EAO | Environmental Assessment Office

Application Information Requirements

Tenas Project

Proposed by:

Telkwa Coal Limited

January 2022

Pursuant to the Environmental Assessment Act, S.B.C. 2002, c.43

BRITISH COLUMBIA

PREFACE TO THE AIR

The Application Information Requirements (AIR) specifies the information that Telkwa Coal Limited (the Proponent) is required to provide in their Application for an Environmental Assessment Certificate (Application) under section 16(2) of the British Columbia (BC) *Environmental Assessment Act, 2002* (Act) (Province of BC [Prov BC] 2002c).

The Proponent is proposing to develop the Tenas Project (Project), as described in the initial Project Description https://projects.eao.gov.bc.ca/api/document/5be1e5e7c4337d0024da316e/fetch and as shown in [**Figure 1**]. The Project is a surface coal mine approximately 25 kilometres (km) south of the Town of Smithers and 7 km southwest of the Village of Telkwa in northwestern BC. Since the Project is a new mine facility that during the Operation phase will have a production capacity of 775,000 to 825,000 tonnes per annum of coal, it is subject to a provincial environmental assessment (EA) review under Part 3 of the Reviewable Projects Regulation (BC Reg 370/2002) (Prov BC 2002f) of the Act.

The BC Environmental Assessment Office (EAO) issued a Section 10 Order to the Proponent on November 6, 2018, confirming that the Project requires an Environmental Assessment Certificate (EAC), pursuant to Section 10(1)(c) of the Act, before it may receive provincial permits to construct and operate the Project. On June 25, 2019, the EAO issued a Section 11 Order to the Proponent establishing the formal scope, procedures and methods concerning the EA for the Project.

On November 27, 2018, the Province of BC passed a new *Environmental Assessment Act, 2018* (Act) (Prov BC 2018a) and the Act was brought into force on December 16, 2019. Proponents with a Section 11 Order under the 2002 Act could specify whether they wish to continue their EA under the former Act or transition the EA proceedings to the new Act. Notice was to be provided by June 16, 2020. On March 4, 2020, the Proponent submitted a letter to the EAO specifying its intent to continue under the 2002 Act.

Canadian Environmental Assessment Act, 2012 Applicability

An EA as described in the *Canadian Environmental Assessment Act*, 2012 (*CEAA* 2012) (Government of Canada [GOC] 2012a) is not required for the Project because the proposed production capacity is under the 3,000 tonnes per day threshold for a designated project, as specified in the Regulations Designating Physical Activities (GOC 2012b). The Proponent received a letter from the Canadian Environmental Assessment Agency (CEAA) on December 12, 2018 determining that the physical works associated with the Project are not described in the Regulations.

Impact Assessment Act, 2019 Applicability

On August 28, 2019, the *Impact Assessment Act, 2019* (*IAA* 2019) (GOC 2019) came into force. The *IAA* 2019 creates the new Impact Assessment Agency of Canada (IAAC) and repeals the *CEAA* 2012. An EA under the *IAA* is not required for the Project because the proposed production capacity is well under the 5,000 tonnes per day coal production threshold for the construction, operation, decommissioning and abandonment of a new coal mine as defined in 16(d) of the Regulations Designating Physical Activities. The IAAC confirmed on June 1, 2020 that the Project is not reviewable under the *IAA*.

Tenas Project

Project Area

Legend

- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Municipal Area
- 138 kV Transmission Line
- 500 kV Transmission Line

Project Features

- Existing 25 kV Power Line
- 25 kV Power Line
- Haul Road
- Rail Loop
- Discharge Path
- Tenas Access Corridor
- Backfill Area
- Control and Plant Sedimentation Pond
- Explosive Infrastructure
- Management Pond
- Mine Infrastructure Complex
- Open Pit
- Pit Lake
- Quarry
- Rail Infrastructure
- Topsoil Stockpile
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
3. Project line features are for display only.

Sources

- Project Features: Allegiance Coal, April 21, 2021.
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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TELKWA COAL LIMITED

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List of Reviewing Agencies

The following government agencies, municipal and regional agencies, Indigenous groups and the public have had the opportunity to review and comment on the Valued Component Scoping Document (Telkwa Coal Limited [TCL] 2019) and/or the draft AIR:

Provincial Agencies:

- BC Environmental Assessment Office;
- BC Ministry of Agriculture;
- BC Ministry of Energy, Mines and Low Carbon Innovation (formerly the Ministry of Energy, Mines and Petroleum Resources) ;
- BC Ministry of Environment and Climate Change Strategy;
- BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development;
- BC Ministry of Indigenous Relations and Reconciliation;
- BC Ministry of Jobs, Trade and Technology;
- BC Ministry of Municipal Affairs and Housing;
- BC Ministry of Transportation and Infrastructure; and
- Provincial Agricultural Land Commission.

Federal Agencies:

- Environment and Climate Change Canada

Municipal, Regional and Community Agencies:

- Bulkley Valley Community Resources Board;
- Northern Health;
- Regional District of Bulkley-Nechako;
- Town of Smithers; and
- Village of Telkwa.

Indigenous Groups identified in the Section 11 Order issued June 25, 2019:

- The Wet'suwet'en (Office of the Wet'suwet'en Hereditary Chiefs).

The Valued Components Scoping Document is located at https://projects.eao.gov.bc.ca/api/public/document/5f08a0159e70cd00219b9cb3/download/190918_Telkwa_VC_Scoping_Doc_FINAL.pdf

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TABLE OF CONCORDANCE

A Table of Concordance will be included in the Application. The Table of Concordance will demonstrate where the requirements in the AIR are found in the Application, with volume, section, and following the format of **Table 1**. A well-constructed Table of Concordance will assist in a timely Application evaluation to determine whether the Application contains the required information.

Table 1: Example Table of Concordance between AIR and Application

AIR Section and Page No.	AIR Title	AIR Section Language	Application Section Title	Application Volume Section, Sub-Section	Relevant Appendix

ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
%	percent
%HA	percent highly annoyed
Act	British Columbia *Environmental Assessment Act 2002, 2018*
AD	anno domini
AIR	Application Information Requirements, reviewed under *Environmental Assessment Act 2002*
ALR	Agricultural Land Reserve
Application	Application for an Environmental Assessment Certificate
AQO	Air Quality Objectives & Standards
ARD	Acid rock drainage
ASTM	American Society for Testing and Materials
BC	British Columbia
BMPs	best management practices
CABIN	Canadian Aquatic Biomonitoring Network
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Agency
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
CH_4	methane
CO_2	carbon dioxide
COPC	Contaminants of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
EA	environmental assessment
EAC	Environmental Assessment Certificate
EAO	British Columbia Environmental Assessment Office
GHG	greenhouse gas
GOC	Government of Canada (in text references only)
HHRA	Human Health Risk Assessment
IAA 2019	*Impact Assessment Act, 2019*
IAAC	Impact Assessment Agency of Canada
IFM	Instream Flow Monitoring
km	kilometre
Leq	noise levels
Leq,day	Daytime noise levels
Leq,night	Nighttime noise levels
LRMP	Land and Resource Management Plan
LSA	Local Study Area
LUPs	Landscape Unit Plans
m	metre
m^3/sec	cubic metre per second
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
ML/ARD	Metal Leaching/Acid Rock Drainage
MOECCS	Ministry of Environment and Climate Change Strategy
NA	not applicable
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NWIPC	North West Invasive Plant Council
P50	fiftieth percentile
PAA	Project Assessment Agreement
PAG	Potentially Acid Generating
PEM	Predictive Ecosystem Mapping
$PM_{2.5}$	respirable particulate matter
PM_{10}	inhalable particulate matter
Project	Tenas Project
Proponent	Telkwa Coal Limited
Prov BC	Province of British Columbia (in text references only)
RSA	Regional Study Area
SARA	*Species at Risk Act*
SIL	Survey Intensity Level
SO_2	sulphur dioxide
SSD	Species Sensitivity Distribution
TCH	Telkwa caribou herd
TCL	Telkwa Coal Limited (in text references only)
TEK	Traditional Ecological Knowledge
TEM	Terrestrial Ecosystem Mapping
TSP	total suspended particulate
US EPA	United States Environmental Protection Agency
VC	Valued Component
WQG	Water quality guidelines

APPLICATION SUMMARY

The Application will include a summary, including the following:

- A summary of the Project including the Project scope, Project benefits and applicable permits. If the Proponent has already requested or intends to request concurrent permitting, this will also be stated;
- A brief overview of the assessment process including project reviewability, and the pre-application and application review stages of the EA;
- A brief overview of consultation approaches with Indigenous groups, the public and government agencies to date;
- A summary of the key issues raised by Indigenous groups, the public and government agencies;
- A summary of key adverse effects on Indigenous interests and mitigation measures;
- A summary of key effects, proposed mitigation measures and residual and cumulative effects on Valued Components; and
- The Proponent's conclusions regarding the potential for significant adverse effects on Valued Components (VCs).

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Application Information Requirements

Part A - Introduction

BRITISH COLUMBIA

PART A - INTRODUCTION

1.0 OVERVIEW OF PROJECT PROPONENT DESCRIPTION

The Application will:

- Describe the Proponent, including history, type of company or organization, affiliations;
- Provide contact information for the Proponent; and
- Include a list of parties involved in the preparation of the Application, their qualifications, and the section(s) for which they were responsible.

1.1 Description of Project

A initial description of the Project is included in the Project Description (TCL 2018) at https://projects.eao.gov.bc.ca/api/document/5be1e5e7c4337d0024da316e/fetch.

The Application will:

- Describe the purpose of the Project from the perspective of the Proponent, and identify whether the objectives of the Project relate to any broader private or public sector policies, plans, or programs;
- Describe the location of the Project and the latitude and longitude coordinates of the site and include maps showing both regional context (identifying nearby communities and geographic features) and the specific location of the Project;
- Describe the location of the Project relative to Indigenous groups' asserted traditional territories, and/or Treaty Nation territories;
- Describe all phases of the Project, including their duration and proposed scheduling;
- Describe all onsite and offsite components associated with the Project, with figures;
- Describe the activities associated with the components and phases of the Project, with figures;
- Discuss the relevant history of the Project, including exploratory or investigative history;
- Summarize existing and planned land and water use that overlaps or may be potentially affected by the Project components and activities, including:
    - Land ownership (e.g., private land, provincial Crown land, federal land [including Indian Reserves], Indigenous title);

- Local government zoning or plans;
- Tenures (municipal, provincial, federal), licenses, permits or other authorizations;
- Non-tenured current land uses;
- Current and planned land use plans;
- Provincial land use plans (e.g., Land and Resource Management Plans) and provincial land use designations (e.g., Agricultural Land Reserve [ALR], Old Growth Management Areas, *Forests and Range Practices Act* [Prov BC 2002d] designations) and provincial land use management objectives;
- Any other development or activities, directly related to the Project or not;
- Maps showing location of other uses referenced above in relation to the Project; and
- References to the Application section that assesses land use and potential overlaps/impacts in more detail.

- Describe the Project's economic benefits;
  - Capital construction cost estimates, including:
    - Breakdown of costs (e.g., land, buildings, equipment) associated with the Project;
    - Estimated operating costs over the life of the Project, including breakdown of costs by category (e.g., labour, supplies and materials, administration); and
    - Estimated costs for Decommissioning and Reclamation and Post-closure.
  - Employment estimates including:
    - Direct employment to be created, by job category by Project phase, in number of person year jobs for the Construction, and Decommissioning and Reclamation phases and full-time equivalent jobs for the Operation phase.
    - Average wages for positions in the Construction and Operation phases;
    - Breakdown of jobs that will be filled from local, provincial, or national labour markets;
    - Indirect and induced employment to be generated, by Project phase; and
    - Information about an employment strategy, if any.

- Contractor supply services estimates including:
    - Value of supply of service contracts expected, broken down at the local, provincial, and national level, by Project phase;
    - Value of supply of service contracts expected, by Project phase; and
    - Information about a local purchasing strategy, if any.
- Annual government revenues, by type (e.g., income tax, licence rent, property tax, mineral tax) and jurisdiction (e.g., local, provincial, federal), for all phases of the Project;
- Any benefits the project may have to the five pillars of assessment (Environmental, Economic, Social, Health and Heritage); and
- All Canadian dollar estimates will be provided in real dollars, with an explanation of how they are measured (e.g., discount rates).

1.2 Applicable Authorizations

A list of required authorizations, to the extent that was known at the time, is available in Section 5.6 Federal, Provincial, and Municipal Authorizations of the Project Description, available at https://projects.eao.gov.bc.ca/api/public/document/5be1e5e7c4337d0024da316e/download/Tenas%20Project%20Description_November%202018_Final%20%28reduced%20size%29.pdf.

The Application will:

- List in table format (see Table 2 below) all applicable licenses, permits and/or approvals that are already received or required for the phases of the Project, and the associated responsible regulatory body; and
- State if the Proponent has or intends to request concurrent permitting under the Act pursuant to the Concurrent Approval Regulation (BC Reg. 371/2002) (Prov BC 2002b).

Proponent will seek concurrent permitting under the Act pursuant to the Concurrent Approval Regulation (BC Reg. 371/2002) (Prov BC 2002b).

Table 2: Authorization Table

Name of Authorization	Statute and Authorizing Agency	Description Need for Authorization
[Name]	[Statute, Level of Government]	[Description]
[Name]	[Statute, Level of Government]	[Description]
[Name]	[Statute, Level of Government]	[Description]

1.3 Alternative Means of Carrying out the Project

The Application will include:

- An assessment of the alternative means of carrying out the Project that are technically and economically feasible including, but not limited to, the alternatives identified in the AIR;
    - This includes an alternative means assessment for waste management of both Potentially Acid Generating (PAG) and non-PAG materials. PAG materials include processed rock (coarse coal rejects, fine coal rejects, and tailings) and mine generated PAG material (EAO 2015);
- The rationale and criteria used to select the proposed means of undertaking the Project; and
- The methodology and criteria used in the assessment of alternatives.

Project components have been designed to minimize potential impacts on the environment and nearby communities. Further alternatives may be identified and reviewed during the EA process. Please also refer to section **1.4** of the AIR.

The following criteria were considered when assessing alternatives:

- Effects on the natural environment;
- Technical applicability, system integrity and reliability;
- Cost effectiveness; and
- Community input and effects on human health.

Alternative means of carrying out the Project that will be considered in the Application include:

- Mining method:
    - Underground room and pillar; or
    - Surface;
- Production rate;
- Equipment selection;
- Plant layout and footprint:
    - Plant location;

  - Parking lot;
  - Office;
  - Dry location;
- Mine access / employee transport;
- Plant flowsheet;
- Coal storage, transport to rail, transport to port;
- Rail Infrastructure;
- Mined and processed rock management (PAG/non-PAG) materials and water cover and discharge);
- Water source for processing; and
- Potable water source and sewage treatment.

1.4 Alternatives to the Project

The Application will include:

- An assessment of the alternatives to the Project that were technically and economically feasible, including, but not limited to, the alternatives identified in this AIR.

The Application will provide a description of the Project purpose and rationale to meet global demand for economically viable steelmaking coal and alternatives to the proposed Project will be assessed on their technical and economic feasibility to meet the Project purpose. Alternatives that will be considered in the Application are:

- No project;
- Consideration for alternate production rates of steelmaking quality coal; and
- Development of other steelmaking coal resources in BC.

Based on an evaluation of the potential development of several other projects, and the positive results for pre-feasibility and feasibility studies for the Project, the Proponent is proceeding with the Project.

2.0 ENVIRONMENTAL ASSESSMENT PROCESS

2.1 Provincial Environmental Assessment Process

The Application will include:

- A statement that the Project is subject to review under the Act, identifying the trigger(s) for the review under the Act;
- A statement that the Application has been developed pursuant to the AIR approved by EAO and complies with relevant instructions provided in the Section 11 Order and any other direction provided by EAO;
- A table documenting applicable milestones, including, but not limited to, issuance of Section 10 Order, Section 11 Order, working group meetings, any public comment periods or open houses and the issuance of the AIR, including links to documents on EAO's public website;
- A list of the government agencies and Indigenous groups that participated in the EA; a summary of their participation; and a list of the key issues raised by each party and the status of issue resolution. (The Proponent will cross-reference, as appropriate, other sections of the Application that deal further with consultation and issues raised); and
- A summary of public participation in the EA, a list of the key issues raised, and the status of issue resolution (with cross-references, as appropriate, to other sections of the Application that deal further with consultation and issues raised).

2.2 Federal Environmental Assessment Process

The *CEAA* 2012 (Gov BC 2012a) does not apply to the Project because the proposed production capacity is under the 3,000 tonnes per day threshold for a designated project, as specified in the Regulations Designating Physical Activities (GOC 2012b). Confirmation was received from the CEAA on December 12, 2018 (CEAA 2018).

On August 28, 2019, the *IAA* 2019 (Gov BC 2019) came into force. The *IAA* 2019 creates the new Impact Assessment Agency of Canada and repeals the *CEAA* 2012. An EA under the *IAA* is not required for the Project because the proposed production capacity is well under the 5,000 tonnes per day coal production threshold for the construction, operation, decommissioning and abandonment of a new coal mine as defined in 16(d) of the Regulations Designating Physical Activities (GOC 2012b). IAAC confirmed on June 1, 2020 that the Project is not reviewable under the *IAA* (GOC 2019).

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Application Information Requirements

Part B – Assessment of Environmental, Economic, Social, Heritage and Health Effects

BRITISH COLUMBIA

PART B - ASSESSMENT OF ENVIRONMENTAL, ECONOMIC, SOCIAL, HERITAGE AND HEALTH EFFECTS

3.0 ASSESSMENT METHODOLOGY

This section of the Application will describe the methods used to assess the potential adverse effects of the Project. The assessment methodology will be based on the EAO's Guideline for the Selection of Valued Components and Assessment of Potential Effects (EAO 2013b). The guideline provides standardized methods for completing EAs under the EAO that will meet the requirements of the Act.

3.1 Issues Scoping and Selection of Valued Components

During initial issues scoping, the Proponent compiled a list of candidate VCs that considered the five pillars requiring assessment under the Act: environmental, economic, social, heritage and health. Identifying candidate VCs involved the analysis of available information to identify issues under the five pillars that may be related to a reviewable project. Previous EAs in northern BC were reviewed and provided insight to the issues, that are generally indicative of the local and regional values of interest to the public, Indigenous groups, and stakeholders in the area.

Candidate VCs were screened to exclude potential VCs that are not relevant to the Project, are not present in the Project Area, or could be better represented by, or included in, the assessment of another VC. These candidate VCs were not carried forward. Candidate VCs that were carried forward were further screened by values in one or more of the following four values categories:

- **Regulatory importance** – Candidate VC is associated with regulatory requirements. Agency input for VC selection is ongoing and additional input is anticipated during the period before the Application is formally submitted.
- **Indigenous group consideration** – Candidate VC has been identified by Indigenous groups of importance or concern. Input from Indigenous groups is ongoing.
- **Conservation or scientific importance** – Candidate VC is identified in federal or provincial databases or legislation applies to species and guild.
- **Significance to other stakeholders, including local government** – Candidate VC identified based on professional experience and expressed through consultation programs.

Candidate VCs that have the potential to interact with the Project and are likely to be present near the Project were screened based on discipline-specific filters to identify those that represent the key values and priorities of government, Indigenous groups, the public and other stakeholders.

Table 3 identifies the VCs and subcomponents that will be assessed for potential Project-induced adverse effects. The term "NA" indicates that subcomponents are not used for that VC. Each of the effects

assessments in Sections 4, 5, 6, 7, and 8 of the Application will address linkages among VCs. The linkage column in **Table 3** identifies other VCs that may support or be supported by each VC.

Table 3: Valued Components and Subcomponents for the Tenas Project

Valued Component	Subcomponents	Indicators	Linkages
Environment Pillar			
Atmospheric	Air Quality	Change in air quality parameters: ▪ Sulphur dioxide (SO_2) ▪ Nitrogen dioxide (NO_2) ▪ Inhalable particulate matter (PM_{10}) ▪ Respirable particulate matter ($PM_{2.5}$) ▪ Total suspended particulate (TSP)	Aquatic Resources Avian Species Community Well-being Fish and Fish Habitat Human Health Land and Resource Use Surface Water Terrain and Soils Vegetation Visual Resources Wildlife
	Greenhouse Gas (GHG) Emissions	Change in GHG emissions: ▪ Carbon dioxide (CO_2) ▪ Methane (CH_4) ▪ Nitrous oxide (N_2O)	
	Noise	Change in noise levels: ▪ Daytime noise levels (Leq,day) ▪ Nighttime noise levels (Leq,night) ▪ Low frequency noise ▪ Percent highly annoyed (%HA)	
Terrain and Soils	Soil Quality	Change in physical or chemical properties of soil in context of land use capability	Aquatic Resources Atmospheric Environment Avian Species Fish and Fish Habitat Groundwater Human Health Land and Resource Use Surface Water Vegetation Visual Resources Wildlife
	Terrain Stability	Change in: ▪ Terrain stability ▪ Terrain morphology	
Surface Water	Surface Water Quantity	Change in surface water flow rates (cubic metres per second [m^3/s])	Aquatic Resources

Valued Component	Subcomponents	Indicators	Linkages
	Surface Water Quality	Change in: ▪ Total and dissolved elements ▪ Anions/ nutrients ▪ Alkalinity/acidity ▪ Hardness ▪ Turbidity ▪ Total suspended solids ▪ pH ▪ Conductivity ▪ Temperature ▪ Polycyclic aromatic hydrocarbons (PAHs)	Atmospheric Environment Avian Species Fish and Fish Habitat Groundwater Human Health Land and Resource Use Terrain and Soils Vegetation Wildlife
Groundwater	Groundwater Quantity	Change in: ▪ Groundwater discharge rates to surface water features (m^3/s) ▪ Groundwater elevation (metres below ground surface)	Aquatic Resources Avian Species Fish and Fish Habitat Human Health Surface Water Terrain and Soils Vegetation Wildlife
	Groundwater Quality	Change in: ▪ Total and dissolved elements ▪ Anions/ nutrients ▪ Alkalinity/acidity ▪ Hardness ▪ Turbidity ▪ Total dissolved solids ▪ pH ▪ Conductivity ▪ Temperature	
Aquatic Resources (benthic invertebrates, periphyton, sediment quality)	NA	Change in: ▪ Composition, abundance, diversity of periphyton and benthic invertebrates ▪ Concentrations of contaminants of potential concern in sediments relative to toxicological benchmarks	Avian Species Atmospheric Environment Fish and Fish Habitat Groundwater Surface Water Terrain and Soils Vegetation Wildlife
Fish and Fish Habitat	Fish Habitat	Change in areal extent permanently altered, destroyed or made inaccessible to fish	Aquatic Resources Atmospheric Environment

Valued Component	Subcomponents	Indicators	Linkages
	Fish	Change in: ▪ Fish health ▪ Abundance ▪ Condition	Avian Species Groundwater Human Health Land and Resource Use Surface Water Terrain and Soils Vegetation Wildlife
Vegetation	Old Growth Forest	Change in: ▪ Extent ▪ Structural stage	Avian Species Aquatic Resources Atmospheric Environment Fish and Fish Habitat Groundwater Heritage Resources Human Health Land and Resource Use Surface Water Terrain and Soils Visual Resources Wildlife
	Wetlands (including biodiversity, water quantity and quality, and habitat function)	Change in extent of wetland communities	
	Listed Ecological Communities	Change in extent	
	Culturally Important Species		
	Rare Plants and Lichens	Change in extent of known occurrences	
Wildlife	Furbearers: American marten (*Martes americana*), Wolverine (*Gulo gulo*), Fisher (*Pekania pennanti*)	Change in: ▪ Habitat, including direct and indirect disturbance (including sensory disturbance) ▪ Mortality ▪ Movement (as an Indicator for Grizzly Bear, Wolverine, Caribou and Western Toad; qualitative analysis for Marten, Moose and Bats based on available information)	Avian Species Aquatic Resources Atmospheric Environment Fish and Fish Habitat Groundwater Heritage Resources Human Health Land and Resource Use Surface Water Terrain and Soils Vegetation Visual Resources
	Caribou (*Rangifer tarandus*) (northern mountain population)		
	Grizzly Bear (*Ursus arctos*) (Bulkley-Lakes and Babine Grizzly Bear Population Units)		
	Moose (*Alces americanus*)		
	Bats (Little Brown myotis (*Myotis lucifugus*), Northern myotis (*Myotis septentrionalis*)		
	Western Toad (*Anaxyrus boreas*)		
Avian Species	Migratory Breeding Birds	Change in: ▪ Habitat, including direct and indirect disturbance (including sensory disturbance) ▪ Mortality ▪ Movement (qualitative analysis based on available information)	Aquatic Resources Atmospheric Environment Fish and Fish Habitat Groundwater Land and Resource Use Surface Water Terrain and Soils Vegetation Visual Resources
	Listed Bird Species		
	Raptors		

Valued Component	Subcomponents	Indicators	Linkages
			Wildlife
Economic Pillar			
Labour Market	NA	Change in: ▪ Number of workers by occupation, industry affiliation, and region of residence ▪ Participation rate and unemployment rate ▪ Difference between unemployment rate and natural rate of unemployment ▪ Potential barriers to Indigenous participation in Project-related economic benefits ▪ Income levels and labour income	Community Well-being Demographics Economic Development Infrastructure and Services
Economic Development	Local Business and Industry	Change in: ▪ Distribution in employment across industries (economic diversity) ▪ Capacity/supply constraints for services and goods and contracting (quantitative and qualitative) ▪ Compatibility/consistency of Project with existing regional economic development plans or strategies of government (qualitative) ▪ Forestry: marketable timber volume ▪ Tourism: services and revenue ▪ Economic contributions during Decommissioning and Reclamation and Post-closure phases and potential downturns	Community Well-being Demographics Infrastructure and Services Labour Market Visual Resources Land and Resource Use
Social Pillar			
Demographics	NA	Change in: ▪ Population ▪ Demographic factors	Community Well-being Infrastructure and Services Economic Development Labour Market Land and Resource Use
Visual Resources	Visual Quality	Change in: ▪ Visual disturbance from selected receptor sites	Avian Species Community Well-being Economic Development Land and Resource Use Wildlife

Valued Component	Subcomponents	Indicators	Linkages
Infrastructure and Services	Housing and Accommodation	Change in: ▪ Demand for housing and accommodation ▪ Active residential listings ▪ Housing costs ▪ Property taxes ▪ Vacancy rates	Demographics Economic Development Labour Market Community Well-being
	Community Infrastructure and Services	Change in: ▪ Supply and demand for all community services (education, childcare, health care, and recreation) and community infrastructure ▪ Supply and demand for emergency services (policing, fire, and search and rescue)	
	Transportation	Change in level of service (change in road, rail and air traffic patterns and infrastructure)	
Land and Resource Use	Commercial Land Use	Compatibility with existing land use plans Change in: ▪ Access to land use areas ▪ Sensory disturbance to existing land and resource uses ▪ Quantity and quality of resources supporting existing land and resource uses	Atmospheric Environment Avian Species Community Well-being Demographics Economic Development Fish and Fish Habitat Heritage Resources Human Health Surface Water Terrain and Soils Vegetation Visual Resources Wildlife
	Public Recreation Use	Change in: ▪ Access to land use areas ▪ Sensory disturbance ▪ Quantity and quality of resources supporting recreational activities ▪ Interference with recreational infrastructure	
Community Well-being	NA	Change in social and economic determinants of health, as defined by Health Canada and including: ▪ Food security ▪ Cost of living ▪ Community cohesion ▪ Mental health	Demographics Economic Development Heritage Resources Human Health Infrastructure and Services Labour Market Land and Resource Use Visual Resources
Heritage Pillar			
Heritage Resources	Archaeological Resources	Change in presence, number, type, significance of resources	Community Well-being

Valued Component	Subcomponents	Indicators	Linkages
	Historic and Cultural Sites		Land and Resource Use Vegetation Wildlife
Health Pillar			
Human Health	NA	Change in human health from biophysical determinants of health	Atmospheric Environment Avian Species Community Well-being Fish and Fish Habitat Groundwater Land and Resource Use Surface Water Terrain and Soils Vegetation Wildlife

NA = Not Applicable, where division into subcomponents is not needed/appropriate for a Valued Component.

