

RAVEN UNDERGROUND COAL PROJECT

**Draft Application Information Requirements /
Environmental Impact Statement Guidelines**

**For
Compliance Coal Corporation
dba Comox Joint Venture**

**Application for an Environmental Assessment Certificate
and
Environmental Impact Statement for Development of the
Comprehensive Study Report to Satisfy Requirements of
the *Canadian Environmental Assessment Act***





PREFACE TO THE APPLICATION INFORMATION REQUIREMENTS / ENVIRONMENTAL IMPACT STATEMENT GUIDELINES

Compliance Coal Corporation dba the Comox Joint Venture (proponent) is proposing the development of the Raven Underground Coal Mine (proposed Raven Project) near Buckley Bay on eastern Vancouver Island. The proposed Raven Project would be located within the Comox Valley Regional District (CVRD) approximately 20 kilometres (km) south of the City of Courtenay and approximately 80 km north of Port Alberni. The proposed Raven Project would mine approximately 30.1 million tonnes (Mt) of coal and rock (raw coal) from an underground mine over a 16 year period. The current mine plan calls for the development of the following components: portal and underground mine; coal processing plant; run-of-mine (ROM) coal, processed coal and clean coal stockpiles; topsoil and till stockpiles; engineered combined coarse and fine rejects stack dump; water management sediment pond; offices; maintenance building; power supply and distribution system (including a transmission line running from the main high voltage transmission line situated up to 5 km east of the proposed Raven Project site); and transport of coal via truck from the mine site to Port Alberni. At the Port Alberni Port Facility, the proposed Raven Project would construct and use transfer and storage facilities and use present berths. The total proposed Raven Project mine site surface footprint is expected to be approximately 200 hectares (ha); the total proposed surface footprint of coal storage and coal loading facilities at the Port Facility is expected to be approximately 2 ha.

The proposed Raven Project has entered into a cooperative environmental assessment (EA) process with both the British Columbia (BC) provincial government and the Canadian federal government. The cooperative process is intended to minimise duplication wherever possible, and must be completed prior to obtaining further permits and beginning construction of the proposed Raven Project. The BC EA process is coordinated by the BC Environmental Assessment Office (BC EAO). A Project Description was submitted by the proponent to BC EAO in August 2009. On 12 August 2009, the BC EAO issued an Order under section 10(l)(c) of the *BC Environmental Assessment Act (BCEAA) 2002* stating that the proposed Raven Project requires an EA Certificate. Pursuant to Part 3 of the *Reviewable Projects Regulation (B.C. Reg. 370/02)*, review is required because the proposed Raven Project is a new mine facility that, during operation, would have a production capacity of greater than 250,000 tonnes per year of clean and raw coal (combined). On 5 March 2010, the BC EAO issued an Order under section 11 of the *BCEAA* describing the scope, procedures, and methods for the provincial review of the proposed Raven Project.

Federal review under the *Canadian Environmental Assessment Act (CEA Act)* as part of the coordinated EA is managed by the Canadian Environmental Assessment Agency (Agency). An EA under section 5 of the *CEA Act* is required for the proposed Raven Project because: Fisheries and Oceans Canada (DFO) may issue authorisations for works or undertakings associated with the project; and the Port Alberni Port Authority (PAPA) may make federal



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lands available for the construction, delivery, transfer, storage, and loading infrastructure required to meet the shipping needs of the proposed Raven Project. The proposed Raven Project is subject to a comprehensive study pursuant to section 16(d) of the *Comprehensive Study List Regulations* of the *CEA Act* because the proposed coal production capacity would be 3000 tonnes per day (t/d) or more.

The purpose of the Application Information Requirements / Environmental Impact Statement Guidelines (AIR / EIS Guidelines) document is to identify the information that is needed to complete the provincial and federal EA processes, and to ensure that this information is included in the Application for an EA Certificate / Environmental Impact Statement (Application / EIS). To ensure a consistent framework for all EAs, the BC EAO has developed templates specifying the format and information requirements for AIR / EIS Guidelines documents. For the proposed Raven Project, a draft AIR / EIS Guidelines document (Version 3.0) was prepared using the template at the time of writing (BC EAO 2007). In April 2010, Version 3.0 of the draft AIR / EIS Guidelines was submitted for review by the BC EAO's advisory Working Group, which is comprised of representatives from federal, provincial, local government agencies and concerned Aboriginal groups. All written comments received from the Working Group were tracked and considered, and were detailed in a tracking table. Version 6.0 of the draft AIR / EIS Guidelines updated the document to the new AIR / EIS Guidelines template (issued October 2010; BC EAO 2010a) and incorporated responses to comments received from the Working Group on Version 3.0. Version 6.0 of the draft AIR / EIS Guidelines was submitted to the Working Group for review in January 2011. All written comments received from the Working Group were again tracked and considered, and are detailed in the tracking table. The present draft AIR / EIS Guidelines document (Version 7.0) incorporates responses to comments received from the Working Group on Version 6.0. Additionally, a standalone tracking table, documenting these updates to Version 7.0, was circulated to the Working Group in April 2011. Working Group comments on these updates (received by 20 April 2011) have been incorporated into Version 7.0 and are included in the tracking table.

In developing the AIR / EIS Guidelines, the proponent engaged with local, provincial and federal government representatives, Aboriginal groups and the public regarding issues and concerns related to the proposed Raven Project. Canadian federal agencies that were provided the opportunity for input include: the Agency, Environment Canada (EC), Health Canada (HC), Transport Canada (TC), DFO, PAPA, Parks Canada (PC), Canadian Food Inspection Agency (CFIA), and Natural Resources Canada (NRCan). Provincial agencies include: the BC Ministry of Environment (BC MOE), BC Integrated Land Management Bureau (BC ILMB), BC Ministry of Forests, Lands and Natural Resource Operations (BC FLNRO), BC Ministry of Transportation and Infrastructure (BC MoTI), BC Ministry of Tourism, Trade and Investment (BC MTTI), BC Ministry of Agriculture, BC Ministry of Energy, Mines and Petroleum Resources (BC MEMPR), BC Ministry of Finance, and the BC EAO. Early in the pre-application stage, the proponent also met or corresponded with



representatives of the Wei Wai Kum First Nation and the We Wai Kai Nation (members of Laich-Kwil-Tach Treaty Society), the K'ómoks First Nation, the Hul'qumin'um Treaty Group, the Qualicum First Nation, the Sliammon First Nation, the Xwémalhkwa Nation (formerly Homalco Indian Band), the Tseshaht First Nation, the Hupacasath First Nation, Maa-nulth First Nations, Métis Nation BC, and the public regarding issues and concerns related to the proposed Raven Project.

Consultation with Aboriginal groups is a key requirement of the EA process. The proponent has initiated this consultation process and is committed to receiving and responding to the comments and concerns of Aboriginal groups. These will be considered in identifying and enhancing positive effects of the proposed Raven Project, as well as avoiding, mitigating or otherwise minimising potential negative effects.

Public participation is also an important component of the AIR / EIS Guidelines and EA processes. Federal funding to support the participation of the public in the EA review process has been made available through the Participant Funding Program. The proponent is committed to the public consultation process, and is engaged in an ongoing process to elicit feedback on the proposed Raven Project. As required by the section 11 Order, a public review period of 40 days will be held on the present document (Version 7.0). The proponent is responsible for responding to all written comments received during this period, and for incorporating responses into the AIR / EIS Guidelines as appropriate. As for the Working Group review, comments were recorded in a standalone tracking document. Notices of public comment opportunities will be posted on the Canadian Environmental Assessment Registry at <http://www.ceaa-acee.gc.ca> and on BC EAO's electronic Project Information Centre (e-Pic).

Once comments from the Working Group, Aboriginal groups and the public have been considered and addressed, BC EAO will formally issue an approved AIR / EIS Guidelines document to the proponent for the proposed Raven Project. Following approval of the AIR / EIS Guidelines, the proponent will complete the studies and analyses specified in the AIR / EIS Guidelines, and submit an Application / EIS to the BC EAO and the Agency for screening to ensure compliance with the AIR / EIS Guidelines. Provided the Application / EIS meets the information requirements of the approved AIR / EIS Guidelines document, the BC EAO will initiate the Application / EIS review phase. This phase will be completed within 180 days if the Application / EIS is accepted by the BC EAO. The Application / EIS will be made available to the Aboriginal groups listed on the BC EAO's section 11 order, the First Nations of the Maa-nulth Treaty Society, Métis Nation BC, government agencies, local governments, and the public. In the early stages of the Application / EIS review, the BC EAO will initiate a 50 day public comment period on the Application / EIS, as set out in the section 11 order. Following the public comment period, the proponent will track and address the issues raised during the Application / EIS review. At the end of the review, the BC EAO will submit an assessment report, and recommendations to the provincial Minister of the Environment and the Minister of Forests, Mines and Lands for a provincial decision on the



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issuance of the EA Certificate. A legally binding table of commitments would be included in the EA Certificate, if issued, as a method of addressing issues raised. Commitments included in the EA Certificate are legally enforceable.

Following the proponent's submission and government review of the Application / EIS, the Agency will prepare a Comprehensive Study Report. The Comprehensive Study Report will be submitted to the federal Minister of the Environment and will be made available for public comment prior to the federal Minister of the Environment's decision under section 23 of the *CEA Act*. The federal Minister may request additional information or require that public concerns be further addressed before issuing the federal EA decision statement. The federal EA decision statement sets out the Minister's opinion as to whether the proposed Raven Project is or is not likely to cause significant adverse environmental effects, taking into account the implementation of any mitigation measures and follow-up programs that the Minister considers appropriate. Once the federal EA decision statement is issued, the proposed Raven Project will be referred back to the relevant federal responsible authorities (RA (e.g., DFO, PAPA)) for appropriate action, which may include issuing authorisations, or provision of federal land in order for the proposed Raven Project to proceed.



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LIST OF APPENDICES

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TABLE OF CONCORDANCE

The proponent commits to providing a Table of Concordance (using the format below) in the Application / EIS. The Table will present all requirements for content and methodological approaches in the approved AIR / EIS Guidelines that are to be addressed by the Application / EIS, including volume, section and page references.

Section Of AIR / EIS Guidelines	Title	Descriptive Summary	Volume Of Application / EIS	Section Of Application / EIS Volume	Page References
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PREFACE TO THE APPLICATION

The proponent commits to provide the following in the Application / EIS:

- Statement that the proposed Raven Project is subject to review under the *BCEAA* and description of the trigger for the review under *BCEAA*;
- Statement that the proposed Raven Project is subject to a comprehensive study assessment under the *CEA Act* and why;
- Information on any other EA approval processes that the proposed Raven Project is undergoing (if applicable), especially if they interact or overlap with the *CEA Act*;
- Statement that the Application / EIS has been developed pursuant to the AIR / EIS Guidelines approved by the BC EAO with input from the Agency, and that it complies with relevant instructions provided in the section 11 Order;
- Statement that the Application / EIS has been developed pursuant to federal information requirements as communicated by the Agency and federal RA; and
- Information identifying the agencies, First Nations, Aboriginal groups and other parties involved in the development of the Application / EIS.



ABBREVIATIONS, ACRONYMS AND DEFINITIONS

The proponent commits to provide a list of all abbreviations, acronyms and terms used, and their definitions, in the Application / EIS. The list provided below refers to terms and abbreviations used in this AIR / EIS Guidelines document.

Abbreviation	Definition
ABA	acid-base accounting
ACRD	Alberni-Clayoquot Regional District
AEE	Agra Earth & Environmental
Agency (the)	Canadian Environmental Assessment Agency
AIA	Archaeological Impact Assessment
AIR / EIS Guidelines	Application Information Requirements / Environmental Impact Statement Guidelines
AIR Template	Application Information Requirements Template with Respect to an Application for an Environmental Assessment Certificate pursuant to the <i>Environmental Assessment Act</i> , S.B.C. 2002, c. 43
ANSI	American National Standard Institute
Application / EIS	Application for an Environmental Assessment Certificate under the British Columbia <i>Environmental Assessment Act</i> / Environmental Impact Statement
AOA	Archaeological Overview Assessment
AOGCM	Atmosphere-Ocean General Circulation Model
baseline information	a description of existing environmental, economic and social conditions at and surrounding an action
BC	British Columbia
BC CSR	BC <i>Contaminated Sites Regulation</i>
BC CDC	BC Conservation Data Centre
BCEAA	BC <i>Environmental Assessment Act 2002</i>
BC EAO	BC Environmental Assessment Office
BC FLNRO	BC Ministry of Forests, Lands and Natural Resource Operations
BC MEMPR	BC Ministry of Energy, Mines and Petroleum Resources
BCGS	BC Geographic System
BC ILMB	BC Integrated Land Management Bureau
BC MELP	BC Ministry of Environment, Lands and Parks
BC MEM	BC Ministry of Energy and Mines
BC MOHS	BC Ministry of Health Services
BC MOE	BC Ministry of Environment
BC MoTI	BC Ministry of Transportation and Infrastructure



Abbreviation	Definition
BC MRES D	BC Ministry of Regional Economic and Skills Development
BC MTTI	BC Ministry of Tourism, Trade and Investment
BCTC	BC Transmission Corporation
BCWQG	BC <i>Water Quality Guidelines</i>
BGC	Biogeoclimatic
BMP	best management practices
CABIN	Canadian Aquatic Biomonitoring Network
CACs	criteria air contaminants
CaCO ₃	calcium carbonate
CAPMoN	Canadian Air and Precipitation Monitoring Network
CCC	Compliance Coal Corporation
CCME	Canadian Council of Ministers of the Environment
CEA	cumulative effects assessment
<i>CEA Act</i>	<i>Canadian Environmental Assessment Act</i>
CEC	Compliance Energy Corporation
CEE	cumulative environmental effects
CEO	Chief Executive Officer
CEQG	Canadian Environmental Quality Guidelines
CFIA	Canadian Food Inspection Agency
CH ₄ /CO ₂	methane / carbon dioxide
CJV	Comox Joint Venture
CMTs	culturally modified trees
COPC	contaminants of potential concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPP	coal preparation plant
Cumulative effects assessment	an assessment of the incremental effects of an action on the environment when the effects are combined with those from other past, existing and future actions
Cumulative environmental effects	effects that are considered in a cumulative effects assessment
CVRD	Comox Valley Regional District
CWS	Canadian Wildlife Service
DFO	Fisheries and Oceans Canada
DIN	German Institute for Standardization (Deutsches Institut für Normung)
DIS	Draft International Standard
e-Pic	electronic Project Information Centre



