, long nose sucker, mountain whitefish)			
– Fish Habitat	NO	NO	YES	
– Fluvial Geomorphology	YES (See Table 4 – Fish Habitat)			
– Aquatic Ecology	YES (See Table 4 – Periphyton and Benthic Invertebrates)			

⁵ May be an RVC or subcomponent of an RVC.

Table 3 (Cont'd): Candidate VC Screening Summary

BCEAA Pillar	Issues Identified During Issues Scoping / Candidate VC	Will the Candidate VC be represented by a Surrogate or Excluded?	Is the Candidate VC an IVC?	Is the Candidate VC a RVC? ⁶	
Environment	- Periphyton	NO	NO	YES	
	- Benthic Invertebrates	NO	NO	YES	
	› Vegetation	NO	NO	YES	
	- Culturally Important Plants	NO	NO	YES	
	- Plant Species at Risk ⁷	NO	NO	YES	
	› Sensitive Ecosystems	NO	NO	YES	
	- Ecological Communities at Risk or of Special Management Concern	NO	NO	YES	
	- Culturally Important Ecosystems	NO	NO	YES	
	- Old Growth Forests	NO	NO	YES	
	- Riparian Habitat	NO	NO	YES	
	- Rock Outcrops	NO	NO	YES	
	- Wetland Ecosystems	NO	NO	YES	
	› Wildlife and Wildlife Habitat	NO	NO	YES	
	- Herptiles	YES (See Table 4 - Western Toad)			
	- Western Toad (<i>Anaxyrus boreas</i>)	NO	NO	YES	
	- Reptile Species	YES (See Table 4 - Western Toad)			
	- Herptile Habitat	YES (See Table 4 - Western Toad)			
	- Aerial Insectivores	NO	NO	YES	
	- American Dipper (<i>Cinclus mexicanus</i>)	NO	NO	YES	
	- Bald Eagle (<i>Haliaeetus leucocephalus</i>)	NO	NO	YES	
	- Bank Swallow (<i>Riparia riparia</i>)	YES (See Table 4 - Aerial Insectivores)			
	- Barn Swallow (<i>Hirundo rustica</i>)	YES (See Table 4 - Aerial Insectivores)			
	- Black Swift (<i>Cypseloides niger</i>)	YES (See Table 4 - Aerial Insectivores)			
	- Common Nighthawk (<i>Chordeiles minor</i>)	NO	NO	YES	
	- Common Merganser (<i>Mergus merganser</i>)	YES (See Table 4 – American Dipper)			
	- Evening Grosbeak (<i>Coccothraustes vespertinus</i>)	YES (See Table 4 – Not Present therefore excluded)			
	- Great Blue Heron (<i>Ardea herodias</i>)	YES (See Table 4 – Bald Eagle)			
	- Harlequin Duck (<i>Histrionicus histrionicus</i>)	YES (See Table 4 – American Dipper)			
	- Horned Grebe (<i>Podiceps auritus</i>)	YES (See Table 4 – Waterfowl and Waterbirds)			
	- Mallard (<i>Anas platyrhynchos</i>)	YES (See Table 4 – Waterfowl and Waterbirds)			
	- Northern Goshawk (<i>Accipiter gentilis</i>)	YES (See Table 4 – Woodpeckers)			
	- Olive-sided Flycatcher (<i>Contopus cooperi</i>)	NO	NO	YES	
	- Peregrine Falcon (<i>Falco peregrinus</i>)	YES (See Table 4 – Not Present therefore excluded)			
	- Pileated Wood pecker (<i>Dryocopus pileatus</i>)	YES (See Table 4 – Woodpeckers)			
	- Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	YES (See Table 4 – Waterfowl and Waterbirds)			
	- Spotted Sandpiper (<i>Actitis macularia</i>)	YES (See Table 4 – American Dipper)			
	- Western Screech-owl (<i>Megascops kennicottii</i>)	YES (See Table 4 – Woodpeckers)			
	- Piscivorous raptor species	YES (See Table 4 – Bald Eagle)			

⁶ May be an RVC or subcomponent of an RVC.

⁷ A list of red and blue-listed plant species with potential to occur in the study area can be found in Appendix A.

Table 3 (Cont'd): Candidate VC Screening Summary

BCEAA Pillar	Issues Identified During Issues Scoping / Candidate VC	Will the Candidate VC be represented by a Surrogate or Excluded?	Is the Candidate VC an IVC?	Is the Candidate VC a RVC? ⁸
Environment	- Shrub-nesting birds	NO	NO	YES
	- Waterfowl and waterbirds	NO	NO	YES
	- Woodpeckers	NO	NO	YES
	- Bird Habitat	YES (See Table 4 – American Dipper, Common Nighthawk, Bald Eagle, Olive-sided Flycatcher, shrub-nesting birds, waterfowl and waterbirds, woodpeckers)		
	- American badger (<i>Taxidea taxus</i>)	NO	NO	YES
	- American marten (<i>Martes americana</i>)	NO	NO	YES
	- American mink (<i>Neovison vison</i>)	YES (See Table 4 – Riparian habitat)		
	- Bighorn sheep (<i>Ovis canadensis</i>)	YES (See Table 4 – Not Present therefore excluded)		
	- Elk (<i>Cervus elaphus</i>)	NO	NO	YES
	- Fisher (<i>Pekania pennanti</i>)	YES (See Table 4 – American marten)		
	- Grizzly bear (<i>Ursus arctos</i>)	NO	NO	YES
	- Little brown myotis (<i>Myotis lucifugus</i>)	NO	NO	YES
	- Lynx (<i>Lynx canadensis</i>)	YES (See Table 4 – Grizzly bear)		
	- Moose (<i>Alces alces</i>)	NO	NO	YES
	- River otter (<i>Lontra canadensis</i>)	YES (See Table 4 – Riparian habitat)		
	- Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	YES (See Table 4 – Little brown myotis)		
	- Wolverine (<i>Gulo gulo</i>)	YES (See Table 4 – Grizzly bear)		
	- Mammal Habitat	YES (See Table 4 – Grizzly bear, little brown myotis, American marten, moose)		
	- Invertebrates	YES (See Table 4 – Gillette's checkerspot)		
	- Gillette's checkerspot (<i>Euphydryas gillettii</i>)	NO	NO	YES
› Biodiversity	YES (See Table 4 – Multiple RVCs)			
Social	› Recreation	NO	NO	YES
	- Community recreation and leisure facilities	YES (See Table 4 – Motorized recreation, Recreational hunting, Recreational angling; Local recreation sites)		
	- Motorized Recreation	NO	NO	YES
	- Recreational Hunting	NO	NO	YES
	- Recreational Angling	NO	NO	YES
	- Local Recreation Sites	NO	NO	YES
	- Outdoor Recreation and Tourism	YES (See Table 4 – Motorized recreation, Recreational hunting, Recreational angling; Local recreation sites, Commercial land and water use)		
	› Services and Infrastructure	NO	NO	YES
	- Accommodation	YES (See Table 4 – Housing)		
	- Housing	NO	NO	YES
	- Property Value	YES (See Table 4 – Housing)		
	- Education	YES (See Table 4 – Health Care Services, Housing, Roads)		
	- Emergency Services	YES (See Table 4 – Health Care Services, Housing, Roads)		
	- Healthcare Services	NO	NO	YES
	- Public Safety	YES (See Table 4 – Roads)		
	- Roads (Conditions and Traffic)	NO	NO	YES
	- Rail Incidents and Emergency Response	YES (See Table 4 – Healthcare Services, Housing, Roads)		
- Other Social Services	YES (See Table 4 – Healthcare Services, Housing, Roads)			

⁸ May be an RVC or subcomponent of an RVC.

Table 3 (Cont'd): Candidate VC Screening Summary

BCEAA Pillar	Issues Identified During Issues Scoping / Candidate VC	Will the Candidate VC be represented by a Surrogate or Excluded?	Is the Candidate VC an IVC?	Is the Candidate VC a RVC? ⁹
Social	› Community Health and Well-Being	NO	NO	YES
	› Visual Quality	NO	NO	YES
	– Dark Skies	YES (See Table 4 – Excluded)		
	› Use of Lands for Traditional Purposes	YES (Covered in the Application under Part C)		
Economic	› Employment	YES (See Table 4 – Labour Force Capacity)		
	› Labour Force Capacity	NO	NO	YES
	› Economic Development	YES (See Table 4 – Labour Force Capacity, Commercial land and water use)		
	› Local and BC Government Finances	YES (Covered in the Application under Project Benefits and Infrastructure and Services)		
	› Commercial Land and Water Use	NO	NO	YES
	› Land and Resource Tenures and Resource Values	YES (See Table 4 - Commercial land and water use)		
Heritage	› Heritage Sites	NO	NO	YES
	› Archaeological Sites	NO	NO	YES
	› Ktunaxa Culture	YES (Covered in the Application under Part C)		
Health	› Traditional and Country Foods	YES (See Table 4 - Human Health)		
	› Human Health	NO	NO	YES

⁹ May be an RVC or subcomponent of an RVC.

Table 4: Candidate VCs that Will Be Assessed Under a Surrogate and/or Excluded, and the Associated Rationale

Eliminated Candidate VC	Surrogate Candidate VC or Exclusion		Rationale for Selecting a Surrogate and/or Exclusion
	RVC	Subcomponent(s)	
Climate, Climate Change, GHG Emissions	GHG	None	Climate, Climate Change, and GHG Emissions are all aspects or nomenclature for the same issue and have will be assessed under the GHG RVC.
Fluvial Geomorphology	Aquatic Resources	Fish Habitat	Changes to fluvial geomorphology will be considered as part of the changes to fish habitat
Northern pikeminnow, peamouth chub, and kokanee	Aquatic Resources	Bull trout, westslope cutthroat trout, longnose sucker, mountain whitefish	Stakeholders have expressed concern regarding pikeminnow, peamouth chub, redbside shiner, and kokanee. Bull trout and westslope cutthroat trout are considered to be an appropriate surrogate for these species due to their sensitivity to selenium that will result in a conservative assessment of effects on these fish species. Effects on burbot will also be analyzed according to Federal EIS Guidelines.
Longnose dace	Aquatic Resources	Bull trout, westslope cutthroat trout, longnose sucker, mountain whitefish	Longnose dace is not present in the LSA, but will be assessed under these surrogate fish species that are present in the LSA.
Redside shiner	Aquatic Resources	Bull trout, westslope cutthroat trout, longnose sucker, mountain whitefish	Redside shiner is not present in the LSA, but will be assessed under these surrogate fish species that are present in the LSA.
Burbot	Aquatic Resources	Bull trout, westslope cutthroat trout, longnose sucker, mountain whitefish	Burbot is not present in the LSA, but will be assessed under these surrogate fish species that are present in the LSA.
Eastern Brook Trout	Aquatic Resources	Bull trout, westslope cutthroat trout, longnose sucker, mountain whitefish	Eastern brook trout is a non-native species that will be assessed under these surrogate fish species that are present in the LSA.
Aquatic Ecology	Aquatic Resources	Periphyton and Benthic Invertebrates	The larger issue of aquatic ecology will be assessed through the combination of periphyton and benthic invertebrates that comprise the dominant aspects of this broader issue.
Reptile species, Herptiles and Herptile habitat	Wildlife and Wildlife Habitat	Western toad	Western toad is considered to be a suitable surrogate for all herptiles (including reptile species) due to their dependence on wetland habitats (to represent effects to wetland amphibian breeding habitat and snake foraging habitat), and their generalist habitat use patterns in upland habitats to represent effects to other generalist herptile species. Western toad will be used as a surrogate for Herptiles and Herptile habitat.
Evening Grosbeak	Excluded		No Evening Grosbeak individuals have been observed within the LSA during any surveys in 2004, 2005, 2011, and 2016, nor has our literature review identified known observations of the species in other studies. The BC Breeding Bird Atlas identifies the upper Elk River valley as an area of low occurrence probability for this species. Evening Grosbeak is not proposed to be carried forward as a subcomponent for the Wildlife and Wildlife Habitat RVC.
Peregrine Falcon	Excluded		No Peregrine Falcon individuals have been observed within the LSA during any surveys in 2004, 2005, 2011, 2012, 2016 and 2017. No known observations of the species have been identified for the LSA during literature review of other studies. Peregrine Falcons are typically found in areas with a combination of nesting and foraging habitat. Though foraging habitat exists in the LSA (e.g., the Elk River and associated duck populations), no nesting habitat (i.e., steep cliffs) is present in the LSA or immediate surroundings. Peregrine Falcon is not proposed to be carried forward as a subcomponent for the Wildlife and Wildlife Habitat RVC.
Bank Swallow, Barn Swallow, and Black Swift	Wildlife and Wildlife Habitat	Aerial Insectivores	Bank Swallows, Barn Swallows, and Black Swift will be best represented by the group "aerial insectivores", representing diurnal bird species that have a similar life history niche of foraging on aerial insects, typically over open and aquatic habitats. This aerial insectivores guild has been added to the list of RVCs based on input from reviewers.
Spotted Sandpiper, Harlequin Duck, and Common Merganser	Wildlife and Wildlife Habitat	American Dipper	Spotted Sandpiper, Harlequin Duck and Common Merganser will be represented by American Dipper. These species are all primarily riverine habitat users while present within the LSA.
Great Blue Heron, and piscivorous raptor species	Wildlife and Wildlife Habitat	Bald Eagle	Bald Eagle will represent Great Blue Heron and piscivorous raptors. Herons and eagles typically nest in mature or old forest habitats in proximity to waterbodies, and forage in aquatic habitats. Only one Great Blue Heron was observed within the LSA during Project surveys, and the closest known rookery is located near Sparwood (within the RSA but not near the LSA). Great Blue Heron are also typically located at elevations below 1,100 m (below the minimum elevation of the LSA) and therefore, there is low suitability of habitat in the LSA (due to elevation). Mitigation measures proposed for Bald Eagle, waterfowl and waterbirds, and riverine birds will also benefit Great Blue Heron.
Mallard, Red-winged Blackbird, and Horned Grebe	Wildlife and Wildlife Habitat	Waterfowl and waterbirds	Mallard, Red-winged Blackbird, and Horned Grebe will be best represented by the group "waterfowl and waterbirds", representing species that live in a similar habitat niche: aquatic habitats (wetlands, ponds, lakes). Project effect pathways, including habitat alteration and potential exposure to contaminants, will be similar for species within this group. Based on input from reviewers, a "waterfowl and waterbirds" guild has been added to the list of subcomponents for the assessment of Project effects on the RVC. There is no species specified to represent waterfowl and waterbirds.
Northern Goshawk, Pileated Wood pecker, and Western Screech-owl	Wildlife and Wildlife Habitat	Woodpeckers (mature-old forest users)	Northern Goshawk, Western Screech-owl, and Pileated Woodpecker will be represented by the species guild "woodpeckers" based on their shared preference for mature and old growth forest habitat, and the majority of old-growth forest within the Project area is located close to waterbodies.

Table 4 (Cont'd): Candidate VCs that Will Be Assessed Under a Surrogate and/or Excluded, and the Associated Rationale

Eliminated Candidate VC	Surrogate Candidate VC or Exclusion		Rationale for Selecting a Surrogate and/or Exclusion
	RVC	Subcomponent(s)	
Bird habitat	Wildlife and Wildlife Habitat	American Dipper, Common Nighthawk, Bald Eagle, Olive-sided Flycatcher, shrub-nesting birds, waterfowl and waterbirds, woodpeckers	The wildlife species and guilds listed were selected to represent various habitat niches within this habitat grouping.
Bighorn sheep	Excluded		Information on bighorn sheep specific to the Elk Valley was obtained from Poole (2013). Bighorn sheep in the vicinity of the LSA include the Elk Valley East and Elk Valley West herds, which are separated by the Elk River. No exchange has been detected between these two herds, and radio-collared sheep monitored in the Elk Valley were not observed to cross the Elk River. Although present in the RSA, bighorn sheep are not anticipated to occur regularly in the Project LSA as it is located mostly along the valley bottom. High predation risk is expected to limit sheep use of the valley bottom (K. Poole, pers. comm. 2016). For this reason, bighorn sheep is not proposed as a subcomponent for the Wildlife and Wildlife Habitat RVC.
Townsend's big-eared bat	Wildlife and Wildlife Habitat	Little brown myotis	Townsend's big-eared bat will be best represented by little brown myotis, based on similar habitat preferences for habitats present in the Project area. Little brown myotis is the proposed species to represent Townsend's big-eared bat in the effects assessment due to their comparable foraging habitat preferences based on known (limited) information about these species, and based on the lack of known suitable roost sites in the LSA for Townsend's big-eared bat (underground mines, caves and other cavernous sites) with the goal of minimizing redundancy and duplication in the effects assessment. This is consistent with guidance from "Guidelines for the Selection of Valued Components and Assessment of Potential Effects" (EAO 2013).
Wolverine and Lynx	Wildlife and Wildlife Habitat	Grizzly Bear	Wolverine and lynx will be represented by the grizzly bear subcomponent, because these species are wide-ranging mammals that can be affected in similar ways by development. Research has shown that grizzly bears, wolverine and lynx all have complex responses to development: attraction or repulsion varying according to landscape type, disturbance type, and other factors; however, for all of these wide-ranging species, there is abundant literature to support that, in general, increased human presence in an area, increased road densities and increased motor vehicle access can have negative impacts to grizzly bear, wolverine and lynx. Much more information is available regarding grizzly bear movement patterns and habitat use as that species is comparatively well-studied. To provide focus for the assessment of Project effects on Wildlife and Wildlife Habitat (as per "Guidelines for the Selection of Valued Components and Assessment of Potential Effects" (EAO 2013)), grizzly bear was identified as an appropriate subcomponent for representing Project effects to wolverine and lynx.
Fisher	Wildlife and Wildlife Habitat	American marten	Fishers have similar life histories to American martens, and are expected to be very rare in the LSA (R. Weir, pers. comm.). Based on their similarities, fisher will be represented by American marten.
American mink and river otter	Wildlife and Wildlife Habitat	Riparian Habitat	American mink and river otter will be represented by a surrogate, representing their predominant terrestrial habitat (riparian habitat).
Mammal habitat	Wildlife and Wildlife Habitat	Grizzly bear, little brown myotis, American marten, moose	The wildlife species listed were selected to represent various habitat niches within this habitat grouping.
Invertebrates	Wildlife and Wildlife Habitat	Gillette's checkerspot	Gillette's checkerspot was selected as a subcomponent since it is the only invertebrate species at risk that is confirmed to be present in the LSA.
Biodiversity	Excluded		Centermount has proposed RVCs for the Project effects assessment that represents a wide variety of species and life history niches and collectively represent the biodiversity of the Project area.
Accommodation, property value	Services and Infrastructure	Housing	Housing was selected as a surrogate to address the issues of accommodation and property value. While property owners may gain from a new project's workers putting upward pressure on housing markets, the adverse effect of major concern is housing affordability for vulnerable populations. As such, the Housing subcomponent will focus on affordability for vulnerable populations, and any benefits of the project will be covered in that part of the Application.
Emergency services, Education, Other social services (such as child care)	Services and Infrastructure	Health Care Services, Housing, Roads	Emergency Services, Education and other social services have similar effect mechanisms as Health Care Services, Housing, and Roads. By examining potential project effects on the latter one can infer the potential effects on the former issues. A new project, for example, may lead to population growth in the region, which may in turn place greater pressure on both the health care system and associated emergency services. As such, Health Care Services, Housing, and Roads were selected as surrogates for Emergency Services, Education and other social services.
Community recreation and leisure facilities	Recreation	Motorized recreation, recreational hunting, recreational angling, local recreational sites	Motorized recreation, recreational hunting, recreational angling, and local recreational sites comprise the major recreation issues due to their being both heavily practiced / used by locals and their possibly being affected by the proposed project. While other recreational activities occur, such as mountain biking along the TransCanada Trail, these other activities are much less prominent. In-community recreational activities and facilities (e.g. soccer fields) will be examined under the Services and Infrastructure RVC.
Public safety	Services and Infrastructure	Roads	Roads was selected as a surrogate to assess public safety as this is the area of potential interaction between the Project and the public. Mine worker shift structure as it relates to road safety will be covered as appropriate here.
Rail incidents and emergency response	Services and Infrastructure	Roads, Health Care Services	Roads and Health Care Services were selected as surrogates to assess rail incidents and emergency response.