The process used to select the VCs and the supporting rationale, and the methodology for assessing potential Project-related effects on the existing condition of each VC, as appropriate, is provided in the Valued Component Scoping Document (TCL 2019).

The Valued Component Scoping Document (TCL 2019) was submitted in draft to the EAO on December 28, 2018. Changes were made based on EAO input and the revised draft was distributed to the Advisory Working Group members on February 26, 2019, for review and comment. Comments received from EAO and the Advisory Working Group members informed the refinement of the VCs in **Table 3**. The selected VCs in this AIR represent the input provided through this consultation.

The Application will summarize the process and methodologies used to identify and select the VCs for assessment. The Application will also include the rationale for any differences in the list of VCs presented in the Application from those listed in the final AIR.

3.2 Assessment Boundaries

3.2.1 Spatial, Temporal, Administrative and Technical Boundaries

The Application will describe the methods used in identifying spatial, temporal, administrative and technical boundaries. Information on spatial, temporal, administrative and technical boundaries for specific VCs will be included in the appropriate VC sections of this document and will encompass all relevant Project phases, components, and activities. The Application will include the rationale for any differences in boundaries from those presented in the final AIR.

Assessment boundaries define the limits of the effects assessment for VCs. Boundaries encompass areas within and times when the Project is expected to interact with the VCs, as well as any constraints due to political, social, and economic realities, and limitations in predicting or measuring changes. Each effects

assessment section in the Application describes spatial and temporal boundaries and the rationale for their selection, as well as any applicable administrative and technical boundaries.

Spatial assessment boundaries are identified for each VC based on the spatial characteristics of the Project and the component (e.g., location, distribution, range), as well as the areas within which Project VC interactions are expected to occur. When determining the spatial boundary, where available and applicable, community knowledge and Indigenous Traditional Ecological Knowledge (TEK), information on current land and resource use by Indigenous groups, and other pertinent ecological, technical, social, and cultural considerations, as well as input from government, and the public will be considered.

Temporal boundaries will be identified for the VC assessments and will encompass periods when the Project is expected to affect VCs. Temporal boundaries will reflect those periods during which planned Project activities are reasonably expected to potentially affect a VC. These boundaries are adjusted as appropriate to reflect seasonal and annual variations or biophysical constraints related to a VC. Proposed temporal boundaries are based on the timing of the different phases of the Project.

As appropriate, the Application will identify the relevant administrative and technical boundaries for each VC and provide an explanation of their relevance to the assessment boundaries. Administrative boundaries arise when political, economic, or social issues, as well as fiscal or other resourcing issues influence the environmental assessment. Administrative boundaries do not apply to every assessment, but where identified, the nature of the administrative boundaries and their effect on the assessment is documented.

Technical boundaries arise when there is a limit in the ability to predict a project's effects. This may occur when sampling is constrained by legal restrictions, when large geographical settings limit the ability of proper sampling, or when modelling constraints impose limitations on the analysis. Technical boundaries do not apply to every assessment, but in cases where technical boundaries have been identified, the nature of the technical boundaries and their effect on the assessment are documented.

3.3 Existing Conditions

For each VC section, (Environmental, Economic, Social, Heritage and Health), the Application will include:

- A description of the existing (or baseline) conditions within the study area in sufficient detail to enable potential Project-VC interactions to be identified, understood, and assessed;
- A description of the quality and reliability of the existing (or baseline) data and its applicability for the purpose used, including any gaps, insufficiencies and uncertainties, particularly for the purpose of monitoring activities;
- Reference to natural and/or human-caused trends that may alter the environmental, economic, social, heritage and health setting, irrespective of the changes that may occur as a result of the Project or other project and/or activities in the area;
- An explanation of if and how other past and present projects and activities in the study area have

affected or are affecting each VC (further described in the **Cumulative Effects Assessment** section **3.8** of this AIR following the Guideline for the Selection of Valued Components and Assessment of Potential Effects [EAO 2013b]);

- Documentation of the methods and data sources used to compile information on existing (or baseline) conditions, including any standards or guidelines followed;
- Where additional project and VC-specific field studies are conducted, the scope and methods to be used will follow published documents pertaining to data collection and analysis methods, where these are available. Where methods used for the assessment deviate from applicable published guidance, the rationale for the variance will be provided in the Application; and
- Description of what TEK, including Indigenous Traditional Knowledge, was used in the VC assessment.

The Application will contain the existing (or baseline) technical reports in the Appendices and will summarize key findings contained in these technical reports directly in the Application, in a manner that allows the reader to understand each VC effects assessment.

3.4 Potential Effects

The Application will summarize the overall process and methodologies used to identify and assess the potential effects of the Project on the identified VCs.

For each VC section, the Application will:

- Identify the potential interactions of the Project and the considered and selected VCs;
- Identify and describe the potential adverse effects resulting from the Project; and
- Demonstrate how feedback from Indigenous Groups, the public, stakeholders and government agencies on VC selection and assessment was incorporated, as appropriate.

Expected Project interactions with each VC, that may result in an effect, will be described within each VC section. In the Application, these interactions will be presented in an interactions table and matrix format for ease of viewing, and to help ensure adequate identification of likely Project-VC interactions. The interactions table lists the various Project activities according to Construction, Operation, Decommissioning and Reclamation, and Post-closure phases, indicates whether there is likely to be an interaction with each VC, and describes the nature of the interaction. The interaction matrix applies a likelihood of interaction to filter the Project components and activities that will or will not result in potential effects.

All Project components and activities that were determined to not interact with a VC, and will therefore not result in a potential effect, are not considered further in the assessment. For some VCs there will be no interactions with any Project activities in a particular Project phase, while for others, there may be

interactions with certain Project activities within a Project phase. The Application will identify all Project activity-VC interactions and/or Project phases that were excluded from further assessment, including the methods and criteria used to justify the exclusion and input received from EAO, government agencies, Indigenous groups and the public regarding the exclusion.

Where an interaction is identified as possible, a potential effect is identified and considered in the assessment. Assumptions regarding the potential effects are documented in each effects assessment section. Project activity-VC interactions that were identified but excluded from further assessment are clearly identified in the potential effects section of the VC section and will include the rationale to justify the exclusion.

3.5 Mitigation Measures

For each VC section, the Application will:

- Describe the approach to identify and analyze mitigation measures, including any management and compensation plans proposed by the Proponent, which will be implemented to address potential effects;
- Describe the mitigation measures incorporated into the Project, including site and route selection, Project scheduling, Project design (e.g., equipment selection, placement, emissions abatement measures), and construction and operation procedures and practices;
- Describe any standard mitigation assumed or proposed to be implemented, including consideration of best management practices (BMPs), environmental management plans, environmental protection plans, contingency plans, emergency response plans, and other general practices;
- Clearly indicate how the mitigation measures will mitigate the potential adverse effects on the VC;
- Provide the rationale for the proposed mitigation measures, including why further avoidance or reduction measures for adverse effects may not be considered feasible, and the need for and scope of any proposed compensation or offset;
- Evaluate the anticipated success of each mitigation measure and describe rationale and analysis for these evaluations. If there is little relevant/applicable experience with a proposed mitigation measure and there may be some question as to its effectiveness, describe the potential risks and uncertainties associated with use of the mitigation;
- Include the time required for mitigation to become effective, to enable understanding of the duration of residual effects and the temporal characteristics of reversibility; and
- Summarize the mitigation measures for potential Project effects by Project phase and identify any mitigation measures that are in management or compensation plans.

Mitigation measures proposed to reduce or eliminate an adverse effect, or enhance a positive effect, are

described in the assessment of each VC. Where possible, information is provided on the effectiveness of the proposed mitigation measure(s) in terms of the VC indicator for the effect. Mitigation measures may include monitoring to verify results, standard mitigation measures such as BMPs and/or changes to the means in which the Project will be designed, constructed, or operated. Mitigation measures will also consider TEK, where applicable and available.

3.6 Characterization of Residual Effects

The Application will describe, in a table format, the residual effects on VCs using the residual effects criteria magnitude, geographic extent, duration, frequency, reversibility, and context, as defined in EAO's Guideline for the Selection of Valued Components and Assessment of Potential Effects (2013b). Where feasible, these criteria will be described quantitatively in the Application for each VC. When residual effects cannot be characterized quantitatively, the Application will characterize these effects qualitatively. Definitions will be provided when qualitative terms are used.

The use of any qualitative terms (e.g., low, moderate, high) will be accompanied by distinct definitions for each of these rankings. An explanation will be included for the conclusion reached for each criterion used to characterize a residual effect.

Potential residual effects that may result from the Project after mitigation measures are implemented, are described in the assessment of each VC. Standardized criteria are used to characterize residual adverse effects: magnitude, geographic extent, duration, frequency, reversibility and context.

The following generalized definitions are used as a guide for establishing specific effects characteristics for each VC:

- **Magnitude:** Refers to the amount of change to the existing condition of a VC, considering factors such as the uniqueness of the effect and the change relative to natural or background variation. Magnitude may be defined as low, moderate, or high.
- **Geographic Extent:** Refers to the geographic area over which the residual effect will occur. The geographic extent of effects may be Project Area, Local Study Area (LSA), Regional Study Area (RSA), or beyond RSA.
- **Duration:** Refers to the length of time for a VC to return to its existing condition. The duration of an effect may be short-term, medium-term, or long-term.
- **Frequency:** Refers to the number of times that an effect might occur. The frequency of an effect may be infrequent, frequent, or continuous.
- **Reversibility:** Refers to the degree to which existing conditions can be regained after the factors causing the effect are removed. Effects can be fully reversible, partially reversible, or irreversible.
- **Context:** Primarily refers to the sensitivity and resilience of the VC to change caused by the Project. Context draws on the descriptions of the existing conditions for the VC, which reflect the

cumulative effects of other Projects and activities, and on information about the natural or human-caused trends in the condition of the VC. Context will be described qualitatively.

Where feasible, these criteria are described quantitatively in each VC section. When residual effects cannot be characterized quantitatively, the effects are characterized qualitatively. Definitions are provided for all effects criteria in each VC section. The characterization of effects will inform the determination of significance of each potential residual adverse effect.

3.6.1 Likelihood

The Application will assess the likelihood for all residual adverse effects using appropriate quantitative or qualitative terms and necessary description to understand how the conclusions were reached. Definitions of any qualitative terms, such as likely, or unlikely will be provided.

Each VC section describes the basis for the determination of likelihood, including the use of appropriate quantitative or qualitative terms with rationale for the conclusions. A variety of factors may influence likelihood or the probability of an adverse residual effect, such as how probable it is that a disturbance will be caused by the Project or that a specific mitigation will be successful. The residual effects described in each VC section represent the best prediction of what is likely to occur based on knowledge of the Project components and activities, the pathways of effect, and the mitigation proposed.

Where qualitative relative terms for likelihood such as low, moderate, or high are used, they will be clearly defined with the intent to avoid varying interpretations by different readers.

3.7 Proponent's Determination of Significance

The Application will present the process and methodology used to define and evaluate the significance of residual effects, including how the term "significance" has been used in relation to each VC using quantitative and qualitative thresholds.

Each VC section discusses the potential for significant adverse residual effects that may occur after mitigation measures are implemented. The approach to determining significance includes a comparison of the current state of the VC, relative to a scenario where it is assumed the Project does not proceed, with the predicted state of the VC if the Project does proceed. The assessment describes the level of confidence in the significance determination and provides a clear rationale for each adverse residual effect determined, based on the criteria for characterization of residual effects.

Where possible, the determination of significance considers one or more management standards; where thresholds do not exist, significance criteria are based on an applied process, including guidance established from a review of literature, precedents, learned persons, panels, and professional judgements.

A conclusion of significance of residual adverse effects will be provided for each VC and residual effects will be rated as not significant or significant, each of which is defined for each VC in the relevant section.

3.7.1 Confidence and Risk

The Application will summarize the process and methodology used to evaluate the levels of confidence associated with residual effects predictions and, how any identified uncertainty may affect either the likelihood or the significance of the predicted residual effect. Where appropriate, the Application will also describe any measures to reduce uncertainty through monitoring, adaptive management, or other follow-up programs.

The Application will summarize the process and methodology used to determine if additional risk analysis is required. If additional risk analysis is required, the Application will summarize the process and methodology used for this analysis and the conclusions, including the range of likely, plausible, and possible outcomes with respect to likelihood and significance.

Each VC section includes a consideration of the level of confidence associated with the effects assessment.

Determination of the level of confidence considers:

- Scientific certainty regarding quantification of effect, including the quality and quantity of data and understanding of effect mechanisms;
- Scientific certainty relative to effectiveness of proposed mitigation and assumptions made; and
- Professional judgment from prior experience predicting effects and developing proven mitigation measures.

Confidence predictions are defined as high, moderate, and low, and may be adjusted for some VC assessments where quantitative data and methods are available. Definitions are provided in each VC section.

3.8 Cumulative Effects Assessment

All previously identified residual Project effects (independent of their significance) will be carried forward to the cumulative effects assessment which considers if residual adverse effects of the Project will overlap in space and time with residual adverse effects of other past, present and reasonably foreseeable projects or activities. Effects that are considered in cumulative effects assessments include those where:

- There is potential for a residual adverse effect of the Project on a VC;
- The residual adverse effect can be demonstrated to act cumulatively with the residual adverse

effects from other projects or activities on the same VC;

- Other projects or activities, which represent a source of residual effects that may interact with Project-related residual effects, have been or will be carried out and are not hypothetical; and
- The cumulative effect is likely to occur.

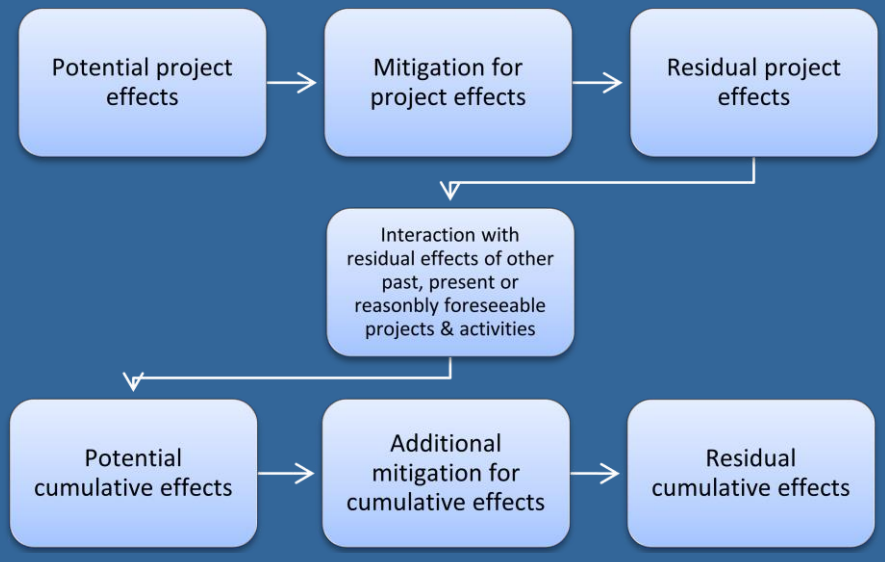
This assessment will be conducted in accordance with EAO's Guideline for the Selection of Valued Components and Assessment of Potential Effects (EAO 2013b).

3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities

The Application will determine residual Project and cumulative effects using the steps identified in **Figure 2**.

As identified in *EAO's Guideline for the Selection of Valued Components and Assessment of Potential Effects (2013a)*, the Application will use the steps outlined in the figure below to determine residual project effects and the subsequent cumulative effects assessment:

Figure 2 Steps to Determine Residual Project & Cumulative Effects



The following development categories will be considered in the Application:

- Projects or activities that have already been built or conducted for which the environmental effects overlap with those of the Project (i.e., certain); and
- Projects that are either proposed (public disclosure) or have been approved to be built, but are not yet built, for which the environmental effects overlap the Project (i.e., reasonably foreseeable).

The following major projects and activities have been preliminarily identified as possible candidates for

inclusion in the assessment of cumulative effects in consideration of the potential for their residual effects to interact with the residual effects of the Project. The list includes other projects and activities within the largest proposed RSA plus a buffer to accommodate projects that may be located outside the RSA but have influence within the RSA. This list will be tailored for each VC-specific cumulative effects assessment. The list has been refined based on input from the Advisory Working Group, EAO and public consultation.

- Agricultural activities;
- Berg Copper-Molybdenum-Silver Mine;
- Big Onion Project;
- Blackjack Mineral;
- Buck Project;
- Bulbous Toe;
- Burning Daylight Quarry;
- Cheslatta Green Energy Project;
- Chuchi Lake Mine;
- Coastal GasLink Pipeline;
- Community development (including Smithers, Houston, Telkwa, Witset, Hudson's Bay Mountain Estates, and any miscellaneous developments);
- Decar Project;
- Dome Mountain Mine;
- Duke Property;
- Emerald Glacier Project;
- Endako Mine;
- Equity Silver Mine;
- Fenton Creek Project;
- Forestry activities;
- Fort St. James Green Energy;
- Fran Property;
- Hanson Project;
- Harvesting activities (including fishing, hunting, and trapping);
- Holy Cross Project;
- Huckleberry Copper-Silver Molybdenum Mine;
- Kenney Dam Cold Water Release Facility;
- Kwanika Project;
- Lennac Lake Project;
- Lorraine-Jajay Copper Mine;
- Maple Leaf Cannabis Production Facility;
- Morrison Copper/Gold Project;
- Mount Milligan Mine;
- Ogden Mountain Jade Project;
- Ootsa Property;
- Pacific Northern Gas Looping Pipeline;

- Pacific Trails Pipeline;
- Prince George to Terrace Capacitors Project;
- Prince Rupert Gas Transmission;
- Recreation activities;
- Silver Hope Project
- Silver Queen Property;
- Smithers Regional Airport Runway Expansion;
- Snowbird Property;
- Stardust Project;
- Telkwa to Smithers Bike Trail;
- Utilities activities; and
- Wildcat Property.

The proposed cut-off date for incorporating any new, reasonably foreseeable future developments in the Application's cumulative effects assessment will be six months prior to the submission of the Application. The rationale is that after this date authors do not have time to reconsider, update, and report on the potentially altered cumulative effects.

The Application will describe the methodology for identifying potential interactions between residual Project effects and the effects of other developments, including a description of the following:

- The spatial boundaries for the cumulative effects assessment for each VC, including maps;
- The spatial and temporal boundaries of other developments; and
- The potential for interaction (spatial and temporal) and linkages (overlap) of VCs with other developments.

The Application will include:

- A table of all past, present and reasonably foreseeable developments that will be included in the cumulative effects assessment for each VC;
- A general description of the information sources used to identify reasonably foreseeable developments and activities; and
- A map showing the location of the projects and activities.

3.8.2 Conducting a Cumulative Effects Assessment

The Application will summarize the process and methodology used to conduct the cumulative effects assessment, including the identification of potential cumulative effects, identification of additional mitigation measures (in addition to those identified to mitigate potential Project effects), and evaluation of any (residual) cumulative effects using the same methodology described above in sections **3.2** to **3.6** of this

AIR. Significance of cumulative effects will be determined using characterization criteria as defined for the residual Project effects assessment (section **3.7** of this AIR).

3.9 Follow-up Strategy

Where a residual adverse effect and/or cumulative effect has been identified for a specific VC, the Application will include a description of a follow-up strategy, where appropriate, that:

- Identifies the measures to evaluate the accuracy of the original effects prediction;
- Identifies the measures to evaluate the effectiveness of proposed mitigation measures; and
- Proposes an appropriate strategy to apply if original predictions of effects and mitigation effectiveness are not as expected. This includes reference to further mitigation, involvement of key stakeholders, Indigenous Groups, government agencies and any other measures deemed necessary to manage the issue.

Each VC section will describe the approach to identifying and developing a monitoring and adaptive management strategy or provide a rationale where no strategy is needed (e.g., where confidence in the effects assessment is high or there is an existing monitoring program).

4.0 ENVIRONMENTAL EFFECTS ASSESSMENT

The Application will include an assessment of environmental effects VCs identified in the AIR. The assessment will be conducted in accordance with the methodology specified above in section **3.0 Assessment Methodology** of the AIR, using the organizational structure demonstrated in this section.

4.1 Atmospheric Environment Valued Component

The Project has the potential to influence the atmospheric environment that includes air quality, greenhouse gas (GHG) emissions and noise due to emissions from Construction, Operation, Decommissioning and Reclamation, and Post-closure phase activities. This section of the Application will present the subcomponents, key indicators, and boundaries of the assessment for the Atmospheric Environment VC, and pathways along which potential Project-related effects could occur, with cross references to other supporting VC assessment sections.

The Atmospheric Environment VC will include the following subcomponents and associated indicators:

Subcomponent	Indicators
Air Quality	Change in air quality parameters: • Sulphur dioxide (SO_2) • Nitrogen dioxide (NO_2) • Inhalable particulate matter (PM_{10}) • Respirable particulate matter ($PM_{2.5}$) • Total suspended particulate (TSP)
GHG Emissions	Change in GHG emissions: • Carbon dioxide (CO_2) • Methane (CH_4) • Nitrous oxide (N_2O)
Noise	Change in noise levels: • Daytime noise levels (Leq,day) • Nighttime noise levels (Leq,night) • Low frequency noise • Percent highly annoyed (%HA)

Although vibration has been screened out as a subcomponent, a qualitative discussion will be included in the Application.

Project-related effects on this VC may have linkages to other VCs, such as:

- Aquatic Resources;
- Avian Species;

- Community Well-being;
- Fish and Fish Habitat;
- Human Health;
- Land and Resource Use;
- Surface Water;
- Terrain and Soils;
- Vegetation; and
- Wildlife.