Abbreviation	Definition
E & N	Esquimalt and Nanaimo
EA	Environmental Assessment
EC	Environment Canada
e.g.	<i>exempli gratia</i> (Latin for “for example”)
EMS	Environmental Management System
EMP	Environmental Management Plan
ERCB	Energy Resource Conservation Board
etc.	<i>et cetera</i> (Latin for “and the rest of such things”)
FHAP	Fish Habitat Assessment Procedure
FNEATWG	First Nations Environmental Assessment Technical Working Group
GDP	gross domestic product
GIS	geographic information system
gob	the waste left in old mine workings
GHG	greenhouse gases
ha	hectare
HADD	harmful alterations, disruption, or destruction
HC	Health Canada
HST	Harmonized Sales Tax
i.e.	<i>id est</i> (Latin for “that is”)
ICC	I-Comox Coal Inc.
IFC	International Finance Corporation
ISO	International Organization for Standardization
km	kilometre
kV	kilovolt
LG	LG International Investments (Canada) Ltd.
LiDAR	Light Detection and Ranging
LRMP	Land and Resource Management Plan
LSA	Local Study Area
m	metre
Met coal	metallurgical coking coal
ML/ARD	metal leaching and acid rock drainage
mm	millimetre
MPMO	Government of Canada's Major Projects Management Office
Mt	million tonne
N ₂ O	nitrous oxide



Abbreviation	Definition
NAPS	National Air Pollution Surveillance
NBCC	National Building Code of Canada
n.d.	no date
NO _x	nitrogen oxides
NP	neutralization potential
NRCan	Natural Resources Canada
NTLU	non-traditional land use
NTS	National Topographic System
O ₃	ozone
PAH	polycyclic aromatic hydrocarbon
PAPA	Port Alberni Port Authority
PC	Parks Canada
PGNAA	Prompt Gamma Neutron Activation Analyses
PM	particulate matter
PM _{2.5}	particulate matter <2.5 micrometre diameter
PM ₁₀	particulate matter <10 micrometre diameter
proponent (the)	Compliance Coal Corporation dba the Comox Joint Venture
proposed Raven Project	proposed Raven Underground Coal Mine Project
PSL	permissible sound levels
PY	person years: a single person employed full-time for one year
QA / QC	quality assurance / quality control
Q2	second quarter
RA	responsible authorities
Raw coal	coal and rock
RCMP	Royal Canadian Mounted Police
RDEA	Regional District Electoral Area
RISC	Resources Inventory Standards Committee
ROM	run-of-mine
ROW	right-of-way
RSA	Regional Study Area
S	sulphur
SARA	<i>Species at Risk Act</i>
SO _x	sulphur oxides
SPMDs	semipermeable monitoring devices



Abbreviation	Definition
t/d	tonnes per day
t/h	tonnes per hour
TC	Transport Canada
TEM	Terrestrial Ecosystem Mapping
TK	traditional knowledge
TLU	traditional land use
TSS	total suspended solids
TSP	total suspended particulates (dust)
TU	traditional use
TUS	traditional use study
UBC	University of British Columbia
US	United States
UTM	Universal Transverse Mercator
VC	valued component (the environmental element of an ecosystem that is identified as having scientific, heritage, social, economic, historical, archaeological or aesthetic importance.)
VIHA	Vancouver Island Health Authority
VOCs	volatile organic compounds
VWP	vibrating wire piezometers
YQQ	Comox Airport
7Q10	10-year seven-day low flow
%	percent
° C	degrees Celsius



EXECUTIVE SUMMARY

The proponent commits to provide the following in the Application for an Environmental Assessment (EA) Certificate / Environmental Impact Statement (Application / EIS):

- Brief description of the proposed Raven Project;
- Summary of the consultations undertaken;
- Summary of the issues and potential proposed Raven Project effects identified;
- Summary of the recommended mitigation measures;
- Summary of the potential residual effects and cumulative effects;
- Summary of the follow-up programs proposed (if applicable); and
- The proponent's conclusions from the EA.



PART A - INTRODUCTION AND BACKGROUND

1 PURPOSE OF THE APPLICATION / EIS

A discussion of the purpose of the Application for an Environmental Assessment (EA) Certificate / Environmental Impact Statement (Application / EIS), pursuant to the British Columbia *Environmental Assessment Act*, S.B.C. 2002, c.43 (*BCEAA*) will be provided. This section will indicate that the Application / EIS meets the requirements of both the provincial and federal EA processes. The section will summarise why the proposed Raven Underground Coal Mine Project (proposed Raven Project) requires an EA Certificate, and, as applicable, formal authorisation under section 35(2) of the *Fisheries Act*, and the granting of federal lands from the Port Alberni Port Authority (PAPA).



2 PROPOSED PROJECT OVERVIEW

2.1 Proponent Description

This section of the Application / EIS will provide information (history, description, and contact information) on the proponent. It will also include a background description and contact information for members of the proposed Raven Project Management Team.

The proponent for the proposed Raven Project is Compliance Coal Corporation (CCC) dba the Comox Joint Venture (CJV; proponent). The Raven property is owned by the CJV, which consists of three companies: CCC (60 percent (%); I-Comox Coal Inc. (ICC), a subsidiary of Itochu Corporation (20%); and LG International Investments (Canada) Ltd. (LGI) (20%). The three companies have formed the CJV for the purpose of exploring and developing their coal and mineral interests on Vancouver Island. Under the CJV arrangement, CCC will be responsible for managing and operating the proposed Raven Project, and ICC and LGI will be responsible for the global marketing for the products produced from the Raven property on an exclusive basis. CCC is a 100% subsidiary of Compliance Energy Corporation (CEC).

CEC is a publicly listed Canadian company based in Vancouver, British Columbia (BC) with interests in mining. CEC shares trade on the TSX Venture Exchange under the symbol CEC. The Company was incorporated under the *Company Act* of the Province of BC on 6 July 2000 as 610230 BC Ltd. and changed its name to Beanstalk Capital Corporation on 27 July 2000. On 19 December 2000 the Company was listed on the Canadian Venture Exchange as a "Capital Pool Company". On 7 May 2002 the Company announced that it had entered into an agreement to acquire all of the issued and outstanding shares of CCC, a private company based in Vancouver, BC that had the right to develop the coal resources in the Tulameen Coal Basin located near Princeton, BC. On 30 August 2002 the Company completed the acquisition of CCC and as part of the acquisition, changed its name to CEC.

CEC's contact information is as follows:

Address: Suite 550, 800 West Pender, Vancouver, BC V6C 2V6

Telephone: 604-689-0489

Facsimile: 604-681-5910

E-mail: john@complianceenergy.com (John A. Tapics, President & Chief Executive Officer (CEO))

Internet: <http://www.complianceenergy.com>.

John A. Tapics, CEC's President and CEO will be the principal contact person for purposes of the EA.



The Application / EIS will identify the qualifications and expertise of the professional(s) preparing each section of the Application / EIS or technical study.

2.2 Proposed Project Description

This section will describe the location and components of the proposed Raven Project in sufficient detail to support the prediction and assessment of potential project-related effects. Each proposed Raven Project phase and their associated activities and components will be described in the Application / EIS with sufficient detail to allow the proponent to predict potential adverse effects and address concerns of interested parties. The section will provide a timeline for each proposed project phase and a discussion of each proposed project component including relevant on-site and off-site facilities. The Environmental Management System (EMS) will be described in a separate section of the Application / EIS including risk management approaches applied and considered for each component of the proposed Raven Project.

The Application / EIS will describe the provincial and federal triggers for the EA. Pursuant to Part 3 of the *Reviewable Projects Regulation* (B.C. Reg. 370/02), an EA Certificate is required because the proposed Raven Project would be a new mine facility that, during operation, would have a production capacity of greater than 250,000 tonnes per year of clean and raw coal (combined). Pursuant to section 5 of the *Canadian Environmental Assessment Act (CEA Act)* a federal EA is required for the proposed Raven Project because: Fisheries and Oceans Canada (DFO) may issue authorizations for works or undertakings associated with the proposed project; and the PAPA may make federal lands available to allow the proposed project to proceed. The proposed Raven Project is subject to a comprehensive study pursuant to section 16(d) of the *Comprehensive Study List Regulations* of the *CEA Act* because the proposed coal production capacity would be 3000 tonnes per day (t/d) or more. The proposed Raven Project has been designated a major resource project tracked by the Government of Canada's Major Projects Management Office (MPMO) (www.mpmo-bggp.gc.ca).

The following comprise components of the Raven Project as currently proposed:

- 16 year mine life with an average of 0.83 million tonnes (Mt) of clean coal per year and a range of 0.7 to 1.1 Mt per year;
- Underground mine works;
- Process plant and ancillary facilities;
- Raw and product coal stockpiles (metallurgical and middlings);
- A reject pile consisting of coarse and fine rejects;
- Sediment ponds;



- Topsoil and till storage;
- Administration building (first aid and other administrative offices);
- Maintenance building (equipment repairs and storage);
- Power supply and distribution facilities;
- Service facilities (water treatment plant, compressed air, and fire fighting facilities);
- Sewage treatment facilities and possible on-site landfill;
- Hazardous material storage facilities;
- Existing power access;
- Upgrades to existing roads;
- Transportation of coal along existing roads; and
- Upgrades to the Port Alberni Port Facility.

Two coal seams (Seams 1 and 3) would be accessed from a coal outcrop on the west side of the deposit, eliminating or minimising the need for cross stone drifts and minimising the number of ventilation raises required. Several roadways would be driven from the surface directly into Seam 1. A small bench may be excavated to create a clean seam exposure for roadways to be driven from, or cut and cover trenches dug to create access through unconsolidated surface material. At a minimum, four roadways would provide a travel way for personnel, materials, conveyor, and ventilation. The roadways would be the height of the seam and 5 to 6 metres (m) wide. Depending on the initial gradient of the travel way for personnel and materials, the floor of the roadway may be concreted. Access to Seam 3 would be from short cross measure stone drifts driven underground from Seam 1 to Seam 3. Run-of-mine (ROM) coal would be processed above ground on the Raven property, in a coal preparation plant (CPP).

The proposed CPP would be capable of processing a nominal 2.2 Mt per year of feed operating 6,000 hours per year with maximum annual capacity in the range of 2.5 Mt per year. Coal processing capacity would be 363 tonnes per hour (t/h). Product metallurgical coal from the plant would be transported by conveyor to a clean coal radial stockpile. Coal from the radial stockpiles would be moved by front-end loader to a feed hopper and conveyed to one of two 50,000 tonne stockpiles depending on coal quality. The product stockpile arrangement allows coal of varying quality to be blended to prepare both metallurgical and middling products for shipment. Plant reject would be conveyed overland to a Reject Disposal Area where the reject would be discharged by a radial stacker and would be spread and compacted by a bulldozer.



The total disturbed surface area is estimated at approximately 200 hectares (ha). Mine life is estimated to be 16 years. The entire disturbed area would be reclaimed. Land use and productivity objectives would be consistent with the pre-mining levels determined by baseline observations and studies. Particular consideration would be given to the restoration of habitat for ungulates and plants of ethno-botanical importance to Aboriginal groups. Reforestation programs would be compatible with the silviculture programs being conducted as part of the regional timber harvesting activities. The preliminary reclamation goal would be to re-establish the site for recreational and wildlife values.

2.2.1 Need for and Purpose of the Proposed Project

This section of the Application / EIS will describe the need for and purpose of the proposed Raven Project. The “need for” the project is defined as the problem or opportunity that the proposed Raven Project is intending to solve or satisfy. The “purpose of” the project is defined as what is to be achieved by carrying out the proposed Raven Project. The “need for” and “purpose of” the project will be established from the perspective of the proponent.

2.2.2 Proposed Project Location and Mapping

The Application / EIS will identify the proposed Raven Project location along with the latitude and longitude of the site. Mapping at appropriate scales indicating site layout and the regional setting of the proposed Raven Project components and activities will be included in the Application / EIS. The mapping will identify proximities to natural features and designated environmentally sensitive areas. The distance to nearby communities and their locations on a regional map will also be provided. Site plans, photographs, and sketches along with features and activities will be incorporated into the maps. Mineral claims held by the proponent will be identified. Tenure, ownership and management details for all lands within the proposed above ground footprint will be identified. The Application / EIS will also include a discussion of facility location considerations with respect to natural hazards and environmental concerns (e.g., fish and wildlife habitat, visual and aesthetic resources, etc.). Project location and mapping information that would be provided for the mine site component of the proposed Raven Project will also be included for the PAPA upgrade and coal facility work.

The Raven property is approximately 3100 ha (9 kilometres (km) by 3½ km) and is located on eastern Vancouver Island, within the Comox Valley Regional District (CVRD) (Figure 2.2-1). Baynes Sound, which separates Denman Island from Vancouver Island, is to the east of the property. The City of Courtenay is approximately 20 km to the north, and Port Alberni is approximately 80 km to the south.

The Raven property is located within the National Topographic System (NTS) maps (1:50,000) 92F10W and 92F7W and within BC Geographic System (BCGS) (1:20,000) maps 092F056 (north) and 092F046 (south). Coordinates at the centre of the proposed Raven Project footprint are 49° 30' 8.0742" latitude and 124° 52' 36.4074" longitude. The Universal



Transverse System's (UTM) for the proposed Raven Project site (zone 10) are X: 362988.91, Y: 5484806.55. Figure 2.2-2 summarises the proposed Raven Project land tenure. The proposed Raven Project is located on private land and on land administered by PAPA.

