Appendix 2.3D
Application Information Requirements

Proposed Blackwater Gold Project

Application Information Requirements

As Approved by
Environmental Assessment Office

On
May 15, 2014

For
New Gold Inc.'s
Application for an Environmental Assessment Certificate

PREFACE TO THE APPLICATION INFORMATION REQUIREMENTS

Purpose of the Application Information Requirements

The purpose of the Application Information Requirements (AIR) under the British Columbia *Environmental Assessment Act* (BC *EAA*) (Government of British Columbia (BC), 2002a) process is to identify the information to be provided by New Gold Inc. (the Proponent) in their Application for an Environmental Assessment (EA) Certificate, pursuant to section 16 of BC *EAA* (the Application) for the proposed Blackwater Gold Project (the proposed Project). Completion of the EA process and issuance of a BC EA Certificate are required prior to construction of the proposed Project.

The AIR also includes information provided by the Proponent regarding the Proponent, the proposed Project, and the Proponent's approach to developing the proposed Project and the Application. The Application will be consistent with the information provided.

Project Description

The Proponent is proposing to develop the Blackwater Gold Project, an open pit gold and silver mine and ore processing facilities with a nominal milling rate capacity of 60,000 tonnes per day (t/d) (22 million tonnes per year (Mt/y)) over 17 years. The proposed Project is situated approximately 110 kilometres (km) south of Vanderhoof (straight-line distance) in central BC and is described in the Project Description accepted by both BC Environmental Assessment Office (BC EAO) and the Canadian Environmental Assessment Agency (the Agency) in November 2012 (AMEC Environment & Infrastructure (AMEC), 2012).

Provincial Scope of the Proposed Project

The proposed Project is subject to review under the BC *EAA* administered by BC EAO. Pursuant to Part 3 of the *Reviewable Projects Regulation* (Government of BC, 2002c), a review is required for the proposed Project because it would constitute a new mine facility with a production capacity greater than 75,000 tonnes per year (t/y) of mineral ore; the proposed Project is expected to have a nominal ore production capacity of 22 Mt/y. On 9 July 2013, the BC EAO issued an Order under section 11 of the BC *EAA* describing the formal provincial scope, procedures, and methods concerning the provincial review of the proposed Project's EA (BC EAO, 2013c).

Federal Scope of the Proposed Project

The proposed Project is subject to review under the *Canadian Environmental Assessment Act, 2012 (CEA Act 2012)* (Government of Canada, 2012a), and the completion of a federal EA review process is required prior to the construction of the proposed Project. Pursuant to paragraphs 15(c) of the *CEA Act 2012, Regulations Designating Physical Activities* (Government of Canada, 2012b), an Environmental Impact Statement (EIS) is required because the proposed Project involves the construction, operation, decommissioning, and abandonment of a gold mine with an ore production capacity greater than 600 t/d. On 19 February 2013, the Agency issued the Environmental Impact Statement Guidelines (EIS Guidelines) for preparation of an EIS for an EA conducted pursuant to the *CEA Act 2012*, outlining the federal information requirements for the preparation of the EIS, which were

finalized with the benefit of comments received from federal departments, Aboriginal groups, and the public.

Federal – Provincial Coordination

The principles of the Canada-BC Agreement for Environmental Assessment Cooperation (BC EAO and Agency, 2004) will be carried out for the proposed Project in the form of a coordinated federal – provincial process.

Development of the Application Information Requirements

The AIR has been developed following BC EAO's AIR Template (BC EAO, 2013). The Proponent provides to BC EAO drafts of the AIR, which BC EAO reviews with the Working Group, First Nations and the public. The AIR is finalized by BC EAO once BC EAO is satisfied that the AIR adequately captures the information requirements for the Application. This document is the final AIR approved by EAO.

In developing the drafts of the AIR, the Proponent considered the results of early project-related consultation to assist with the scoping and identification of issues to be included in the draft AIR. Consultation continued through the review of the draft AIR to establish its final scope as the basis of the preparation of the Application. The following table is a list of both federal and provincial regulatory authorities, community groups, local authorities, landowners and land/resource users, and Aboriginal groups having an interest in the proposed Project and with whom the Proponent consulted or engaged throughout the preparation of the AIR.

Stakeholder	Consulted
Provincial Government	
BC Ministry of Aboriginal Relations and Reconciliation	Yes
BC Ministry of Children and Family Development	No
BC Ministry of Energy and Mines (BC MEM)	Yes
BC Ministry of Environment (BC MOE)	Yes
BC Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO)	Yes
BC Ministry of Jobs, Tourism and Skills Training	Yes
BC Ministry of Transportation and Infrastructure (BC MOTI)	No
British Columbia Environmental Assessment Office (BC EAO)	Yes
Front Counter BC	Yes
Northern Health Authority	Yes
Federal Government	
Aboriginal Affairs and Northern Development Canada	No
Canadian Environmental Assessment Agency (the Agency)	Yes
Environment Canada (EC)	Yes
Fisheries and Oceans Canada (DFO)	Yes
Health Canada	Yes
Major Projects Management Office	Yes

Stakeholder	Consulted
Natural Resources Canada (NRCan)	Yes
Transport Canada (TC)	Yes
Local Government	
Burns Lake Community Health Centre	Yes
Bulkley-Nechako Regional District	Yes
Cariboo Regional District	Yes
City of Prince George	Yes
City of Quesnel	Yes
District of Fort St. James	Yes
District of Vanderhoof	Yes
Royal Canadian Mounted Police (RCMP)	Yes
School District 91	Yes
Village of Burns Lake	Yes
Village of Fraser Lake	Yes
Landowners and Land/Resource Users	
Canadian Forest Products	Yes
CTN Ranching Ltd.	Yes
Laidman Lake Ecolodge	Yes
L&M Lumber Limited	Yes
Moose Lake Lodge	Yes
Rim Rock Ranch	Yes
Range Tenure holder RAN0772381	Yes
Tatelkuz Lake Ranch Resort	Yes
TTM Resources Ltd.	Yes
Landowner of lot 124R4C	Yes
West Fraser Mills Ltd.	Yes
Other Stakeholders	
BC Forest Safe Council	Yes
BC Institute of Technology	Yes
BC Trappers Association	Yes
BC Wildlife Federation	Yes
Caledonia Courier	Yes
College of New Caledonia	Yes
Community Futures Stuart Nechako	Yes
Ecosystem Restoration Committee	Yes
Gord Armstrong (ARO Auto/Industrial)	Yes
Guide outfitters and trappers potentially affected by proposed Project footprint	Yes
Gulbranson Logging Ltd.	Yes
Lakes District Community Services	Yes

Stakeholder	Consulted
The Nature Trust of BC	Yes
Nechako Environment and Watershed Stewardship Society	Yes
Nechako Valley Cattlemen's Association	Yes
Nechako Valley Historical Society	Yes
Nechako Valley Sporting Association	Yes
Nechako Waste Reduction Initiative	Yes
University of British Columbia	Yes
University of Victoria	Yes
Upper Nechako Wilderness Council	Yes
Vanderhoof and District Chamber of Commerce	Yes
Vanderhoof International Air Show Society	Yes
West Chilcotin Tourism Association	Yes

Aboriginal Groups	Engaged
Lhoosk'uz Dene Nation	Yes
Nadleh Whut'en First Nation	Yes
Nazko First Nation	Yes
Saik'uz First Nation	Yes
Skin Tyee Nation	Yes
Stellat'en First Nation	Yes
Ulkatcho First Nation	Yes
Tsilhqot'in National Government	Yes
Métis Nation BC	Yes

The first draft AIR (dAIR) was provided to BC EAO and the Agency in December 2012. Subsequent versions of the dAIR were prepared to adjust to the new template provided by BC EAO and to address comments. A revised version of the dAIR was circulated to the Working Group for review and comment in April 2013. The Working Group comprises representatives from federal, provincial, and local governments and Aboriginal groups.

BC EAO held a formal public comment period from 9 October 2013 to 8 November 2013, during which the public was encouraged to submit their written comments. BC EAO posted the dAIR on BC EAO Project Information Centre (e-PIC) website, as well as written comments received during the public comment period. The Proponent responded to the written comments received, as appropriate, and these responses are also posted on the BC EAO e-PIC website. The Proponent will address in the Application, as appropriate, comments received from the public.

Next Steps in the Environmental Assessment of the Proposed Project

This AIR is issued to the Proponent for the proposed Project. The Proponent is responsible for ensuring that the Application complies with all the information requirements identified in this AIR.

Upon completion, the Proponent will submit the Application to BC EAO for screening. BC EAO, with the assistance of a Working Group comprised of provincial and federal government agencies, Aboriginal groups, and local governments, will screen the Application for compliance to this AIR. If BC EAO finds the Application satisfactorily complies with information requirements identified in this AIR, the Application will be accepted for review.

The Application review includes a public comment period, as set out in the section 11 Order, and technical review by the Working Group. The Proponent is responsible for tracking and responding to comments received on the Application during the public comment period and from the Working Group.

TABLE OF CONTENTS

The Table of Contents presented below provides an initial outline of the components, including sections, subsections, list of references, appendices, figures, and tables that will comprise the AIR and the Application. The Application will generally follow this Table of Contents, and discrepancies between the two documents will be identified in the Table of Concordance.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONCORDANCE

This section of the Application will present a table listing each requirement for content and methodological approach in the approved AIR. The table will identify where the requirements have been addressed in the Application, with volume, section, and page references. The Table of Concordance will use the format presented below.

AIR Section	Brief Description of Relevant Section and Subsection	Application Volume, Section and Page

PREFACE TO THE APPLICATION

This section of the Application will include:

- Statement that the proposed Project is subject to review under the BC *EAA* and description of the trigger for the review under BC *EAA*;
- Statement that the proposed Project is subject to a standard assessment under the *CEA Act 2012* and why;
- Statement that the proposed Project is subject to a coordinated EA process between the Province of BC and Canada;
- Information on any other EA approval processes that the proposed Project is undergoing (if applicable), especially if they interact or overlap with the *CEA Act 2012*;
- Statement that the Application has been developed pursuant to the AIR approved by BC EAO with input from the Agency and that it complies with relevant instructions provided in section 11 Order; and
- Information identifying the agencies, Aboriginal groups, and other parties involved in the development of the Application.

ACRONYMS

This section of the Application will provide a list of all abbreviations, acronyms and terms used, and their definitions, in the Application. The list provided below refers to terms and abbreviations used in this AIR.

Abbreviations and Units of Measure	Definition
3D	three-dimensional
7dQ10	seven-day, 10-year return period
Application (the)	Application for an Environmental Assessment Certificate, pursuant to section 16 of the British Columbia *Environmental Assessment Act*
Agency (the)	Canadian Environmental Assessment Agency
ABA	acid-base accounting
AIA	Archaeological Impact Assessment
AIR	Application Information Requirements
AMEC	AMEC Environment & Infrastructure
ARD	acid rock drainage
BC	British Columbia
BC CDC	British Columbia Conservation Data Centre
BC *EAA*	British Columbia *Environmental Assessment Act*
BC EAO	British Columbia Environmental Assessment Office
BC IOM	BC Input/Output Model
BC MEM	British Columbia Ministry of Energy and Mines
BC MFLNRO	British Columbia Ministry of Forests, Lands and Natural Resource Operations
BC MOE	British Columbia Ministry of Environment
BC MOF	British Columbia Ministry of Forests
BC MOTI	BC Ministry of Transportation and Infrastructure
BGC	Biogeoclimatic
BMPs	Best Management Practices
CABIN	Canadian Aquatic Biomonitoring Network
CCME	Canadian Council of Ministers of the Environment
CEA Act 2012	*Canadian Environmental Assessment Act, 2012*
CEO	Chief Executive Officer
CNRS	California Natural Resources Agency
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
dAIR	draft Application Information Requirements
dBA	decibel A scale
DEM	Digital Elevation Model
DFO	Fisheries and Oceans Canada

Abbreviations and Units of Measure	Definition
DNA	deoxyribonucleic acid
EA	Environmental Assessment
EC	Environment Canada
EEM	Environmental Effects Monitoring
EHS	Environment, Health and Safety
EIS	Environmental Impact Statement
EIS Guidelines	Environmental Impact Statement Guidelines
EMP	Environmental Management Plan
EMS	Environmental Management System
e-PIC	BC EAO's Project Information Centre
FHAP	Fish Habitat Assessment Procedure
FMOP	Fisheries Mitigation and Offsetting Plan
FPC	Forest Practices Code
FSR	Forest Service Road
GDP	Gross Domestic Product
GHG	greenhouse gas
GIS	Geographic Information System
GST	Goods and Service Tax
g/t	grams per tonne
ha	hectare
ICMC	International Cyanide Management Code
ICMI	International Cyanide Management Institute
ICP-MS	Inductively Coupled Plasma – Mass Spectroscopy
IR	Indian Reserve
ISO	International Organization for Standardization
km	kilometre
km^2	square kilometre
kV	kilovolt
LiDAR	Light Detecting and Ranging
LRMP	Land and Resource Management Plan
LSA	Local Study Area
m	metre
m^2	square metres
ML/ARD	metal leaching / acid rock drainage
masl	metres above sea level
MEND	Mine Environment Neutral Drainage
MMER	*Metal Mining Effluent Regulations*

Abbreviations and Units of Measure	Definition
µm	micrometre
Moz	million ounces
Mt	million tonnes
Mt/y	million tonnes per year
NAG	non-acid generating
NHA	Northern Health Authority
NPR	Neutralization Potential Ratio
NRCan	Natural Resources Canada
NTLRU	non-traditional land and resource use
NTS	National Topographic System
OH&S	Occupational Health & Safety
ON	Ontario
oz	Ounce
PAG	potentially acid generating
PDCA	Plan-Do-Check-Act cycle
PEA	Preliminary Economic Assessment
PEM	Predictive Ecosystem Mapping
PM_{10}	particulate matter no greater than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	particulate matter no greater than 2.5 micrometres in aerodynamic diameter
ppm	parts per million
Proponent (the)	New Gold Inc.
proposed Project (the)	Proposed Blackwater Gold Project
PSLs	Permissible Sound Levels
PST	provincial sales tax
PY	person-year
RCMP	Royal Canadian Mounted Police
RDEA	Regional District Electoral Area
RIC	Resource Inventory Committee
Richfield	Richfield Ventures Corporation
RISC	Resource Inventory Standards Committee
ROW	Right-of-Way
RSA	Regional Study Area
SARA	*Species at Risk Act*
SC	Statistics Canada
SFE	shake flask extraction
SIL	Survey Intensity Level

Abbreviations and Units of Measure	Definition
SMART	specific, measurable, achievable, realistic, and time-bound
SMU	Soil Map Unit
SO_2	sulphur dioxide
SOP	Standard Operating Procedure
t/d	tonnes per day
t/y	tonnes per year
TC	Transport Canada
TDG	Transportation of Dangerous Goods
TDG Act	*Transportation of Dangerous Goods Act*
TEM	Terrestrial Ecosystem Mapping
TK	Traditional Knowledge
TLU	Traditional Land Use
TPM	Total Particulate Matter
TSF	Tailings Storage Facility
US	United States
US EPA	United States Environmental Protection Agency
UWR	Ungulate Winter Range
VC	Valued Component; includes valued environmental components, valued economic components, valued social components, valued heritage components, and valued health components
WSC	Water Survey of Canada

EXECUTIVE SUMMARY

The Executive Summary will include:

- A brief description of proposed Blackwater Gold Project (the proposed Project);
- A summary of the assessment of alternatives including reasons for rejecting certain alternatives;
- A summary of the consultation undertaken;
- A summary of the issues and potential project impacts identified;
- A summary of recommended mitigation measures;
- A summary of potential cumulative impacts and residual effects;
- A summary of the follow-up programs proposed (if applicable); and
- Proponent conclusions resulting from the Environmental Assessment (EA).

PART A – INTRODUCTION AND BACKGROUND

1.0 PURPOSE OF THE APPLICATION

New Gold Inc. (the Proponent) must provide a description of the purpose of the Application for an Environmental Assessment (EA) Certificate (the Application), pursuant to section 16 of the British Columbia *Environmental Assessment Act* (BC *EAA*).

The Proponent intends to submit an Application for the proposed Blackwater Gold Project (the proposed Project). This section of the Application will include the following information:

- Identification of the proposed Project and the Proponent; and
- Information that demonstrates how the Application fulfills the requirements of the Application Information Requirements (AIR), approved for the proposed Project.

2.0 PROPOSED PROJECT OVERVIEW

2.1 Proponent Description

The Proponent must provide in the Application:

- A detailed description of the Proponent, including history, type of company, affiliations, headquarters location, and contact information containing contact names, addresses, telephone numbers, fax numbers, and e-mail addresses;
- The name and contact for the firm/individual managing the EA of the proposed Project; and
- Identification of information in the Application that has been prepared by a qualified professional and information related to the qualified professional's expertise.

The Proponent has provided the following summary for inclusion in the AIR.

The Proponent is an international gold producer with operations in Canada, United States (US), Mexico, and Australia, and development projects in Canada and Chile. The Proponent was incorporated under the laws of the Province of British Columbia (BC) on 31 January 1980. The Proponent has corporate offices in Vancouver and Toronto and is listed on the Toronto Stock Exchange and the New York Stock Exchange Market under the symbol NGD. The proposed Project is managed out of the Proponent's Vancouver office. Tim Bekhuys, Environment and Sustainability Director, will be the principal contact person for purposes of the EA.

Proponent contact information is as follows:

Proposed Project Name:	Blackwater Gold Project
Proponent:	New Gold Inc.
Proponent Address:	Suite 1800, Two Bentall Centre 555 Burrard Street, Box 212 Vancouver, BC, V7X 1M9 Telephone: (604) 696-4100 Facsimile: (604) 696-4110 Internet: www.newgold.com
Principal Contact:	Tim Bekhuys, RP Bio, Environment & Sustainability Director E-mail: Tim.Bekhuys@newgold.com Telephone: (604) 696-4100 Facsimile: (604) 696-4110

The Project Management Team for the proposed Project also includes:

- New Gold:
  - Robert Gallagher, President, Chief Executive Officer (CEO) & Director;
  - Peter Marshall, P.Eng., Project Director – Blackwater;
  - Nigel Fisher, Environmental Manager;

- Paul Hosford, P.Eng., Feasibility Study Director;
- Claudette Gouger, Community Manager;
- Amber Teed, First Nations Coordinator; and

- Sustainability Engineering:
  - Keith Ferguson, P.Eng., Environment & Permitting Advisor; and
- AMEC Environment & Infrastructure (AMEC):
  - Alvaro Paredes, MPhil, EP, Project Manager.

AMEC Environment & Infrastructure (AMEC) has prepared the AIR for the proposed Project and has been retained by the Proponent to lead the preparation of the Application. Where applicable, additional information in the Application that has been prepared by a qualified professional and information related to the qualified professional's expertise will be identified in the Application.

2.2 Proposed Project Description

This section of the Application will present the Project Description for the proposed Project. Feasibility level engineering studies will be provided as an appendix to the Application to provide additional information for components of the proposed Project.

The Proponent must state in the Application:

- The threshold in the BC *Reviewable Projects Regulation* (B.C. Reg. 370/02) that has been met such that the proposed Project is required to undergo EA (or description of other mechanism by which the proposed Project entered EA (i.e. section 6 or 7 of the *BC EAA*);
- The known or likely threshold that has been met under the *Canadian Environmental Assessment Act, 2012* (*CEA Act 2012*) Regulations Designating Physical Activities; and
- That the Canadian Environmental Assessment Agency (the Agency) has determined that a federal EA is required and that the proposed Project is undergoing a coordinated federal and provincial review process.

Pursuant to Part 3 of the BC EAA (Government of BC, 2002a) Reviewable Projects Regulation (Government of BC, 2002c), review is required for the proposed Project because it would constitute a new mine facility with a production capacity greater than 75,000 tonnes per year (t/y) of mineral ore; the proposed Project is expected to have a nominal ore production capacity of 22 million tonnes per year (Mt/y). The BC Environmental Assessment Office (BC EAO) issued an Order under section 10 of the BC EAA on 5 November 2012 indicating the proposed Project requires an EA Certificate and the Proponent may not proceed with the proposed Project without an assessment (BC EAO, 2012).

The proposed Project meets the definition of a designated project under CEA Act 2012 and the schedules of the Regulations Designating Physical Activities (Government of Canada, 2012b) and that the proposed Project Description meets the requirements of the Prescribed Information for a Description of a Designated Project Regulations (Agency, 2012b). The

Agency published a Notice of Environmental Assessment Determination on 21 December 2012 indicating that a federal EA is required (Agency, 2012c). The proposed Project is undergoing a coordinated EA review by BC EAO and the Agency.

This section of the Application will present the changes made to the proposed Project during the EA process considering consultation conducted with stakeholders and feasibility level engineering studies.

2.2.1 Purpose and Location of the Proposed Project

The Proponent must include in its Application a description of the purpose of the proposed Project (Agency, 2013d).

The Proponent is proposing to develop an open pit gold and silver mine and ore processing facilities with a nominal milling rate capacity of 60,000 tonnes per day (t/d) (22 Mt/y) over 17 years. The proposed Project is situated approximately 110 kilometres (km) southwest of Vanderhoof (straight-line distance) in central BC, approximately 160 km southwest of Prince George.

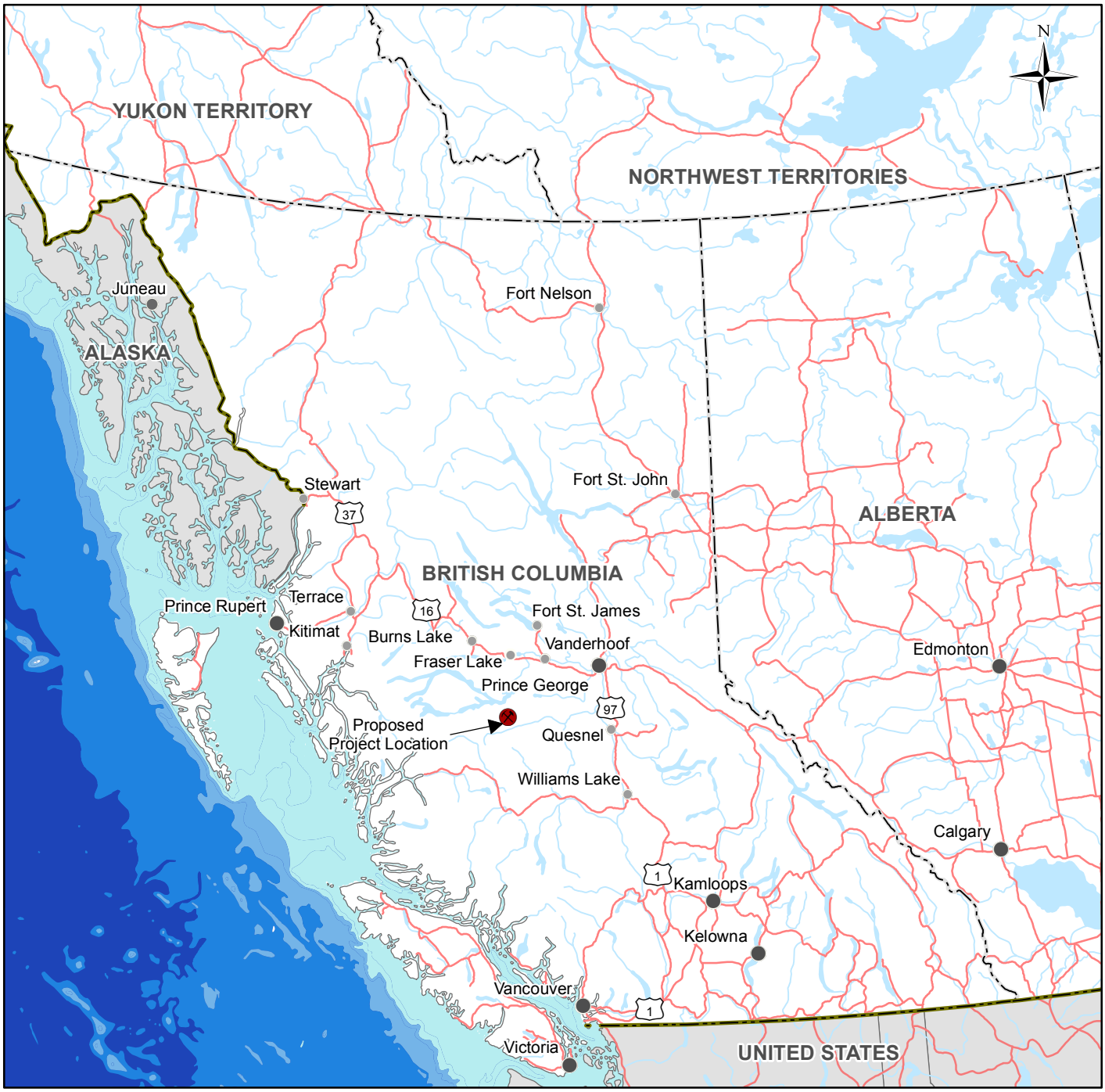
The Application must include a description of the location of the proposed Project and the longitude and latitude of the site. The Application must include maps showing both regional context (identify nearby communities) and site-specific setting. The Application must identify the distance to nearby communities and note the communities on the regional map.

The Proponent has provided the following summary for inclusion in the AIR.

The proposed Project is located within the traditional territories of First Nations. The mine site is located in the vicinity of several Lhook'uz Dene Nation Indian Reserves (IRs). The closest IR to the mine site is Tatelkus Lake (IR 28, approximately 10 km to the northeast). Other IRs located in the vicinity of the mine site are Kushya Creek (IR 7, 14 km southeast), Tsachla Lake (IR 8, 18 km, south), Kluskus (IR 1, 22 km southeast), and Tzetzi Lake (IR 11, 18 km southwest).

The two closest IRs to the proposed transmission line are the Stellaquo 1 Reserve (Stellat'en First Nation) at 3 km to the northeast, and the Seaspunkut 4 Reserve (Nadleh Whut'en First Nation) at 9 km to the northeast of the Kluskus Forest Service Road (FSR). The closest IR to the Kluskus FSR is the Clustalach Reserve 5 (Saik'uz First Nation) at approximately 1.8 km to the east.

The proposed mine site is centered at 53° 11' 22.872" N 124° 52' 0.437" W (5893000 N and 375400 E) and is located in National Topographic System (NTS) sheet 93F/02**)** (**Figure 2.2-1**).



Legend

- Blackwater Gold Project
- City
- Town
- Road
- Stream
- Waterbody
- Provincial Boundary
- International Boundary

Reference
Atlas of Canada scale 1:7,500,000

Scale: 1:9,000,000

0 50 100 200 300 400 500
Kilometres

CLIENT: newgold

PROJECT: Blackwater Gold Project

Location of the Blackwater Project in British Columbia

DATE:	ANALYST:	**Figure** 2.2-1
March, 2014	MY	
JOB No: VE52095	QA/QC: IM	PDF FILE: Other-100-005_v12DAIR_project_location.pdf
GIS FILE: Other-100-005_v12DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

Y:\GIS\Projects\VE\VE52095_Richfield_BlackwaterMapping\Other\Other-100-005_v12DAIR.mxd

2.2.2 Project Overview

The Application must include a description of the relevant history of the proposed Project.

The Project Overview will be complemented by feasibility level studies that will be included in an appendix to the Application. Mineral exploration activities in the proposed Project area commenced in 1973 by Granges Exploration Ltd. and continue to take place. Richfield Ventures Corporation (Richfield) acquired the Blackwater mineral claims in 2009 and conducted additional drilling and baseline environmental programs. The Proponent purchased Richfield in 2011, acquiring the Blackwater mineral claims, and continued major exploration drilling, metallurgical test work and engineering, and environmental studies.

Exploration activities undertaken by the Proponent to support the Preliminary Economic Assessment (PEA) of the proposed Project were completed in mid-May 2012 and involved drilling 449 holes for approximately 160,000 metres (m). The Proponent's environmental baseline studies began in May 2011 and were conducted until 2013. Results from the environmental baseline studies will be included in the Application.

The Proponent has stated that the main objective of the proposed Project is the economic extraction of the gold and silver resources from the Blackwater deposit. The proposed Project is based on a conventional diesel powered truck-shovel open pit mine, which will feed a 60,000 t/d (22 Mt/y) plant where the ore would be processed by whole ore cyanide leaching. The gold and silver would be recovered into a gold-silver doré product and shipped by air or by road. The proposed Project would represent an annual average production of 507,000 ounces (oz) of gold and 2,039,000 oz of silver during 17 years of operations, and would generate positive economic effects, including employment and business opportunities and tax payments. The main physical activities associated with the proposed Project include the construction, operations, closure[1], and post-closure of an open pit mine; ore processing facilities; mine waste management facilities; and associated on-site and off-site infrastructure.

This section of the Application will also include a summary of the changes that have been made to the initial proposed Project as described in the Project Description accepted in November 2012 (AMEC, 2012).

2.2.3 On-site Components and Infrastructure

The Application must include a description of all on-site components and associated on-site and off-site infrastructure and other facilities associated with the proposed Project and include figures of components.

The Application must also include a description of the activities associated with construction, operations, and decommissioning of the proposed Project and provide figures of activities.

The Proponent has provided the following summary for inclusion in the AIR.

[1] The term closure is preferred to the term decommissioning because it is more inclusive and takes into account other activities such as clean-up, recontouring, revegetation, and reclamation, which are implemented during the closure phase of the proposed Project.

Table 2.2-1 presents a summary of the main proposed Project components and facilities with their approximate dimensions and capacities which will be described in the Application.

Table 2.2-1: Proposed Project Components and Facilities – Approximate Dimensions and Capacity

Project Component or Facility	Dimensions and/or Capacity
ON-SITE	
Mine Site	Occupies approximately 4,400 hectares (ha) and accommodates all mine, ore processing, mine waste, water supply and management, and on-site infrastructure.
Open Pit	Footprint of approximately 238 ha with approximate dimensions 2 km long from east to west and 1.5 km long from north to south, with an anticipated depth of 550 m below ground surface.
West Waste Rock Dump	Footprint of approximately 172 ha to store 87 Mt of Non-Acid Generating (NAG) 4, NAG 5 and overburden with an elevation of 1,535 metres above sea level (masl) (160 m high).
East Waste Rock Dump	Footprint of approximately 158 ha to store 50 Mt of Type 5 NAG and overburden with an elevation of 1,590 masl (105 ^{m} high).
Low Grade Stockpile	Footprint of approximately 76 ha to store 50 Mt of low-grade ore.
Construction Laydown	Occupies approximately 31 ha.
Construction Camp	8 ha with the capacity to accommodate 800 to 1,200 personnel people during construction phase.
Truck Shop	Occupies approximately 6 ha.
Tailings Storage Facility (TSF)[(1)]	Footprint of approximately 1,117 ha comprising Cell C, which occupies 192 ha and Cell D, which occupies 925 ha. The maximum elevation of the main dam for Cell D is 1,339 masl (149 m high). The TSF is designed to store a total of 784 Mt of tailings, Potentially Acid Generating (PAG 1 and PAG 2), and NAG 3 waste rock as follows: • 345 Mt of tailings; • 313 Mt of Type 1 (PAG1) waste rock; • 62 Mt of Type 2 (PAG2) waste rock; and • 79 Mt of Type 3 (NAG3) waste rock.
Plant Site	Occupies approximately 35 ha with industrial buildings to process 60,000 t/d (22 Mt/y) of ore and produce 500,000 oz of doré. This surface includes the crusher and the conveyor. The plant site is located at an elevation of 1,425 masl. Plant site will have an area for storage of hazardous materials (e.g., cyanide) and it will also include the core logging area.
Operations Camp	Occupies approximately 5 ha with buildings to accommodate up to 400 personnel during the operations phase.
Topsoil Stockpile	Footprint of approximately 10 ha distributed in two locations within the mine site.
Borrow Areas	73 ha comprise 30 ha for the Site C main dam and 43 ha for the Site D main dam. The borrow areas also include a sand and screening plant.
OFF-SITE	
Transmission Line	Occupies approximately 550 ha – 133 km long, 230 kilovolt (kV) line over a right of way 40 m wide
Mine Access Road	Starting of km 124.5 of the Kluskus-Ootsa FSR and occupies

Project Component or Facility	Dimensions and/or Capacity
	approximately 28 ha – 15 km long over a right of way 20 m wide
Freshwater Supply System	Freshwater requirements will be met by pumping water from Tatelkuz Lake via a 20-km long pipeline (**Figure 2.2-2**) to a receiving area within the mine site. This water will be used for ore processing and flow maintenance in Davidson Creek. The pipeline will be placed adjacent to a road approximately 5 m to 10 m wide, depending on local ground conditions. The pumping station will be located on the shores of Tatelkuz Lake, and during construction, a laydown area will be required to support the construction activities. It is anticipated that the area required will be approximately 100 m x 100 m.
Airstrip	An approximately 2 km long and 200 m wide airstrip will be built in the proximity of the mine site with location selected in consideration of existing land use, access, and environmental conditions.

Note: Type 1 (PAG1): PAG waste rock with NPR <1
Type 2 (PAG2): Waste rock with uncertain ARD potential or 1 <NPR <2
Type 3 (NAG3): NAG waste rock with NPR >2 and solid Zn concentrations >1,000 ppm
Type 4 (NAG4): NAG waste rock with NPR >2 and solid Zn concentrations <1,000 and >600 ppm
Type 5 (NAG5): NAG waste rock with NPR >2 and lower solid Zn concentrations <600 ppm

(1) The TSF has the potential to store larger quantities of tailings and waste rock. The tonnages reported correspond to mine plan within the scope of the Application.

ARD = acid rock drainage; FSR = Forest Service Road; ha = hectare; km = kilometre; kV = kilovolt; m = metre; masl = metres above sea level; Mt = million tonnes; Mt/y = million tonnes per year; NAG = Non-Acid Generating; NPR = Neutralization Potential Ratio; PAG = Potentially Acid Generating; ppm = parts per million.

It is anticipated that materials required on-site will be transported along the Kluskus-Ootsa FSR will include the following:

- Reagents for gold extraction (e.g. cyanide);
- Reagents for laboratory analytical work;
- Lime for pH control;
- Flocculants and coagulants;
- Grinding balls for rock crushing;
- Mill liners;
- Tires;
- Fuel, oil, and lubricants for equipment maintenance; and
- Explosives and blasting agents.