4.1.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Atmospheric Environment VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Atmospheric Environment VC are described below and are illustrated in **Figure 3** and **Figure 4**. Air quality boundaries are based on modelling guidance and expected emissions, primarily fugitive dust. Potential effects of GHGs are global in nature and thus the assessment area follows provincial and federal boundaries. Noise boundaries are based on the expected extent of noise emissions that would attenuate to background levels:

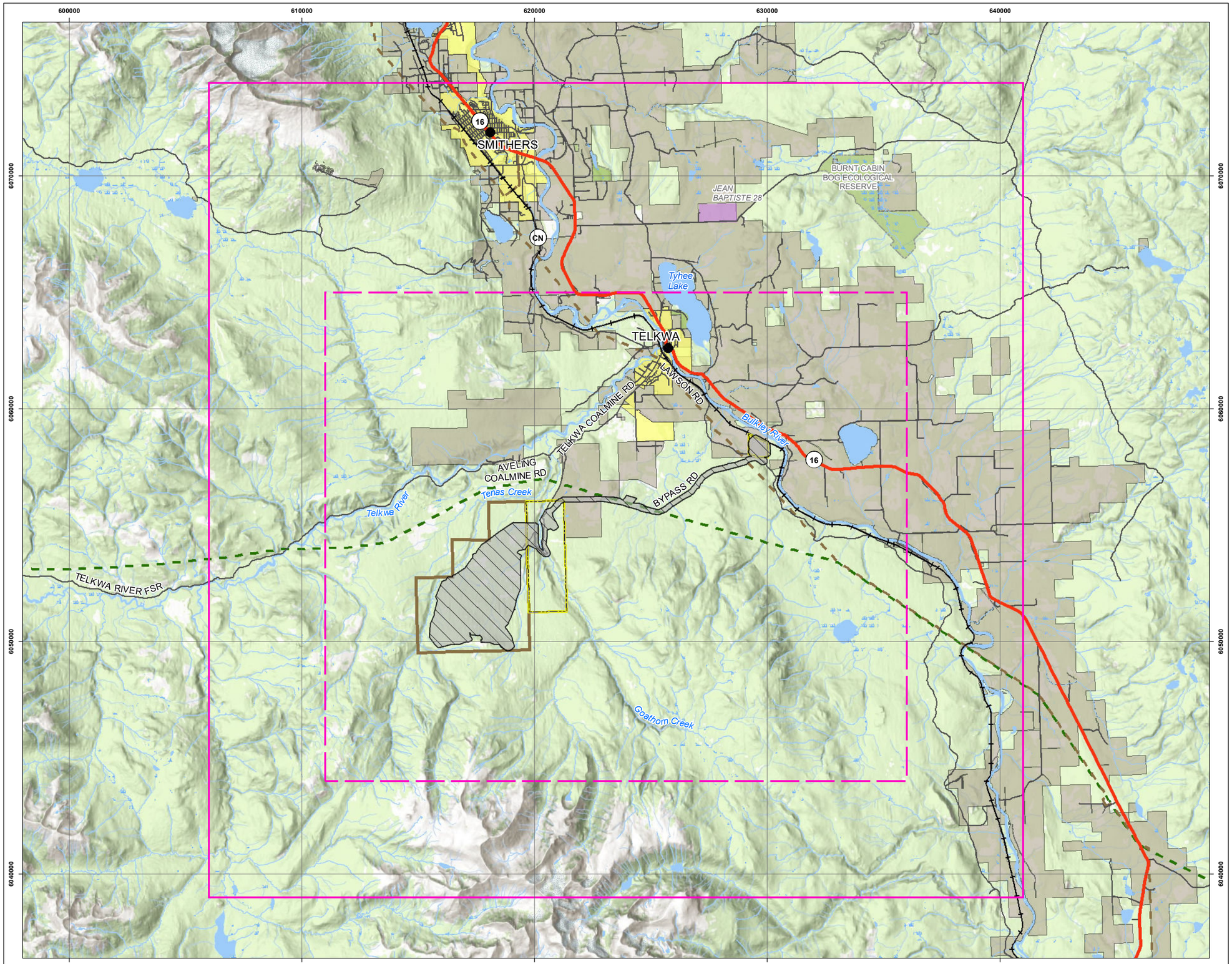
- LSA:
    - Air Quality LSA: 25 km by 21 km area including a minimum 5 km buffer around proposed infrastructure. This represents the area within which the main effects on air quality may be expected.
    - GHG Emissions LSA: Not applicable.
    - Noise LSA: Extends 3 km from Project boundaries and activities, including the haul road.
- RSA:
    - Air Quality RSA: 35 km by 35 km area including a 10 km buffer around proposed infrastructure. This represents an area within which potential effects on Telkwa and Smithers are captured.
    - GHG Emissions RSA: The RSA includes provincial and federal boundaries.

- Noise RSA: Extends 5 km from project boundaries and activities, including the Bypass Road and Minesite haul road.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Air Quality Local and Regional Study Areas



Legend

- Air Quality Local Study Area
- Air Quality Regional Study Area
- City/Town
- Rail Line
- Highway
- Road
- 138 kV Transmission Line
- 500 kV Transmission Line
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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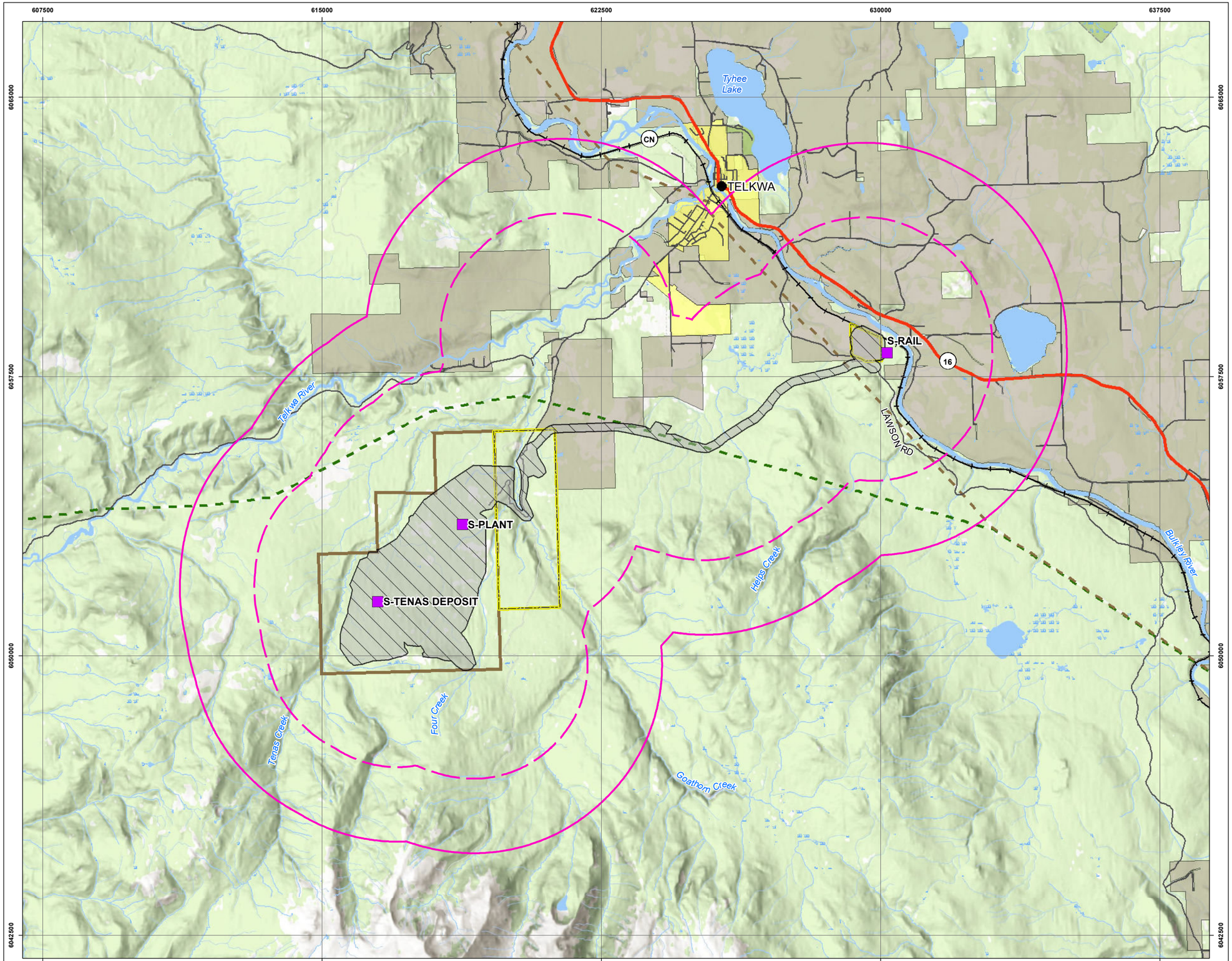
Tenas Project

Noise Local and Regional Study Areas



Legend

- Noise Monitoring Location
- Noise Local Study Area
- Noise Regional Study Area
- City/Town
- Rail Line
- Highway
- Road
- 138 kV Transmission Line
- 500 kV Transmission Line
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
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4.1.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, a list of the information provided in the baseline report, and descriptions of field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Atmospheric Environment VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC.

The following general approach is being taken to develop existing conditions for the Atmospheric Environment VC:

- Air Quality
    - Dustfall was monitored during consecutive periods of approximately 30 days each, beginning in September/October 2017 until February 2018.
    - At the end of each sampling period, dustfall canisters were collected and analyzed for particulates (total, soluble, and insoluble), anions and nutrients (sulphate, nitrate, chloride, and ammonia), and metals.
    - A Partisol station to measure PM_{10} and $PM_{2.5}$ was installed in November 2018.
    - A meteorological station was installed at the Tenas Deposit in September 2017.
- Noise
    - Noise was monitored at three stations, and measurements were collected.
    - Noise measurements were logged once every minute at approximately 1.5 metre (m) above ground. Measurements were taken for approximately 24 hours at each sampling season and each location.

The following technical reports will be reviewed as part of the Application. Where historic technical reports from unrelated projects are used as supporting information, the Application will include context relevant to the Project:

- Davidson Project: Davidson Project Meteorology, Air Quality and Noise Baseline Study (Blue Pearl Mining Inc. 2008).
- Dome Mountain Project: 2009/10 Meteorology and Air Quality Baseline Report (Rescan 2010).

- Telkwa Coal Project
    - Application for a Project Approval Certificate – Volumes I-V (Manalta Coal Ltd 1997a).
    - BC Air Data Archive website (BC Ministry of Environment and Climate Change 2019).
    - BC State of the Air Reports (BC Lung Association 2018).

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs, and guidance documents related to the Atmospheric Environment VC, including:

- Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC Ministry of Environment 2016a);
- *Environmental Management Act.* SBC 2003. Chapter 53 (Prov BC 2003);
- Air Quality Objectives & Standards (BC AQO) (BC Ministry of Environment and Climate Change Strategy 2018a);
- Canadian Ambient Air Quality Standards (Canadian Council of Ministers of the Environment (CCME) 2020a);
- National Ambient Air Quality Objectives (CCME 1974);
- Village of Telkwa's Noise Control Bylaw No. 495, 2001 (Village of Telkwa 2001);
- Noise Control Best Practices Guidelines (BC Oil & Gas Commission 2009);
- Environmental Code of Practice for Metal Mines (Environment Canada 2009);
- Night Noise Guidelines for Europe (World Health Organization 1999);
- Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter), American Society for Testing and Materials (ASTM) D1739 98 (ASTM International 2017);
- Standard Guide for Selection Environmental Noise Measurements & Criteria, ASTM E1686-03 (ASTM International 2008);
- Useful Information for Environmental Assessments (Health Canada 2010c);
- Guideline for Air Quality Dispersion Modelling in BC (Ministry of Environment 2015b);
- Guidance for Evaluating Human Health Impacts in Environmental Assessments: Noise (Health Canada 2017b); and
- Guidance for Developing a Fugitive Dust Management Plan (Ministry of Energy, Mines and Petroleum Resources & Ministry of Environment and Climate Change Strategy 2020).

The following Atmospheric Environment VC technical reports will be provided with the Application:

- Tenas Project: 2017 to 2019 Baseline Report (ERM 2020); and
- Data from BC Ministry of Environment and Climate Change monitoring stations (BC Ministry of Environment and Climate Change 2018c).

4.1.3 Potential Effects

The Application will identify potential adverse effects on the Atmospheric Environment VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Atmospheric Environment VC resulting from Project activities within each phase of the Project. Interactions between Project components and activities and the Atmospheric Environment VC will be summarized.

The following potential effects will be assessed:

- Fugitive dust emissions from material handling, blasting, vehicles, and processing can result in increases in ambient particulate matter concentrations (total suspended particulate [TSP], inhalable particulate matter [PM_{10}], and respirable particulate matter [$PM_{2.5}$]) that can affect human and wildlife health and increases in dust fall deposition that can affect vegetation and waterbodies.
- Combustion emissions from vehicles and equipment can result in increases in ambient concentrations of nitrogen dioxide (NO_2), sulphur dioxide (SO_2), and other contaminants that can negatively affect human health and vegetation.
- The nature and extent of potential increases in ambient noise levels resulting from mining and Rail Loadout activities during the Operation phase of the Project for daytime noise levels (Leq,day) and nighttime noise levels (Leq,night) at receptor locations, as well as percent highly annoyed (%HA) and low frequency noise.
- Increases in GHG emissions and comparisons to provincial and federal emissions.

4.1.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects on the Atmospheric Environment VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans (as identified in section **13 Management Plans**) will be referenced, e.g., fugitive dust management will be part of the Air Quality Management Plan. Linkages to other sections in the Application will also be identified.

4.1.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood, 3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.1.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;

- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR; and

- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR.

- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.1.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

4.2 Terrain and Soils Valued Component

The Project has the potential to change slope stability and increase the risk of geohazards during the Construction, Operation, Decommissioning and Reclamation and Post-closure phases for the access road to the pit area. There is also the potential to interact with soil quantity and quality as a result of mine development. Soil quantity and quality will be considered during reclamation planning. This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Terrain and Soils VC, and pathways along which potential Project related effects could occur, with cross references to other supporting VC assessment sections.

The Terrain and Soils VC will include the following subcomponents and their associated indicators:

Subcomponent	Indicators
Soil Quality	Change in physical and chemical properties of soil in context of land use capability
Terrain Stability	Change in: • Terrain stability • Terrain morphology

The Terrain and Soils VC will be supported by the Atmospheric Environment VC assessment. Project-related effects on the Terrain and Soils VC may have linkages to the following VCs:

- Aquatic Resources;
- Atmospheric Environment;
- Avian Species;
- Fish and Fish Habitat;
- Groundwater;
- Human Health;
- Land and Resource Use;
- Surface Water;
- Vegetation;
- Visual Resources; and
- Wildlife.

4.2.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Terrain and Soils VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Terrain and Soils VC are described below and are illustrated in **Figure 5**.

- Terrain and Soils LSA: includes the Project Area with a 250 m buffer on gravel quarries and linear infrastructure outside of the Rail Loop, Minesite and Mine Infrastructure Complex (i.e., roads, powerlines, pipelines), and a 500 m buffer around all other infrastructure (e.g., Rail Loop,

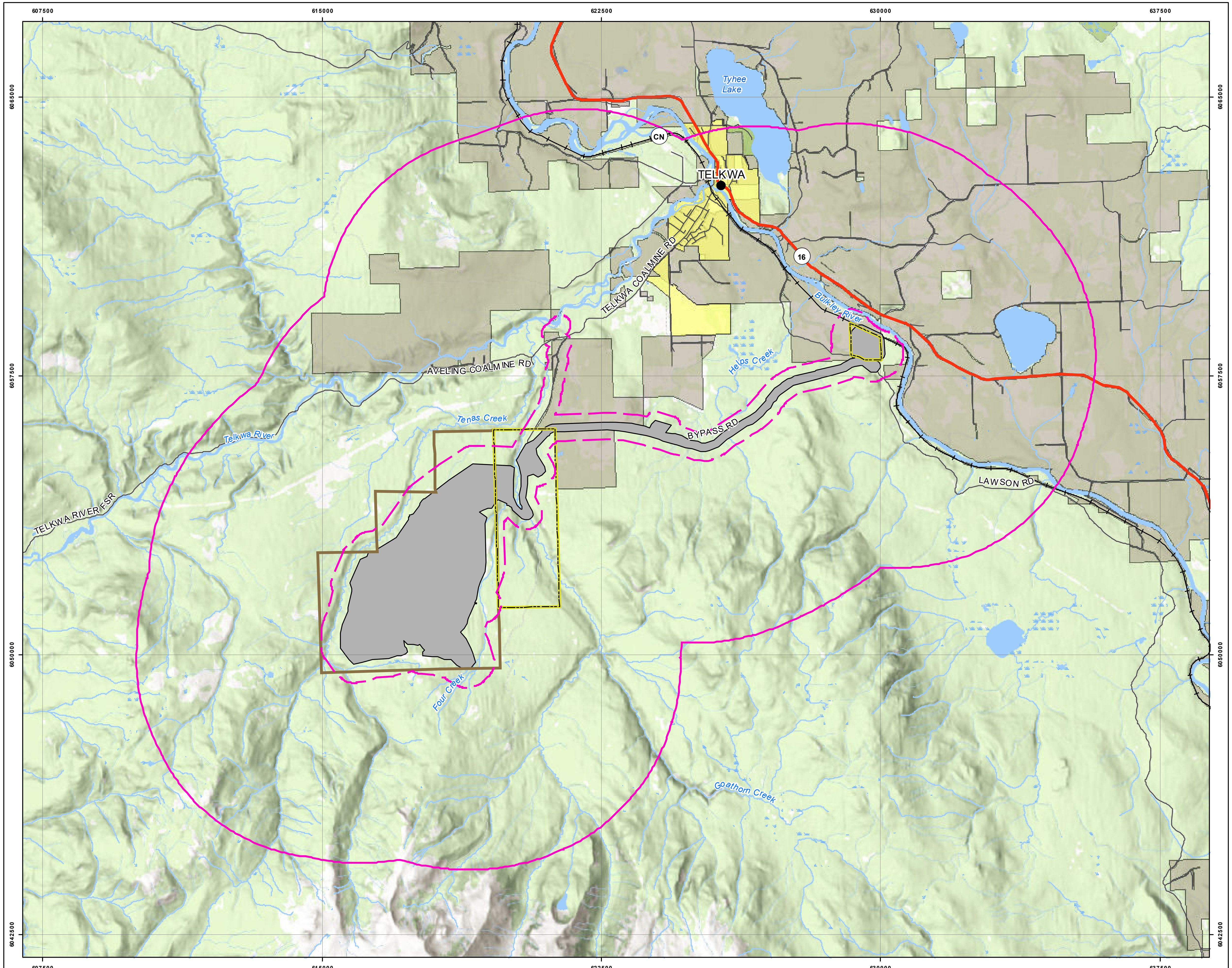
Explosives Facility and Magazine, pit).

- Terrain and Soils RSA: includes a minimum of a 5 km buffer around the Project Area.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation, and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Terrain and Soils Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Terrain and Soils Local Study Area
- Terrain and Soils Regional Study Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Map

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TELKWA COAL LIMITED

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4.2.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, list of the information provided in the baseline report, and field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Terrain and Soils VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Terrain and Soils VC:

- Desktop studies using publicly available information will be completed. Information sources may include but are not limited to existing terrain, soils, and geology mapping, reports completed from previous projects and the scientific literature.
- Terrain will be mapped within the Terrain and Soils LSA following the Terrain Classification System for British Columbia (Howes and Kenk 1997), the Guidelines and Standards to Terrain Mapping in British Columbia (Resources Inventory Committee 1996).
- Terrain mapping will be completed at the 1:10,000 scale, which indicates that 26 to 75 percent (%) of the polygons will be verified in the field.
- Field methodology will follow the Field Manual for Describing Terrestrial Ecosystems (BC Ministry of Forests and Range and BC Ministry of Environment 2010).
- Soils will be described using detailed soil surveys within any ALR areas and using Terrestrial Ecosystem Mapping (TEM) in non-ALR areas.
- Soil quality will be assessed in the context of land capability classification for agriculture.
- Any TEK will be included where relevant and available.

The Application will identify applicable provincial and federal legislation, policies, BMPs and guidance documents related to Terrain and Soils VC, including:

- *Mines Act*. RSBC 1996. Chapter 293 (Prov BC 1996f).
- Health, Safety and Reclamation Code for Mines in British Columbia. Ministry of Energy and Mines (Prov BC 2021);

- *Forest and Range Practices Act.* SBC 2002. Chapter 69 (Prov BC 2002d);
- *Environmental Assessment Act.* SBC 2002. Chapter 43 (Prov BC 2002c);
- Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME 2007);
- Bulkley Land and Resource Management Plan (Prov BC 1998a); and
- *Agricultural Land Commission Act* (Prov BC 2002a) and Agricultural Land Reserve Use Regulation (Prov BC 2019a).

The following Terrain and Soils VC technical reports will be referenced in the Application:

- Soil Survey and Land Capability Evaluation of the Telkwa Coal Project (Pedology Consultants 1984); and

The following Terrain and Soil VC technical report will be provided as an appendix to the Application:

- Terrain and Soil Baseline Studies.

4.2.3 Potential Effects

The Application will identify potential adverse effects on the Terrain and Soils VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Terrain and Soils VC resulting from activities within each phase of the Project. Interactions between Project components and activities and the Terrain and Soils VC will be summarized.

The following potential effects will be assessed:

- Changes to terrain from vegetation and rock removal during Construction and Operation phases of the Project; and
- Loss of soils and changes to soil quality due to change in chemical and physical characteristics during Construction, Operation, and Decommissioning and Reclamation phases of the Project.

4.2.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects on the Terrain and Soils VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

4.2.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on

the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.2.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;

- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR; and

- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR.

- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.2.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

4.3 Surface Water Valued Component

Project design and implementation may affect surface water quantity and quality in the Project Area. Instream and near-stream construction activities have the potential to produce elevated suspended solids in surface water and increase sediment deposition in sensitive habitats. This section of the Application will present the subcomponents, key indicators, and boundaries of the assessment for the Surface Water VC, and pathways along which potential Project related effects could occur, with cross references to other supporting VC assessment sections.

The Surface Water VC will include the following subcomponents and their associated indicators.

Subcomponent	Indicators
Surface Water Quantity	Change in surface water flow rates (m^3/sec)
Surface Water Quality	Change in: • Total and dissolved elements • Anions/ nutrients • Alkalinity/acidity • Hardness • Turbidity • Total suspended solids • pH • Conductivity • Temperature • PAHs

Project-related effects on this VC may have linkages to the following VCs:

- Aquatic Resources;
- Atmospheric Environment;
- Avian Species;
- Fish and Fish Habitat;
- Groundwater;
- Human Health;
- Land and Resource Use;
- Vegetation; and
- Wildlife.

4.3.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Surface Water VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Surface Water VC are described below and are illustrated in **Figure 6**. The water study boundaries are selected to account for near and far-field changes to surface water quantity and quality:

- Surface Water LSA: is defined where direct discharges occur to watercourses within the vicinity of the mine (e.g., Tenas Creek, Four Creek, and Goathorn Creek), to the edge of the mixing zone in the Telkwa River, and downstream of the Rail Loadout in the Bulkley River.

- Surface Water RSA: is assumed to extend to monitoring location WQS12 in the Bulkley River, downstream of the confluence with the Telkwa River. The extent of the RSA will be confirmed through modelling.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project, including a Post-closure monitoring plan. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Surface Water Local and Regional Study Areas

Legend

- City/Town
- Rail Line
- Highway
- Road
- Discharge Path
- Watercourse
- LSA Boundary
- RSA Boundary
- Wetland
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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4.3.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, list of the information provided in the baseline report, field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Surface Water VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach and sources are being used to develop existing conditions for the Surface Water VC:

- Surface water hydrology
    - Hydrometric monitoring stations were set up at Tenas Creek, Goathorn Creek, and Telkwa River. At each station, pressure transducers were installed as deep in the channel as possible to allow for continuous monitoring of water levels at all ranges of flows. Pressure transducers continuously recorded water level at a ten-minute interval.
    - Manual flow measurements were completed during each site visit during the 2017 to 2019 monitoring period to obtain a range of measured discharges under varying conditions.
    - To provide a continuous record of the discharge at hydrometric monitoring sites, empirical relationships between measured stage and discharge (i.e., rating curves) were developed (ISO 2010). Once the rating curve is established for a monitoring site, continuous stage data can be converted into continuous discharge data by applying the rating curve equation to the recorded stage values. Data are then presented as discharge hydrographs.
    - Annual hydrographs, presented as mean daily discharge, were generated for each hydrometric monitoring station operated in 2017.
    - Observed and calculated discharge values were used to generate a series of hydrologic indices including annual runoff, mean annual discharge, seasonal runoff distribution, and annual peak and low flows.
- Surface water quality
    - Water samples were collected in Tenas Creek, Goathorn Creek, Four Creek, Helps Creek, Telkwa River, and Bulkley River.
    - Samples were analyzed by ALS Environmental Laboratories.

- Water-quality parameters were compared to their respective BC Ministry of Environment and Climate Change Strategy and CCME water quality guidelines for the protection of freshwater aquatic life.

- Sources:
  - Telkwa River Below Tsai Creek, Bulkley River at Quick, and Bulkley River Near Smithers Real-time Hydrometric Data (Water Survey of Canada 2021a);
  - Goathorn Creek Near Telkwa Historical Hydrometric Data (Water Survey of Canada 2021b);
  - Telkwa Coal Project: Application for a Project Approval Certificate – Volumes I-V (Manalta Coal Ltd 1997a);
  - Final Project Report Specifications for Manalta Coal Ltd.'s Proposed Telkwa Coal Project (Telkwa Coal Project Committee 1997b);
  - Application for Environmental Assessment Certificate (Blue Pearl Mining Inc. 2008);
  - Davidson Project Meteorology and Hydrology Baseline report 2006-2008 (Rescan Environmental Services Ltd 2009);
  - Water Management for the Telkwa Coal Project (Piteau Engineering Ltd. August 1998);
  - Ambient Water Quality Objectives for the Bulkley River Basin: Overview Report. B.C. Ministry of Environment (R. Nijman 1986a);
  - Ambient Water Quality Objectives for the Bulkley River Basin: Technical Appendix. B.C. Ministry of Environment (R. Nijman 1986b);
  - Telkwa Coal Mine Surface Water Monitoring Program 1998. (AGRA Earth & Environmental Ltd. 1999) ;
  - Telkwa Coal Project 1999 Baseline Surface Flow and Water Quality Final Data Report (AGRA Earth & Environmental Ltd. 2000);
  - Drinking Water Source Quality Monitoring 2002-03; Bulkley Valley Surface Water Sources: Smithers Lakes, Kirby Lake, Chicago Creek, Bulkley River, Tobaggan Creek, and Thompson Creek (BC MOE 2006a);
  - Skeena-Nass Area Bulkley River Basin Water Quality Assessment and Objectives (BC Ministry of Environment 1986) ;
  - Report to Stephen Day: BC Research Selenium Results (Frontier Geosciences 1999);
  - Baseline Data, Surface Water and Groundwater, Telkwa Coal Project (Piteau Engineering

1994);

- Summary of Fisheries, Aquatic Habitat and Water Quality Information for the Telkwa Project Area: A Literature Review (SRK Consultants 1996);
- TEK where relevant and available.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Surface Water VC, including:

- *Water Sustainability Act*. Chapter 15 (Prov BC 2014);
- *Canada Water Act. R.S.C.* 1985 (GOC 1985a);
- *Fisheries Act. R.S.C.* 1985 (GOC 1985d);
- *Canadian Environmental Protection Act*. S.C. 1999 (GOC 1999);
- *Mines Act.* Chapter 293. 1996 (Prov BC 1996f);
- *Environmental Management Act*. Chapter 53. 2003 (Prov BC 2003);
- Manual of British Columbia Hydrometric Standards (Prov BC 2018b);
- Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC Ministry of Environment 2016a);
- British Columbia Environmental Laboratory Manual (BC Ministry of Environment 2020a);
- British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (Ministry of Environment 2019c);
- Canadian Council of Ministers of the Environment (CCME) guidelines (CCME 2018);
- BC Field Sampling Manual (BC Ministry of Environment 2016b); and
- Guidelines for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia (Prov BC 1998b).