Table 4 (Cont'd): Candidate VCs that Will Be Assessed Under a Surrogate and/or Excluded, and the Associated Rationale

Eliminated Candidate VC	Surrogate Candidate VC or Exclusion		Rationale for Selecting a Surrogate and/or Exclusion
	RVC	Subcomponent(s)	
Outdoor recreation and tourism	Recreation	Motorized recreation, recreational hunting, recreational angling, local recreational sites	The variety of outdoor recreation activities occurring and possible in the area will be assessed by focusing on motorized recreation, recreational hunting, recreational angling, and local recreational sites. These four activities are the most prominent in the area and can also be considered surrogates for other recreational activities. Any tourism activities involving outdoor recreation (e.g., guided angling) will be covered in the Local Economy VC.
Dark Skies	Excluded		Due to the low elevation of the proposed operations and the distance from Elkford, a night sky visual effects assessment is not considered necessary.
Use of lands for traditional purposes	Part C of the Application		This information will be assessed in the various RVC that apply and predominantly addressed in Part C of the Application.
Employment	Local Economy	Labour Force Capacity	Employment will be addressed in the surrogate of Labour Force Capacity.
Economic Development	Local Economy	Labour Force Capacity, Commercial Land and Water Use	The larger issue of economic development will be assessed by focusing on labour supply and competition, and how other commercial uses of land and water may otherwise be affected. In doing so, the assessment will concern itself with how the range of existing commercial activities in the region – both in-community and out on the land – may be affected.
Local and BC Government finances	Covered under Project Benefits in the Application and Services and Infrastructure	Housing Health care services Roads	Covered under Project Benefits in the Application. We have identified four potential adverse economic effects of the project: (1) impacts on the costs of housing, (2) impacts on government finances, (3) impacts on commercial uses of lands and waters, and (4) inflation in wages. We will address effects (1) and (2) in Services and Infrastructure RVC, and effects (3) and (4) in Local Economy RVC.
Land and resource tenures and resource values	Local Economy	Commercial Land and Water Use	Land and resource tenures and resource values will be addressed under Commercial Land and Water Use.
Ktunaxa Culture	Part C of the Application		This will be assessed in the various RVC that apply and predominantly addressed in Part C of the Application.
Traditional and country foods	Human Health	None	Traditional and country foods will be addressed under Human Health.

5 Selected RVCs, IVCs, Potential Effects, and Rationale

Table 5 provides a summary of anticipated interactions between the Project and the various RVCs and IVCs, which aids in identifying the potential effects. Table 6 presents for each selected IVC: the associated VCs for which the IVC is included in the pathway, the rationale for VC selection, and the potential effects. Table 7 summarizes for each selected RVC: the subcomponents, associated VCs along the pathways of effect, and rationale for selection.

Table 5: Project – Valued Component Interaction Matrix

Project Components / Activity	Environment												Economic	Social			Heritage	Health	
	Air Quality	GHG	Noise and Vibration	Terrain	Soil	Surficial Geology	Surface Water	Groundwater	Aquatic Resources	Vegetation	Sensitive Ecosystems	Wildlife and Wildlife Habitat	Local Economy	Recreation	Services and Infrastructure	Community Health and Wellbeing	Visual Quality	Heritage & Archeological Resources	Human Health
Construction																			
Site Preparation (clearing, grubbing, leveling, set up of temporary activities)	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X
Mine pit area and waste rock storage area	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Coal processing plant and ancillary facilities	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
27 km new rail line, bridges and rail load out, and Roads (mine haul roads, access and FSR upgrades)	X	X	X	X	X		X		X	X	X	X	X	X	X	X		X	X
Surface water management features	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X
Vehicle and rail traffic	X	X	X				X		X	X		X	X	X	X	X			X
Waste management		X					X	X	X			X	X		X	X		X	X
Blasting	X	X	X	X	X	X	X	X	X			X	X	X	X			X	X
Operations																			
Resource extraction (mining)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Coal production	X	X	X				X	X					X	X	X	X			X
Waste management		X	X				X					X	X	X	X				X
Surface water management				X			X	X	X	X	X	X					X		X
Transport of coal, waste rock and other materials	X	X	X				X	X	X			X	X	X	X	X	X		X
Waste rock placement	X	X	X	X			X	X	X			X		X	X	X	X		X
Vehicle and rail traffic	X	X	X				X					X		X	X	X			X
Blasting	X	X	X	X	X	X	X	X	X			X	X	X	X			X	X
Closure and Decommissioning																			
Dismantling of infrastructure	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X		X
Reclamation and closure activities	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		X
Maintenance of post-mining systems							X	X	X	X	X	X					X		X

Table 6: Intermediate Valued Components, Receptor Valued Components, Rationale, and Potential Effects

Intermediate Valued Component	Valued Components (for which the IVC is a pathway for effects)	Rationale	Potential Effects
Pillar – Environment			
Air Quality	<ul style="list-style-type: none"> › Aquatic Resources; › Vegetation; › Sensitive Ecosystems; › Wildlife and Wildlife Habitat; › Recreation; › Visual Quality; and › Human Health 	<ul style="list-style-type: none"> › Air Quality has been raised as an issue of concern by local communities, First Nations and regulators. › Air emissions are a regulated component of the environment. › Air emissions from the Project may have an effect on air quality and visibility, which may impact ultimate receptors in valued components such as Aquatic Resources, Vegetation, Sensitive Ecosystems, Wildlife and Wildlife Habitat, and Human Health. › Given that a change in air quality has an ultimate effect on those receptors identified above, Air Quality will be treated as an IVC in the Application. 	<ul style="list-style-type: none"> › Change in ambient air quality.
Noise and Vibration	<ul style="list-style-type: none"> › Aquatic Resources; › Wildlife and Wildlife Habitat; › Community Health and Well-being; › Local Economy; › Recreation; and › Human Health. 	<ul style="list-style-type: none"> › Noise and vibration have been raised as an issue of concern by local communities, First Nations and regulators. › Project activities could potentially increase baseline sound and vibrations levels in the vicinity of the Project. › Guidelines and best management practices are provided by Health Canada. › Noise and Vibration will address Noise Levels and Vibrations Levels Candidate VCs. › Noise and Vibration will be treated as an IVC in the Application since both have the potential to directly affect valued components such as Aquatic Resources, Wildlife and Wildlife Habitat, Community Health and Wellbeing, Local Economy, Recreation and Human Health. 	<ul style="list-style-type: none"> › Change in ambient sound levels; and › Change in vibration levels.
Terrain	<ul style="list-style-type: none"> › Vegetation; › Sensitive Ecosystems; › Wildlife and Wildlife Habitat; and › Visual Quality. 	<ul style="list-style-type: none"> › The Application will include discussion on the stability of terrain as it affects the Project, in addition to the resulting effects of terrain failure on the receiving environment. › Terrain will address Avalanche Paths and Landforms Candidate VCs. › Terrain represents the changes that are made (effects), but are not a receptor of a Project effect. As such, Terrain will be treated as an IVC in the Application as an input to the subcomponents in the Vegetation, Wildlife and Wildlife Habitat, Visual Quality, and Sensitive Ecosystem RVCs. 	<ul style="list-style-type: none"> › Change in terrain stability; and › Change in landform.
Soil	<ul style="list-style-type: none"> › Vegetation; › Wildlife and Wildlife Habitat; and › Sensitive Ecosystems; and Human Health. 	<ul style="list-style-type: none"> › Soil quality and soil quantity are intrinsic indicators of the physical, chemical, and biological characteristics of soils, which is an important component of terrestrial environment. › Soil quality is regulated provincially and federally. › Soil will address both quality and quantity. › Changes in soil quality and quantity are not representative of the ultimate receptors that are in valued components such as Vegetation, Sensitive Ecosystems, Wildlife and Wildlife Habitat, and Human Health. As such, Soil will be treated as an IVC in the Application. › Soils will be pivotal for closure and reclamation planning. 	<ul style="list-style-type: none"> › Changes in soil quality; and › Changes in soil quantity.
Surficial Geology	<ul style="list-style-type: none"> › Surface Water; and › Groundwater 	<ul style="list-style-type: none"> › Surficial Geology will address the Acid Rock Drainage/Metal Leaching Potential (ARD/ML) Candidate VC. › The ARD/ML Candidate VC is essential to Project design and predicting potential effects on Surface Water and Groundwater IVCs. › Geology represents the changes that are made (effects), but are not a receptor of a Project effect. As such, Geology will be treated as an IVC in the Application. 	<ul style="list-style-type: none"> › Acid Rock Drainage and Metal Leaching Potential.
Surface Water	<ul style="list-style-type: none"> › Aquatic Resources; › Sensitive Ecosystems; › Wildlife and Wildlife Habitat › Surficial Geology; › Vegetation; › Human Health; and › Local Economy. 	<ul style="list-style-type: none"> › Protection of Surface Water has been raised as an issue of concern by all stakeholder categories including First Nations, especially with respect to selenium and cumulative effects within the Elk River Valley. › Surface water quality is regulated provincially and federally through the British Columbia Water Quality Objectives, Canadian Environmental Quality Guidelines developed by the Canadian Council of Ministers of the Environment (CCME) and through a number of acts and regulations. › Surface Water will be assessed within the context and framework provided by the Elk Valley Water Quality Plan (Teck 2014). › Surface Water will address Surface Water Quality, Surface Water Quantity and Sediment Quality Candidate VCs. › Mining activities may result in changes to surface water quantity, quality and sediment quality that have the potential to affect ultimate receptors in valued components such as Aquatic Resources, Sensitive Ecosystems, Wildlife and Wildlife Habitat, Surficial Geology, Vegetation, Local Economy, and Human Health. As such, Surface Water will be treated as an IVC in the Application. 	<ul style="list-style-type: none"> › Changes in surface water quality; › Changes in surface water quantity; and › Changes in sediment quality.
Groundwater	<ul style="list-style-type: none"> › Aquatic Resources; › Surficial Geology; › Human Health; and › Local Economy. 	<ul style="list-style-type: none"> › Protection of Groundwater has been raised as an issue of concern by all stakeholder categories including First Nations, especially with respect to selenium and cumulative effects within the Elk River Valley. › Groundwater quality is regulated provincially and federally British Columbia Water Quality Objective, CCME and through a number of acts and regulations. › Groundwater will address Groundwater Quality and Groundwater Candidate VCs. › Mining activities may result in changes to groundwater quantity and quality that have the potential to affect ultimate receptors in valued components such as Aquatic Resources, Surficial Geology, Community Health and Well-being, Human Health, and Local Economy RVCs. 	<ul style="list-style-type: none"> › Changes in groundwater quality; and › Changes in groundwater quantity.

Table 7: Receptor Valued Components, Subcomponents, Pathway of Effects, Rationale, and Potential Effects

Receptor Valued Components	Subcomponents (Where Significance Will Be Determined)	Pathway of Effect	Rationale	Potential Effects
Pillar – Environment				
GHG	<ul style="list-style-type: none"> GHG 	N/A	<ul style="list-style-type: none"> Climate change has been identified as an issue of concern by local communities, First Nations and regulators. As an ultimate receptor, GHG does not affect other valued component assessment and therefore will be treated as an RVC in the application. 	<ul style="list-style-type: none"> Changes in GHG emissions.
Aquatic Resources	<ul style="list-style-type: none"> Fish species that are linked to commercial, recreational or Aboriginal fisheries: mountain whitefish and longnose sucker; Fish species at risk (federal and provincial): westslope cutthroat trout and bull trout; Fish habitat (spawning, rearing and overwintering); Periphyton (Chlorophyll a); and Benthic invertebrates. 	<ul style="list-style-type: none"> Air Quality; Surface Water; Groundwater; and Noise and Vibration. 	<ul style="list-style-type: none"> Protection of Aquatic Resources has been raised as an issue of concern by all stakeholder categories including First Nations. Recreational, commercial and Aboriginal fisheries have a recognized value in British Columbia. The Fisheries Act regulates activities that may affect fish or fish habitat including introduction of barriers or modification of flows (S.20), permanent alteration or destruction of habitat (S.35), and deposition of deleterious substances (S.36). The Water Regulation (under the Water Sustainability Act) protects water quality and habitat during works that may result in changes in and about a stream. Aquatic Resources will address species protected under the Species at Risk Act (SARA) and Provincially-listed species. Aquatic Resources will use subcomponents: westslope cutthroat trout, bull trout, mountain whitefish, longnose sucker, Fish habitat, periphyton and benthic invertebrates. Project activities may have a direct effect on Aquatic Resources and other receptors that rely on them. As an ultimate receptor, the subcomponents of Aquatic Resources will be treated as RVCs in the Application, with inputs from the Air Quality, Surface Water, Groundwater, and Noise and Vibration IVCs. 	<ul style="list-style-type: none"> Alteration or destruction of fish habitat; Potential effects to fish productivity, distribution and diversity will be assessed at a local, reach and population scale; Fish mortality, sub-lethal effects; and Changes in benthic invertebrates species and populations: <ul style="list-style-type: none"> Changes in the concentration of selenium and other contaminants in tissues of benthic invertebrates
Vegetation	<ul style="list-style-type: none"> Plant species at risk; and Culturally important plants. 	<ul style="list-style-type: none"> Air Quality; Terrain; Soils; and Surface Water. 	<ul style="list-style-type: none"> Protection of Vegetation has been raised as an issue of concern by all stakeholder categories. Vegetation will address species protected under the Species at Risk Act (SARA) and Provincially-listed species. Vegetation VC Discipline will consider individual species at risk. Project activities may have a direct effect on Vegetation and an indirect effect on other receptors that rely on them. As an ultimate receptor, the subcomponents of Vegetation will be treated as RVCs in the Application, with inputs from the Air Quality, Terrain, Soils, and Surface Water IVCs. 	<ul style="list-style-type: none"> Permanent and temporary loss of vegetation; Changes in the concentration of selenium and other contaminants in plant tissues.
Sensitive Ecosystems	<ul style="list-style-type: none"> Old growth forests; Riparian habitat; Rock outcrops; Wetland ecosystems; Ecological communities at risk or of special management concern; and Culturally important ecosystems. 	<ul style="list-style-type: none"> Air Quality; Surface Water; Terrain; and Soils. 	<ul style="list-style-type: none"> Protection of Sensitive Ecosystems has been raised as an issue of concern by all stakeholder categories. Sensitive Ecosystems will address ecosystems protected under the Species at Risk Act (SARA) and Provincially-listed species. The Federal Policy on Wetland Conservation promotes conservation of wetlands and wetland function within areas of federal jurisdiction. Sensitive Ecosystems will address ecosystem-related Candidate VCs. Project activities may have a direct effect on Sensitive Ecosystems and an indirect effect on other receptors that rely on them. As an ultimate receptor, the subcomponents of Sensitive Ecosystems will be treated as RVCs in the Application, with inputs from the Air Quality, Surface Water, Terrain, and Soils IVCs. 	<ul style="list-style-type: none"> Permanent loss or alteration of sensitive ecosystems: <ul style="list-style-type: none"> Changes in wetlands and wetland functions from selenium and other contaminants.
Wildlife and Wildlife Habitat	<ul style="list-style-type: none"> Herptiles: western toad; Birds: American Dipper, aerial insectivores, Bald Eagle, Common Nighthawk, Olive-sided Flycatcher, shrub-nesting birds, waterfowl and waterbirds, woodpeckers; Mammals: American badger, American marten, elk, grizzly bear, little brown myotis, and moose; and Invertebrates: Gillette's checkerspot. 	<ul style="list-style-type: none"> Air Quality; Noise and Vibration; Terrain; Soils; Surface Water; Recreation; and Services and Infrastructure. 	<ul style="list-style-type: none"> Protection of Wildlife and Wildlife Habitat has been raised as an issue of concern by all stakeholder categories, particularly with respect to ungulates and their movements. Wildlife and Wildlife Habitat will address species protected under the Species at Risk Act (SARA) and Provincially-listed species. The Migratory Birds Convention Act and Wildlife Act provide protection to wildlife and specific wildlife habitats. Wildlife and Wildlife Habitat will address Wildlife, Rare Wildlife and Wildlife Habitat Candidate VCs and individual species. Project activities may have a direct effect on Wildlife and Wildlife Habitat and an indirect effect on other receptors that rely on them. As an ultimate receptor, the subcomponents of Wildlife and Wildlife Habitat will be treated as RVCs in the Application, with inputs from the Air Quality, Terrain; Soils, Surface Water, Noise and Vibration, Recreation, and Service and Infrastructure VCs. 	<ul style="list-style-type: none"> Change in habitat for species of interest; Alteration of migratory movements; Change in wildlife mortality risk; and Changes in exposure risks to selenium and other contaminants.

Table 7 (Cont'd): Receptor Valued Components, Subcomponents, Pathway of Effect, Rationale, and Potential Effects

Receptor Valued Components	Subcomponents (Where Significance Will Be Determined)	Pathway of Effect	Rationale	Potential Effects
Pillar - Social				
Recreation	<ul style="list-style-type: none"> › Motorized recreation (ATVing, snowmobiling); › Recreational hunting; › Recreational angling; and › Local recreation sites and navigation. 	<ul style="list-style-type: none"> › Air Quality; › Noise and Vibration; › Wildlife and Wildlife Habitat; › Aquatic Resources; and › Visual Quality. 	<ul style="list-style-type: none"> › Effects on Recreation have been raised as an issue of concern by all stakeholder categories. › BCEAA requires consideration of adverse social effects. › An assessment of the navigability of Blue Lake will take place. › As an ultimate receptor, the subcomponents of Recreation will be treated as RVCs in the Application with inputs from the Air Quality, Noise and Vibration, Wildlife and Wildlife Habitat, Aquatic Resources, and Visual Quality VCs. 	<ul style="list-style-type: none"> › Conflicts with existing recreational land and water uses; › Changes in land and water use capability; and › Changes to recreation use, recreational areas, and/or recreational accessibility.
Services and Infrastructure	<ul style="list-style-type: none"> › Housing; › Health care services; and › Roads. 	N/A	<ul style="list-style-type: none"> › Changes in Services and Infrastructure have been raised as an issue of concern by all stakeholder categories. › BCEAA requires consideration of adverse social effects. › Regional districts, municipal governments, health authorities, and public service providers are interested in the potential pressures major projects may place on their staff and infrastructure. › Data gathered to date indicates that the most important issues are housing, health care and traffic on the forest service road between the proposed Project site and Elkford. › As an ultimate receptor, the subcomponents of Services and Infrastructure will be treated as RVCs in the Application. 	<ul style="list-style-type: none"> › Population pressure on housing stock; and › Strain on government-provided community services and infrastructure, including health care and roads.
Community Health and Well-being	<ul style="list-style-type: none"> › Adequate community services and infrastructure; › Healthy lifestyles; › Healthy living environments; › Social cohesion; and › Sense of self-determination. 	<ul style="list-style-type: none"> › Services & Infrastructure; › Local Economy; › Noise & Vibration; › Visual Quality; › Human Health; › Wildlife and Wildlife Habitat; and › Aquatic Resources. 	<ul style="list-style-type: none"> › Social determinants of health have been raised as issues of concern by all stakeholder categories. › BCEAA requires consideration of adverse social and health effects. › Local, provincial, federal, and Aboriginal governments are interested in potential pressures of major projects on community health and well-being, including issues regarding social cohesion and changes to healthy living environments that may affect mental health. › As an ultimate receptor, the subcomponents of Community Health and Well-being will be treated as RVCs in the Application with inputs from the Services and Infrastructure, Local Economy, Noise and Vibration, Visual Quality, Human Health, Wildlife and Wildlife Habitat, and Aquatic Resources. 	<ul style="list-style-type: none"> › Population and demographic change affecting community social dynamics; › Environmental change affecting perceptions of and actual environmental health, including country food, air quality, and water quality; as well as possible effects on mental health; › Pressure on housing markets leading to financial challenges for low-income households; and › Strain on community services and infrastructure, such as social supports and health care.
Visual Quality		<ul style="list-style-type: none"> › Air Quality. 	<ul style="list-style-type: none"> › Changes in Visual Quality have been raised as an issue of concern. › Project components and activities as well as changes to air quality may have impacts to visual quality. › As an ultimate receptor, Visual Quality will be treated as an RVC in the Application with inputs from the Air Quality IVC. 	<ul style="list-style-type: none"> › Change in visual quality.
Pillar - Economic				
Local Economy	<ul style="list-style-type: none"> › Labour Force Capacity; and › Commercial Land and Water Use. 	<ul style="list-style-type: none"> › Air Quality; › Noise and Vibration; › Wildlife and Wildlife Habitat; › Aquatic Resources; and › Visual Quality. 	<ul style="list-style-type: none"> › Changes in economic conditions have been raised as an issue of concern by all stakeholder categories. › BCEAA requires consideration of adverse economic effects. › As an ultimate receptor, labour force capacity and commercial land and water use will be treated as RVCs in the Application with inputs from Air Quality, Noise and Vibration, Wildlife and Wildlife Habitat, Aquatic Resources, and Visual Quality. 	<ul style="list-style-type: none"> › Pressures on local and regional employers due to change in regional labour demand and employment incomes; › Conflict(s) with existing industrial, commercial land and water uses; › Conflict(s) with existing land use plans; › Permanent and temporary changes in land use capability; and › Changes to other operations in the area (forestry, tourism, oil and gas).