Other materials may be added as the proposed Project evolves.

An overview of information on the following proposed Project facilities will be presented in the Application with details present in an appendix.

- Open pit:
  - Description of the open pit development plan including pit phases;

- Pit designs including slopes, design standards and geotechnical and hydrogeological considerations;
- Description of proposed pit water management including inflow diversions and wall dewatering;
- Description of conceptual instrumentation and monitoring of the pit during operations; and
- Description of geohazards influences on the pit.

- Waste rock dumps, low grade ore stockpile, and topsoil stockpile:
  - Feasibility level geotechnical investigation and design;
  - Foundation conditions including foundation angle and soil properties;
  - Feasibility level geotechnical stability assessment including preliminary factors of safety;
  - Water management features including description of seepage control measures for the waste rock dumps and low grade stockpile;
  - Conceptual plan for any proposed instrumentation or monitoring;
  - Failure modes effects assessment for each facility;
  - Development sequence for each facility; and
  - Reference to the interim Guidelines of the BC Mine Waste Rock Pile Research Committee.

- Tailings Storage Facility (TSF):
  - Feasibility level geotechnical investigation;
  - Feasibility level embankment design including heights, slopes, and method of construction;
  - Foundation conditions including foundation angle and soil properties;
  - Description of embankment construction materials and borrow source locations;
  - Feasibility level geotechnical stability assessment including preliminary factors of safety;
  - Description of tailing properties;
  - Conceptual plan for any proposed instrumentation or monitoring;
  - Description of any water diversion structures and spillways, including design criteria;
  - Description of seepage control and seepage management;
  - Description of geohazards that could influence the TSF; and
  - Reference to the Canadian Dam Association, Dam Safety Guidelines including consequence classification, seismic design criteria, and inflow design flood criteria.

The TSF will act as the main water storage facility for ore processing. In addition to the TSF, the construction of a freshwater reservoir is proposed, which will serve the double purpose of supplying make-up water to the plant and provide freshwater for fish habitat mitigation.

The design of this facility will follow the Canadian Dam Association Dam Safety Guidelines and will be presented in the Application. If sediment ponds are required during the construction phase, these will be clearly identified in the Application.

Given the large size and the disseminated nature of mineralization within the proposed Project footprint, open pit mining is the only feasible option for economic extraction of the ore. The current reserve estimate indicates combined Proven and Probable total reserves of 8.17 million ounces (Moz) of gold and 60.8 Moz of silver at a 0.3 grams per tonne (g/t) gold equivalent cut-off grade (New Gold, 2014).

Ore would be processed in a mill to be constructed north of the open pit. Tailings from the mill will be treated by a sulphur dioxide (SO_2)/air treatment plant to destroy cyanide prior to disposal in the TSF. The Proponent has stated that cyanide management and treatment will follow International Cyanide Management Code (ICMC) for the Manufacture, Transport, and Use of Cyanide in the Production of Gold (International Cyanide Management Institute (ICMI), 2012).

Geochemical characterization of the waste rock has been conducted and it is proposed that potentially acid generating (PAG) (PAG 1 and PAG 2) waste rock and high solid phase zinc concentration non–acid generating (NAG) (NAG 3) waste rock be disposed under water in the TSF or in the open pit. NAG waste rock with solid phase zinc concentrations less than 600 parts per million (ppm) (NAG 4 and NAG 5) would be deposited on land, covered with overburden, and re-vegetated at closure.

The Application will explain that the location of the mine waste storage facilities was primarily selected based on discussions with local Aboriginal groups and the Proponent's environmental analysis as per the Guidelines for the Assessment of Alternatives for Mine Waste Disposal (Environment Canada (EC), 2011). Specifically, the TSF avoids the Blackwater River drainage to the south, whitebark pine (listed on schedule 1 of the *Species at Risk Act* (*SARA*)) to the south, and the Ungulate Winter Range (UWR) to the west. The Application will explain that the location of the mine waste storage facilities was confirmed with condemnation drilling conducted within the proposed mine site.

Figure 2.2-2 presents the location of the proposed mine site, transmission line corridor, and access roads.

Figure 2.2-3 provides the general orientation of the plant facilities and layout within the entire mine footprint.

Figure 2.2-4 provides the specific location details and relationships of the plant and on-site infrastructure.

320000 360000 400000 440000

5960000 5920000 5880000

François Lake
Cheslatta Carrier
Danskin
CHESLATTA 1
Skin Tyee
Uncha Mountains Red Hills Park
Francois Lake Park
Uncha Lake
Takysie Creek
Binta Lake
BINTA LAKE 2
Cheslatta
KNAPP LAKE 6
Knapp Creek
BAPTISTE LOUIS 8
Cheslatta River
Cheslatta Lake
TARGE CREEK 15
ALEXIS THOMAS 1A
HOLY CROSS LAKE 3
Cheslatta
MURRAY LAKE 4
Bird Creek
Nechako Canyon Protected Area
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
LEON 14
Natalkuz Lake (Nechako Reservoir)
Tetachuck River
Entiako River
Entiako Park
Entiako Lake
Tweedsmuir Park
ULKATCHO 6
TSETZI LAKE 11
TSACHLA LAKE 8
Tsacha Lake
Moose Lake
Johnny Lake
Laidman Lake
Fawnie Creek
Top Lake
Kluskus-Ootsa FSR
Proposed Mine Access Road
Proposed Freshwater Supply Pipeline
Exploration Road
TATELKUS LAKE 28
Tatelkuz Lake
Chedakuz Creek
Kluskus-Blue FSR
Kluskus FSR
KLUSKUS 1
KLOYADINGLI 2
YALADELASSLA 4
SUNDAYMAN'S MEADOW 3
KLUSKUS 14
BISHOP BLUFFS 10
BISHOP BLUFFS 6
BISHOP BLUFFS 5
CHIEF MORRIS 13
Kluskus
Blackwater River
KUSHYA CREEK 12
KUSHYA CREEK 7
UPPER KLUSKUS LAKE 9
Kushya
Kuyakuz Lake
Euchiniko Lakes
Finger Lake
TATUK LAKE 7
Tatuk Lake
Finger Tatuk Park
Chilako River Ecological Reserve
Meridian Road (Vanderhoof) Ecological Reserve
Chilako River
Batnuni Lake
Taluk Creek
Euchiniko River
Nataniko Creek
Kluskoil Lake Park
EUCHINICO CREEK 19
TROUT LAKE JONNY 15
EUCHINICO CREEK 17
EUCHINICO CREEK 18
TROUT LAKE ALEC 16
Nazko
REDWATER CREEK 30
Baezaeko
Nazko
Euchiniko
Cluculz Lake
Cluculz Creek
Khai
Sinkut River
Corkscrew
Stony
Tachick Lake
STONY CREEK 1
Saik'uz
CLUSTALACH 5
Nulki
Nulki Lake
OLD COUNTRY MEADOW 4
LAKETOWN 3
CORKSCREW CREEK 10
CORKSCREW CREEK 9
SINKUT LAKE 8
SACKANITECLA 2
Mapes
Vanderhoof
NOONLA 6
Weneez
Sinkut River
Stuart River Park
Stuart River
Engen
Nechako River
Fraser Lake
FRASER LAKE 2
Nadleh Whuten
YENSISCHUCK 3
Fort Fraser
NAUTLEY 1
Fraser Lake
STELLAQUO 1
SEASPUNKUT 4
Endako
Stellako
Stellako River
Stellako WMA
Smith Creek
Nithi River
Hallett Lake
Tahultzu Lake
Greer Creek
Targe Creek
Francois Lake
16
27

Legend

- Populated Place
- Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Railway
- Existing Transmission Line
- Stream
- Waterbody
- Parks and Protected Areas
- Indian Reserve

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Mine Site

KEY MAP

Scale: 1:500,000

0 5 10 20

Kilometres

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Proposed Mine Site Location with Mine Access Road, Transmission Line and Freshwater Supply Pipeline

DATE: April, 2014	ANALYST: WR	**Figure** 2.2-2
JOB No: VE52277	QA/QC: AP	PDF FILE: Other-100-028_v15_TL_DAIR.pdf
GIS FILE: Other-100-028_v15_TL_DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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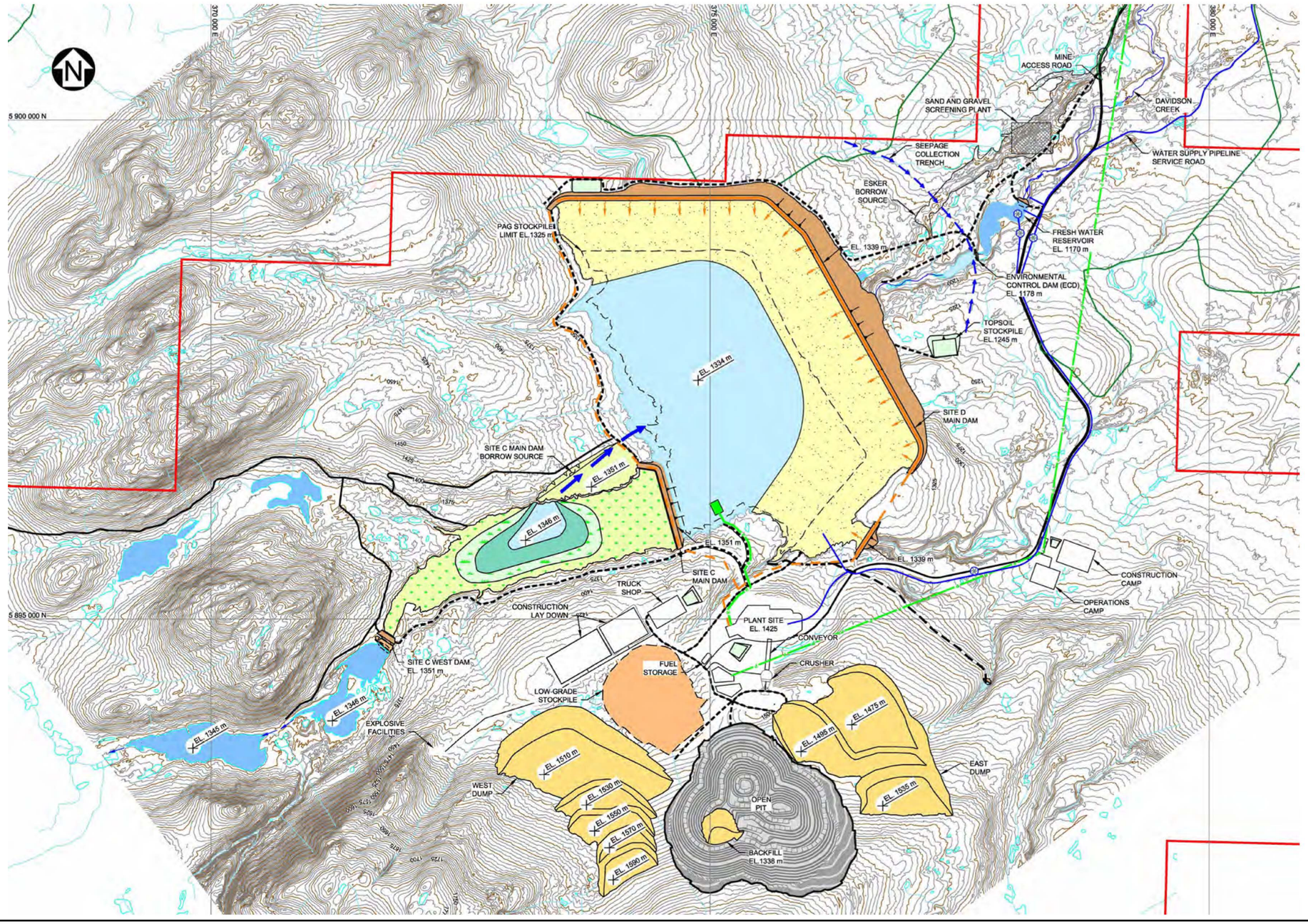

CLIENT: newgold

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DWN BY:	MY
CHK'D BY:	AP
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	N/A

PROJECT: Blackwater Gold Project

TITLE: Overall Site Layout of Open Pit and Waste Facilities

DATE:	August, 2013
PROJECT NO:	VE52277
REV. NO.:	A
FIGURE No.	2.2-3

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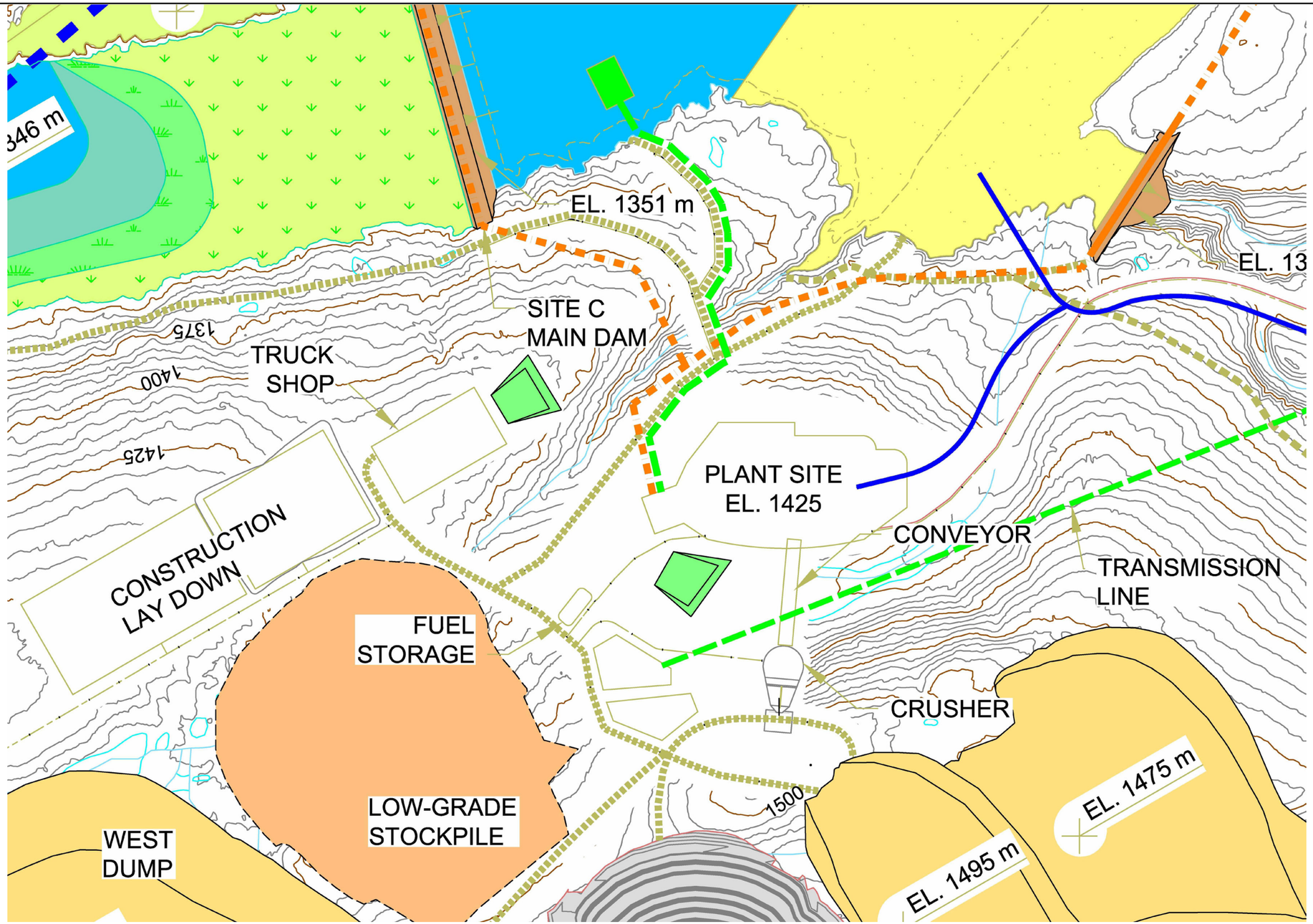

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DWN BY:	MY
CHK'D BY:	AP
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	N/A

PROJECT: Blackwater Gold Project

TITLE: Layout of Plant and On-site Infrastructure

DATE:	August , 2013
PROJECT NO:	VE52277
REV. NO.:	A
FIGURE No.	2.2-4

Y:\GIS\Projects\VE\VE52095_Richfield_Blackwater\Mapping\Other\Other-100-034_v4.ai

2.2.4 Off-Site Infrastructure

The Proponent has provided the following summary information for inclusion in the AIR.

The Kluskus-Ootsa FSR is an existing road that will be used as the transportation route to access the proposed mine site. This FSR starts on Highway 16 at Engen and will connect to the proposed mine access road at km 124.5. The proposed mine access road will be approximately 15 km long (**Figure 2.2-2**).

Goods to be transported on highways and FSRs will be checked against federal transportation of dangerous goods (TDG) classifications under the *Canadian Transportation of Dangerous Goods Act* (*TDG Act*) and *Regulations*. Each substance listed under *TDG Act* as dangerous will be listed in the Application together with transport volumes and on-hand volumes. A preliminary Hazardous Materials Management Plan will be developed and presented in the Application, which will include a description of management practices for the TDG.

TDGs will be undertaken according to applicable international, federal, and provincial; guidelines, acts and regulations including, but not limited to, the ICMC (ICMI, 2012); EC's Environmental Code of Practice for Metal Mines (EC, 2009); Canadian *TDG Act* and *Regulations*, and BC *TDG Act* and *Regulations*. The manufacturing, transport, storage, and use of cyanide will adhere to the ICMC and follow EC's Environmental Code of Practice for Metal Mines.

A 133-km transmission line connecting the mine site with an existing substation south of the community of Endako will be required to provide power to the proposed Project. The transmission line alignment presented in **Figure 2.2-2** was selected as the preferred alternative among six different options. The assessment of alternatives will be presented in **Section 2.5** Alternative Means for Undertaking the Project of the Application. The preferred alignment was selected out of six alternatives based on the existence of a sub-station at Endako (which avoids the need for a new facility), and current land use (the existing corridor runs largely along Crown land and minimizes overprinting private parcels and Federal Lands). Where the transmission line will cross the Stellako River and at the Tatelkuz Lake Resort, alternative re-routes are considered for the assessment. The re-route at the Stellako River suggests an alignment closer to the existing BC Hydro transmission line. At the Tatelkuz Lake Resort the re-route option does not follow the Kluskus FSR to avoid potential effects on the existing Tatelkuz airstrip.

Both re-routes will be included in the effects assessment in the Application.

Freshwater requirements will be met by pumping water from Tatelkuz Lake via a 20 km long pipeline to a receiving area within the mine site. This water will be used for ore processing and flow maintenance in Davidson Creek.

An airstrip will be built in the proximity of the mine site, with location selected in consideration of existing land use, access, and environmental conditions.

2.2.5 Environmental Management System and Adaptive Management Approach

The Application will include a summary of the Environmental Management System (EMS) and adaptive management approach for the proposed Project.

An EMS will be used for the planning and implementation of project activities in accordance with applicable environmental regulations and those specific requirements identified in the project certificate of approval to operate. These plans and the adaptive management system will be developed to ensure consistent management of the following waste materials associated with the proposed Project and will be described in greater detail in the Application:

- Atmospheric emissions from point and fugitive sources from mining and ore processing activities and general vehicle movements;
- Mine site water, managed in the following ways during each phase of the proposed Project:
    - Mitigation measures for any expected exceedances of guidelines predicted by water quality modelling will be detailed in the Application document to a conceptual engineering level;
    - During construction the mine site would be managed to ensure downstream water quality and aquatic values were protected;
    - During operations, process water and mine site surface drainage would be managed to prevent surface water discharges. Water in contact with the mine facilities, including the NAG waste dumps, the open pit, and low-grade stockpile, would be collected and either conveyed to the TSF or the open pit; and
    - During post-closure the mine site would discharge to local streams once water meets closure effluent permit discharge limits;
- Domestic solid and liquid waste from the accommodation camp;
- Solid mine waste consisting of overburden not suitable or required for construction and reclamation activities, waste rock, and tailings (mine waste management is described above); and
- Hazardous wastes would be stored in appropriate temporary storage areas and removed from site for recycling or disposal as per applicable law.

2.2.6 Project Schedule

The Application must provide a description of the capital construction phase and the length or lifetime of the proposed Project in years. The Application will also describe how seasonal factors will be considered in the proposed Project schedule.

The Proponent has provided the following information for inclusion in the AIR.

The Proponent has completed a Feasibility Study in the fourth quarter of 2013 and the Application is expected to be submitted in the second quarter of 2014. Provincial and federal decisions are expected during 2015.

The construction phase of the proposed Project is expected to take two years. With the current resource estimates, approximately 361 Mt of ore are to be mined and processed at a rate of 60,000 t/d (22 Mt/y). The operations phase is expected to continue for 17 years. The closure phase will start once the operations are finished and will end once the mine site

starts discharging water back to the environment. The closure phase is expected to last 18 years. The post-closure phase will commence once the closure activities are completed.

2.3 Provincial Scope of Proposed Project

This section of the Application will include a description of the scope of the proposed Project to be assessed in the Application (pursuant to the section 11 Order). Based on the section 11 Order, as amended by an Order under section 13 (BC EAO, 2014), BC EAO defines the scope of the proposed Project as consisting of the following on-site and off-site components and activities in the area shown in **Figure 2.2-2.**

- Mine site;
- Open pit;
- Overburden and waste rock dumps;
- Ore and low grade ore stockpile;
- Topsoil stockpiles, borrow pits;
- Construction laydown area;
- TSF and associated structures;
- Water management structures, including site runoff, ditches, diversion, and sediment and erosion control;
- Plant site and facilities, including mill, conveyors, crushers;
- Construction and operations camps;
- Core logging area;
- Explosives manufacturing and storage facilities;
- Hazardous material storage and distribution;
- On-site infrastructure, facilities and services including:
    - Electrical substation and distribution;
    - Mine haul and access roads;
    - Truck shop;
    - Equipment and fuel storage areas and facilities;
    - Communications network;
    - Laboratories;
    - Safety and environmental control;
    - Potable water distribution and treatment;
    - Sewage treatment and disposal facilities;
    - Waste disposal facilities;
    - Non-hazardous waste incinerator;
    - Backup power generation facilities;

    - Gravel washing;
    - Screening and cement batch plants;
    - Maintenance;
    - Administration and warehouse facilities;
    - Emergency response facilities; and
    - Fire water distribution;
- Water supply intake, pump stations, pipeline, equipment and associated access roads;
- Electric transmission line connecting the mine site with an existing substation and related access roads;
- Potential upgrades to Kluskus and Ootsa FSRs;
- Transportation of workers, materials, and equipment along the FSRs to the mine site;
- On site roads, site access roads, and new road to connect mine site with the existing FSRs; and
- Other transportation infrastructure to service the proposed Project including potential airstrip, helicopter pad, and related facilities.

2.4 Federal Scope of Assessment of the Proposed Project

This section of the Application will [i]nclude a description of the scope of the proposed Project to be assessed in the federal Environmental Impact Statement (EIS) as per the EIS Guidelines (Agency, 2013b).

The scope of the proposed Project for the purposes of the EA includes the components, activities, and federal decisions in the Project Description accepted by BC EAO and approved by the Agency in November 2012 (AMEC, 2012). The Proponent will consider all the components, activities, and federal decisions identified within these sections and the Project Description document as part of the effects assessment.

Based on the EIS Guidelines, the Agency defines the scope of the proposed Project to be assessed as the construction, operations, closure, and post-closure of the following project components:

- An open-pit mine;
- Waste rock and overburden dumps (NAG and PAG);
- Low grade ore stockpile;
- Sewage water management facilities;
- Construction laydown area;
- Truck shop;
- Fuel storage facilities;
- Storage of dangerous goods other than oils and gas;
- TSF;

- Processing plant facility;
- Explosives manufacturing and storage facility;
- Construction and operations camps;
- Top soil stockpiles;
- Core logging area;
- Airstrip and air transportation service buildings;
- Railway line/spur[2];
- Transload facility[2];
- Water supply intake, pump stations, pipeline, and associated access roads;
- Temporary or permanent water diversions;
- Waste storage and disposal (hazardous and non-hazardous);
- Sedimentation/settling ponds;
- Power generator;
- Transmission line and right-of-way (ROW) and associated access roads;
- Temporary access roads during construction; and
- Mine access road.

Based on the information provided in the Project Description, federal authorities may be required to exercise a power or perform a duty or function (other than under the *CEA Act 2012*). **Section 2.9** of the Application will describe potential federal and provincial permits and licences and authorizations required for the proposed Project.

2.5 Alternative Means of Undertaking the Proposed Project

The alternative means of undertaking the proposed Project corresponds to specific Project components, whose location or type were subject to an assessment of alternatives using technical, economic, environmental and social criteria, including how Aboriginal groups were considered.

The Application will include the specific Project components subject to an assessment of alternatives, which are identified and briefly described in **Table 2.5-1**.

Table 2.5-1: Alternative Means of Undertaking the Proposed Project

Project Component	Description
Mine waste management	Mine waste would consist of overburden, waste rock, and tailings. Five potential locations for storage of mine waste were identified within 10 km of the deposit area.
Main project access	The Proponent assessed different alternatives for road access to and from the proposed mine site from Highway 16 (between Prince George and Fraser Lake) and Highway 97 (between Prince George and Quesnel) (refer to **Figure 2.2-2**). The alternatives were assessed considering the presence of the existing FSRs

[2] The Proponent has advised the Agency that a transload facility, and railway line/spur as described in the Project Description (AMEC, 2012) is no longer being considered as a component of the proposed Project.

Project Component	Description
	versus the potential need for new roads or bridges where access was not available.
Mine site access	Two different options were considered: the utilization of the existing exploration road or the development of a new road. The new road option was selected as it reduces distance to the mine site and avoids the UWR.
Transmission line	The proposed Project requires electrical power and interconnection to the BC Hydro grid through construction of a transmission line (refer to **Figure 2.2-2)**. Six alternatives for the alignment were considered to link the proposed Mine Site with potential connection points along the BC Hydro power corridor running between Vanderhoof and Endako parallel to Highway 16.
Freshwater supply	Three lake options (Tatelkuz, Kuyakuz, and Top Lakes) were assessed for proposed Project water supply. Tatelkuz Lake was selected, as it is the most reliable source of freshwater.
Airstrip	Twenty-eight potential sites were initially identified for the airstrip from local knowledge, previous work, and preliminary terrain analysis. Screening and field investigations were conducted to identify the selected location of the airstrip, which will be developed on an already logged area with limited additional direct disturbance to the environment.

Note: FSR = forest service road; km = kilometre; UWR = Ungulate Winter Range.

The methodology proposed for assessing the alternative means of undertaking the proposed Project considers the following:

- Alternatives for mine waste management will be assessed consistently with EC's Guidelines for the Assessment of Alternatives for Mine Waste Disposal (EC, 2011); and
- Other project components identified in **Table 2.5-1** will be assessed using a comparative approach that considers environmental performance objectives and that have been utilized for mining projects in Canada. Using this method, and with the knowledge that all performance objectives are essential to the decision making process, an alternative is rejected if it attains an unacceptable rating for any single performance objective.

Consistent with the information presented above, this section of the Application will:

- Provide an assessment of the alternative means of carrying out the proposed Project that are technically and economically feasible; and
- Identify the rationale for selecting the preferred alternative.

2.6 Reclamation and Closure

This section of the Application will include a description of the reclamation goals for the proposed Project and strategies proposed to achieve these goals. The scope of the reclamation and closure plan will include on-site and off-site infrastructure. Key Project objectives relevant to reclamation and closure include the design of the mine for closure and the practice of progressive rehabilitation of areas impacted by its activities.

This section will also provide a detailed description of proposed land reclamation measures that address reclamation standards as outlined in section 10 of the Health, Safety, and Reclamation Code for Mines in BC. The reclamation objectives will conform to land and resource management objectives and strategies presented in the Vanderhoof Land and Resource Management Plan (LRMP).

During development of the reclamation and closure plan applicable legislation, criteria and guidelines will be considered. Methods to achieve these objectives will be provided, including: soil management and use, landform design, decommissioning and site preparation, revegetation prescriptions for specified ecotype targets, seeding and planting densities. The plan will include management and monitoring strategies to verify reclamation success, and a timeline for reclamation and monitoring activities. Opportunities for reclamation research will be described. The plan will also describe management strategies for temporary closure (including a description of the conditions under which temporary closure will occur). The plan will emphasize soil, vegetation and wildlife habitat reclamation, and will cross reference relevant management plans presented in **Section 12.2** which addresses the topics of Mine Waste Management, Water Quality and Liquid Discharges Management; Construction Management; Landscape, Soils and Vegetation Management and Restoration; Erosion and Sediment Control; Fisheries Mitigation and Offsetting Plan (FMOP); Invasive Species Management; Wetland Management; and Wildlife Management. A conceptual reclamation cost estimate will be included in the Application.

2.7 Proposed Project Land Use

This section of the Application will:

- Describe the land ownership and land use regime (e.g., fee simple, Crown land, Indian Reservation, description of zoning, Agricultural Land Reserve designation, applicable LRMPs and other land use designations as applicable) including tenures, licenses, permits or other authorizations that would be potentially affected by the proposed Project and report on the status of consultations with holders of such tenures and permits, and private land owners on resolving issues with tenure and permit holders;
- Identify the proposed Project's overlaps with First Nation Traditional Territories;
- Identify the LRMPs that the proposed Project overlaps and list the management objectives of the LRMPs;
- Identify existing and proposed management and monitoring programs or regional studies;
- Identify other developments (as defined in **Section 4.3.5**) even if not directly related to the proposed Project, that may result in overlapping impacts with the proposed Project; and
- Identify future developments (as defined in **Section 4.3.5**) that are reasonably foreseeable and sufficiently certain to proceed.

2.8 Proposed Project Benefits

This section of the Application will provide the following information:

- Initial capital construction cost estimates:
  - Breakdown of costs for the land, buildings, and equipment associated with the proposed Project; and
  - Indicate the potential for use of local facilities and indicate if these are currently under-utilized;
- Estimated operating costs over the life of the proposed Project (for land, buildings, and equipment) including:
  - Estimated annual operating costs (excluding labour);
  - Indicate how the costs are measured (either in current dollar value or use of Net Present Value); and
  - Cost for closure and post-closure;
- Employment estimates including:
  - Direct employment, stated in number of person-years (PY) to be created by major job category during construction and operations, distinguishing among full-time, part-time and seasonal workers;
  - Wage levels, by major job category, for the construction and operating periods;
  - Breakdown of the number of people that will be hired locally, provincially, nationally or internationally;
  - Potential for the Proponent to use local human resources currently under-utilized;
  - Indicate any relevant employment policies/practices including any proposed training and employment initiatives; and
  - Indirect employment for the construction and operation phases of the proposed Project. Include any assumptions relating to industry specific multipliers or other multipliers used;
- Contractor supply services estimates, including:
  - List of the major types of businesses/contractors, broken down at the local, provincial and national levels that will benefit from the overall proposed Project;
  - Value of supply of service contracts expected for both the construction and operation phases of the proposed Project; and
  - Information about local purchasing strategy, if any;
- Annual government revenues for the construction and operations phases of the proposed Project including:
  - Local/municipal (property taxes, other);
  - Regional district (taxes, other);
  - Provincial (income tax, provincial sales tax (PST), lease, license and tenure, royalties, other); and
  - Federal (income tax, Goods and Services Tax (GST), payroll taxes, other);

- All assumptions and reference information sources for the above information; and
- Proposed Project contributions to community development;
- The following is a list of references to be used in providing the above information:
  - BC Stats, Quarterly Regional Statistics (http://www.bcstats.gov.bc.ca/pubs/pr_qrs.asp); and
  - BC Stats, BC Input-Output Model (http://www.bcstats.gov.bc.ca/pubs/pr_pem.asp);
- BC Stats, Current Labour Force Data (http://www.bcstats.gov.bc.ca/pubs/pr_lfs.asp);
- BC Stats, Regional District Data (http://www.bcstats.gov.bc.ca/regions.asp);
- BC Stats, Socio-economic Profiles (http://www.bcstats.gov.bc.ca/data/sep/index.asp); and
- Statistics Canada (SC) – Community Profiles (http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E).

The information presented will be consistent with the information presented in **Section 2.2** of the Application.

2.9 Applicable Permits

This section of the Application will:

- List applicable provincial and federal licenses, permits and/or approvals required for the construction, operations, closure, and post-closure of the proposed Project and the associated responsible regulatory agency; and
- Indicate if a request for concurrent permitting is being presented under the Concurrent Approval Regulation (Government of BC, 2002b). At this time, the Proponent does not intend to apply for concurrent permitting.

Table 2.9-1 and **Table 2.9-2** present a list of expected required permits, licenses, authorizations, and certificates under provincial and federal regulations. Other approvals may be required depending upon proposed Project design.