The following Surface Water VC technical reports will be provided with the Application:

- Tenas Project: 2017 to 2019 Baseline Report (ERM 2020).

4.3.3 Potential Effects

The Application will identify potential adverse effects to the Surface Water VC in a manner consistent with

section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Surface Water VC resulting from project activities within each phase of the Project. Interactions between Project components and activities and the Surface Water VC will be summarized.

Results from water quality predictions will be screened against provincial guidelines and background concentrations. Exceedances will be identified and discussed in the context of potential risk for biological effects. A detailed water quantity and quality model will be completed for the effects assessment. The methodologies and model results throughout all Project phases will be presented in the Application. The water quality model will incorporate parameters of potential concern, with relevant water quality guidelines. BC water quality guidelines for drinking water and freshwater aquatic life, combined with the Canadian Council of Ministers of Environment (CCME) guidelines and a Species Sensitivity Distribution (SSD) approach will be used.

A bioaccumulation assessment of selenium in the aquatic environment will be prepared (to determine selenium risk), and this will be presented in the Application. The above-mentioned water quality model will predict total selenium.

Parameters including, but not limited to copper, cadmium, selenium, and sulphate will be evaluated in the water and load balance modeling for the Project. Nitrogen species released through blasting have also been incorporated using approved methodologies. Calcite saturation indices will be calculated to determine if calcite is supersaturated in the modelled solutions to determine if calcite has the potential to precipitate in site waters and discharge from the Project.

The site-wide water balance and water quality model will incorporate the results of the groundwater numerical flow model to delineate surface water-groundwater interactions and potential effects to both surface water quantity and surface water quality.

The following potential effects will be assessed for all Project phases:

- Annual runoff;
- Seasonal distribution of flow;
- Timing and magnitude of peak and low flow events;
- Changes to groundwater-surface water interactions;
- Evaluation of the metal leaching and acid rock drainage (ML/ARD) potential of mined materials (e.g., mined rock and processed rock) and influence of ML/ARD on surface water quality; and
- Changes to surface water quality.

4.3.4 Mitigation Measures

The Application will identify measures to avoid, reduce, manage or otherwise mitigate potential adverse effects to the Surface Water VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced (e.g., Water, Discharge, and Explosives), when and if appropriate. Potential linkages to other aspects of the Application will be identified and cross-referenced. Mitigation measures and contingency plans will be proposed should predictions exceed benchmarks for the protection of the environment.

4.3.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.3.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;

- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR; and

- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR.

- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.3.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

4.4 Groundwater Valued Component

Groundwater is protected under various legislation including the *BC Water Sustainability Act* (Prov BC 2014), *BC Environmental Management Act* (Prov BC 2003) and the *BC Mines Act* (Prov BC 1996f). The Project has the potential to interact with groundwater quantity and quality as a result of Project-related water management, and mine development. This section of the Application will present the subcomponents, key indicators, and boundaries of the assessment for the Groundwater VC, and pathways along which potential Project related effects could occur, with cross references to other supporting VC assessment sections.

The following Groundwater VC will include the following subcomponents and indicators:

Subcomponent	Indicators
Groundwater Quantity	Change in • Groundwater discharge rates to surface water features (e.g., streams and creeks) (m^3/s) • Groundwater levels (metres below ground surface)
Groundwater Quality	Change in • Dissolved elements • Anions/nutrients • Alkalinity/acidity • Hardness • Total dissolved solids • pH • Conductivity • Temperature

Project-related effects on this VC may have linkages to the following VCs:

- Aquatic Resources;
- Avian Species;
- Fish and Fish Habitat;
- Human Health
- Surface Water;
- Terrain and Soils;
- Vegetation; and
- Wildlife.

4.4.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Groundwater VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Groundwater VC are described below and are illustrated in **Figure 7**.

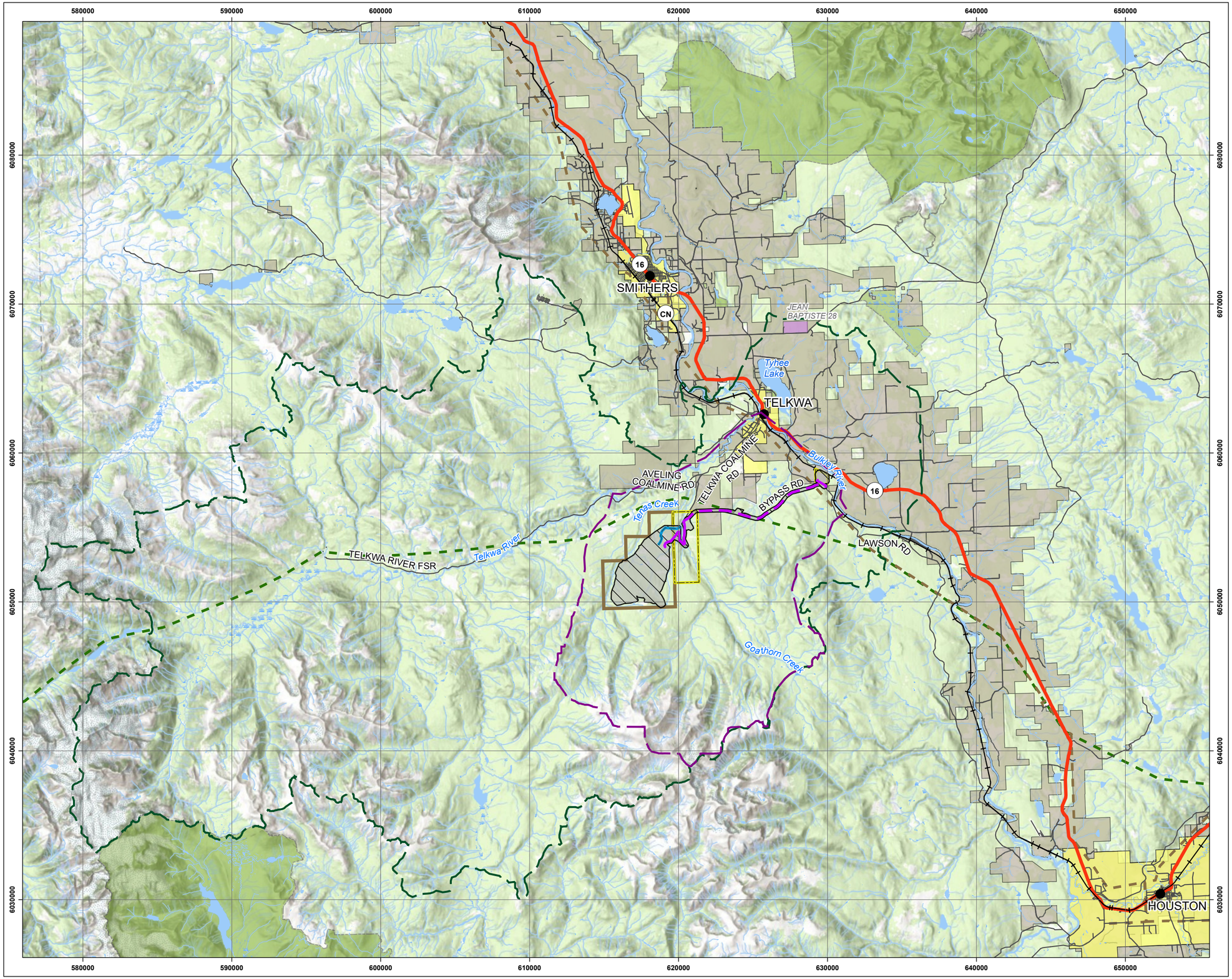
- Groundwater LSA: Where the Project may have a direct influence on the groundwater system and/or groundwater users. The area is delimited based on watersheds and to include the Project Area, and the private domestic wells located downgradient of the Project.

- Groundwater RSA: Coincides with the Aquatic Resources RSA given the interdependence between groundwater and surface water.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project, including a Post-closure monitoring plan. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Groundwater Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Tenas Access Corridor
- Road
- 138 kV Transmission Line
- 500 kV Transmission Line
- Discharge Path
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Groundwater LSA
- Groundwater RSA

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a “stand-alone” document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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4.4.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, list of the information provided in the baseline report, field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Groundwater VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Groundwater VC:

The characterization of groundwater has generally followed regulatory and policy frameworks, and provincial and regional BMPs and guidance documents, applicable to the Groundwater VC. Although not an exhaustive list, references include the following:

- Joint Application Requirements for *Mines Act* and *Environmental Management Act* Permits (BC Ministry of Energy, Mines and Petroleum Resources, and BC Ministry of Environment and Climate Change Strategy 2019);
- Groundwater Protection Regulation (Prov BC 2016), *Water Sustainability Act*. Chapter 15. 2016. (Prov BC 2014);
- Guidelines for Groundwater Modelling to Assess Impacts of Proposed Natural Resource Development Activities (BC Ministry of Environment 2012);
- Framework for a Hydrogeologic Study in support of an Application for an Environmental Assessment Certificate under the *Environmental Assessment Act* and Regulations (BC Ministry of Environment, Water Stewardship Division 2019);
- Draft Guidelines for the Preparation of an Environmental Impact Statement (CEAA 2015); and
- Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators, Version 2 (BC Ministry of Environment 2016a).

The Application will describe the existing (or baseline) groundwater conditions within the study area in detail to enable potential Project-VC interactions to be identified, understood, and assessed, including:

- A description of the literature reviews, desktop studies, and field programs, with reference to applicable assumptions, standards, methods, dates, analyses, and margins of error or degree of uncertainty; and

- Natural and/or human-caused trends that may have altered the VC as a result of the Project or other project and/or activities in the area.

The baseline groundwater conditions will be characterized based on the relevant documentation produced specifically for the Project, as well as publicly available studies for the study area or other projects in central BC. The key findings will be summarized directly in the Application and the full description of the study will be documented in two technical reports contained in Appendices:

- Baseline Data – Surface Water and Groundwater for the Project; and
- Groundwater Assessment Technical Report for the Project.

The information specific to the Project will include:

- The groundwater field investigations completed by the prior owners (Manalta Coal Ltd.);
- The groundwater field investigations completed since 2017 to compliment the historical studies;
- Comparisons of groundwater quality at the Project with BC Ministry of Environment approved and working water quality guidelines for freshwater aquatic life; and
- Characterization of the baseline hydrogeological setting and groundwater flow regime of the Project.

4.4.3 Potential Effects

The Application will identify potential adverse effects to the Groundwater VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Groundwater VC resulting from activities within each phase of the Project. Interactions between Project components and activities and the Groundwater VC will be summarized..

The following potential effects will be assessed:

- Groundwater Quantity: Mining and pit dewatering may cause changes to ground surface and subsurface characteristics and development of water management components may change groundwater levels and discharge rates to creeks; and
- Groundwater Quality: The potential loads associated with the weathering of pit walls, waste facilities, and control ponds can migrate via groundwater and change the groundwater quality.

Potential groundwater quantity effects will be assessed using numerical groundwater flow models that follow the Guidelines for Groundwater Modelling to Assess Impacts of Proposed Natural Resource Development Activities, prepared by BC Ministry of Environment (2012). The models will be calibrated to groundwater levels and baseflow estimates and the sensitivity of model parameters will be tested. Model results will be provided in the Groundwater Assessment Technical Report included as an appendix to the Application. Potential effects related to groundwater quality will be assessed with the site-wide water and

load balance model utilizing results from the numerical groundwater flow models. All primary effects pathways will be carried forward for further evaluation of the residual effects.

4.4.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Groundwater VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

4.4.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context, as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.4.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR; and
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR.
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.4.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

4.5 Aquatic Resources Valued Component

The Project has the potential to affect aquatic resources in subbasins of the Telkwa River over which the Project is located (i.e., Tenas Creek, Goathorn Creek, and Four Creek), and in aquatic habitats downstream of proposed diversions and contact water discharge locations . Construction and Operation phases of the mine may have adverse effects on aquatic resources through change in water quality and in concentrations of contaminants in sediments that may affect the abundance, diversity, richness, and evenness of benthic invertebrates and periphyton.

As Project-related effects to this VC comprise one of the steps along the pathways of effects of the Project, with other VCs as the ultimate receptors of those effects, Aquatic Resources will be studied in the context of effects of the Project on Fish and Fish Habitat, Wildlife, and Avian Species. The Aquatic Resources VC will include the following subcomponents and associated indicators. This section of the Application will present the subcomponents, key indicators, and boundaries of the assessment for the Aquatic Resources VC, and pathways along which potential Project related effects could occur, with cross references to other supporting VC assessment sections. The Aquatic Resources VC will include the following subcomponents and indicators:

Subcomponent	Indicators
NA	Change in: • Composition, abundance, diversity of periphyton and benthic invertebrates • Concentrations of contaminants of potential concern in sediments relative to toxicological benchmarks

This VC assessment may support and be supported by the following VC assessments:

- Avian Species;
- Atmospheric Environment;
- Fish and Fish Habitat;
- Groundwater;
- Human Health;
- Surface Water;
- Terrain and Soils;
- Vegetation; and
- Wildlife.

4.5.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Aquatic Resources VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Aquatic Resources VC are described below and are illustrated in **Figure 8**. The boundaries of the LSA and RSA encompass those instream areas that are likely influenced by Project-related habitat disturbance, water quality effects, and sedimentation and were chosen to correspond with those for the Fish and Fish Habit VC (Section 4.6 of the Application).

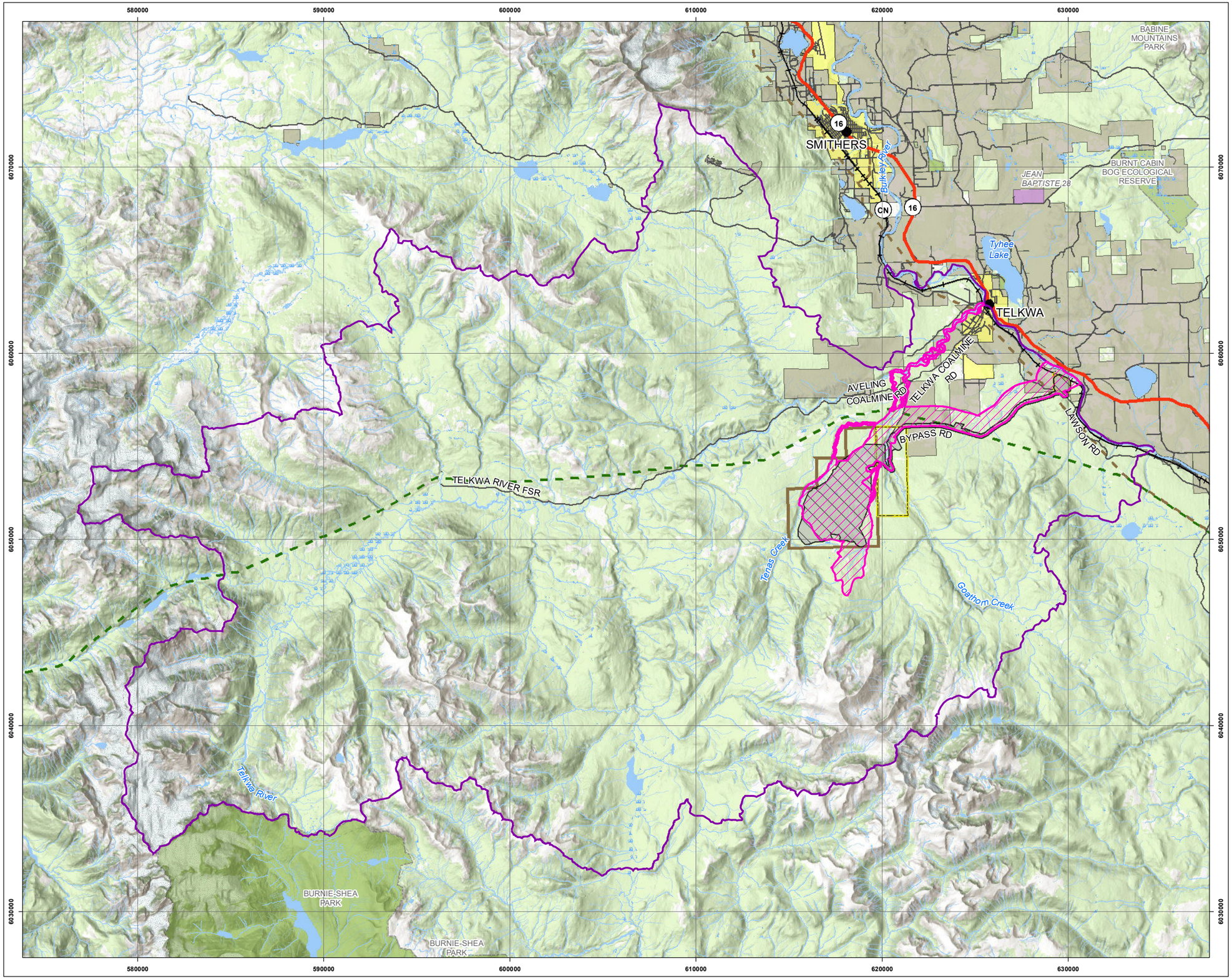
- Aquatic Resources LSA: Fish habitats within the Project Footprint, Four Creek, and Tenas and Goathorn Creeks downstream of the mine footprint; and from 100 m upstream to 300 – 1000 m downstream on watercourses crossed by the Bypass Road.

- Aquatic Resources RSA: Fish habitats in the Telkwa River watershed and in the tributaries to the Bulkley River crossed by the Bypass Road.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Aquatic Resources Local and Regional Study Areas



Legend

- Aquatic Resources and Fish and Fish Habitat Local Study Area
- Aquatic Resources and Fish and Fish Habitat Regional Study Area
- City/Town
- Rail Line
- Highway
- Road
- 138 kV Transmission Line
- 500 kV Transmission Line
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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4.5.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, list of the information provided in the baseline report, field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Aquatic Resources VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC.

The following general approach is being taken to develop existing conditions for the Aquatic Resources VC:

- Summarize available existing aquatic resource information for the Project study areas including the historical surveys of water quality, sediment quality, and abundance, diversity, and richness of benthic invertebrates and periphyton;
- Sampling of sediments;
    - Sediment samples were collected from six sites in the Project area in September 2017.
    - Sediment samples were collected from existing sites and four new sites in 2019.
    - Whole sediment samples from streams were analyzed for pH, particle size, nutrients, total organic compounds, and metals.
    - Sediments were compared to the current BC Ministry of Environment and Climate Change Strategy working sediment quality criteria (BC Ministry of Environment and Climate Change Strategy 2018b) and sediment quality guidelines (CCME 2018).
- Sampling of periphyton;
    - Periphyton biomass (as chlorophyll *a*) was sampled from six stream sites in 2017.
    - Periphyton samples were collected from existing sites and four new sites in 2019.
    - Periphyton density was calculated by dividing the total number of cells counted by the area sampled and corrected for subsampling.
- Sampling of benthic invertebrates;
    - Kick net sampling was conducted once at each site in 2017.

  - The Canadian Aquatic Biomonitoring Network (CABIN) model was used for comparing relative stream health based on benthic invertebrate density and diversity.
  - Invertebrates were sorted and identified to the lowest possible taxonomic level (usually genus).
- Instream Flow Methods (IFM);
  - Three IFM field surveys were conducted in 2019 to capture seasonal flows; and
  - Overwintering surveys in 2019 and 2020 will complement IFM surveys.
- Compilation of TEK where relevant and available.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Aquatic Resources VC, including:

- Surface Water Quality Guidelines for the Protection of Aquatic Life in BC (Ministry of Environment 2018);
- *Water Sustainability Act*. SBC 2014. Chapter 15 (Prov BC 2014);
- *Canada Water Act*. RSC 1985 (GOC 1985a);
- *Mines Act.* RSBC 1996. Chapter 293 (Prov BC 1996f);
- *Environmental Management Act*. SBC 2003. Chapter 53 (Prov BC 2003);
- Manual of British Columbia Hydrometric Standards (Prov BC 2018b);
- *Fisheries Ac*t. RSC 1985 (GOC 1985d);
- *Canadian Environmental Protection Act*. SC 1999 (GOC 1999).;CCME guidelines (CCME 2018);
- Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (Ministry of Environment 2016a);BC Field Sampling Manual (Clark 2002, 2013 edition);
- *Riparian Areas Protection Act.* SBC 1997. Chapter 21 (Prov BC 1997);
- *Species at Risk Act* (*SARA*). SC 2002 (GOC 2002);
- *Canadian Environmental Assessment Act.* 2012 (GOC 2012);
- British Columbia Conservation Data Centre (Ministry of Environment 2015a);
- Fisheries and Oceans Canada Protection Policy Statement (Fisheries and Oceans Canada 2013);

- BC Water and Sediment Quality Guidelines (Ministry of Environment 2006b);
- Canadian Sediment Quality Guidelines (CCME 2011); and
- Canadian Tissue Residue Guidelines (CCME 2001).

The following Aquatic Resources VC technical reports will be provided with the Application:

- Telkwa Coal Project Aquatic Resources Assessment (Bustard 1985);
- Assessment of Benthic Invertebrate and Juvenile Fish Populations in Goathorn and Tenas Creeks and the Lower Telkwa Rivers (Bustard 1984); and
- Tenas Project: 2017 to 2019 Baseline Report (ERM 2020).

4.5.3 Potential Effects

The Application will identify potential adverse effects to the Aquatic Resources VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Aquatic Resources VC resulting from Project activities within each phase of the Project. The Application will identify and evaluate the anticipated interactions between the Project and the VC.

The following potential effects will be assessed:

- Change in water quality due to releases of suspended sediments, mine contact water, blast residues, and flow alterations;
- Change in sediment quality due to releases of suspended sediments, mine contact water, blast residues, and flow alterations; and
- Change in the abundance and community structure of periphyton and benthic invertebrates.

4.5.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Aquatic Resources VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

4.5.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context, as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.5.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** this AIR;

- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR; and

- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR.

- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.5.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

4.6 Fish and Fish Habitat Valued Component

The Project has the potential to affect fish and fish habitat in sub-basins of the Telkwa River in which the Project is located (i.e., Tenas Creek, Goathorn Creek, and Four Creek), and in aquatic habitats downstream of proposed diversions and contact water discharge locations. Construction and Operation phases of the mine may have adverse effects on fish and fish habitat through direct mortality of fish, alterations or destruction of fish habitat, change in base flows, and in the degradation of water quality. Due to their position as a top predator in the aquatic food chain, fish are important as an indicator of overall aquatic health. They are also important for their recreational, ceremonial, and food value to both Indigenous and other users.

The Fish and Fish Habitat VC will include the following subcomponents and associated indicators:

Subcomponent	Indicators
Fish Habitat	Change in areal extent permanently altered, destroyed or made inaccessible to fish
Fish	Change in: • Fish health • Abundance • Condition

This VC assessment may support and be supported by the following VC assessments:

- Aquatic Resources;
- Atmospheric Environment;
- Avian Species;
- Groundwater;
- Human Health.
- Land and Resource Use;
- Surface Water;
- Terrain and Soils;
- Vegetation; and
- Wildlife.

4.6.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Fish and Fish Habitat VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Fish and Fish Habitat VC are described below and are illustrated in **Figure 9**. They coincide with the spatial boundaries of the Aquatic Resources VC (section **4.5** of this AIR). The LSA includes instream and riparian areas that are likely to be influenced by Project-related habitat disturbance, water quality effects, and sedimentation. The RSA includes those instream and riparian areas in which Project-related effects may interact with effects from other projects.

- Fish and Fish Habitat LSA: Fish habitats within the Project Footprint, Four Creek, and Tenas and Goathorn Creeks downstream of the mine footprint; and from 100 m upstream to 300 – 1000 m downstream on watercourses crossed by the Bypass Road.

- Fish and Fish Habitat RSA: Fish habitats in the Telkwa River watershed and in the tributaries to the Bulkley River crossed by the Bypass Road.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Fish and Fish Habitat Local and Regional Study Areas

Legend

- Fish and Fish Habitat Local Study Area
- Fish and Fish Habitat Regional Study Area
- City/Town
- Rail Line
- Highway
- Road
- 138 kV Transmission Line
- 500 kV Transmission Line
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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4.6.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, a list of the information provided in the baseline report, and field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Fish and Fish Habitat VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC.

The following general approach is being taken to develop existing conditions for the Fish and Fish Habitat VC:

- Summarize available existing fisheries inventory and habitat use information for the Project study areas including the occurrence and distribution of indicators, as well as information on habitat use.
- Sampling for fish to determine fish presence, species composition and distribution, and to collect fish tissue for metals analysis at receiving and reference sites.
- Identification of species and maturity for captured fish and measurement of length, weight, condition, and age.
- Assessment of stream habitat for indicator species within the LSA based on known species distributions and species captured during fish sampling.
- Compilation of TEK where relevant and available.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Fish and Fish Habitat VC, including:

- *Fisheries Act* RSC 1985 (GOC 1985d);
- *Water Sustainability Act*. SBC 2014. Chapter 15 (Prov BC 2014);
- *Species at Risk Act* (*SARA*). SC 2002 (GOC 2002);
- *Canadian Navigable Waters Act*. RSC 1985 (GOC 1985c);
- *Mines Act.* RSBC 1996. Chapter 293 (Prov BC 1996f);

- *Environmental Management Act*. SBC 2003. Chapter 53 (Prov BC 2003); and
- Metal Mining Environmental Effects Monitoring Technical Guidance Document (Environment Canada 2011).

The following Fish and Fish Habitat VC technical reports will be provided with the Application:

- 1982 Investigations of Adult Coho Salmon in the Telkwa River (Bustard 1983);
- Assessment of Benthic Invertebrate and Juvenile Fish Populations in Goathorn and Tenas Creeks and the Lower Telkwa River (Bustard 1984); and
- Tenas Project: 2017 to 2019 Baseline Report (ERM 2020).

4.6.3 Potential Effects

The Application will identify potential adverse effects to the Fish and Fish Habitat VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Fish and Fish Habitat VC resulting from Project activities within each phase of the Project. Interactions between Project components and activities and the Fish and Fish Habitat VC will be summarized.