Table 7 (Cont'd): Receptor Valued Components, Subcomponents, Intermediate Valued Components, Rationale, and Potential Effects

Receptor Valued Components	Subcomponents (Where Significance Will Be Determined)	Pathway of Effect	Rationale	Potential Effects
Pillar - Heritage				
Heritage and Archaeological Resources	<ul style="list-style-type: none"> › Heritage sites; and › Archaeological sites. 	› N/A	<ul style="list-style-type: none"> › Changes in Heritage and Archaeological Resources have been raised as an issue of concern, especially by First Nations. › BCEAA requires consideration of adverse heritage effects. › The Heritage Conservation Act protects archaeological sites predating 1846, all sites containing precontact human remains, and all rock art sites, as well as certain post-contact sites with exceptional historical importance. › As an ultimate receptor, the subcomponents of Heritage and Archaeological Resources will be treated as RVCs in the Application. › Standard and accepted management plans will be in place (i.e., chance find management plan) at the mine to mitigate effects where there are incidences of Paleontological resources located during mining. 	<ul style="list-style-type: none"> › Alteration or destruction of heritage sites; and › Alteration or destruction of archaeological sites.
Pillar - Health				
Human Health		<ul style="list-style-type: none"> › Air Quality; › Noise and Vibration; › Soils; › Surface Water; › Groundwater; › Vegetation; › Sensitive Ecosystems; › Wildlife and Wildlife Habitat; and › Aquatic Resources. 	<ul style="list-style-type: none"> › Protection of Human Health has been raised as an issue of concern by all stakeholder categories. › BCEAA requires consideration of adverse health effects. › As an ultimate receptor, Human Health will be treated as an RVC in the Application, with inputs from the Air Quality, Noise and Vibration, Soils, Surface Water, and Groundwater IVCs, as well as Aquatic Resources, Vegetation, Sensitive Ecosystems, Wildlife and Wildlife Habitat, and Aquatic Resources RVCs. 	<ul style="list-style-type: none"> › Changes in human health.

6 Aboriginal Interests

Discussion and assessment of Project effects to Aboriginal Interests will be included in the Aboriginal Consultation section of the Application as specified by the EAO's AIR template.

7 Valued Components Study Boundaries and Data Collection Methods

Study boundaries (temporal and spatial) and technical study methodologies for each RVC and IVC were defined based on knowledge gathered during issues scoping.

7.1 Spatial Boundaries

The spatial boundaries define the scope or geographic areas where the Project is anticipated to interact with the VCs. They can be defined in three ways: the Project footprint, Local Study Area (LSA), and the Regional Study Area (RSA). The Project footprint (or Project boundary) comprises the area that will be directly disturbed by construction and operation activities. The LSA is a larger area than the Project footprint and encompasses the zone of influence of the Project and those areas that may experience direct or indirect impacts from the Project; the LSA is the spatial extent of Project-related effects on a VC. The RSA is typically larger than the LSA and provides regional context for the effects assessment. An RSA is also VC-specific and is usually the same area where cumulative effects on the VC from the Project as well as with past, present, and likely future projects can best be understood and put in perspective.

A preliminary list of past, current, and foreseeable projects applicable to this Project for the purposes of a cumulative effects assessment can be found in Appendix B. The Application will contain a final list of projects considered in the cumulative effects assessment. Centermount acknowledges the Elk Valley Cumulative Effects Management Framework as providing valuable input for the cumulative effects assessment.

The LSAs and RSAs are described in Table 8 for each RVC and IVC with accompanying figures in Appendix C.

Table 8: Proposed Study Areas for the Bingay Environmental Assessment

RVC/IVC	LSA	RSA
Air Quality	The Air Quality LSA will include sensitive receptor sites that may be affected by Project-related activities that change air quality. The Air Quality LSA is a 50 km x 50 km area centered on the Project site (BC ENV ¹⁰ 2015).	The Air Quality RSA is a 70 km by 100 km area. The context for cumulative effects will include additional areas north of the mine site and additional areas south of the mine beyond Sparwood, including the Line Creek, Baldy Ridge, and Crown Mountain Coal Mines.
GHG	The LSA for GHG will adhere to provincial boundaries.	The RSA for GHG will adhere to federal boundaries
Noise and Vibration	The Noise and Vibration LSA includes sensitive receptor sites that may be affected by Project-related activities that change noise and vibration levels. This area represents a 5 km buffer surrounding the Project Site including the 27 km Railway.	The Noise and Vibration RSA is the same as the LSA. The distance of 5 km is greater than the 1.5 km criterion used for consideration of cumulative effects in the BC OGC Guideline, and is considered to be a conservative assumption regarding the potential extent of noise and vibration effects from the Project.

¹⁰ Ministry of Environment & Climate Change Strategy (ENV), formerly known as Ministry of Environment (MoE).

Table 8 (Cont'd): Proposed Study Areas for the Bingay Environmental Assessment

RVC/IVC	LSA	RSA
Terrain; Soils; and Surficial Geology.	The LSA for Terrain, Soils, and Surficial Geology includes disturbance areas (the Project Footprint) where these VCs may be affected by Project-related activities. It also includes tenure areas Bingay Main and Bingay B and a 500 m corridor along the rail line and the new road constructed to bypass the mine area.	A RSA for Terrain, Soils and Surficial Geology is not required as cumulative effects on these VCs resulting from Project-related activities are not anticipated to extend beyond the LSA.
Aquatic Resources; Groundwater; and Surface Water.	The Aquatic LSA includes tributaries to the Elk River watersheds that may be affected by Project-related activities and railway construction that change water quality or directly disturb the watercourses. The Aquatic LSA extends through the tributary watersheds to the Elk River and then down the Elk River to the ER1 node established within the Elk Valley Water Quality Plan (including the groundwater wells south of Elkford). This LSA may be adjusted once modelling information is complete to ensure that effects on these RVC/IVCs are captured.	The Aquatic RSA includes the entire Elk River Watershed (a total area of approximately 437,484 ha including the portion of Lake Koocanusa located within Canada) as issues associated with these VCs are managed on this scale (per Elk Valley Water Quality Plan). This area provides the context for the assessment of cumulative effects.
Vegetation; Sensitive Ecosystems; and Wildlife and Wildlife and Habitat.	The Terrestrial LSA includes areas that may be affected by Project-related activities. The Terrestrial LSA includes the tenure area surrounded with a 1,000 m buffer, and the Project rail corridor surrounded with a 500 m buffer, where effects that are related to this Project will be assessed.	The Terrestrial RSA includes wildlife management unit (WMU) 4-23 (covering approximately 336,671 ha in the Elk Valley watershed). The RSA provides landscape context for the assessment of Project effects, and is the appropriate scale for the assessment of cumulative effects.
Community Health and Well-being; Services and Infrastructure	The Community Health and Well-Being and Services and Infrastructure LSAs include the following communities: District of Sparwood; City of Fernie; District of Elkford; Municipality of Crowsnest Pass (Alberta); Ktunaxa communities; and Regional District of East Kootenay Electoral Area A (to capture other small communities). We expect that the majority of Project-related potential effects on community assets, functionality, and health would occur in these local communities.	The Community Health and Well-Being and Services and Infrastructure RSAs are the same area as the LSA because the majority of interactions between the Project and the effects of other developments are expected to occur in these same communities.

Table 8 (Cont'd): Proposed Study Areas for the Bingay Environmental Assessment

RVC/IVC	LSA	RSA
Recreation	<p>The Recreation LSA is the Project footprint and transportation corridors used by road and rail traffic associated with the Project and adjacent buffers. The Bingay Project will affect land and water at and near the Project site and along the roadway and rail line used by the Project. A buffer around the Project footprint and transportation corridors is included because users may be affected by changes in the visual landscape, noise, dust, and potential impacts related to aquatic resources and wildlife.</p>	<p>The RSA for Recreation covers the following areas: The RSA for non-commercial hunting is Wildlife Management Unit 4-23; the area in which this activity is managed. This RSA is the same as the Terrestrial RSA. The RSA for angling is the Upper Elk River watershed, as target species occupy this watershed and angling is managed for the same geography. The RSA for other forms of recreation is Wildlife Management Units 4-1, 4-2, and 4-23, as such forms of recreation in this region are largely focused in this spatial area, and these forms of recreation generally occur within the watershed captured within this spatial area.</p>
Local Economy	<p>The LSA for the Labour Force Capacity RVC is the same as the LSA for community health and well-being and services and infrastructure. For Commercial Use of Lands and Waters RVC, the LSA is the same as Recreation.</p>	<p>The RSA for the Labour Force Capacity RVC matches the LSA since the majority of interactions between Project direct effects and the effects of other development are expected to occur in these communities. The RSA for the Commercial Use of Lands and Waters RVC covers areas within which commercial uses of lands and waters operate and is consistent with how these uses are managed:</p> <ul style="list-style-type: none"> › Cranbrook Timber Supply Area (forestry) › Elk Valley Bighorn Operators' tenure boundary (guiding/outfitting) › Upper Elk River watershed (guided angling) › Wildlife Management Unit 4-23 (trapping)
Visual Quality	<p>The Visual Quality LSA includes areas within 8 km of the Project footprint to account for foreground and middle-ground viewing distances.</p>	<p>The Visual Quality RSA includes areas within 25 km of the Project footprint to account for foreground, middle-ground, and background viewing distances.</p>
Heritage and Archeological Resources	<p>The Archaeology and Heritage LSA includes areas that may be affected by Project-related activities. The Archaeology and Heritage LSA covers the Project tenure areas Bingay Main and Bingay B and the new rail line and new road construction with a 50 m buffer, since effects on this VC can only arise through direct disturbance.</p>	<p>The Archaeology and Heritage RSA encompasses the middle Spray River drainage, extending north to Henrietta Creek (Fording River).</p>

Table 8 (Cont'd): Proposed Study Areas for the Bingay Environmental Assessment

RVC/IVC	LSA	RSA
Human Health	<p>The LSA for Human Health includes Elkford and will comprise human receptors within the following areas:</p> <ul style="list-style-type: none"> › Aquatic LSA; › Terrestrial LSA; and › Air Quality LSA 	<p>The RSA for Human Health includes Elkford and will comprise human receptors within the following areas:</p> <ul style="list-style-type: none"> › Aquatic LSA; › Terrestrial RSA; and › Air Quality RSA

7.2 Temporal Boundaries

The temporal boundaries for RVCs and IVCs refer to the duration of the Project phases. These will be defined in the Application, and will include the construction, operation, and decommissioning phases of the Project.

Construction is expected to take 1.5 - 2 years. The lifespan of the mine (i.e., operation) is approximately 13 years of coal production using shovel and truck operation open pit mining. The timing and duration of mine closure and mine reclamation activities will be determined in more detail when a reclamation plan is submitted in advance of projected mine closure. Post-closure reclamation activities are anticipated to require 2 - 3 years, with continued ongoing monitoring beyond this time frame to ensure successful reclamation.

7.3 Methods of Data Collection

Table 9 provides a summary of proposed RVC and IVC study methods for the Project. Where traditional ecological knowledge (TEK) and traditional use (TU) studies have been provided that include information relating to particular VCs, that information will be incorporated into the assessment of the relevant VCs. Additional detail on VCs and study and assessment methods will be described in the AIR.

7.4 Assessment Methods

The Application will present an assessment of interactions and potential Project effects on VCs, as well as measures to mitigate these effects. The effects assessment follows these general steps:

1. Identify potential interactions between the Project and Intermediate and Receptor VCs;
2. Describe potential adverse effects and mechanism pathways resulting from these interactions;
3. Develop mitigation for potential adverse effects;
4. Characterize residual effects for IVCs and RVCs using the six criteria defined for the effects assessment: Magnitude, Geographic Extent, Frequency, Duration, Reversibility, and Context;
5. For residual effects to each RVC, assess the likelihood and significance of the residual effect and specify the confidence in the significance determination; and
6. The significance of residual adverse effects is not assessed for IVC's, except where specified in the AIR.

Table 9: Summary of Study Methods for IVCs and RVCs

Valued Components		Indicators / Measurable Parameters (Changes to)	Proposed Methods ¹¹¹²	Technical Report
Pillar - Environment				
IVC	Air Quality	<ul style="list-style-type: none"> Criteria Air Contaminants (total suspended particulate matter (TSP), PM2.5, PM10, SO2, NOX, and CO). 	<ul style="list-style-type: none"> Review of available information and reports. Review of legislation, policies and guidelines. 	<ul style="list-style-type: none"> Incorporated directly into the Application.
RVC	GHG	<ul style="list-style-type: none"> GHG emissions and Project compliance with provincial and federal GHG emission targets (CO2, CH4 and N2O), black carbon; CO2e will be included using the Intergovernmental Panel on Climate Change (IPCC), Fifth Assessment Report (FAR), and Global Warming Potential (GWP) values). 	<ul style="list-style-type: none"> Site-specific meteorology data and baseline data for Criteria Air Contaminants (CACs), and Greenhouse Gases (GHGs will be collected. Emissions assessment and air dispersion modelling to determine changes resulting from Project air emissions sources. In addition to CACs, Total Petroleum hydrocarbons (TPH), volatile organic chemicals (VOCs), polycyclic aromatic hydrocarbons (PAHs), heavy metals, and any chemicals associated with coal extraction and processing as may be applicable will be considered in the Application and incorporated into the Human Health and Ecological Risk Assessments. 	
IVC	Noise and Vibration	<ul style="list-style-type: none"> Equivalent continuous sound levels (dBA, Leq); A-weighted Day-Night levels (dBA, Ldn); and Peak overpressure (in kilopascal [kPa]). 	<ul style="list-style-type: none"> Review of available information and reports. Since the Elk Valley has been heavily monitored, existing baseline data for noise levels will largely be relied on, with site-specific data incorporated to augment the existing data, if required. Determine Permissible Sound Level (PSL) as relying on BC OGC and Health Canada guidelines. Noise Modelling to evaluate the expected impact on the Project during all phases Vibration Modelling to evaluate the expected impact of the Project during construction and operation. 	<ul style="list-style-type: none"> Incorporated directly into the Application.
IVC	Terrain	<ul style="list-style-type: none"> Terrain type, slope and aspect; and Landform type and drainage. 	<ul style="list-style-type: none"> Aerial photograph analysis, terrain characterization and mapping. Terrain stability assessment. 	<ul style="list-style-type: none"> Incorporated directly into the Application.
IVC	Soil	<ul style="list-style-type: none"> Metals and non-metals concentrations; and Soil type and properties by area (measured in square metres). 	<ul style="list-style-type: none"> Review of existing information and government databases. Ground assessment and soil sampling and analysis. Soils classification and soil erosion potential mapping. 	<ul style="list-style-type: none"> Incorporated directly into the Application.
IVC	Surficial Geology	<ul style="list-style-type: none"> Potential acid rock drainage (ARD) (loadings of acidity, sulphate salinity and metals and metalloids); and Total concentrations of metals and metalloids. 	<ul style="list-style-type: none"> Review of all relevant mine planning information and pre existing geochemistry data sets (e.g. total metals and metalloids; Acid-Base Accounting (ABA), shake flask extraction). Selection of samples for additional laboratory test work that will comprise. Review of the geological and spatial representation of available samples. Geochemical analytical results and relevant analogues (where appropriate) will be used to develop load and water quality inputs for exposed rock (pit walls, waste rock, etc.). Semi-quantitative XRD mineralogy analysis. Acid Base Accounting (ABA) analysis. Net Acid Generation (NAG) leachate analysis. Humidity cell test work. Evaluation of the geochemical attributes of waste rock, overburden and coarse rejects as per Mine Environment Neutral Drainage (MEND) guidelines. 	<ul style="list-style-type: none"> Incorporated directly into the Application.
IVC	Surface Water	<ul style="list-style-type: none"> Metals and non-metals concentrations; and Mean annual discharge (MAD) and seasonal hydrograph. 	<ul style="list-style-type: none"> Review of existing information and government databases. Collect water quality samples. Analyze water samples for physical parameters, major anions, nutrients, total and dissolved metals, organics; and PAH. Sediment baseline sampling to describe sediment composition and the presence of nutrients, metals and organics. Site-wide water quality model will characterize predicted water quality from all major Project components (pit walls, waste rock facilities, mill, etc.) and site discharges. Hydrometric monitoring program. Hydrological modelling of abundance and distribution of surface water in Project areas to predict and understand flow regimes. Regional hydrologic analysis, estimation of annual runoff, monthly runoff, peak flows and low flows will be determined along with variability of these parameters. 	<ul style="list-style-type: none"> Surface Water Baseline Report; and Surface Water Modelling Report.

¹¹ Includes identification of measures to avoid or reduce effects.

¹² Review and consideration of TUS/TEK, if available.