The proposed Raven Project is located within the treaty rights area of the:

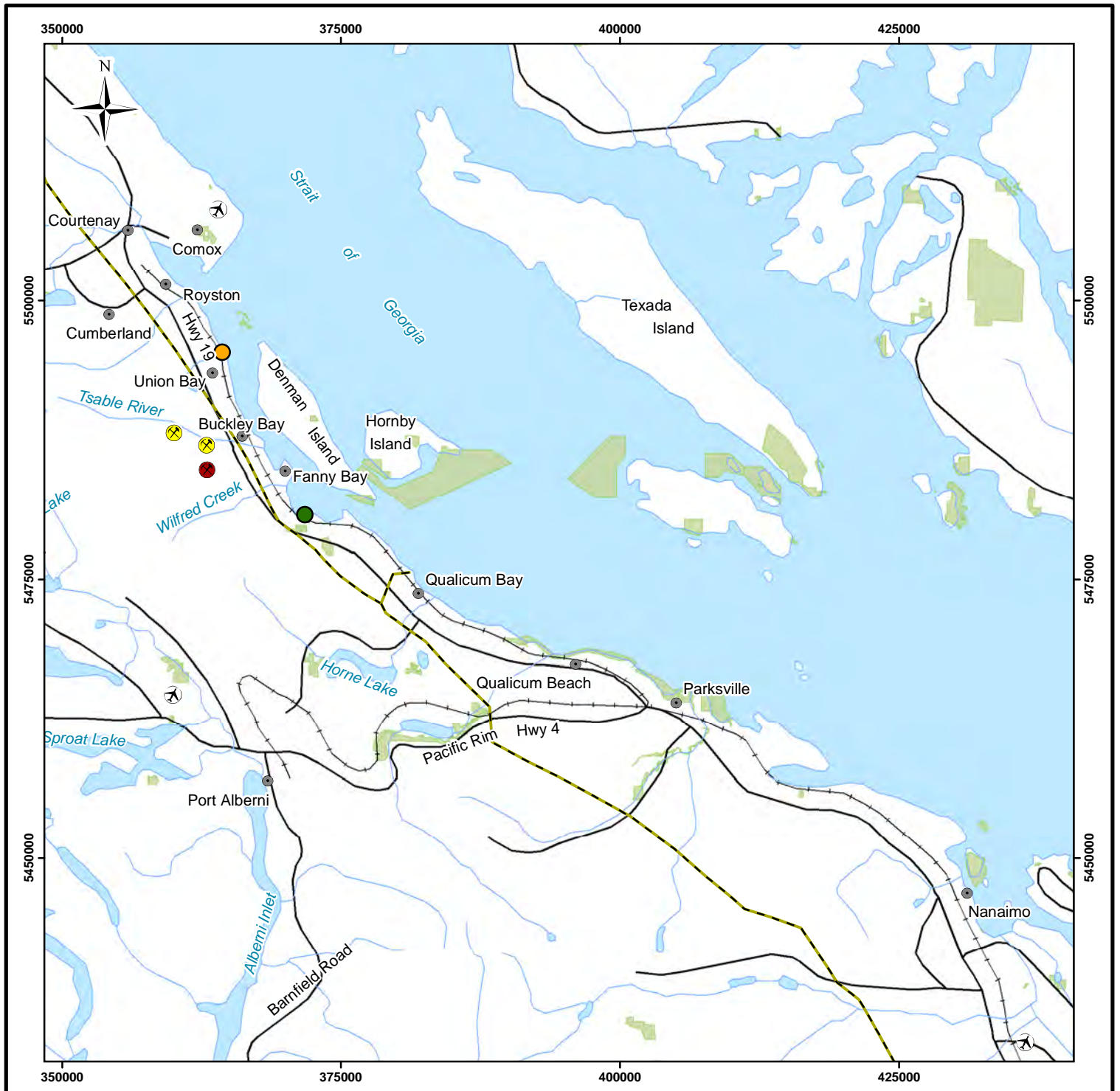
1. Maa-nulth First Nations:
3075 3rd Avenue, Port Alberni, BC V9Y 2A4

The proposed Raven Project is located in the asserted territories of the:

1. Wei Wai Kum First Nation (member of Laich-Kwil-Tach Treaty Society):
1400 Weiwaikum Rd., Campbell River, BC V9W 5W8
2. We Wai Kai Nation (member of Laich-Kwil-Tach Treaty Society):
PO Box 220, Quathiaski Cove, BC V0P 1N0
3. K'ómoks (Comox) First Nation:
3320 Comox Road, Courtenay, BC V9N 3P8
4. Qualicum First Nation:
5850 River Road, Qualicum Beach, BC V9K 1Z5
5. Xwémalhkwa Nation (formerly Homalco Indian Band):
1218 Bute Crescent, Campbell River, BC V9H 1G5
6. Tseshaht First Nation:
5091 Tsuma-as Drive, Port Alberni, BC V9Y 8X9
7. Hupacasath First Nation:
5500 Ahahswinis Drive, Port Alberni, BC V9Y 7M7
8. Métis Nation BC:
30691 Simpson Road, Abbotsford, BC V2T 6C7

The proposed Raven Project is in the vicinity of the asserted territories of the:

1. Hul'qumin'um Treaty Group (which includes the Cowichan Tribes, Chemainus First Nation, Penelakut Tribe, Lyackson First Nation, Lake Cowichan First Nation and the Halalt First Nation):
12611-B Trans Canada Highway, Ladysmith, BC V9G 1M5
2. Sliammon First Nation:
RR2 Sliammon Rd., Powell River, BC V8A 4Z3



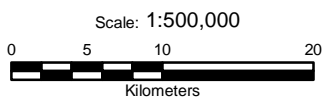
Legend

- Raven Coal Project
- ⊗ Historic Mine Site
- Qualicum National Wildlife Area
- Coal Waste Pile
- Airport
- Populated Place
- Road
- Rail line
- Transmission Line
- Park or Protected Area

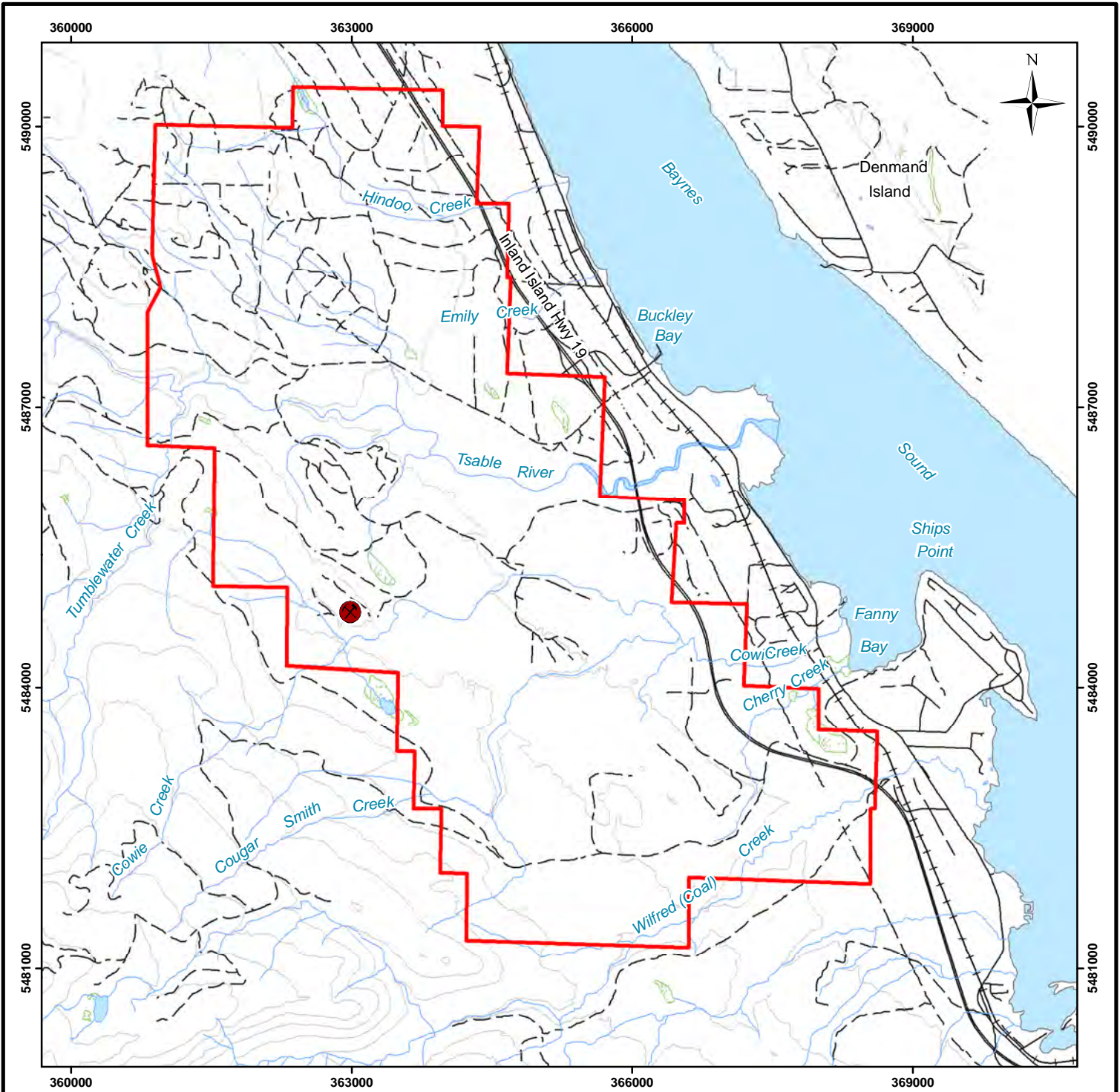
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Reference










Base Data: 1:2,000,000 scale
from the Land and Resource Data Warehouse



Compliance Coal Corporation		
PROJECT: Raven Underground Coal Project		
<h2 style="margin: 0;">Proposed Raven Project Location</h2>		
DATE: April 15, 2009	ANALYST: EO	<h3 style="margin: 0;">Figure 2.2-1</h3>
JOB No.: VE51897	QA/QC: LR	PDF FILE: 18-50-002_location_map.pdf
GIS FILE: 18-50-002		
PROJECTION: UTM Zone 10	DATUM: NAD83	



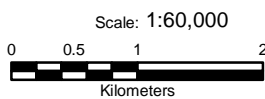
Legend



-  Raven Coal Project
-  Populated Place
-  Road
-  Railway Line
-  Railroad
-  Elevation Contour (100 m)
-  Watercourse
-  Waterbody
-  Wetland
-  Raven Coal Property Tenure

DRAFT

Reference

TRIM scale 1:20,000



CLIENT:  Compliance Coal Corporation	
PROJECT: Raven Underground Coal Project	
<h2 style="margin: 0;">Proposed Raven Project Land Tenure</h2>	
DATE: July 6, 2009	ANALYST: EO
Figure 2.2-2	
JOB No: VE51897	QA/QC: LR
PDF FILE: 18-50-006_prop_boundary.pdf	
GIS FILE: 18-50-006	
PROJECTION: UTM Zone 10	DATUM: NAD83
	



2.2.3 Background and Rationale

The Application / EIS will provide a summary of the history of exploration activities on and around the Raven property since its initial discovery. Project rationale and objectives will be presented in the Application / EIS along with economic study results, sustainability principles, and traditional knowledge (TK) that have guided project planning. The rationale for the selection of Port Alberni for the proposed Port Facility will also be presented.

The land within and adjacent to the Raven property has been extensively explored. Historical activities have included:

- 1875 - 1877: the abandoned Baynes Sound Mine was in operation (production statistics unavailable);
- 1949 - 1966: the abandoned underground Tsable River Mine (to the west of the proposed Raven Project area on the north bank of the Tsable River) produced approximately 2.0 Mt of coal;
- Pre - 1975: 95 rotary drill holes totalling 14,400 m;
- 1990-2001: 57 core or rotary core holes totalling 11,800 m;
- 1996: 13.6 km of seismic surveys;
- 2006: 12 rotary cores totalling 2,900 m;
- 2006: 21.0 km of seismic surveys;
- 2006: 12 tonne bulk sample; and
- 2009: completion of 3 partial holes previously drilled, and drilling of 41 new holes.

A coal washing plant and coke ovens were located in Union Bay to the north of the proposed Raven Project and operated during the late 1800s to early 1900s (Seacor n.d.).

2.2.4 Geology and Coal Resources

This section of the Application / EIS will describe the regional geology (stratigraphy, structure and coal seam development and correlation), proposed Raven Project underground mine geology (stratigraphy, structure and coal seams to be mined), and coal resources of the proposed Raven Project underground mine. The Application / EIS will include mapping of geological faults in relation to streams, surface water bodies, mine surface components and underground workings. Results from geo-mechanical analysis of rock strata in relation to their susceptibility to fracturing, subsidence, and potential changes to permeability, including effects due to faults and proximity to faults will be described, including an accounting for the thickness of overlying rock in different sections of the mine.



2.2.5 Geochemical Characterisation

This section of the Application / EIS will describe the approach and methods used to collect data on metal leaching and acid rock drainage (ML/ARD), which has the potential to impact both surface and groundwater quality. The information will also be used to guide waste management planning.

This section will describe the approach, methods and results of ML/ARD characterisation for the Raven coal deposit (including static acid-base accounting (ABA) testing, kinetic leach testing and potentially field based leach testing). The description will be sufficiently detailed to assess the potential for ML/ARD from the overburden and interburden waste rock, coarse and fine rejects that may be generated during mining. The assessment will review and, where appropriate, incorporate available data with respect to ML/ARD. Results from the ML/ARD characterisation will be described. The description will document the geochemical characteristics of all mine components and materials to be disturbed or created during mining including coal, coarse and fine coal rejects and underground mine surfaces including the waste left in old workings (gob). Results will be integrated into mine planning and used in the assessment of potential impacts to surface and groundwater quality as well as in waste management planning and development of follow-up and monitoring programs. The assessment of ML/ARD will be conducted in accordance with the following ML/ARD policy and guidance documents:

- “Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia”, British Columbia Ministry of Energy and Mines (BC MEM) and British Columbia Ministry of Environment, Lands and Parks (BC MELP), July 1998; and
- “Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia”, BC MEM, August 1998.