The following potential effects will be assessed:

- Change in the aerial extent of available fish habitat due to destruction, alteration, change in baseflows, degradation of water quality, or creation of barriers to fish passage; and
- Change in health, abundance, or condition of fish due to direct impacts, stranding, or degradation of water quality.

4.6.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Fish and Fish Habitat VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

4.6.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context, as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.6.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;

- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;

- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and

- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.6.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

4.7 Vegetation Valued Component

The landscape where the Project is located is primarily sub-boreal spruce forest that has experienced forest harvesting over the last 40 years, creating a mosaic of young to mature forest types. The Project has potential to alter forests, wetlands, ecological communities, culturally important plant species and rare plants or lichens. This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Vegetation VC, potential Project-related effects, and analysis of potential residual effects. There will be cross references to other relevant VC assessment sections.

The Vegetation VC will include the following subcomponents and their associated indicators:

Subcomponent	Indicators
Old Growth Forest	Change in: • Extent • Structural stage
Wetlands (including biodiversity, water quantity and quality, and habitat function)	Change in extent of wetland communities
Listed Ecological Communities	Change in extent
Culturally Important Species	
Rare Plants and Lichens	Change in extent of known occurrences

This VC assessment may support and be supported by the following VC assessments:

- Avian Species;
- Aquatic Resources;
- Atmospheric Environment
- Fish and Fish Habitat;
- Groundwater;
- Heritage Resources;
- Human Health;
- Land and Resource Use;
- Surface Water;
- Terrain and Soils;
- Visual Resources; and

- Wildlife.

4.7.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Vegetation VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Vegetation VC are described below and are illustrated in **Figure 10**. The Vegetation LSA includes all areas that have potential for direct and indirect effects on vegetation resources as a result of the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. The RSA is designed to provide context for regionally available vegetation resources for the assessment of both residual and cumulative effects. The boundaries are consistent with the extent of Predictive Ecosystem Mapping (PEM; at a regional scale), and TEM (at a local scale):

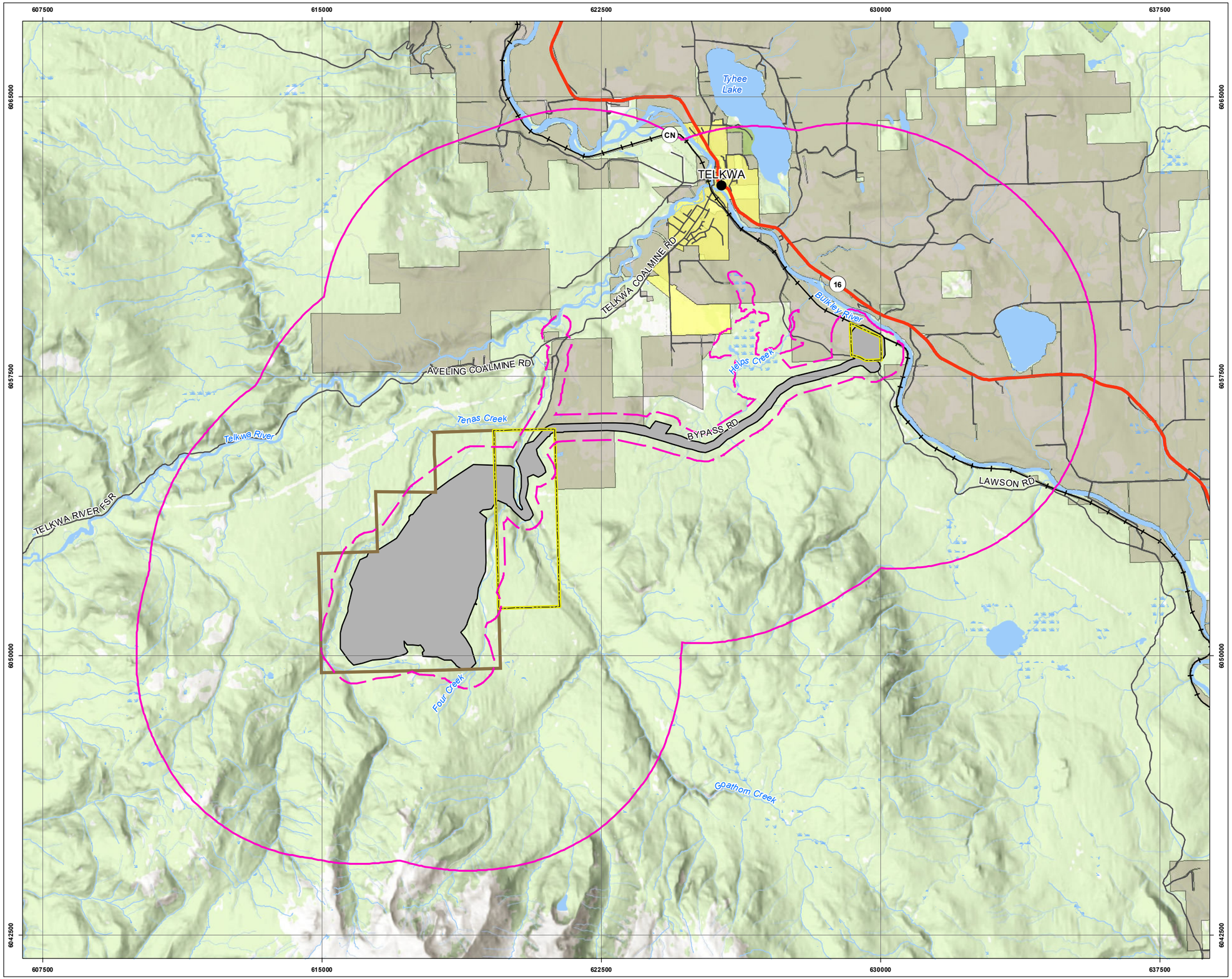
- Vegetation LSA: includes the Project Area with a 250 m buffer on gravel quarries and linear infrastructure outside of the Rail Loop, Minesite and Mine Infrastructure Complex (i.e., roads, powerlines, pipelines), and a 500 m buffer around all other infrastructure (e.g., Rail Loop, Explosives Facility and Magazine, pit). A wetland complex located downgradient from the Project was also included within the Vegetation LSA to encompass potential indirect effects on wetlands.

- Vegetation RSA: includes a minimum of a 5 km buffer around the Project Area.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and the Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Vegetation Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Vegetation Local Study Area
- Vegetation Regional Study Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
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4.7.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, list of the information provided in the baseline report, field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the timeframe and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. Where available and appropriate, the Application will describe available traditional ecological or community knowledge related to the Vegetation VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following approach is being taken to develop existing conditions for the Vegetation VC:

- Desktop studies using publicly available information will be completed. Information sources may include but are not limited to existing TEM, PEM, Vegetation Resources Inventory, records of occurrences of species and ecosystems at risk according to the BC Conservation Data Centre, reports completed for relevant previous projects, and the scientific literature.

- TEM will be completed for the Project Footprint according to the Standard for Terrestrial Ecosystem Mapping in British Columbia (Resources Inventory Committee 1998) at the 1:5,000 scale and survey intensity level (SIL 1/2) within the mine pit area and rail loadout, which indicates that 51 – 100% of the polygons will be inspected in the field to verify mapping accuracy. The remainder of the Project Footprint will be mapped at the 1:10,000 scale (SIL 2), which indicates that 51 – 75% of the polygons will be field verified.

- Field methodology will follow the Field Manual for Describing Terrestrial Ecosystems (BC Ministry of Forests and Range and BC Ministry of Environment 2010).

- Ecosystems will be classified according to the Biogeoclimatic Ecosystem Classification system and applicable site identification field guides (e.g., Banner et al. 1993).

- Wetlands will be classified according to Wetlands of British Columbia: A Guide to Identification (MacKenzie and Moran 2004).

- Wetland functions (e.g., hydrologic, biochemical, ecological and habitat) will be assessed in the field using an adapted protocol following Wetland Ecological Functions Assessment: An Overview of Approaches (Hanson et al. 2008).

- Invasive plants will be inventoried in the field and classified according to the BC *Weed Control Act* (Prov BC 1996i).

- Provincially and federally-listed rare plants and lichens will be surveyed according to the Protocols

for Rare Plant Surveys (Penny and Klinkenberg 2018).

- Culturally important species will be identified through literature research and consultation with Indigenous Groups.
- Where available and appropriate, TEK will be incorporated.

The Application will identify applicable provincial and federal legislation, policies, BMPs and guidance documents related to the Vegetation VC, including:

- *Forest and Range Practices Act*. SBC 2002. Chapter 69 (Prov BC 2002d);
- *Species at Risk Act (SARA)*. SC 2002 (GOC 2002);
- *Mines Act.* RSBC 1996. Chapter 293 (Prov BC 1996f);
- Health, Safety and Reclamation Code for Mines in British Columbia (Prov BC 2021);
- *Weed Control Act*. RSBC 1996. Chapter 487 (Prov BC 1996i) and Weed Control Regulations (Prov BC 2011);
- Bulkley Land and Resource Management Plan (Prov BC 1998a);
- Standard for Terrestrial Ecosystem Mapping in British Columbia (Resources Inventory Committee 1998);
- The Federal Policy on Wetland Conservation (GOC 1991);
- Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia. Wetland Stewardship Partnership (Prov BC 2009);
- *Environmental Management Act.* SBC 2003. Chapter 53 (Prov BC 2003);
- *Water Sustainability Act*. Chapter 15 (Prov BC 2014); and
- North West Invasive Plant Council (NWIPC 2018).

The following Vegetation VC technical report will be provided as an appendix to the Application:

- Ecosystems and Vegetation Baseline Report

4.7.3 Potential Effects

The Application will identify potential adverse effects to the Vegetation VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Vegetation VC resulting from Project activities within each phase of the Project. Interactions between Project components and activities and the Vegetation VC will be summarized.

The following potential effects will be assessed for all phases of the Project:

- Alteration and/or loss of vegetation, ecosystems and wetlands from land clearing and mine Construction and Operation phases; and
- Deposition of trace metals on plants and soil, which can result in uptake by plants during Construction and Operation phases.

4.7.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Vegetation VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

4.7.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context, as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.7.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with

sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.7.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

4.8 Wildlife Valued Component

The landscape where the Project is located primarily sub-boreal spruce forest that has experienced forest harvesting over the last 40 years creating a mosaic of young to mature forest types. There is a range of mixed and coniferous forested ecological communities, small wetlands, and open water areas. The disturbed nature of the landscape influences the type and abundance of wildlife present. Wildlife species identified as having historic or current use, include ungulates (caribou, moose, mule deer, white-tailed deer and elk), bears (black and grizzly bear), furbearers (wolf, lynx, coyote, fisher, marten, ermine), small mammals (squirrels, voles, mice), bats, reptiles (common garter snake) and amphibians (western toad, Columbia spotted frog, long-toed salamander). This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Wildlife VC, potential Project-related effects, and analysis of potential residual effects. There will be cross references to other relevant VC assessment sections.

The Wildlife VC will include the following subcomponents and their associated indicators:

Subcomponent	Indicators
Furbearers (American marten (*Martes americana*); Wolverine (*Gulo gulo*), Fisher (*Pekania pennanti*)	Change in: • Habitat, including direct and indirect disturbance (including sensory disturbance) • Mortality • Movement (as an Indicator for grizzly bear, caribou, wolverine, and Western toad; qualitative analysis for marten, moose and bats based on available information)
Caribou (*Rangifer tarandus*) (northern mountain population)	
Grizzly Bear (*Ursus arctos*)	
Moose (*Alces americanus*)	
Bats (Little Brown myotis (*Myotis lucifugus*), Northern myotis (*Myotis septentrionalis*)	
Western Toad (*Anaxyrus boreas*)	

This VC assessment may support and be supported by the following VC assessments:

- Avian Species;
- Aquatic Resources;
- Atmospheric Environment;
- Fish and Fish Habitat;
- Groundwater;

- Heritage Resources;
- Human Health;
- Land and Resource Use;
- Surface Water;
- Terrain and Soils;
- Vegetation; and
- Visual Resources.

4.8.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Wildlife VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

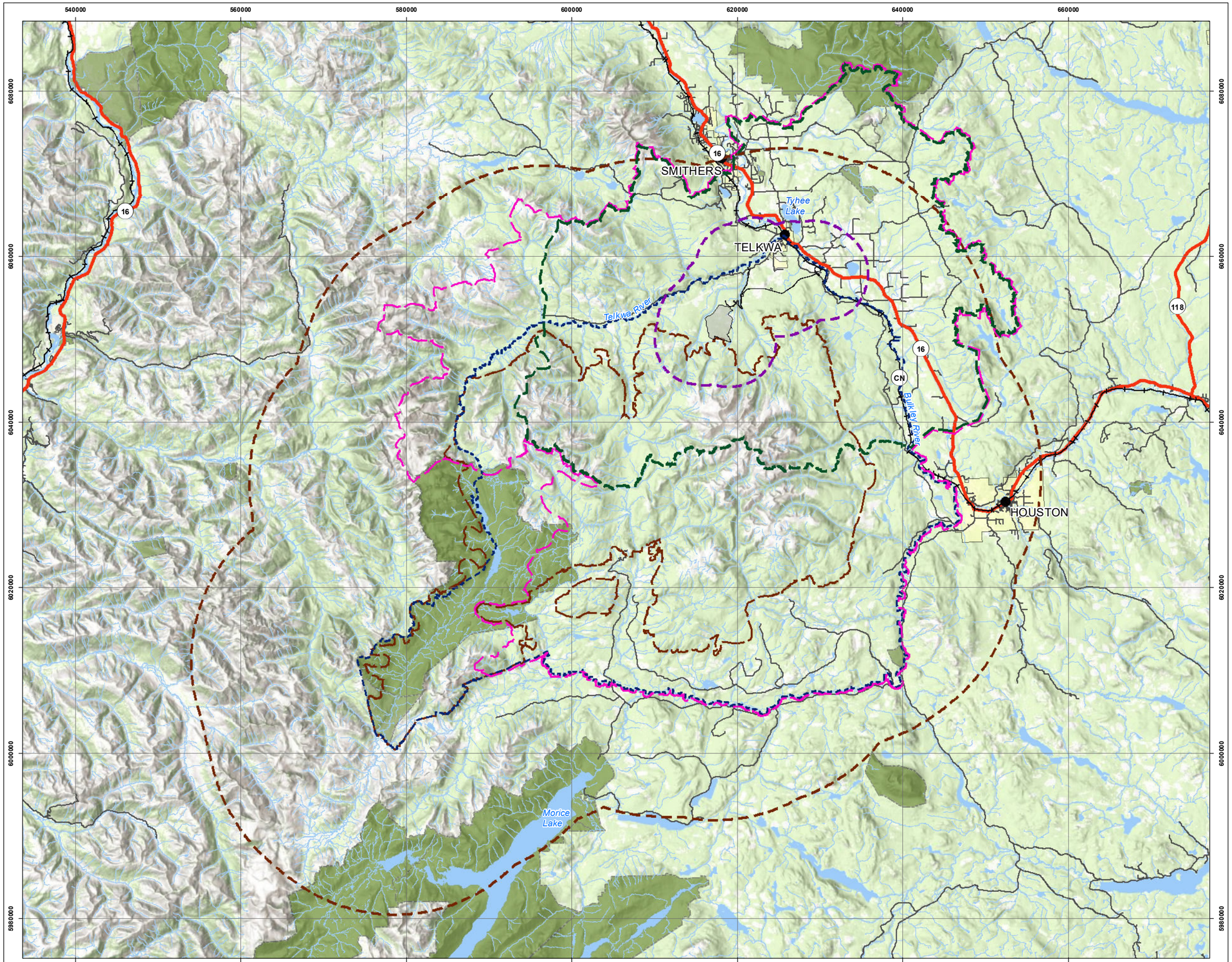
The proposed LSA and RSA for the Wildlife VC are described below and are illustrated in **Figures 11A-C**.

- Wildlife LSA: designed to capture potential direct and indirect effects of the Project's Construction, Operation, and Decommissioning and Reclamation phases. It includes the Project Area plus a minimum of a 5 km buffer (**Figure 11A**).
- Wildlife RSA: designed to include regionally available habitat for wildlife species that have been selected as subcomponents. Three separate RSAs are proposed relative to species' range:
    - Wildlife RSA: Intersection of all watersheds that overlap a 10 km buffer around the Project Area (**Figure 11B**);
    - Wide-ranging Wildlife RSA: Bulkley watershed excluding biogeoclimatic zones that are associated with coastal ecosystems (**Figure 11B**); and
    - Caribou RSAs: Three RSAs will be used for assessments for caribou, as per recommendations from ECCC and the Province: the 2014 ECCC Critical Habitat area (RSA1) (ECCC 2014), the 2019 Provincial Core habitat (RSA2 Core) (Dodd and Carswell 2019), and Matrix habitat (RSA2 Matrix) (Dodd and Carswell 2019) types. RSA1 corresponds to existing provincial management areas for the Telkwa Caribou Herd (TCH), such as the TCH Wildlife Habitat Area (**Figure 11C**).

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Wildlife and Caribou Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Waterbody
- Park or Protected Area
- Municipal Area
- Project Area
- Wildlife Local Study Area
- Wildlife Regional Study Area
- Wide Ranging Wildlife Regional Study Area

Caribou Regional Study Areas

- 2014 ECCC Critical Habitat Area
- 2019 BC Habitat Mapping Core
- 2019 BC Habitat Mapping Matrix

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a “stand-alone” document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, 2020
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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20P0172	Production Date: Jul 05, 2021	Figure 11A

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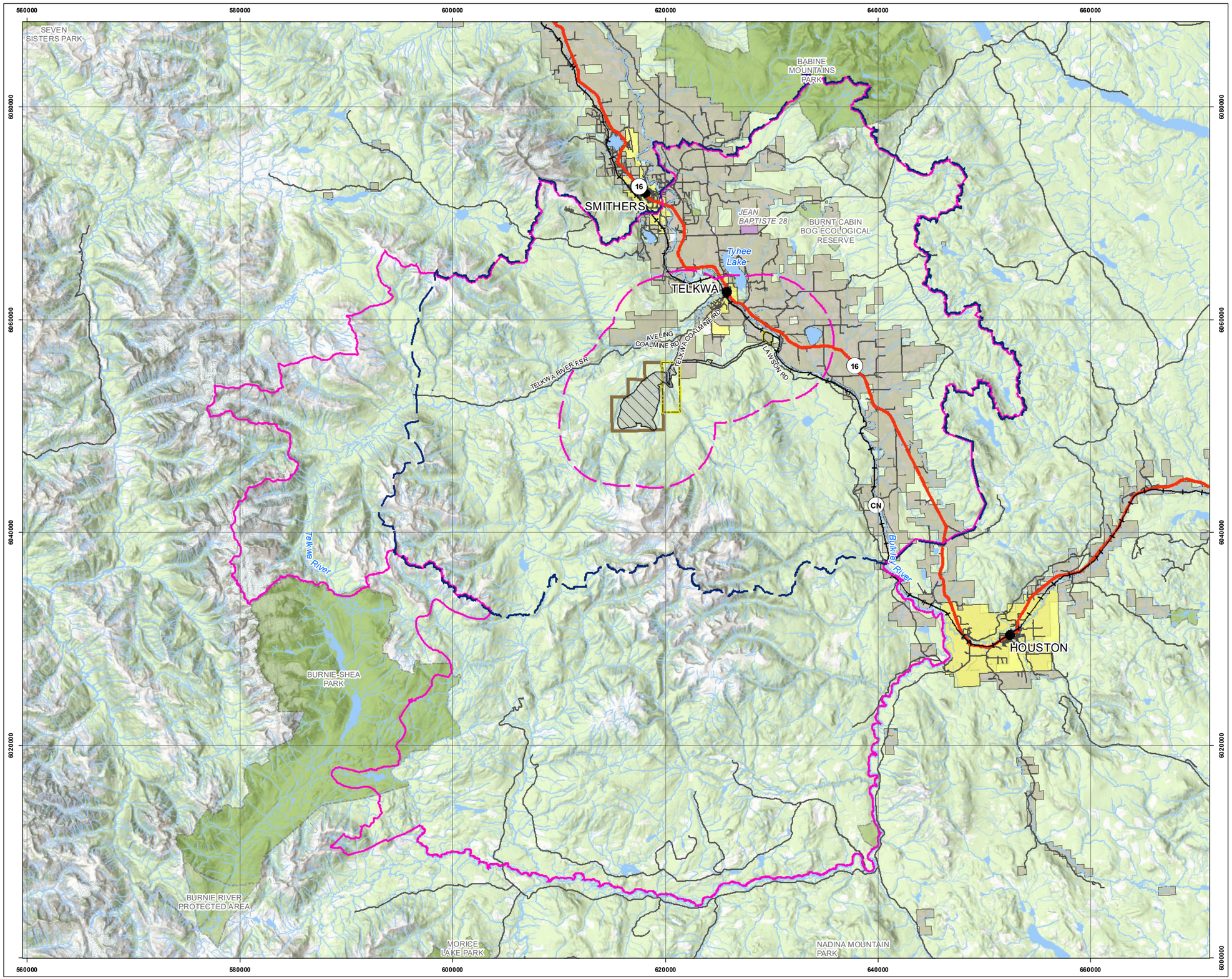
Tenas Project

Wildlife Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Wildlife Local Study Area
- Wildlife Regional Study Area
- Wide-Ranging Wildlife Study Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a “stand-alone” document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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20P0172	Production Date: Nov 09, 2021	Figure 11B

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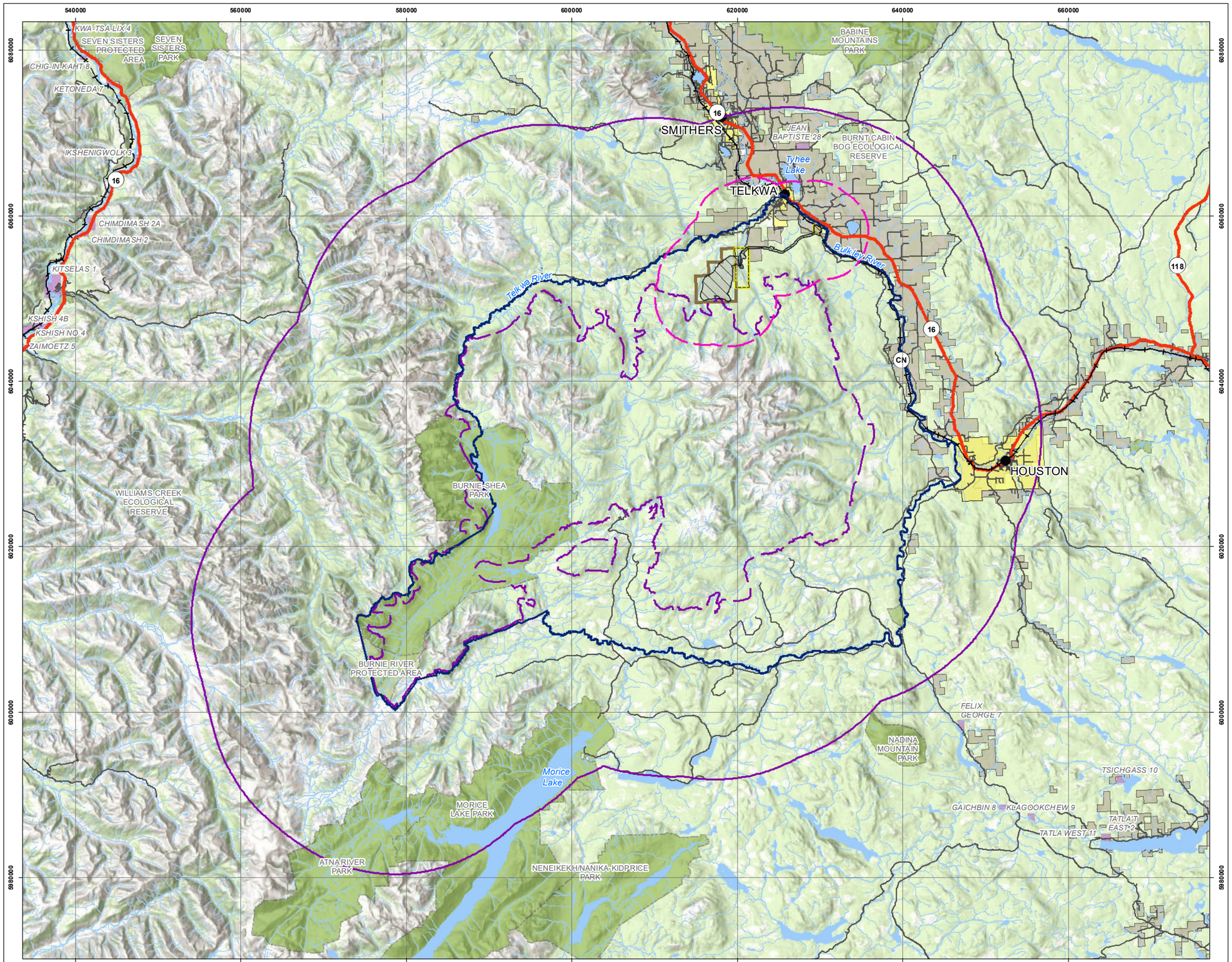
Tenas Project

Caribou Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Wildlife Local Study Area
- Telkwa Caribou Herd Regional Study Area 1
- Telkwa Caribou Herd Regional Sudy Area 2 Core
- Telkwa Caribou Herd Regional Study Area 2 Matrix

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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TELKWA COAL LIMITED

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4.8.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, list of the information provided in the baseline report, field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Wildlife VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Wildlife VC:

- Desktop studies using publicly available information will be completed. Information sources may include but are not limited to available existing wildlife inventory and habitat use information for the Project study areas including occurrence, distribution and population status as well as travel corridors and potential breeding areas where available.
- Habitat suitability following provincial standards will be modelled and results will be incorporated into the assessment of potential effects on habitat availability for subcomponent species.
- Caribou habitat analysis will follow the standard approach being used for caribou habitat assessment, including in other assessments in BC and in the Recovery Strategy for the Woodland Caribou, Southern Mountain Population (Environment Canada [EC] 2014), by applying a buffer around all disturbance features on the landscape.
- Project-related field studies will be summarized, including habitat assessment, species-specific and generalized wildlife surveys.
- Element occurrence records from sources such as the BC Conservation Data Centre and the BC Wildlife Species Inventory Database will be summarized.
- TEK will be incorporated where relevant and available.