Table 9 (Cont'd): Summary of Study Methods for IVCs and RVCs

Valued Components		Indicators / Measurable Parameters (Changes to)	Proposed Methods ^{13,14}	Technical Report
IVC	Groundwater	<ul style="list-style-type: none"> › Metals and non-metals concentrations; and › Groundwater depth meters below ground surface (mbgs) and flow rate (m/s). 	<ul style="list-style-type: none"> › Review of available information and reports. › Baseline hydrogeological assessment to establish existing groundwater conditions. › Collect groundwater quality samples. › Analyze groundwater samples for physical parameters, major anions, nutrients, total and dissolved metals, organics, and PAH. › Groundwater resource assessment. › Develop a conceptual hydrogeological model. › Identify groundwater recharge and discharge areas. 	<ul style="list-style-type: none"> › Groundwater Baseline Report; and › Groundwater Modelling Report.
RVC	Aquatic Resources	<ul style="list-style-type: none"> › Area of habitat affected (measured in square metres); › Habitat availability and distribution; › Abundance and distribution of fish linked to a commercial, recreational or Aboriginal fishery; › Growth, survival, and reproduction of fish linked to a commercial, recreational or Aboriginal fishery; › Changes in periphyton (Chlorophyll a) abundance; › Changes in of benthic invertebrate community and productivity; and › Hazard Quotients to benthic invertebrates and fish. 	<ul style="list-style-type: none"> › Review of existing information and government databases, and range of extent of species (desktop and field knowledge). › Determination of species richness and relative abundance (if possible) for indicator species. › Abundance, distribution and diversity for indicator species. › Quantification of habitat for indicator species. › Ecological Risk to Aquatic Resources (Benthic invertebrates, fish) is through Hazard Quotient of water exposure, including tissue metal concentrations. 	<ul style="list-style-type: none"> › Aquatic Resources Baseline Report.
RVC	Vegetation	<ul style="list-style-type: none"> › Abundance and distribution of individual plants from the species of interest; › Area of vegetation loss associated with Project (measured in hectares); › Abundance and distribution of invasive plant species; › Changes (including destruction and alteration) to critical habitat which may be within the Project area; and › Metal concentrations in tissue. 	<ul style="list-style-type: none"> › Review of existing information and government databases, and range of extent of species (desktop and field knowledge). › Vegetation baseline survey, including identification of potentially rare taxa and noxious weeds, and culturally important plants. › Identification of rare plant occurrences is primarily driven by field surveys conducted by botanists experienced with identification of rare plants in the region, and supplemented by other sources including the BC Conservation Data Centre (CDC) data (see Appendix A). › Define a list of all plants including rare taxa and invasive plants known to be present in the LSA. 	<ul style="list-style-type: none"> › Vegetation Baseline Report.
RVC	Sensitive Ecosystems	<ul style="list-style-type: none"> › Abundance and distribution of sensitive ecosystems; › Area of affected sensitive ecosystem (measured in hectares); › Changes in abundance and distribution of blue- and red-listed wetland ecological communities; and › Changes in wetland function as it relates to migratory birds and species at risk. 	<ul style="list-style-type: none"> › Review of existing information and government databases, and range of extent of ecological communities and ecosystems (desktop and field knowledge). › Quantify and define mapped units from habitat mapping (Terrestrial Ecosystem Mapping [TEM]). › Quantify and define ecosystems and habitats from available mapping and ground truthing. › Delineate and classify wetland ecosystems. 	<ul style="list-style-type: none"> › Sensitive Ecosystem Baseline Report.
RVC	Wildlife and Wildlife Habitat	<ul style="list-style-type: none"> › Area of habitat affected (measured in hectares); › Habitat availability and distribution; › Mortality risk; › Number of barriers to migratory movement; › Species abundance and distribution; › Growth, survival, and reproduction of species of interest; › Changes (including destruction and alteration) to critical habitat which may be within the Project area; and › Hazard Quotient for birds and mammals and food chain exposure. 	<ul style="list-style-type: none"> › Review of existing information and government databases, and range of extent of species (desktop and field knowledge). › Determination of species richness and relative abundance (if possible) for indicator species. › Abundance, distribution and diversity for subcomponents. › Quantification of habitat for subcomponents, where possible, including important habitat features (eg. mineral salt licks). › Assessment of Ecological Risk to wildlife through food chain analysis and Hazard Quotient of air, water and soil exposure. 	<ul style="list-style-type: none"> › Wildlife and Wildlife Habitat Baseline Report.

¹³ Includes identification of measures to avoid or reduce effects.

¹⁴ Review and consideration of TUS/TEK, if available.

Table 9 (Cont'd): Summary of Study Methods for IVCs and RVCs

Valued Components		Indicators / Measurable Parameters (Changes to)	Proposed Methods ¹⁵¹⁶	Technical Report
Pillar - Economic				
RVC	Local Economy	<ul style="list-style-type: none"> › Amount, area, or volume of lands and resources affected (e.g., timber volume); › Indicators used for assessing impacts on air, noise, fish, vegetation, visual quality, wildlife, etc.; and › Wages in competing sectors in the region. 	<ul style="list-style-type: none"> › Economic modelling and techniques. › Population modeling. › Desktop study of relevant information including maps and spatial information on land and water uses, tenure documentation and legal designations, government reports, academic and grey literature, government statistics. › Familiarization trip to Project site and local communities. › Interviews and/or workshops with First Nations, stakeholder representatives including business representatives, and local experts to identify key issues and concerns, to validate and fill in gaps in secondary research, and to gather stakeholder judgments of potential Project impacts. › Modeling and/or quantification of impacts e.g. on timber harvest, tourism demand, etc. › Development of pathways of effects models linking the Project to the RVC. 	<ul style="list-style-type: none"> › Incorporated directly into the Application.
Pillar - Social				
RVC	Recreation	<ul style="list-style-type: none"> › Amount, area, trail length, or volume of lands and recreational resources affected; and › Indicators used for assessing impacts on environmental quality, i.e., air, noise, fish, visual quality, wildlife, etc. 	<ul style="list-style-type: none"> › Desktop study of relevant information including maps and spatial information on land and water uses, and other relevant government, grey, and academic literature including the navigability of Blue Lake. › Familiarization trip to Project site and local resource use and recreational areas. › Interviews and/or workshops with First Nations, stakeholder representatives, and local experts to identify key issues and concerns, to validate and fill in gaps in secondary research, and to gather stakeholder judgments of potential Project impacts. › Development of pathways of effects models linking the Project to the RVC. › Review of analogues to infer impacts in the study area. › GIS analysis. 	<ul style="list-style-type: none"> › Incorporated directly into the Application.
RVC	Services and Infrastructure	<ul style="list-style-type: none"> › Cost of housing; › Health care capacity; › Road traffic volume on forest service road; and › Other indicators of strain on services and infrastructure as needed. 	<ul style="list-style-type: none"> › Desktop study of relevant information including local and regional government reports, government statistics, and academic and grey literature. › Familiarization trip to local communities. › Interviews and/or workshop with First Nations, stakeholder representatives, and local experts (e.g. health care managers, social service providers, police, etc.) to identify key issues and concerns to validate and fill in gaps in secondary research, and to gather stakeholder judgments of potential Project impacts. › Development of pathways of effects models linking the Project to the RVC. › Review of analogues to infer impacts in the study area. › Modeling of past, present, and future population and in-migration. › Review of available traffic data, modeling of future traffic data, and comparison of anticipated traffic with established safety standards. 	<ul style="list-style-type: none"> › Incorporated directly into the Application.
RVC	Community Health and Well-being	<ul style="list-style-type: none"> › Indicators used for other VCs pertaining to economic, environmental, and community conditions; and › Qualitative data on Social cohesion, Healthy lifestyles, Health living environments and Sense of self-determination. 	<ul style="list-style-type: none"> › Development of pathways of effects models linking the Project to the VC. › Familiarization trip to local communities. › Interviews and/or workshops with local experts and service providers focused on community health and well-being in particular, on top of data gathering on constituent social determinants of health. › Review of how shift-structure affects mental health › Desktop study of relevant information including local and regional government reports, government statistics, and academic and grey literature. › Review of analogues to infer impacts in the study area. › Modeling of past, present, and future population and in-migration. › Synthesis of findings of assessments on contributing IVCs and RVCs. 	<ul style="list-style-type: none"> › Incorporated directly into the Application.
RVC	Visual Quality	<ul style="list-style-type: none"> › Number of recreational or cultural viewpoints able to view Project Footprint; › Number of viewers at viewpoints; and › Qualitative data on air quality parameters 	<ul style="list-style-type: none"> › Desktop study of relevant information and government documents and databases to determine management objectives for visual quality for the Project area, if any, and to identify candidate viewpoints. › Interviews and/or workshops with First Nations, regulators, stakeholder representatives, and local experts to identify key issues and concerns, including validation of candidate viewpoints and viewpoint use. › Review of potential changes to visually sensitivity areas of the Project (Project footprint and access road/rail) relative to viewpoints from commercial and non-commercial activities and uses in the area. 	<ul style="list-style-type: none"> › Incorporated directly into the Application.

¹⁵ Includes identification of measures to avoid or reduce effects.

¹⁶ Review and consideration of TUS/TEK, if available.

Table 9 (Cont'd): Summary of Study Methods for IVCs and RVCs

Valued Components		Indicators / Measurable Parameters (Changes to)	Proposed Methods ^{17,18}	Technical Report
Pillar - Heritage				
RVC	Heritage and Archaeological Resources	<ul style="list-style-type: none"> › Number of affected sites; › Location of known and unknown archaeological sites; › Site type and condition; › Changes to accessibility to archaeological sites, features and artifacts; and › Measurable disturbance or loss of archaeological sites, features and artifacts. 	<ul style="list-style-type: none"> › Map of archaeological and heritage resources. › Archaeological overview assessment to determine archaeological potential within the LSA. › Where available, review of site forms to determine site type and condition. › In-field studies based on results of the AOA to determine potential impacts to archaeological sites and materials. › Project footprint map. › Stakeholder and expert input into relative importance of affected resources. 	<ul style="list-style-type: none"> › Archeological Impact Assessment.
Pillar - Health				
RVC	Human Health	<ul style="list-style-type: none"> › Hazard quotient; › Incremental Lifetime Cancer Risk; and › Qualitative literature assessment for particulate matter. 	<ul style="list-style-type: none"> › Review of available information and reports. › Follow guidance published by federal agencies, and Health Canada's guidance on human health risk assessment. › Human Health Risk Assessment (HHRA) carried out to evaluate adverse health effects associated with air emissions from the Project. › Review and incorporation of Traditional ecological knowledge (TEK) and Traditional Use (TU) studies. › HHRA will rely on findings from Air Quality, Water, Soil and Country (or Traditional) Foods Studies. › Assessment of country foods of importance to First Nations communities in the area. › Risk analyses as needed. 	<ul style="list-style-type: none"> › Incorporated directly into the Application.

¹⁷ Includes identification of measures to avoid or reduce effects.

¹⁸ Review and consideration of TUS/TEK, if available.

8 Conclusion

This VC Selection Document describes the approach to the selection of VCs for the environmental assessment of the proposed Project. This document also provides the rationale for VC selection, high level study methods, and local and regional study area boundaries. The VCs selected for environmental assessment will be carried forward in the AIR and confirmed in the Application. Any changes to the selected VCs that occur during the assessment process will be documented and justified in the Application.

9 References

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Appendix A

Preliminary Listed Plant Species with Potential to Occur in the Study Area

Red and Blue-listed Plant Species with Potential to Occur in the Study Area¹⁹

Scientific Name	Scientific Name Synonyms	English Name
<i>Androsace chamaejasme</i> ssp. <i>lehmanniana</i>	<i>Androsace chamaejasme</i>	sweet-flowered fairy- candelabra
<i>Anemone canadensis</i>		Canada anemone
<i>Arenaria longipedunculata</i>		low sandwort
<i>Astragalus crassicaarpus</i>		ground plum
<i>Astragalus drummondii</i>		Drummond's milk-vetch
<i>Astragalus vexilliflexus</i> var. <i>vexilliflexus</i>		bent-flowered milk- vetch
<i>Atrichum tenellum</i>		
<i>Botrychium ascendens</i>		upswept moonwort
<i>Botrychium crenulatum</i>		dainty moonwort
<i>Botrychium simplex</i> var. <i>compositum</i>		least moonwort
<i>Botrychium spathulatum</i>		spoon-shaped moonwort
<i>Brickellia grandiflora</i>		large-flowered brickellia
<i>Bryobrittonia longipes</i>		
<i>Bryum uliginosum</i>		
<i>Castilleja cusickii</i>		Cusick's paintbrush
<i>Castilleja gracillima</i>		slender paintbrush
<i>Cirsium scariosum</i> var. <i>scariosum</i>	<i>Cirsium scariosum</i>	elk thistle
<i>Delphinium bicolor</i> ssp. <i>bicolor</i>	<i>Delphinium bicolor</i>	Montana larkspur
<i>Didymodon subandreaeoides</i>		
Scientific Name	Scientific Name Synonyms	English Name
<i>Eleocharis elliptica</i>	<i>Eleocharis tenuis</i>	elliptic spike-rush
<i>Eleocharis rostellata</i>		beaked spike-rush
<i>Encalypta spathulata</i>		
<i>Epilobium saximontanum</i>		Rocky Mountain willowherb
<i>Eriogonum androsaceum</i>		androsace buckwheat
<i>Erythranthe breviflora</i>	<i>Mimulus breviflorus</i>	short-flowered monkey- flower
<i>Gaura coccinea</i>		scarlet gaura
<i>Gayophytum humile</i>		dwarf groundsmoke
<i>Gentiana calycosa</i>		mountain bog gentian
<i>Grappheporum wolfii</i>		Wolf's trisetum
<i>Hygrohypnum alpinum</i>		
<i>Hypericum scouleri</i> ssp. <i>nortoniae</i>		western St. John's-wort
<i>Isoetes howellii</i>		Howell's quillwort
<i>Lupinus bingenensis</i> var. <i>subsaccatus</i>		Suksdorf's lupine
<i>Lupinus sulphureus</i>		sulphur lupine

¹⁹ This list was developed through BC MOE (2017) and Government of Canada (2017).

Red and Blue-listed Plant Species with Potential to Occur in the Study Area (Cont'd)

<i>Mnium arizonicum</i>		
<i>Orthotrichum pallens</i>		
<i>Packera contermina</i>	<i>Senecio conterminus</i>	high alpine butterweed
<i>Papaver pygmaeum</i>	<i>Papaver alpinum</i>	dwarf poppy
<i>Pellaea gastonyi</i>	<i>Pellaea atropurpurea</i>	Gastony's cliff-brake
<i>Penstemon nitidus</i> var. <i>nitidus</i>	<i>Penstemon nitidus</i>	shining penstemon
<i>Phacelia lyallii</i>		Lyall's phacelia
<i>Physaria didymocarpa</i> ssp. <i>didymocarpa</i>		common twinpod
<i>Physcomitrium pyriforme</i>		
<i>Pinus albicaulis</i>		whitebark pine
<i>Pinus flexilis</i>		limber pine
<i>Plagiobothrys hispidulus</i>		harsh popcornflower
<i>Plantago canescens</i>		arctic plantain
<i>Plantago eriopoda</i>		alkali plantain
<i>Pohlia longicollis</i>	<i>Pohlia longicolla</i>	
<i>Polygonum austinae</i>	<i>Polygonum douglasii</i> ssp. <i>austinae</i>	Austin's knotweed
<i>Polygonum engelmannii</i>	<i>Polygonum douglasii</i> ssp. <i>engelmannii</i>	Engelmann's knotweed
<i>Potentilla glaucophylla</i> var. <i>perdissecta</i>	<i>Potentilla diversifolia</i> var. <i>perdissecta</i>	diverse-leaved cinquefoil
<i>Potentilla ovina</i> var. <i>ovina</i>	<i>Potentilla ovina</i>	sheep cinquefoil
<i>Prenanthes sagittata</i>		arrow-leaved rattlesnake-root
<i>Racomitrium pygmaeum</i>		
<i>Salix boothii</i>		Booth's willow
<i>Schistidium robustum</i>		
<i>Selaginella standleyi</i>		Standley's selaginella
<i>Senecio hydrophiloides</i>		sweet-marsh butterweed
<i>Senecio megacephalus</i>		large-headed groundsel
Scientific Name	Scientific Name Synonyms	English Name
<i>Silene drummondii</i> var. <i>drummondii</i>		Drummond's campion
<i>Sphaeralcea coccinea</i>		scarlet globe-mallow
<i>Stellaria obtusa</i>		blunt-sepaed starwort
<i>Stuckenia vaginata</i>	<i>Potamogeton vaginatus</i>	sheathing pondweed
<i>Synthyris wyomingensis</i>	<i>Besseyia wyomingensis</i>	Wyoming kitten-tails
<i>Thalictrum dasycarpum</i>		purple meadowrue



Appendix B

Preliminary List of Past, Present, and Foreseeable Future
Projects

Bingay Coal – Preliminary List of Past, Present and Foreseeable Future Projects

Proponent	Project Type	Project	Project Description	Location	Status
Silenus Resource Management (formerly Storm Cat Energy)	Natural Resource Exploration (Energy)	Coalbed Gas	Existing wells are located in FRO Swift Project Area.	Elk Valley, BC	Ongoing
Resorts of the Canadian Rockies	Recreation	Fernie Alpine Resort	Long-term program for construction of ski resort facilities. The resort centre, express quad lift, and a number of facilities and accommodations are completed. Residential phase is the Timber Landing subdivision. The sewage treatment plant has been rebuilt. Bear Paw Lodge, Snow Creek cabins and Polar Peak Lodges are complete. New development will occur after infrastructure planning is completed. Estimated capital cost of \$250 million is over ten years.	Fernie, BC	Ongoing
Private Forestry Companies (Canfor)	Natural Resource Development (Forestry)	Forest Management in Elk Valley	Activities directly overlapping the land use and tenure/terrestrial local study area.	Elk Valley, BC	Ongoing
Apache Corporation	Natural Resource Exploration (Coalbed Gas)	Mist Mountain Coalbed Gas Project	The Mist Mountain Coalbed Gas Project is a proposal by Apache Canada to assess whether natural gas in British Columbia's Crowsnest Coalfield can be produced.	Crowsnest Coalfield, southeast BC	Future
BC Hydro	Power	Winsor Substation Upgrade	Increase the firm capacity at Winsor (WIN) Substation to allow the station to meet expected load forecasts for the next 10 years, rebuild the station to current Engineering Standards, replace station switchyard equipment and wood pole supporting structures which are at end of life or in deteriorated conditions and provide a facility to utilize a mobile transformer in the event of an emergency.	Elko, BC	Ongoing

Bingay Coal – Preliminary List of Past, Present and Foreseeable Future Projects (Cont'd)

Proponent	Project Type	Project	Project Description	Location	Status
Mistral Power Inc. and AltaGas Ltd.	Power	Crowsnest Pass Power Project	6 MW power plant using exhaust of gas turbines to create electricity which is sold to grid (\$13 million in capital costs).	Sparwood, BC	Ongoing
Numerous	Numerous	Numerous	Other infrastructure maintenance and upgrades associated with the existing Fortis BC and other communication service providers networks.	Elk Valley, BC	Ongoing
Teck Coal Limited	Natural Resource Development (Coal mine)	Fording River Operations (Existing and Approved Operations)	The Fording River operation is located 29 kilometers northeast of the community of Elkford, in southeastern BC. The mine produces steelmaking coal. The current annual production capacity of the mine and preparation plant is approximately 8.5 and 9.5 million tonnes of clean coal, respectively. Existing permitted mining areas at FRO could sustain operations until approximately 2017. This includes completion of Turnbull South Pit and Eagle 6 Pushback Bridging Project (through 2017).	Elk Valley, BC	Ongoing
Teck Coal Limited	Natural Resource Development (Coal mine)	Greenhills Operations (Existing and Approved Operations)	The Greenhills operation is located eight kilometers northeast of the community of Elkford, in southeastern BC. Greenhills is operated under a joint venture agreement among Teck, POSCO Canada Limited ("POSCAN") and POSCAN's parent, POSCO, a Korean steel producer.	Elk Valley, BC	Ongoing

Bingay Coal – Preliminary List of Past, Present and Foreseeable Future Projects (Cont'd)

Proponent	Project Type	Project	Project Description	Location	Status
Teck Coal Limited	Natural Resource Development (Coal mine)	Line Creek Operations (Existing and Approved Operations)	The Line Creek mine is located approximately 25 kilometers north of Sparwood in southeastern BC. Line Creek supplies steelmaking and thermal coal to a variety of international and domestic customers. The current annual production capacities of the mine and preparation plant are 3.5 and 3.5 million tonnes of clean coal, respectively. Existing permitted mining areas at LCO could sustain operations until 2034.	Elk Valley, BC	Ongoing
Teck Coal Limited	Natural Resource Development (Coal mine)	Elkview Operations (Existing and Approved Operations)	The Elkview operation is located approximately 3 km east of Sparwood in southeastern BC. Teck has a 95% partnership interest in Elkview. The remaining 5% is indirectly held equally by Nippon Steel & Sumitomo Metal Corporation, a Japanese steel producer, and POSCO, each of which acquired a 2.5% interest in 2005. Coal produced at Elkview is used to make steel. The current annual production capacities of the mine and preparation plant (on a 100% basis) are approximately 7.0 million and 7.0 million tonnes of clean coal, respectively. Existing permitted mining areas at EVO could sustain operations until approximately 2024.	Elk Valley, BC	Ongoing
Teck Coal Limited	Natural Resource Development (Coal mine)	Coal Mountain Operations (Existing and Approved Operations)	The Coal Mountain operation is located 30 kilometers southeast of Sparwood in southeastern BC. Coal mined at Coal Mountain is used to make steel. The current annual production capacities of the mine and preparation plant are approximately 2.7 and 3.5 million tonnes of clean coal, respectively. Existing permitted mining areas at CMO could sustain operations until 2017, with production beginning to decline in 2016 (based on current projected production rates).	Elk Valley, BC	Ongoing