Sufficient samples from each material will be collected to ensure adequate representation. Sampling will focus on characterising the reject rock material, including the gob, as well as interburden and partings between coal seams where pyrite is often found. The program would include sufficient samples to characterise ML/ARD variability and sulphur distributions within the rejects.

Drill core and rock samples will be submitted for ABA and metals testing. Testing will include:

- Paste pH;
- Modified Sobek neutralization potential (NP);
- Total inorganic carbon;
- Sulphur (S) speciation (total S, sulphate-S, sulphide-S and organic-S);



- Total metals by aqua-regia inductively coupled plasma;
- Leachable metals; and
- Mineralogy by Reitveld X-ray diffraction.

A sub-set of the ABA samples will also be submitted for shake flask extraction to assess the soluble metal content.

A kinetic testing program to assess the ML potential and predict the rates of acid generation and depletion of NP (the estimate of lag time until material 'goes acid') in rock units and coal rejects will be conducted following ABA testing.

The ML/ARD characterisation will be used to provide geochemical source terms for predictive geochemical and water quality modelling. The ML/ARD management strategy (such as an engineered cover over the rejects or blending of rejects material to inhibit ML/ARD formation) proposed will be sufficiently supported by the appropriate studies to demonstrate their feasibility.

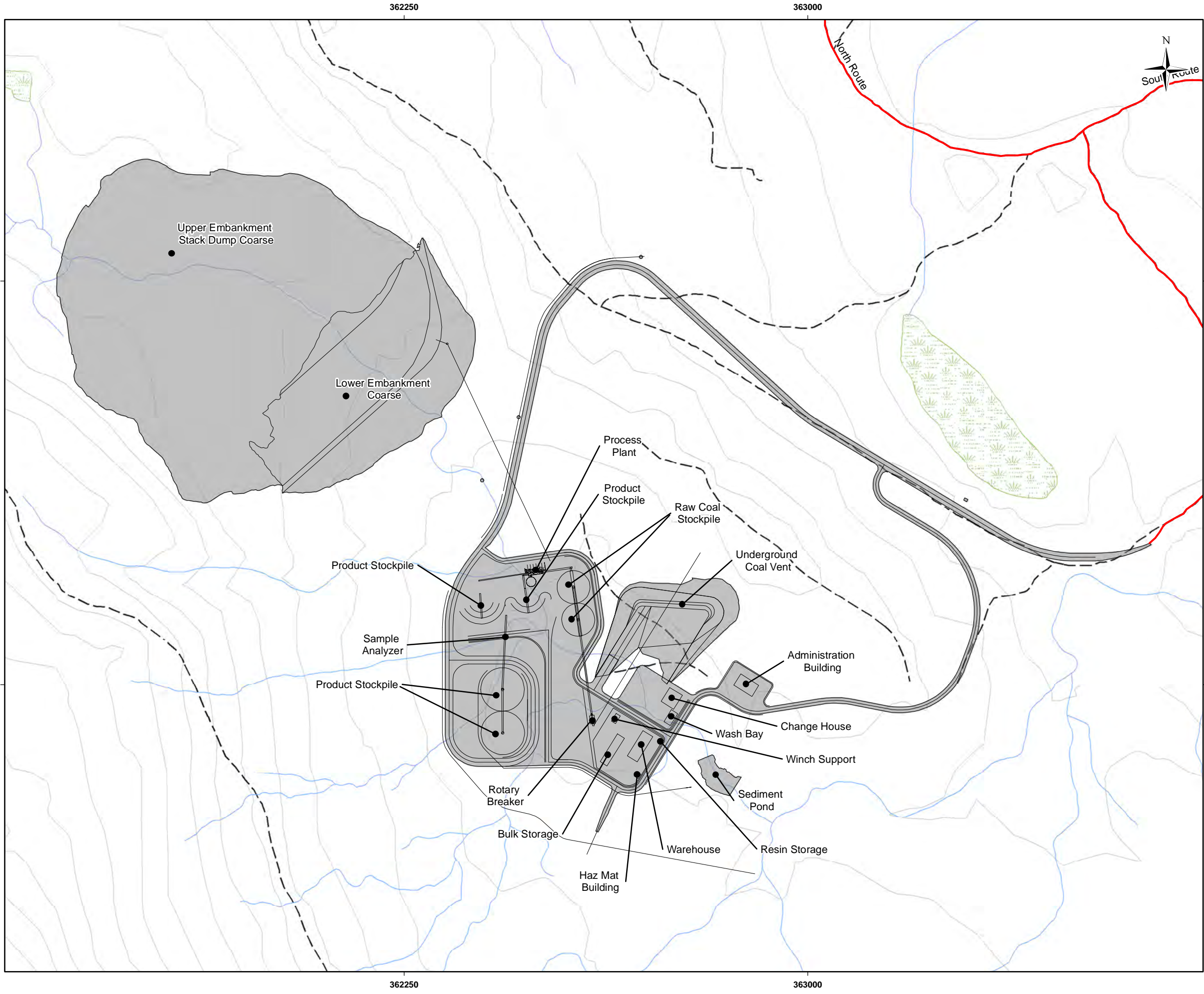
The proposed Raven Project would use existing roads. If road upgrades are required, an assessment for ML/ARD potential would be completed during the construction phase as a component of the Soil Management Plan. Any required assessments would be completed in concert with regulatory agencies.

2.2.6 Mine Plan

The Application / EIS will provide a mine plan and feasibility assessment detailed enough to demonstrate that the proponent has the necessary understanding, resources, technical capability, and intent to develop the mine in a safe and environmentally sound manner. This includes a preliminary mine plan developed in accordance with the "Health, Safety and Reclamation Code for Mines in British Columbia" (British Columbia Ministry of Energy, Mines and Petroleum Resources (BC MEMPR) 2008) and map(s) as appropriate to demonstrate the possible extent of underground workings. The proponent's objective is to develop a robust mine plan based on the philosophy of "design for closure" and will use accepted sound engineering and environmental practices.

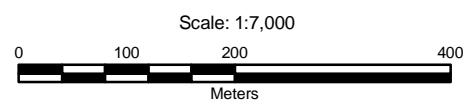
The mine plan will consider the results of environmental studies in order to minimize potential effects of the proposed Raven Project. The proposed Raven Project footprint would be located and sized to minimise potential effects. A preliminary plan of mine surface facilities is presented in Figure 2.2-3.

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- Legend**
- Proposed Access Road
 - Paved Road
 - - - Gravel/Rough Road
 - + + + Railroad
 - Elevation Contour (20 m)
 - Watercourse
 - Waterbody
 - Wetland
 - Potential Location of Site Facilities

DRAFT



Reference
 LIDAR (5m) used to define Cowie and Cougar Smith Creek Watercourses
 TRIM used in other watersheds
 Basedata: TRIM

CLIENT:	Compliance Coal Corporation	
PROJECT:	Raven Underground Coal Project	
<h2>Conceptual Infrastructure</h2>		
DATE: November 9, 2010	ANALYST: EO	Figure 2.2-3
JOB No: VE51897	QA/QC: BO	PDF FILE: 18-50-004_mine_site.pdf
GIS FILE: 18-50-004		
PROJECTION: UTM Zone 10	DATUM: NAD83	



The mine plan will include discussion of:

- Mine planning, development and production schedules;
- Anticipated underground layout, showing the proposed sequence of coal extraction;
- Locations of support pillars, anticipated pillar spacing and pillar size and strength;
- Locations of ventilation shafts;
- Depth of mining, vertical cover thickness overlying the underground workings and risk of surface subsidence;
- Volume of waste rock and rejects to be generated;
- Coal and rejects handling, including rationale for selection of waste rock disposal sites;
- Water management and drainage collection works design;
- Effluent generation;
- Air and sound emissions;
- Rejects and rejects production;
- Stockpiles, including locations and maximum sizes;
- Shipment of coal down Alberni Inlet and Trevor Channel to the Cape Beale Pilotage Station;
- Operations;
- Equipment;
- Services;
- Storage, use, handling, and disposal of hazardous materials and dangerous goods including explosives; and
- Emergency response and safety planning, awareness and training.

The mine plan will include an access plan that will detail the travel routes to be used for transporting workers to and from the site during construction and operations. The mine plan will also include an access plan for transporting the processed coal to Port Alberni, the preferred Port Facility. The Application / EIS will include preliminary designs of any proposed culvert upgrades. The proponent will comply with each relevant provincial, federal, and municipal regulation related to road construction and maintenance, and incorporate these into the design and operation of roads. For example, trucks to be used off-site would meet required road load limits. In addition, the proponent will work to the best



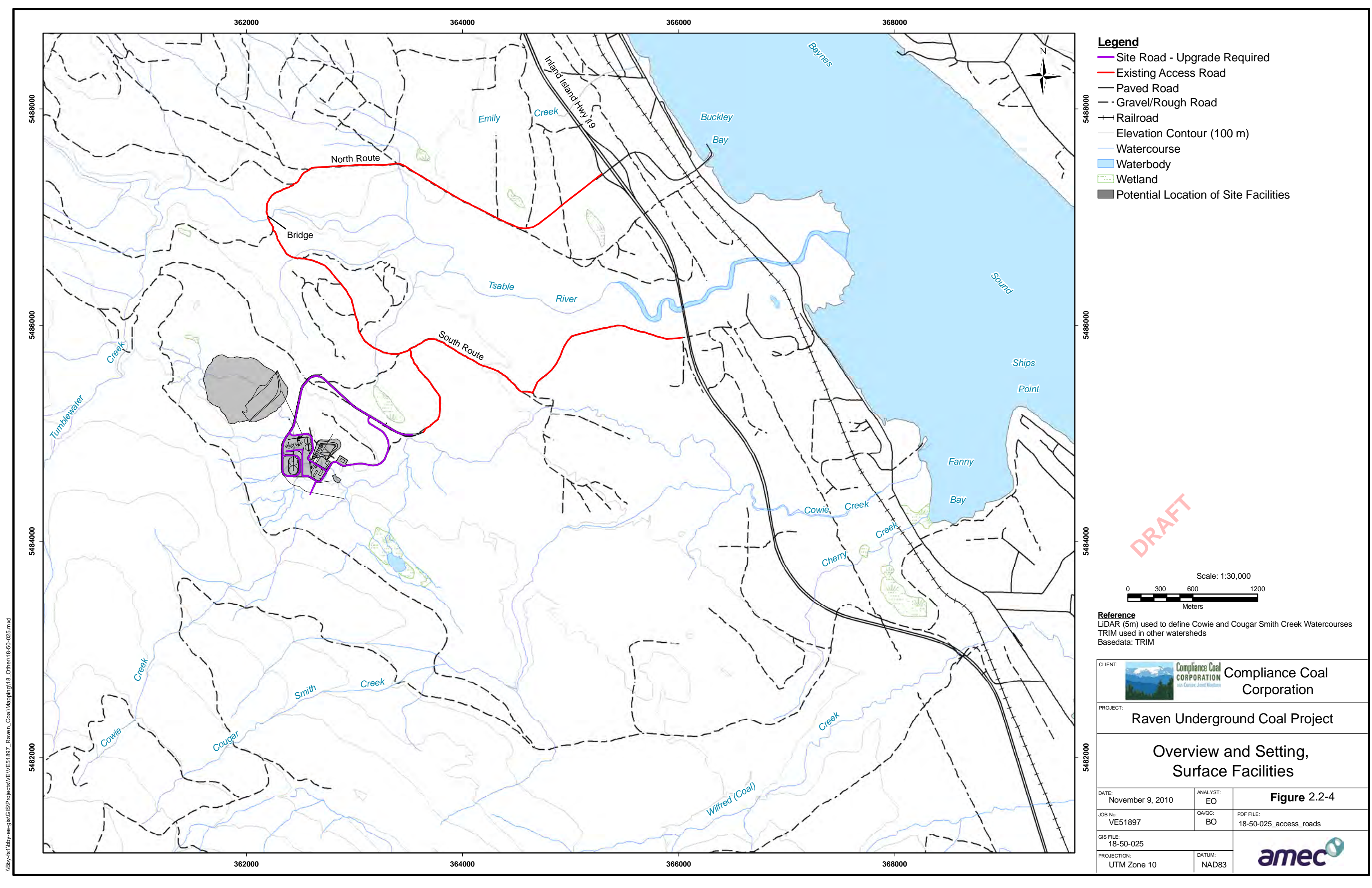
of its ability with other stakeholders to address common aspects of the road construction, road maintenance, and safe road use.

There are five coal seams identified as occurring in the proposed Raven Project area, two of which are considered to be of economic interest: Seam 1 and Seam 3. Seam 1 is the prime economic target. Seam 3 is, on average, approximately 30 m above Seam 1, and generally occurs as two coal plies (lower and upper ply), with Seam 3 Upper being the economic target. Coal would be mined underground, using the room-and-pillar method. Room-and-pillar coal mining with pillar extraction is widely used in Canada and the United States (US) and is particularly suited to geologies such as that at the Raven property, where faulting and variable coal quality are expected (AGL 2007; ORCRC 2007).

Coal from the Raven property is considered unique in Western Canada because of its high volatile content and its strong metallurgical properties. Coal from the Raven property is relatively hard (HGI of 51-53) and thus has a relatively coarse size distribution. The proposed Raven Project is estimated to be capable of producing from 1.6 to 2.4 Mt of ROM coal per year and 0.7 to 1.1 Mt of clean coal (processed) per year. Coal quality and washability testing suggests that the clean coal product would be metallurgical coking coal (met coal) and middling coal.

2.2.7 Access and Power

The site is currently accessed via the Inland Island Highway (Highway 19) from two existing private forest roads built and maintained by Island Timberlands (Figure 2.2-4). The northern road (Buckley Bay Mainline road) would be used by in-coming trucks, and the southern route used by out-going trucks. From the exit point on Highway 19, the distance travelled on existing two lane logging roads is approximately 7.6 km. Processed coal would be transported by road via Highway 19 to Parksville, and via Highway 4 to Port Alberni. Alternative routes from Highway 4 to the port terminal at PAPA will be examined and analysed. Coal would be loaded to Panamax ships at the proposed Port Alberni Port Facility for export. Existing roads to the proposed Raven Project may require some upgrades. Other local forestry roads and private logging and resource roads provide access to various other parts of the proposed Raven Project property.