The Application will identify applicable provincial and federal legislation, policies, BMPs and guidance documents related to the Wildlife VC. These will include, among others:

- *Forest and Range Practices Act.* SBC 2002. Chapter 69 (Prov BC 2002d);
- *Species at Risk Act* (*SARA*). S.C. 2002 (GOC 2002);
- *Wildlife Act.* RSBC 1996. Chapter 488 (Prov BC 1996j);

- *Canada Wildlife Act.* RSC 1985 (GOC 1985b)*;*
- Grizzly Bear Population Inventory and Monitoring Strategy for British Columbia (Apps 2010);
- Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia (BC Ministry of Environment 2014);
- BC Furbearer Management Guidelines: Marten (BC Ministry of Forests, Lands and Natural Resource Operations [MFLNRO] 2003);
- Management Plan for the Western Toad (*Anaxyrus boreas*) in Canada [Proposed] (Environment and Climate Change Canada 2016);
- Management Plan for the Western Toad (*Anaxyrus boreas*) in British Columbia (Provincial Western Toad Working Group 2014);
- A Future for Grizzly: British Columbia Grizzly Bear Management Strategy (BC Ministry of Environment, Lands and Parks 1995a);
- Conservation of Grizzly Bears in British Columbia. Background Report (BC Ministry of Environment, Lands and Parks 1995b);
- Grizzly Bears in British Columbia: Ecology, Conservation and Management (BC Ministry of Environment, Lands and Parks 2002);
- Provincial Caribou Recovery Program. 2017/18 Annual Report (BC Ministry of Environment, Lands and Parks 2019);
- Recovery Strategy for the Woodland Caribou, Southern Mountain Population (*Rangifer tarandus caribou*) in Canada [Proposed] (Environment Canada 2014);
- Provincial Framework for Moose Management in British Columbia (BC Ministry of Forests, Lands and Natural Resource Operations 2015); and
- A Strategy to Help Restore Moose Populations in British Columbia (BC Ministry of Forests, Lands and Natural Resource Operations 2016a).

The following Wildlife VC technical reports will be referenced in the Application:

- Telkwa Project: Vegetation – Forestry – Wildlife. Stage II Report for Crows Nest Resources Ltd. (Taesco Consultants Ltd. 1984);
- Wildlife North of the Telkwa River: A Stage II Assessment for the Proposed Telkwa Project. (Hatler 1990);

- Moose Habitat Capability/Suitability Mapping. Telkwa Coal Project. (Manalta Coal Ltd. 1997c);
- Wildlife Assessment. Telkwa Coal Project. (Manalta Coal Ltd. 1997d); and
- Habitat selection and calf survival in the Telkwa caribou herd, British Columbia. (Stronen 2000);

The following Wildlife VC technical report will be provided as an appendix to the Application:

- Wildlife Baseline Studies

4.8.3 Potential Effects

The Application will identify potential adverse effects to the Wildlife VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Wildlife VC resulting from Project activities within each phase of the Project. Interactions between Project components and activities and the Wildlife VC will be summarized.

The following potential effects will be assessed for all phases of the Project:

- Alteration and/or loss of habitat;
- Change in mortality; and
- Change in movement patterns.

This section will include an evaluation of whether contaminants of potential concern (COPCs) may be present at concentrations that could result in adverse effects or impacts on wildlife species/populations. To establish the latter, COPCs will be screened against applicable Wildlife, Livestock and Freshwater Aquatic Life Water Quality Guidelines (WQG) (e.g., BC Ministry of Environment and Climate Change Strategy [BC MOECCS], CCME, United States Environmental Protection Agency [US EPA]). If there are exceedances of the WQG based on this screening exercise, a wildlife health assessment will be conducted.

4.8.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Wildlife VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

4.8.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context, as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's

significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.8.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;

- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR. The caribou cumulative effects assessment boundary will be the largest of the RSAs, which is the 2019 BC Matrix habitat mapping boundary, plus the northeastern portions of the Wildlife RSA that lies just outside the Matrix boundary;

- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and

- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.8.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

4.9 Avian Species Valued Component

The landscape where the Project is located is primarily sub-boreal spruce forest that has experienced forest harvesting over the last 40 years, creating a mosaic of young to mature forest types. The mixed and coniferous forests provide nesting and foraging habitat for a range of migratory bird species and raptors typical for those forest types, as well as the cultivated land along the access road and Rail Loadout areas.

This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Wildlife VC, potential Project-related effects, and analysis of potential residual effects. There will be cross references to other relevant VC assessment sections.

The Avian Species VC will include the following subcomponents and their associated indicators.

Subcomponent	Indicators
Migratory Breeding Birds	Change in: • Habitat, including direct and indirect disturbance (including sensory disturbance) • Mortality • Movement (qualitative analysis based on available information)
Listed Bird Species	
Raptors	

This VC assessment may support and be supported by the following VC assessments:

- Aquatic Resources;
- Atmospheric Environment;
- Fish and Fish Habitat;
- Groundwater;
- Heritage Resources;
- Human Health;
- Land and Resource Use;
- Surface Water;
- Terrain and Soils;
- Vegetation;
- Wildlife; and
- Visual Resources.

4.9.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable of the Avian Species VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Avian Species VC are described below and are illustrated in **Figure 12**.

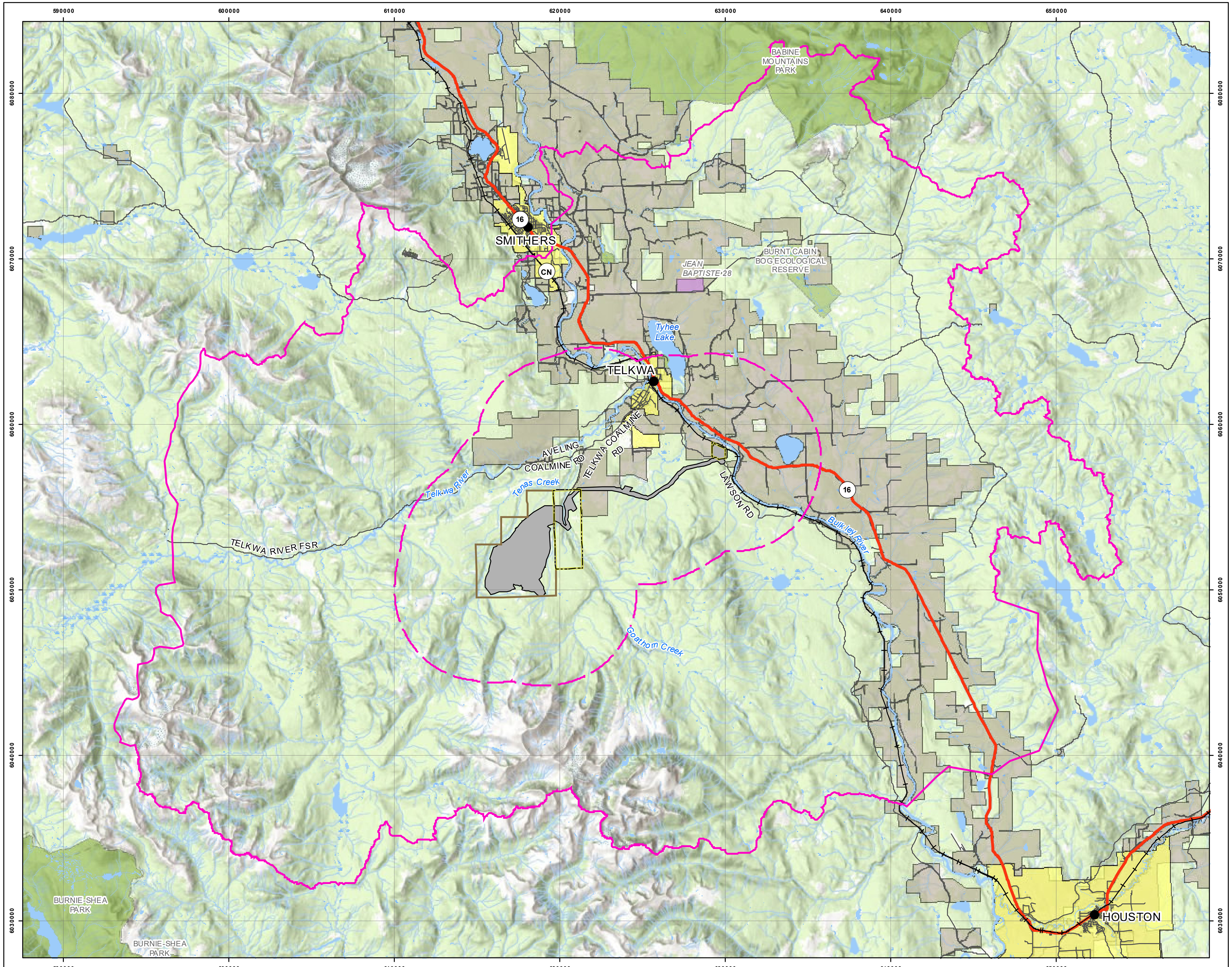
- Avian Species LSA: designed to capture all potential direct and indirect effects resulting from all phases of the Project and is the same as the Wildlife LSA. It includes the Project Area with a minimum of a 5 km buffer.

- Avian Species RSA: designed to capture the extent of indirect effects resulting from the Project, and home ranges of species that could overlap with the direct or indirect effects. The Avian Species RSA is the same as the Wildlife RSA.

The Application will include analyses for all phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Avian Species Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Avian Species Local Study Area
- Avian Species Regional Study Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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TELKWA COAL LIMITED

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4.9.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, list of the information provided in the baseline report, and field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Avian Species VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC.

The following general approach is being taken to develop existing conditions for the Avian Species VC:

- Desktop studies using publicly available information will be completed. Information sources may include but are not limited to available existing wildlife inventory and habitat use information for the Project study areas including occurrence, distribution and population status as well as travel corridors and potential breeding areas where available.
- Modelling of habitat suitability for focal species following provincial standards.
- Modelling of habitat suitability for migratory breeding birds using the habitat guild approach. Wetland, Open, and Forest guilds will be used. Summary of Project-related field studies including habitat assessment, species-specific and breeding bird surveys.
- Summary of element occurrence records from sources such as the BC Conservation Data Centre, the BC Breeding Bird Atlas, the BC Christmas Bird Count Database and eBird.
- TEK will be incorporated where relevant and available.

The Application will identify applicable provincial and federal legislation, policies, BMPs and guidance documents related to Avian Species VC, including:

- *Forest and Range Practices Act*. SBC 2002. Chapter 69. Prov BC 2002d);
- *Species at Risk Act*. SC 2002 (GOC 2002);
- *Migratory Birds Convention Act.* SC 1994. c. 22 (GOC 1994);
- *Mines Act.* RSBC 1996. Chapter 293 (Prov BC 1996f)*;*
- Health, Safety and Reclamation Code for Mines in British Columbia (Prov BC 2017)*;*

- Bulkley Land and Resource Management Plan (Prov BC 1998a);
- Any applicable Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status reports or recovery plans;
- *Environmental Management Act*. SBC 2003. Chapter 53 (Prov BC 2003);
- *Water Sustainability Act*. SBC 2014. Chapter 15 (Prov BC 2014);
- *Wildlife Act*. RSBC 1996. Chapter 488 (Prov BC 1996j); and
- Any TEK where relevant and available.

Existing Avian Species VC technical reports will be referenced in the Application, including:

- Telkwa Project: Vegetation – Forestry – Wildlife. Stage II Report for Crows Nest Resources Ltd. (Taesco Consultants Ltd. 1984);
- Wildlife North of the Telkwa River: A Stage II Assessment for the Proposed Telkwa Project (Hatler 1990); and
- Wildlife Assessment. Telkwa Coal Project (Manalta Coal Ltd. 1997d).

The following Avian VC technical report will be provided as an appendix to the Application:

- Avian Baseline Report.

4.9.3 Potential Effects

The Application will identify potential adverse effects to the Avian Species VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to assess the potential effects on the Avian Species VC resulting from Project activities within each phase of the Project. Interactions between Project components and activities and the Avian Species VC will be summarized.

The following potential effects will be assessed:

- Alteration and/or loss of habitat as a result of the Project Construction phase;
- Change in mortality as a result of Project Construction and Operation phases; and
- Change in movement patterns as a result of Project Construction and Operation phases.

This section will include an evaluation of whether contaminants of potential concern (COPCs) may be present at concentrations that could result in adverse effects or impacts on avian species/populations. To

establish the latter, COPCs will be screened against applicable Wildlife, Livestock and Freshwater Aquatic Life Water Quality Guidelines (WQG) (e.g., BCMOECCS, CCME, US EPA). If there are exceedances of the WQG based on this screening exercise, a wildlife health assessment will be conducted.

4.9.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Avian VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

4.9.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context, as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.9.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

4.9.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

5.0 ECONOMIC EFFECTS ASSESSMENT

The Application will include an assessment of economic VCs identified in this AIR. The assessment will be conducted in accordance with the methodology specified in section **3.0 Assessment Methodology** of this AIR and reported using the organizational structure demonstrated in section **4.0 Environmental Effects Assessment** of this AIR.

5.1 Labour Market Valued Component

Project employment, contracting, and procurement may influence the availability of workers within the local and regional labour market and/or the cost of labour. This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Labour Market VC, and pathways along which potential Project-related effects could occur, with cross references to other supporting VC assessment sections.

The Labour Market VC will include the following indicators:

Subcomponent	Indicators
NA	Change in: • Number of workers by occupation, industry affiliation, and region of residence • Participation rate and unemployment rate • Difference between unemployment rate and natural rate of unemployment • Potential barriers to Indigenous participation in Project-related economic benefits • Income levels and labour income

This VC assessment may support and be supported by the following VC assessments:

- Community Well-being;
- Demographics;
- Economic Development; and
- Infrastructure and Services.

5.1.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Labour Market VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Labour Market VC are described below and are illustrated in **Figure 13**:

- Socio-economic LSA: includes the communities of Telkwa, Smithers, Houston and Witset.
- Socio-economic RSA: includes the Regional District of Bulkley-Nechako and Witset.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Socio-economic Local and Regional Study Areas

Legend

- Tenas Project
- Labour Market Local Study Area Community
- Labour Market Regional Study Area
- Regional District of Bulkley-Nechako (RDBN)
- Electoral Areas

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, 2020
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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TELKWA COAL LIMITED

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5.1.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the Labour Market VC, including literature reviews and desktop studies and a list of the information provided in the baseline report, field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degrees of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Labour Market VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Labour Market VC:

- Interviews and community consultation conducted during baseline data collection;
- Collection and review of publicly available sources of information, such as but not limited to Statistics Canada and Province of BC (e.g., 2016 Canada Census Profile (Statistics Canada 2018b); 2011 National Household Survey (Statistics Canada 2018a); BC Labour Market Outlook 2018 Edition (Prov BC 2019b) and information from other relevant projects;
- Review of available socio-economic information for the Project. The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Labour Market VC; and
- *Local Government Act*. RSBC. Chapter 1 (Prov BC 2015).

The following Labour Market VC technical reports will be provided with the Application:

- Socio-economic Baseline Report

5.1.3 Potential Effects

The Application will identify potential adverse effects to the Labour Market VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology, and standards used to determine the potential effects on the Labour Market VC resulting from Project activities within each phase of the Project. Interactions between Project components and activities and the Labour Market VC will be summarized.

The following potential effects will be assessed:

- Change in competition for skilled local and regional workforce;

- Change in labour costs; and
- Barriers to Indigenous employment and participation in Project-related economic benefits.

5.1.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Labour Market VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

5.1.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context, as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

5.1.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in this AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

5.1.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

5.2 Economic Development Valued Component

During the Construction and Operation phases, the Project may affect the number and diversity of retail and commercial businesses and industrial sectors represented in the local and regional economies. This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Economic Development VC, and pathway along which potential Project-related effects could occur, with cross references to other supporting VC assessment sections.

The Economic Development VC will include the following subcomponents and their associated indicators:

Subcomponent	Indicators
Local Business and Industry	Change in: • Distribution in employment across industries (economic diversity) • Capacity/supply constraints for services and goods and contracting (quantitative and qualitative) • Compatibility/consistency of Project with existing regional economic development plans or strategies (qualitative) • Forestry: marketable timber volume • Tourism: services and revenue • Economic contributions during Decommissioning and Reclamation and Post-closure phases and potential downturns

This VC assessment may support and be supported by the following VC assessments:

- Community Well-being;
- Demographics;
- Infrastructure and Services;
- Labour Market;
- Land and Resource Use; and
- Visual Resources.

5.2.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Economic Development VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Economic Development VC are described below and are illustrated in **Figure 13**:

- Socio-economic LSA: includes the communities of Telkwa, Smithers, Houston and Witset.

- Socio-economic RSA: includes the Regional District of Bulkley-Nechako and Witset.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

5.2.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the Economic Development VC, including literature reviews and desktop studies, a list of the information provided in the baseline report, and field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degrees of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Economic Development VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Economic Development VC:

- Interviews and community consultation conducted during baseline data collection;
- Collection and review of Statistics Canada and BC Stats data (e.g., BC Stats 2020b. 2016 Canada Census Profile (Statistics Canada 2018b); 2011 National Household Survey (Statistics Canada 2018b); BC Labour Market Outlook 2018 Edition (Prov BC 2019b), Gross Domestic Product by industry (Statistics Canada 2020), and information from other relevant projects; and
- Review of available socio-economic information for the Project.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Economic Development VC, including:

- *Local Government Act*. RSBC 2015. Chapter 1 (Prov BC 2015).

The following Economic Development VC technical reports will be provided with the Application:

- Socio-economic Baseline Report

5.2.3 Potential Effects

The Application will identify potential adverse effects to the Economic Development VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Economic Development VC resulting from project activities within each phase of the Project. Interactions between Project components and activities and the Economic Development VC will be summarized.

The following potential effects will be assessed:

- Change in economic diversity (Construction and Operation phases);
- Change in the capacity of local or regional businesses to supply goods or services (Construction and Operation phases);
- Change that impacts development plans or strategies of local and regional government (Construction and Operation phases);
- Change in local and regional marketable timber (Construction and Operation phases);
- Change in local or regional tourism (Construction, Operation, Decommissioning and Reclamation and Closure phases); and
- Change in economic contribution (Decommissioning and Reclamation and Post-closure phases).

5.2.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Economic Development VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

5.2.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

5.2.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

5.2.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

6.0 SOCIAL EFFECTS ASSESSMENT

The Application will include an assessment of social VCs identified in the AIR. The assessment will be conducted in accordance with the methodology specified in section **3.0 Assessment Methodology** of this AIR and reported using the organizational structure demonstrated in the section **4.0 Environmental Effects Assessment**.

6.1 Demographics Valued Component

Project employment, contracting and procurement, and other induced local and regional economic effects may contribute to change in local and regional demographics. This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Demographics VC, and pathways along which potential Project-related effects could occur, with cross references to other supporting VC assessment sections.

Project-related effects on this VC may have linkages to the following VC assessments:

- Community Well-being;
- Economic Development;
- Infrastructure and Services;
- Labour Market; and
- Land and Resource Use.

The Demographics VC will include the following indicators:

Subcomponent	Indicators
NA	Change in: • Population • Demographic factors

6.1.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable to the Demographics VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Demographics VC are described below and are illustrated in **Figure 13**:

- Socio-economic LSA: includes the communities of Telkwa, Smithers, Houston and Witset.
- Socio-economic RSA: includes the Regional District of Bulkley-Nechako and Witset.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

6.1.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, a list of the information provided in the baseline report, and field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degrees of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Demographics VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Demographics VC:

- Interviews and community consultation conducted during baseline data collection;
- Collection and review of Statistics Canada and BC Stats data (2016 Canada Census Profile (Statistics Canada 2018b); 2011 National Household Survey (Statistics Canada 2018a); BC Labour Market Outlook 2018 Edition (Prov BC 2019b) and information from other relevant projects;
- Review of available socio-economic information for the Project; and
- Review and integration of any relevant demographics data on affected Indigenous communities within the LSA.

The following Demographics VC technical report will be provided with the Application:

- Socio-economic Baseline Report.

6.1.3 Potential Effects

The Application will identify potential adverse effects to the Demographics VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Demographics VC resulting from project activities within each phase of the Project. Interactions between Project components and activities and the Demographics VC will be summarized.

The following potential effects will be assessed:

- Change in populations in LSA and RSA communities, including:
    - Change in population size; and
    - Change in demographic composition.

6.1.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Demographics VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

6.1.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.1.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR; and
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR.
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.1.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

6.2 Visual Resources Valued Component

The aesthetic value of a landscape is largely determined by the character of the natural landforms and the proximity to and number of viewers of that landscape. The Project's proximity to the Village of Telkwa and Town of Smithers, along with the recreation and tourism opportunities in the surrounding area, suggests that the Project has the potential to adversely affect the visual resources of the landscape. This section of the Application will present the indicators and boundaries of the assessment for the Visual Resources VC, and pathways along which potential Project-related effects could occur, with cross references to other supporting VC assessment sections.

Project-related effects on this VC may have linkages with the following VC assessments:

- Avian Species;
- Community Well-being;
- Economic Development;
- Land and Resource Use; and
- Wildlife.

The Visual Resources VC will include the following subcomponents and their associated indicators:

Subcomponent	Indicators
Visual Quality	Change in: • Visual disturbance from selected receptor sites

Although ambient light has been screened out as a subcomponent, a qualitative discussion will be included in the Application.

6.2.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Visual Resources VC, including maps with relevant layers (e.g., recreation mapping layers), in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The proposed LSA and RSA for the Visual Resources VC are described below and are illustrated in **Figure 14** Both study areas are based on the locations where the Project is expected to be visible from and the Bulkley Land and Resource Management Plan (LRMP) Landscape Unit plan boundaries. The LRMP delegates specific guidance regarding visual quality to the individual Landscape Unit Plans (LUPs), which typically focus on the management of landscapes that can be seen from within the Unit, including the identification of specific viewpoints that are considered particularly important. The study areas are determined as follows:

- Visual Resources LSA: any location within the limit of visibility from the Minesite (35 km per BC

MFLNRO [2016b]), within the Bulkley LRMP.

- Visual Resources RSA: the amalgamation of all Bulkley LRMP LUPs that have any portion of the plan area fall within the LSA.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

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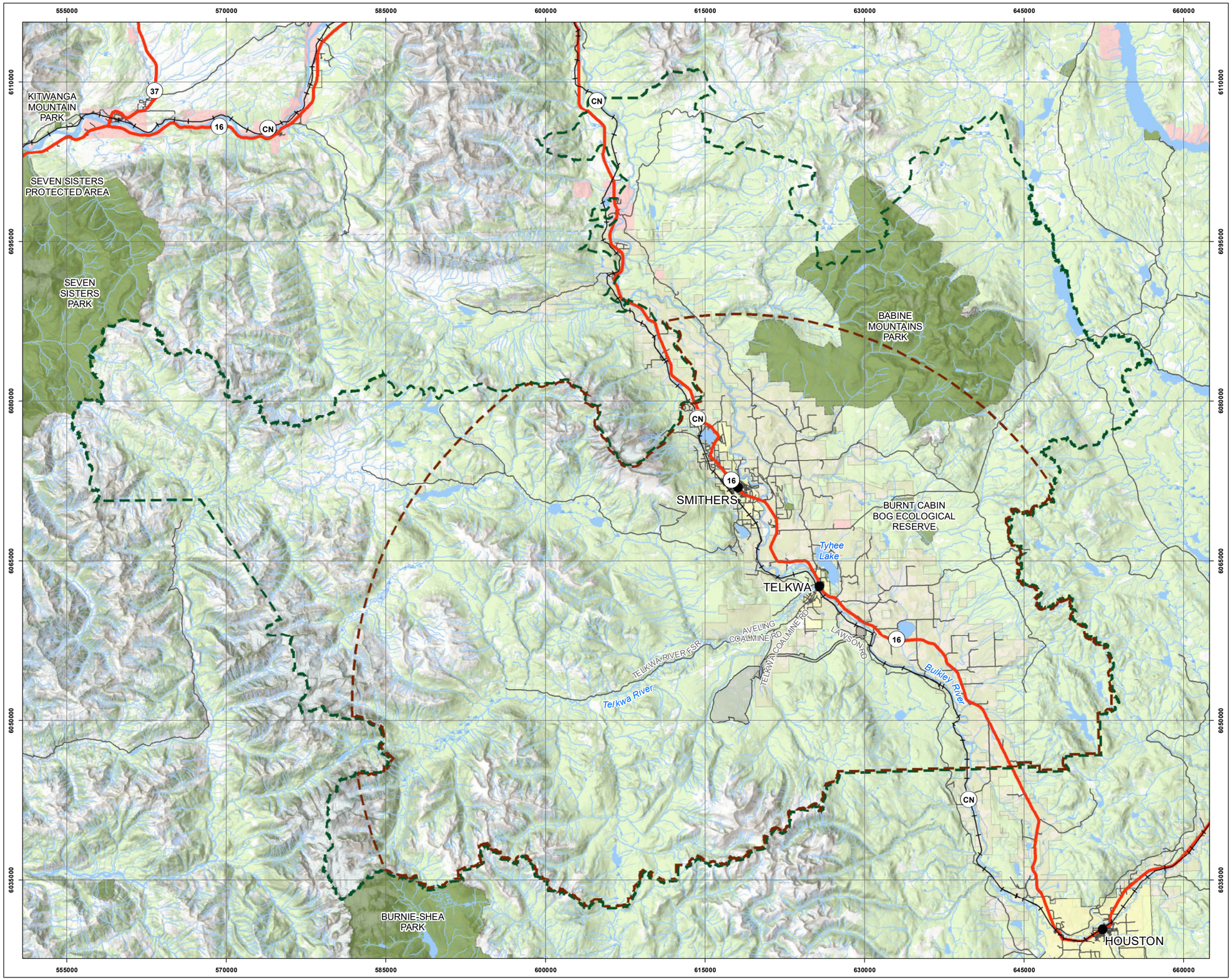
Visual Resources Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- Telkwa Coal Private Land
- Private Land
- Project Area
- Local Study Area
- Regional Study Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, 2020
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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6.2.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the Visual Resources VC, including literature reviews and desktop studies, a list of the information provided in the baseline report, and field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degrees of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Visual Resources VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Visual Resources VC:

- Review provincially established field methodologies for assessing visual quality as per the Visual Impact Assessment Guidebook (BC Ministry of Forests 2001).
- Review the Bulkley Land and Resource Management Plan (Prov BC 1998a) and the Bulkley Valley Sustainable Resource Management Plan (Prov BC 2005) to determine what areas are considered important for visual resources. This includes all LUPs contained within the Bulkley Valley LRMP.
- Pre-field preparation:
    - Line-of-sight modelling to determine the viewshed of the Project (i.e., total of areas that have a view of the Project);
    - Consultation with local stakeholders around areas of potential concern for adverse effects on visual quality, including the incorporation of TEK; and
    - Selection of viewpoints reflecting the distribution of different viewing angles, land uses, and stakeholder concerns within the viewshed.
- Reconnaissance visits to each selected viewpoint to document current visual quality conditions by taking photographs in the direction of the Project.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Visual Resources VC, including:

- *Forest and Range Practices Act*. SBC 2002. Chapter 69. (Prov BC 2002d);
- Visual Impact Assessment Guidebook, Second Edition (BC Ministry of Forests 2001) for guidance on measuring visual disturbance; and

- Bulkley Land and Resource Management Plan (Prov BC 1998a) and the Bulkley Valley Sustainable Resource Management Plan (Prov BC 2005) for guidance on visual quality targets or objectives.