Bingay Coal – Preliminary List of Past, Present and Foreseeable Future Projects (Cont'd)

Proponent	Project Type	Project	Project Description	Location	Status
Teck Resources Limited	Water treatment	West Line Creek Water Treatment Facility Phase I	Phase I of the West Line Creek water treatment facility was commissioned in 2015 and treats water from Line Creek and West Line Creek at a rate of 7,500 m ³ /d.	Elk Valley, BC	Ongoing
Canfor Corporation	Forestry	Forest Management in Elk Valley	Activities directly overlapping the land use and tenure / terrestrial local study area.	Elk Valley, BC	Future
Jemi Fibre Corp.	Forestry	Forest Management in Elk Valley	Private timberlands development in East Kootenays of BC.	Elk Valley, BC	Future
Parastone Developments	Residential	Montane Fernie	Planned and developed in 2014, Montane, offers a selection of residences to complete any lifestyle ranging from upscale cabin designs to elegant homes. Streets and greenways are oriented to the stunning views across Elk River to Cedar Valley, the Lizard Creek Valley and the Lizard Range, Fernie Mountain and the iconic peaks of the Three Sisters. The first phase of a \$200-million master-planned residential community of Montane. The 267-hectare site, in an area that has become popular over the years with Alberta investors and those seeking recreational property or second homes, will eventually comprise about 140 single-family homes which will include cottages, townhomes and estate properties.	Fernie, BC	Future
City of Fernie	Water wells	James White Park Well Project	Drilling a well or wells in James White Park in order to extract water from the underlying aquifer to supply domestic water to the City of Fernie.	Fernie, BC	Future

Bingay Coal – Preliminary List of Past, Present and Foreseeable Future Projects (Cont'd)

Proponent	Project Type	Project	Project Description	Location	Status
NWP Coal Canada Ltd.(subsidiary of Jameson Resources Limited)	Natural Resource Exploration (Coal)	Crown Mountain Coal Project	NWP Coal Canada Limited is proposing to construct a new open pit metallurgical coal mine with an estimated production capacity of 3.7 million tonnes/year of clean coal. A preliminary estimate of surface disturbance associated with the Project is up to 1,100 ha. The proposed project would have a mine life of approximately 16 years. Exploration and feasibility assessment is underway and the project has received a Section 10 and Section 11 Order issued by the BC EAO Oct. 30, 2014, and May 27, 2015, respectively. The site is approximately 8 km northeast of Teck's Elkview Operations, and 12 km south of Teck's Line Creek Operations.	Elk Valley, BC	Future
Riversdale Resources	Natural Resource Exploration (Coal)	Grassy Mountain Coal Project	Benga Mining Limited (Benga), a wholly owned subsidiary of Riversdale Resources Limited (Riversdale), is proposing to develop the Grassy Mountain Coal Project (the Project). The Project will be located in south-west Alberta near the Crowsnest Pass, approximately 7 km north of the community of Blairmore, in the Municipalities of Ranchland and Crowsnest Pass, Ranges 3 and 4, Townships 8 and 9, West of the 5th Meridian. The project will involve a surface coal mine, a coal preparation plant and associated infrastructure including a coal conveyor system and a rail load-out facility. The total project area will be approximately 4,500 hectares and the mine production will average 2.0 to 4.0 million tonnes of metallurgical coal per year. Proposed Terms of Reference were published in December 2014, available for public comment until Jan. 23, 2015 and the final Terms of Reference issued March 19, 2015.	Crowsnest Pass, AB	Future

Bingay Coal – Preliminary List of Past, Present and Foreseeable Future Projects (Cont'd)

Proponent	Project Type	Project	Project Description	Location	Status
Altitude Resources Inc.	Natural Resource Exploration (Coal)	Unnamed	Altitude Resources Inc. has signed an exploration and option agreement with Elan Coal Ltd. (Elan), a privately owned Canadian coal exploration and development company. The agreement gives Altitude the option to acquire up to a 51% interest in Elan's 22,000 ha of coal leases near Crowsnest Pass, as well as the right to conduct exploration activities on the leases. Elan's leases are adjacent to the Riversdale Resources property.	Crowsnest Pass, AB	Future
Teck Coal Limited	Natural Resource Development (Coal)	FRO - Swift Project	The Swift Project is an extension of current operations at FRO. The Swift Project is estimated to provide an aggregate total of approximately 170 million metric tonnes of clean coal and will be a critical part of Teck Coal Limited's product blends for the next 25 years. The proposed development will generate approximately 1,500 Mbcm of waste rock. Waste rock will be placed around the pit excavations and a considerable portion of the waste material (approximately 25 percent) will be used to backfill the new excavations using a phased development approach. An EAC was received for this Project on September 10, 2015. For the purposes of the BRE Project, the Swift Project was considered reasonably foreseeable at the time of conducting the assessment.	Elkford, BC	Future
Teck Coal Limited	Natural Resource Development (Coal)	FRO - Castle Mountain	Extension of FRO in the Kilmarnock Creek watershed with generation of 2,642 Mbcm of waste rock according to the 2011 LOM Plan. The 2013 LOM Plan has this project expected to start in 2025. The project is expected to be similar to that described in the 2011 LOM Plan.	Fording River Operations	Future

Bingay Coal – Preliminary List of Past, Present and Foreseeable Future Projects (Cont'd)

Proponent	Project Type	Project	Project Description	Location	Status
Teck Coal Limited	Natural Resource Development (Coal)	FRO - Eagle 6 Pit Pushback	Previously Teck received a bridging permit to allow for development of the Eagle 6 Pushback at FRO. Teck has also applied for development of the Eagle 6 Pit Pushback through to 2023. The project would generate about 1,600 Mbcm of waste rock.	Fording River Operations	Future
Teck Coal Limited	Natural Resource Development (Coal)	GHO - Greenhills Ridge Phase 2	Greenhills Ridge Phase 2, which will build on the Cougar Pit Extension Project with generation of 573 Mbcm waste rock (2014 LOM Plan); expected to start in 2022.	Greenhills Operations	Future
Teck Coal Limited	Natural Resource Development (Coal)	GHO - Cougar Pit Extension	The proposed CPX Project involves a pushback of the existing Phase 6 mine pit (Phase 6X), development of the new Phase 7 pit, further expansion of the West Spoil, and a new access road for spoil placement. Development of the CPX Project would extend the mine life by 6 years to 2029 with generation of approximately 407 Mbcm of waste rock. The CPX Project would be integrated with current mining of Phases 4, 5 and 6, and is expected to start in 2016.	Greenhills Operations	Future
Teck Coal Limited	Natural Resource Development (Coal)	CMO - Coal Mountain Phase 2	Extension of CMO mainly within the Wheeler Creek watershed, with small disturbances proposed in the Carbon and Snowslide Creek watersheds, with generation of 603 Mbcm of waste rock, according to the Project Description recently submitted to EAO. While originally expected to start in 2017, the project was put on hold on November 17, 2015. For the purposes of this EAC Application, the Coal Mountain Phase 2 Project has been included in the RFD Case as it was described prior to the Project being put on hold.	Coal Mountain Operations	Future

Bingay Coal – Preliminary List of Past, Present and Foreseeable Future Projects (Cont'd)

Proponent	Project Type	Project	Project Description	Location	Status
Teck Resources Ltd.	Water management	Elk Valley Water Management Plan - Treatment facilities	The Elk Valley Water Quality Management Plan (EVWQP) lays out a comprehensive strategy to address increasing selenium and nitrate water concentrations within the Elk Valley, and assess and monitor levels of cadmium and sulphate in waters; while at the same time allowing for continued sustainable mining. It also lays out a strategy to address calcite formation associated with historical and current mining activity.	Sparwood, BC	Future
Teck Resources Ltd.	Natural Resource Development (Coal)	Elkview Operations - Baldy Ridge Extension	Teck Coal Limited (Proponent) proposes to extend Elkview Operations through the Baldy Ridge Extension Project. The proposed Project would increase the disturbance area by 862 ha and would have a production capacity of 6.8 million tonnes/year of clean coal. The proposed Project is located 2.5 km east of Sparwood in south-east BC.	Sparwood, BC	Future
CanAus Coal Ltd.	Natural Resource Development (Coal)	Michel Creek Coking Coal Project	CanAus is proposing the development of the Michel Creek Coking Coal Project, which includes only the Loop Ridge deposit at this time. The proposed Project, which is located on privately owned fee simple lands approximately 15 km southeast of Sparwood, includes: An annual production of 3.5 million tonnes raw coal (2.1 million tonnes clean coal); A Loop Ridge mine life of 10 years with the potential to extend the Project life by approximately 10 years assuming positive resource exploration at the other deposits; and An initial estimate of project disturbance footprint over the 10-year life-of-mine of approximately 1,000 ha. CanAus Coal Limited is a Canadian resource company based in Sparwood, BC, and is a wholly owned subsidiary of CoalMont Pty Ltd (CoalMont), a private Australian resource development company.	Sparwood, BC	Future



Appendix C

Local and Regional Study Areas

Figure A-1: Air Quality and GHG LSA and RSA

Figure A-2: Noise and Vibration LSA

Figure A-3: Terrain, Soils, and Surficial Geology LSA

Figure A-4: Aquatic LSA

Figure A-5: Aquatic RSA

Figure A-6: Terrestrial LSA and RSA

Figure A-7: Community Health and Well - Being and Services and Infrastructure LSA and RSA

Figure A-8: Recreation LSA

Figure A-9: Recreation RSA

Figure A-10: Labour Force Capacity LSA and RSA

Figure A-11: Commercial Land and Water use LSA

Figure A-12: Commercial Land and Water use RSA

Figure A-13: Visual Quality LSA and RSA

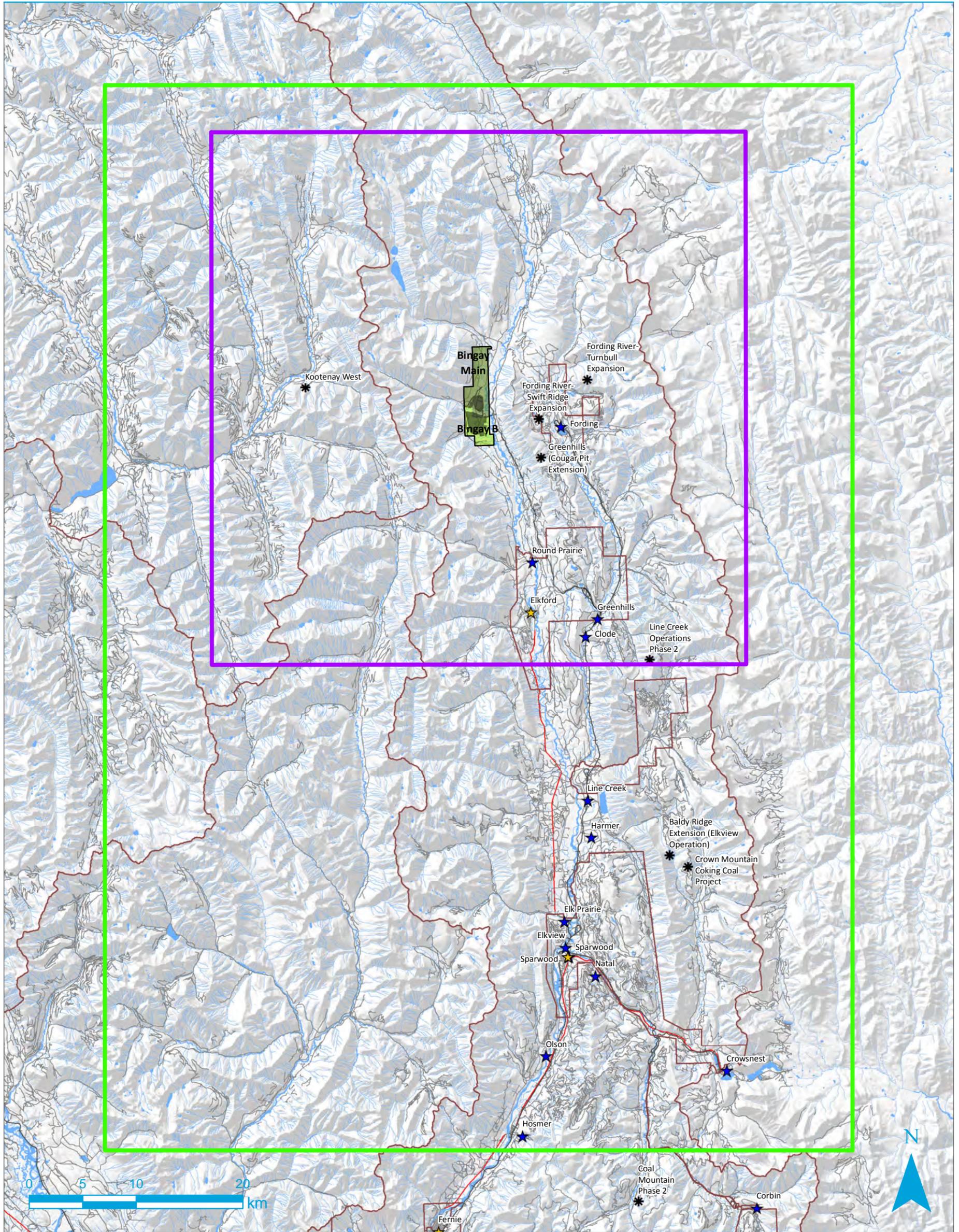
Figure A-14: Archaeological and Heritage LSA

Figure A-15: Archaeological and Heritage RSA

Figure A-16: Human Health LSA

Figure A-17: Human Health RSA

Air Quality Local and Regional Study Area

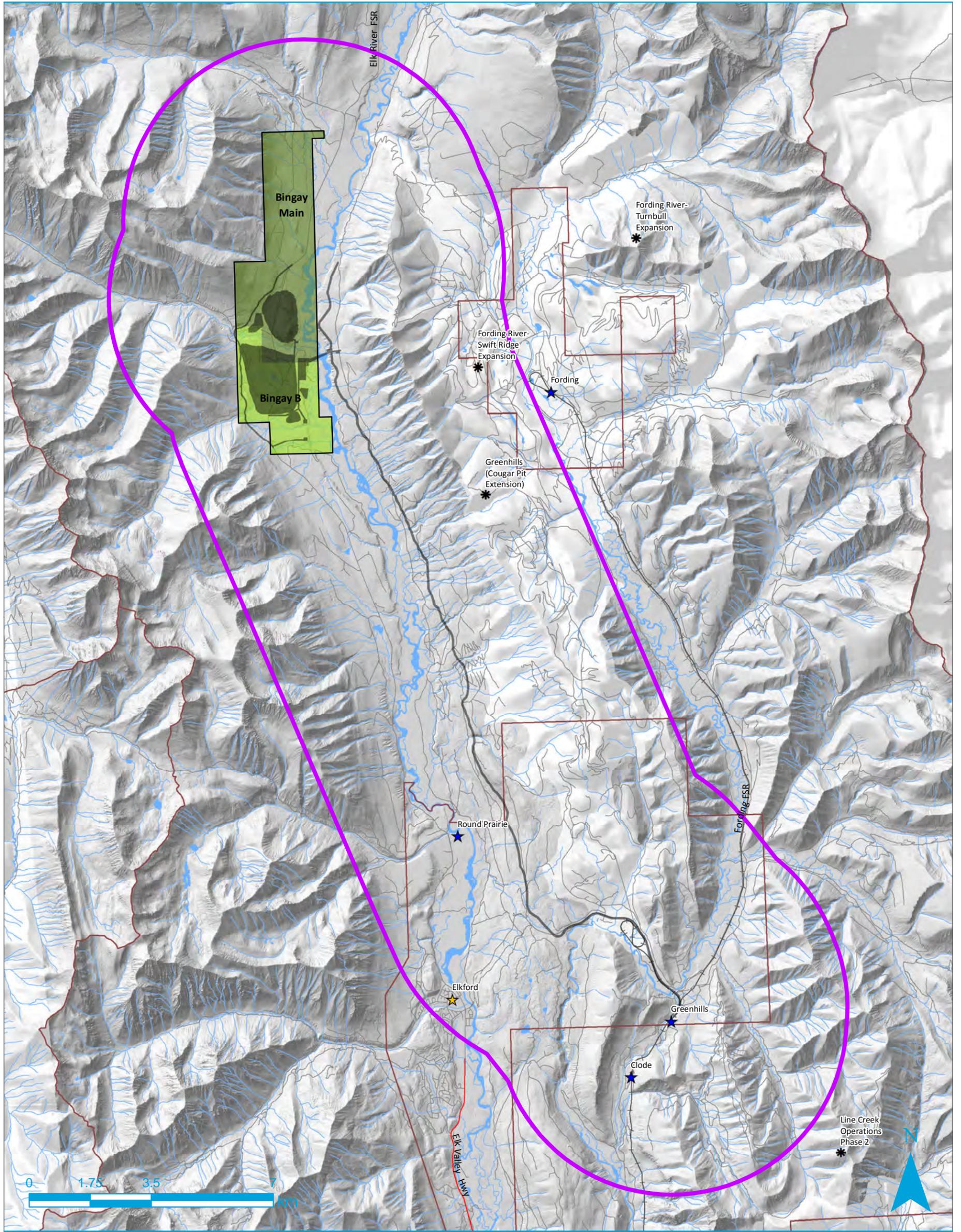


Legend

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|---------------------------|-------------------------|------------------|-------------------------|
| Local Study Area | Major Project Locations | Streams | Bingay Main |
| Regional Study Area | Railway | Lakes/Rivers | Administrative Boundary |
| Incorporated Town | Highway | Bingay Mine Site | Project Footprint |
| Unincorporated Rural Area | Road | Bingay B | |