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Power to the mine site would be brought in by interconnecting to a major BC Transmission Corporation (BCTC) 132 kilovolt (kV) transmission line located more or less parallel and to the east of the Inland Island Highway adjacent to the proposed Raven Project. There are three 132 kV lines and one 230 kV line in this corridor. A line tap connection to one of the three 132 kV BCTC transmission lines and construction of 5.1 km of 132 kV transmission line along the Holiday Main to the facilities area would be required. Construction of a step down substation would be required at site. Grounding and fault detection equipment would meet all regulatory standards. The location of the right-of-way (ROW) for the new power line, which would be based on the selected configuration of the mine site, will be determined in the Feasibility Study. The information pertaining to where the new substation would be located will be provided as it becomes available. The process plant would also include electrical rooms for distribution voltage step-down, motor control centres, and emergency generators.

Other infrastructure in the vicinity of the Raven property includes: the Esquimalt and Nanaimo (E & N) railway, which links Courtenay to Victoria and Port Alberni and lies parallel to the Island Highway and off the eastern edge of the property boundary; and the Vancouver Island 10-inch natural gas pipeline.

2.2.8 On-Site Facilities

The Application / EIS will describe the on-site components of the proposed Raven Project and associated infrastructure, including the results of studies leading to the selection of the sites. Alternate locations for these sites will be discussed. The level of detail will be determined by the predicted potential impact of the preferred site selection. This will include:

- CPP: including coal characteristics, design criteria (including environmental controls), flowsheet, screening, breaking, treatment, crushing, conveying, flotation, environmental controls and power requirements;
- Coarse and fine rejects stockpiles, and alternatives for disposal based on ML/ARD characterisation;
- Power supply and distribution system: power could be brought from a main line 5 km away; a substation and connecting electrical switchgear would be required, as well as grounding and fault detection equipment that meets regulatory standards;
- Water management facilities including surface and underground water balance calculations, ponds, potable water supply and storage (potable water system plans would be provided as part of detailed permitting and would meet the requirements of the *Drinking Water Protection Act* as administered by the Vancouver Island Health Authority (VIHA)); storm water management measures, diversion systems, water withdrawal and discharge points and facilities used for recycling water (water quality would conform to



Waste Management Effluent Permit objectives before being discharged to surface water bodies);

- Mine ventilation facilities for management of mine methane gas;
- Sewage treatment facilities and effluent monitoring provisions, including predicted wastewater flow volume, and effluent characteristics and point of discharge (water quality would conform to the proposed *Wastewater Systems Effluent Regulations* objectives before being discharged to surface water bodies; BC Ministry of Environment (BC MOE) would be responsible for regulating sewage disposal and industrial wastewater):
- Solid waste disposal facilities (e.g., landfill, contractor removal to an existing landfill);
- Fire protection system, including consideration of spontaneous combustion risks;
- Concrete foundations for the main underground conveyer drive and the stacker conveyer;
- Tank farm (consisting of double-walled fuel tanks and a double-walled waste oil collection tank), tank farm containment measures, and spill prevention measures;
- On-site containment features (e.g., concrete pads and dykes), and early warning spill detection systems;
- First aid and security;
- Administration building used for on-site personnel offices, communications, first-aid, and other administrative requirements; and
- Maintenance building used as a cover for equipment repairs, and for storage of consumable items such as bagged limestone dust.

Mobile and stationary equipment would conform to the “Health, Safety and Reclamation Code for Mines in British Columbia.” (BC MEMPR 2008)

The methods used in the alternatives assessment for the coarse and fine rejects stockpiles (including presenting technical feasibility, environmental and capital and operating costs as criteria) would be provided. The rejects would be filtered to a 30 percent (%) moisture content.

2.2.9 Off-Site Facilities

The Application / EIS will describe the relevant off-site proposed Raven Project components and associated infrastructure, including the results of studies leading to the selection of the sites. Alternate locations for these sites will be discussed. The level of detail will be determined by the predicted potential impact of the preferred site selection, but sufficient to



identify where effects monitoring would be required for the purpose of risk analysis and to provide details on potential environmental effects. Component areas to be addressed include:

- Electrical power supply and transmission - including identifying the power line options considered to provide power to the mine site, and the preferred option;
- Development activities at the proposed Port Facility at Port Alberni - including information on facility security, pile driving, dredging, dredge spoil testing and deposition, and dolphin placement; and
- Transportation and access - including the access roads and site roads; the transportation of people and materials by road, the marine transportation of coal down Alberni Inlet and Trevor Channel, and the time to time movement of explosives and hazardous materials. The Port Facility and coal transport options would be described and the tenure and ownership of access roads would be identified.

Based on engineering, environmental considerations, costing and consultation work, Port Alberni has been identified as the preferred option for the location of the Port Facility. In addition, trucking has been identified as the preferred option for the transport of coal from the mine site to the Port Facility. Highways 19 and 4 would be used to transport coal from the mine site to Port Alberni. The feasibility of alternate routes utilising industrial secondary roads will be considered. Although rail was identified in the section order, a rail option does not exist at this time, because a rail line is not currently technically and economically feasible.

PAPA has advised that the existing wharf at Berths 1 and 2, and the adjacent terminal area, could be made available for vessel berthing / loading and coal storage respectively. The existing wharf is approximately 320 m long and was built in increments (oldest portion-1950s, newest-1980s) out of timber piling, timber caps, and concrete deck sections. The wharf structure is in satisfactory condition, but does not meet code requirements for seismic resistance. As a result, a standalone coal loader support structure is proposed. The new berthing and loading facility would be structurally independent from the existing timber wharf. The existing wharf structure would not be degraded nor upgraded by the proposed changes.

The new berthing and loading structure would consist of a new concrete deck structure, a covered conveying system, an enclosed ship loader, a new fender system, and new steel pipe piling, located within the footprint of the existing wharf. The southern portion would be used for berthing to minimise the amount of dredging required to accommodate Panamax-sized vessels. An examination and analysis of alternative transportation routes from the mine site to Port Alberni would also be presented. In addition, five new dolphins would be constructed at the southern end to position and moor vessels beyond the wharf face, further



minimising dredging requirements. Upland storage facilities would include covered conveyors to reduce noise and fugitive dust emissions and storage buildings with a storage capacity of up to 80,000 tonnes (Panamax-sized load).

2.2.10 Construction Phase Activities

Construction activities will be described, along with the intended approach for the delivery of required services and associated logistics. These include:

- Employment;
- Access road;
- Transmission line;
- Equipment and machinery transportation to site including analysis of anticipated changes to traffic (e.g., type and volume) on public roads and marine shipping routes;
- Land clearing;
- Excavating;
- Grading;
- Soil and till salvage, handling and storage, including locations, volumes and impacted areas;
- De-watering, including water disposal;
- Directional drilling;
- Infilling;
- Surface infrastructure installations;
- Drift supply, conveyor and ventilation shaft development;
- Blasting;
- Temporary sump installation;
- Conveyers installation;
- Fan installation;
- Site set-up (first aid, safety, fire and security);
- Obtaining the applicable permits and approvals from VIHA for water system, sewage system (if applicable) and food premises (if applicable); and
- Environmental mitigation, enhancement and compensation works (including fish habitat compensation structures).



The Application / EIS will include the sequence of events for construction, including construction timelines. On-site construction camp facilities and ancillary facilities (e.g., potable water, solid and liquid waste, and sewage treatment), if required, will be described. The Application / EIS will also describe any construction activities required to upgrade the existing Port Facility at Port Alberni.

2.2.11 Operations Phase Activities

Coal resource extraction and associated activities including maintenance will be described in the Application / EIS. These include:

- Employment;
- Underground mining;
- Processing;
- Coal transportation by truck to PAPA (including a description of methods to mitigate fugitive dust emissions, analysis of anticipated changes to traffic (e.g., type and volume) on public roads);
- A description of the proposed Port Facility at Port Alberni, including ship activity at port, past, present and anticipated future frequency of ships, number of days in port, loading procedures and coal storage at port;
- Water management related to coal extraction and processing activities including: mine de-watering during the operation, water requirements for processing, management of overflow from the sediment pond(s) and management of waste rock contact water;
- Dust emission control of the underground and CPP ventilation systems;
- Soils and rejects / waste management; and
- Mine methane gas management.

2.2.12 Decommissioning Activities

The Application / EIS will include information about the expected lifetime of the proposed Raven Project and any proposed Raven Project components. Conceptual plans for reclamation and decommissioning, the removal of structures and ancillary equipment, and site remediation will be included in the Application / EIS. The proponent will develop a Conceptual Closure and Reclamation Plan that includes estimates of long term maintenance and monitoring costs, as well as end land use. The Application / EIS will include a conceptual plan for temporary or early-permanent closure. This plan will also include a discussion of soil capability for reclamation and closure. Activities and issues associated with mine decommissioning will be described, including the following:



- Employment;
- Stream drainage restoration and water management at closure;
- Ongoing water treatment, if required;
- Surface rejects area reclamation;
- Coal stockpile areas reclamation and fugitive dust control;
- Contingency plans for disposal of any remnant stockpiled coal that could not be used;
- Soil use for reclamation;
- Revegetation;
- Settling pond decommissioning;
- Mine access roads decommissioning and reclamation;
- Access road decommissioning and reclamation;
- Transmission line decommissioning and reclamation;
- Underground mine works, including subsidence issues;
- Equipment and machinery removal, recycling, disposal;
- Removal and recycling or disposal of any industrial wastes;
- Surface infrastructure dismantling, removal, recycling, and disposal; and
- Decommissioning and / or reassignment of proposed Raven Project specific facilities at the port.

2.2.13 Scheduling

An estimated year-by-year construction to post-closure schedule based on best available information will be incorporated into the Application / EIS.

The anticipated development schedule for the proposed Raven Project (Table 2.2-1) is based on an anticipated mine life of 16 years, and includes the duration of key project phases including construction, commissioning, operation, and decommissioning and abandonment. Additional information and schedule details for the proposed Raven Project will be developed during the ongoing feasibility study and EA process and will be included in the Application / EIS.



Table 2.2-1: Preliminary Project Schedule

Phase	Duration
Construction	2012
Commissioning	2013
Operation	2013 to 2029
Decommissioning and abandonment	2029 to 2030

2.2.14 Environmental Management System

This section of the Application / EIS will summarise the EMS for the proposed Raven Project. Complete details of the EMS will be provided in Section 10 of the Application / EIS.

The EMS for the proposed Raven Project will ensure a consistent approach to responsible environmental management by inclusion of the following elements, which are described in more detail in Section 10 of this draft Application Information Requirement / Environmental Impact Statement Guidelines (AIR / EIS Guidelines) document:

- Planning;
- Implementation;
- Checking and corrective action;
- Continual improvement; and
- Stakeholder engagement.

2.2.15 Human Resources Procedures and Procurement Policy

The Application / EIS will outline and identify the proponent's human resources policies and procedures and procurement policy during each proposed Raven Project stage. The intended approach for the delivery of services and associated logistics required in the operations phase of the proposed Raven Project will be described.

2.3 Provincial Scope of Proposed Project

This section of the Application / EIS will provide a description of the scope of the proposed Raven Project to be assessed in the provincial EA (pursuant to the section 11 Order).

Based on the Project Description submitted by the proponent, the BC Environmental Assessment Office (BC EAO) has designated the proposed Raven Project as reviewable under the BCEAA. On 5 March 2010, the BC EAO issued an Order under section 11 of the BCEAA describing the scope, procedures, and methods for this review. The EA will be tailored specifically to the circumstances of the proposed Raven Project as defined in both



the section 11 Order and an approved AIR / EIS Guidelines document. The first draft AIR / EIS Guidelines was submitted for regulatory review in April 2010.

The provincial scope of the proposed Raven Project to be assessed, as defined by the section 11 Order, would include, if applicable:

- An underground mine and associated surface infrastructure;
- Load area and stockpile(s);
- Topsoil and till storage areas;
- Water management and treatment structures including settling ponds and associated collection ditches;
- New access roads and / or existing road upgrades;
- Potential rail spur from the mainline or rail siding along the mainline;
- Coal processing plant site and associated facilities, including coarse reject piles; and fine reject piles, sedimentation ponds and ancillary infrastructure;
- A power transmission line from the existing BC Hydro transmission line near the Inland Island Highway to the mine site and related substation, if required;
- Natural gas line, if required, from the existing line near the Inland Island Highway to the mine site;
- Sewage treatment facilities; and
- Coal haul route to an appropriate deep sea port, now designated as Port Alberni.

The scope of the review will include:

- Potential adverse environmental, social, economic, health and heritage effects, and practical means to prevent or reduce to an acceptable level any such potential adverse effects; and
- Potential adverse effects on Aboriginal groups' interests, and, to the extent appropriate, ways to avoid, mitigate or otherwise accommodate such potential adverse effects.

There are two general stages in the provincial EA process: a pre-application phase when appropriate studies are identified through consultation and studies are undertaken; and an application review phase during which further consultation occurs and potential environmental, economic, social, heritage and health adverse effects are identified, mitigated, or avoided, and positive effects are identified and enhanced.



2.4 Federal Scope of Assessment of the Proposed Project

This section of the Application / EIS will provide a description of the scope of the proposed Raven Project to be assessed in the federal EA, as directed by the Canadian Environmental Assessment Agency (Agency).

Based on the Project Description submitted by the proponent, the Agency has determined that the proposed Raven Project is subject to the *Comprehensive Study List Regulations* and that an EA is required. The Agency will act as the Federal EA Coordinator and as the Crown Consultation Coordinator for the EA. The BC EAO and the Agency (Agency 2003a) have advised the proponent that the proposed Raven Project will undergo a single cooperative assessment as provided for in the "Canada-BC Agreement on Environmental Assessment Cooperation".