The following Visual Resources VC technical reports will be provided with the Application:

- Tenas Project: 2017 to 2019 Baseline Report (ERM 2020).

6.2.3 Potential Effects

The Application will identify potential adverse effects to the Visual Resources VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Visual Resources VC resulting from project activities within each phase of the Project. Interactions between Project components and activities and the Visual Resources VC will be summarized.

The following potential effects will be assessed:

- Change in visual quality in the Construction, Operation, Decommissioning and Reclamation and Post-closure phases; and

6.2.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Visual Resources VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

6.2.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.2.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;

- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.2.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

6.3 Infrastructure and Services Valued Component

The Project, located on provincial Crown land, freehold land parcels and coal licenses approximately 25 km south of Smithers and 7 km southwest of Telkwa in northwestern BC, within Wet'suwet'en traditional territory, will require changes and additions to roads, and has the potential to affect the use of local infrastructure and community services. This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Infrastructure and Services VC, and pathways along which potential Project related effects could occur, with cross references to other supporting VC assessment sections.

The Infrastructure and Services VC will include the following subcomponents and their associated indicators.

Subcomponent	Indicators
Housing and Accommodation	Change in: • Demand for housing and accommodation • Active residential listings • Housing costs • Property taxes • Vacancy rates
Community Infrastructure and Services	Change in: • Supply and demand for all community services (education, childcare, health care, and recreation) and community infrastructure • Supply and demand for emergency services (policing, fire, and search and rescue)
Transportation	Change in level of service (change in road, rail and air traffic patterns and infrastructure)

This VC assessment may support and be supported by the following VC assessments:

- Community Well-being;
- Demographics;
- Economic Development; and
- Labour Market.

6.3.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Infrastructure and Services VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The LSA and RSA have been selected to include communities potentially directly and indirectly affected within the Project area (**Figure 13**):

- Socio-economic LSA: includes the communities of Telkwa, Smithers, Houston and Witset.
- Socio-economic RSA: includes the Regional District of Bulkley-Nechako and Witset.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

6.3.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterizing the existing conditions of the VC, including literature reviews and desktop studies, a list of the information provided in the baseline report, and field programs or modelling undertaken with reference to any applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented, and margins of error or degrees of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Infrastructure and Services VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Infrastructure and Services VC:

- Interviews and community consultation conducted during baseline data collection;
- Collection and review of publicly available sources of information, including information from other relevant projects; and
- Review of available socio-economic information for the Project.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Infrastructure and Services VC, including:

- *Water Sustainability Act*. SBC 2014. Chapter 15 (Prov BC 2014);
- *Agricultural Land Commission Act*. SBC 2002. Chapter 36 (Prov BC 2002a);
- Regional District of Bulkley-Nechako Floodplain Management Bylaw No. 1300, 2004 (Regional District of Bulkley-Nechako 2016);
- Village of Telkwa bylaws (Village of Telkwa 2020);
- Bulkley Land and Resource Management Plan (Prov BC 1998a);
- Bulkley Valley Sustainable Resource Management Plan (Prov BC 2005);
- Standard Working Group Comments and Recommendations for Provincial Environmental Assessments in Northern British Columbia (Northern Health 2015b);
- The Social Determinants of Health Impacts of Resource Extraction and Development in Rural and Northern Communities (Northern Health and Provincial Health Services Authority 2018); and

- Social Determinants of Health Discussion Guide (First Nations Health Council 2017).

The following Infrastructure and Services VC technical reports will be provided with the Application:

- Traffic Study; and
- Socio-economic Baseline Report

6.3.3 Potential Effects

The Application will identify potential adverse effects to the Infrastructure and Services VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Infrastructure and Services VC resulting from Project activities within each phase of the Project. Interactions between Project components and activities and the Infrastructure and Services VC will be summarized.

The following potential effects will be assessed:

- Change in cost or availability of housing and accommodations (Construction and Operation phases);
- Change in use of community services, including education, childcare, healthcare and recreation (Construction and Operation phases);
- Change in use of emergency services including policing, fire and search and rescue (Construction and Operation phases); and
- Change in use of roads and related increases in traffic (Construction and Operation phases).

6.3.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Infrastructure and Services VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

6.3.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.3.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.3.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

6.4 Land and Resource Use Valued Component

The Project includes construction undertakings and operation that may result in local adverse effects to land and resource use. Potential pathways for adverse effects include either reduced access to or reduced availability of land and resources used for residential, recreational or commercial purposes. In addition to the Project Area, potential factors within the surrounding area include noise, dust levels and/or diminished visual quality or sense of place. This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Land and Resource Use VC, and pathways along which potential Project related effects could occur, with cross references to other supporting VC assessment sections. See Part C, Wet'suwet'en Title, Rights, and Interests in the Application, for identification and assessment of potential Project effects to current use of land and resources for traditional purposes.

The Land and Resource Use VC will include the following subcomponents and their associated indicators:

Subcomponent	Indicators
Commercial Land Use	Compatibility with existing land use plans Change in: • Access to land use areas • Sensory disturbance to existing land and resource uses • Quantity and quality of resources supporting existing land and resource uses
Public Recreation Use	Change in: • Access to land use areas • Sensory disturbance • Quantity and quality of resources supporting recreational activities • Interference with recreational infrastructure

This VC assessment may support and be supported by the following VC assessments:

- Atmospheric Environment;
- Avian Species;
- Community Well-being;
- Demographics;
- Economic Development;
- Fish and Fish Habitat;
- Heritage Resources;
- Human Health;
- Surface Water;
- Terrain and Soils;
- Vegetation;
- Visual Resources; and
- Wildlife.

6.4.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Land and Resource Use VC, including maps with relevant layers (e.g., recreation mapping layers), in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

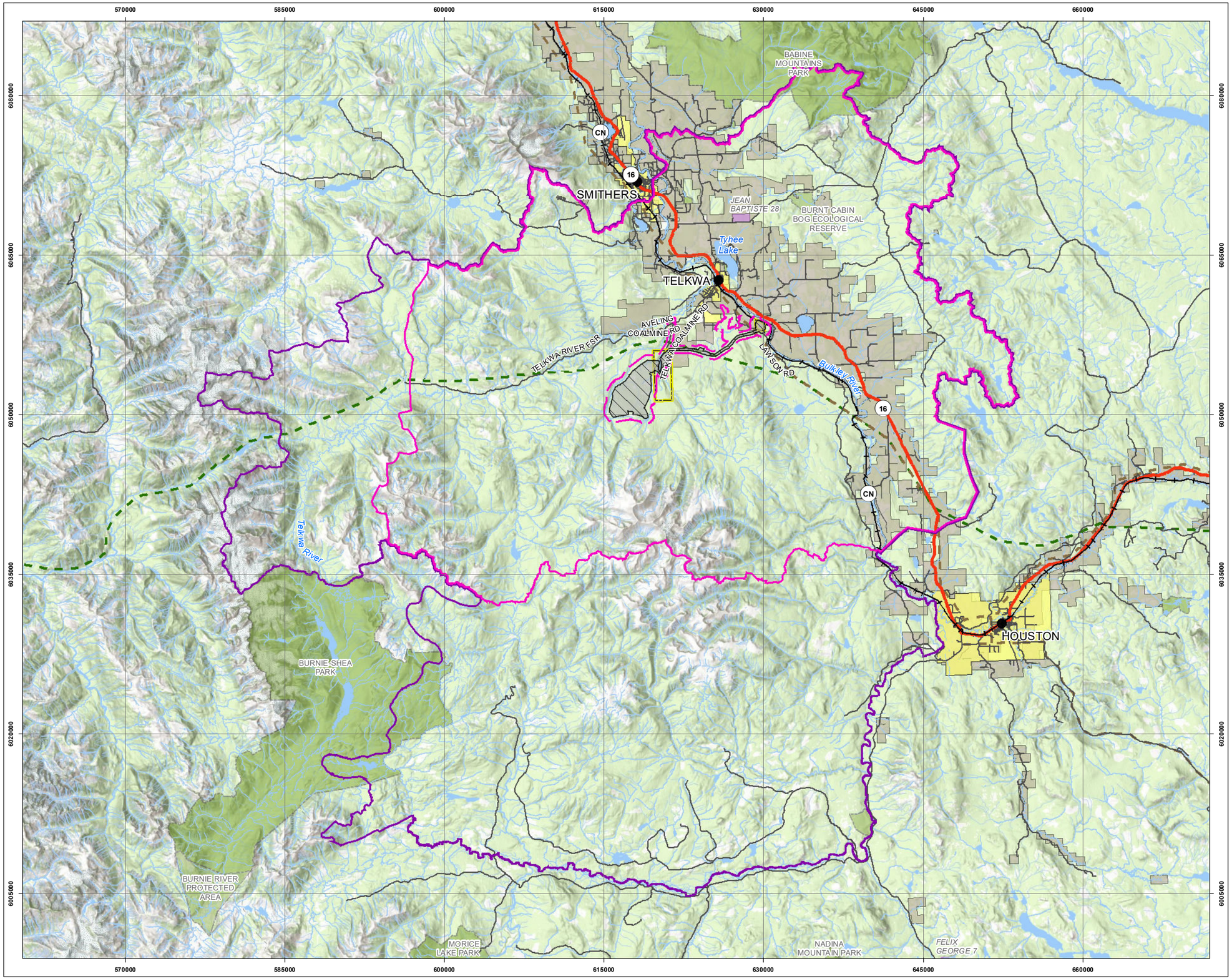
The proposed LSA and RSA for the Land and Resource Use VC are described below and are illustrated in **Figure 15**:

- Land and Resource Use LSA: same as the Vegetation LSA.
- Land and Resource Use RSA: same as the Wildlife RSA or, in the case of Guide Outfitters, the Wide-ranging Wildlife RSA.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Land and Resource Use Local and Regional Study Areas



Legend

- City/Town
- Rail Line
- Highway
- Road
- 138 kV Transmission Line
- 500 kV Transmission Line
- Watercourse
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Telkwa Coal Limited Private Property
- Project Area
- Non-Traditional Land Use Local Study Area
- Non-Traditional Land Use Regional Study Area
- Non-Traditional Land Use Regional Study Area (Guide Outfitting and Trapping)

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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Kilometres

NAD 1983 UTM Zone 9N

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20P0172	Production Date: Jun 07, 2021	Figure 15

TELKWA COAL LIMITED

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6.4.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, a list of the information provided in the baseline report, and field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degrees of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Land and Resource Use VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Land and Resource Use VC:

- Interviews and community consultation conducted during baseline data collection;
- Collection and review of publicly available sources of information, including information from other relevant projects;
- Review of available socio-economic information for the Project; and
- Review and integration of all relevant and available sources of TEK or land use information.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Land and Resource Use VC, including:

- *Local Government Act*. RSBC 2015. Chapter 1 (Prov BC 2015);
- *Forest and Range Practices Act*. SBC 2002. Chapter 69. (Prov BC 2002d);
- *Forest Act*. RSBC 1996. Chapter 157 (Prov BC 1996a);
- *Land Act*. RSBC 1996. Chapter 245 (Prov BC 1996c);
- *Mineral Tenure Act*. RSBC 1996. Chapter 292 (Prov BC 1996e);
- *Mining Right of Way Act*. RSBC 1996. Chapter 294 (Prov BC 1996d);
- *Wildlife Act*. RSBC 1996. Chapter 488 (Prov BC 1996j);
- *Park Act*. RSBC 1996. Chapter 344 (Prov BC 1996g);
- *Protected Areas of British Columbia Act*. SBC 2002. Chapter 17 (Prov BC 2002e); and

- *Tourism Act*. RSBC 1996. Chapter 453 (Prov BC 1996h).

The following Land and Resource Use VC technical reports will be provided with the Application:

- Land and Resource Use Baseline Report.

6.4.3 Potential Effects

The Application will identify potential adverse effects to the Land and Resource Use VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Land and Resource Use VC resulting from Project activities within each phase of the Project. Interactions between Project components and activities and the Land and Resource Use VC will be summarized.

The following potential effects will be assessed:

- Change in access to or availability of land and resources for residential, recreational or commercial purposes (Construction and Operation phases);
- Change in quantity or quality of land and resources for residential, recreational or commercial purposes (Construction and Operation phases);
- Change in residential, recreational or commercial uses due to sensory disturbance (e.g., emissions, noise or light) (Construction and Operation phases); and
- Change in visual quality or sense of place (Construction and Operation phases).

6.4.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Land and Resource Use VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

6.4.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.4.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.4.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

6.5 Community Well-being Valued Component

The Project has the potential to adversely affect Community Well-being related to change in demographic composition, population, employment and income, land and resource use, housing affordability and use of infrastructure, roads, and community services. Such changes may increase stress or anxiety levels and place strain on traditional values, local culture as well as social fabric, affecting overall community well-being in the LSA and the RSA. This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for Community Well-being, and pathways along which potential Project related effects could occur, with cross references to other supporting VC assessment sections.

The Community Well-being VC will include the following subcomponents and their associated indicators. Please note the list of indicators is not exhaustive:

Subcomponent	Indicators
NA	Change in social and economic determinants of health, as defined by Health Canada and including: • Food security • Cost of living • Community cohesion • Mental health

This VC assessment will be supported by or will support the following VC assessments:

- Demographics;
- Economic Development;
- Heritage Resources;
- Human Health;
- Infrastructure and Services;
- Labour Market;
- Land and Resource Use; and
- Visual Resources.

6.5.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Community Well-being VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

The LSA and RSA have been selected in order to include communities potentially directly and indirectly affected within the Project area (**Figure 13**):

- Socio-economic LSA: includes the communities of Telkwa, Smithers, Houston and Witset.
- Socio-economic RSA: includes the Regional District of Bulkley-Nechako and Witset.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

6.5.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, a list of the information provided in the baseline report, and field programs or modelling undertaken with reference to any applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented, and margins of error or degrees of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to Community Well-being VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC: The following general approach is being taken to develop existing conditions for the Community Well-being VC:

- Interviews and community consultation conducted during baseline data collection;
- Collection and review of Statistics Canada and BC Stats data (2016 Canada Census Profile [Statistics Canada 2018b]; 2011 National Household Survey [Statistics Canada 2018a]) and information from other relevant projects;
- Review of background information and literature describing community health and well-being in the local and regional study areas;
- Review of available socio-economic information for the Project; and
- Review and integration of available and appropriate sources of TEK or land use information.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Community Well-being VC, including:

- *Environmental Management Act*. SBC 2003. Chapter 53 (Prov BC 2003);
- *Water Sustainability Act*. SBC 2014. Chapter 15 (Prov BC 2014);
- *Agricultural Land Commission Act.* SBC 2002. Chapter 36 (Prov BC 2002a);
- Regional District of Bulkley-Nechako Floodplain Management Bylaw No. 1300, 2004 (Regional District of Bulkley-Nechako 2016);
- Village of Telkwa bylaws (Village of Telkwa 2020);
- Bulkley Land and Resource Management Plan (Prov BC 1998a);

- Bulkley Valley Sustainable Resource Management Plan (Prov BC 2005);
- Standard Working Group Comments and Recommendations for Provincial Environmental Assessments in Northern British Columbia (Northern Health 2015b);
- The Social Determinants of Health Impacts of Resource Extraction and Development in Rural and Northern Communities (Northern Health and Provincial Health Services Authority 2018); and
- Social Determinants of Health Discussion Guide (First Nations Health Council 2017).

The following Community Well-being VC technical reports will be provided with the Application:

- Traffic Study;
- Socio-economic Baseline Report; and
- Human Health Risk Assessment Report.

6.5.3 Potential Effects

The Application will identify potential adverse effects to the Community Well-being VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Community Well-being VC resulting from project activities within each phase of the Project. Interactions between Project components and activities and the Community Well-being VC will be summarized.

The following potential effects will be assessed:

- Change in food security (Construction and Operation phases);
- Change in the cost of living (Construction and Operation phases);
- Change in community cohesion (Construction and Operation phases); and
- Change in the indicators of community and/or mental health (Construction and Operation phases).

6.5.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Community Well-being VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

6.5.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.5.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;

- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;

- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and

- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

6.5.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

7.0 HERITAGE EFFECTS ASSESSMENT

The Application will include an assessment of heritage VCs identified in the AIR. The assessment will be conducted in accordance with the methodology specified in section **3.0 Assessment Boundaries** of this AIR and reported using the organizational structure demonstrated in section **4.0 Environmental Effects Assessment**.

7.1 Heritage Resources Valued Component

The Project area has been identified as an area of archaeological potential and heritage sensitivity. Heritage Resource VC subcomponents are known to occur in the Project area and are currently protected under the provincial *Heritage Conservation Act* (Prov BC 1996b). This section of the Application will present the subcomponents, indicators, and boundaries of the assessment for the Heritage Resources VC, and pathways along which potential Project-related effects could occur, with cross references to other supporting VC assessment sections.

The Heritage Resources VC will include the following subcomponents and associated indicators:

Subcomponent	Indicators
Archaeological Resources	Change in presence, number, type, significance of resources
Historic and Cultural Sites	

This VC assessment may support and be supported by the following VC assessments:

- Community Well-Being;
- Land and Resource Use;
- Vegetation; and
- Wildlife.

7.1.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable for the Heritage Resources VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

Proposed boundaries for the LSA and RSA include areas that may be affected by Project-related activities (**Figure 16**).

- Heritage Resources LSA: includes the Project Area with a 100 m buffer, because effects on this VC can only arise through direct ground disturbance.
- Heritage Resources RSA: the boundary has been primarily defined by the House boundaries of the Gitdumden and Laksilyu Wet'suwet'en Clans. The RSA also includes a 500 m buffer on the Water Discharge Infrastructure near the confluence of Tenas Creek and the Telkwa River.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and the Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Heritage Resources Local and Regional Study Areas

590000 600000 610000 620000 630000 640000 650000 660000

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BABINE MOUNTAINS PARK

SMITHERS

CN

16

JEAN BAPTISTE 28

BURNT CABIN BOG ECOLOGICAL RESERVE

Tyhee Lake

TELKWA

AVELING COALMINE RD

TELKWA COALMINE RD

BYPASS ROAD

LAWSON RD

Tenas Creek

TELKWA RIVER FSR

Telkwa River

Bulkley River

Goathorn Creek

Laksilyu (Kwen Bea Yex)

Gitdumden (Cas Yex)

BURNIE-SHEA PARK

HOUSTON

Legend

- City/Town
- Rail Line
- Highway
- Tenas Access Corridor
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- Telkwa Coal Private Land
- Private Land
- Project Area
- Heritage Resources Local Study Area
- Heritage Resources Regional Study Area
- Wet'suwet'en House Boundary

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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Kilometres

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ERM

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7.1.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC, including literature reviews and desktop studies, list of the information provided in the baseline report, field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods where available. Any assumptions will be documented. Margins of error or degrees of uncertainty will be reported where appropriate. The Application will describe available traditional ecological or community knowledge related to the Heritage Resources VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC.

The following general approach is being taken to develop existing conditions for the Heritage Resources VC:

- Review existing information:
    - Previously completed archaeological assessments (Impact Assessment, Heritage Overview Assessment, and Archaeological Overview Assessment), including subsequent mapping information, to determine terrain within the LSA that has potential to contain precontact archaeological sites (pre-dating anno domini (AD) 1846) within the LSA; this guides the in-field archaeological assessment;
    - Archaeological site forms to determine regional site type(s), artifact assemblages, and condition of previously recorded archaeological sites within the LSA; and
    - Available Traditional Use Studies and TEK.
- Conduct planned activities:
    - Completion of an Archaeological Impact Assessment, including in-field studies based on results of the Archaeological Overview Assessment to confirm/refute the presence of precontact archaeological material and officially record previously undocumented precontact archeological sites with the Archaeology Branch;
    - Include Wet'suwet'en participation and knowledge in heritage assessments;
    - Consider expert input into relative importance of affected resources; and
    - Determine potential impacts to archaeological sites and materials and provide recommendations to prevent or reduce impacts to archaeological sites.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Heritage Resources VC, including:

- Provincial Guidelines:
    - *Heritage Conservation Act.* RSBC 1996, Chapter 187 (Prov BC 1996b);
    - British Columbia Archaeology Inventory Guidelines (Archaeology Branch 2000); and
    - Archaeology Impact Assessment Guidelines (Archaeology Branch 1989 [revised 1998]).
- Indigenous Nation Guidelines:
    - Applicable documents shared by the Wet'suwet'en will be included in this assessment.

The following Heritage Resources VC technical reports may be provided with the Application if they do not contain confidential information:

- Archaeological Overview Assessment: Tenas Project (Crossroads 2018).
- Archaeological Impact Assessment (TBC).

7.1.3 Potential Effects

The Application will identify potential adverse effects to the Heritage Resources VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Heritage Resources VC resulting from project activities within each phase of the Project. Interactions between Project components and activities and the Heritage Resources VC will be summarized.

7.1.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Heritage Resources VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

7.1.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

7.1.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

7.1.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

8.0 HEALTH EFFECTS ASSESSMENT

The Application will include an assessment of health VCs identified in the AIR. The assessment will be conducted in accordance with the methodology specified in section **3.0 Assessment Methodology** of this AIR and reported using the organizational structure demonstrated in section **4.0 Environmental Effects Assessment**.

8.1 Human Health Valued Component

Physical determinants of health comprise environmental conditions that have the potential to affect human health through biophysical media, including water quality, soil quality, air quality and dust, quality of sustenance foods, and change in noise levels. This section of the Application will present the indicators and boundaries of the assessment for the Human Health VC, and pathways along which potential Project-related effects could occur, with cross references to other supporting VC assessment sections. The Human Health VC will include the following indicators:

Subcomponent	Indicators
NA	Change in human health from biophysical determinants of health

This VC assessment may support and be supported by the following VC assessments:

- Atmospheric Environment;
- Avian Species;
- Community Well-being;
- Fish and Fish Habitat;
- Groundwater;
- Land and Resource Use;
- Surface Water;
- Terrain and Soils;
- Vegetation; and
- Wildlife.

8.1.1 Context and Boundaries

The Application will identify the spatial, temporal, administrative and technical study area boundaries, as applicable to the Human Health VC, including maps, in a manner consistent with section **3.2 Assessment Boundaries** of the AIR.

Human health boundaries are based on boundaries of VCs that support the Human Health VC (**Figure 17**).