Noise and Vibration Local Study Area

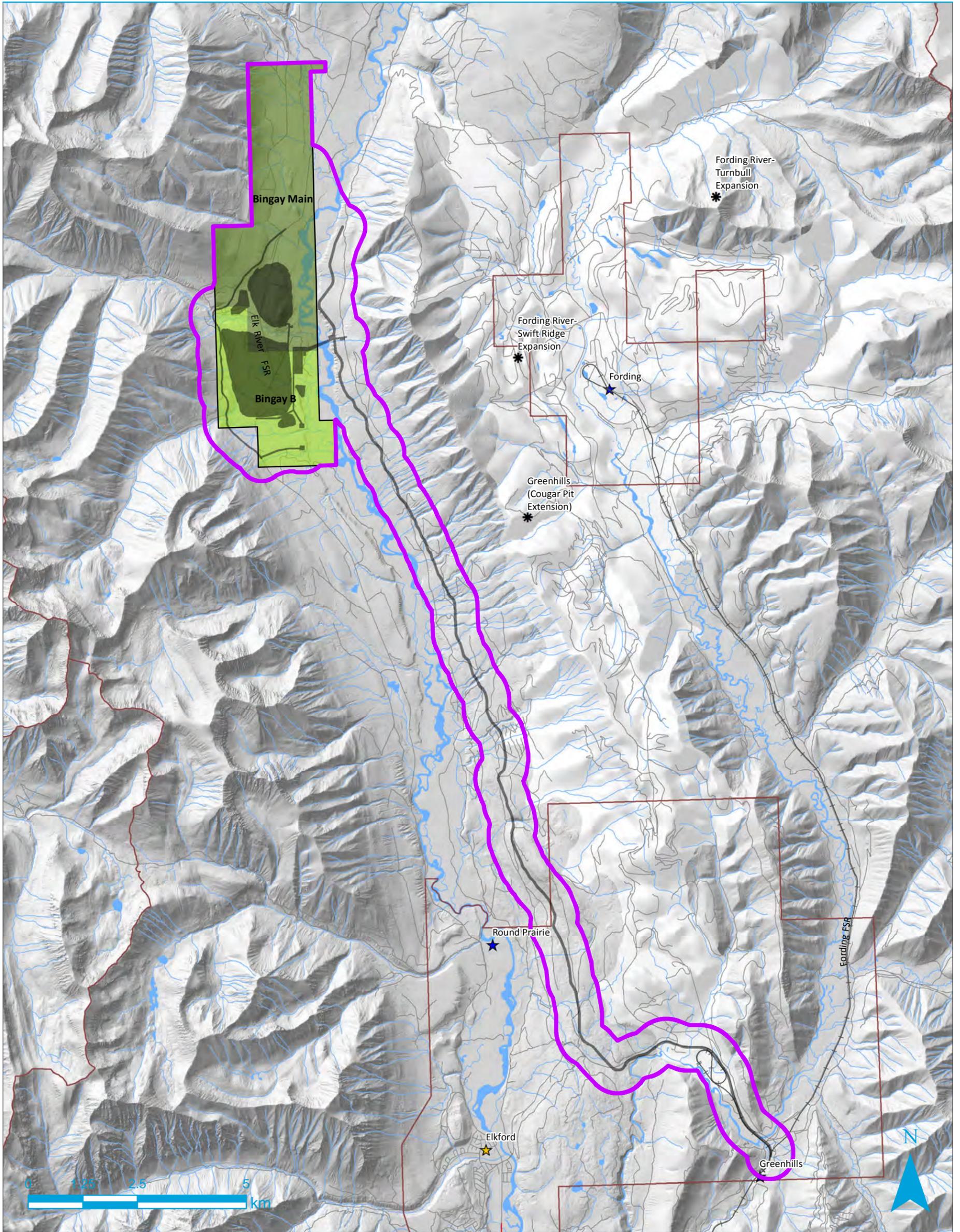


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|---------------------------|---------|------------------|-------------------------|
| Local Study Area | Railway | Lake/River | Administrative Boundary |
| Incorporated Town | Highway | Bingay Mine Site | Project Footprint |
| Unincorporated Rural Area | Road | Bingay B | |
| Major Project Locations | Streams | Bingay Main | |



Terrain, Soils and Surficial Geology Local Study Area

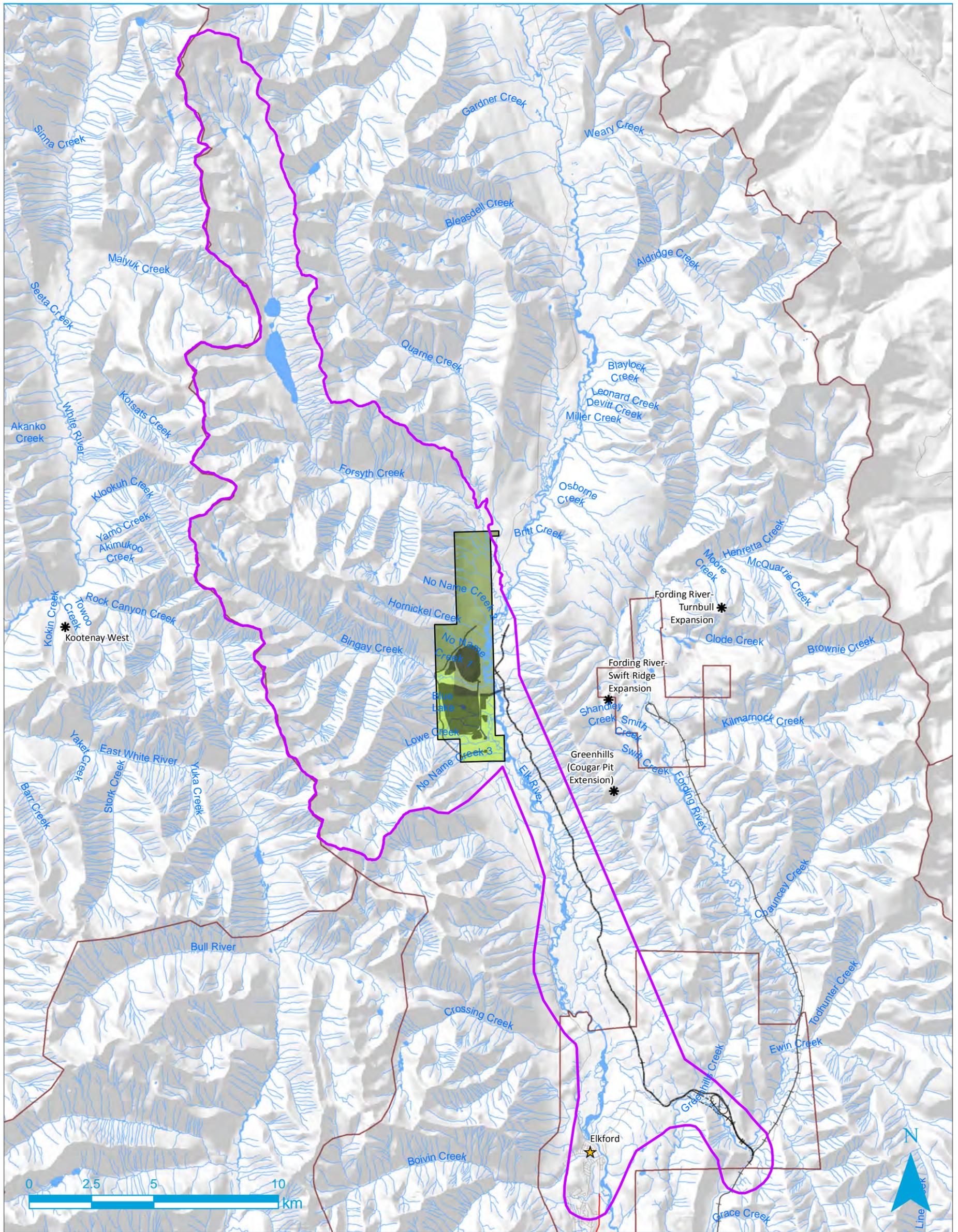


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Local Study Area	Railway	Lake/River	Administrative Boundary
Incorporated Town	Highway	Bingay Mine Site	Project Footprint
Unincorporated Rural Area	Road	Bingay B	
Major Project Locations	Streams	Bingay Main	



Aquatic Local Study Area

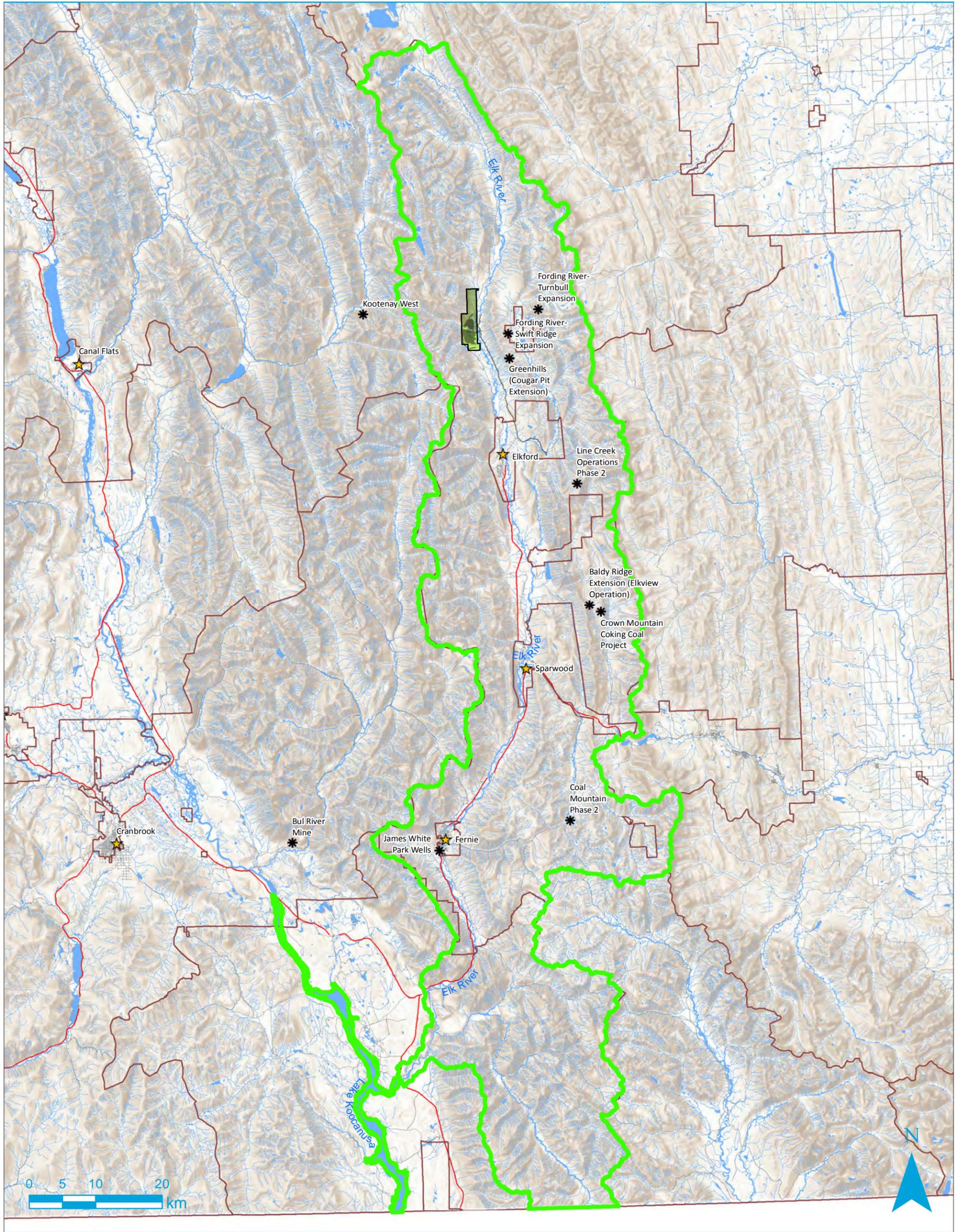


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|-------------------------|------------------|------------------|-------------------------|
| Local Study Area | Highway | Lake/River | Administrative Boundary |
| Incorporated Town | Road | Bingay Mine Site | Project Footprint |
| Major Project Locations | Proposed Railway | Bingay B | |
| Railway | Streams | Bingay Main | |



Aquatic Regional Study Area

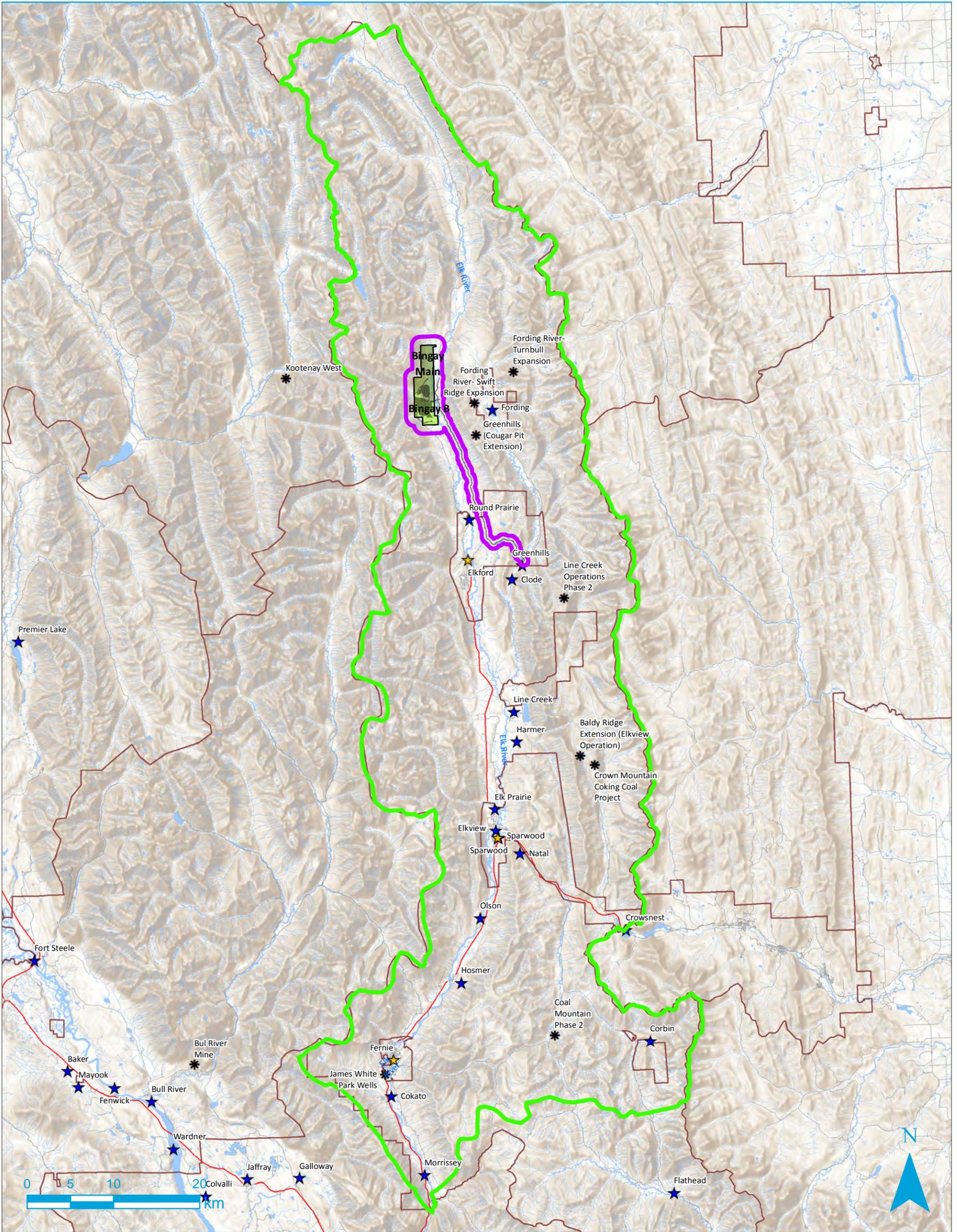


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|--|--|---|
|  Regional Study Area |  Road |  Bingay B |
|  Incorporated Town |  Streams |  Bingay Main |
|  Major Project Locations |  Lake/River |  Administrative Boundary |
|  Highway |  Bingay Mine Site |  Project Footprint |



Terrestrial Local Study Area and Regional Study Area

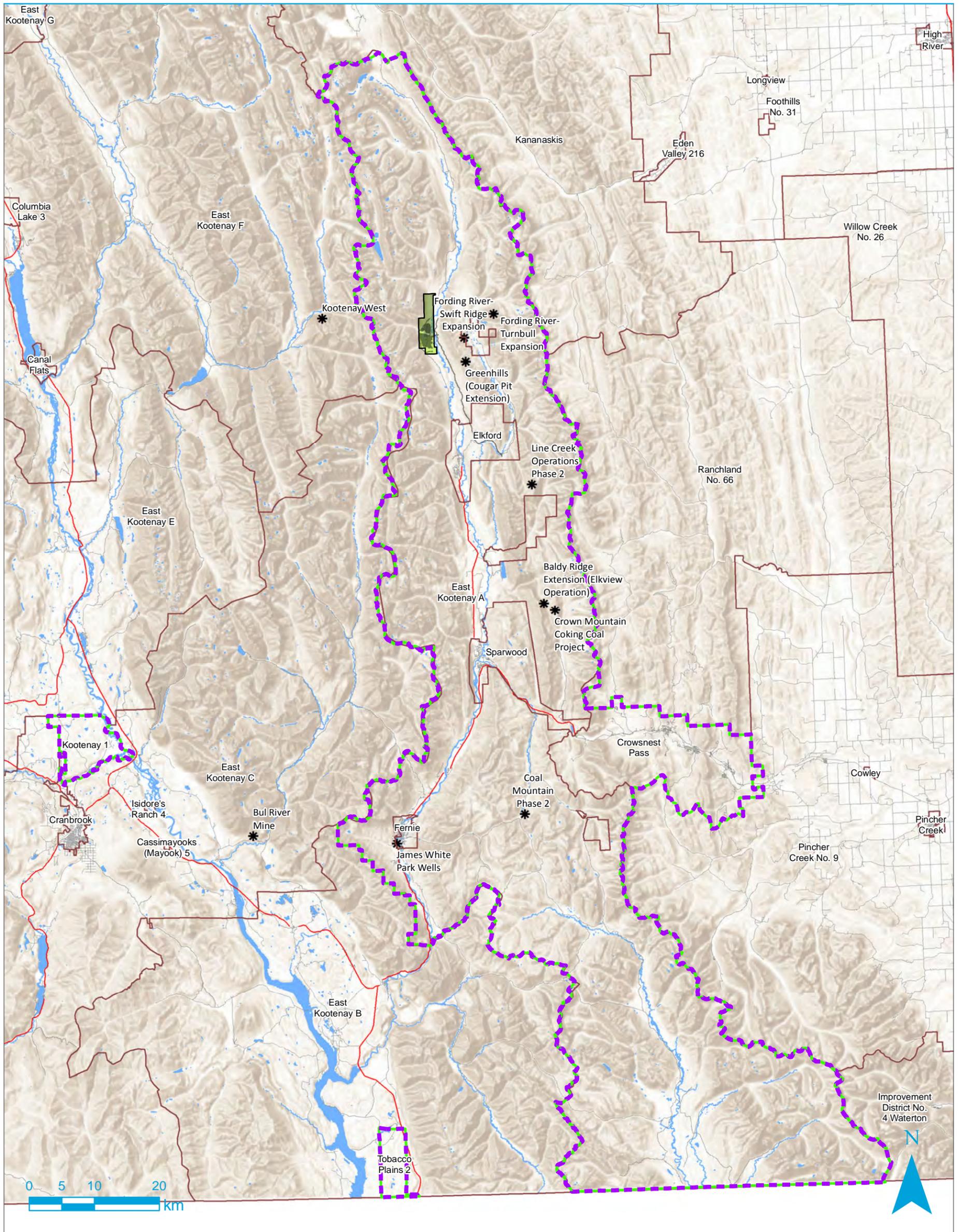


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|---------------------------|-------------------------|------------------|-------------------------|
| Regional Study Area | Major Project Locations | Lakes/Rivers | Administrative Boundary |
| Local Study Area | Highway | Bingay Mine Site | Project Footprint |
| Incorporated Town | Road | Bingay B | |
| Unincorporated Rural Area | Stream | Bingay Main | |