Table 2.9-1: Potential Provincial Permits, Licenses, and Authorizations Required for the Proposed Project

Statute	Authorization or Requirement	Agency
BC *EAA*	EA Certificate Conditions of BC EA Certificate (e.g., Fish and Wildlife Monitoring and Management Plans)	BC EAO and other applicable Provincial permitting authorities
Environmental Management Act	Effluent Discharge Permit	BC MOE
Mines Act Section 10	Mine and Reclamation Permit	BC MEM
Mines Act	Mining Lease	BC MEM
Forest Act	Occupant Licence to Cut - Sec 47.4	BC MFLNRO
Forest Practices Code (FPC) Act, *Provincial Forest Use Regulations*, *Forest and Range Practice Act*	Special Use Permit	BC MFLNRO
FPC Act, *Provincial Forest Use Regulations, Forest and Range Practice Act*	Road Use Permit	BC MFLNRO
Water Act, Water Regulation	Approval or Notification of "changes in or about a stream" (s.8/s.9)	BC MFLNRO
Water Act, Water Protection Act	Water Licence	BC MFLNRO
Heritage Conservation Act	s. 14 Inspection Permit	BC MFLNRO
Heritage Conservation Act	s. 14 Investigative Permit	BC MFLNRO
Heritage Conservation Act	s. 12 Site Alteration Permit	BC MFLNRO
Environmental Management Act	Fuel Storage Permit	BC MOE
Environmental Management Act - Hazardous Waste Regulation	Hazardous Waste Registration	BC MOE
Environmental Management Act	Air Discharge Permit	BC MOE
Environmental Management Act	Refuse Permit	BC MOE
Environmental Management Act - Municipal Wastewater Regulation	Sewage System Registration	BC MOE
Wildfire Act	Burn registration number	BC MFLNRO
Wildlife Act	*Amendment to Closed Area Regulations*	BC MFLNRO
Wildfire Act, Wildfire Regulation	Forest and Range Protection – Part 1, Authority of Government for Fire Prevention and Fire Control – Part 2	BC MOE
Transportation Act, Motor Vehicles Act	Access Permit (MOTI-A)	BC MOTI
Motor Vehicles Act	Approvals for oversize loads or bulk haul	BC MOTI
Drinking Water Protection Act and Regulation	Construction Permit - Sec 2	NHA
Drinking Water Protection Act and Regulation	Operating Permit - Part 2	NHA
Land Act	Investigative Use Permit	BC MFLNRO
Land Act	License of Occupation	BC MFLNRO; BC Safety Authority
Mines Act	Explosives Storage and Use Permit	BC MEM

Note: BC *EAA* - British Columbia *Environmental Assessment Act;* BC EAO - British Columbia Environmental Assessment Office; BC MEM - British Columbia Ministry of Energy, Mines and Natural Gas and Responsible for Housing; BC MFLNRO - British Columbia Ministry of Forests, Lands and Natural Resource Operations; BC MOE - British Columbia Ministry of Environment; BC MOTI - British Columbia Ministry of Transportation and Infrastructure; EA - Environmental Assessment; FPC - Forest Practices Code; NHA - Northern Health Authority

Table 2.9-2: Potential Federal Permits, Licences, and Authorizations Required for the Proposed Project

Enabling Legislation	Authorization or Requirement	Agency
CEA Act 2012	EA Decision	Agency
MMER under Fisheries Act	Compliance and Reporting	EC
Fisheries Act	Authorizations under s.35(2) – Approval of final FMOP	DFO
	Authorization under s.36(3) – Schedule 2 Amendment under the MMER	DFO
Explosives Act Explosives Regulations	Licenses under s.7(1)(a)	NRCan
Explosives Act Ammonium Nitrate and Fuel Oil Order Regulation	Assemble and Blend Ammonium Nitrate & Fuel Oil	
Explosives Act Explosives Regulations	Mechanical Ammonium Nitrate & Fuel Oil Certificate	
Radio Communication Act	Licenses	Industry Canada
Transportation of Dangerous Goods Act Transportation of Dangerous Goods Regulations	Transportation of Dangerous Goods Permit	TC
Navigation Protection Act (Amended Navigable Waters Protection Act on 1 April 2014)	TC's approval	TC

Note: Agency - Canadian Environmental Assessment Agency; *CEA Act 2012 - Canadian Environmental Assessment Act, 2012;* DFO - Fisheries and Oceans Canada; EA - Environmental Assessment; EC - Environment Canada; FMOP - Fisheries Mitigation and Offsetting Plan; *MMER - Metal Mining Effluent Regulations;* NRCan - Natural Resources Canada; TC - Transport Canada

3.0 ASSESSMENT PROCESS

3.1 Provincial EA Process

This section of the Application will provide:

- List of the federal and provincial agencies/departments/organizations likely to be involved in the EA and their anticipated or confirmed roles;
- List of applicable milestones. Milestones must include, but are not limited to, issuance of section 10 and 11 Orders, Working Group meetings, and public comment periods; and
- The Issues Tracking Tables to document issues and concerns raised and the degree to which issues are considered resolved or addressed by the Proponent and other parties during the preparation of the AIR and Application. Issues tracking tables are required for each of the following groups: public, Aboriginal groups, and local, provincial, and federal government agencies.

3.2 Federal Assessment

This section of the Application will provide:

- List of the federal agencies/departments/organizations likely to be involved in the review, and their anticipated or confirmed roles;
- List of applicable federal milestones; and
- The Issues Tracking Table to document issues and concerns raised during the preparation of the AIR and the Application.

The Agency confirmed that the proposed Project will not be referred to a review panel. The responsibility for conducting the EA rests with the Agency (Agency, 2013a).

3.3 Aboriginal Groups Information Distribution and Consultation

This section of the Application will:

- Summarize consultation activities undertaken with the identified Aboriginal groups potentially affected by the proposed Project (as identified in the section 11 Order);
- Describe the means of information distribution and consultation used; and
- Summarize issues, concerns, and interests identified during consultation, and how these matters were addressed, including reference to applicable mitigation and/or accommodation measures identified in Section 18 of the Application.

3.3.1 Pre-Application Consultation

This section will provide an outline of consultations undertaken in the pre-Application stage, covering both the preparation of the AIR and the Application, specifically:

- Summary of consultations with Aboriginal groups; and

- The Issues Tracking Tables to document issues and concerns raised by Aboriginal groups and the degree to which issues are considered resolved or addressed by the Proponent and other parties during the preparation of the AIR and the Application.

3.3.2 Consultation Planned During Application Review

This section will provide the following:

- Description of the Aboriginal groups consultation program proposed for the Application review stage of the EA process; and
- Description of the proposed methods and process to resolve outstanding issues.

3.4 Public and Agency Information Distribution and Consultation

This section of the Application will provide the following:

- Summary of the consultations with public and other key stakeholders, federal, provincial, and local government agencies;
- Description of the means of information distribution and consultation used including the following:
  - Public meetings and open houses;
  - One-on-one meetings with interested parties;
  - Publication of articles in the media, enclosures and community newspapers;
  - Interviews on local radio and television;
  - Participation in community events; and
- Summary of issues, concerns, and interests identified during these consultations, and how these matters were addressed.

3.4.1 Pre-Application Consultation

This section will provide an outline of consultations undertaken in the pre-Application stage, covering both the preparation of the AIR and the Application, specifically:

- Summary of consultations with public and other key stakeholders;
- Summary of consultations with federal, provincial, and local government representatives; and
- The Issues Tracking Tables to document issues and concerns raised by the public and government agencies and the degree to which issues are considered resolved or addressed by the Proponent and other parties during the preparation of the AIR and the Application.

3.4.2 Consultation Planned During Application Review

This section will provide the following:

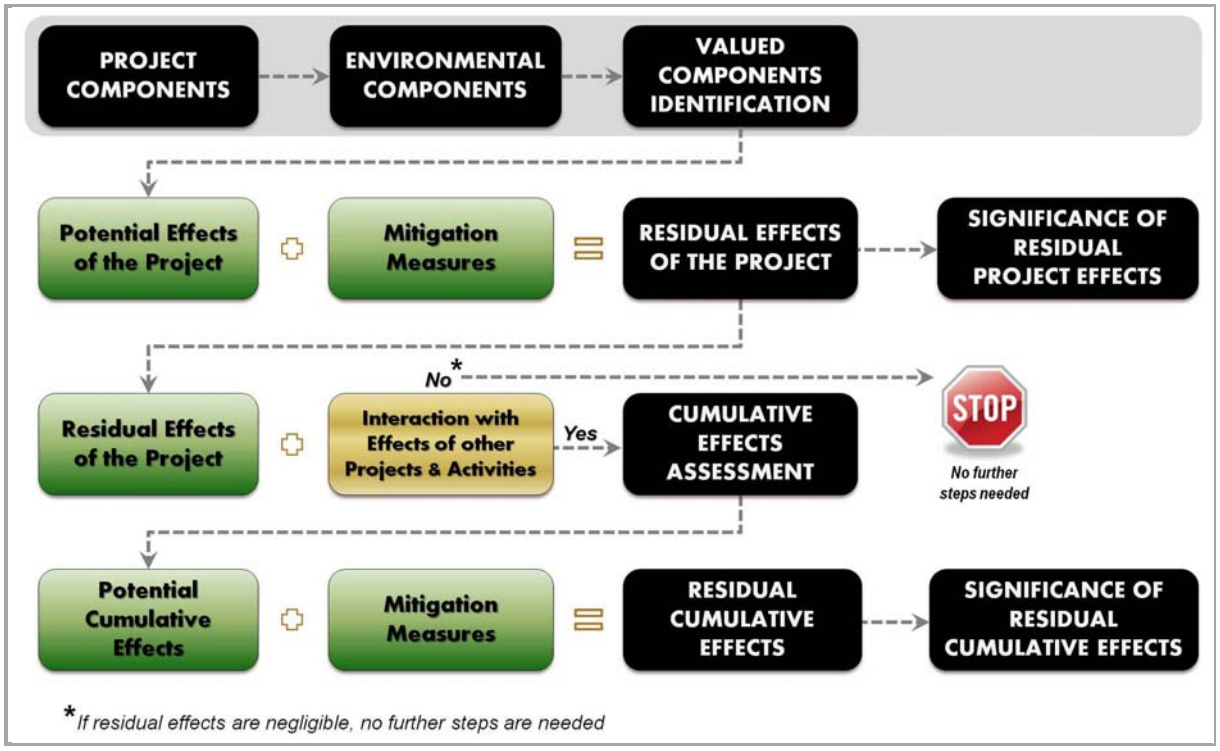
- Description of the public consultation program proposed for the Application review stage of the EA process;
- Description of the proposed programs for consultation with government agencies; and
- Description of the proposed methods and process to resolve outstanding issues.

PART B – ASSESSMENT OF POTENTIAL EFFECTS, INCLUDING CUMULATIVE EFFECTS, MITIGATION, AND SIGNIFICANCE OF RESIDUAL EFFECTS

4.0 ASSESSMENT METHODOLOGY

4.1 General Approach

This general approach proposed to determine potential project effects, appropriate mitigation measures, anticipated residual effects and their significance is illustrated in **Figure 4.1-1**.



Note: Modified from BC EAO (2013a)

Figure 4.1-1: Effects Assessment Process Flow Chart

The methodology in the Application will be consistent with the Guideline for Selection of Valued Components (VCs) and Assessment of Potential Effects (BC EAO, 2013b).

The section will describe the methodology to be used to assess the potential significant and cumulative effects of the interaction of the proposed Project activities on the five pillars—environmental, economic, social, heritage, and health components. Baseline characterization and the results of consultation and engagement activities provide the information to allow for the identification of the VC representative of the five pillars.

The baseline characterization will provide information on the important features of each subject area and associated processes, their interrelationships and interactions, as well as the variability within and among resources, processes, and interactions over the temporal scale as identified in the Application. This information will be presented in sufficient detail to allow characterization of each component before any disturbance to the environment due to

the proposed Project. In describing the environmental components, both scientific and available traditional knowledge will be included, as well as the indicators and measures of component health and integrity used for the analysis. The baseline characterization will address the resilience of the subject area, and relevant historical information. Where little or no information is available, specific studies will be designed to gather further information. The background characterization will cover all relevant seasonal and temporal variations. Detailed information will be provided in appendices of the Application and summarized in the Application. The summary will be focused on representative surrogates and/or indicators of all of the five pillar components that may be affected by the proposed Project.

Once the identification and selection of VCs is completed, the methodology continues with assessment of potential and residual effects of the proposed Project on the VCs. Mitigation measures will be proposed for each VC as required, taking into consideration the magnitude and duration of the potential effects of the proposed Project. The mitigation measures will be discussed in relation to their expected effectiveness and uncertainty.

Following the assessment of the residual effects of the proposed Project, a Cumulative Effects Assessment is undertaken for each VC for which there is a residual effect, taking into consideration the past, present, certain (the physical activity will proceed or there is a high probability that the physical activity will proceed, e.g., the proponent has received the necessary authorizations or is in the process of obtaining those authorizations) and reasonably foreseeable (the physical activity is expected to proceed, e.g., the proponent has publicly disclosed its intention to seek the necessary EA or other authorizations to proceed) (Agency, 2013c) future projects and activities. The rationale for the selection of projects and activities (both included and excluded) will be presented in the Application. If potential cumulative effects are deemed unacceptable, additional mitigation measures will be proposed to generate acceptable residual cumulative effects.

Uncertainties and assumptions used in the significance assessment of residual effects and cumulative effects will be presented under each VC in the Application.

Under this approach, the potential effects are considered as pre-mitigation effects while the residual effects are the ones expected to occur subsequent to the application of mitigation measures. The residual effects are the basis for the determination of significance.

This section of the Application will provide a clear description of the assessment methodology, specifically:

- The scope of the EA;
- A list of the agencies, Aboriginal groups, and stakeholders that reviewed and commented on the AIR;
- A list of the guidance documents provided by agencies used to develop the assessment methodology;
- Description of applicable standards used for effects assessment;
- A list of applicable provincially/regionally developed Best Management Practices (BMPs) and guidance documents that will be implemented;

- Methods used for assessing the potential and residual effects of the proposed Project and cumulative effects (considering past, present, certain, and reasonably foreseeable future projects). The assessment will include the construction, operations, closure, and post-closure phases of the proposed Project;
- How the significance of the residual effects of the proposed Project will be determined, considering the following categories:
    - Context;
    - Magnitude;
    - Geographic extent;
    - Duration;
    - Reversibility; and
    - Frequency.
- The criteria and rationale for each of the above listed categories as it applies to each VC;
- How likelihood will be applied as a category to describe the residual effect for each VC; and
- How confidence will be applied as a category to characterize the level of uncertainty associated with both, the significance and likelihood determinations.

4.2 Identification and Selection of Valued Components

VCs are defined as any part of the environment (natural or human) that is considered important by the Proponent, Aboriginal groups, public, scientists, and governments involved in the assessment process. Importance may be determined on the basis of values as identified by Aboriginal groups' interests, scientific literature, and regulatory standards or requirements, biodiversity, and sensitivity to project effects.

Indicators are metrics used to measure and report on the condition and trend of a VC and will be identified to further focus and facilitate the analysis of interactions between the project and the selected VC (BC EAO, 2013b).

This subsection of the Application will provide the following information for each of the five types of impacts (environmental, economic, social, heritage and health):

- Identification of the VCs to be considered in the EA; and
- Description of the general methodology used to identify VCs.

Candidate VCs and proposed indicators and other factors for the assessment of residual and cumulative effects are presented in **Table 4.2-1**. The Application will provide the rationale for choosing the VCs and indicators/factors listed in this table. It will also discuss the rationale for VCs considered or suggested but not selected.

The list of VC candidates is subject to review and discussion and may be further refined in light of further comments received from the Working Group, Aboriginal groups, and the public, and to be consistent with EAO Guidelines on Valued Components (BC EAO, 2013b).

Table 4.2-1: Valued Components Candidates and Indicators/Factors for Assessment

Pillar	Valued Components	Indicators/Factors for Assessment
Environmental	• Noise and vibration	• Overall sound levels
	• Climate change	• Greenhouse gas (GHG) emissions
	• Air quality	• Measured parameters (e.g., particulate matter and combustion gases)
	• Surface water flow	• Water flow • Lake level
	• Surface water quality	• Measured parameters (e.g., pH and heavy metals) • ARD/Metal leaching • Geochemistry
	• Sediment quality	• Measured parameters (e.g., pH and heavy metals) • ARD/Metal leaching • Geochemistry
	• Groundwater quantity	• Groundwater flow • Groundwater level
	• Groundwater quality	• Measured parameters (e.g., pH and heavy metals) • ARD/Metal leaching • Geochemistry
	• Wetlands	• Hydrological function • Biochemical function • Ecological function • Habitat function
	• Fish habitat	• Surface water flow • Surface water quality • Sediment quality • Ecological health • Wetlands (riparian habitat)
	• Fish	• Rainbow trout • Kokanee
	• Physiography and topography	• Terrain stability
	• Surficial geology and soil cover	• Soil availability and depth
	• Soil quality	• Reclamation suitability
	• Ecosystem composition	• Ecosystem distribution • Riparian • Old growth • Sparsely vegetated ecosystems • Traditional use plant habitat
	• Plant species and ecosystems at risk	• SARA listed whitebark pine

Pillar	Valued Components	Indicators/Factors for Assessment
		• Ecosystems at risk
	• Amphibians	• Western toad • Western toad habitat
	• Waterbirds	• Ring-necked duck • Ring-necked duck habitat • Yellow rail • Yellow rail habitat
	• Forest and Grassland Birds	• Olive-sided flycatcher (songbird) • Olive-sided flycatcher habitat • Clark's nutcracker (songbird) • Clark's nutcracker habitat • Red-tailed hawk (raptor) • Red-tailed hawk habitat
	• Moose	• Moose • Moose habitat
	• Caribou	• Caribou • Caribou habitat
	• Grizzly Bear	• Grizzly bear • Grizzly bear habitat
	• Furbearers	• Marten • Marten habitat • Beaver • Beaver habitat
	• Bats	• Little brown myotis • Little brown myotis habitat
	• Invertebrates	• Jutta arctic (butterfly) • Jutta arctic habitat • American emerald (dragonfly) • American emerald habitat
Economic	• Provincial economy	• Provincial economy activity (Gross Domestic Product (GDP)) • Provincial employment and labour income • Provincial government revenues
	• Regional and local employment and businesses	• Direct employment of local and regional residents • Contract and business opportunities (Project purchasing from local contractors and businesses) • Changes in regional unemployment • Local and regional labour income and costs • Training and Education
	• Regional and local government finance	• Municipal tax revenues • Costs to regional and local governments
Social	• Demographics	• Population
	• Regional and community infrastructure	• Regional and municipal infrastructure (water supply, water/sewage treatment, landfills, communications, electricity, and recreational facilities)

Pillar	Valued Components	Indicators/Factors for Assessment
		• Community housing and temporary accommodation • Regional transportation (road, rail, air)
	• Regional and local services	• Regional and local services and conditions (educational, health, social and protective services)
	• Family and community well-being	• Economic hardship • Crime (including drug and alcohol abuse) • Family relationships
	• Non-traditional land and resource use	• Protected areas and parks • Recreation/tourism use (e.g., all terrain vehicle use) • Mining, exploration, and mineral tenures • Forestry and timber resource use • Hunting/trapping/guide outfitting • Fishing and aquaculture • Agriculture and grazing • Range use • Land ownership and tenures • Recreational and commercial use of waterways • Groundwater resource use • Surface water resource use
	• Current Land and Resource Use for Traditional Purposes	• Hunting and trapping activities • Fishing activities • Plant gathering activities • Other cultural and traditional uses of the land (e.g. cultural and spiritual places, trails, navigation)
	• Visual resources	• Visual record • Demonstrated aesthetic value
Heritage	• Archaeological sites	• Landmarks • Buildings • Religious features • Human remains • Culturally modified trees • Subsistence features
	• Historic heritage sites	• Landmarks • Buildings • Religious features • Human remains • Culturally modified trees • Subsistence features
	• Paleontological resources	• Fossil sites
Health	• Environmental exposures	• Noise and vibration • Air quality • Surface water and sediment quality • Groundwater quality • Fish

Pillar	Valued Components	Indicators/Factors for Assessment
		• Soil quality • Contamination of country foods
	• Workers health and safety	• Occupational exposures • Safety in the workplace • Noise when workers are at rest (construction and operations)

Note: The list of candidate VCs will be further refined in light of comments received from the Working Group, Aboriginal groups, and the public and to be consistent with BC EAO Guidelines on Valued Components. (BC EAO, 2013b).
ARD = acid rock drainage; GDP = Gross Domestic Product; GHG = greenhouse gases.

4.3 Assessment of Potential Effects on Selected Valued Components

This subsection of the Application will present a description of the assessment methodology used to determine whether the proposed Project would have significant adverse environmental, social, economic, heritage and health effects, taking into account the mitigation measures proposed in the Application. The Application will present specific assessment methods for each VC identified in **Section 4.2**.

4.3.1 Assessment Boundaries

Assessment boundaries serve to define the scope of limits of the assessment. The following sections describe the four types of assessment boundaries required for each selected VC.

4.3.1.1 *Spatial Boundaries*

This subsection of the Application will identify and present in each VC section the local and regional spatial boundaries for each VC and the rationale for selecting these boundaries. Maps for each VC will display the spatial extent of the Local Study Area (LSA) and Regional Study Area (RSA). The LSA is defined as an area within which all (or most) potential project effects are expected to occur (BC EAO, 2013b). The RSA is defined as a larger area (relative to the LSA) and used to provide context for the assessment of potential project effects. (BC EAO, 2013b) Spatial boundaries will reflect the range of geographic areas within which specific effects may occur, and will be based on applicable guidance documents, reasonable expectations for the specific VC, and professional judgment. Spatial boundary identification will consider the following criteria. This consideration will be discussed in the Application for each VC:

- Physical extent (terrestrial, freshwater aquatic, and airshed) of the proposed Project footprint, including mine site, mine access road, transmission line and freshwater supply pipeline as described in **Section 2.2**;
- Extent of terrestrial, freshwater, aquatic, and applicable resources potentially affected by the proposed Project;
- Extent of social, economic, heritage, and health effects including those of Aboriginal groups potentially occurring from the proposed Project; and

- Results from consultation with Aboriginal groups, the public, and government agencies on the scoping of issues to be addressed in the Application.

Table 4.3-1 presents the spatial boundaries proposed for each VC for the proposed Project

Table 4.3-1: Valued Components Candidates and Proposed Spatial Boundaries

Valued Components Candidate	Study Area	Description
1. Noise and Vibration	Local Study Area (LSA) (refer to **Figure 4.3-1**)	• Mine Site: Approximately circular area within a 1.5 km distance from the proposed mine site permanent noise sources which refers to permissible sound level of 40 decibel A-scale (dBA) likely to be adopted for this open pit mining project. The exact shape of the LSA will depend on results of noise modelling and it will be presented as noise contours. • Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR: overlapping the linear component footprint by 1.5 km on each side (3 km wide).
	Regional Study Area (RSA) (refer to **Figure 4.3-1**)	• Mine Site: Overlaps the proposed mine footprint by 4 km in each direction. The RSA is centered on and extends over a circular area with a radius of 5 km for area of the proposed mine site open pit mine, processing facilities, and waste disposal sites. • Transmission line, mine access road, airstrip, freshwater supply pipeline and Kluskus FSR: overlapping the linear component footprint by 2.5 km on each side (5 km wide).
2. Air Quality 3. Climate Change	LSA (refer to **Figure 4.3-2**)	• Mine Site: 40 x 40 km^2 centred on the proposed open pit. • Transmission line, mine access road, airstrip, freshwater supply pipeline and Kluskus FSR: 3-km wide corridor (e.g., 1.5 km on each side) along the linear components.
	RSA (refer to **Figure 4.3-2**)	• Mine Site: same as LSA. • Transmission line, mine access road, airstrip, freshwater supply pipeline and Kluskus FSR: same as LSA.
4. Surface Water Flow 5. Surface Water Quality 6. Sediment Quality 7. Wetlands 8. Fish Habitat 9. Fish	LSA (refer to **Figure 4.3-3**)	• Mine Site: Entire watersheds of Davidson Creek, Creek 661, Turtle Creek, and Creek 705. Tributaries flowing in to the south side of Tatelkuz Lake. Chedakuz Creek from confluence with Creek 661 to Tatelkuz Lake. Chedakuz Creek from Tatelkuz Lake to confluence with Turtle Creek. • Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR: 100 m on either side of the centre line of these proposed developments (i.e., 200 m total width). • **Note:** wetland spatial boundaries will follow the boundaries associated with ecosystem composition and plant species and ecosystems at risk for the assessment of the transmission line, mine access road airstrip, freshwater supply pipeline and Kluskus FSR.

Valued Components Candidate	Study Area	Description
	RSA (refer to **Figure 4.3-3**)	• Mine Site: Entire watershed of Chedakuz Creek not included in LSA. Entire watershed of Laidman Lake not included in the LSA. • Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR: Same corridor as LSA. • Note: wetland spatial boundaries will follow the boundaries associated with ecosystem composition and plant species and ecosystems at risk for the assessment of the transmission line, mine access road, airstrip, freshwater supply pipeline and Kluskus FSR.
10. Groundwater Quantity 11. Groundwater Quality	LSA (refer to **Figure 4.3-4**)	• Mine Site: 1 km around the proposed mine footprint. • Transmission line, mine access road, airstrip, freshwater supply pipeline and Kluskus FSR: Not required.
	RSA (refer to **Figure 4.3-4**)	• Mine Site: incorporates the Davidson Creek watershed, Tatelkuz Lake, Creek 661 watershed, Turtle Creek watershed, and portions of the upper Fawnie Creek watershed. • Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR: Not required.
12. Physiography and Topography 13. Surficial Geology and Soil Cover 14. Soil Quality 15. Ecosystem Composition 16. Plant Species and Ecosystems at Risk	LSA (refer to **Figure 4.3-5**)	• Mine Site: 500 m from the proposed Project mine site boundary. • Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR: 100 m beyond the proposed linear component boundary.
	RSA (refer to **Figure 4.3-5**)	• Mine Site: 3,000 m from the proposed Project mine site boundary. • Transmission line, mine access road, airstrip, freshwater supply pipeline and Kluskus FSR: 500 m beyond their proposed linear component boundary.
17. Amphibians 18. Waterbirds 19. Forest and Grassland Birds 20. Moose 21. Caribou 22. Grizzly Bear 23. Furbearers	LSA (refer to **Figure 4.3-6** and **Figure 4.3-7**)	• Mine Site: Approximate 500 m buffer around the proposed mine site facilities. • Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR: approximately 250 m buffer from each side of the linear component boundary. • For the caribou LSA the portions of the transmission line and Kluskus FSR located outside of suitable caribou habitat were excluded.

Valued Components Candidate	Study Area	Description
24. Bats 25. Invertebrates	RSA (refer to **Figure 4.3-6** and **Figure 4.3-7**)	• Mine Site: Includes ungulate winter range established for the Tweedsmuir-Entiako caribou herd (U-7-012). The western and southern edges of the RSA outline these winter ranges. The southwestern boundary follows the Upper Blackwater Management Zone where the RSA then follows the Blue Road till it reaches the Ootsa – Kluskus FSR and follows this north until it reaches the Nechako Reservoir. The northern boundary of the RSA follows the shoreline of the Nechako Reservoir. The northern boundary of the RSA follows the shoreline of the Nechako Reservoir. • Transmission Line and Kluskus FSR. Approximate 1 km buffer from the linear component boundary; • Grizzly bear RSA will also consider effects in the context of the Provincial Grizzly Bear Population Management Units. • For the caribou RSA the portions of the transmission line and Kluskus FSR located outside of suitable caribou habitat were excluded. Caribou regional effects will also be considered in the context of the Ungulate winter range and both herd areas (Tweedsmuir-Entiako caribou herd and Itcha-Ilgachuz caribou herd).
26. Provincial Economy 27. Regional and Local Employment and Businesses 28. Regional and Local Government Finance 29. Demographics 30. Regional and Community Infrastructure 31. Regional and Local Services 32. Family and Community Well-Being	LSA (refer to **Figure 4.3-8)**	• Statistical reporting units used by Statistics Canada (SC) and the Government of BC: Vanderhoof, Fraser Lake, Bulkley-Nechako Regional District Electoral Area (RDEA) D, Bulkley-Nechako RDEA F, and eleven populated Indian Reserves: Stony Creek 1, Laketown 3, Nautley (Fort Fraser) 1, Seaspunkut 4, Stellaquo 1, Kluskus 1, Tatelkus Lake 28, Sundayman's Meadow 3, Euchinico Creek 17, Trout Lake Alec 16 and Nazco 20.
	RSA (refer to **Figure 4.3-8)**	• Statistical reporting units used by SC and the Government of BC: Fraser-Fort George RDEA C, Bulkley-Nechako RDEA C and Bulkley-Nechako RDEA B, Prince George, Burns Lake, Fort St. James, and 12 Indian Reserves: Nak'azdli (Necoslie) 1, Sowchea 3, William Prairie Meadow 1A, North Tacla Lake 7, Dzitline Lee 9, Tache 1, Binchie 2 (Pinchie 2), Ye Koo Che 3; Burns Lake 18; Woyenne 27; Duncan Lake 2; and Palling 1.
33. Non-Traditional Land and Resource Use	LSA (refer to **Figure 4.3-9**)	• 500-m buffer beyond the proposed Project footprint.
	RSA (refer to **Figure 4.3-9**)	• Based on Vanderhoof Land and Resources Management Plan. Includes all subzones that overlap with LSA or fall within RSAs identified for other disciplines (i.e., aquatics). To provide representative information the eastern RSA boundary was moved towards the west in order to balance out the area on either side of the proposed transmission and Kluskus FSR.
34. Current Land and Resource Use for Traditional Purposes	LSA (refer to **Figure 4.3-10**)	• Mine site: Same as Aquatic LSA, with some additions to include the west facing slopes of the Nechako Range up to the skyline between Tatelkuz and Kuyakuz mountains. • Transmission Line and Kluskus FSR: same as Wildlife LSA.
	RSA (refer to **Figure 4.3-10**)	• Mine site: same as Wildlife RSA with some additions from the aquatics RSA in the south portion to include the entire watershed of Laidman Lake and Chedakuz Creek. • Transmission Line and Kluskus FSR: same as Wildlife RSA.

Valued Components Candidate	Study Area	Description
35. Visual Resources	LSA (refer to **Figure 4.3-11**)	• A viewshed analyses will be generated using Geographic Information System (GIS) modelling software and a Digital Elevation Model (DEM) to delineate the LSA, where line of sight with project facilities may affect existing land uses and scenic quality.
	RSA (refer to **Figure 4.3-11**)	• An extended viewshed analyses will be generated to delineate the RSA from where specific viewpoints or recreation sites may be affected at a greater distance.
36. Archaeological Sites 37. Historic Heritage Sites 38. Paleontological Resources	LSA (refer to **Figure 4.3-12**)	• Mine Site: 500-m buffer around the proposed mine site footprint. • Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR: 500 m from centerline in either direction (1 km total).
	RSA (refer to **Figure 4.3-12**)	• Mine Site: 33 km by 25 km rectangle around mine site; • Transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR: same as LSA.
39. Environmental Exposures 40. Workers Health and Safety	LSA (refer to **Figure 4.3-8**)	• Same as LSA defined for social and economic VCs. • **Note:** the LSA for environmental exposures may be revised if biophysical effects are demonstrated outside of proposed spatial boundaries.
	RSA (refer to **Figure 4.3-8**)	• Same as RSA defined for social and economic VCs.

Notes:

1. The proposed Project footprint refers to the land where any proposed Project facilities or infrastructure will be developed. The proposed Project footprint includes the Rights-of-Way for the transmission line, mine access road, airstrip, and the freshwater supply pipeline. The proposed Project footprint does not include existing infrastructure such as the forest service roads or other roads that are currently being used by third parties.
2. BC - British Columbia; dBA - decibel A scale; FSR = Forest Service Road; GIS - Geographic Information System; km - kilometre; km^2 - square kilometre; LSA - Local Study Area; m - metre; NTLRU - Non-Traditional Land and Resource Use; RDEA - Regional District Electoral Area; RSA - Regional Study Area; SC - Statistics Canada
3. The terrestrial study areas have been defined in relation to the proposed Project boundaries. When proposed Project components are in close proximity, there is a possibility that study areas would overlap, and if this is the case, the study areas will be merged to avoid duplication.
4. If the results of the assessments indicate the spatial boundaries need to be adjusted to ensure the full extents of the effects are captured, the boundary will be adjusted for the Application, with supporting justification/rationale.

When proposed Project components are in close proximity, there is a possibility that study areas would overlap, and if this is the case, the study areas will be merged to avoid duplication.

320000 360000 400000 440000

6000000 5960000 5920000 5880000

François Lake
Cheslatta Carrier
Danskin
Skin Tyee
Endako
Stellako
Fraser Lake
Ellis Island Ecological Reserve
Nadleh Whuten
Fort Fraser
Beamont Provincial Park
Drywilliam Lake Ecological Reserve
Francois Lake Protected Area
Uncha Mountains Red Hills Park
Francois Lake Park
Engen
Nechako River
Vanderhoof
Stuart River Park
Weneez
Sinkut River
Saik'uz
Tachick Lake
Nulki
Nulki Lake
Mapes
Cluculz Lake
Cluculz Creek
Khai
Sinkut River
Smith Creek
Uncha Lake
Takysie Creek
Binta Lake
Nithi River
Tahultzu Lake
Nechako River
Hallett Lake
Cheslatta River
Cheslatta Lake
Knapp Creek
Cheslatta
Targe Creek
Bird Creek
Nechako Canyon Protected Area
Kluskus FSR
Meridian Road (Vanderhoof) Ecological Reserve
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
Finger Lake
Tatuk Lake
Finger Tatuk Park
Chilako River Ecological Reserve
Chilako River
Natalkuz Lake (Nechako Reservoir)
Tetachuck River
Entiako River
Chedakuz Creek
Taiuk Creek
Batnuni Lake
Euchiniko River
Nataniko Creek
Euchiniko
Entiako Park
Entiako Lake
Tweedsmuir Park
Kluskus-Ootsa FSR
Proposed Mine Access Road
Proposed Fresh Water Pipeline
Exploration Road
Tatelkuz Lake
Top Lake
Kluskus-Blue FSR
Kluskoil Lake Park
Nazko
Laidman Lake
Fawnie Creek
Johnny Lake
Kuyakuz Lake
Euchiniko Lakes
Moose Lake
Blackwater River
Kluskus
Baezaeko
Tsacha Lake
Kushya
Nazko

N

Legend

- Populated Place
- Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Existing Transmission Line
- Stream
- Waterbody
- Parks & Protected Areas

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Freshwater Supply Pipeline
- Proposed Transmission Line
- Proposed Mine Site

Noise and Vibration

- Regional Study Area
- Local Study Area

Note: The 5km radius around the open pit and waste rock dumps falls within the 4km buffer around the mine site boundary.