The federal scope of the proposed Raven Project considered for the EA consists of on-site and off-site proposed Raven Project components, which includes:

- On-site components:
 - Underground coal mine, including access trench, ventilation, and truck loading facility;
 - CPP, including screening, crushing, heavy medium separation, washing, cyclone separation, and flotation;
 - Coarse and fine rejects stockpiles and / or ponds;
 - Power supply / distribution, including 24 km from main line, substation;
 - Water management facilities, including settling ponds, storm water management measures, mine dewatering, diversion systems, water recycling facilities, potential process and mine water discharges to surface waters;
 - Domestic sewage treatment and disposal facilities;
 - Fire protection system;
 - Concrete foundations for main underground conveyer drive and stack conveyer;
 - Tank farm, including double-walled fuel tanks and double-walled waste oil collection tank;
 - First aid and security;
 - Maintenance building; and
 - Administration building.



- Off-site components:
 - Electrical power supply and transmission line;
 - Access roads and site roads;
 - Transportation of processed coal from mine site to coal storage shed at PAPA;
 - Facility upgrades at the existing port of Port Alberni, including sheet piling, new mooring bollards, dolphin and catwalk, dredging of shipping berth involving upland dredge spoil disposal, covered ship loading conveyor, truck unloading facility, coal storage shed with associated conveyor, and dust collection systems; and
 - Operation of vessels associated with the proposed Raven Project within Alberni Inlet and Trevor Channel to the Cape Beale Pilotage Station.

The proposed scope of factors to be considered in the federal EA (Table 2.4-1) were defined by the Agency in a document presenting background information for the initial federal public comment period on the Comprehensive Study pursuant to the *CEA Act* for the proposed Raven Project (Agency 2011).

Table 2.4-1: Federal Scope of Factors

Environmental Component	Scope of Review
Terrestrial physical environment	<ul style="list-style-type: none"> • Freshwater quality • Hydrology • Hydrogeology • Air quality • Climate and meteorology • Terrain, soils and geology • Light & noise emissions • Natural hazards
Terrestrial biological environment	<ul style="list-style-type: none"> • Vegetation and plant communities • Wetlands • Wildlife and wildlife habitat • Ecologically sensitive or significant areas, species of conservation concern, including species at risk and their habitats • Freshwater aquatic environment (e.g., aquatic life, fish and fish habitat) • Migratory birds and their habitats



Environmental Component	Scope of Review
Marine physical environment	<ul style="list-style-type: none">• Water quality• Marine / coastal processes (erosion, sedimentation)• Navigation• Air quality• Natural hazards
Marine biological environment	<ul style="list-style-type: none">• Marine aquatic environment (e.g., aquatic life, fish and fish habitat)• Ecologically sensitive or significant areas, species of conservation concern, including species at risk and their habitats
Human environment (i.e., indirect effects resulting from a direct change in the environment)	<ul style="list-style-type: none">• Current use of lands and resources for traditional purposes by Aboriginal persons• Navigable waters• Fisheries (including aquaculture)• Human health (e.g., noise, drinking water quality, country foods)• Physical and cultural heritage• Structures / sites of archaeological significance

Note: Table reproduced from the Agency's background information document (2011).

Spatial boundaries assessing the marine vessel traffic component of the proposed Raven Project will be established in such a way as to ensure proper evaluation of the effects of the proposed Raven Project on Maa-nulth First Nations treaty rights within the Trevor Channel area, as set out in Appendix N (Domestic Fishing Area), Appendix O (Designated Shellfish Aquaculture Sites), Appendix P (Inter-tidal Bi-valve Harvest Areas), Appendix Q (Wildlife Harvest Area), and Appendix R (Migratory Bird Harvest Area) of the Maa-nulth First Nations Final Agreement.

Additional factors are required for a comprehensive study, as outlined in section 16 of the *CEA Act*, including:

- Cumulative environmental effects, focussing on the interaction between the residual environmental effects (those that were predicted to remain after mitigation) of the proposed Raven Project and the environmental effects of past, present or reasonably foreseeable future projects or activities;
- Need for and purpose of the proposed Raven Project, including a description of the problem or opportunity that the proposed Raven Project intends to solve or satisfy and a description of what is to be achieved by carrying out the proposed Raven Project;



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- Comments from the public, including those received in accordance with the *CEA Act* from responsible authorities (RA) and the BC EAO. A record of how comments have been addressed in the EA would be prepared;
- Mitigation measures, including those that are technically and economically feasible and would mitigate identified adverse environmental effects arising from the proposed Raven Project;
- Environmental effects analysis and the significance of environmental effects, including an evaluation of the nature, extent, and significance of residual adverse environmental effects after mitigation;
- Alternative means of carrying out the proposed Raven Project, including an analysis of the environmental effects and rationale for the preferred alternative;
- Effects of the environment on the proposed Raven Project, including an analysis of the changes to the proposed Raven Project that may arise as a result of the environment. This evaluation includes factors such as: extreme weather events (e.g., lightning, flooding, wind); seismic events; fire; slope stability; and climate change;
- Sustainability of renewable resources, including an evaluation of the capacity of these resources to significantly affect the proposed Raven Project to meet the needs of the present and the future;
- Potential accidents and malfunctions, including unplanned events that have the potential to occur in any phase of the proposed Raven Project. The EA would consider the likelihood and circumstances effects under which these events may occur, and the possible environmental effects that may result, should contingency plans not be fully effective;
- Follow-up program, verifying the accuracy of the EA and determining the effectiveness of mitigation measures. The EA would also describe requirements of the follow-up program; and
- Comments from the Maa-nulth First Nations, including addressing those received pursuant to section 22.2.0 of the Maa-nulth First Nations Final Agreement during the conduct of the federal EA for the proposed Raven Project.

The primary objective of a federal EA is to ensure that a project is considered in a careful and precautionary manner in order to ensure that it would not result in significant adverse environmental effects. The federal EA process aims to promote sustainable development and thereby achieve or maintain a healthy environment and economy, promote communication and cooperation among federal and provincial agencies, as well as with Aboriginal peoples, and provide opportunities for timely and meaningful public participation.



2.5 Alternative Means of Undertaking the Proposed Project

This section of the Application / EIS will provide a summary of and reference to alternative means of undertaking the proposed Raven Project. This section will address both provincial and federal EA requirements for alternative assessment.

Preparation of this section of the Application / EIS will refer to the document "Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act*" (Agency 2007b).

The proponent commits to providing the following in the Application / EIS:

- Brief description of proposed project alternatives;
- Summary of key issues in considering the alternative means of undertaking the proposed Raven Project;
- An analysis of the alternative means of carrying out the proposed Raven Project that are technically and economically feasible (including supported justification for why an alternative is or is not economically feasible); and
- The rationale for selecting the preferred alternative, with supporting documentation.

The Application / EIS will describe alternative economically feasible means of undertaking the proposed Raven Project which have been considered throughout planning and design as well as general environmental effects (such as water quality and quantity changes, water flow patterns or land subsidence) associated with the alternatives and the rationale for the selection of preferred alternatives.

This section of the Application / EIS will be conducted in accordance with the guidance presented in the Agency (2007b), and will include the following considerations:

- Details of alternative means of carrying out the proposed Raven Project, or its components, and identification of technically and economically feasible alternative means;
- Identification of environmental effects of each alternative means; and
- Identification of the preferred means based on relative consideration of environmental effects and of technical and economic feasibility of the alternative means, as well as identification of alternatives that are unacceptable on the basis of the potential for significant environmental effects.

Alternatives considered for the proposed Raven Project may include the following:

- Mining methods, including alternatives to room-and-pillar mining in order to minimize rock fracturing;



- Mining extent and subsurface layout;
- Reject / waste treatment and management methods, including the feasibility of backfilling waste rock and / or tailings into underground mine workings;
- Arrangement of infrastructure, stockpiles and ponds to minimize the area disturbed;
- Arrangement of mine infrastructure, stockpiles, ponds and diversion ditches relative to environmental constraints (e.g., relative to non-fish bearing streams, geotechnical investigations, seepage management, and closure options, etc.);
- Alternative mining methods;
- Location or size of adit access points, ventilation shafts, subsurface pillars, etc.;
- Access road alignment and location;
- Land transport of coal to the proposed port facility at Port Alberni, including transport route options;
- Location of Port Facility;
- Methane management;
- Water disposal;
- Water management; and
- Power options.

The proponent recognizes the importance of the EA process and consultation in mine planning, particularly in alternatives assessment. The Application / EIS will describe how public and Aboriginal groups' feedback on alternatives was incorporated throughout the EA process and into the mine design process.

2.6 Proposed Project Land Use

The proposed Raven Project's land, marine and resource use study areas include private and Crown lands. The proponent will provide a description of the land ownership and land use regime, including tenures, licenses, permits or other authorisations that will be potentially affected by the proposed Raven Project. The proponent will report on the status of consultation and issues resolution with the holders of the tenures and permits and private land owners. This land use section will also include a description of:

- The Vancouver Island Summary Management Plan, including a list of management objectives;
- Other official community plans and zoning requirements from local governments including CVRD's regional growth strategy (Bylaw No. 120);



- Relevant existing or proposed management and monitoring programs or regional studies;
- Interactions of proposed Raven Project activities with regional land use objectives including CVRD's regional growth strategy (Bylaw No. 120);
- Future developments that are reasonably foreseeable and sufficiently certain to proceed as defined in the cumulative effects assessment (CEA); and
- Other developments that may result in overlapping effects with the proposed Raven Project.

2.7 Proposed Project Benefits

Having described the main features of the proposed Raven Project, this section will discuss the importance of the proposed Raven Project in the context of regional, provincial, federal and international economies, by considering the implications of supply and demand on the market. This section will itemize the projected economic and social benefits of the proposed Raven Project, including identifying labour force requirements during construction and operation (direct and indirect jobs).

Initial capital construction and life-time operating cost estimates will include:

- Any costs for land, buildings, and equipment associated with the proposed Raven Project;
- The potential for use of local facilities, and information about current utilisation of these facilities;
- Estimated annual operating costs (excluding labour);
- An indication of how these costs are measured; and
- Costs for decommissioning, closure, abandonment, and reclamation.

Employment estimates will include:

- Direct employment, stated in number of person years (PY - defined as a single person employed full-time for one year) created by major job categories (e.g., labour, management, business services) during construction and operation. The estimates would distinguish between 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 are expected to be hired locally, provincially, nationally, or internationally;



- Potential for the proponent to use local human resources that are currently under-utilised;
- Any relevant employment policies and practices (a local hiring strategy would be provided if required); and
- Indirect employment (i.e., employment in industries that supply goods and services used to produce an industry's output or to be consumed by individuals) for the construction and operation phases of the proposed Raven Project. Estimates would include any assumptions relating to industry specific multipliers or other multipliers used.

This section will also include estimated direct and indirect government revenues (provincial and local) including:

- Local / municipal (property taxes, other);
- Regional District (taxes, other);
- Provincial (income tax, sales tax, lease, license and tenure, royalties, other); and
- Federal (income tax, Harmonized Sales Tax (HST), payroll taxes, other).

An economic analysis of mining the available deposits, making use of commercial assumptions, including estimated capital investment, prices and shipping, will be included in the Application / EIS. All assumptions and information sources will be clearly defined and referenced as appropriate. Contractor supply services will be identified including:

- A description of the major types of businesses / contractors that would benefit overall from the proposed Raven Project, broken down at the local, provincial, and national levels;
- The value of supply of service contracts expected for both the construction and operation phases of the proposed Raven Project; and
- Information about a local purchasing strategy, if any.

The following is a list of resources that will be used in providing the above information:

- BC Stats, Quarterly Regional Statistics – http://www.bcstats.gov.bc.ca/pubs/pr_qrs.asp:
 - Quarterly data on Labour Force Survey, manufacturing, building permits, tourism, incorporations and bankruptcies, economic structure, unemployment, income assistance and population;
- BC Stats, BC Input-Output Model – http://www.bcstats.gov.bc.ca/pubs/pr_pem.asp:



- Economic gross domestic product (GDP), employment and government revenue multipliers allow users to quickly gauge the potential impact of industrial development / contraction in the Province;
- BC Stats, Current Labour Force Data - http://www.bcstats.gov.bc.ca/pubs/pr_ifs.asp:
 - This summary of labour force conditions shows employment and unemployment by age, gender, occupation and industry, with a breakdown for Development Regions, Metropolitan Vancouver and Victoria;
- BC Stats, Regional District Data - <http://www.bcstats.gov.bc.ca/regions.asp>:
 - Breakdown of regional statistics by population, economic and social profiles, Aboriginal profiles, and population projections;
- BC Stats, BC Regional Socio-Economic Profiles & Indices - <http://www.bcstats.gov.bc.ca/data/sep/index.asp>:
 - These profiles consist of charts and tables for the 26 Regional Districts, 86 Local Health Areas, 16 Health Service Delivery Areas, five Health Authorities, eight Development Regions, and 15 College Regions within the Province of BC. Also included are the special geographies of the Georgia, Fraser, and Columbia Basins; and
- Statistics Canada - Community Profiles (community-level information from the 2006 Census of Population) - <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E>.

This section will also describe project contributions to healthy living and community development.

2.8 Applicable Permits

The proponent will ensure that a list of all applicable provincial and federal licenses, permits and / or approvals required for the construction, operation and decommissioning of the proposed Raven Project, and the associated RA are provided in the Application / EIS.

There is an option to apply for concurrent provincial permits under the *BCEAA (Concurrent Approval Regulation)*. At this time, the proponent does not intend to apply for concurrent provincial permits. Instead, the proponent intends to develop information for key provincial and federal permits in draft form for review during the EA process.

The primary BC authorisation for the development of a mine project is a permit under the provincial *Mines Act*. Authorizations may also be required under provincial statutes including, but not limited to the *Lands Act*, *Environmental Management Act*, *Health Act*,



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Water Act, Forest Act, Hazardous Waste Regulation, etc. An access permit would be required from the BC Ministry of Transportation and Infrastructure (BC MoTI) to connect to the Island Highway if existing road access or railway access is not utilised. Other authorisations potentially required from the federal government include: Transport Canada (TC) authorisation to allow road site access through crossing rivers and streams under the *Navigable Waters Protection Act*; Natural Resources Canada (NRCan) authorisation for use of explosives for mining use under the *Explosives Act*; DFO authorisation to potentially alter fisheries habitat; and other possible authorizations from Environment Canada (EC) such as those required under the *Species at Risk Act (SARA)*. Water system operating permits and source approval would be required under the *Drinking Water Protection Act*, as administered by VIHA.