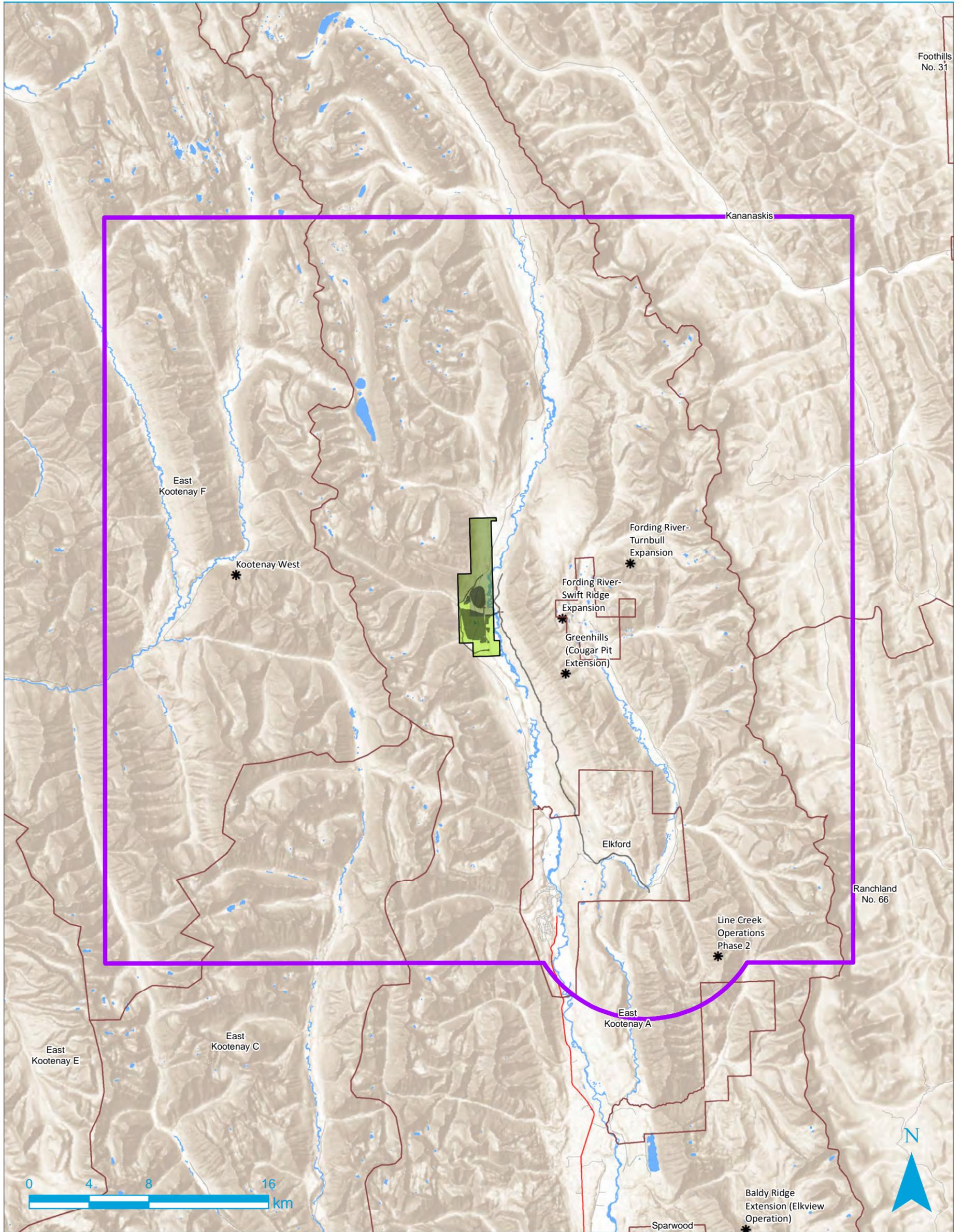
Community Health & Well-Being & Services and Infrastructure Regional Study Area and Local Study Area



- Legend**
- Local and Regional Study Area
 - * Major Project Locations
 - Highway
 - Road
 - Lake/River
 - Bingay Mine Site
 - Bingay B
 - Bingay Main
 - Administrative Boundary
 - Project Footprint



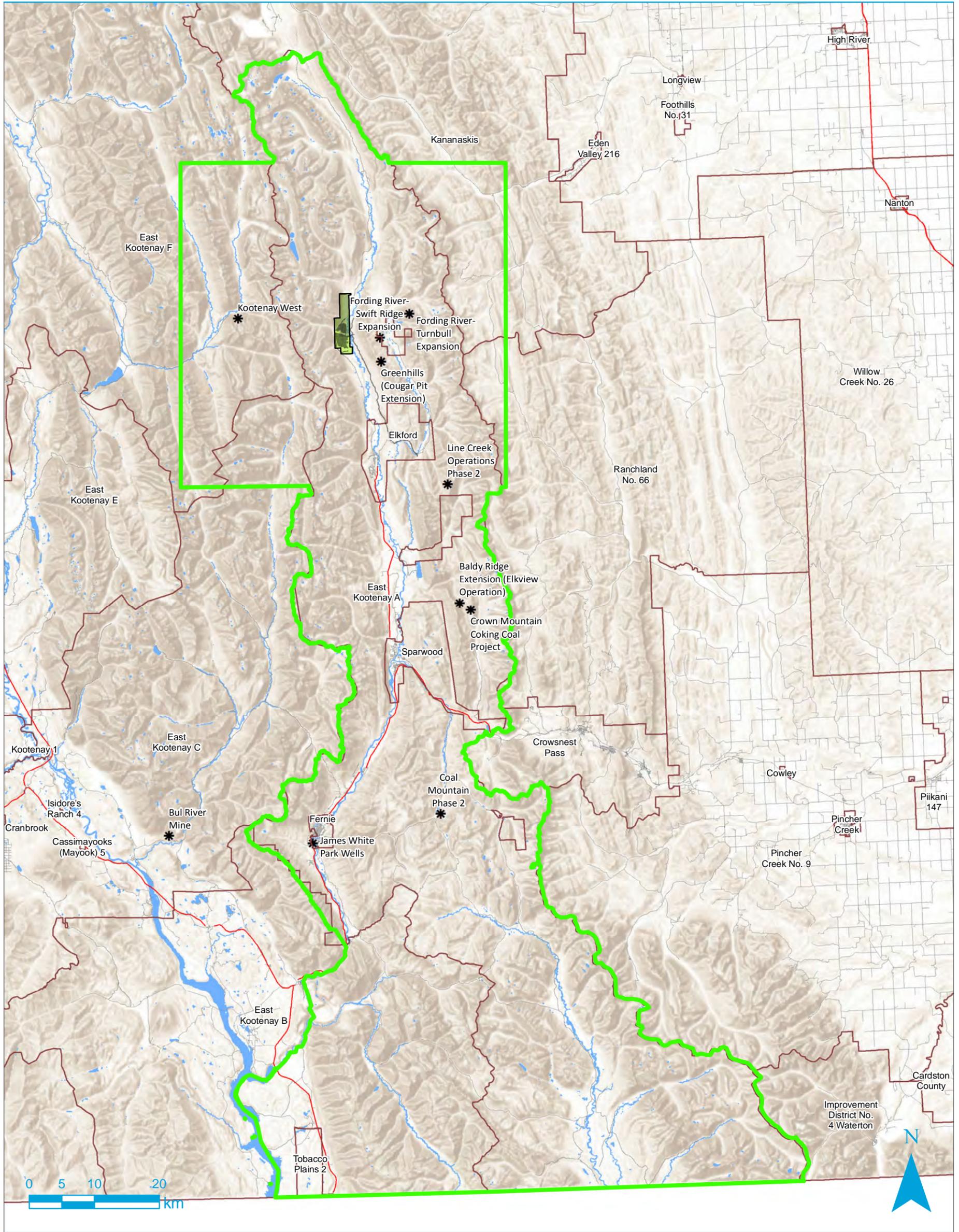
Recreation Local Study Area



- Legend**
- Local Study Area
 - Lake/River
 - Administrative Boundary
 - * Major Project Locations
 - Bingay Mine Site
 - Project Footprint
 - Highway
 - Bingay B
 - Road
 - Bingay Main



Recreation Regional Study Area

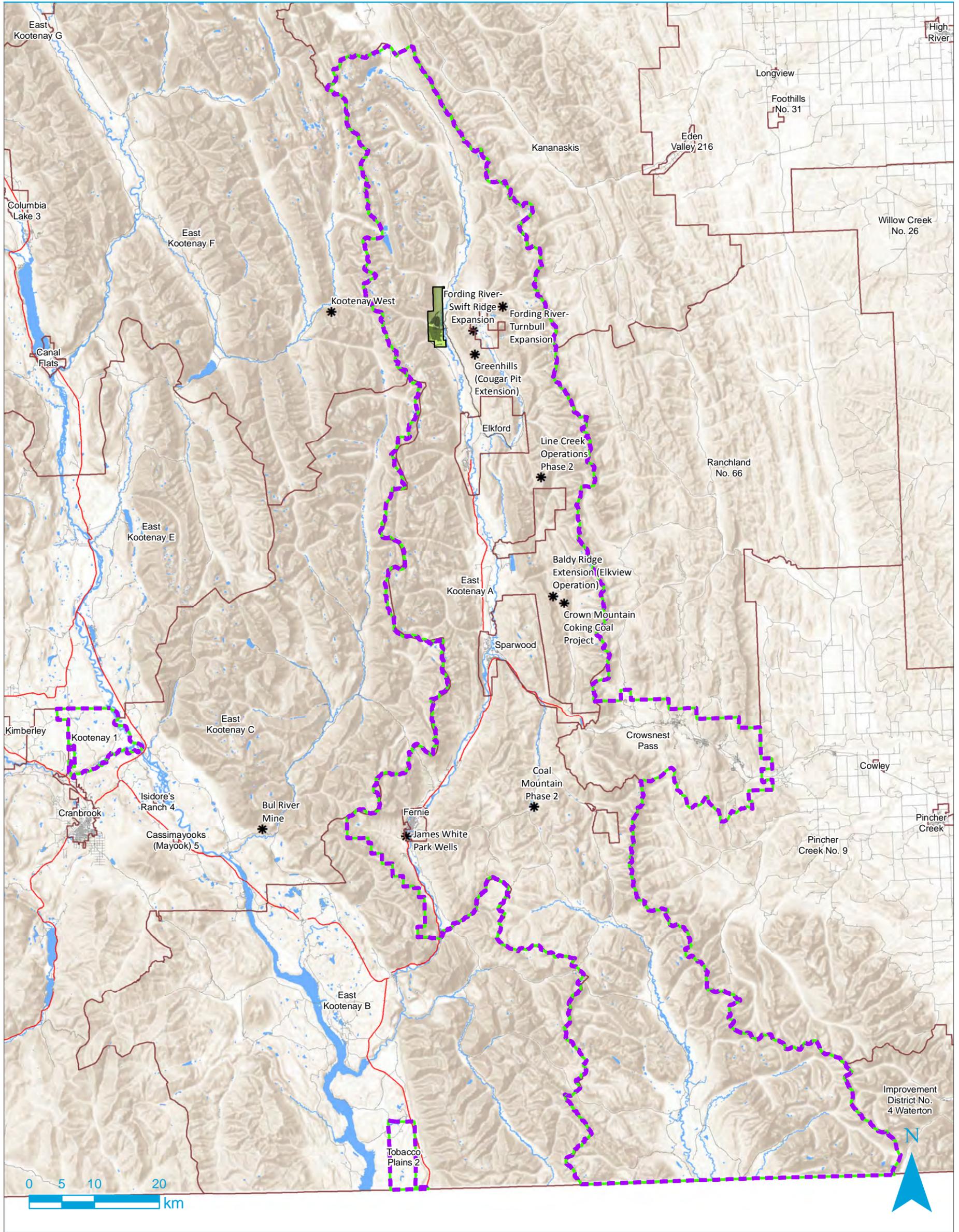


- Legend**
- Regional Study Area
 - Lake/River
 - Administrative Boundary
 - * Major Project Locations
 - Bingay Mine Site
 - Project Footprint
 - Highway
 - Bingay B
 - Road
 - Bingay Main



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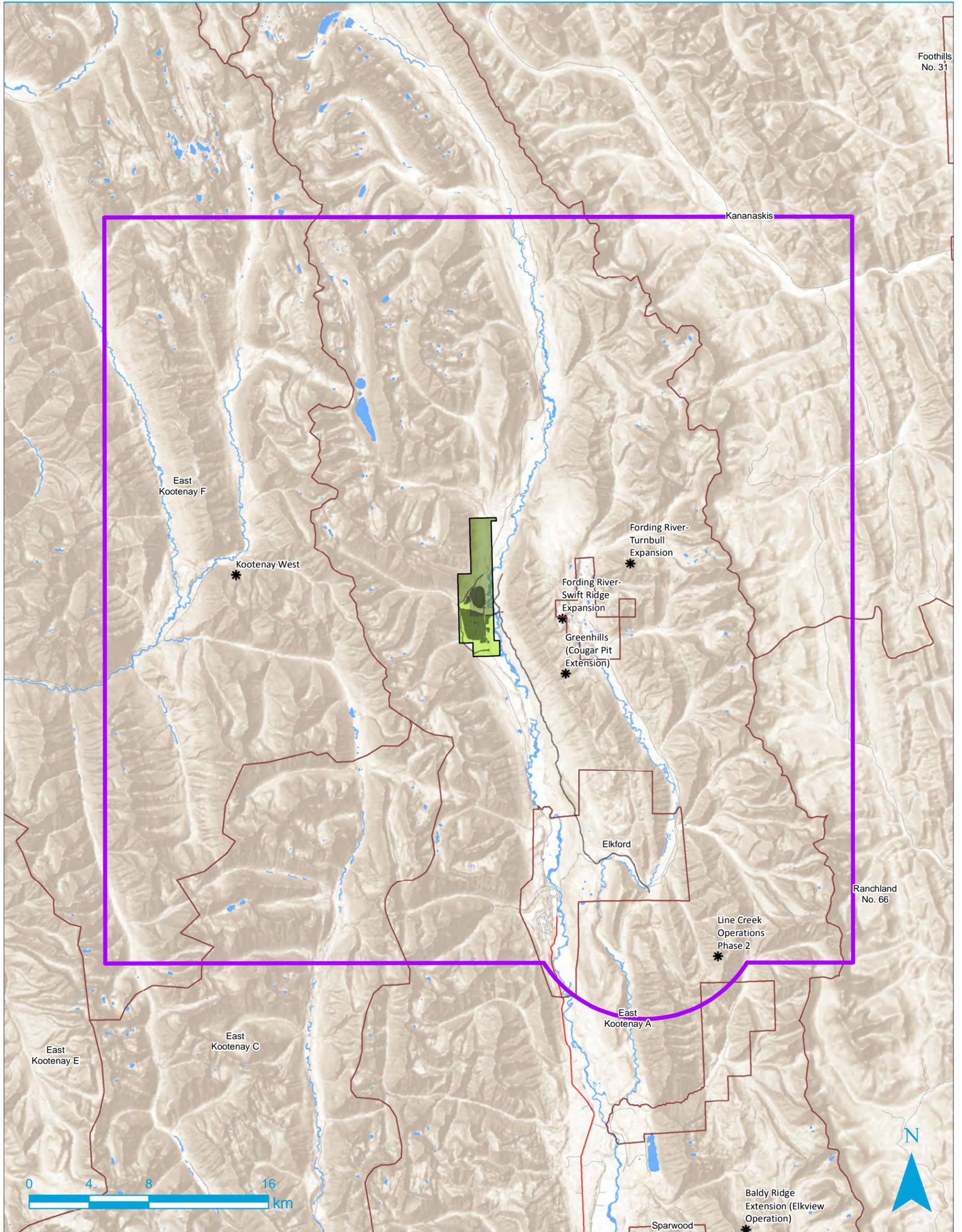
Labour Force Capacity RVC Regional and Local Study Area



- Legend**
- Regional and Local Study Area
 - Lake/River
 - Administrative Boundary
 - Major Project Locations
 - Bingay Mine Site
 - Project Footprint
 - Highway
 - Bingay B
 - Bingay Main
 - Road



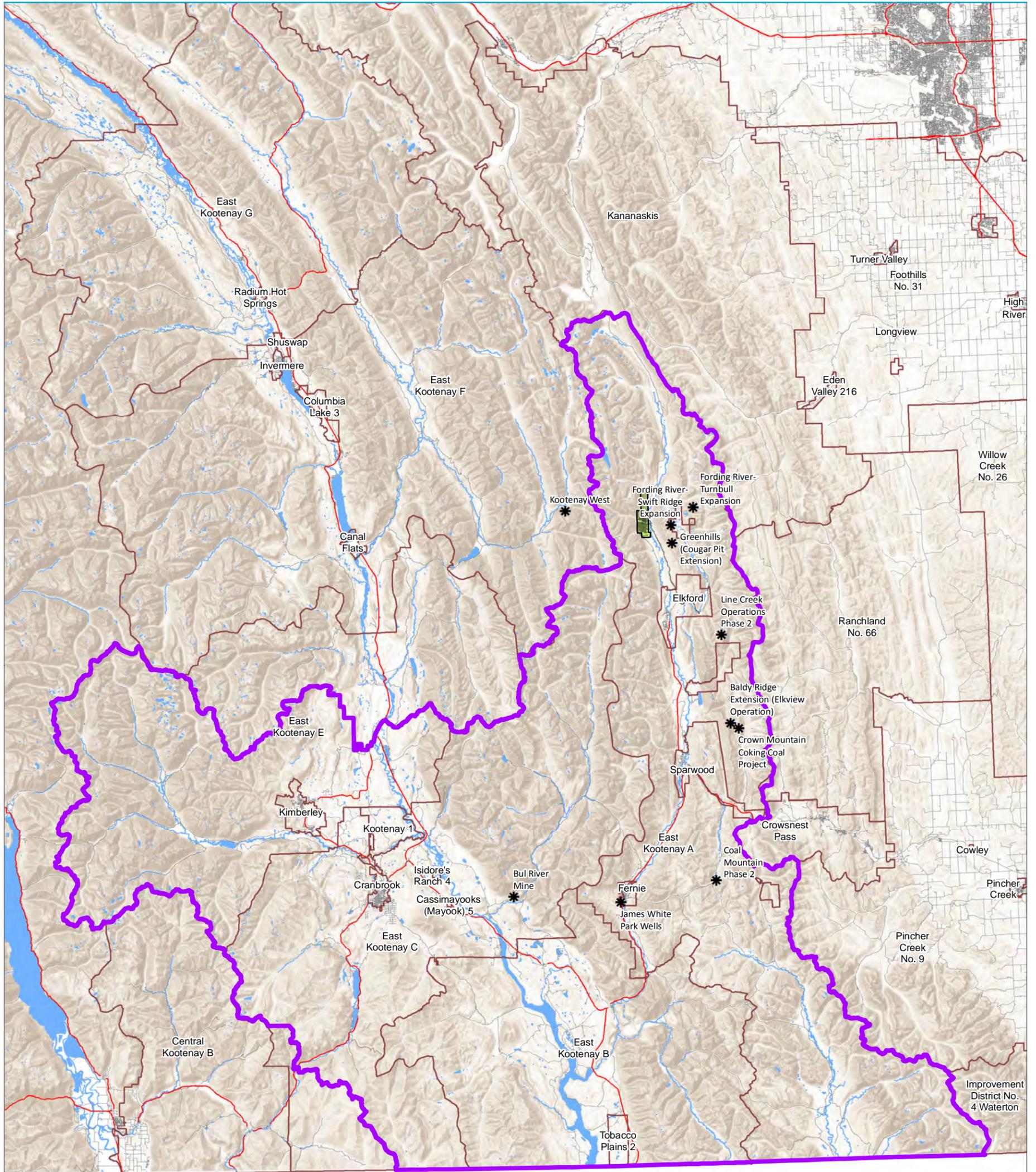
Commercial Land and Water Use RVC Local Study Area



- Legend**
- Local Study Area
 - Lake/River
 - Administrative Boundary
 - * Major Project Locations
 - Bingay Mine Site
 - Project Footprint
 - Highway
 - Bingay B
 - Road
 - Bingay Main