KEY MAP

Scale: 1:500,000

0 5 10 20
Kilometres

Reference
BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Noise and Vibration Study Areas

DATE: May, 2014	ANALYST: WR	**Figure** 4.3-1
JOB No: VE52420	QA/QC: LR	PDF FILE: 12-100-001_v6_Noise_SA_NA_DAIR.pdf
GIS FILE: 12-100-001_v6_Noise_SA_NA_DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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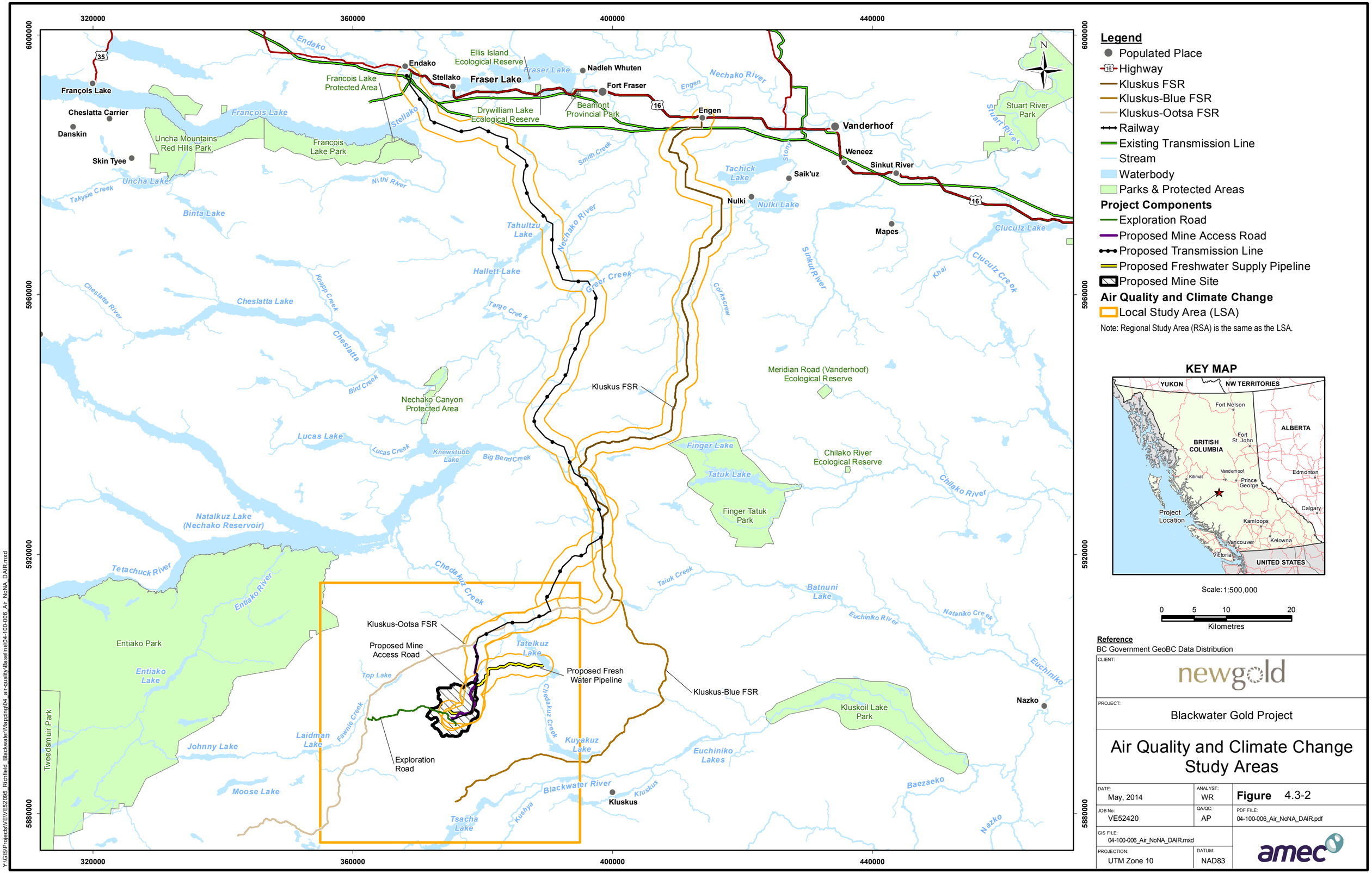
320000
360000
400000
440000
6000000
5960000
5920000
5880000
François Lake
Cheslatta Carrier
Danskin
Skin Tyee
Endako
Stellako
Fraser Lake
Ellis Island Ecological Reserve
Nadleh Whuten
Fort Fraser
Francois Lake Protected Area
Drywilliam Lake Ecological Reserve
Beamont Provincial Park
Engen
Nechako River
Vanderhoof
Stuart River Park
Weneez
Sinkut River
Saik'uz
Tachick Lake
Nulki
Nulki Lake
Mapes
Cluculz Lake
Cluculz Creek
Khai
Sinkut River
Corkscrew
Uncha Mountains Red Hills Park
Francois Lake Park
Uncha Lake
Takysie Creek
Binta Lake
Nithi River
Smith Creek
Tahultzu Lake
Greer Creek
Hallett Lake
Targe Creek
Cheslatta River
Cheslatta Lake
Knapp Creek
Cheslatta
Bird Creek
Nechako Canyon Protected Area
Kluskus FSR
Meridian Road (Vanderhoof) Ecological Reserve
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
Finger Lake
Tatuk Lake
Finger Tatuk Park
Chilako River Ecological Reserve
Chilako River
Natalkuz Lake (Nechako Reservoir)
Tetachuck River
Entiako River
Chedakuz Creek
Taiuk Creek
Batnuni Lake
Euchiniko River
Nataniko Creek
Euchiniko
Entiako Park
Entiako Lake
Tweedsmuir Park
Kluskus-Ootsa FSR
Proposed Mine Access Road
Proposed Fresh Water Pipeline
Tatelkuz Lake
Top Lake
Fawnie Creek
Laidman Lake
Johnny Lake
Moose Lake
Exploration Road
Kluskus-Blue FSR
Kuyakuz Lake
Kluskoil Lake Park
Nazko
Euchiniko Lakes
Blackwater River
Kluskus
Tsacha Lake
Kushya
Baezaeko
Nazko
Legend
Populated Place
Highway
Kluskus FSR
Kluskus-Blue FSR
Kluskus-Ootsa FSR
Railway
Existing Transmission Line
Stream
Waterbody
Parks & Protected Areas
Project Components
Exploration Road
Proposed Mine Access Road
Proposed Transmission Line
Proposed Freshwater Supply Pipeline
Proposed Mine Site
Air Quality and Climate Change
Local Study Area (LSA)
Note: Regional Study Area (RSA) is the same as the LSA.
KEY MAP
YUKON
NW TERRITORIES
ALBERTA
BRITISH COLUMBIA
Juneau
Fort Nelson
Fort St. John
Stewart
Vanderhoof
Kitimat
Prince George
Edmonton
Calgary
Project Location
Kamloops
Vancouver
Kelowna
Victoria
UNITED STATES
Scale: 1:500,000
0 5 10 20
Kilometres
Reference
BC Government GeoBC Data Distribution
CLIENT:
newgold
PROJECT:
Blackwater Gold Project
Air Quality and Climate Change Study Areas
DATE: May, 2014
ANALYST: WR
Figure 4.3-2
JOB No: VE52420
QA/QC: AP
PDF FILE: 04-100-006_Air_NoNA_DAIR.pdf
GIS FILE: 04-100-006_Air_NoNA_DAIR.mxd
PROJECTION: UTM Zone 10
DATUM: NAD83
amec
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360000 375000 390000 405000

5925000 5910000 5895000 5880000

Natalkuz Lake (Nechako Reservoir)
Entiako River
Mount Swannel 1768m
Capoose Lake
Erlhorn Creek
Lower Chedakuz Creek
Big Bend
Euchiniko River
Brewster Lake
Proposed Transmission Line
Kluskus FSR
Lake 113
Mills Lake
Chutanli Lake
Taiuk Creek
FAWNIE RANGE
NECHAKO RANGE
Fawnie Nose 1926m
Fawnie Dome 1726m
Tatelkuz Mountain 1611m
Kluskus-Ootsa FSR
Kluskus-Blue FSR
Turtle Creek
Davidson Creek
Proposed Mine Access Road
Tatelkuz Lake
Proposed Freshwater Supply Pipeline
Snake Lake
Top Lake
Suscha Lake
Exploration Road
Creek 705
Lake 01428UEUT
Lake 01538UEUT
Upper Chedakuz Creek
Kuyakuz Mountain 1734m
Kuyakuz Lake
Laidman Lake
Fawnie Creek
Mathews Creek
Mount Davidson 1856m
Tsacha Mountain 1781m
Williamson Lake
Euchiniko Lakes
Blackwater River
Kluskus
Kluskus Creek
Tsacha Lake
Kushya River
Kluskus Lakes

WQ13 H5 WQ9 WQ14 WQ8 WQ7 WQ21 L1 H6 H4B WQ26 WQ11 H3 H9 L3-1 L3-2 L4 WQ22 H2 WQ10 H1 WQ5 WQ3 H10 WQ6 WQ1 WQ4 WQ25 WQ15 WQ12 WQ24 WQ16 WQ23 L5 H7

Legend

- Hydrology Station
- Surface Water Quality Site
- Meteorological Station
- Populated Place
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Stream
- Waterbody

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Mine Site

Watersheds

- Chedakuz Creek Local
- Creek 661
- Creek 705
- Davidson Creek
- Tatelkuz Lake Tributaries
- Turtle Creek

Hydrology, Surface Water and Sediment Quality, Wetlands, Fish and Fish Habitat

- Regional Study Area
- Local Study Area

Scale:1:200,000

0 2.5 5 10

Kilometres

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Hydrology, Surface Water and Sediment Quality, Wetlands, Fish and Fish Habitat Study Areas

DATE: March, 2014	ANALYST: WR	**Figure** 4.3-3
JOB No: VE52277	QA/QC: AP	PDF FILE: 09-100-021_StudyAreas_DAIR_v2.pdf
GIS FILE: 09-100-021_StudyAreas_DAIR_v2.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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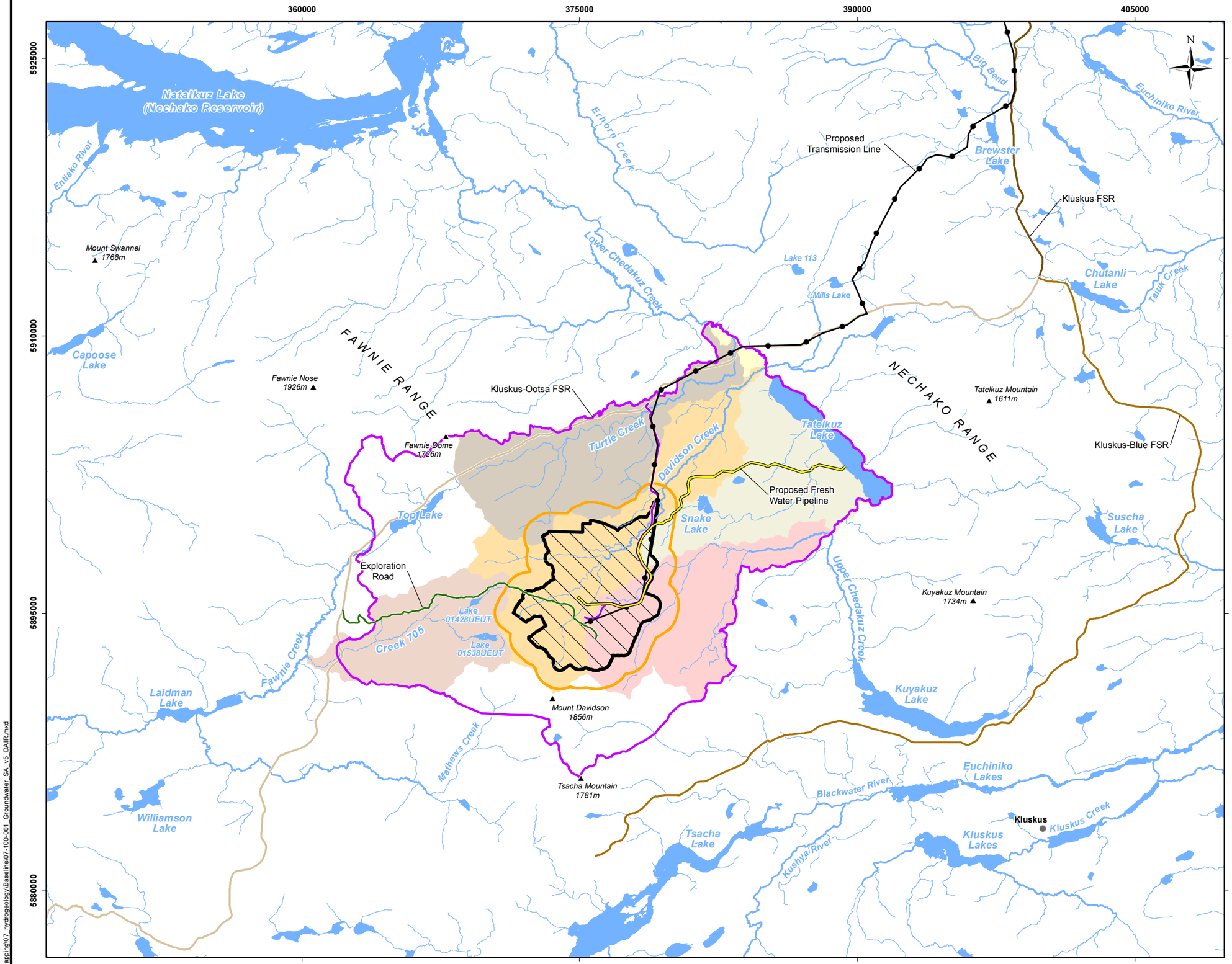

Legend

- Populated Place
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Stream
- Waterbody

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Fresh Water Pipeline

Watersheds

- Chedakuz Creek Local
- Creek 661
- Creek 705
- Davidson Creek
- Tatelkuz Lake Tributaries
- Turtle Creek

Groundwater

- Regional Study Area
- Local Study Area

Scale:1:200,000

0 2.5 5 10

Kilometres

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Groundwater Study Areas

DATE:	ANALYST:	Figure 4.3-4
January, 2014	WR	
JOB No: VE52277	QA/QC: AP	PDF FILE: 07-100-001_Groundwater_SA_v5_DAIR.pdf
GIS FILE: 07-100-001_Groundwater_SA_v5_DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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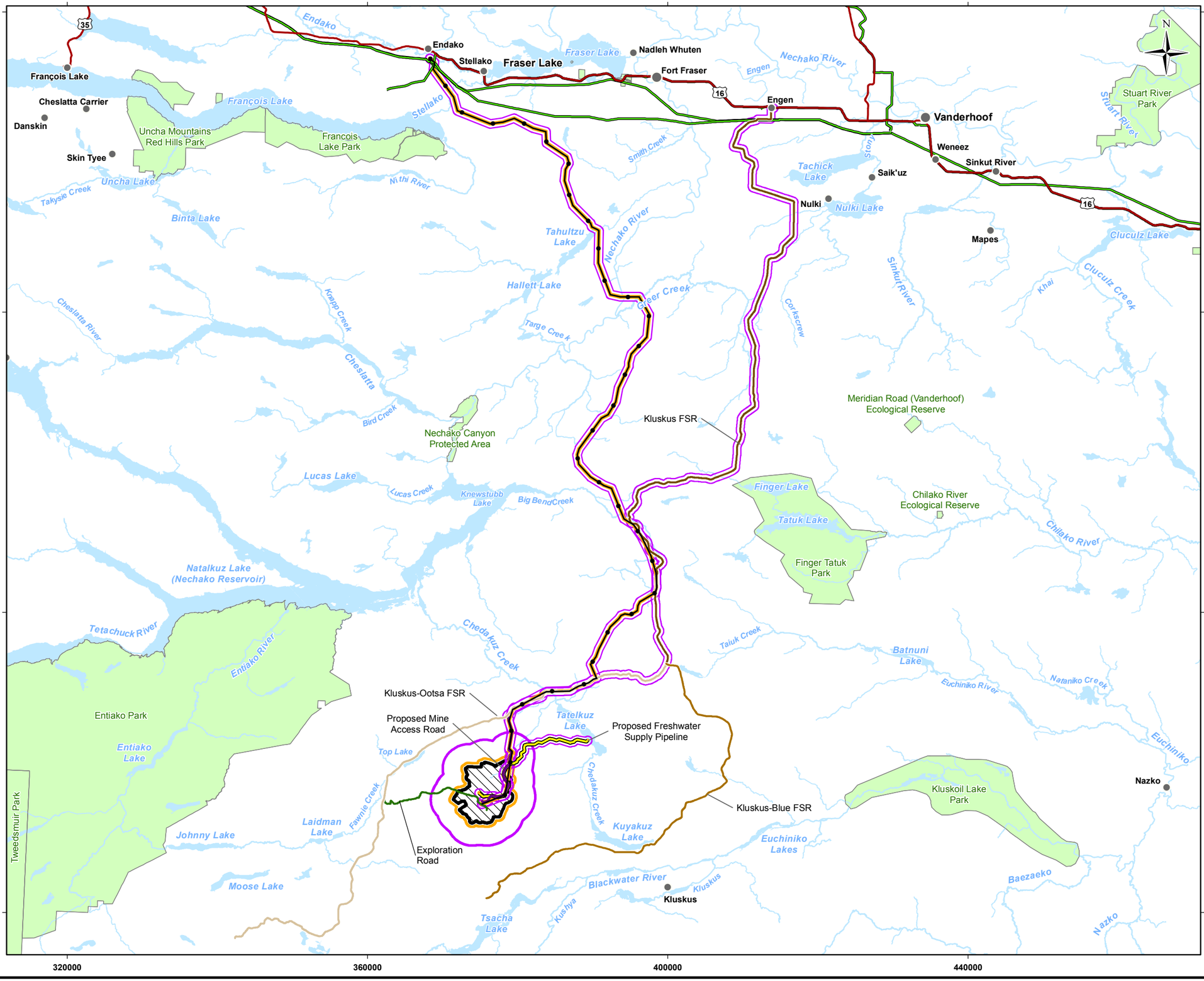

Legend

- Populated Place
- Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Railway
- Existing Transmission Line
- Stream
- Waterbody
- Parks & Protected Areas

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Mine Site

Terrain, Soils, and Vegetation

- Regional Study Area
- Local Study Area

KEY MAP

Scale: 1:500,000

0 5 10 20

Kilometres

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Terrain, Soils, and Vegetation Study Areas

DATE: January, 2014	ANALYST: WR	**Figure** 4.3-5
JOB No: VE52277	QA/QC: LR	PDF FILE: 06-100-001_v17_terr_SA_NA_DAIR.pdf
GIS FILE: 06-100-001_v17_terr_SA_NA_DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

320000 360000 400000 440000

6000000 5960000 5920000 5880000

Endako
Stellako
Fraser Lake
Nadleh Whuten
Fort Fraser
Engen
Nechako River
Vanderhoof
Weneez
Sinkut River
Saik'uz
Nulki
Nulki Lake
Mapes
Stuart River Park
Stuart River
Cluculz Lake
Cluculz Creek
Khai
Sinkut River
Corkscrew
Tachick Lake
Stony
Smith Creek
Tahultzu Lake
Nechako River
Creer Creek
Hallett Lake
Targe Creek
Knapp Creek
Cheslatta Lake
Cheslatta River
Cheslatta
Bird Creek
Nechako Canyon Protected Area
Meridian Road (Vanderhoof) Ecological Reserve
Kluskus FSR
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
Finger Lake
Tatuk Lake
Finger Tatuk Park
Chilako River Ecological Reserve
Chilako River
Natalkuz Lake (Nechako Reservoir)
Tetachuck River
Entiako River
Entiako Park
Entiako Lake
Tweedsmuir Park
Chedakuz Creek
Taiuk Creek
Batnuni Lake
Euchiniko River
Nataniko Creek
Euchiniko
Kluskoil Lake Park
Nazko
Tatelkuz Lake
Top Lake
Fawnie Creek
Laidman Lake
Johnny Lake
Moose Lake
Kuyakuz Lake
Euchiniko Lakes
Blackwater River
Kluskus
Tsacha Lake
Kushya
Baezaeko
Nazko
François Lake
Southbank
Cheslatta Carrier
Danskin
Skin Tyee
Uncha Mountains Red Hills Park
François Lake Park
Uncha Lake
Takysie Creek
Binta Lake
Nithi River
Francois Lake
Stellako
Endako
Cheslatta
Marilla
Kluskus-Ootsa FSR
Proposed Mine Access Road
Proposed Fresh Water Pipeline
Kluskus-Blue FSR
Exploration Road

Legend

- Populated Place
- Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Railway
- Existing Transmission Line
- Stream
- Waterbody
- Parks & Protected Areas

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Mine Site

Wildlife and Wildlife Habitat

- Regional Study Area (except for Caribou)
- Local Study Area (except for Caribou)

KEY MAP

Scale: 1:500,000

0 5 10 20
Kilometres

Reference
BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Wildlife and Wildlife Habitat Study Areas

DATE:	ANALYST:	**Figure** 4.3.6
March, 2014	KA	
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PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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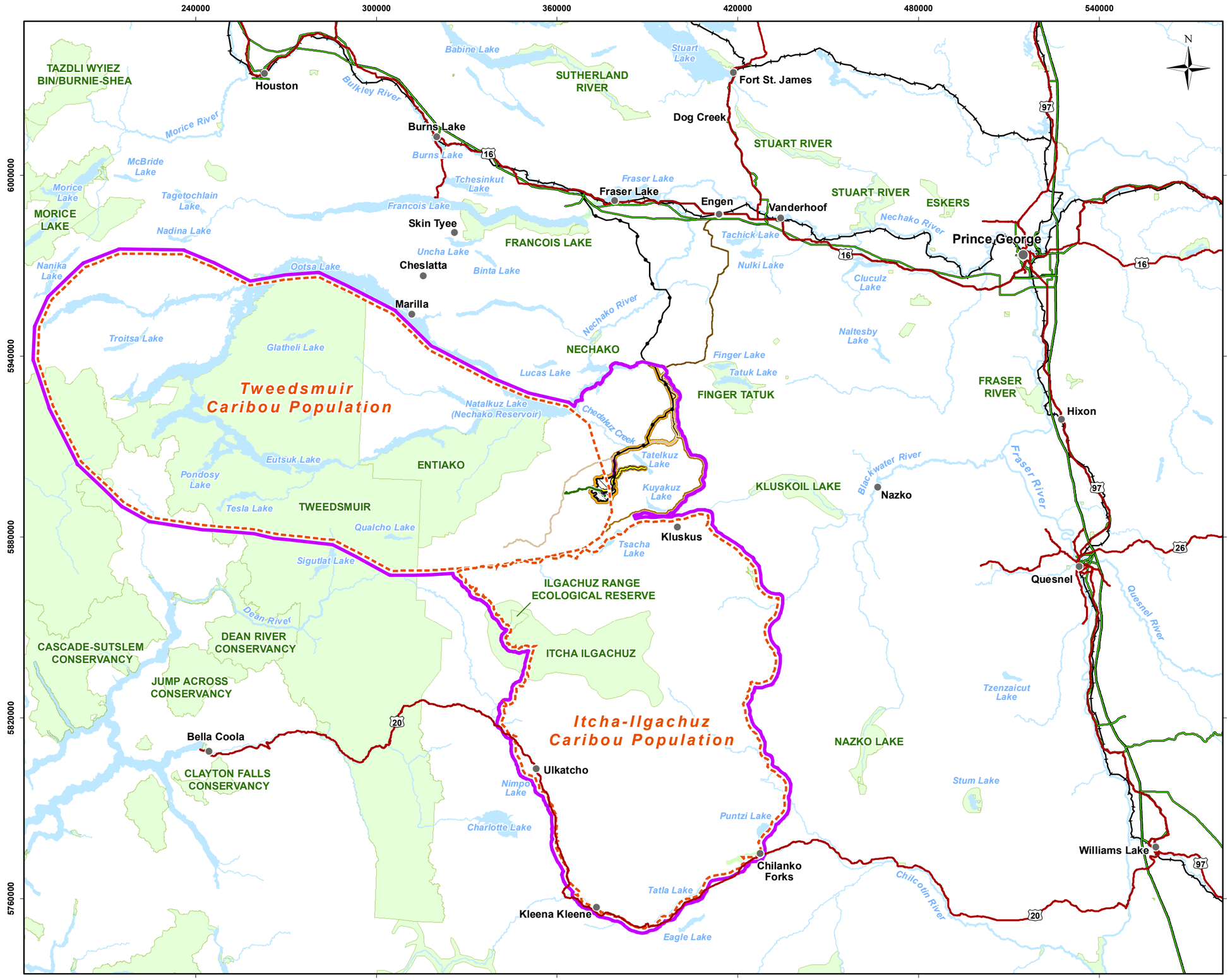

Legend

- Populated Place
- Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Existing Transmission Line
- Streams
- Waterbody
- Parks and Protected Areas

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Mine Site

Caribou

- Caribou Local Study Area
- Caribou Regional Study Area
- Caribou Herd Populations

Note: For the Caribou RSA, portions of the transmission line and Kluskus FSR located outside suitable caribou habitat were excluded.

Scale: 1:1,250,000

0 10 20 40 60

Kilometres

Reference

BC Government GeoBC Data Distribution

Caribou Herd Boundaries are shown only for features used in analysis

CLIENT: newgold

PROJECT: Blackwater Gold Project

Caribou Study Areas

DATE:	ANALYST:	**Figure** 4.3-7
May, 2014	KA	
JOB No: VE52420	QA/QC: MY	PDF FILE: 11-200-101_WildlifeSA_Caribou_DAIR_v2.pdf
GIS FILE: 11-200-101_WildlifeSA_Caribou_DAIR_v2.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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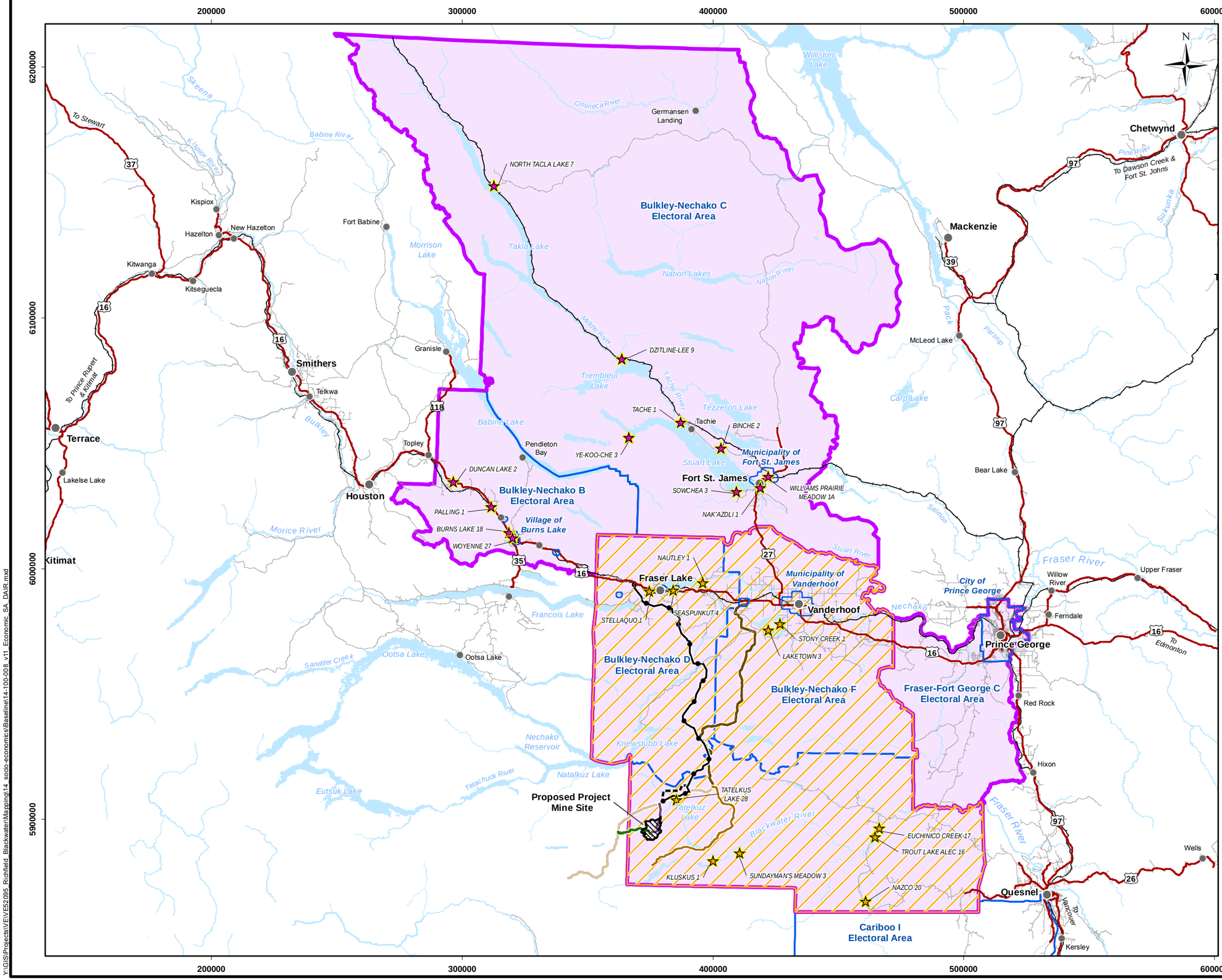

Reference
BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Economic, Social and Health Assessment Study Areas

DATE: May, 2014	ANALYST: WR	**Figure** 4.3-8
JOB No: VE52420	QA/QC: AP	PDF FILE: 14-100-008_v11_Economic_SA_DAIR.pdf
GIS FILE: 14-100-008_v11_Economic_SA_DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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6000000 5970000 5940000 5910000 5880000

N

Endako
Endako
Stellako
Fraser Lake
Fraser Lake
Nadleh Whuten
Fort Fraser
Engen
Nechako River
Vanderhoof North RMZ 1
Stuart River RMZ 2
Stuart River Park
Stuart River
Nechako Floodplains
Vanderhoof
Weneez
Sinkut River
Vanderhoof South RMZ 0
François Lake
Cheslatta Carrier
Danskin
Skin Tyee
Uncha Mountains Red Hills Park
Uncha Lake
Takysie Creek
Binta Lake
François Lake
François North RMZ 6
Francois Lake Resort
Francois South RMZ 7
Francois Lake Park
Nithi Mountain 1352m
Nithi Rd
Nithi River
Smith Creek
Smith Creek Rd
Nechako Valley RMZ 5
Fraser Mountain 1053m
Tachick Lake
Tachick Lake Resort
Saik'uz
Saikuz Park and Camping Ground
Nulki
Nulki Lake
Nulki Spirit Resort
Nechako Valley RMZ 5
Brookside
Lakeside
Sob Lake Adventure Camp
Mapes
Cluculz Lake
Cluculz Creek
Khai
Nechako West RMZ 8
Holy Cross FSR
Tahultzu Lake
Nechako River
Mount Greer 1247m
Crystal Lake Cabins
Holy Cross Mtn 1425m
Hallett Lake
Greer Creek
Nechako Retreat
Kenney Dam Road
Targe Creek
Knapp Creek
Cheslatta River
Cheslatta
Upper Nechako River RMZ 9
HSP Ranch
Crystal Lake Lodge
Crystal Lake RMZ 10
Kluskus FSR
Corkscrew
Sinkut River
Sinkut Mountain FSR
Vanderhoof South RMZ 12
Sinkut Mountain 1404m
Nulki Hills
Nulki Peak 1527m
Meridian Road (Vanderhoof) Ecological Reserve
Nechako Canyon RMZ 11
Nechako Canyon Protected Area
Bird Creek
Nechako Lodge
Cutoff Bute 1095m
500 Road
Kenney Dam
Lucas Lake RMZ 15
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
Kluskus-Red
Finger Creek Ranch
Finger Lake Resort
Finger Lake
Tatuk Lake Resort
Tatuk Lake
Kluskus-Gold
Sumanik's Sanctuary
Chilako River Ecological Reserve
Finger-Tatuk RMZ 13
Finger Tatuk Park
Kluskus RMZ 14
Nechako Range
Chilako River
Natalkuz Lake (Nechako Reservoir)
Chedakuz RMZ 16
Chedakuz Creek
Kluskus-Euchino
Tatuk Creek
Batnuni Lake Camp
Batnuni Lake
Euchiniko River
Nataniko Creek
Euchiniko
Tetachuck River
Entiako River
Mount Swannel 1768m
Fawnie Nose 1926m
Entiako Park
Entiako RMZ 20
Proposed Mine Access Road
Kluskus-Chedakuz
Tatelkuz Lake Ranch Resort
Tatelkuz Lake
Tatelkuz Mountain 1611m
Proposed Freshwater Supply Pipeline
Kluskus-Ootsa FSR
Top Lake
Entiako Lake
Fawnie Range
Fawnie Creek
Laidman Lake RMZ 18
Laidman Lake
Kluskus-Messue
Chedakuz Creek
Kuyakuz Mountain 1734m
Kluskus-Blue FSR
Kuyakuz Lake
Kluskoil Lake Park
Nazko
Tweedsmuir Park
Johnny Lake
Johnny Lake Lodge
Moosehead Lodge
Laidman Lake Ecolodge
Moose Lake Lodge
Moose Lake
Mount Davidson 1856m
Exploration Road
Tsacha Mountain 1781m
Davidson Creek RMZ 17
Euchiniko Lakes
Blackwater River
Kluskus
Kushya
Tsacha Lake
Upper Blackwater RMZ 19
Baezaeko

Legend

- Populated Place
- Recreation Lodge
- Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Other FSRs
- Existing Transmission Line

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline

Resource Management Zones

- Multi-Value Emphasis Zone
- Protected Area
- Resource Development Emphasis Zone
- Settlement/Agriculture Zone
- Special Resource Zone
- Vanderhoof Land and Resource Management Plan Area and Access Management Plan Area

Non-Traditional Land and Resource Use

- Regional Study Area
- Local Study Area

Scale: 1:530,000

0 5 10 20

Kilometres

Reference

BC Government GeoBC Data Distribution; NRCAN Geobase; Ministry of Forests, Lands and Natural Resource Operations

CLIENT: newgold

PROJECT: Blackwater Gold Project

Non-Traditional Land and Resource Use Study Areas

DATE: January, 2014	ANALYST: WR	**Figure** 4.3-9
JOB No: VE52277	QA/QC: MY	PDF FILE: 17-100-018_v3_NTLUSA_WP_NA_DAIR.pdf
GIS FILE: 17-100-018_v3_NTLUSA_WP_NA_DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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320000 360000 400000 440000