3 ASSESSMENT PROCESS

3.1 Provincial EA Process

In the Application / EIS, the proponent will provide the following information, which was compiled during the pre-application stage:

- List of the agencies, departments and organisations likely to be involved in the review (e.g., BC MOE);
- List of applicable milestones;
- 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 / EIS Guidelines and the Application / EIS by each of the following groups:
 - Public;
 - First Nations and Aboriginal groups; and
 - Local, provincial, and federal government agencies.

Version 3.0 of the draft AIR / EIS Guidelines was submitted to the BC EAO advisory Working Group in April 2010. All written comments received from the Working Group were tracked and considered. A standalone issues tracking table was prepared to reflect the comments received and the approach taken to addressing them. Version 6.0 of the draft AIR / EIS Guidelines incorporated responses to comments received from the Working Group on Version 3.0, and also updated the document to the new AIR / EIS Guidelines template issued in October 2010 (BC EAO 2010a). Version 6.0 of the draft AIR / EIS Guidelines was submitted the BC EAO for review in January 2011. All written comments received from the Working Group were again tracked and considered, and are detailed in a standalone tracking table document. The present draft AIR / EIS Guidelines document (Version 7.0) incorporates responses to comments received from the Working Group on Version 6.0.

3.2 Federal Review

The proponent will provide a list of the agencies, departments and organisations likely to be involved in the review, and their anticipated or confirmed roles and applicable federal milestones. Issues and concerns would be summarised in an issues tracking table (similar to that referred to in Section 3.1), which would also include a description of how these matters would be addressed.

Comments on Versions 3.0 and 6.0 of the draft AIR / EIS Guidelines received from federal members of the BC EAO advisory Working Group are included in the respective issues tracking tables associated with those documents, and changes have been incorporated into the present draft of the AIR / EIS Guidelines as appropriate.



3.2.1 Cooperative Review Process

The Application / EIS would describe the cooperative review process followed for the proposed Raven Project.

3.3 Aboriginal Groups Information Distribution and Consultation

3.3.1 Pre-Application / EIS Consultation

The Application / EIS will provide a summary of consultation activities undertaken with the identified Aboriginal groups potentially affected by the proposed Raven Project. The summary would include the preparation of the AIR / EIS Guidelines. The Application / EIS will also include a summary of past consultation activities and a consultation plan for the Application / EIS Review stage of the EA prior to submission of this material. Issues and concerns will be summarised in an issues tracking table (similar to that referred to in Section 3.1), which will also include a description of how these matters will be addressed. Aboriginal groups were provided the opportunity to comment on Versions 3.0 and 6.0 of the draft AIR / EIS Guidelines. Comments received and the approach to addressing these are included in the issues tracking tables. Changes have been incorporated into the present draft of the AIR / EIS Guidelines as appropriate.

Aboriginal consultation activities completed to date are further described in Section 15 of this draft AIR / EIS Guidelines document.

3.3.2 Consultation Planned During Application / EIS Review

The proponent will provide a description of consultation programs for First Nation and Aboriginal groups that are proposed for the Application / EIS review stage. The proponent will document the proposed methods and processes which will be used to resolve outstanding issues. This process would include the continuation and expansion of the initiatives discussed above and in Sections 15 and 20. The section 11 Order requires that First Nations be provided with a summary of past consultation activities and a consultation plan for the Application / EIS Review stage of the EA prior to submission of this material in the Application / EIS.

3.4 Public and Agency Information Distribution and Consultation

3.4.1 Pre-Application / EIS Consultation

The Application / EIS will include a summary of consultations with public and other key stakeholders, federal, provincial and local government agencies, including the means of information distribution. The summary may include information about:

- Public meetings and open houses;
- One-on-one meetings with interested parties;
- Publication of articles in the media, enclosures and community newspapers;



- Project updates distributed door to door and published in local newspapers;
- Interviews on local radio and television;
- Community Advisory Group meetings;
- Project information telephone line;
- Correspondence in responds to questions from the public;
- Regular email updates to stakeholders;
- Issuing regular news releases and responding to all reporter queries;
- Site tours;
- Website and website updates; and
- Participation in community events.

The Application / EIS will document the strategies that the proponent used in its consultation with, among others, the communities of Courtenay, Comox, Union Bay, Buckley Bay, Fanny Bay, Ship's Point, Cumberland, Denman Island, and Port Alberni.

In addition, the draft AIR / EIS Guidelines document will be provided to the public, and an established 40 day public comment period, as specified in the BC EAO section 11 Order. Issues and concerns will be summarised in an issues tracking table (similar to that referred to in Section 3.1), which would also include a description of how these matters will be addressed, list the party(ies) responsible for addressing matters raised through consultation and the status of issues (e.g., resolved, pending).

A variety of public consultation activities have been initiated. Activities completed to date have included the establishment of a community liason officer. Candy-Lea Chickite (250-830-7346; info@theravenproject.ca) is a member of the We Wai Kai Nation who has extensive current and historical knowledge of the area and the Aboriginal groups in the vicinity of the proposed Raven Project area. Ms. Chickite receives enquiries from the public, Aboriginal groups, and media outlets. Each telephone call is tracked and interests or concerns logged. The majority of calls to date have requested information about employment or contracting opportunities. All emails and letters received are answered by the Raven Project Management Team, and interests or concerns are logged. A website has been developed as a central distribution point for information about the proposed Raven Project, community and Aboriginal consultation activities, and the progress of the proposed Raven Project through the EA process (www.theravenproject.ca). An independent firm, Context Research, has been engaged by the proponent to facilitate public and Aboriginal consultation activities, including tracking of the interests, issues, and concerns raised.



Two Open House events have been completed to date. They took place in Fanny Bay (October 2009; approximately 300 attendees) and in Port Alberni (July 2010; approximately 160 attendees). The Open House format provides an opportunity for the proponent to present information about the proposed Raven Project, and for participants to review information boards and ask questions directly of technical and environmental consultants and project staff. All concerns raised are tracked. In addition, representatives from the proposed Raven Project have participated in two community events: Harbour Festival in Deep Bay (1 May 2010); and Island Railway Days in Parksville (10 July 2010). Participation at these events has provided an opportunity for the proponent to present information about the proposed Raven Project and answer questions, and discuss issues.

The Raven Project Management Team have been proactive in dealing with local media outlets, including the provision of press releases, interviews, and the completion of a media site tour in October 2009. A file of media articles relating to the proposed Raven Project is maintained to track issues and concerns raised.

Four Project Updates have been advertised in community newspapers and / or distributed to stakeholders via email.

A series of site tours have also been organised with other interested parties, including the BC EAO, Vancouver Island University, the University of BC (UBC) Aboriginal Minerals Training Course, the Vancouver Island Branch of the BC Association of Professional Engineers and Geoscientists, and CoalWatch, a non-governmental organisation.

Project team members also made a presentation on the proposed Raven Project's social responsibility principles and activities to MBA students enrolled in a social responsibility class at Vancouver Island University.

In addition to these initiatives, the proponent has established a Community Advisory Group as a forum for information exchange and issues resolution. Potential stakeholders, including Aboriginal groups, local governments and citizen groups, were identified and invited to participate. The Advisory Group presently includes representatives from:

- BC Shellfish Growers Association;
- Fanny Bay Salmon Enhancement Society;
- Comox Valley Water Watch Coalition;
- Fanny Bay Waterworks District;
- Ships Point Improvement District;
- Union Bay Improvement District;
- City of Courtenay Agriculture Advisory;



- K'omoks First Nation;
- We Wai Kai Nation;
- We Wai Kum First Nation;
- Sliammon First Nation;
- Penelakut Tribe;
- Lake Cowichan First Nation; and
- Cowichan Tribe.

The group was initially established via an Opportunities and Concerns Workshop held in June 2009. A site tour was completed at this time to familiarise members with the proposed Raven Project area. The Community Advisory Group has subsequently met on two occasions (16 October 2009; 4 February 2010). Minutes of meetings are recorded to ensure that issues and concerns are identified. These minutes are reviewed and approved by the full Advisory Group.

Support for public participation in the EA process for the proposed Raven Project has been provided through the federal Participant Funding Program.

Issues and concerns raised in these various venues of public consultation have been tracked and would be incorporated into mine planning and the EA process, as appropriate. The Application / EIS will identify how issues were tracked and addressed.

3.4.2 Consultation Planned During Application / EIS Review

The proponent will provide a description of the public consultation program proposed for the Application / EIS review stage of the EA process. The description will include the following:

- Description of the proposed program for public consultation;
- Description of the proposed programs for consultation with government agencies; and
- Documentation of the proposed methods and process which would be used to resolve outstanding issues.

Consultation would be scheduled to ensure that results are incorporated in planning and decision processes.

Planned consultation includes the continuation and expansion of the initiatives described above. In the early stages of the Application / EIS review stage, the BC EAO will initiate a 50 day public comment period on the Application / EIS, as set out in the section 11 Order. Following the public comment period, the proponent will track and address the issues raised during the Application / EIS Review.



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

4 ASSESSMENT METHODOLOGY

The assessment of potential effects in the Application / EIS will be based on the methods described below. Development of these methods was guided by the “Application Information Requirements Template with Respect to an Application for an Environmental Assessment Certificate pursuant to the *Environmental Assessment Act*, S.B.C. 2002, c. 43” (AIR Template) prepared by the BC EAO 4 October 2010 (BC EAO 2010a), the *BCEAA* (BC Reg_2002), *CEA Act* (Canadian Reg. 1992), and provincial and federal guidance documents and engagements. Figure 4-1 below shows the EA process and Figure 4-2 below shows the framework for assessing potential effects from the proposed Raven Project in the provincial and federal EA process.

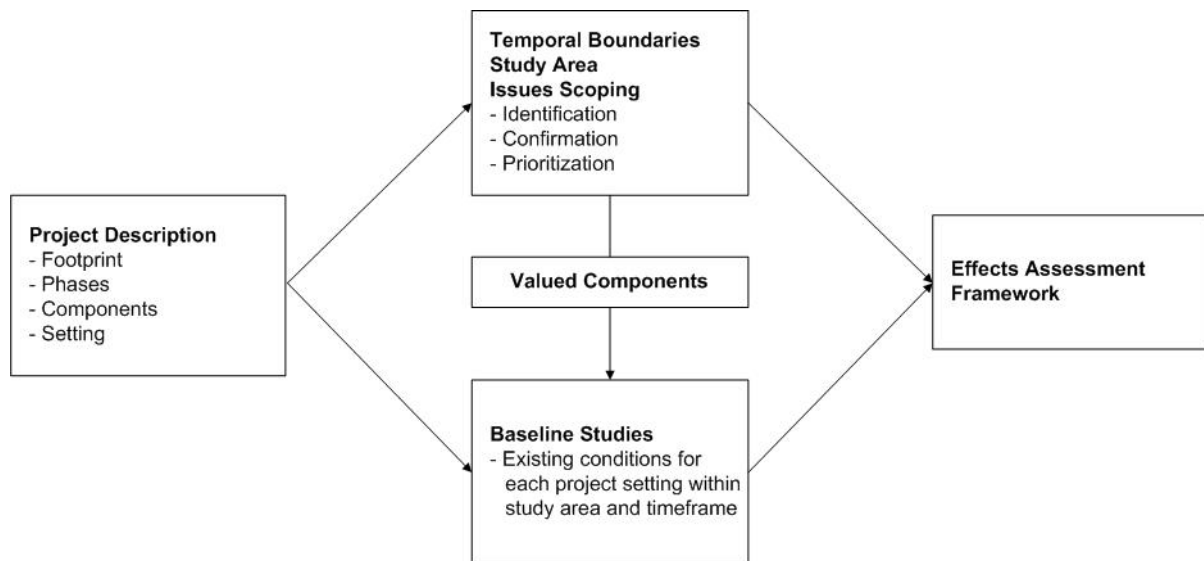
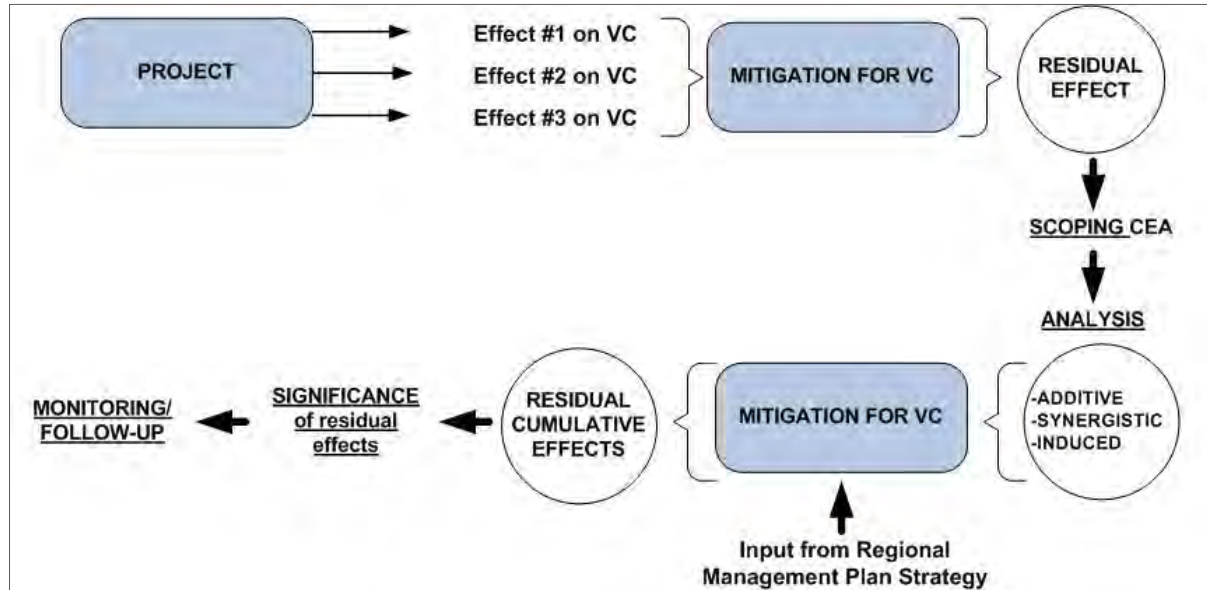


Figure 4-1: Environmental Assessment Process



Note: CEA-cumulative effects assessment; VC-valued component

Source: Agency 2011

Figure 4-2: Framework for Assessing Potential Effects from the Proposed Raven Project

The preliminary list of VCs to be assessed in the Application / EIS includes, but is not limited to, the following:

- Atmospheric environment VCs:
 - Air quality;
 - Climate change;
 - Noise; and
 - Vibration.
- Groundwater VCs:
 - Hydrogeology; and
 - Groundwater quality.
- Hydrology, surface water quality and sediment quality VCs:
 - Surface hydrology (Cowie Creek and Cougar Smith Creek watersheds); and
 - Freshwater and sediment quality.