Commercial Land and Water Use RVC Regional Study Area

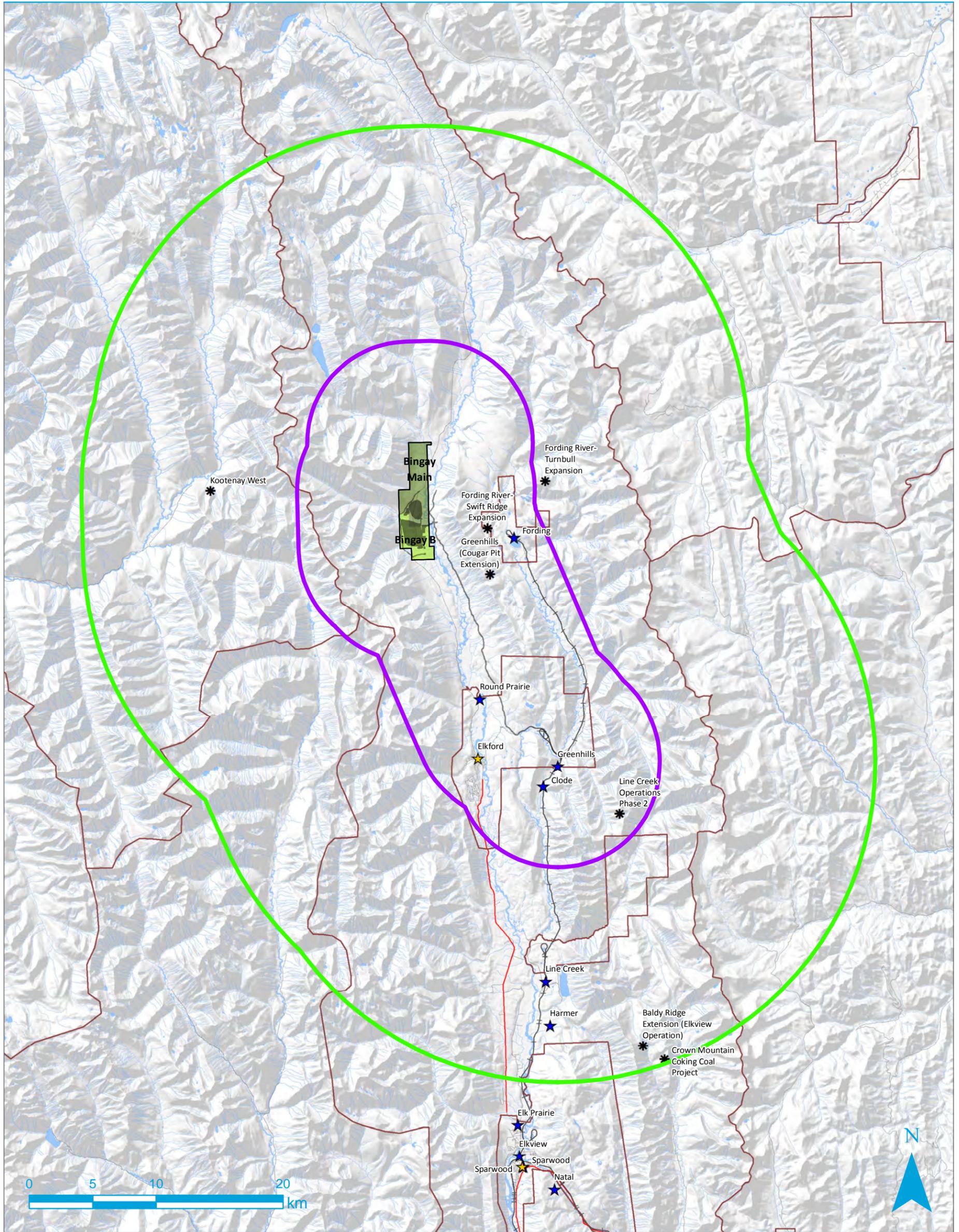


Legend

- Regional Study Area
- Lake/River
- Administrative Boundary
- * Major Project Locations
- Bingay Mine Site
- Project Footprint
- Highway
- Bingay B
- Road
- Bingay Main



Visual Quality Local Study Area and Regional Study Area

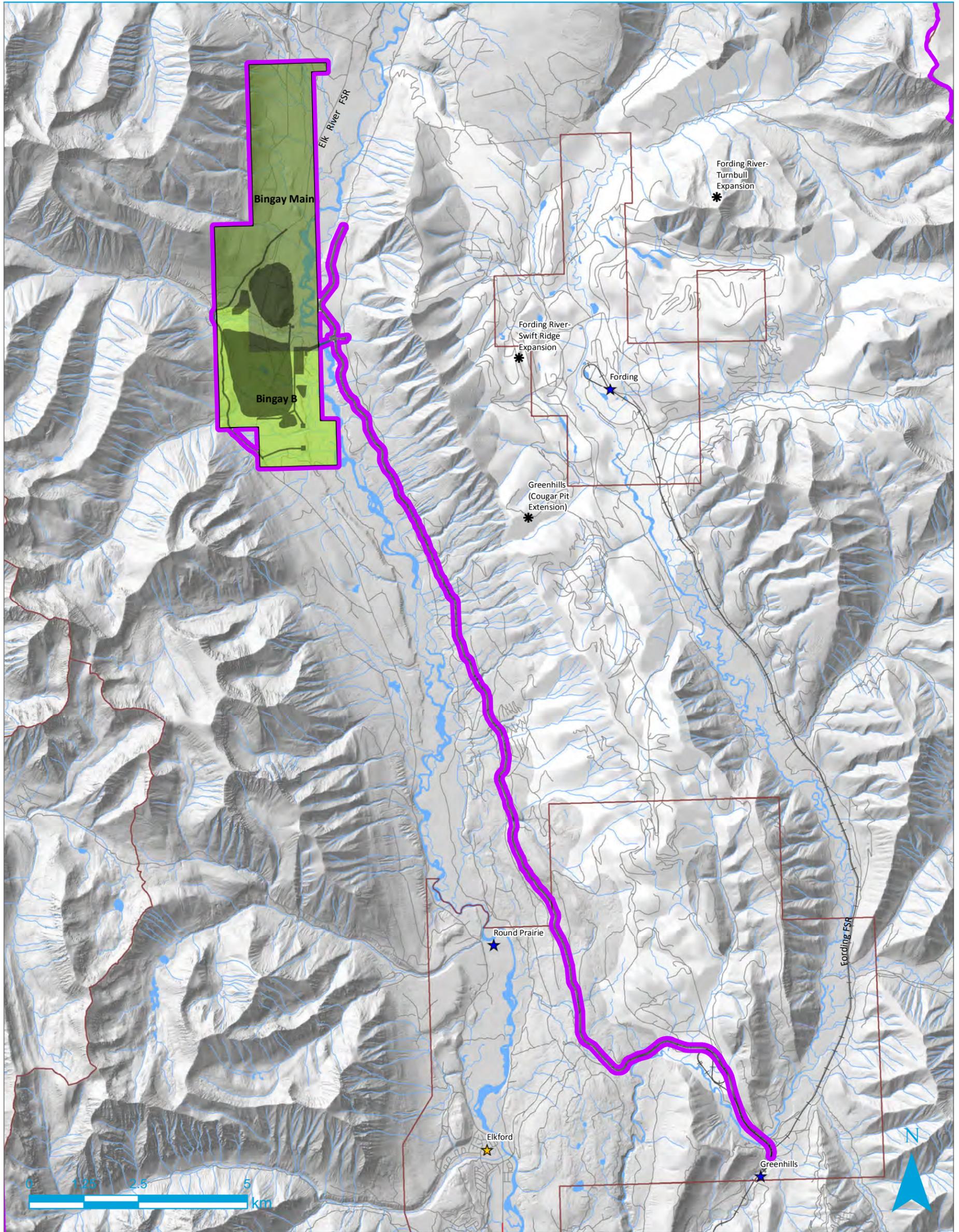


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|--|---------------------------|--|-------------------------|--|------------------|--|-------------------------|
| | Regional Study Area | | Major Project Locations | | Stream | | Bingay Main |
| | Local Study Area | | Railway | | Lake/River | | Administrative Boundary |
| | Incorporated Town | | Highway | | Bingay Mine Site | | Project Footprint |
| | Unincorporated Rural Area | | Road | | Bingay B | | |



Archaeological and Heritage Local Study Area

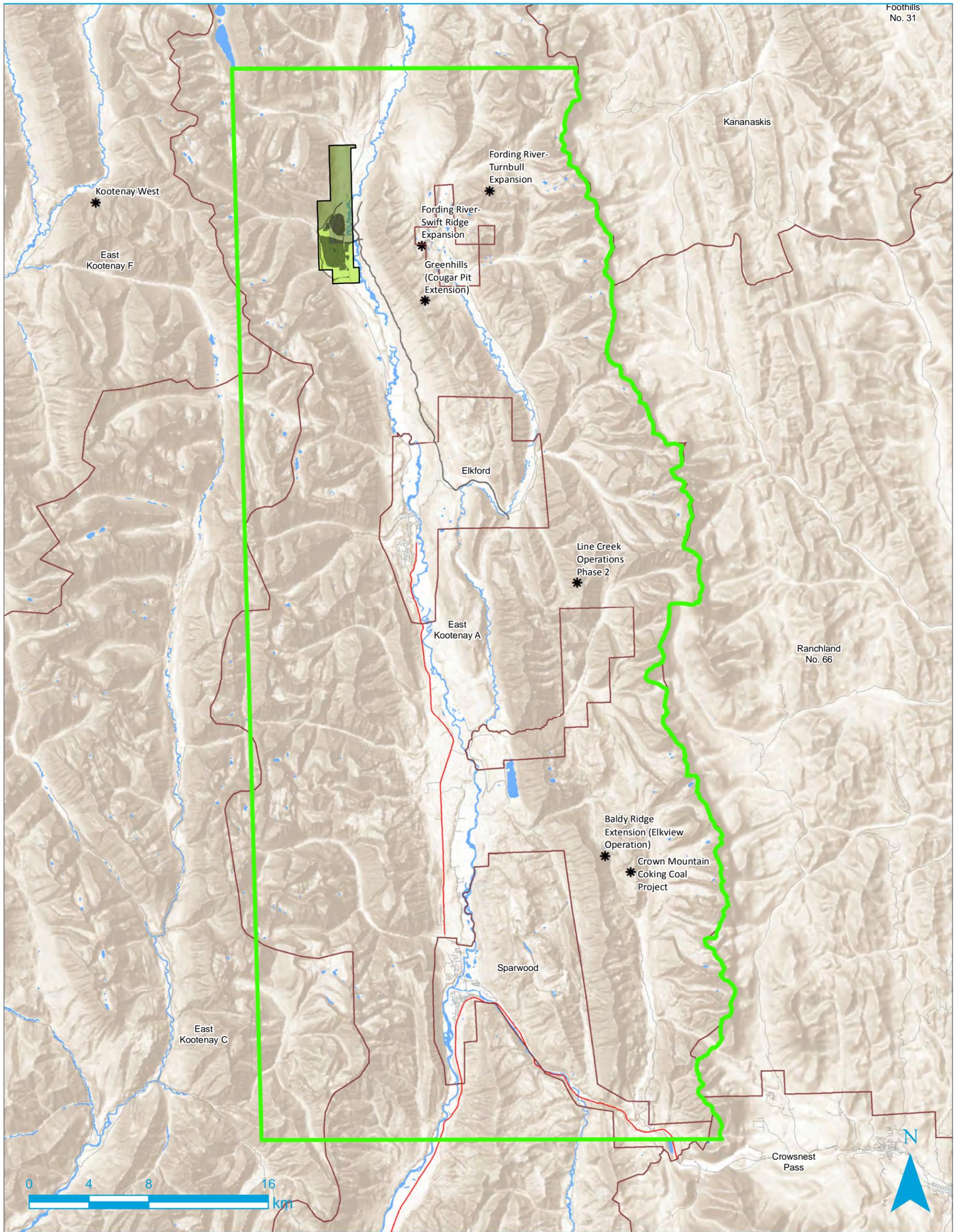


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| Local Study Area | Railway | Lake/River | Administrative Boundary |
| Incorporated Town | Highway | Bingay Mine Site | Project Footprint |
| Unincorporated Rural Area | Road | Bingay B | |
| Major Project Locations | Streams | Bingay Main | |



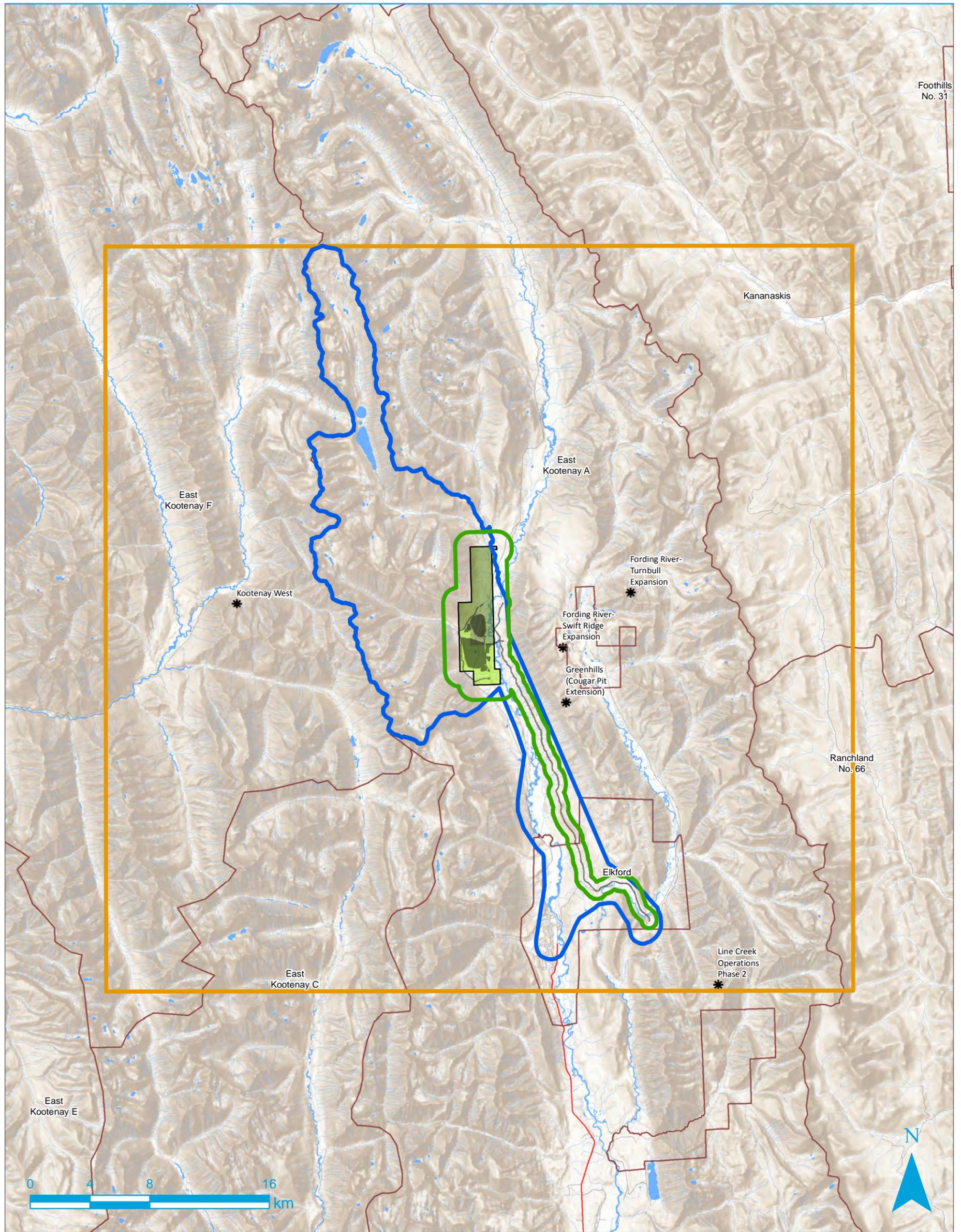
Archaeological and Heritage Regional Study Area



- Legend**
- Regional Study Area
 - Lake/River
 - Administrative Boundary
 - * Major Project Locations
 - Bingay Mine Site
 - Project Footprint
 - Highway
 - Bingay B
 - Road
 - Bingay Main



Human Health Local Study Area

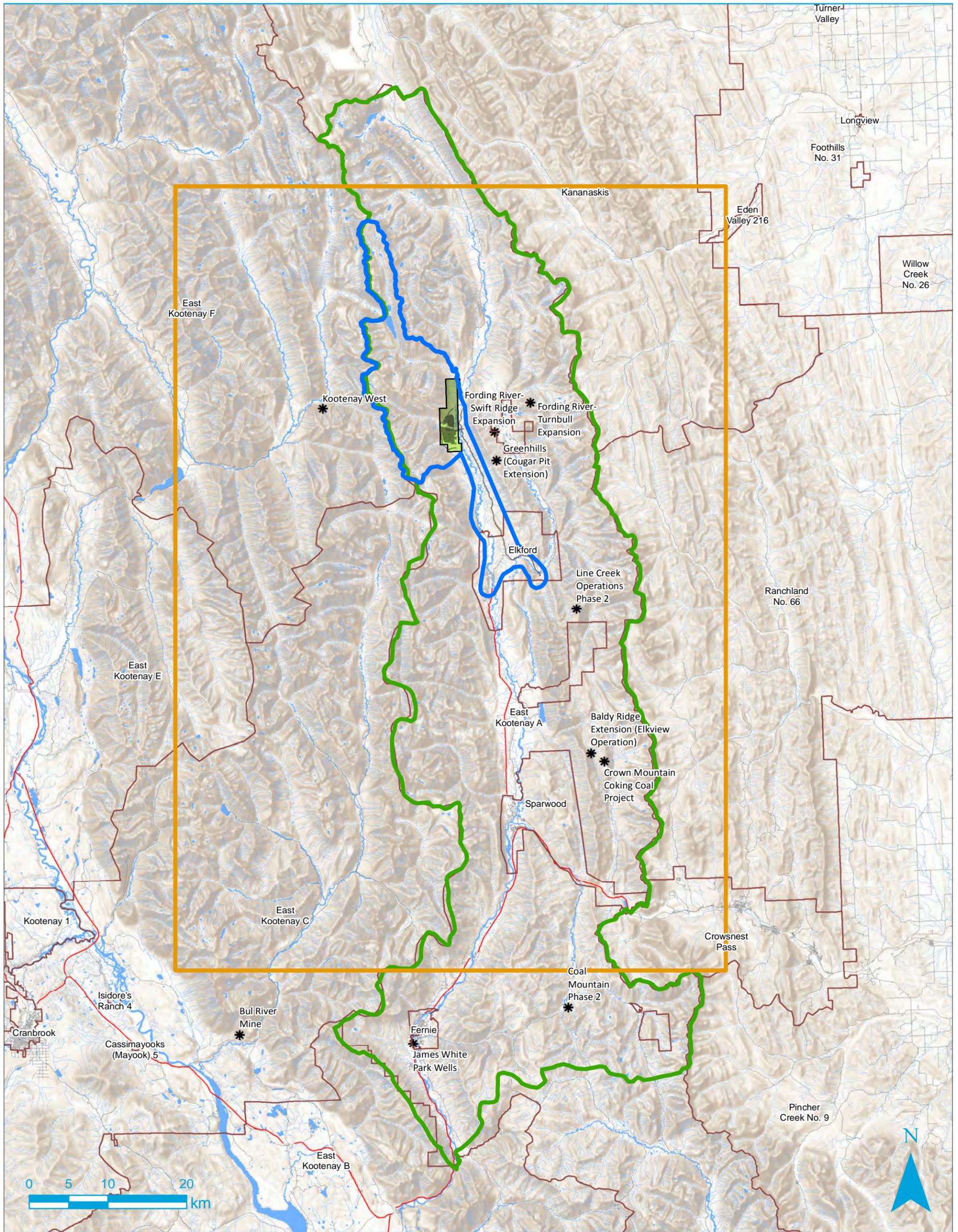


Legend

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|-------------------------|------------|-------------------------|-------------------|
| Air Quality LSA | Highway | Bingay Mine Site | Project Footprint |
| Aquatic LSA | Road | Bingay B | |
| Terrestrial LSA | Stream | Bingay Main | |
| Major Project Locations | Lake/River | Administrative Boundary | |



Human Health Regional Study Area



Legend

- | | | | |
|-------------------------|------------|-------------------------|-------------------|
| Air Quality RSA | Highway | Bingay Mine Site | Project Footprint |
| Aquatic LSA | Road | Bingay B | |
| Terrestrial RSA | Stream | Bingay Main | |
| Major Project Locations | Lake/River | Administrative Boundary | |





SNC-Lavalin Inc.

Suite 500, 745 Thurlow Street
Vancouver, British Columbia, Canada V6E 0C5

☎ 604.662.3555

www.snclavalin.com



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