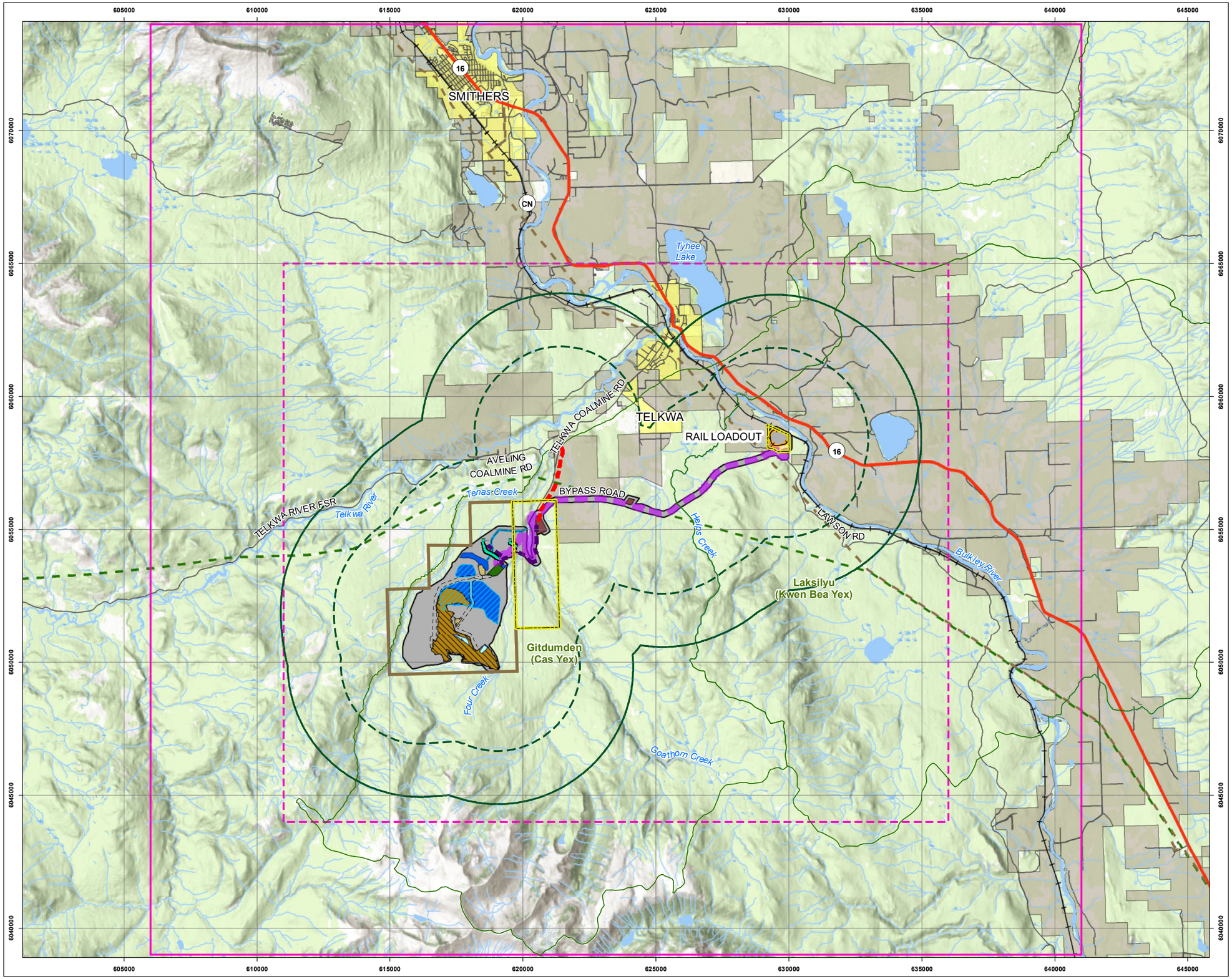
- Human Health LSA: The Human Health LSA will be based primarily on the LSA for the Air Quality subcomponent of the Atmospheric Environment VC, which corresponds to the air quality modeling domain. The Air Quality LSA is expected to cover the largest area and therefore includes the LSA boundaries of the VCs that quantitatively support the Human Health LSA (Atmospheric Environment, Surface Water, Groundwater, Terrain and Soils, and Vegetation).

- Human Health RSA: The Human Health RSA is the same as the Air Quality RSA.

The Application will include analyses for the Construction, Operation, Decommissioning and Reclamation and Post-closure phases of the Project. If applicable, other boundaries may be described in the Application. These may include temporal, administrative, and technical boundaries. If there are no other relevant boundaries, this will be stated.

Tenas Project

Human Health Local and Regional Study Areas



Legend

- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Municipal Area
- General Private Property
- Wet'suwet'en House Boundary
- 138 kV Transmission Line
- 500 kV Transmission Line

Project Features

- Existing 25 kV Power Line
- 25 kV Power Line
- Haul Road
- Rail Loop
- Discharge Path
- Tenas Access Corridor
- Backfill Area
- Control and Plant Sedimentation Pond
- Explosive Infrastructure
- Management Pond
- Mine Infrastructure Complex
- Open Pit
- Pit Lake
- Quarry
- Rail Infrastructure
- Topsoil Stockpile
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Human Health Regional Study Area
- Human Health Local Study Area
- Noise Regional Study Area
- Noise Local Study Area

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
3. Project line features are for display only.

Sources

- Project Features: Allegiance Coal, April 21, 2021.
- Basedata: Government of British Columbia
- Basemap: World Topo Base

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Kilometers

NAD 1983 UTM Zone 9N

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8.1.2 Existing Conditions

The Application will summarize existing conditions in a manner consistent with section **3.3 Existing Conditions** of this AIR.

This section of the Application will describe the approach taken to characterize the existing conditions of the VC (including literature reviews and desktop studies), and list the information provided in the baseline report, and field programs or modelling undertaken with reference to applicable standards or methods. The Application will indicate the sources of the regional and site-specific data, including the time frame and data collection methods, where available. Any assumptions will be documented. Margins of error or degree of uncertainty will be reported, where appropriate. The Application will describe available traditional ecological or community knowledge related to the Human Health VC. The Application will use relevant associated documents produced for the Project and publicly available studies for other projects in central BC. The following general approach is being taken to develop existing conditions for the Human Health VC.

A Baseline Human Health Risk Assessment (HHRA) will be used to characterize baseline human health from biophysical determinants of health. The HHRA consists of a problem formulation, an exposure assessment, toxicity assessment, risk characterization, and an uncertainty analysis.

- Problem formulation:
    - Reviews current use of land and resources for traditional purposes, and reviews any TEK where relevant and available;
    - Identifies human receptors of concern;
    - Reviews baseline reports for surface water and groundwater quality, air quality, noise, fish and fish habitat, wildlife, avian species, soil, and vegetation;
    - Compiles baseline concentration datasets for surface water, groundwater, fish tissues, soil, vegetation, air quality, and screens datasets against applicable guidelines to identify contaminants of potential concern (COPCs); and
    - Identifies operable exposure pathways from environmental media to human receptors of concern for identified COPCs and summarizes the information in a conceptual site model.
- Exposure assessment:
    - Uses exposure models to calculate the total exposure concentration for COPCs in environmental media (i.e., surface water, groundwater, air, soil, and sustenance foods (country foods such as vegetation, wildlife, and avian species).

- Toxicity assessment:
    - Identifies toxicity thresholds from literature review for COPCs for identified receptors.
- Risk characterization:
    - Integrates the exposure and toxicity assessments to produce quantitative risk estimates; and
    - Conclusions regarding risk to human receptors are made.
- Uncertainty analysis:
    - Describes assumptions and uncertainties encountered during the process of risk assessment and whether they could affect the conclusions of the risk assessment.

Inputs, assumptions, and results of the HHRA will be summarized for the existing conditions for the Human Health VC.

The Application will identify and describe applicable provincial and federal legislation, policies, BMPs and guidance documents related to Human Health VC, including:

- Useful Information for Environmental Assessments (Health Canada 2010c);
- Guidelines for Evaluating Human Health Impacts in Environmental Assessment: Human Health Risk Assessment (Health Canada 2019);
- Federal Contaminated Site Risk Assessment in Canada, Supplemental Guidance on Human Health Risk Assessment on Air Quality, Version 2.0 (Health Canada 2017a);
- Provincial Air Quality Objective Information Sheet - British Columbia Ambient Air Quality Objectives (BC Ministry of Environment and Climate Change Strategy 2020b);
- Canadian Ambient Air Quality Standards (CAAQS): State of the Air Report (CCME 2020b);
- National Ambient Air Quality Objectives for Particulate Matter (Health Canada 1998);
- Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality (Health Canada 2016a);
- Guidelines for Community Noise (World Health Organization 1999);
- Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise (Health Canada 2017b);

- Guidance for Evaluating Human Health Impacts in Environmental Assessment: Drinking and Recreational Water Quality (Health Canada 2016b);
- Guidance on Human Health Risk Assessment. Version 1.0. (Northern Health 2015a);
- Guidelines for Canadian Drinking Water Quality Summary Table (Health Canada 2020);
- Canadian Environmental Quality Guidelines (CCME 2020b);
- Guidance for Evaluating Human Health Impacts in Environmental Assessment: Country Foods (Health Canada 2018);
- Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment, Version 2.0 (Health Canada 2010a);
- Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values and Chemical-Specific Factors, Version 2.0 (Health Canada 2010b);
- Source Drinking Water Quality Guidelines (BC Ministry of Environment and Climate Change Strategy 2020a); and
- Standard Working Group Comments and Recommendations for Provincial Environmental Assessments in Northern British Columbia. Version 2.1. (Northern Health 2015b).

The following Human Health VC technical reports will be provided with the Application:

- Human Health Risk Assessment Report.

8.1.3 Potential Effects

The Application will identify potential adverse effects to the Human Health VC in a manner consistent with section **3.4 Potential Effects** of this AIR.

The Application will describe the analysis, methodology and standards used to determine the potential effects on the Human Health VC resulting from project activities within each phase of the Project. Interactions between Project components and activities and the Human Health VC will be summarized.

The potential for change in human health will be predicted in the Human Health Risk Assessment Report using the same risk assessment approach described in section **8.1.2 Existing Conditions** using predicted (modelled) COPC concentrations in surface water, groundwater, dust, soil, and subsistence foods (country foods), and predicted air contaminants and noise levels.

The following potential effects will be assessed:

- Change in human health based on change in:

- Air quality;
- Drinking water quality;
- Soil or vegetation quality (including from dust deposition);
- Subsistence food quality such as plants, fish, animals, or birds; and
- Noise levels.

8.1.4 Mitigation Measures

The Application will identify measures to avoid, manage or otherwise mitigate potential adverse effects to the Human Health VC in a manner consistent with section **3.5 Mitigation Measures** of this AIR. Relevant management plans will be referenced. Linkages to other sections in the Application will be identified.

8.1.5 Residual Effects

Where an adverse residual effect is identified, the Application will characterize the residual effect based on the magnitude, geographic extent, duration, frequency, reversibility, and context as described in section **3.6 Characterization of Residual Effects** of this AIR.

Where an adverse residual effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

8.1.6 Cumulative Effects

If a residual effect is identified, unless stated otherwise by EAO, the Application will:

- Determine whether any cumulative interactions between residual effects of the Project and the potential residual effects of other developments, based on the preliminary list of past, present and reasonably foreseeable developments provided in the AIR, are likely to occur, consistent with section **3.8.1 Identifying Past, Present or Reasonably Foreseeable Projects and/or Activities** of this AIR;
- Conduct a cumulative effects assessment consistent with section **3.8.2 Conducting a Cumulative Effects Assessment** of this AIR;
- Identify any additional mitigation measures, consistent with section **3.5 Mitigation Measures** of this AIR; and
- Where an adverse residual cumulative effect is identified, the Application will also describe the likelihood, Proponent's significance determination and predictive confidence, in accordance with sections **3.6.1 Likelihood**, **3.7 Proponent's Determination of Significance** and **3.7.1 Confidence and Risk** of this AIR.

8.1.7 Follow-up Strategy

Where a residual effect and/or cumulative effect have been identified, the Application will include a description of a follow-up strategy that is consistent with section **3.9 Follow-up Strategy** of this AIR.

9.0 ACCIDENTS AND MALFUNCTIONS

This section of the Application will present a risk-based approach for the assessment of accidents and malfunctions during all phases of the Project. It will include a description of potential credible accidents and malfunctions associated with the Project, and the conditions under which they could occur. Proposed mitigations and contingency plans will be provided in the Application and will reference the appropriate management plans included in the Application. Predicted effects to VCs will be evaluated for significance and conclusions of the assessment will be presented. Specifically, the Application will include the following:

- Identification of potential accidents and malfunctions;
- The overall methodology for assessing the potential risk of an event (likelihood and consequence);
- Definitions of each category of likelihood;
- Definitions for each category of consequence;
- An assessment of the likelihood of the event occurring, based on historical trends and predictive models;
- Identification of proposed measures to reduce the likelihood of the event;
- Assessment of consequence of the event, in a manner consistent with the direct effects assessment,
- Identification of measures to mitigate the consequences to valued components; and
- Conclusions on the potential risk (likelihood multiplied by consequence) of the accident or malfunction.

At minimum, the following accidents and malfunctions will be assessed:

- Containment loss;
    - Containment failure of management ponds;
    - Loss of containment of PAG material leachate;
    - Hazardous material spills in water;
    - Hazardous material spills on land; and
    - Sediment release into water.
- Transportation accidents;

  - Motor vehicle accidents involving construction, operation, or transport crews; and
  - Rail infrastructure accidents.
- Power failure;
- Earthworks failure: failure or slumping of pit wall; and
- Fire or explosions.

10.0 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The Application will include:

- The environmental factors deemed to have possible consequences on the Project, including, but not necessarily limited to, consideration of natural hazards such as:
    - Potential impacts of climate change (e.g., temperature rise, and trend of increasing precipitation);
    - Extreme weather and weather-related events (e.g., heavy precipitation, extreme temperatures and high winds);
    - Flood events;
    - Lightning strikes;
    - Geohazards, including slope stability;
    - Seismic activities/events; and
    - Forest fires.
- A description of any changes or effects on the Project that may be caused by the above-mentioned environmental factors;
- The likelihood and consequence of the changes or effects to relevant VCs;
- Practical mitigation measures, including design strategies and environmental contingency plans, to avoid or minimize the likelihood and consequence of the effects of the environment on the Project; and
- A conclusion about the potential risk of an effect of the environment on the Project and to relevant VCs.

PART C - WET'SUWET'EN RIGHTS AND INTERESTS

11.0 WET'SUWET'EN RIGHTS AND INTERESTS ASSESSMENT

11.1 Introduction

This section of the Application will:

- Identify and introduce the potentially affected Indigenous group, the Wet'suwet'en Nation (the Wet'suwet'en), as identified in Schedule B of the Section 11 Order, and the Wet'suwet'en First Nation, as identified in Schedule C of the Section 11 Order.
- Describe the process of developing Part C, and how the Wet'suwet'en and the Proponent worked together to establish the approach/methodology.

In April 2017, the Office of the Wet'suwet'en and the Proponent signed a Communication and Engagement Agreement as an initial formal step in the relationship. In July 2020, the Office of the Wet'suwet'en provided to TCL, the Work Plan outlining the Wet'suwet'en Process to be followed for the Project. A Project Assessment Agreement (PAA) will provide guidance to TCL in relation to the Wet'suwet'en process.

TCL is using available information and soliciting input from individuals within the Wet'suwet'en to prepare Part C of the Application as it pertains to TCL's understanding of Wet'suwet'en's Rights and Interests. The assessment will be conducted for those VCs associated with Wet'suwet'en Rights and Interests as provided by the OW. During the EA process, TCL will work with the Wet'suwet'en to gather additional insight and information related to sections 11.3, 11.4 and 11.6.

11.2 Wet'suwet'en Background

This section of the Application will:

- Provide a map that identifies Indian Reserves and Wet'suwet'en communities, and hereditary territory locations and boundaries with respect to the Project location;
- Describe the ecological conditions in Wet'suwet'en territory, based on both science and Wet'suwet'en TEK and understanding, where available;
- Provide background information on the Wet'suwet'en, including, but not limited to:
    - Ethnography and historic background;
    - Language;
    - Land use setting and planning, including relevant Indigenous nations policies and applicable stewardship principles;

- Populations;
- Governance (hereditary and band level);
- Sustenance;
- Traditional and preferred future economies;
- Lands and current reserves; and
- Current use of land and resources for traditional purposes.

11.3 Known Wet'suwet'en Interests

The Application will:

- Provide a historical context of the area of the Project.
- Provide a summary of known Wet'suwet'en lands and resources, Rights and Interests as related to the Project based on publicly available references.

11.4 Potential Effects on Wet'suwet'en Rights and Interests

The Application will describe what types of disturbance the Project will entail, based on a Wet'suwet'en understanding of the Project.

The Application will identify potential effects from the Project which may include:

- Change in access to land and resources currently used by the Wet'suwet'en for traditional purposes;
- Change preventing or interfering with preferred methods or timing of current Wet'suwet'en use of areas for traditional purposes;
- Change in availability (quantity) or quality of wildlife and fish resources in preferred locations due to direct mortality (resulting from traffic, contamination, attractants, hunting pressure) or alteration of movement (resulting from sensory disturbance, physical impediments, habitat fragmentation);
- Change in availability of plant resources in preferred locations due to direct removal (resulting from site clearing) or alteration (resulting from edge effects from clearing, roads, emissions, contamination);
- Change in confidence in the safety of water and country foods, due to (real and perceived) contamination of water, plants, and animals (resulting from dust, chemicals, metals, herbicides, spills, explosives);

- Change in sense of place due to sensory disturbance (resulting from noise, light, visual changes);
- Change in mobility due to removal or disturbance of trails and waterways (resulting from site clearing, infrastructure), reduced safety on roads (resulting from traffic), removal of campsites (resulting from site clearing, infrastructure);
- Change in sense of connection with land, spirit, and culture due to removal, alteration, and disturbance of burial sites, cultural heritage sites, spiritual and ceremonial sites, sites connected with important names, legends, and stories, and teaching and learning sites (resulting from site clearing, infrastructure, roads); and
- Change in community well-being as a result of social and economic change in the territory.

11.5 Assessment Methods and Information Sources

This section of the Application will describe the methods for determining effects from the Project on Wet'suwet'en Rights and Interests.

Existing information, publicly available or made available by the Wet'suwet'en, will be gathered, and reviewed, and may include:

- Historical or ethnographic records/materials;
- Wet'suwet'en knowledge on seasonal use, occupancy or traditional land use;
- Other planning or policy related documents;
- GIS-related files showing seasonal use/occupancy, areas of intent, traditional district boundaries;
- Site specific data related to subsistence, habitation, cultural or spiritual, environment or navigation; and
- Other publicly available information.

The significance of residual effects from several other chapters in the Application will be brought forward to this section, including:

- Atmospheric Environment;
- Avian Species;
- Community Well-being;
- Demographics;

- Economic Development;
- Fish and Fish Habitat;
- Heritage Resources;
- Human Health;
- Land and Resource Use;
- Surface Water;
- Terrain and Soils;
- Vegetation;
- Visual Resources; and
- Wildlife.

11.6 Scope of Assessment of Wet'suwet'en Rights and Interests

This section of the Application will include assessment of the potential Project-related effects on Wet'suwet'en Rights and Interests. Currently, the assessment will focus on components and key potential effect pathways such as the following:

- **Current Land Use and Resource Harvesting** (hunting, trapping, fishing, gathering) – Project potentially affecting harvesting for sustenance, trade, social, cultural, ceremonial or spiritual purposes through changes to access or ecology.
- **Cultural Heritage** – Project potentially affecting access to lands and water or altering the environment which in turn affects Wet'suwet'en teaching and cultural practices.
- **Community Well-being** – Through change in the local and regional communities, demographics and land use, the Project potentially affecting existing and future economic and social well-being of Wet'suwet'en citizens.
- **Wet'suwet'en Health** – From the assessment of changes to human health from alterations in quality of water and foods and considering potential change in food security and availability of traditional foods, the potential for the Project to affect the health of Wet'suwet'en individuals and community.

The assessment will provide:

- A description of the existing situation;

- An assessment of potential adverse effects of the Project on Wet'suwet'en Rights and Interests for each component;
- A description or summary of mitigation measures to avoid or reduce potential adverse effects on Indigenous groups' interests consistent with section **3.5 Mitigation Measures** of this AIR; and
- A characterization of the residual adverse effects on Wet'suwet'en rights and interests after mitigation using the methodology described in sections **3.6 Characterization of Residual Effects**, **3.6.1 Likelihood** and **3.7.1 Confidence and Risk** of this AIR and incorporating the findings of the VC chapters in the Application that are relevant to Indigenous groups' interests.
- Due to the unique nature of Indigenous rights, the Application will make no determination of the significance of residual adverse effects on Wet'suwet'en rights and interests.

11.7 Perspectives on Cumulative Effects

This section will describe Wet'suwet'en perspectives on cumulative effects, as documented in existing publicly available resources.

This section will discuss the residual effects of the Project in the context of other industrial and environmental effects, considering known Wet'suwet'en perspectives.

11.8 Summary of Potential Project Effects, Mitigation and Conclusions

The Application will include a Summary Table (see example below) that identifies potential effects on Wet'suwet'en Rights and Interests, proposed mitigation measures and conclusions.

Table 4: Summary of Potential Effects on Wet'suwet'en Interests and Rights, Mitigation Measures and Conclusions

Potential Effect on Wet'suwet'en Interests and Rights	Proposed Mitigation Measure	Conclusion

11.9 Consultation

The Application will include:

- A summary of past and planned consultation activities;
- If applicable, a summary of proposed changes to the Indigenous Consultation and Engagement Plan resulting from the Wet'suwet'en feedback, or experience from consultation to date, including any such changes which have been implemented;
- An Appendix, the Indigenous Consultation and Engagement Report, which contains comments

received from Wet'suwet'en regarding this section of the Application;

- A Summary Table (see example below) that summarizes the results of consultation related to Wet'suwet'en Interests or other matters of concern to Wet'suwet'en that may be affected by the Project, and how these were addressed including design considerations, mitigations, accommodations, and specific commitments that address the effects identified;
- A summary of any outstanding Indigenous Interests issues identified by Wet'suwet'en; and
- A summary of publicly available arrangements or agreements reached between the proponent and Wet'suwet'en.

Table 5: Summary Table of the Results of Consultation related to Wet'suwet'en Interests/Other Matters of Concern

Group	Consultation Stage / Information Source	Issue – Wet'suwet'en Interest	Issue – Other Matters of Concern	Analysis of Potential Effect	Proposed Measures to Avoid, Mitigate or Otherwise Manage Effects	Status of Issue *(e.g., resolved, ongoing resolution, referred to agency, etc.)*

EAO | Environmental Assessment Office

Application Information Requirements

Part D – Public Consultation

BRITISH COLUMBIA

PART D – PUBLIC CONSULTATION

12.0 PUBLIC CONSULTATION

The Application will include a report on the results of implementation of the approved Public Consultation Plan including:

- Background Information:
    - Identification of local governments, residents, property owners, and other rights holders who are potentially impacted by the Project;
    - Maps of local government boundaries, private land, tenures/authorizations, or residences with respect to the Project; and
    - Background information about each potentially affected municipality and/or stakeholder group.
- Public Consultation:
    - A summary of the past and planned consultation activities;
    - A summary of any proposed changes to the approved Public Consultation Plan as a result of feedback from local governments, stakeholders or individuals, or experience from consultation to date; and
    - A description of the key issues raised by the public that are relevant to the EA, the responses to those issues, and the status of their resolution.
- Summary Table:
    - Identification of concerns raised by the public and the measures to avoid, reduce or mitigate those effects. This information will be provided in the form of a table.

EAO | Environmental Assessment Office

Application Information Requirements

Part E – Management Plans and Management Strategies

BRITISH COLUMBIA

PART E - MANAGEMENT PLANS AND FOLLOW UP STRATEGIES

13.0 MANAGEMENT PLANS

The Environmental Management System (EMS) for the Project is an overarching management plan strategy comprising a set of processes and practices which enable TCL to manage its environmental and safety performance in a holistic way, within an integrated framework. While the management plans are part of the EMS, the EMS is not just a collection of management plans. Important features of the EMS include identification and management of key aspects, document control, operational procedures, regulatory compliance, training, communication, and defining the roles and responsibilities for participants by using formal Plan-Do-Check-Act functions.

The management plans are designed to meet (or exceed) the requirements of the BC EAO and other regulatory agencies. Each management plan includes mitigation measures designed to address the potential for adverse effects associated with Project components and activities. Individual management plans may include applicable monitoring programs and adaptive management processes.

Application will include a list of management plans for all phases of the Project, including but not limited to:

- Air Quality Management Plan (including dust control);
- Chemicals and Materials, Storage, Transfer, and Handling Plan;
- Construction Environmental Management Plan;
- Discharge Management Plans (including selenium management);
- Environmental Management System;
- Explosives Management Plan (including blast vibration control);
- Fuel Management and Spill Control Plan;
- Heritage Resources Management Plan;
- Mine Emergency Response Plan;
- Minesite Traffic Control Plan;
- Minesite Water Management Plan;
- ML/ARD Management Plan (including mine material management);

- Occupational Health and Safety Program;
- Public Access Management Plan;
- Reclamation and Closure Plan (including soil management);
- Socio-economic Management Plan;
- Surface Erosion Prevention and Sediment Control Plan;
- Vegetation Management Plan (including invasive plant control);
- Visual Resources Management Plan;
- Waste Management Plan for Refuse and Emissions; and
- Wildlife Management Plan.

- A comprehensive description of the contents of each management plan, including the identification of any mitigation measures described in previous sections that will be included within the plans.

14.0 FOLLOW-UP STRATEGY

The Application will include:

- A description of the monitoring and follow-up programs the Proponent will implement, including their activities, objectives, and reporting; and
- Reporting structure as identified within the environmental management plans, monitoring plans and EAC conditions.

EAO | Environmental Assessment Office

Application Information Requirements

Part F – Conclusions

BRITISH COLUMBIA

PART F - CONCLUSIONS

15.0 CONCLUSIONS

The Application will:

- Provide the Proponent's conclusions regarding the potential for significant adverse effects on VCs from the Project;
- Request an EAC for the Project; and
- Acknowledge the need, if applicable, to successfully complete a federal EA and subsequent permitting/authorization processes prior to proceeding with the Project's Construction, Operation, and Decommissioning and Reclamation phases.

15.1 Summary of Mitigation Measures

The Application will include a table that identifies the proposed measures to mitigate potential effects to VCs as shown in **Table 6**. This information provides the foundation for the development of a Table of Conditions for the Project, which would be appended to an EAC, should one be issued.

Table 6: Summary of Proposed Mitigation Measures

No.	VC and Effect	Proposed Mitigation Measure	Timing	Legal Requirement?	Responsible Agency
Environmental					
1.1					
1.2					
Social					
2.1					

15.2 Summary of Residual Effects

The Application will summarize all potential residual effects, including cumulative residual effects, in a table format that depicts the potential effect, Project phases, Project activity or physical work linked to the effect, proposed mitigation and significance of effect on VCs.

16.0 REFERENCE MATERIAL

The Proponent will provide a list of reference material used in developing the Application.

AGRA Earth & Environmental Ltd. 1999. Telkwa Coal Mine Surface Water Monitoring Program 1998.

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British Columbia Ministry of Energy, Mines and Petroleum Resources & Ministry of Environment and Climate Change Strategy. 2020. Developing a Fugitive Dust Management Plan. Available: https://www2.gov.bc.ca/assets/gov/environment/waste-management/waste-discharge-authorization/guides/templates/gui-tec-031_fugitive_dust_mgmt_plan_guidance.pdf?bcgovtm=20200319_GCPE_AM_COVID_4_NOTIFICATION_BCGOV_BCGOV_EN_BC__NOTIFICATION [Accessed August 2020]

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17.0 APPENDICES

This section will include the appendices referenced in the Application.

Information prepared by professionals and provided under their professional seal will be identified in the Application and the related sealed studies will be included in an Appendix.