6000000 5960000 5920000 5880000

Endako
Stellako
Fraser Lake
Nadleh Whuten
Fort Fraser
Engen
Vanderhoof
Weneez
Sinkut River
Saik'uz
Nulki
Mapes
François Lake
Cheslatta Carrier
Danskin
Skin Tyee
Uncha Mountains Red Hills Park
Francois Lake Park
Uncha Lake
Takysie Creek
Binta Lake
Nithi River
Smith Creek
Tachick Lake
Nulki Lake
Stuart River Park
Stuart River
Cluculz Lake
Cluculz Creek
Khai
Sinkut River
Nechako River
Tahultzu Lake
Hallett Lake
Creer Creek
Corkscrew
Targe Creek
Knapp Creek
Cheslatta River
Cheslatta
Bird Creek
Nechako Canyon Protected Area
Meridian Road (Vanderhoof) Ecological Reserve
Kluskus FSR
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
Finger Lake
Tatuk Lake
Finger Tatuk Park
Chilako River Ecological Reserve
Chilako River
Natalkuz Lake (Nechako Reservoir)
Tetachuck River
Entiako River
Entiako Park
Entiako Lake
Tweedsmuir Park
Chedakuz Creek
Taluk Creek
Batnuni Lake
Euchiniko River
Nataniko Creek
Euchiniko
Kluskus-Ootsa FSR
Tatelkuz Lake
Top Lake
Fawnie Creek
Laidman Lake
Johnny Lake
Moose Lake
Exploration Road
Kluskoil Lake Park
Nazko
Kuyakuz Lake
Kluskus-Blue FSR
Euchiniko Lakes
Baezaeko
Blackwater River
Kluskus
Kushya
Tsacha Lake
Nazko

N

Legend

- Populated Place
- Highway
- Kluskus FSR
- Kluskus-Ootsa FSR
- Kluskus-Blue FSR
- Railway
- Existing Transmission Line
- Stream
- Waterbody
- Parks & Protected Areas

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Mine Site

Current Land and Resource Use for Traditional Purposes

- Regional Study Area
- Local Study Area

KEY MAP

Scale: 1:500,000

0 5 10 20
Kilometres

Reference
BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Current Land and Resource Use for Traditional Purposes Study Areas

DATE: February, 2014	ANALYST: WR	**Figure** 4.3-10
JOB No: VE52277	QA/QC: LR	PDF FILE: 15-100-014_TLU-StudyAreas_v3DAIR.pdf
GIS FILE: 15-100-014_TLU-StudyAreas_v3DAIR.mxd		
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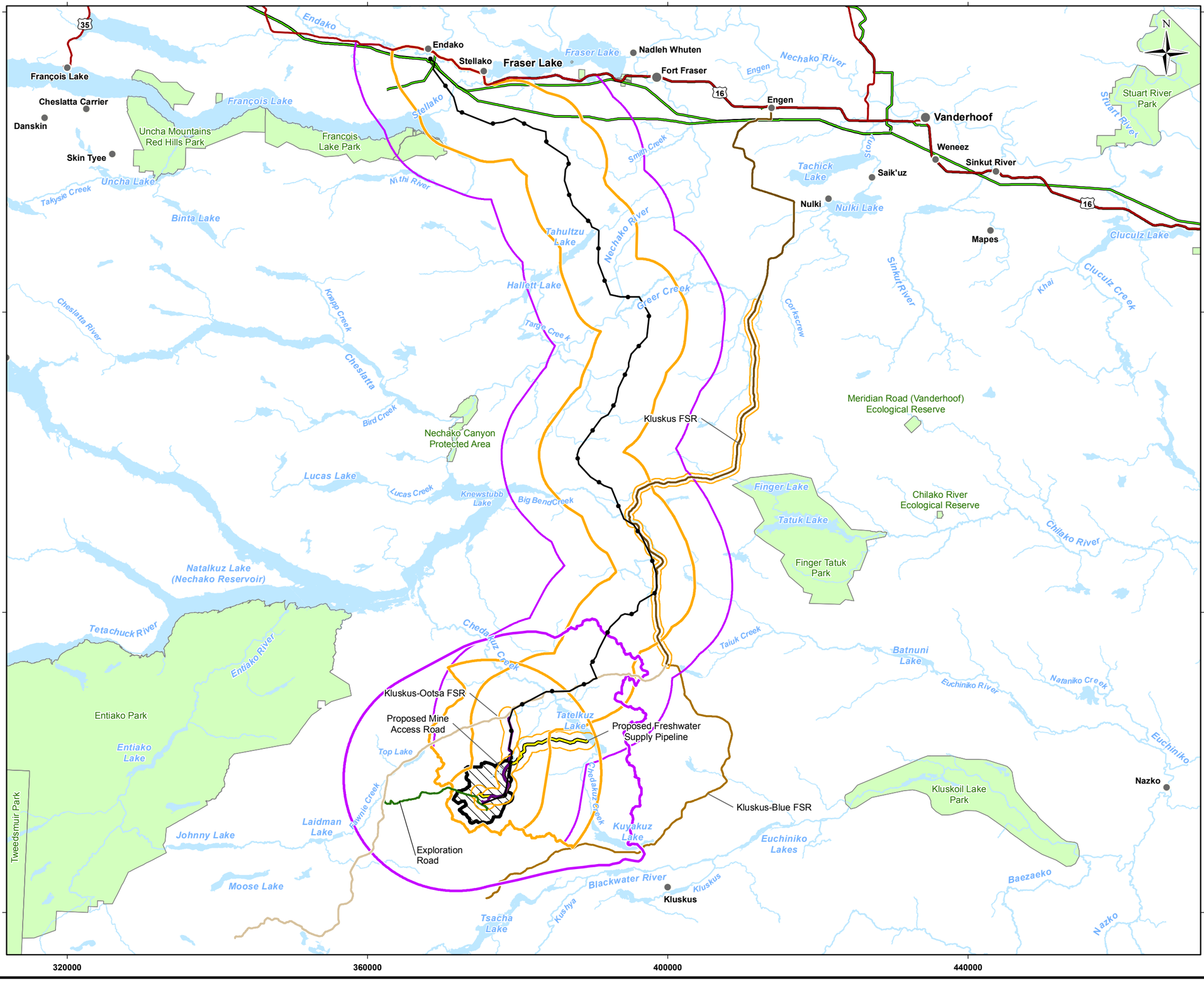

Legend

- Populated Place
- Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Railway
- Existing Transmission Line
- Stream
- Waterbody
- Parks & Protected Areas

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Mine Site

Visual Resources

- Regional Study Area
- Local Study Area

KEY MAP

Scale: 1:500,000

0 5 10 20
Kilometres

Reference
BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Visual Resources Study Areas

DATE: January, 2014	ANALYST: WR	**Figure** 4.3-11
JOB No: VE52277	QA/QC: AP	PDF FILE: 19-05_VisualRSA_v5DAIR.pdf
GIS FILE: 19-05_VisualRSA_v5DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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320000 360000 400000 440000

6000000 5960000 5920000 5880000

Endako
Stellako
Fraser Lake
Nadleh Whuten
Fort Fraser
Engen
Nechako River
Vanderhoof
Weneez
Sinkut River
Saik'uz
Nulki
Nulki Lake
Mapes
Stuart River Park
Stuart River
Cluculz Lake
Cluculz Creek
Khai
Sinkut River
Tachick Lake
Smith Creek
Stellako
François Lake
Southbank
Cheslatta Carrier
Danskin
Skin Tyee
Uncha Mountains Red Hills Park
Francois Lake Park
Uncha Lake
Takysie Creek
Binta Lake
Nithi River
Cheslatta
Tahultzu Lake
Nechako River
Hallett Lake
Graser Creek
Targe Creek
Knapp Creek
Cheslatta River
Cheslatta Lake
Cheslatta
Bird Creek
Corkscrew
Meridian Road (Vanderhoof) Ecological Reserve
Kluskus FSR
Nechako Canyon Protected Area
Lucas Lake
Lucas Creek
Knewstubb Lake
Big Bend Creek
Finger Lake
Tatuk Lake
Finger Tatuk Park
Chilako River Ecological Reserve
Chilako River
Natalkuz Lake (Nechako Reservoir)
Tetachuck River
Entiako River
Entiako Park
Entiako Lake
Tweedsmuir Park
Chedakuz Creek
Taluk Creek
Batnuni Lake
Euchiniko River
Nataniko Creek
Euchiniko
Nazko
Kluskoil Lake Park
Kluskus-Ootsa FSR
Proposed Mine Access Road
Proposed Fresh Water Pipeline
Tatelkuz Lake
Top Lake
Fawnie Creek
Laidman Lake
Johnny Lake
Moose Lake
Kuyakuz Lake
Kluskus-Blue FSR
Exploration Road
Euchiniko Lakes
Blackwater River
Kluskus
Kushya
Tsacha Lake
Baezaeko
Nazko

N

Legend

- Populated Place
- Highway
- Kluskus FSR
- Kluskus-Blue FSR
- Kluskus-Ootsa FSR
- Railway
- Existing Transmission Line
- Stream
- Waterbody
- Parks & Protected Areas

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Mine Site

Heritage Resources

- Regional Study Area
- Local Study Area

Note: RSA is the same as LSA for the transmission line, mine access road, airstrip, freshwater supply pipeline, and Kluskus FSR.

Scale: 1:500,000

0 5 10 20
Kilometres

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Heritage Resources Study Areas

DATE:	ANALYST:	**Figure** 4.3-12
May, 2014	WR	
JOB No: VE52277	QA/QC: AP	PDF FILE: 16-100-001_v8_arch_study_area_NA_DAIR.pdf
GIS FILE: 16-100-001_v8_arch_study_area_NA_DAIR.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	

amec

Y:\GIS\Projects\VE\VE52095 Richfield BlackwaterMapping\16 archaeology\Baseline\16-100-001 v8 arch study area NA DAIR.mxd

4.3.1.2 *Temporal Boundaries*

This subsection of the Application will present the rationale for the proposed temporal boundaries to be used for the EA including an assessment of the effects for each phase of the proposed Project, including site preparation, construction, operations and maintenance, closure, and post-closure. In addition, consideration will be given to the possibility of social and economic effects occurring before construction (i.e., during procurement and or recruitment). The description of the temporal extent of the EA (entire life of the proposed Project) will be relative to the VCs. Any annual or seasonal variation related to VCs and biophysical constraints for all phases of the proposed Project will be described.

Preliminary temporal boundaries of the proposed Project, which are contingent on permitting, include four primary phases.

- **Construction phase**: the construction phase of the proposed Project will occur over two years;
- **Operations phase**: the operations phase of the proposed Project will extend for approximately 17 years and will start once the plant site has been built and commissioned and is ready for ore processing;
- **Closure phase**: the closure phase is estimated to occur for approximately 18 years (ending in Year 35). This phase considers initial two years following the cessation of ore processing activities as the period during which the buildings and infrastructure that will no longer be needed will be removed and mine facilities reclaimed. An additional 16 years will be required for the open pit to flood and start discharging towards the TSF, and for the TSF to start overflowing and discharging water back to Davidson Creek; and
- **Post-closure phase**: the post-closure phase starts once the proposed Mine Site starts discharging water back to Davidson Creek (starting in Year 35). At this stage, it is expected that the Mine Site would have reached an equilibrium and only maintenance and monitoring activities will be required.

4.3.1.3 *Administrative Boundaries*

Administrative boundaries refer to the limitations imposed on an environmental assessment by political, economic, or social constraints (BC EAO, 2013). For each VC the administrative boundaries will be described and rationale will be provided in the Application.

4.3.1.4 *Technical Boundaries*

Technical boundaries refer to the constraints imposed on an environmental assessment by limitations in the ability to predict the effects of a project (BCEAO, 2013) For each VC the technical boundaries will be described and rationale will be provided in the Application.

4.3.2 Existing Conditions

For each VC, the existing conditions within the study areas will be described in sufficient detail to enable potential interactions between the proposed Project and the VCs to be

identified, understood and assessed (BC EAO, 2013). Primary and secondary information will be used to characterize existing conditions.

In addition to the description relative to the VC, the scope of the description of existing conditions will include:

- Natural and/or human trends that may alter the existing conditions irrespective of the changes that may be caused by the proposed Project or other projects and activities in the study area; and
- Description of how other past and present projects and activities in the study area have affected or are affecting each VC.

4.3.3 Potential Project Effects

Interactions between all project components and activities, and each VC will be identified and described. Key interactions revealed as part of this process will constitute the focus of the assessment.

Potential project effects can be assessed qualitatively or quantitatively depending on the nature of the indicator selected for the VC. Limitations and assumptions for models used to quantitatively estimate Project effects will be clearly stated for each VC.

4.3.4 Mitigation of Project Effects

Technically and economically feasible mitigation measures will be described for each VC aimed to reduce the potential adverse effects to acceptable levels. Mitigation measures will include the following actions:

- Avoidance;
- Minimization;
- Treatment;
- Restoration;
- Compensation; and
- Off-Setting.

Mitigation will be proposed to bring potential adverse effects of the proposed Project down to residual effects that will be acceptable.

4.3.5 Evaluating Residual Project Effects

Adverse residual effects of the proposed Project will be characterized and their significance will be determined as described in the following sections.

4.3.5.1 *Characterization of Residual Effects*

This subsection of the Application will present the rationale for describing residual effects and assessing their significance on VCs.

The following attributes will be considered for the characterization of residual effects and the assessment of their significance:

- Context: this refers to the ability of the VC to accept change. For example, the effect of a project may have an impact if it occurs in areas that are ecologically sensitive, with little resilience to imposed stresses;
- Magnitude: this refers to the severity of the impact;
- Geographic extent: this refers to the spatial extent over which the predicted impact is expected to occur;
- Duration: this refers to the length of time the effect lasts;
- Reversibility: this refers to the ability of the VC to return to its original state once the stressor is removed; and
- Frequency: this refers to how often an effect is expected to occur.

This section of the Application will present the rationale for the rating criteria applied to each of the categories listed above. For those VCs with standards established by legislation or regulations (such as noise, air quality, surface water quality, and sediment quality), the predicted effect in relation to the standard will serve as the basis for the determination of the magnitude of the effect. For other VCs, the assessment of magnitude will be conducted by analyzing other factors, which will be VC-specific.

4.3.5.2 *Likelihood*

Likelihood refers to whether or not a residual effect is likely to occur. The likelihood of each residual Project effect will be stated for each VC. The likelihood will be classified as high, moderate or low.

4.3.5.3 *Significance*

The significance of residual Project effects will be determined for each VC considering the attributes described in **Section 4.3.5**.

4.3.5.4 *Confidence and Risk*

Once the residual effects predictions has been described in terms of significance and likelihood, the level of confidence on the assessment of residual Project effects will be stated for each VC. The level of confidence will be classified as high, moderate or low. For cases when a low level of confidence is determined, a risk analysis will be conducted to more fully characterize the potential risk associated with uncertain outcomes.

4.3.5.5 *Determining the Need for Cumulative Effects Assessment*

The need for a cumulative effects assessment on a VC will be determined according to the following:

- The occurrence of a residual adverse Project effect has been determined, but this residual effect is not expected to be negligible; and
- The residual Project effects must be demonstrated to interact with the cumulative effect of other past, present or future projects or activities.

The Application will include a rationale for selection of other projects/activities, including consideration of Agency guidance (Agency, 2013c), as well as other factors that may inform whether a future development is sufficiently certain to proceed.

The following major projects are initially identified as possible candidates for inclusion in the assessment of cumulative effects:

- Nulki Hills Wind Project (Project Description submitted November 2012; section 10, Order, issued 26 November 2012);
- Coastal Gas Link Pipeline; and
- Pacific Northern Gas Looping Project.

The following general land uses will also be reviewed to determine the potential contribution to cumulative effects:

- Protected areas and parks;
- Recreation/tourism use (e.g., all terrain vehicle use);
- Mining, exploration, and mineral tenures;
- Forestry and timber resource use;
- Hunting/trapping/guide outfitting;
- Fishing and aquaculture;
- Agriculture and grazing;
- Range use;
- Land ownership and tenures;
- Recreational and commercial use of waterways;
- Groundwater resource use; and
- Surface water resource use.

4.3.6 Assessment of Cumulative Effects

The assessment of cumulative effects will identify the residual effects of the proposed Project with the potential to interact with the residual effects of other projects or activities within the RSA and assess whether this interaction is likely to result in a greater impact to the identified VC.

As for the assessment of Project Effects, the assessment of cumulative effects will consider the following steps:

- Potential cumulative effects;
- Mitigation of cumulative effects; and
- Evaluation of residual cumulative effects.

The significance of cumulative effects will be determined considering the same categories used as for the assessment of residual effects.

5.0 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

This section of the Application will present the assessment of effects for the biophysical environment. **Section 5.1** will describe the biophysical baseline conditions of the proposed Project. **Sections 5.2** to **Section 5.4** will present the scoping and rationale conducted to select VC for the atmospheric, acoustic, aquatic and terrestrial environments, the results of effects assessment on each VC and the proposed monitoring and follow-up activities. The VCs proposed for each environmental discipline is based on the list of VCs presented in **Table 4.2-1** in **Section 4**. **Section 5.5** will present a summary of the environmental effects assessment results.

5.1 Environmental Baseline

This section of the Application will present an overview of the methodology for determining baseline conditions for the atmospheric, acoustic, aquatic, and terrestrial environmental components.

5.1.1 Atmospheric and Acoustic Environment

5.1.1.1 *Climate*

This subsection will present a climate baseline study, which includes the following:

- Methods used to collect site climatology information, including description of the meteorological stations installed on-site and public sector climate data for the region;
- Presentation and analysis of the data collected from the site climate stations;
- Characterization of regional meteorological conditions and comparison with site-specific conditions; and
- Provincial and sector specific greenhouse gas (GHG) release information.

Regional climatologic conditions within the proposed Project area will be used to describe climate. The local climatologic conditions will be summarized based on data obtained from the two on-site meteorological stations. If on-site data are insufficient to characterize the site-specific conditions, data from nearby EC stations will be analyzed to describe the local conditions (EC, 2012).

5.1.1.2 *Air Quality*

This subsection will present an air quality baseline study, which includes continuous on-site monitoring of particulates concentration including respirable fraction of 2.5 micrometres (µm) in diameter ($PM_{2.5}$) and thoracic fraction of 10 µm in diameter (PM_{10}) carried out by the Proponent since October 2012. A protocol of the gravimetric sampling agreed with BC Ministry of Environment (BC MOE) involves a Partisol instrument, three-day sampling cycles, and a gravimetric analysis of respirable and thoracic samples by a certified laboratory. Consequently, baseline concentration of $PM_{2.5}$ and PM_{10} are completed using on-

site real-time data. Because dust is the most common and significant contaminant generated during open pit mining, the real time monitoring of baseline and proposed Project dust concentrations is essential in the assessment of air contaminants impact on critical receptors, including people, wildlife and wildlife habitat, vegetation, and surface water. Secondary data will be reviewed if available for Total Particulate Matter (TPM) and dust deposition. If data are available it will be added to the air quality baseline.

Baseline concentration of other Criteria Air Contaminants expected at the mine airshed such as nitrogen oxides, SO_2, and atmospheric ozone are developed during a desktop study based on data available for similar remote locations operated by EC and the private sector (e.g., mining companies).

Air quality along the road and transmission corridors is evaluated using secondary information. The secondary information may be information collected from projects with similar activities and/or from projects in similar climatic regimes as found in the proposed Project's region or published data from previous studies.

5.1.1.3 *Noise and Vibration*

This subsection will present a noise baseline study, which includes baseline monitoring at identified critical noise receptors as one of the fundamental components associated with the assessment of noise. Human dwellings are considered as noise receptors if they are continuously occupied at least six weeks per year. Active trappers' cabins and cottages usually meet this requirement. Wildlife receptors such as species of conservation concern and mating areas are considered. IRs located in the vicinity of the proposed Project will be considered as potential noise receptors. The nearest permanent dwellings are located at the IR Tatelkus Lake 28 and Tatelkuz Lake Resort (**Figure 2.2-2**).

A baseline noise survey representing 24-hour noise levels is required to describe the aerial sound features within the LSA. All fieldwork is conducted with Type 1 noise monitoring instrument. Along with noise monitoring, the weather parameters at the monitoring point such as wind speed, direction, temperature, pressure, and cloud cover are recorded because of their potential impact interaction with noise propagation.

No vibrations baseline study will be undertaken. Effects of expected vibrations to be generated during operations, in particular from mine blasting activities will be described, assessed and presented in **Section 5.2.2** of the Application.

5.1.2 Aquatic Environment

5.1.2.1 *Hydrology*

This subsection will present the hydrological baseline condition of watercourses in the LSA. It will describe the general hydrologic setting of the area, summarize archived and historic data obtained from regional Water Survey of Canada (WSC) hydrometric stations, and the methods used to collect site flow data. This subsection will include a description of watersheds affected by the mine, transmission line, access roads, and existing water use. Surface hydrology will be described along with water quality and quantity, including potential

reference areas for Environmental Effects Monitoring (EEM). The surface hydrology baseline will include a description of:

- Methods used;
- Watersheds affected by the mine, access roads, and infrastructure including local wetlands, ponds and lakes;
- Flow data from regional hydrometric stations;
- Site flow monitoring data;
- Mean monthly and annual flows;
- 10-year seven-day low flow;
- 20 years of simulated daily flows; and
- Peak flood events (e.g., 1 in 200-year flood event).

Where potential effects on fish values and proposed fish habitat mitigation and compensation measures are presented and discussed, the information listed above are used as part of the basis for analysis of potential effects from the proposed Project.

The hydrological program includes the following:

- Establishing continuous water level recorders;
- Measuring stream discharges;
- Downloading continuous water level recorders and check data whenever streams are gauged;
- Establishing rating curves; and
- Determining the flow hydrographs.

Analyses required include flood and low flow calculations and determination of the effects of water withdrawal or discharge by the proposed Project development on flows. Analysis of the site-specific meteorological precipitation data, together with available EC data will be required to provide a measure of data representation and flow verification.

Streams in the area are generally characterized by high flows in late spring and early summer due to rain and snowmelt, and low flows in the winter. Flow data are collected from 16 hydrometric stations that were installed in the proposed Project area. These stations include 10 full hydrometric stations being used for rating curve development and six lake stations being used to record seasonal fluctuations in water levels. Instrumentation used in these studies includes Unidata dataloggers and KPSI™ temperature/pressure transducers, with surveyed water level (gauge height) obtained from bench marks installed at the stations during every site visit. Data collection activities are undertaken according to guidelines given in the Manual of British Columbia Hydrometric Standards (BC MOE, 2009).

Hydrometric stations are operated on a continuous basis throughout the open water season from April to November, as mid-winter snow and ice conditions typically interfere with the stage discharge relationship. In order to develop a reliable stage discharge curve, approximately ten flow measurements at different creek stages are required. Instantaneous flow measurements are also collected during mid-winter conditions to determine the magnitude of minimum winter stream flows, and where feasible, selected stations are

operated continuously during the winter too. Additional long-term continuous hydrological data are available from local WSC hydrometric stations to support the analysis.

Regression analysis is carried out to develop a long-term flow series at each of the 10 hydrometric stations. This information is used to estimate return period runoff scenarios and low flows.

Two years of data are currently available from three of the hydrometric monitoring stations. The remaining baseline monitoring network of stations was commissioned in early 2012.

5.1.2.2 *Surface Water and Sediment Quality*

This subsection will present the methods and results for baseline characterization for surface water and sediment quality.

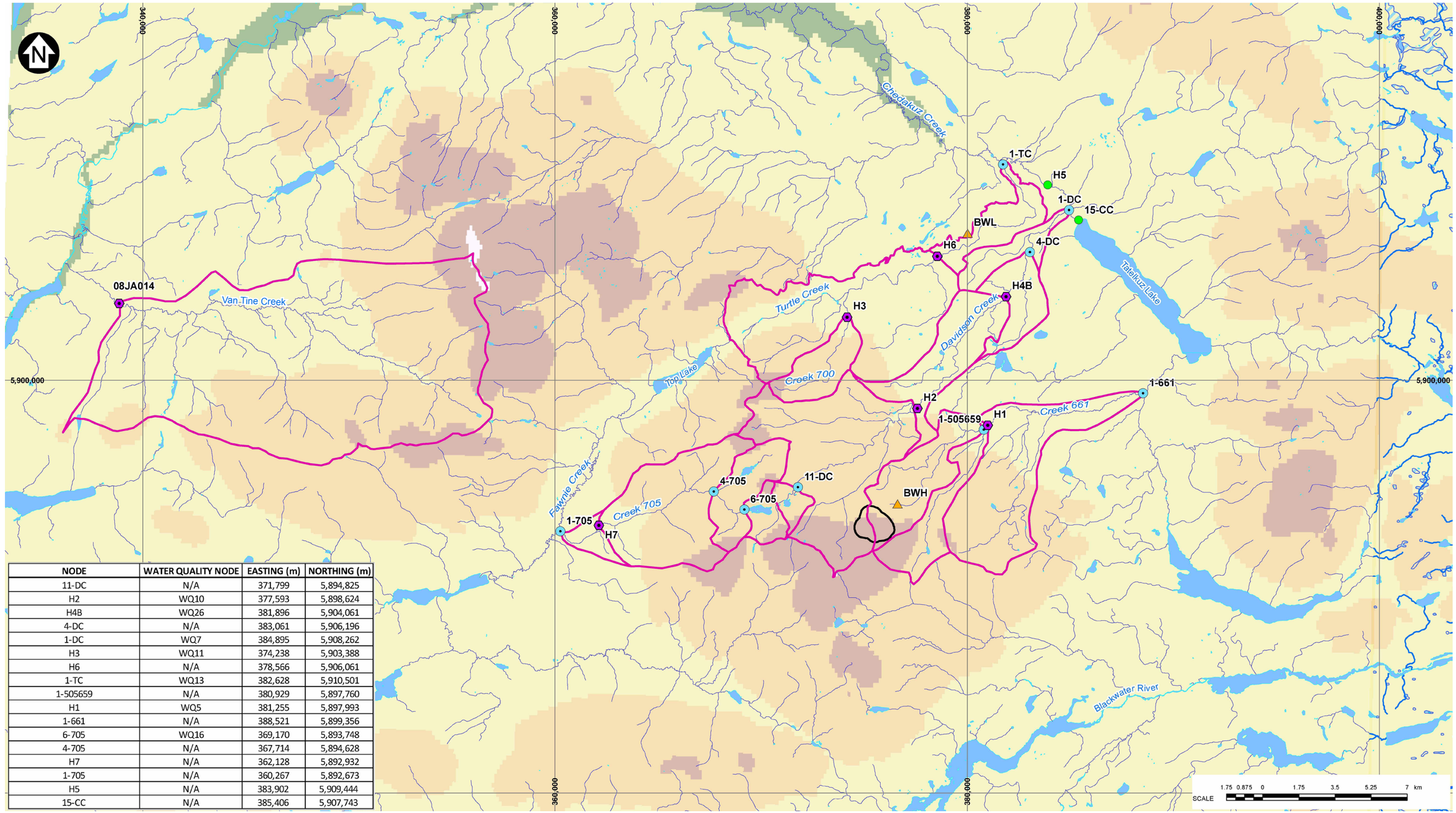
Surface Water Quality

This subsection will present an overview of the surface water quality baseline condition of watercourses within the LSA and RSA. It will describe the general water chemistry of streams in watersheds within the LSA and RSA. Sampling, laboratory analysis and reporting methodology conform to that contained in the latest BC MOE monitoring guide for mine operators and Proponents (BC MOE, 2012). Monthly water quality monitoring began in early spring 2011 and was conducted until Q3 2013. Quarterly monitoring started in Q4 in 2013 and is ongoing. Weekly freshet monitoring is conducted three times: in 2011, 2012, and 2013. A standard list of parameters including physical parameters, nutrients, major ions, and trace metals is being assayed. The Application will present a figure showing each monitoring station (refer to **Figure 4.3-3**), as well as a summary table showing mean and 95th percentile of water quality results along with protection of aquatic life guidelines. The water quality baseline report will be presented as an appendix to this section of the Application including data collected to the middle of June 2013. **Figure 5.1-1** shows the location of the hydrology station/watershed model nodes.

Streams in the area are generally low in nutrients and dilute (low Total Dissolved Solids, low hardness). Some trace metals are somewhat elevated, as might be expected in a mineralized area.

Contents of surface water quality baseline report include:

- Proposed Project setting;
- General characterization of proposed Project area streams;
- Rationale for including surface water quality as a VC;
- Sampling methodology;
- Analysis methodology;
- Reporting methodology;
- Major parameter results and discussion;
- Minor parameter results and discussion; and
- Conclusions.



NODE	WATER QUALITY NODE	EASTING (m)	NORTHING (m)
11-DC	N/A	371,799	5,894,825
H2	WQ10	377,593	5,898,624
H4B	WQ26	381,896	5,904,061
4-DC	N/A	383,061	5,906,196
1-DC	WQ7	384,895	5,908,262
H3	WQ11	374,238	5,903,388
H6	N/A	378,566	5,906,061
1-TC	WQ13	382,628	5,910,501
1-505659	N/A	380,929	5,897,760
H1	WQ5	381,255	5,897,993
1-661	N/A	388,521	5,899,356
6-705	WQ16	369,170	5,893,748
4-705	N/A	367,714	5,894,628
H7	N/A	362,128	5,892,932
1-705	N/A	360,267	5,892,673
H5	N/A	383,902	5,909,444
15-CC	N/A	385,406	5,907,743

LEGEND:

- CLIMATOLOGY STATION
- HYDROLOGY STATION/WATERSHED MODEL NODE
- NODE NOT INCLUDED IN WATERSHED MODEL
- WATERSHED MODEL NODE
- RIVER
- WATERSHED BOUNDARY
- LAKE
- WETLAND
- OPEN PIT

ELEVATION BAND (M)
- < 915
- 915-1220
- 1220-1525
- 1525-1830
- > 1830

Source: Knight Piesold Drawing from April 16, 2013
AMEC labelled Van Tine Creek

CLIENT: newgold

AMEC Environment & Infrastructure
4445 Lougheed, Suite 600, Burnaby, B.C., V5C 0E4
Tel. 604-294-3811 Fax 604-294-4664

DWN BY:	MY
CHK'D BY:	AP/JW
DATUM:	NAD83
PROJECTION:	UTM Zone 10
SCALE:	N/A

PROJECT: Blackwater Gold Project

TITLE: Baseline Model Water Discretization

DATE:	August, 2013
PROJECT NO:	VE52277
REV. NO.:	A
FIGURE No.	5.1-1

Y:\GIS\Projects\VE\VE52095_Richfield_Blackwater\Mapping\09_water-quality\Baseline/09-100-012_watershed_model_discretization.ai

Sediment Quality

This subsection will present the sediment quality baseline condition. Sediment chemistry is sampled at all surface water monitoring sites during summer low flows in 2011 and 2012; two stream stations added in late 2012 were sampled in 2013 (WQ15 and WQ16) along with Tatelkuz and Snake Lakes and Lakes 6182, 4123, and 1538. The methodology is compliant with BC MOE guidelines (BC MOE, 2012). Results using the BC MOE Strong Acid Leach Method indicate a number of exceedances of guidelines, which is expected since the method imposes a very harsh leaching condition using strong acid and results are not representative of natural leaching rates in water bodies.

Sediment quality baseline reporting will be included in the surface water quality report and will follow the same general format.

5.1.2.3 *Hydrogeology*

This subsection will present the methods and results for baseline characterization for hydrogeology in the LSA.

Baseline characterization consists of the review of available data and on-site field investigations. The review of available data includes:

- Current groundwater use in the area;
- Published geology and hydrogeology reports;
- Geological maps, watershed maps, and aerial photography;
- Geological conditions based on drill hole and test pit data; and
- Climate and hydrometeorology data.

Hydrogeology on-site field investigations include:

- Installation of groundwater monitoring wells and water flow and quality sampling;
- Determination of groundwater levels and seasonal variation; and
- Completion of hydraulic testing.

Using the results of the field investigations, a conceptual groundwater flow model is prepared considering the following:

- A watershed model is prepared to simulate monthly stream flows in the areas of the proposed mine. It uses climate records, streamflow records, and the conceptual groundwater model to develop monthly stream flows over a period of record. The model includes groundwater recharge, groundwater storage, and groundwater discharge. The watershed model includes an evaluation of the precipitation, snow melt, evapotranspiration, infiltration, and runoff conditions; and
- A numerical groundwater flow model will be used to simulate baseline groundwater flow conditions. The numerical model includes the assumptions developed as part of the conceptual model and the parameters and outputs of the watershed model, and is calibrated to on-site measurements.

The hydrogeology baseline report will present the following results:

- General description of the geographic setting, landforms, topography, drainage, climate, soil types, geomorphologic conditions;
- General description of geologic setting, type and nature of geologic materials, vertical and lateral extent of geologic units, stratigraphy, and structural features;
- Locations and descriptions of hydrogeologic units, areal extent and thickness, properties (hydraulic conductivity, etc.);
- Assessment of groundwater use, including amount and source(s) of groundwater recharge and discharge, quantity of groundwater storage, current amount of groundwater extraction, potential amount available for future groundwater extraction;
- Description of local and regional groundwater levels, flow regime, and rates of movement;
- Evaluation of surface water/groundwater quantity interaction; and
- Evaluation of groundwater level data and hydraulic testing data.

Hydrogeologic maps and cross-sections outlining the extent of hydrogeologic units, locations of water wells, drill holes and instrumentation (e.g., piezometers, monitoring wells) springs, (potentiometric) water level contours, directions and rates of groundwater flow and locations of surface water courses will be provided in the Application.

Technical guidance for the design of the hydrogeology program and data collection methods considers BC MOE (2012) and direction provided by provincial and federal agency staff.

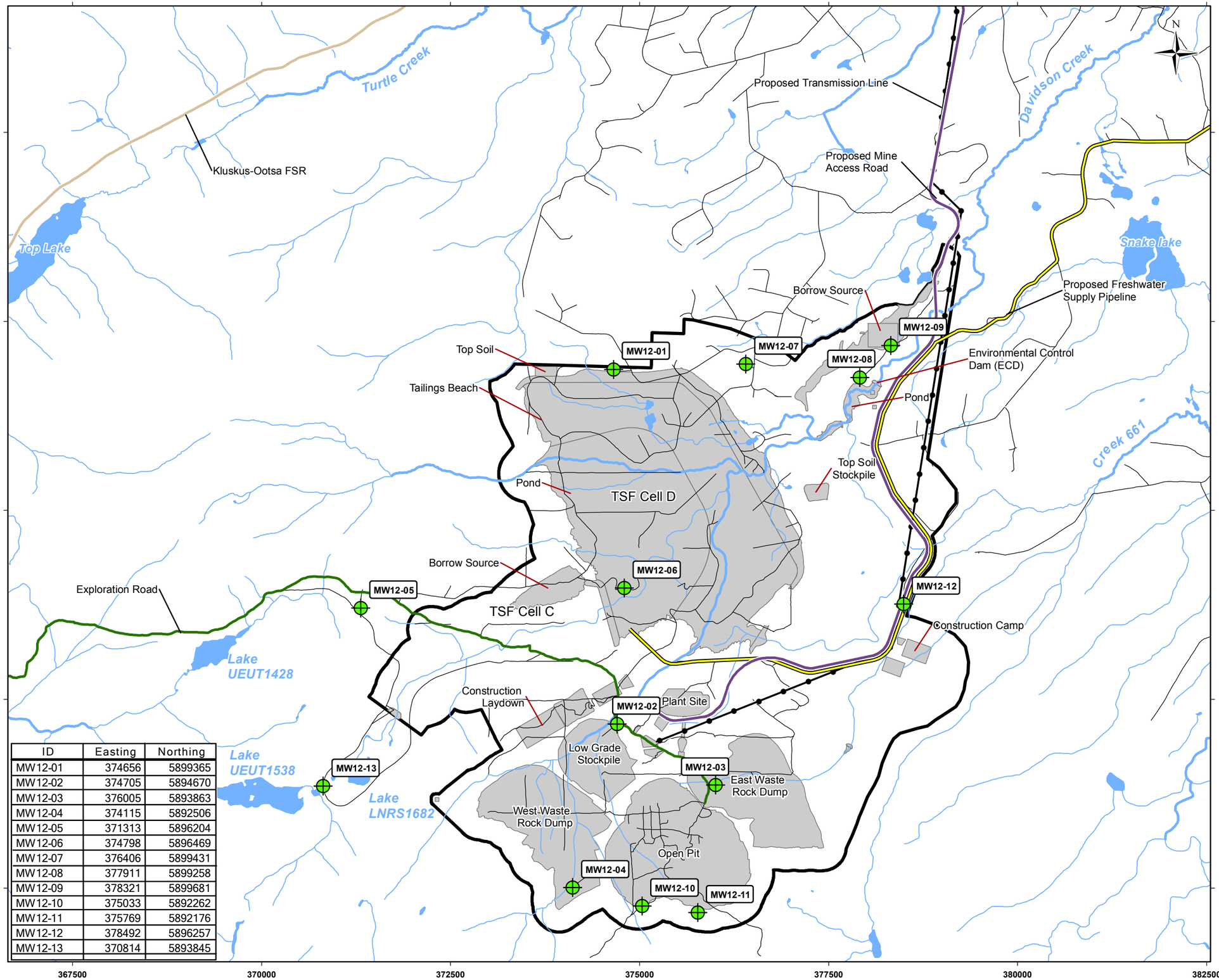
5.1.2.4 *Groundwater Quality*

This subsection will present the methods and results for groundwater quality characterization.

The groundwater quality-sampling program is developed on the basis of the piezometers installed as part of the hydrogeology baseline characterization described in **Section 5.1.2.3** and in accordance with the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (BC MOE, 2012). The proposed scope of work includes the following:

- Review of methods for geological interpretation, well design and well installation;
- Confirmation of sampling protocols for the list of elements analyzed;
- Review of data obtained from other sources;
- Collation of groundwater quality sampling results;
- Interpretation and analysis of groundwater quality results; and
- Production of groundwater quality baseline report.

Figure 5.1-2 shows the locations of the groundwater monitoring wells.



ID	Easting	Northing
MW12-01	374656	5899365
MW12-02	374705	5894670
MW12-03	376005	5893863
MW12-04	374115	5892506
MW12-05	371313	5896204
MW12-06	374798	5896469
MW12-07	376406	5899431
MW12-08	377911	5899258
MW12-09	378321	5899681
MW12-10	375033	5892262
MW12-11	375769	5892176
MW12-12	378492	5896257
MW12-13	370814	5893845

Legend

- Sampling Well Locations
- Existing Road
- Kluskus-Ootsa FSR

Project Components

- Exploration Road
- Proposed Mine Access Road
- Proposed Transmission Line
- Proposed Freshwater Supply Pipeline
- Proposed Site Facilities
- Proposed Mine Site

KEY MAP

Scale:1:50,000

0 0.5 1 2

Kilometres

Reference

BC Government GeoBC Data Distribution

CLIENT: newgold

PROJECT: Blackwater Gold Project

Groundwater Monitoring Well Locations

DATE: January, 2014	ANALYST: KA	**Figure** 5.1-2
JOB No: VE52277	QA/QC: WR	PDF FILE: 07-100-002_well_Location_DAIR_v4_minsite.pdf
GIS FILE: 07-100-002_well_Location_DAIR_v4.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	amec

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5.1.2.5 *Wetlands*

This subsection will describe the baseline condition of wetlands.

The wetland baseline program is designed to classify and describe (including primary wetland functions) wetlands within the LSA.

Wetlands are classified in accordance with the provincial wetland guide, Wetlands of British Columbia: A Guide to Identification (MacKenzie and Moran, 2004). Once classified, three primary wetland functions (i.e., hydrological, biochemical, and ecological/habitat) are described.

Hydrological Function

Wetland hydrogeomorphological studies are conducted at representative wetlands in the proposed Project area. These studies provide hydrological characteristic of the area that could be used to infer the hydrology of wetlands throughout the baseline study areas.

Biochemical Wetland Function

In-situ field measurements are collected within a pre-selected wetland system to identify pH, conductivity, dissolved oxygen, and temperature. Composite surface water samples are also collected and analyzed for routine indicators, major ions, chlorophyll *a*, nutrients, total and dissolved metals, and dissolved organic carbon. Sampling protocols were adhered to in accordance with provincial standards (Clark, 2003).

Ecological Wetland Function

Ecological wetland function is described using the following techniques (MacKenzie and Moran, 2004):

- Wetlands are mapped to the wetland class or site association level communities based on Terrestrial Ecosystem Mapping (TEM) field data collections;
- Rare and sensitive wetland ecosystems were identified by biogeoclimatic (BGC) subzone and compared against a list generated by the BC Conservation Data Centre (BC CDC, 2012) of wetland associations within the regional forest district. Wetlands are identified via species abundance, composition, and site characteristics within the wetland communities and native wetland species supported by the wetland (BC CDC, 2012); and
- Provincially at risk wetlands (Red- and Blue-listed) are also identified and mapped (BC CDC, 2012).

Habitat Wetland Function

A list of potentially occurring wildlife species (amphibians, birds, mammals, and odonates) is developed for each wetland classification. Once identified, a habitat function value is determined based on biological productivity and biodiversity support (Hanson et al., 2008).

The main results of the wetland baseline characterization program include the following information:

- A wetland map that identifies wetlands within the LSA; and
- Wetland functional values (hydrological, biochemical, and ecological/habitat).

5.1.2.6 *Fish and Fish Habitat*

This subsection will present the methods and expected results of the baseline characterization for fish and fish habitat.

Fish

The methods to conduct baseline characterization of fish include the following:

- Review of historical fishing effort and catch data from provincial databases, available consultants reports and from private forestry inventory records;
- Assessment of spring spawning migrations of rainbow trout using upstream and downstream hoop nets over a three-week period at eight locations in streams potentially affected by the proposed Project;
- Assessment of fall mountain whitefish migrations using short set upstream hoop nets at four locations in streams potentially affected by the proposed Project;
- Assessment of species composition and relative abundance in four lakes near to the proposed Project site using provincial standard (Resource Inventory Committee (RIC), 2001) floating and sinking gillnets set for short periods to reduce mortality;
- Assessment of the absolute number of kokanee and rainbow trout in Tatelkuz Lake using hydroacoustic methods, and estimation of absolute number of rainbow trout in the three headwater lakes by extrapolation of rainbow trout density (i.e., number/hectare (ha) lake surface area) measured in Tatelkuz Lake to headwater lakes;
- Assessment of streambank counts and aerial surveys to understand the distribution and relative abundance of kokanee spawning in streams potentially affected by the proposed Project and in regional streams potentially used by kokanee;
- Assessment of species composition, relative abundance, length and age structure, growth and health of different fish populations in streams potentially affected by the proposed Project using catches from electrofishing, minnow traps and angling;
- Collection and analysis of samples of rainbow trout muscle, liver and whole-body tissue in streams and lakes of the LSA, and collection analysis of mountain whitefish muscle, liver and whole-body tissue in Tatelkuz Lake to establish baseline total metal concentrations for potentially affected streams and lakes; and
- Collection of DNA samples from rainbow trout and kokanee in streams potentially affected by the proposed Project and collection of kokanee samples in regional streams.

The fish baseline characterization program will provide the following results:

- Results of historical and present surveys will be summarized with respect to the species composition, distribution and relative abundance of species captured;
- Estimates of run size, run timing, upstream distribution, and habitat use will be presented for rainbow trout, the spring spawning species captured;
- Mean length, weight, age, and condition factor will be calculated for rainbow trout, the only species captured in sufficient numbers to support analyses;
- Length and age frequency distributions and length-weight relationships, mean length at age, mean age, and mean length and age at maturity will be presented for rainbow trout;
- Diet data will be presented for rainbow trout;
- Where captures will be sufficient, summer habitat use will be presented by species and life stages;
- Mean tissue metals concentrations will be summarized for representative fish species (e.g., rainbow trout and mountain whitefish). Results will be compared to provincial fish tissue guidelines for the protection of piscivorous wildlife; and
- Genetic similarity of rainbow trout and kokanee populations will be compared to other BC populations for which genetic data exist. Genetic similarity between fish captured in different locations within the study area will be compared where appropriate. The number and spatial distribution of breeding populations of both species in the LSA will be identified.

Fish Habitat

The methods to conduct baseline characterization of fish habitat include the following:

- Review of historical fish habitat inventory information obtained from provincial databases, available consultants reports and from private forestry inventory records;
- Characterization of fish habitat in study streams is characterized two standard methods: Fish Habitat Assessment Procedure (FHAP) (Johnston and Slaney, 1996) and the Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures (RIC, 2001):
    - Continuous FHAP sampling is conducted for Davidson Creek within the proposed TSF site;
    - Modified FHAP sampling is conducted for 250 m sections around fish sampling sites in selected streams; and
    - Reconnaissance 1:20,000 site cards were completed for smaller streams within the proposed Project area and at stream crossings along the proposed access road and transmission line alignment;
- Collection of continuous water temperature data at selected sites within streams potentially affected by the proposed Project;

- Collection of winter dissolved oxygen measurements at selected sites within streams potentially affected by the proposed Project;
- Installation of instream flow transects in run, riffle and pool habitats in Davidson Creek, Creek 661 and Chedakuz Creek to establish relationships between stream discharge and depth, water velocity, and useable habitat area (Lewis et al., 2004);
- Surveys of lake habitat in three lakes using a modified primary lake survey (RIC, 2001);
- Assessment of benthic macroinvertebrate (BMI) communities in proposed Project area streams using Canadian Aquatic Biomonitoring Network (CABIN) and modified CABIN protocols;
- Benthic macroinvertebrate and phytoplankton communities in proposed Project area lakes were assessed using standardized protocols (Jones et al., 2007; Clark, 2003); and
- Collection and analysis of benthic macroinvertebrates to characterize tissue metal concentrations in streams where rainbow trout were the dominant fish species.

The fish habitat baseline characterization program will provide the following results:

- Results of historical and present habitat surveys will be summarized and mapped with respect to the distribution and quality of habitat present for different fish species;
- Relationships between discharge and fish habitat will be modelled to support prediction of potential project effects on flow and fish habitat;
- Benthic macroinvertebrate communities in study area streams and lakes will be characterized by dominance structure, taxa richness, and diversity and evenness indices; and
- Mean metal concentrations in benthic macroinvertebrate tissues will be summarized in tables.

5.1.3 Terrestrial Environment

5.1.3.1 *Geology and Geochemistry*

This subsection will present the methods of the baseline characterization for geology and geochemistry.

Geology and geochemistry baseline characterization is conducted during 2011, 2012 and 2013 with the dual purpose of supporting the design of mine waste and mine water management facilities and the assessment of potential effects on surface and groundwater quality. The methods used for baseline characterization are described below.

Data Review and Gap Analysis

Data review and gap analysis involves the data review of deposit geology and exploration multi-element Inductively Coupled Plasma – Mass Spectroscopy (ICP-MS) database.

Site Investigation, Sampling, and Analysis

The focus of additional geochemical evaluations is on anticipated future production of mine waste (rock and tailings) and open pit walls. Geochemical investigations include the following:

- Detailed assessment of future waste production by lithology and alteration, as well as sulphur and carbonate content (acid rock drainage (ARD) block model);
- Sampling and analysis of these waste units with appropriate spatial and volumetric coverage;
- Sampling and analysis of material representing anticipated final pit wall exposure;
- Analysis of metallurgical test products (i.e., tailings);
- Prediction of chemical loading from anticipated facilities using laboratory data;
- Chemical analysis will be completed by a qualified commercial laboratory in BC. The analysis will include the following:
    - Mineralogy (optical and Quantitative X-Ray Diffraction);
    - Multi-element geochemistry by ICP-MS (including low detection limit arsenic, mercury, selenium, and cadmium, if required);
    - Acid-base accounting (ABA) with modified Sobek NP and sulphur speciation;
    - Shake flask extraction (SFE) test for leachable metals; and
    - Humidity cell and other kinetic tests, as appropriate.

All samples will be submitted for ABA and ICP-MS, whereas a sub-set will be submitted for mineralogy and SFE.

The static testing results are used to guide the selection of representative and worst-case samples for laboratory based kinetic testing. Both humidity cell and column tests will be used to investigate mineral reaction and metal leaching rates. Procedures follow those recommended in Price (1997) and Price (2009).

The results of the geology and geochemistry characterization program are documented in a baseline report. The report will present the mineralogy and metal leaching / acid rock drainage (ML/ARD) characteristics for overburden, ore, waste rock, and tailings. Data from the kinetic testing program will also be presented together with the prediction of chemical loading from anticipated facilities using laboratory data. Both static and kinetic test results guide waste management practices to prevent or minimize ML/ARD. These practices will be described with greater detail in the surface water quality and groundwater quality effects assessment. The goal of the ML/ARD prevention plan is to ensure that mine site discharge water quality does not exceed the BC water quality guideline values.

The ML/ARD characterization is robust program that uses industry best practices to understand the geochemical behaviour of the waste rock, ore, and tailings. The testing program followed the recommendations in Price (1997) and Price (2009).

5.1.3.2 *Soils and Terrain*

This subsection will present the methods and results of the baseline characterization for the soils, terrain, and surficial geology. The methods proposed to conduct baseline characterization include the following:

- The baseline information is compiled using the results of field sampling programs, literature reviews, interpretation of aerial photography and Light Detecting and Ranging (LiDAR) and existing provincial mapping information;
- The methods for conducting terrain mapping follows the provincial mapping conventions outlined in Howes and Kenk (1997) and RIC (1998). The combination of both the LiDAR hillshade and the high resolution ortho-photography is utilized during the baseline assessment;
- An integrated approach with ecosystem mapping will be completed based on the guidelines presented in Standards for TEM in British Columbia (RIC, 1998);
- On-site field surveys for soil and terrain are completed to support the baseline mapping. A stratified Survey Intensity Level (SIL) approach for field data collection is applied based on the RSA, LSA, and the proposed Project footprint. The SIL for each project area is based on the on-site investigation of a required percentage of defined polygons;
- Soil samples for laboratory analysis are collected at selected sites in order to verify the field identification of soil great group, to provide data for land use interpretations and provide the baseline levels of trace metals;
- The baseline metal levels will be compared against the BC *Contaminated Sites Regulation* (Government of BC, 1996a) soil standards for urban park and industrial use, and against the Canadian Council of Ministers of the Environment (CCME) (2007) soil quality guidelines for residential/parkland and industrial use. The rationale for use of these standards will be presented in the Application;
- Based on the terrain and surficial geology map developed for the RSA and LSA, a soil map is developed by assigning a soil attribute to each decile of the terrain. This combination of multiple soil attributes within a single terrain polygon is termed a Soil Map Unit (SMU);
- Terrain stability ratings are assigned to each terrain polygon through aerial photograph and LiDAR interpretation based on the criteria outlined in Mapping and Assessing Terrain Stability Guidebook (BC Ministry of Forests (BC MOF) and BC MOE, 1999);
- The suitability of soils for reclamation purposes is derived by applying the criteria recommended by the BC Ministry of Energy (1998). These criteria are adapted from

Soil Quality Relative to Disturbance and Reclamation (Alberta Soils Advisory Committee, 1987); and

- Spatial statistics for the RSA and LSA are generated using digital map files and ArcMAP® Geographic Information System (GIS) software.

The baseline report submitted for the Application will include figures and detailed descriptive text outlining the baseline conditions of the study area. The reporting of baseline soil conditions includes an interpretation of terrain and surficial geology, development of SMUs, identification of suitability of reclamation material, assessment of terrain stability, and the presentation of baseline metal analysis for the soils of the study areas. The figures presented in the baseline report will include:

- A terrain map for the proposed Project for the RSA and LSA for the mine footprint as well as the transmission line, access road, and freshwater supply pipeline;
- A soils map identifying SMUs for the entire study area;
- A reclamation suitability map indicating suitability of reclamation material for the presented polygons; and
- A terrain stability map indicating areas of potential slope instability.

5.1.3.3 *Vegetation*

This subsection will present the baseline conditions for vegetation. The vegetation baseline program includes classification of each ecosystem following the provincial site classification of Biogeoclimatic Ecosystem Classification system (British Columbia Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO), 2013) and mapping the distribution of ecosystems within the LSA and RSA including sensitive ecosystems, such as old growth, sparsely vegetated, and riparian. An assessment of plant species at risk, ecological communities at risk and invasive plants will be completed for the baseline case of the LSA and RSA. Baseline wetland conditions in the proposed Project area will be presented in **Section 5.1.2.5** of the Application. The analysis of plant tissue for metal uptake will be presented in **Section 9.2**, Human Health, of the Application. Invasive plant baseline conditions and management strategies will be presented in **Section 12.2**, Environmental Management Plans.

<u>Ecosystem Mapping</u>

Ecosystem mapping method for the mine site, water pipeline, airstrip, airstrip access road, and the proposed mine access road will be based on aerial photography; the transmission line will be based on satellite imagery; and the existing road access route will be based on a combination of Predictive Ecosystem Mapping (PEM) and aerial photography. The LSA and RSA of the mine site, water pipeline, airstrip, airstrip access road and proposed mine access road will be mapped using a standard TEM approach based on bioterrain and three-dimensional (3D) aerial photograph interpretation at a scale of 1:5000 following provincial guidelines for TEM (RIC, 1998). The proposed transmission line and existing road access route will be mapped using a modified TEM approach incorporating existing PEM. Detailed

methods will be provided in the baseline report as an appendix to this section of the Application.

Potential sampling sites will be selected to provide a cross section of the BGC units/ecosystems, structural stages and topographic relief present within the landscape unit. The target survey level intensity for the mine site LSA is survey level 3 (percentage of polygon inspections is 26% to 50%) and for the linear project components (transmission line, freshwater supply pipeline, airstrip, airstrip access road, and proposed mine access road) it will be survey level 5 (percentage of polygon inspections is 5% to 10%) (RIC, 1998). The survey level intensity for the RSA and existing road access route will be a reconnaissance level (percentage of polygon inspections is 0% to 5%).

Provincial standards (RIC, 1998) distinguish three types of field inspections depending on the level of detail: full plots, ground inspection, and visual checks. For the purposes of this assessment a combination of full plots, ground inspection and visual checks are conducted. The structure of the plant community is evaluated by estimating the percent cover of each species within various layers (e.g., moss/lichen/seedling, herb, low shrub, tall shrub, subcanopy, and main canopy). Vascular and non-vascular plant species will be documented at both full plots and ground inspections. Mapping requires evaluation of polygons on the photos including terrain information and examination of field data and other sources (e.g., Vegetation Resource Inventory). Each polygon will be attributed with up to three ecosystem components and the percentage (or decile) of the polygon occupied by each component will be estimated. The attribute database contains all the data required to produce the final ecosystem map and interpretations.

Plant Species at Risk Survey

Plant species and ecosystems at risk (Red and Blue lists) include those listed on the BC CDC (2013) website and those listed on Schedule 1 of *SARA* (Government of Canada, 2002b). An online search is conducted for a list of plant species and ecological communities at risk that potentially occur in the proposed Project area. The BC CDC maps known locations of Red- and Blue- listed species and ecosystems known as Occurrences. Using geographic mapping software, a second spatial search is conducted for Occurrence records possibly occurring in the proposed Project area.

Plant species at risk surveys will be performed using a “focused” approach (California Natural Resources Agency (CNRA), 2009). Emphasis is placed on ecosystems with a high potential for plant species at risks. Plant species at risk are usually associated with unique ecosystems or landscapes such as wetlands, rocky outcrops, steep shallow slopes, or seepage areas.

Invasive Species

Invasive plant is used to include all species listed as noxious, invasive, or alien invasive in federal, provincial, or local regulations. The term noxious weed is a legislative designation reserved for those species listed under the provincial *Weed Control Act* and Regulations (1996c). Invasive plant is a legislative designation for those species listed under the *Forest and Range Practices Act* (2002) *Invasive Plants Regulation*. The term alien invasive species

is a legislative designation for those species listed in a Schedule to the *Community Charter's Spheres of Concurrent Jurisdiction – Environment and Wildlife Regulation* (2008).

The presence/absence of invasive plants will be documented for the proposed Project area and an Invasive Species Management Plan will be completed to identify strategies to prevent the introduction and of invasive plants.

The results of the application of the overview methods described above will result in a vegetation baseline report, which includes the following:

- An ecosystem map that identifies and quantifies forested (e.g., upland and riparian) and non-forested ecosystems (e.g., grassland and wetlands);
- Presence/absence of plant species and ecological communities at risk;
- Identifies the distribution and abundance of sensitive ecosystems, such as sparsely vegetated, and grassland; and
- Documents the presence/absence of invasive plant species.

5.1.3.4 *Wildlife and Wildlife Habitat*

This subsection will include a description of the local and regional wildlife in the LSA and RSA, including, but not limited to:

- **Habitat**: documentation of: (a) terrestrial habitat within the zone of influence for the proposed Project; (b) known and potential critical habitats of identified wildlife species VCs; (c) potential for proposed Project activities to cause loss in quantity or quality of habitat; and (d) documentation of inventories and chosen wildlife VC suitability ratings based on vegetation/habitat mapping as related to land capability closure objectives;
- **Amphibians and reptiles**: documentation of: (a) amphibian and reptilian wildlife such as frogs, toads, snakes, turtles, sensitive species, traditional use species (species composition, distribution, life history characteristics, habitat utilization, and possible seasonal movements); and (b) potential for proposed Project activities to affect amphibian and reptilian wildlife and their habitat;
- **Birds**: documentation of: (a) forest and water avian wildlife such as forest and grassland songbirds, waterfowl and shorebirds, raptors, sensitive species, traditional use species and possible breeding locations, impacts from proposed site activities would be assessed for impacts to select species of conservation concern; and (b) potential for proposed activities to affect avian wildlife and their habitat;
- **Mammals**: documentation of: (a) mammalian wildlife including caribou, moose, grizzly, bats and furbearers such as marten, sensitive species, and traditional use species; and (b) potential for proposed activities to affect mammalian wildlife (e.g., disruption of seasonal and daily movements) and impacts to their habitat or potential predator – prey communities (e.g., wolf numbers vs. moose and deer due to habitat changes);

- I**nvertebrates**: documentation of: (a) invertebrate wildlife such as dragonflies, damselflies and butterflies; and (b) potential activities to affect invertebrates and their habitat;
- **Rare and listed species**: documentation of wildlife species covered by *SARA*; Committee on the Status of Endangered Wildlife in Canada (COSEWIC); BC provincial Red and Blue lists (BC CDC, 2012) and how they may be affected by the proposed Project; and
- **Species of importance to humans**: documentation of wildlife species that are of importance to the local economy, local communities, First Nations and how they may be affected by the proposed Project.

The methods considered for baseline characterization include a combination of secondary information research and review, field surveys and local knowledge when available. Specific methods for field surveys include the following:

- **Amphibians and reptiles**: field surveys are aimed at identifying the presence/not-detected status of all common or rare species. Suitable survey habitat for amphibians is selected based on the review of aerial photographic information, including the water body size and breeding habitat potential. Visual encounter surveys and road surveys for amphibians and reptiles follow modified Resource Inventory Standards Committee (RISC) protocols of transect searches (RISC, 1998a). Surveys are conducted to identify wetlands that appear suitable for amphibian breeding. During the ground surveys, the shorelines of wetlands are surveyed systematically for tadpoles and adult amphibians;
- **Birds**: for the baseline surveys, birds are separated out into terrestrial birds, waterbirds, and raptors based on their individual RISC methodology protocols. Terrestrial birds are surveyed using modified variable point count stations following the RISC standards for forest and grassland birds (RISC, 1999a). Waterbirds are surveyed using aerial transect survey methodology during the breeding season following RISC protocols for waterfowl and allied species (RISC, 1999b). Raptors presence and distribution will be surveyed by conducting call-playback surveys and stand watches following RISC protocols and by searches for stick nests during other flights (RISC, 2001 and RISC, 2006);
- **Mammals:** field surveys for mammals are separated into winter mammal presence/absence surveys, incidental observations of mammals and bat surveys. Winter mammal surveys involve aerial and ground based transects recording wildlife and wildlife sign following RISC protocols. Bat inventory methods adhere to modified RISC standards that use the analysis of sound recordings (RISC, 1998b). Limiting seasons/habitats that require specific surveys will also be discussed; and
- **Invertebrates:** invertebrate sampling methodology follow netting and chasing methods described in RISC inventory methods for terrestrial arthropods (RISC, 1998c) to obtain a list of butterfly and dragonfly/damselfly species present.

5.2 Atmospheric and Acoustic Environment Effects Assessment

This section of the Application will present the identification and selection of VCs of the Atmospheric and Acoustic Environment following the methods described in **Section 4.2**. This section will also present the assessment of effects for the proposed VCs following the methods described in **Section 4.3**.

5.2.1 Identification and Selection of Valued Components

This subsection will present the rationale and justification for Candidate VCs, Selected VCs and Candidate VCs not selected as VCs for the Atmospheric and Acoustic Environment.

5.2.2 Noise and Vibration

5.2.2.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.2.2.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.2.2.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment of residual noise effects of the proposed Project involves the determination of permissible sound levels (PSLs), noise source characterization, and noise modelling to estimate future noise levels.

Determination of Permissible Sound Levels

PSLs are likely undefined in the proposed Project area and it will be necessary to review existing PSLs related to commercial operations in remote areas or the mining industry. In

consultation with provincial and federal regulators, most suitable noise criteria are adopted, and anthropogenic noise are compared to the permissible sound level.

Noise Source Characterization

Each significant noise source that will be a part of the proposed Project must be described in terms of its sound power, location, size, and housing (i.e., whether or not it is enclosed). Source characterization work cannot be finished until a complete equipment list is identified. If there is uncertainty regarding equipment, options, and alternatives are reviewed. Other sources of information include review of published sound power information, equipment manufacturer's specifications, and estimates produced by recognized methods of calculation.

Noise Modelling

Environmental noise model SPM9613 is used as part of the modelling. The model is based on International Organization for Standardization (ISO) Standard 9613 Parts 1 and 2 that specifically address effects observed during outdoor noise propagation. Significant noise sources present during construction and operations phases are included as inputs to the model, and specific noise predictions in the LSA and RSA are shown as 3D noise contours. If necessary, additional modelling of noise barriers is conducted. Noise contours generated will be overlaid with available mapped locations of each permanent and seasonal human receptor, to enable an understanding of the proposed Project's related noise levels that may be experienced at individual receptor locations. Results will be presented and discussed in **Section 9.2.2**.

Vibration Assessment

Prediction of vibration effects due blasting and heavy equipment operation is conducted using empirical equations. Vibration mitigation methods are identified if considered necessary to protect existing or proposed infrastructure. The Application will describe proposed measures available to manage the effects identified above.

5.2.2.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.2.2.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.2.2.4** above.

5.2.2.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.2.2.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.2.3 Climate Change

5.2.3.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.2.3.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.2.3.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment of residual effects for climate change involves the preparation of an emission inventory and dispersion modelling.

5.2.3.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.2.3.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.2.3.4** above.

5.2.3.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.2.3.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.2.4 Air Quality

5.2.4.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.2.4.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.2.4.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment of residual effects for air quality involves the preparation of an emission inventory and dispersion modelling.

Emission Inventory

An emission inventory for the proposed Project is established based on design data, construction plans, and operational scenarios. The activities that will be considered for the emissions inventory include but are not limited to ore and waste rock transportation within the mine site, as well as the transportation of materials and products outside the mine site (whether by air or road). Wherever possible, engineering data and manufacturer's specifications are used to estimate emission rates. Where necessary, this information is supplemented by emission factors from the United States Environmental Protection Agency (US EPA) AP-42. Emissions from mobile sources during construction and operations are estimated using the US EPA models MOVES2010b and NONROAD.

Dispersion Modelling

Dispersion modelling is performed with the program CALPUFF, which is a Lagrangian dispersion model that simulates pollutant releases as a continuous series of puffs. The CALPUFF model has been the preferred model for regions with complex, non-steady-state meteorological conditions such as those found in mountainous terrain like the proposed Project property. The model can predict both concentration and deposition patterns of air contaminants. This model is applied in the more refined CALMET mode to incorporate mesoscale meteorological data MM5.

The results of the dispersion modelling are predicted ground level concentrations for particulate matter and combustion gases, and dust deposition rates at the proposed mine

site boundary and beyond at sensitive receptors are assessed with reference to ambient air quality objectives and health effects.

5.2.4.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.2.4.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.2.4.4** above.

5.2.4.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.2.4.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.3 Aquatic Environment Effects Assessment

This section of the Application will present the identification and selection of VCs of the Aquatic Environment following the methods described in **Section 4.2**. This section will also present the assessment of effects for the proposed VCs following the methods described in **Section 4.3**.

5.3.1 Identification and Selection of Valued Components

This subsection will present the rationale and justification for Candidate VCs, Selected VCs and Candidate VCs not selected as VCs for the Aquatic Environment.

5.3.2 Surface Water Flow

5.3.2.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.3.2.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.3.2.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

A water balance model is developed to assess changes in streamflows as a result of mine construction, operations, closure, and post-closure under a range of climatic conditions. Consideration of extreme events and years, both wet and dry, is included.

The Application will identify potential effects on surface water quantity and flow. Effect conclusions are based on predicted water volumes in and from the proposed Project area, including mine water, seepage, surface runoff, and collection ponds. The assessment considers the potential effects on water quantity and catchment areas in relation to:

- Water withdrawals and discharge related to the proposed Project, including points of withdrawal and discharge;
- Quantity of runoff, groundwater, and seepage from mine workings. This includes: a description of predicted inflows; water handling procedures; water balance predictions and contingencies for potential inflows that are higher than expected; and the effects of discharges on the hydrology of the area;

- Consideration of flood and drought conditions (wet and dry);
- Climate change scenarios, considered in the form of sensitivity analysis of key hydrological parameters such as precipitation, are applied to water balance; and
- Receiving water quantity, including changes in timing, volume, and deviation of peak and minimum flows resulting from the proposed Project.

Potential effects of the proposed Project on water quantity will also be incorporated into other sections of the Application (e.g., surface water and sediment quality, fisheries and aquatic resources, etc.). All parameter estimates (e.g., water balance) reported in the Application will include sources of information (either estimates or empirical) and assumptions built into the data.

5.3.2.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.3.2.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.3.2.4** above.

5.3.2.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.3.2.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.3.3 Surface Water Quality

5.3.3.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.3.3.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.3.3.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

During construction, BMPs will be applied (including Fisheries and Oceans Canada (DFO) Operational Statements with respect to overhead powerlines, clear span bridges and culvert maintenance will be followed as well as relevant DFO BMPs and guidelines).

A key objective of the proposed Project design is to prevent surface water discharges from the proposed mine site to adjacent streams during operations. The Proponent has stated that the current proposed Project design has been developed with intent to comply with this key objective. All contact water reports to the TSF. Seepage is captured and pumped back to the TSF. The TSF will be sized to contain storm events while maintaining the required freeboard. Seepage will be intercepted by a downstream environmental control dam. Since seepage capture is not expected to be 100%, an assessment is carried out of the potential effects of loss of some seepage to proposed Project area drainages. The TSF will be permitted as a zero discharge facility. Should discharge be necessary at any time after commissioning, the *Environmental Management Act* permit issued by BC MOE and required for operation of the facility, will need to be amended or a new permit applied for prior to any discharge from the TSF. Discharge water quality and quantity will be set in the permit and will be protective of the receiving environment as well as, at a minimum, meet *Metal Mining Effluent Regulations* (*MMER*) discharge standards.

After closure and once the open pit fills, water is discharged from a reclaimed TSF to Davidson Creek. Quantitative modelling is conducted to predict the effects.

Goldsim™ will be used in deterministic mode (i.e., using set values for input parameters, with a number of scenarios to provide sensitivity analyses). Average and dry (seven-day, 10-year return period (7dQ10)) flows in Davidson Creek and Stream 705 (tributary of Fawnie Creek potentially influenced by TSF seepage) are modelled. Average and 95th percentile background water quality and source chemistry (where available) are also modelled. These scenarios produce a base case (expected) and a number of reasonable worse case results.

Two receiving streams, Davidson Creek and Creek 705 – an unnamed tributary of Fawnie Creek flowing to the west from near the proposed Project site – are modelled. Sources modelled include the open pit, waste rock and ore storage piles, overburden stockpile, landfill, sewage treatment plant, site runoff, TSF, TSF dams; both runoff and seepage are included.

Predicted results are compared to CCME guidelines for the protection of aquatic life, BC MOE water quality maximum and 30-day guidelines, and site-specific objectives proposed for the surface water quality. Guidelines will be hardness adjusted.

Operations, closure and post-closure are modelled. Construction will be modelled if there is to be a discharge from a sediment control pond (possibly not required if winter construction of starter dam).

For closure, an additional model is employed to predict closed pit water chemistry. Predictions from this model feed into the Goldsim model as one of the source terms.

Contents of surface water quality effects assessment section will include:

- Summary of baseline results and reference to baseline report appendix;
- Effects assessment methodology including discussion of modelling;
- LSA/RSA assumed and rationale;
- Results discussion by drainage basin and by modelled parameter;
- Rating of effects;
- Mitigation and management to limit potential effects;
- Quantification of residual effects;
- Significance of residual effects; and
- Discussion of potential cumulative effects and significance.

5.3.3.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;

- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.3.3.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.3.3.4** above.

5.3.3.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.3.3.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.3.4 Sediment Quality

5.3.4.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.3.4.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.3.4.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;

- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

During construction, sediments from disturbed areas are captured in sedimentation ponds or the TSF. A comprehensive erosion and sedimentation management plan developed prior to commencement of construction proactively limits erosion to the extent practical. During operations contact water sediments are captured in the TSF.

Some increase in trace metal levels in sediments in streams immediately contiguous with the proposed Project may occur from the limited seepage that is expected to report to these streams from the TSF. Seepage from the main dam is captured by the Environmental Control Dam downstream of the main dam. Some deep seepage is expected to bypass the seepage recovery dam and is estimated for the EA.

Some seepage is generated by the dam on the west side of the tailing impoundment, because topography is expected to flow back toward the dam rather than to the west. Capture and pump back of seepage is the proposed mitigation to limit metals uptake by stream sediments.

There is essentially no correlation between background water and sediment quality, principally because the method of assessing sediment metals levels is a strong acid leach, which will never occur in a natural stream not subject to acid drainage. Therefore, (1) the only source of sediment metals is precipitation/adsorption from surface water; and (2) the lack of correlation between water and sediment metals, a qualitative effects assessment is carried out for the EA. Sediment quality effects assessment will be included in the surface water quality section, although no quantitative modelling is proposed.

5.3.4.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.3.4.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;

- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.3.4.4** above.

5.3.4.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.3.4.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.3.5 Groundwater Quantity

5.3.5.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.3.5.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.3.5.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area;
- Quantify the proportion of the flow in the receiving environment that corresponds to seepage from the TSF;
- Assess the sensitivity for seepage estimates for the TSF; and
- Describe measures to mitigate the potential adverse effects identified above.

The watershed model will be updated to include proposed mine site elements and proposed water management plans. The updated watershed model assesses potential reductions in stream flows as a result of mine site construction, operations, and closure. Potential effects on groundwater flow during short-term closures will be discussed. Analytical and/or numerical models are used to estimate potential groundwater seepage from waste piles and/or tailings facilities and the potential effects of mine dewatering on the surrounding area.

The effects assessment report will include a discussion of the potential impacts of mine development on the groundwater resource quantity and interrelated surface water resource.

5.3.5.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.3.5.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.3.5.4** above.

5.3.5.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.3.5.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.3.6 Groundwater Quality

5.3.6.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.3.6.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.3.6.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The approach for assessing residual effects includes the following:

- Interpretation of the results of the groundwater quantity residual effects assessment and the mine waste baseline geochemistry characterization program to determine how the groundwater regime is affected by the proposed Project during its different phases and how project components could influence its quality. The focus is the potential quality of the seepage being generated by mine waste facilities, the expected quality of water in the pit lake during closure and how they may affect downstream surface water;
- Qualitative discussion on how groundwater quality within the LSA could potentially be affected. Topics to be discussed include potential groundwater quality changes compared to baseline data for specific elements of concern during mine construction/operations and post-closure; and
- Identification of elements of concern, and for these elements of concern mitigation strategies to counter potential adverse effects.

5.3.6.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.3.6.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.3.6.4** above.

5.3.6.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.3.6.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.3.7 Wetlands

5.3.7.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.3.7.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;

- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

The detailed baseline study and effects assessment will use and include the following references as appropriate:

- Hanson, L. Swanson, D. Ewing, G. Grabas, S. Meyer, L Ross, M. Watmough, and J. Kirkby 2008. Wetland ecological functions assessment: and overview of approaches. A. Atlantic Region. Technical Report Series Number 497.
- Government of Canada. 1991. The Federal Policy on Wetland Conservation. Environment Canada. Ottawa, ON.
- Lynch-Stewart, P., P. Neice, C. Rubec and I. Kessel-Taylor 1996. The Federal Policy on Wetland Conservation: Implementation Guide for Federal Land Managers. 1996. P. Lynch-Stewart, P. Neice, C. Rubec and I. Kessel-Taylor. Canadian Wildlife Service, Environment Canada. 32 p.
- Milko, R. 1998. Wetlands environmental assessment guideline. Canadian Wildlife Service, Ottawa, ON.

5.3.7.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

Following the production of a baseline map that includes wetland ecosystems, the proposed Project footprint is applied to identify potential effects (direct and indirect) on wetland resources within the LSA and RSA. The results of the effects assessment include the following:

- Description of wetland Baseline Case, including a wetland mapping product;
- Identification of potential effects on wetlands, including wetland functions described in the baseline report, associated with the proposed Project development. Potential effects (i.e., wetland losses, effects caused by hydrological changes, and effects caused by groundwater drawdown) will be quantitatively and qualitatively assessed as appropriate by comparing baseline conditions with proposed development; and
- Mitigation measures to comply with the Federal Policy on Wetland Conservation (Government of Canada, 1991), including a conceptual wetlands mitigation and compensation plan.

5.3.7.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.3.7.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.3.7.4** above.

5.3.7.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.3.7.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.3.8 Fish

The representative species or indicators for fish are kokanee and rainbow trout. The assessment described in the subsections below will be conducted for each species.

5.3.8.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.3.8.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.3.8.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The methods pertaining to the assessment include the following:

- Potential effects on fish due to potential changes in water quality in study area streams and lakes are assessed using available guidelines for the protection of freshwater aquatic biota;
- Potential effects on fish due to potential changes in water temperature in study area streams are assessed by comparing the predicted thermal regimes to baseline thermal regimes and to optimal and tolerance limits for rainbow trout and kokanee; and
- Potential habitat effects, including potential flow effects, are assessed using the fish habitat VC, which will consider results of the Instream Flow Study.

5.3.8.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.3.8.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.3.8.4** above.

5.3.8.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.3.8.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.3.9 Fish Habitat

5.3.9.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.3.9.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.3.9.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The methods pertaining to the assessment include the following:

- The quantity and quality of fish habitat affected by the proposed Project assessed using a Habitat Evaluation Procedures approach; and
- Modelled relationships between flow and the quantity and quality of fish habitat are used to assess potential effects of flow on fish habitat. An Instream Flow Study approach based on BC Instream Flow Guidelines (Lewis et al., 2004) will be used.

The anticipated results of the assessment include the following:

- Outputs are a summation of the total area (square metres (m^2)) and total habitat units (i.e., area scaled by relative quality) of fish habitat, by stream or lake, by fish species, and by life stage, affected by all stages of the proposed Project;
- Relationships between discharge and wetted width, depth, and velocity in different habitat types (e.g., runs, riffles, pools) are used to assess potential changes in the suitability of instream habitat to species and life stages potentially affected; and
- A detailed FMOP will be developed to address any unavoidable effects on fisheries. The plan will provide DFO with the information necessary to determine the potential effects on fisheries of proposed Project activities.

5.3.9.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.3.9.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.3.9.4** above.

5.3.9.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.3.9.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4 Terrestrial Environment Effects Assessment

This section of the Application will present the identification and selection of VCs of the Terrestrial Environment following the methods described in **Section 4.2**. This section will also present the assessment of effects for the proposed VCs following the methods described in **Section 4.3**.

5.4.1 Identification and Selection of Valued Components

This subsection will present the rationale and justification for Candidate VCs, Selected VCs and Candidate VCs not selected as VCs for the Terrestrial Environment.

5.4.2 Physiography and Topography

5.4.2.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.2.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.2.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment of project effects on the physiography and topography is completed in part through spatial analysis using GIS software. To assess the potential effects, the proposed mine footprint, including all facilities, is overlain on the baseline terrain map. Based on the Project Description (AMEC, 2012) the expected changes to the baseline slope and topography conditions are calculated.

It is anticipated that project effects will result in a residual effect on the landscape, as the alteration of the baseline conditions to physiography and topography cannot be completely reversed at the completion of the project life cycle. For example, it is expected that waste rock piles, tailings areas and the open mine pit will remain once operations and closure are complete.

5.4.2.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.2.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.2.4** above.

5.4.2.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.2.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.3 Surficial Geology and Soil Cover

5.4.3.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.3.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.3.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment of project effects on surficial geology and soil cover is completed in part through spatial analysis using GIS software. To assess the potential effects, the proposed mine footprint, including all facilities, is overlain on the baseline terrain map. Based on the Project Description (AMEC, 2012), the expected changes to the baseline parent material and soil cover conditions are calculated.

Project activities that require grading or levelling (Earthworks) first require the removal of the cover soil and surficial material for use in reclamation. The removal and storage of overburden material is expected to result in two potential effects including the linkages to other disciplines (i.e., vegetation or water quality), and along with the potential for acceleration of erosion and decreased terrain stability. For soil cover, Project effects are expected to be the disturbance of the soil at construction and to the re-distribution of the soil during reclamation.

5.4.3.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;

- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.3.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.3.4** above.

5.4.3.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.3.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.4 Soil Quality

5.4.4.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.4.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.4.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment of the Project effects on soil quality is completed in part through spatial analysis using GIS software. The proposed mine footprint including all facilities is overlain on the baseline reclamation suitability map created for the proposed Project. Based on the Project Description (AMEC, 2012), the expected changes to the baseline soil quality are calculated and assessed qualitatively.

Changes to soil physical and chemical properties occur as a result of soil disturbance. Soil disturbance is a physical effect that can alter the quality of the soil through admixing, compaction, rutting, or erosion. Soil contamination from mining dust or other foreign substances can also affect the quality of the soil for use in reclamation.

5.4.4.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.4.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.4.4** above.

5.4.4.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.4.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.5 Ecosystem Composition

5.4.5.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.5.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.5.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The approach for the effects assessment considers overlapping the proposed Project footprint on the existing vegetation cover described in **Section 5.1.3.2**. The approach includes comparing the existing condition or Baseline Case to the Project Case (i.e., baseline with the addition of the proposed Project). The effects on vegetation VCs from each Project phase are evaluated in terms of magnitude, geographic extent, duration, frequency, reversibility, ecological context, direction, certainty, and level of confidence. Significance of identified residual effects will be determined.

Ecosystem composition refers to the diversity of ecosystems present within the proposed Project area as well as sensitive ecosystems (sparsely vegetated, old growth and riparian). Ecosystems are classified using the provincial BGC classification system and mapped as

part of the vegetation baseline program. To determine the potential effects of the proposed Project on ecosystem composition, the proposed Project footprint is superimposed over the terrestrial ecosystem map. The change in ecosystem composition is assessed and compared to the proposed Project development to determine the change in hectares pre– and post– reclamation for each ecosystem unit within the LSA and RSA.

5.4.5.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.5.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.5.4** above.

5.4.5.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.5.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.6 Plant Species and Ecosystems at Risk

5.4.6.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.6.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.6.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The approach included for the effects assessment considers comparing the existing condition or Baseline Case to the Project Case (i.e., baseline with the addition of the proposed Project) overlapping the Project footprint on the existing vegetation cover described in **Section 5.1.3.2**.

The assessment of potential effects for the plant species at risk is based on baseline data collection and assessment. Plant species at risk are defined to include:

- Vascular and non-vascular species listed by the BC CDC, which are typically ranked as Red- or Blue-listed (BC CDC, 2012); and
- Species listed as Endangered, Threatened, or Special Concern under the federal *SARA* and COSEWIC.

To determine the potential effects on plant species at risk, the location of plant species at risk, if any, is mapped and superimposed with the project activities and development. In addition, ecosystem units are ranked (e.g., high, medium and low) to determine the ability to support potentially occurring plant species at risk. The area (ha) of ranked ecosystems between the Baseline Case and Project Case is compared including pre-reclamation and post-reclamation.

Ecosystems at risk are defined as those communities listed by the BC CDC, which are typically ranked as Red or Blue-listed (BC CDC, 2012). The ecosystem map is used to determine the effects of ecosystems at risk and is based on site-specific baseline data, which identifies their specific location, distribution and abundance within the proposed Project area. The proposed Project footprint is applied to the ecosystem map to determine the effect on each ecosystem at risk and the total area affected for the ecosystem at risk.

5.4.6.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.6.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.6.4** above.

5.4.6.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.6.7 *Conclusion*

This subsection will provide a conclusion regarding the residual effects and their significance.

5.4.7 Amphibians

The representative species or indicator for amphibians is the western toad (*Anaxyrus boreas*).

5.4.7.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.7.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.7.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Use water quality effects assessment to inform the EA whether effects are possible on amphibians and commit to an EEM program to validate or refute effects predictions;
- Commit to adaptive management practices to mitigate significant residual effects observed through the EEM program that can reasonably be ascribed to mine activities;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species of amphibians;
- Feeding, or breeding habitats;
- Any wetland habitat alteration or loss;
- Barriers to wildlife, including the roads developed as part of the mine and their potential effects on wildlife movements;
- Disturbance of daily or seasonal wildlife movements (e.g., dispersal corridors), which would include potential hazards and conflicts associated with mine access and travel corridors of terrestrial wildlife;
- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity;
- Any species of amphibians that are Rare, Vulnerable, Endangered, Threatened, or of Special Concern as listed under provincial Blue and Red lists, *SARA*, COSEWIC, as well as, any species of international significance; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities during each stage of the proposed Project could potentially interact with the amphibian fauna. Habitat loss, features that act as attractants to the amphibians, potential mortality, changes in habitat availability, and disruption of movement are the predicted key issues of the proposed Project related to amphibians in the proposed Project area.

5.4.7.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.7.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.7.4** above.

5.4.7.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.7.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.8 Waterbirds

The representative species or indicators proposed for waterbirds are ring-necked duck (*Aythya collaris*) and yellow rail (*Coturnicops noveboracensis*). The assessment described in the subsections below will be conducted for these species.

5.4.8.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.8.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.8.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Use water quality effects assessment to inform the EA whether effects are possible on waterbirds and commit to an EEM program to validate or refute effects predictions;
- Commit to adaptive management practices to mitigate significant residual effects observed through the EEM program that can reasonably be ascribed to mine activities;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Aquatic and riparian habitat, including the quality and quantity of any lost habitat for relevant species of birds;
- Feeding, nesting, or breeding habitats;
- Any wetland habitat alteration or loss;
- Any species of birds that are Rare, Vulnerable, Endangered, Threatened, or of Special Concern as listed under provincial Blue and Red lists, *SARA*, COSEWIC, as well as any migratory birds and species of international significance;
- Direct and indirect wildlife mortality from the mine operations and traffic;
- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities occurring during each phase of the proposed Project could potentially interact with waterbirds. Habitat alteration, noise disturbance (displacement), and potential mortality are the predicted key issues for waterbirds.

5.4.8.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.8.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.8.4** above.

5.4.8.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.8.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.9 Forest and Grassland Birds

The representative species or indicators proposed for forest and grassland birds are olive-sided flycatcher *(Contopus cooperi)* and Clark's nutcracker *(Nucifraga columbiana)* under songbirds, and red-tailed hawk *(Buteo jamaicensis)* under raptors. The assessment described in the subsections below will be conducted for these species.

5.4.9.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.9.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.9.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Commit to adaptive management practices to mitigate significant residual effects observed through the EEM program that can reasonably be ascribed to mine activities;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species of birds;
- Feeding, nesting, or breeding habitats;
- Any wetland habitat alteration or loss;
- Any species of birds that are Rare, Vulnerable, Endangered, Threatened, or of Special Concern as listed under provincial Blue and Red lists, *SARA*, COSEWIC, as well as any migratory birds and species of international significance;
- Direct and indirect wildlife mortality from the mine operations and traffic;
- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities occurring during each phase of the proposed Project could potentially interact with forest and grassland birds. Habitat alteration, noise disturbance (displacement), and potential mortality are the predicted key issues for forest and grassland birds.

5.4.9.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.9.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.9.4** above.

5.4.9.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.9.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.10 Moose (Alces americanus)

The assessment described in the subsections below will be conducted for this VC.

5.4.10.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.10.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;

- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.10.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species;
- Feeding, denning, or breeding habitats;
- Any wetland habitat alteration or loss;
- Barriers to wildlife, including the roads developed as part of the mine and their potential effects on wildlife movements;
- Disturbance of daily or seasonal wildlife movements (e.g., migration and home ranges), which would include potential hazards and conflicts associated with mine access and travel corridors of moose;
- Direct and indirect wildlife mortality from the mine operations and traffic;
- Increased access and indirect mortality of species through increased hunting opportunities or improved access for predator species;
- Potential implications to predator - prey dynamics from changes in habitat suitability (e.g., potential changes in wolf numbers or distribution due to habitat and prey abundance changes);
- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities occurring during each phase of the proposed Project could potentially interact with moose. Habitat loss, features that act as attractants to some species, potential mortality, changes in habitat availability, noise disturbance (displacement), and disruptions of movement are the predicted key issues of the proposed Project related to moose.

5.4.10.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.10.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.10.4** above.

5.4.10.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.10.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.11 Caribou (Rangifer tarandus)

5.4.11.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.11.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.11.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species;
- Feeding, calving, or breeding habitats;
- Barriers to wildlife, including the roads developed as part of the mine and their potential effects on wildlife movements;
- Disturbance of daily or seasonal wildlife movements (e.g., migration and home ranges), which would include potential hazards and conflicts associated with mine access and travel corridors of caribou;
- Any species that are rare, vulnerable, endangered, threatened, or of special concern as listed under provincial Blue and Red lists, *SARA*, COSEWIC, as well as, any species of international significance;
- Direct and indirect wildlife mortality from the mine operations and traffic;
- Increased access and indirect mortality of species through increased hunting opportunities or improved access for predator species;
- Potential implications to predator – prey dynamics from changes in habitat suitability (e.g., potential changes in wolf numbers or distribution due to habitat and prey abundance changes);
- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities occurring during each phase of the proposed Project could potentially interact with caribou. Habitat loss, features that act as attractants to some species, potential mortality, changes in habitat availability, noise disturbance (displacement), and disruptions of movement are the predicted key issues of the proposed Project related to caribou.

The Proponent is working with the nearby First Nations and the Proposed Southern Mountain Caribou Recovery Plan, and the Province to understand and protect caribou and their habitat. The Proponent is actively participating and supporting caribou and wolf related studies on a regional basis, involving the Tweedsmuir Itcha - Ilgachuz metapopulation. In its Application, the Proponent will describe and document how knowledge and practices

learned from these regional initiatives will be incorporated holistically into mine planning and environmental management plans (EMPs) for the proposed Project to address caribou metapopoulation concerns related to the proposed Project. The Application will also describe any long term plans and/or commitments that the Proponent has or intends to make to continue to actively participate in collaborative regional initiatives with local First Nations and Regulators to better understand and protect the caribou herds through all phases of its proposed Project.

5.4.11.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.11.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.11.4** above.

5.4.11.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.11.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.12 Grizzly Bear (*Ursus arctos*)

5.4.12.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.12.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.12.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species;
- Feeding, denning, or breeding habitats;
- Any wetland habitat alteration or loss;
- Barriers to wildlife, including the roads developed as part of the mine and their potential effects on wildlife movements;
- Disturbance of daily or seasonal wildlife movements (e.g., migration and home ranges), which would include potential hazards and conflicts associated with mine access and travel corridors of grizzly bears;
- Any species that are rare, vulnerable, endangered, threatened, or of special concern as listed under provincial Blue and Red lists, *SARA*, COSEWIC, as well as, any species of international significance;
- Direct and indirect wildlife mortality from the mine operations and traffic;
- Increased access and indirect mortality of species through increased hunting opportunities;

- Potential implications to predator-prey dynamics from changes in habitat suitability;
- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities occurring during each phase of the proposed Project could potentially interact with grizzly bears. Habitat loss, features that act as attractants to some species, potential mortality, changes in habitat availability, noise disturbance (displacement), and disruptions of movement are the predicted key issues of the proposed Project related to grizzly bears.

5.4.12.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.12.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.12.4** above.

5.4.12.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.12.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.13 Furbearers

Marten (*Martes americana*) and Beaver (*Castor canadensis)* are the representative species under furbearers. The assessment described in the subsections below will be conducted for this species.

5.4.13.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.13.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.13.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species;
- Feeding, denning, or breeding habitats;
- Any wetland habitat alteration or loss (particularly to address effects on beaver);
- Barriers to wildlife, including the roads developed as part of the mine and their potential effects on wildlife movements;
- Disturbance of daily or seasonal wildlife movements (e.g., migration and home ranges), which would include potential hazards and conflicts associated with mine access and travel corridors of terrestrial wildlife;
- Any species that are rare, vulnerable, endangered, threatened, or of special concern as listed under provincial Blue and Red lists, *SARA*, COSEWIC, as well as, any species of international significance;

- Direct and indirect wildlife mortality from the mine operations and traffic;
- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities occurring during each phase of the proposed Project could potentially interact with furbearers. Habitat loss, features that act as attractants to some species, potential mortality, changes in habitat availability, noise disturbance (displacement), and disruptions of movement are the predicted key issues of the proposed Project related to furbearers.

5.4.13.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.13.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.13.4** above.

5.4.13.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.13.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.14 Bats

Little brown myotis (*Myotis lucifugus*) will be the representative species for bats. The assessment described in the subsections below will be conducted for bats.

5.4.14.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.14.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.14.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species;
- Feeding, hibernation, or breeding habitats;
- Any wetland habitat alteration or loss;
- Barriers to wildlife, including the roads developed as part of the mine and their potential effects on wildlife movements;
- Disturbance of daily or seasonal wildlife movements (e.g., migration and home ranges), which would include potential hazards and conflicts associated with mine access and travel corridors of bats;
- Any species that are rare, vulnerable, endangered, threatened, or of special concern as listed under provincial Blue and Red lists, *SARA*, COSEWIC, as well as, any species of international significance;
- Direct and indirect wildlife mortality from the mine operations and traffic;

- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities occurring during each phase of the proposed Project could potentially interact with bats. Habitat loss, features that act as attractants to some species, potential mortality, changes in habitat availability, noise disturbance (displacement), and disruptions of movement are the predicted key issues of the proposed Project related to bats.

5.4.14.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.14.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.14.4** above.

5.4.14.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.14.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.4.15 Invertebrates

The representative species or indicators proposed for invertebrates are Jutta Arctic (*Oeneis jutta*) and American emerald (*Cordulia shurtleffii*). The assessment described in the subsections below will be conducted for each species.

5.4.15.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

5.4.15.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

5.4.15.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species;
- Feeding or breeding habitats;
- Any wetland habitat alteration or loss;
- Barriers to wildlife, including the roads developed as part of the mine and their potential effects on wildlife movements;
- Disturbance of daily or seasonal wildlife movements (e.g., migration and home ranges), which would include potential hazards and conflicts associated with mine access and travel corridors of terrestrial wildlife;
- Any species that are Rare, Vulnerable, Endangered, Threatened, or of Special Concern as listed under provincial Blue and Red lists, *SARA*, COSEWIC, as well as, any species of international significance;

- Wildlife habitat is being rated for suitability as a surrogate for wildlife productivity; and
- Implications of the proposed Project acting as an attractant for particular species.

Activities occurring during each phase of the proposed Project could potentially interact with invertebrates. A change in habitat availability and potential mortality are the predicted key issues of the proposed Project related to invertebrates.

5.4.15.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

5.4.15.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 5.4.15.4** above.

5.4.15.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

5.4.15.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

5.5 Summary of Assessment of Environmental Effects

This section of the Application will present the summary of the assessment of environmental effects in the format of **Table 5.5-1**.

Table 5.5-1: Summary of Assessment of Potential Environmental Effects

Valued Components (Identify Phase of Proposed Project)	Potential Effects	Key Mitigation Measures	Evaluation of Significance of Residual Effects (Summary Statement)

6.0 ASSESSMENT OF POTENTIAL ECONOMIC EFFECTS

This section of the Application will present the assessment of economic effects. The assessment for each VC includes a description of the rationale and baseline information conducted to select the VC, discussion of potential effects of the proposed Project and proposed mitigation, and an analysis of residual effects significance. The VCs proposed for Economic Condition include provincial economy; regional and local employment and businesses and regional and local government finance. **Section 6.3** will present a summary of the economic effects assessment results.

6.1 Economic Baseline

This section of the Application will present the economic baseline information for the LSA and RSA. The economic baseline will include the following information:

- Provincial economic activity (Gross Domestic Product (GDP)) and revenues for recent years and applicable economic forecasts;
- Employment and unemployment conditions in the LSA and RSA using the most recent Canadian and provincial statistics for the various communities, regions and Indian Reserves (census subdivisions). Assessment of the extent to which the local and regional workforce has the capacity to address proposed Project demands in the context of other approved or potential major projects that may be competing for labour. Where possible, information will be provided for off-reserve and on-reserve Aboriginal groups;
- Regional economic diversity using available information from BC Stats, the province's central statistics agency;
- Business capacity in the LSA and RSA based on available information, focusing on the number and capacity of businesses that could supply the goods and services needed for proposed Project construction and operations;
- Average and median income and earnings for residents of the urban and rural communities and Indian Reserves in the LSA and RSA using the most recent Canadian and provincial information, including census information and BC taxation statistics;
- Description of the current educational qualifications of residents in the LSA and RSA; and
- Recent municipal government financial information from BC Stats to describe current revenues and operating costs, assessment base, and tax rates.

Economic information is supplemented as part of consultation with local community and business representatives.

6.2 Economic Effects Assessment

This section of the Application will present the identification and selection of economic VCs following the methods described in **Section 4.2**. This section will also present the assessment of effects for the proposed VCs following the methods described in **Section 4.3**.

6.2.1 Identification and Selection of Valued Components

This subsection will present the rationale and justification for Candidate VCs, Selected VCs and Candidate VCs not selected as VCs for the Economic Condition.

6.2.2 Provincial Economy

6.2.2.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

6.2.2.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

6.2.2.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

This assessment is conducted using the BC Input/Output Model (BC IOM) to estimate potential direct, indirect, and induced effects of project spending on provincial GDP and take project information on mining royalties to estimate effects on provincial revenues.

6.2.2.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;

- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

6.2.2.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 6.2.2.4** above.

6.2.2.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

6.2.2.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

6.2.3 Regional and Local Employment and Businesses

6.2.3.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

6.2.3.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

6.2.3.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment of potential effects is done by combining project requirements for labour during construction and operation (by skill) with available regional and local labour force.

The assessment estimates the extent to which project employment (direct) would affect employment rates in the LSA and RSA and will consider competing demand for the local labour pool in the LSA and RSA and estimates the extent to which economic diversity would change. Economic diversity will be assessed by examining income dependency on economic sectors such as forestry or mining. In addition, it identifies opportunities for increasing local and regional participation in the project workforce and regional indirect employment that would occur from local and regional purchases of goods and service.

The assessment also identifies opportunities for increasing participation by local and regional businesses using results from the BC IOM to estimate average and total earnings by the project workforces during construction and operations, and compares this with the most recent historical information to assess effects. In addition, it will assess effects on the local economy from competing demands for the same services provided by contractors and businesses.

The assessment discusses project commitments to training and education and describes the extent to which training and education will enhance labour force capability in the LSA and RSA.

6.2.3.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

6.2.3.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 6.2.3.4** above.

6.2.3.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

6.2.3.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

6.2.4 Regional and Local Government Finance

6.2.4.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

6.2.4.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

6.2.4.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment uses information on project payments of municipal taxes to identify the extent to which the proposed Project would affect municipal government finances as well as potential costs to regional and local governments.

6.2.4.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

6.2.4.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 6.2.4.4** above.

6.2.4.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

6.2.4.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

6.3 Summary of Assessment of Economic Effects

This section of the Application will present the summary of the assessment of economic effects in the format of **Table 6.3-1**.

Table 6.3-1: Summary of Assessment of Potential Economic Effects

Valued Components (Identify Phase of Proposed Project)	Potential Effects	Key Mitigation Measures	Evaluation of Significance of Residual Effects (Summary Statement)

7.0 ASSESSMENT OF POTENTIAL SOCIAL EFFECTS

This section of the Application will present the assessment of social effects. The assessment for each VC includes a description of the rationale and baseline information conducted to select the VC, discussion of potential effects of the proposed Project and proposed mitigation, and an analysis of residual effects significance. The VCs proposed for Social Conditions include demographics; regional and community infrastructure; regional and local services; family and community well-being; non-traditional land and resource use (NTLRU); current land and resource use for traditional purposes, and visual resources. **Section 7.3** will present a summary of the social effects assessment results.

7.1 Social Baseline

This section of the Application will present an overview of the social baseline conditions for the LSA and RSA. This will include the following information:

- Summary of population and demographic conditions and trends within the LSA and RSA;
- Summary of regional and community infrastructure within the selected study area, focusing on municipal infrastructure and facilities, housing and temporary accommodation, and regional transportation;
- Overview of the current regional services available in the study area, including educational, health, social and protective services;
- Brief description of the community well-being conditions in the LSA and RSA;
- A summary of the publicly available baseline data describing NTLRU occurring within the proposed study area; and
- Summary of the baseline characterization for visual resources.

7.1.1 Social Conditions

The social baseline characterization focuses on identifying current social capacity and thresholds in the study area. Baseline data are collected via a variety of mediums including:

- Community profiles from the 2011 and 2006 and Census. When and where trending is appropriate, the 2001 and 1996 Census is also utilized;
- Various reports provided by BC Stats and Vital Statistics BC;
- Community and regional reports from government agencies, community profiles produced by municipalities and community and regional websites;
- Various reports produced by BC Ministry of Justice (which reports crime statistics), BC Ministry of Education, BC Ministry of Transportation and Infrastructure (BC MOTI), Insurance Corporation of British Columbia, BC Transit, Northern Health, BC Ministry of Public Safety and Solicitor General, as well as Official Community Plans; and
- Interviews with key informants, including Royal Canadian Mounted Police (RCMP).

The detailed social baseline studies within the LSA and RSA will be presented in an appendix to this section and will include:

- Demographic conditions and trends within the region;
- Capabilities and capacity of existing regional infrastructure (e.g., municipal infrastructure and facilities, housing and temporary accommodation, and regional transportation);
- Description of regional services and capacity (e.g., educational, health, social and protective services);
- Measures of family and community well-being and human health; and
- Overview of the current transportation network in the study area.

7.1.2 Non-Traditional Land and Resource Use

The scope of the land use baseline is determined based on the review of the available information. A summary of the publicly available baseline data describing NTLRU occurring within the proposed study area are compiled.

The following methods are used to complete the compilation of available baseline information:

- Information from various government, commercial and private websites, guidance documents, acts, regulations and reports are reviewed;
- Information from GIS databases (e.g., GeoBC) are sorted, summarized, and mapped, where available; and
- Individuals and companies familiar with the Project area may be contacted and requested to provide comment.

Following the review of information compiled during the detailed desktop study, data gaps are identified and reviewed with relevant local and provincial government agencies to determine if additional information is available. Stakeholders, including land tenure holders (e.g., timber rights holders, ROW holders, etc.) may be contacted for specific information to address gaps if within the scope of the proposed Project.

The NTLRU baseline report will include a description of the historical and current land uses within the proposed study area. A description of applicable land use management objectives for the proposed Project area will also be presented, where available, land and resource uses considered in this section include:

- Protected areas and parks;
- Recreation/tourism use (e.g., all terrain vehicle use);
- Mining, exploration, and mineral tenures;
- Forestry and timber resource use;
- Hunting/trapping/guide outfitting;
- Fishing and aquaculture;

- Agriculture and grazing;
- Range use;
- Traffic and access;
- Land ownership and tenures;
- Recreational or commercial use of waterways for transportation;
- Groundwater resource use; and
- Surface water resource use.

This information will facilitate the formulation of the Project Inclusion List for use in the cumulative effects assessment.

7.1.3 Current Land and Resource Use for Traditional Purposes

This section of the Application will provide a summary of the current use of lands and resources for traditional purposes by Aboriginal peoples potentially affected by the proposed Project. Current use of lands and resources for traditional purposes may or may not be linked to the exercise of asserted or established Aboriginal or treaty rights (Aboriginal Interests) by Aboriginal people; they may have originated before or after the critical dates related to assessment of Aboriginal Interests, and may make use of locations inside or outside the boundary of an asserted traditional territory.

For each Aboriginal group, current land use information available may vary depending on the participation of the particular Aboriginal group in the EA Process. The following sources are used to compile the available baseline information:

- Project-specific Traditional Land Use (TLU) and Traditional Knowledge (TK) studies or other Project-related information provided by Aboriginal groups;
- Ethno-historical, and ethnographic literature;
- Semi-structure interviews; focus groups and community meetings with Aboriginal groups representatives; and
- Results from consultation with Aboriginal groups.

7.1.4 Visual Resources

The scope of the visual resources baseline is determined based on review of the available information. A summary of the publicly available baseline data describing visual and aesthetic resources occurring within the proposed study area is compiled.

The baseline analysis describes the setting, whether or not a visual resource is present, and why it qualifies as a visual resource. An inventory of existing visual features is developed. The visual resources potentially affected by the proposed Project are identified by a variety of measures such as the following:

- An inventory of visual and aesthetic resources is compiled following the review of the appropriate LRMPs which may include recreational values, protected areas, and areas identified as scenic;

- Internet databases (e.g., GeoBC) and available information on tourism, recreational use, scenic areas, and aesthetic resources are reviewed;
- Various individuals familiar with the area (e.g., tourism officers, may be interviewed); and
- The perspective of potential viewers based on the locations of proposed Project components is developed.

Following the review of information compiled during the detailed desktop study, data gaps are identified and reviewed with relevant local and provincial government agencies to determine if additional information is available. Stakeholders, including land tenure holders (e.g., timber rights holders, ROW holders, etc.) may be contacted for specific information to address gaps if within the scope of the proposed Project.

Potentially sensitive viewpoints and land uses in the area are identified and photographs taken from proposed locations from one or more directions looking towards the proposed Project. Where possible, Global Positioning System points for the photographs are recorded, along with a compass bearing to document the direction of each photograph. If available, representative viewpoints may also be proposed using Google Maps Street View.

Visual resources considered in this section include a review of:

- Parks, protected areas and conservancy areas;
- Documented recreational and tourism locations/areas;
- Other land uses occurring in the area;
- Visual Landscape Inventory (visual sensitivity);
- Recreational Features Inventory (recreation significance, view lines and points); and
- Established visual quality objectives.

7.2 Social Effects Assessment

This section of the Application will present the identification and selection of social VCs following the methods described in **Section 4.2**. This section will also present the assessment of effects for the proposed VCs following the methods described in **Section 4.3**.

7.2.1 Identification and Selection of Valued Components

This subsection will present the rationale and justification for Candidate VCs, Selected VCs and Candidate VCs not selected as VCs for Social Condition.

7.2.2 Demographics

7.2.2.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

7.2.2.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

7.2.2.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment estimates the extent to which project employment and purchases (as estimated in **Section 6** Economic Effects Assessment would result in people moving into the study area, either permanently or temporary, which in turn would affect demand for regional services and infrastructure.

7.2.2.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

7.2.2.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 7.2.2.4** above.

7.2.2.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

7.2.2.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

7.2.3 Regional and Community Infrastructure

7.2.3.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

7.2.3.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

7.2.3.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment determines the ability of regional infrastructure to absorb the increased demand resulting from the proposed Project. The methodology utilized to determine the Project effects on regional and community infrastructure in the study area are:

- Estimating anticipated increase in demand for regional and municipal infrastructure (water supply, water/sewage treatment, landfills, communications, electricity, and recreational facilities) and comparing it to the RSA's current baseline conditions and determining the RSA's ability to absorb the additional demand;

- Estimating anticipated increase in demand for housing and temporary accommodation against the data collected in the baseline regarding RSA's capacity and ability to provide housing and temporary accommodation; and
- Assessing potential additional demands on the transportation network infrastructure in the study area that would occur from Project-related transportation activities and comparing those against current transportation network capacity and user safety.

7.2.3.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

7.2.3.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 7.2.3.4** above.

7.2.3.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

7.2.3.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

7.2.4 Regional and Local Services

7.2.4.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

7.2.4.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

7.2.4.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment determines the ability of regional and local services to absorb potential temporary and permanent increased demand resulting from the proposed Project. This includes estimating the increased demand for educational, health, social and protective services, and determining what affects a temporary and permanent influx of new residents may have on the study area's services and conditions by drawing from statistics and interviews found in the baseline.

7.2.4.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

7.2.4.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 7.2.4.4** above.

7.2.4.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

7.2.4.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

7.2.5 Family and Community Well-being

7.2.5.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

7.2.5.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

7.2.5.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the extent to which the potential change in demographics and new project-related income and employment may affect the well-being of families and communities in the study area in terms of economic hardship, crime and family relationships.

7.2.5.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

7.2.5.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 7.2.5.4** above.

7.2.5.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

7.2.5.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

7.2.6 Non-Traditional Land and Resource Use

7.2.6.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

7.2.6.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

7.2.6.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the interaction of the proposed Project footprint and activities against NTLRU, including:

- Protected areas and parks;
- Historic and current mining and exploration activities;
- Small gravel pits and rock quarries;
- Forestry activities and timber resource use;
- Hunting / guide outfitting;
- Registered traplines;
- Range use;
- Fishing and aquaculture;
- Recreational or commercial use of waterways;
- Recreation / tourism use (e.g., all terrain vehicle use);
- Traffic and access;
- Groundwater resource use;
- Surface water resource use; and
- Permits, licenses, and land tenures.

The assessment incorporates applicable management objectives and strategies for assessing potential effects at a regional scale.

7.2.6.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

7.2.6.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 7.2.6.4** above.

7.2.6.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

7.2.6.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

7.2.7 Current Land and Resource Use for Traditional Purposes

Information on the current use of lands and resources for traditional purposes by Aboriginal people potentially affected by the proposed Project will be provided in this section of the Application. Current uses may or may not be linked to the exercise of asserted or established Aboriginal or treaty rights (Aboriginal Interests) by Aboriginal people.

Aboriginal people may rely on a more traditional economy, closely tied to the use of lands and natural resources, for everyday living. Aspects of the traditional economy may have originated before or after the critical dates related to assessment of Aboriginal Interests, and may make use of locations inside or outside the boundary of an asserted traditional territory.

This section will discuss potential impacts to the current uses of lands and resources by Aboriginal people. A discussion of potential impacts to Aboriginal Interests will be provided

in Part C of the Application and may draw on information related to the current use of lands and resources by Aboriginal people presented in this section.

7.2.7.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

7.2.7.2 *Valued Component Baseline*

This subsection will:

- Provide baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

Baseline information on current land use for traditional purposes will be based on desk-based research from historical, ethnographic and current sources, field interviews and on TLU and TK studies provided by Aboriginal groups, when available. For each Aboriginal group potentially affected by the proposed Project, current land use information available may vary depending on the participation of the particular First Nation in the EA Process. Detail data collection efforts, challenges, and results to date will be included in this section. The Proponent's proposed approach to addressing additional information on TLU and/or TK received during the Application Review Period or post-Certification (should an EA Certificate be issued) will also be noted.

7.2.7.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The assessment considers the potential effects of the proposed Project and activities on current land and resource use for traditional purposes within the defined study areas in relation to:

- Changes in hunting and trapping activities;
- Changes in fishing activities;
- Changes in plant gathering activities; and
- Changes in other cultural and traditional uses of the land (e.g., cultural and spiritual places, trails, navigation).

The assessment will consider potential restrictions on access to land and resources, change in amount of resources available and sensory disturbances. The assessment will consider assessments and mitigations developed in other sections of the Application (e.g. fish and fish habitat, ecosystem composition, moose, etc.).

A discussion of potential impacts to Aboriginal Interests will be provided in Part C of the Application and may draw on information related to the current use of lands and resources by Aboriginal peoples presented in this section.

7.2.7.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility and frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

7.2.7.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 7.2.7.4** above.

7.2.7.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

7.2.7.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

7.2.8 Visual Resources

7.2.8.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

7.2.8.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

7.2.8.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The determination of residual effects on the identified visual resources is conducted by identifying the areas from which the proposed Project components can be observed (Project viewshed) and identifying potential receptors within those areas.

A visibility assessment will be conducted using 3D viewshed modelling. Input data are based on the Digital Elevation Model (DEM) from the NTS, which provides 3D topographic information. The viewshed analysis identifies areas that can be seen from the specific viewpoints and takes into account the elevation of various Project structures.

7.2.8.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

7.2.8.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 7.2.8.4** above.

7.2.8.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

7.2.8.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

7.3 Summary of Assessment of Social Effects

This section of the Application will present the summary of the assessment of social effects in the format of **Table 7.3-1**.

Table 7.3-1: Summary of Assessment of Potential Social Effects

Valued Components (Identify Phase of Proposed Project)	Potential Effects	Key Mitigation Measures	Evaluation of Significance of Residual Effects (Summary Statement)

8.0 ASSESSMENT OF POTENTIAL HERITAGE EFFECTS

This section of the Application will present the assessment of heritage effects. The assessment for each VC includes a description of the rationale and baseline information conducted to select the VC, discussion of potential effects of the proposed Project and proposed mitigation, and an analysis of residual effects significance. The VCs proposed for Heritage Resources include archaeological sites, historic sites, and paleontological resources. **Section 8.3** will present a summary of the heritage effects assessment results.

The Proponent has retained the services of a consulting archaeologist to conduct an Archaeological Impact Assessment (AIA) consistent with the BC Archaeological Impact Assessment Guidelines (Government of BC, 1998). AIAs for the proposed Project were conducted under permits issued by the Archaeology Branch.

8.1 Heritage Baseline

This section of the Application will present the heritage baseline information for the LSA and RSA.

The heritage baseline includes archaeology, historical heritage (including structures of architectural significance), and paleontological resources. A key starting point for research is the baseline inventory, which draws on analysis of archaeological and historical records.

The heritage baseline study methods include two key components, a baseline inventory of known heritage resources, and an AIA. The baseline inventory consists of:

- A data-gap analysis and desktop review of available archaeological, historical heritage, and paleontological information relevant to the study area (within or adjacent to the proposed Project) – this is equivalent to an Archaeological Overview Assessment as defined in the British Columbia Archaeological Impact Assessment Guidelines (Government of BC, 1998);
- Determining the number and extent of previous archaeological studies within the study area, including those which encountered no heritage resources;
- Creating a model of archaeological site potential for the proposed Project locality which establishes three classes of lands with archaeological site potential (low, moderate, high); lands with moderate to high archaeological potential requires further (in-field) assessment; and
- Including the following sources:
    - Published and unpublished ethnographic, archaeological, and historical literature for the Nechako-Blackwater drainage areas;
    - Geo-spatial data for documented heritage (i.e., archaeological and historical sites) in the vicinity of the proposed Project area acquired from an electronic database (the Provincial Heritage Register) maintained by the Archaeology Branch;

- The Vanderhoof District office of BC MFLNRO for information on lands covered in the past by archaeological assessments for forestry developments in their district;
- Archaeology Branch for other kinds of archaeological assessments in this region including any available archaeological potential models for this area that are not currently available via Remote Access to Archaeological Data;
- Mapped biophysical data for localized information pertinent to the assessment of archaeological potential values in this region, including bedrock geology, surface sediments and/or soil classification, and BGC zonation; and
- The Land Tenure Branch, BC MFLNRO, and the Geological Survey of Canada contacted for information regarding palaeontology for the proposed Project footprint.

8.2 Heritage Effects Assessment

This section of the Application will present the identification and selection of heritage VCs following the methods described in **Section 4.2**. This section will also present the assessment of effects for the proposed VCs following the methods described in **Section 4.3**.

8.2.1 Identification and Selection of Valued Components

This subsection will present the rationale and justification for Candidate VCs, Selected VCs and Candidate VCs not selected as VCs for Heritage Resources.

8.2.2 Archaeological Sites

8.2.2.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

8.2.2.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

8.2.2.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;

- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

Effects on archaeological sites will potentially occur by land-altering activities associated with the proposed Project and increased general activities in the larger area. Archaeological sites requiring protection and/or mitigation are identified during the AIA and managed accordingly. If the archaeological sites are protected and/or mitigated there will be no residual effects. Archaeological sites not identified during the AIA might be encountered during construction and potentially operations. If any sites are identified, they are managed through the proposed Archaeology and Heritage Resources Management Plan (**Section 12.2**). The plan guides the identification, recording, assessment, consultation, and avoidance and/or data recovery mitigation options.

8.2.2.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

8.2.2.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 8.2.2.4** above.

8.2.2.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

8.2.2.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

8.2.3 Historic Sites

8.2.3.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

8.2.3.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

8.2.3.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

Effects on historical heritage (including structures of architectural significance) will potentially occur by land-altering activities associated with the proposed Project and increased general activities in the larger area. Heritage sites requiring protection and/or mitigation are identified during the AIA and managed accordingly. If the historical heritage sites are protected and/or mitigated there will be no residual effects. Historical heritage sites not identified during the AIA might be encountered during construction and potentially operations. If any sites are identified, they are managed through the proposed EMPs (**Section 12.2**). The plan guides the identification, recording, assessment, consultation, and avoidance and/or data recovery mitigation options.

8.2.3.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

8.2.3.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 8.2.3.4** above.

8.2.3.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

8.2.3.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

8.2.4 Paleontological Resources

8.2.4.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

8.2.4.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

8.2.4.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

Effects on paleontological sites will potentially occur by land-altering activities associated with the proposed Project and increased general activities in the larger area. Paleontological sites requiring protection and/or mitigation are identified during the AIA and managed accordingly. If the paleontological sites are protected and/or mitigated there will be no residual effects. Paleontological sites not identified during the AIA might be encountered during construction and potentially operations. If any sites are identified, they are managed through the proposed EMPs (**Section 12.2**). These plans guide the identification, recording, assessment, consultation, and avoidance and/or data recovery mitigation options.

8.2.4.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

8.2.4.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 8.2.4.4** above.

8.2.4.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

8.2.4.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

8.3 Summary of Assessment of Heritage Effects

This section of the Application will present the summary of the assessment of heritage effects in the format of **Table 8.3-1**.

Table 8.3-1: Summary of Assessment of Potential Heritage Effects

Valued Components (Identify Phase of Proposed Project)	Potential Effects	Key Mitigation Measures	Evaluation of Significance of Residual Effects (Summary Statement)

9.0 ASSESSMENT OF POTENTIAL HEALTH EFFECTS

This section of the Application will present the assessment of health effects. **Section 9.1** will describe the health baseline conditions of the proposed Project. The assessment for each VC includes a description of the rationale and baseline information conducted to select the VC, discussion of potential effects of the proposed Project and proposed mitigation, and an analysis of residual effects significance. The VCs proposed for Human Health include environmental exposures and worker safety and health. **Section 9.3** will present a summary of the health effects assessment results.

9.1 Health Baseline

This section of the Application will present the health baseline information for the LSA and RSA.

The health effects baseline is an overview of health status of potentially affected populations in the LSA and RSA, including the regions from where employment is likely to be drawn. The overview is derived from data published for the province and local health authorities by BC Vital Statistics Agency and SC. Health status and mortality data are interpreted to identify sensitivities of the potentially affected populations (e.g., if men or women have compromised health status).

9.2 Health Effects Assessment

This section of the Application will present the identification and selection of health VCs following the methods described in **Section 4.2**. This section will also present the assessment of effects for the proposed VCs following the methods described in **Section 4.3**.

9.2.1 Identification and Selection of Valued Components

This subsection will present the rationale and justification for Candidate VCs, Selected VCs and Candidate VCs not selected as VCs for Human Health.

9.2.2 Environmental Exposures

9.2.2.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

9.2.2.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

9.2.2.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The following steps are followed to assess the potential for health effects as a result of environmental exposures:

- Identify components of the proposed Project where potential environment exposure pathways exist, considering dependent discipline assessments, such as air quality, noise and vibration, surface water and sediment quality, soil quality, fish and vegetation;
- Predict or evaluate the likely effects through a quantitative human health risk assessment, considering dependent discipline assessments (e.g., air quality, drinking water quality, and contamination of country foods);
- Compare the baseline and predicted exposure levels presented in the relevant biophysical effects assessment for each contaminant of potential concern to relevant toxicological reference values to estimate the risks to human health;
- Identify permanent, temporary or seasonal residents or land users, including Aboriginal groups, in the zone of potential influence using relevant information presented in the economic effects assessment, social effects assessment, human health risk assessment; Aboriginal groups background information and non-traditional land use baseline to determine if any valid pathways of exposure potentially exist;
- Dustfall and deposition of contaminants of potential concern to soils will be modelled, such that future concentrations in fish, wild game, and plant tissue can be predicted, and carried through to the human health risk assessment;
- Determine the duration of identified pathway exposures (immediate, short-term or long-term) and the magnitude of people potentially exposed;
- Compare health-based criteria (e.g., noise at 55 decibel A scale (dBA) is potentially annoying) for potential pathway exposure durations;
- Determine any potential for health effects to occur, taking into account any exceedances of health-based criteria or the presence of any sensitive populations, which were identified in the human health baseline study;
- Determine if effects on health status could be observed on the individual, local or regional level;

- Identify feasible mitigation or enhancement measures;
- Determine the potential significance of any residual environmental effect following the implementation of mitigation or enhancement; and
- The Application will provide an outline of a monitoring plan for water, plants and animals that maybe consumed in the area of the mine site and/or downstream of the mine site. The plan will outline the proposed species to be sampled including but not limited to whitefish, moose and berry producing plant species, the general location of sampling, duration and frequency of monitoring including pre-operations and throughout the mine life and propose how the plan will be developed, implemented and results communicated with First Nations, community members and Agencies prior to the initiation of any monitoring.

9.2.2.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

9.2.2.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 9.2.2.4** above.

9.2.2.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

9.2.2.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

9.2.3 Worker Safety and Health

9.2.3.1 *Introduction*

This subsection will describe the approach and applicable regulatory framework for the assessment of the VC.

9.2.3.2 *Valued Component Baseline*

This subsection will:

- Provide detailed baseline information on the VC and the source of the information;
- Identify past, present or future projects/activities that may impact the VC; and
- Describe traditional ecological or community knowledge, where available.

9.2.3.3 *Potential Effects of the Proposed Project and Proposed Mitigation*

This subsection will:

- Identify and analyze potential adverse effects resulting from the proposed Project's construction, operations, closure and post-closure phases;
- Identify and describe any potential adverse effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describe measures to mitigate the potential adverse effects identified above.

The following steps are followed to assess the effects on worker safety and health:

- Identify the hazards that could affect worker safety and health;
- Quantitatively predict change in hazard risk (to injury and disease) for employees in the employment catchment by comparing injury rates and workers compensation insurance base rates for the industry sectors that potential employees are currently employed in. Base rates are used as an indicator of occupational injury and disease;
- Determine any potential for health effects to occur, taking into account presence of any sensitive populations identified in the human health baseline study;
- Identify feasible mitigation or enhancement measures; and
- Determine the potential significance of any residual environmental effect following the implementation of mitigation or enhancement.

Surface mining operations are safer than many heavy industries in BC and working conditions will likely improve for most employees. Sensitive populations include young workers, Aboriginal groups workers, and employees previously without employment or in low risk employment. Workers exposed to multiple hazards, such as maintenance workers, are also sensitive subgroups (BC Ministry of Energy, Mines and Petroleum Resources, 2008).

9.2.3.4 *Residual Effects and their Significance*

This subsection will:

- Identify and describe any residual effects after mitigation;
- Where residual adverse effects have been identified, provide an assessment of the significance of those residual effects considering context, magnitude, geographic extent, duration, reversibility, frequency;
- Assess the likelihood of the effect;
- Assess the significance of the residual effects; and
- Assess/discuss the level of confidence and risk in the determination of significance and likelihood of the residual effect.

9.2.3.5 *Cumulative Effects*

This subsection will:

- Determine the need for assessing cumulative effects;
- Assess potential cumulative effects; and
- If applicable, assess cumulative effects and evaluate these effects using the same criteria and steps as noted in **Section 9.2.3.4** above.

9.2.3.6 *Limitations*

This subsection will present assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects.

9.2.3.7 *Conclusion*

This subsection will provide a conclusion regarding the significance of residual effects and cumulative effects if applicable.

9.3 Summary of Assessment of Health Effects

This section of the Application will present the summary of the assessment of human health in the format of **Table 9.3-1**.

Table 9.3-1: Summary of Assessment of Potential Human Health Effects

Valued Components (Identify Phase of Proposed Project)	Potential Effects	Key Mitigation Measures	Evaluation of Significance of Residual Effects (Summary Statement)

10.0 ACCIDENTS OR MALFUNCTIONS

This section of the Application will identify potential accidents, malfunctions, and unplanned events that could occur during any phase of the proposed Project involving any project component or activity. The Application will assess the likelihood and circumstances under which these events could occur, and the environmental effects and/or consequences that may result from such events, considering mitigation or contingency plans in place and risk if they are not fully effective. The Application will describe how each potential accident, malfunction, or unplanned event would be managed or mitigated. Accident and malfunctions considered for the Application include but not be limited to the following:

- Spills of hazardous substances stored on site (reagents, fuels, contained liquid waste) possible during a refuelling operation;
- Breach or failure of tailings dam or other containment structure;
- Pit wall failure and failure of the waste rock dumps and low grade stockpile;
- Tailings pipeline leakage or failure;
- Accidental discharge of off-specification effluent from sewage treatment plant;
- Power outages;
- Fires or explosions that could potentially be caused during construction or operations, such as brush fires caused by clearing and construction activities;
- Fly rock from blasting;
- Motor vehicle accidents involving construction, maintenance, or transport crews;
- Motor vehicle accidents during transfer and transport of hazardous materials (fuels and other chemicals); and
- Sediment releases into watercourses.

11.0 POTENTIAL EFFECTS OF THE ENVIRONMENT ON THE PROJECT

This section of the Application will assess the potential environmental factors that may affect the proposed Project and the predicted effects of those environmental factors. The range of climate conditions, including extreme weather events and climate change is considered. The effect of global climate change on the proposed Project is examined.

The Application will:

- Identify and describe the environmental factors that may adversely affect the proposed Project such as:
  - Natural hazards (ice jams, landslides, avalanches, freezing, etc.);
  - Extreme weather conditions (drought, flooding);
  - Natural seismic events (e.g., liquefaction, subsidence, etc.);
  - Volcanic events;
  - Forest fires;
  - Slope stability and mass wasting events (outflow conditions); and
  - Climate change;
- Identify any changes or effects on the proposed Project that may be caused by the above-mentioned environmental factors, whether the changes or effects occur within or outside of Canada;
- Identify the likelihood and severity of the changes or effects; and
- Identify mitigation measures, including design strategies, planned to avoid or minimize the likelihood and severity of the changes or effects.

12.0 SUMMARY OF PROPOSED ENVIRONMENTAL AND OPERATIONAL MANAGEMENT PLANS

12.1 Environmental Management System

This section of the Application will discuss the structure of the EMS. The EMS for the proposed Project is part of the Proponent's overall corporate management system used to develop and implement its environmental policy, manage its environmental risks, and achieve its environmental performance objectives for the proposed Project. The Project EMS consists of an interrelated set of elements, including organizational structure, planning activities, responsibilities, processes, procedures, practices, and resources. It would be used to manage environmental risks throughout the life cycle of the proposed Project.

The Proponent has stated that the highest practicable standards of Environment, Health and Safety (EHS) management are applied during all phases of the proposed Project. High standards would be achieved by developing and implementing an integrated management system that combines environmental, Occupational Health and Safety (OH&S), and community engagement components. To achieve this goal, the integrated management system would include an environmental component that conforms to ISO 14001 and an OH&S component that conforms to the *Mines Act* (Government of BC, 1996b).

The Proponent has chosen an integrated management system approach because of inherent overlaps in environmental and OH&S management system elements; for example, actions taken to protect the environment often protect workers' health and safety as well. These approaches would also be applied in community engagement programs that can incorporate local perspectives on social issues. The Emergency and Spill Response Plan, for example, would address spills to the environment, which can also have worker and public safety risks. Similarly, traffic safety and driver training programs can significantly reduce risks to workers, the public, as well as spills to the environment.

The EMS is intended to be consistent with the Proponent's environmental and social policies and relevant regulatory requirements, permits, and standards. The EMS provides a structured approach to achieving EHS standards for Project operations through a consistent system of planning, implementation, checking, and corrective action, and continual improvement. The senior management review element promotes continual improvement in environmental management performance.

The Proponent has stated that the EMS would emphasize key stakeholder engagement initiatives for environmental management, including educational and consultation programs with Aboriginal groups and other key stakeholders.

In general, the EMS would:

- Recognize environmental and social responsibility as key corporate priorities;
- Maintain information on legislative requirements and environmental and social aspects associated with the organization's activities;
- Facilitate environmental planning through the project life cycle;
- Provide a process for achieving targeted performance levels;

- Assign clear accountability and responsibility for environmental protection and social responsibility to management and employees;
- Establish and maintain relationships with internal and external stakeholders;
- Provide appropriate and sufficient resources, including training, to achieve targeted performance levels on an on-going basis;
- Evaluate environmental and social responsibility performance against the Proponent's policies, objectives and targets, and seek improvement where appropriate; and
- Establish a management process to audit and review the Proponent's EMS and to identify opportunities for improvement of the system and resulting environmental performance.

The EMS would be developed before commencing construction in consultation with relevant permitting agencies. The EMS would be designed to ensure a consistent approach to responsible environmental management and promote continual improvement through a Plan-Do-Check-Act (PDCA) cycle. The structure of the EMS would include the following four elements:

- **Planning**: defining the scope of the EMS, establishing an environmental policy for the proposed Project, identifying applicable legal and other (non-regulatory) requirements, setting environmental performance objectives, and developing the EMPs;
- **Implementation**: resource allocation and the assignment of roles and responsibilities, environmental management training, internal and external communications, EMS documentation and records and document control, and operating controls, including emergency response activities;
- **Checking and corrective action**: on-going monitoring of environmental performance; inspection and evaluation of environmental management practices, including environmental compliance, and EMS audits; and
- **Continual improvement:** senior operational management review of the EMS and identification of improvements in environmental performance of the proposed Project.

Objectives and targets for environmental and social performance would be established and reviewed annually. Objectives are typically broader environmental goals, quantifiable where practical, whereas targets are detailed performance requirements that arise from the objectives. Where possible, the targets for environmental and social performance would be specific, measurable, achievable, realistic, and time-bound (SMART). This enables a quantitative evaluation of the effectiveness of the EMPs and the need for performance improvement.

12.2 Environmental Management Plans

This section of the Application will provide a description of the various EMPs that the Proponent has stated may be required to develop for the proposed Project as part of the EMS.

EMPs provide the principal means of guiding proper implementation of mitigation as prescribed by permits, approvals, and authorizations as well as Proponent policies. Environmental requirements and commitments set out in the EA are typically consolidated into EMPs. EMPs set out approaches to EHS and social management at each phase of the proposed Project and can be converted to more specific Standard Operating Procedures (SOPs) where required.

Project EMPs would be designed to provide an integrated, systematic approach to environmental management and would help deliver assurance to interested parties regarding the phases and activities of the proposed Project. The EMPs will be based on the principle of adaptive management, will implement BMPs, and will include appropriate environmental management practices described in the Environmental Code of Practice for Metal Mines (EC, 2009) document.

This section of the Application will include an overview of individual or consolidated EMPs that will work in conjunction with each other and with other management plans under the EMS, where applicable. The EMPs will be organized for the construction, operations and closure phases of the proposed Project and will cover the following topics:

- Mine Waste Management;
- Mine Water Management;
- Hazardous Materials Management;
- Air Quality and Emissions Management;
- Water Quality and Liquid Discharges Management;
- Industrial and Domestic Waste Management;
- Transportation and Access Management;
- Construction Management;
- Cyanide Management;
- Emergency and Spill Preparedness and Response;
- Landscape, Soils and Vegetation Management and Restoration;
- Erosion and Sediment Control;
- Aquatic Resources Management (including pre- and post-construction phases, fisheries habitat compensation plans for both phases, and monitoring plans for both phases as per requirements of the *Fisheries Act* (Government of Canada, 1985b));
- Invasive Species Management;
- Wetlands Management;

- Wildlife Management;
- Wildfire Protection;
- Occupational Health and Safety Management;
- Recruitment, Training and Employment;
- Visual Resources and Aesthetics Management; and
- Archaeology and Heritage Resources Management.

Activities or mitigation proposed for the closure and post-closure phases, including the Landscape Design and Restoration Plan, Soil Salvage and Site Reclamation Plan, and Facilities Decommissioning Plan, will be presented in the Closure Plan that will be integrated into the Project Description in **Section 2.6**.

13.0 FOLLOW-UP MONITORING AND COMPLIANCE REPORTING

This section of the Application will provide a description of the reporting structure as identified within the EMPs, monitoring plans, and commitments.

PART C – ABORIGINAL GROUPS INFORMATION REQUIREMENTS

Part C of the Application will discuss Aboriginal groups' considerations pertaining to the proposed Project.

This section will rely on guidance found in BC EAO's User Guide (BC EAO, 2010b), AIR Template, and Proponent Guide for Providing First Nation Consultation Information (Non-Treaty First Nations) (BC EAO, 2010a).

Part C of the Application will consider the potential effects of the proposed Project on the potential or established Aboriginal rights and related interests of the named Aboriginal groups that have the potential to be adversely affected by the proposed Project.

The Aboriginal groups currently identified by the EAO and the Agency for the Application/EIS are presented in the table below.

Aboriginal Groups Identified by the EAO and the Agency

Aboriginal Group	Section 11 Order Schedule B	Section 11 Order Schedule C	EIS Guidelines
Lhoosk'uz Dene Nation	✓		✓
Nadleh Whut'en First Nation	✓		✓
Saik'uz First Nation	✓		✓
Stellat'en First Nation	✓		✓
Ulkatcho First Nation	✓		✓
Nazko First Nation		✓	✓
Skin Tyee Nation		✓	✓
Tsilhqot'in National Government		✓	✓
Métis Nation of British Columbia			✓

The section 11 Order directs the Proponent to consult with the Aboriginal groups listed on Schedule B of the Order. Information related to those Aboriginal groups will be the main focus in the Proponent's Application.

14.0 ABORIGINAL GROUPS BACKGROUND INFORMATION

This section of the Application will provide background information on each of the Aboriginal groups specified in the section 11 Order. This section will describe the environment, economic, social, cultural, heritage, and health conditions for each of the identified Aboriginal groups. It will also include maps, where available, of the asserted traditional territory of the Aboriginal groups potentially affected by the proposed Project.

Using a range of primary and available secondary data sources, as well as other methods developed through discussions with Aboriginal groups, the description will include relevant discussions of:

- Socio-cultural:
  - Ethnography;
  - Population and demographics;
  - Reserves, where applicable;
  - Language;
  - Governance;
  - Family and cultural practices;
  - Community well-being;
  - Infrastructure;
  - Land use setting and planning; and
- Economic:
  - Economic setting;
  - Traditional land use and traditional knowledge (fishing, hunting, trapping, plant harvesting);
  - Employment and labour force; and
  - Skills and training.

The items listed above will aim to incorporate information provided directly by Aboriginal groups, where available. A summary of traditional knowledge and traditional use information from Aboriginal groups, and other sources, relevant to the proposed Project and not subject to confidentiality provisions, will be presented in the Application. Where feasible, information collection and reporting methodologies are determined by or in collaboration with Aboriginal groups, and may include broad or site-specific information collected from knowledge holders.

15.0 ABORIGINAL RIGHTS

This section of the Application will discuss potential or established Aboriginal rights and related interests for the Aboriginal groups identified for the proposed Project.

This section of the Application will summarize the Proponent's understanding of Aboriginal rights and related interests asserted within the proposed Project area. In doing so it will:

- Identify past, present and anticipated future uses of the proposed Project area by Aboriginal groups;
- Identify any specific asserted Aboriginal rights (including title) about which the Proponent receives information from Aboriginal groups and other sources;
- Identify potential impacts of the proposed Project on the uses and asserted rights identified by way of the preceding two bullet points; and
- Describe mitigation measures to avoid or reduce such impacts.

16.0 OTHER ABORIGINAL INTERESTS

This section of the Application will identify other Aboriginal interests with respect to potential social, economic, environmental, heritage and health effects (to the extent that these are not already identified in **Section 15**). This section will also describe how these interests have been addressed.

17.0 ABORIGINAL GROUPS CONSULTATION

This section of the Application will summarize engagement and consultation activities undertaken with Aboriginal groups potentially affected by the proposed Project as well as future planned engagement and consultation activities. The sections will be summarized as described below.

17.1 Pre-Application Engagement

This section will provide a summary of engagement activities undertaken with the identified Aboriginal groups potentially affected by the proposed Project. The summary will include the exploration stage and cover the preparation of the AIR and the development of the Application. Key issues identified during engagement that are of relevance to the Application will be summarized in this section, as well as the Proponent's responses to those key issues. Cross-reference to Aboriginal Groups Issues Tracking Table (to be included in an appendix to the Application) will be made. This section will also demonstrate the efforts made by the Proponent to ensure Aboriginal groups have current and relevant Project information as well as efforts made to integrate Aboriginal traditional knowledge.

17.2 Planned Engagement and Consultation during the Application Review

This section will describe the Proponent's plans for engagement and consultation during the Application review stage. It will describe the planned engagement and consultation activities for this stage and document the proposed methods and processes to resolve outstanding issues.

18.0 SUMMARY OF ABORIGINAL GROUPS INFORMATION

This section of the Application will summarize effects of the proposed Project on the Aboriginal rights and identify in a table specific commitments to address effects (**Table 18.1-1**).

18.1 Do not delete this subheading, it is connected to the table below.

Table 18.1-1: Summary of Potential Effects on Aboriginal Activities and Accommodations Measures

Potential Effects on Aboriginal Activities	Accommodation Measures

PART D – CONCLUSIONS

19.0 SUMMARY OF RESIDUAL EFFECTS

This section of the Application will provide a tabular summary of residual environmental, economic, social, heritage, or health effects predicted to result from the proposed Project that cannot be completely avoided or mitigated through the redesign or relocation of the proposed Project or through Proponent commitments.

An example of the table is presented in **Table 19.1-1**.

19.1 Do not delete this subheading, it is connected to the table below.

Table 19.1-1: Summary of Residual Effects

Residual Effect	Project Phase	Contributing Project Activity or Physical Works	Proposed Mitigation	Significance
Effect Category (e.g., Archaeology, Wildlife and Wildlife Habitat, Fish and Fish Habitat)				

The summary will reference mitigations that were taken into consideration in the assessment of effects and will present the conclusion of the evaluation of significance (significant or not significant) for residual effects predicted to occur to VCs as a result of the proposed Project.

This section of the Application will summarize the findings of the effects assessments conducted for the proposed Project and will provide concluding statements regarding the significance of residual or cumulative residual effects predicted to occur as a result of the proposed Project.

20.0 SUMMARY OF MITIGATION MEASURES

This section of the Application will present a summary of proposed mitigation measures to prevent or reduce adverse environmental, economic, social, heritage, or health effects.

All mitigation measures must described in language so that the measure is clear, measurable and enforceable.

An example of the table is presented in **Table 20.1-1**.

20.1 Do not delete this subheading, it is connected to the table below.

Table 20.1-1: Summary of Proposed Mitigation Measures

Number	Proposed Mitigation Measure	Timing

21.0 CONCLUSION

This section of the Application will summarize the findings of the effects assessments conducted for the proposed Project and will provide concluding statements regarding the significance of the proposed Project residual or cumulative residual effects predicted to occur as a result of the proposed Project.

The conclusion section will also:

- Provide a summary of the Proponent's understanding of the provincial EA process in promoting sustainable development while minimizing adverse effects on environmental, economic, social, heritage, and health values;
- Describe how the proposed Project aligns with the goal of the provincial EA process; and
- State the request for an EA Certificate for the proposed Project and the need to successfully complete a federal EA and subsequent permitting / authorization processes prior to proceeding with proposed Project construction, operations, and closure.

REFERENCES

This section of the Application will include the list of references cited throughout the Application, and will be included in each volume of the Application.

REFERENCES TO THE APPLICATION INFORMATION REQUIREMENTS

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APPENDICES

This section will provide applicable appendices to the Application. The Application will identify and append applicable sealed studies where the information is prepared by professionals and provided under their professional seal.