- Fisheries and aquatic resources VCs:
 - Rainbow trout / steelhead;
 - Cutthroat trout;
 - Coho salmon;
 - Chum salmon; and
 - Pink salmon.
- Marine environment VCs:
 - Marine water quality;
 - Shellfish;
 - Marine fish;
 - Marine mammals; and
 - Marine birds.
- Terrestrial environment VCs:
 - Terrain, soils and surficial geology (physiography and topography, soil cover, soil quality, and surficial geology); and
 - Vegetation and plant communities (biodiversity and plant community structure composition, species at risk, and ecological communities at risk);
- Wildlife and their habitat VCs:
 - Ungulates;
 - Small mammals;
 - Songbirds;
 - Raptors;
 - Carnivores; and
 - Invertebrates.
- Environmental health VCs:
 - Humans (non-carcinogenic toddlers and carcinogenic adults);
 - Mammals (large carnivores / omnivores, ungulates, and furbearers);
 - Birds (raptors, songbirds, waterfowl and shorebirds);



- Amphibians;
 - Fish; and
 - Invertebrates (terrestrial and aquatic).
- Economic health VCs:
 - Provincial economy and government revenues;
 - Regional employment;
 - Employment opportunities;
 - Contract and business opportunities;
 - Labour income;
 - Local unemployment rate and trend;
 - Regional government finances; and
 - Employment and economic diversification.
- Social conditions VCs:
 - Social conditions (regional population and demographics, housing, regional services, regional infrastructure, and family and community wellbeing);
 - Transportation;
 - Non-traditional land use (parks and protected areas, mining and exploration activities; renewable resource use, tourism and other recreational uses, and marine uses and tenures); and
 - Visual and aesthetic resources (visual landscape).
- Heritage resources VCs:
 - Archaeological sites; and
 - Historic heritage sites.
- Human health VCs:
 - Public health;
 - Healthy living; and
 - Worker safety and health.



4.1 Valued Component Scoping and Rationale

The Application / EIS will consider five broad types of effects: environmental; economic; social; heritage; and health. For each of the five types of effects, the Application / EIS will describe the methods used to identify, scope, and rationalise the inclusion of valued components (VCs). VCs are components that are considered important by the proponent, the public, Aboriginal groups, scientists and government agencies involved in the EA process (e.g., fish and fish habitat, listed species, rare ecosystems, air quality, water quality, housing, regional services, provincial economy and government revenues, regional employment and income, archaeological sites, historic heritage sites, public health, and healthy living). Importance may be determined on the basis of values including Aboriginal interests, scientific and / or regulatory concern, biodiversity, and sensitivity to proposed Raven Project effects.

Specific rationale for why each VC is included in the EA will be provided in Sections 5 to 9 of the Application / EIS. The assessment of potential effects will be completed on a VC by VC basis grouped into subject areas for each project setting component (environmental, economic, social, heritage, and health). Preliminary VCs and rationale for inclusion are presented in Part B, Sections 5 – 9 of this draft AIR / EIS Guidelines.

4.1.1 Spatial Boundaries

The Application / EIS will identify and present the spatial boundaries to be used for the EA and the rationale for selecting the boundaries. Spatial boundaries will be identified using the following criteria:

- Physical extent (terrestrial, freshwater aquatic, marine aquatic, and airshed), to which the impacts of the proposed Raven Project (including the Port Facility) might be manifested;
- Extent of terrestrial, freshwater aquatic, and marine ecosystems and applicable resources potentially affected by the proposed Raven Project;
- Extent of potential social, economic, heritage and health effects, including those of Aboriginal groups, arising from the proposed Raven Project; and
- Considerations resulting from consultation with Aboriginal groups, the public, and government agencies on the scoping of issues to be addressed in the Application / EIS.

Each project setting component section of the Application / EIS (Sections 5 - 9) will include a description and rationale for each study area boundary employed which reflects the range of geographic areas within which specific effects may be experienced. Maps outlining the spatial extent of both a Local Study Area (LSA) and a Regional Study Area (RSA) will be provided. Spatial boundaries will be based on applicable guidance documents, reasonable expectations and professional judgement, and would include:



- Proposed project footprint (includes each on-site facility described in Section 2.2 of this AIR / EIS Guidelines and on-site roads);
- LSA, which includes the proposed Raven Project footprint plus buffer, encompassing the zone of potential direct project-specific effects; and
- RSA, which includes the proposed Raven Project and surrounding region encompassing the zone of influence for potential project-specific effects.

Where environmental effects are anticipated, baseline data will be used to assess potential project-related effects. This may include the expansion of discipline specific study areas where appropriate.

4.1.2 Temporal Boundaries

Temporal boundaries are time limits for the EA. Temporal boundary selection will be based on a reasonable expectation of the time over which the proposed Raven Project would affect biophysical and human environment receptors.

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

Specifically each of the following phases of the proposed Raven Project will be considered:

- Construction Phase - 2012;
- Operations Phase - 2013 to 2029: includes progressive reclamation (the duration of the operations phase of the proposed Raven Project will be assessed as part of an ongoing feasibility study);
- Decommissioning and Closure Phase – 2030: includes a closure period during which the facilities would be reclaimed; and
- Post-Closure Phase - post 2030: includes post-closure monitoring until on-site water quality has stabilised and results indicate no material future adverse effects on local receiving waters. Stabilisation of rejects facilities would also be considered in post-closure monitoring.

4.2 Selected Valued Component

For each VC identified in the Application / EIS, the Application / EIS document will present the following information.



4.2.1 Detailed Baseline for Selected VC (e.g. VC #1)

4.2.1.1 Information Source and Methods

The Application / EIS will describe the source of information and methods used to obtain detailed baseline information on the selected VC (e.g., VC #1).

4.2.1.2 Relevant Legislation and Legal Framework

The Application / EIS will describe and provide legislation and the legal framework related to the assessment of the VC.

4.2.1.3 Cultural, Ecological or Community Knowledge

The Application / EIS will describe as appropriate, available cultural, ecological, or community knowledge relevant to the VC.

4.2.1.4 Detailed Baseline Description

The Application / EIS will provide detailed baseline information.

4.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

The Application / EIS will identify, analyse, and describe potential adverse and positive effects resulting from the proposed Raven Project's construction, operation, decommissioning and closure and post-closure. The Application / EIS will describe measures that the proponent would commit to, to mitigate potential adverse effects or to enhance positive effects.

4.2.2.1 Identification and Analysis of Potential Project Effects

Assessment of effects on a VC include consideration of effects from project components (direct effects) and effects from other project affected VCs (indirect effects) on the selected VC during each proposed Raven Project phase (construction, operation, decommissioning and closure and post-closure). The Application / EIS will use the following steps to identify potential impacts during each proposed Raven Project phase, both direct and combined (direct impacts combined with indirect impacts), of the proposed Raven Project on a selected VC:

- Vetting of each potential direct effect that may occur during each proposed Raven Project phase to determine whether there is an interaction between the proposed Raven Project components and the selected VC (e.g., air quality);
- Determination of whether direct project effects on the VC (e.g., air quality) are likely to result in indirect effects on other VCs;
- Determination of whether there is an interaction between residual project effects on biophysical, economic, social, heritage and health project setting components and the VC (e.g., air quality);



- Assessment of potential combined project effects resulting from the interaction of direct and indirect project effects on the VC (e.g., air quality). Vetting of each potential combined project effect during each project phase to determine if it is likely to occur (e.g. impacts on air quality from vegetation clearing (indirect project effect on air quality) in combination to dust generation caused by foundation excavation (direct project effect on air quality) during the project construction phase); and
- Potential direct and combined project effects that may not be eliminated through implementation of changes to project design would be carried forward in the assessment.

Results will be described and summary tables will be included for each step described above.

4.2.2.2 Mitigation Measures

The Application / EIS will describe mitigation measures including management and compensation plans approved by the proponent, which would be implemented to address potential impacts on the VC. This will include a specific breakdown of the proposed Raven Project design, mitigation or enhancement measures that could and would be done to:

- **Enhance** positive environmental, economic, social, heritage or health effects;
- **Eliminate** the threat / risk to environmental, economic, social, heritage, and health components completely (change to project design (e.g., alternate approaches, different chemical / material used));
- **Prevent / reduce** impacts of the threat / risk to environmental, social, economic, heritage, and health components (e.g., berms, training, pollution prevention equipment / technologies);
- **Respond** to threat / risks to environmental, social, economic, heritage, and health components when it occurs (e.g., emergency response, clean up); and
- If the suggested mitigation is **Unknown** (i.e., untried elsewhere in similar circumstances and the response of the target (organism or physical process) is unknown), this will be identified.

The anticipated success of each breakdown above will be rated as high, medium or low. Mitigation / enhancement measures for potential project effects by proposed Raven Project phase and relevant mitigation success rating will be summarised in a table format and assumptions made for the VC will be clearly described.



4.2.3 Potential Residual Project Effects

The Application / EIS will assess potential residual effects for the proposed Raven Project, which include beneficial effects and those adverse environmental effects which cannot be avoided or mitigated through the application of environmental control technologies or other acceptable means, including emergency response and contingency plans. The Application / EIS will summarise the findings of potential residual project effects assessments for each separate VC and will include results in a table.

4.2.4 Cumulative Effects Assessment

Various human activities, which individually are considered to cause insignificant effects on a VC, may combine within a period of space and time to cause significant changes on that VC. The Agency defines cumulative effects as:

“changes to the environment that are caused by an action in combination with other past, present and future human actions” (Agency 1999a).

Under this definition “actions” include human, projects and activities. Projects are typically some form of commercial or industrial development that is planned, constructed, and operated (e.g., a mine development or resource access road). Activities may either be part of a project or may arise over time because of ongoing human presence in an area. Examples of activities are public traffic, hiking and hunting (Agency 1999a).

The CEA for the proposed Raven Project would be conducted to assess any cumulative effects that are likely to result from the proposed Raven Project in combination with other projects or activities that have been or would be carried out.

In order to prepare a comprehensive CEA for each VC, the following three steps will be required:

- Each residual effect identified for the VC will be reviewed;
- Potential interactions / overlaps for each residual proposed Raven Project effect carried forward in the CEA will be reviewed and described, including:
 - Residual effects from other historical (closed) projects / activities; and
 - Existing (currently active) projects and general land use activities, and reasonably foreseeable future projects occurring within the same timeframe and in the same area.
- Potential cumulative effects will be assessed, and any necessary mitigation and enhancement measures described.



4.2.5 Rationalization for Carrying Forward Project Related Residual Effects into the CEA

The Application / EIS will provide a rationale for each residual project effect carried forward into the CEA.

4.2.5.1 Interaction between VC #1 and other Past, Present or Future Projects / Activities

The Application / EIS will follow the methodology presented below to select and describe past, present and / or future projects / activities that may interact with the VC within the proposed Raven Project's LSA and RSA as per the AIR Template (Agency 2011).

The selection of other projects and human activities to be considered in the CEA would be initially identified by reviewing available information for the following:

- Historical (closed) projects / activities within the CEA study areas;
- Existing (currently active) projects within the CEA study areas;
- General land use activities within the CEA study areas; and
- Reasonably foreseeable future projects (i.e., planned and approved projects) occurring within the CEA study areas.

Both biophysical and economic / social study areas will be identified for the CEA. The biophysical CEA study area is focused and would not include most of the projects identified in the economic and social CEAs. Following a review of the available information and the scope of the CEA for the proposed Raven Project, other projects and human activities, including major foreseeable projects and human activities, which potentially overlap (to some degree) spatially or temporally with the proposed Raven Project include:

- Historical and current mining and exploration activities:
 - Quinsam Coal project;
 - Baynes Sound Mine operated from 1875 to 1877; and
 - T'sable River Mine operated from the 1940s to 1966;
- Small gravel pits and rock quarries scattered throughout the proposed Raven Project area operated by timber companies and the BC MoTI in support of road building (ORCRC 2007);
- Logging;
- Hunting;
- Trapping;



- Fishing;
- Recreation / tourism use;
- Air traffic (Canadian Forces Comox Base, Comox Airport (YQQ));
- Transportation and access (Highways 19 and 4);
- Groundwater resource use;
- Surface water resource use;
- Baynes Sound aquaculture;
- Port Alberni waterfront marine environment in the vicinity of the offloading facility; and
- Existing shipping activities from the PAPA down Alberni Inlet / Trevor Channel through the Maa-nulth Domestic Fishing Area.

Note that the proponent has conducted exploration on the Bear Coal Project situated approximately 10 km to the northwest of the proposed Raven Project.

A Project Inclusion List and associated map will summarise those projects or human activities identified as overlapping either spatially or temporally with the proposed Raven Project that may cause changes to the biophysical or social economic environment in combination with the proposed Raven Project.

For each of the residual effects identified above which are carried forward into the CEA, the Application / EIS will describe interactions between other projects, human activities and reasonably foreseeable projects.

The Application / EIS will carry forward activities identified above as having the potential to interact with residual project effects on the VC and assess if there is a spatial and temporal overlap. The Application / EIS will describe the potential cumulative effect on the VC.

The Application / EIS will provide a discussion regarding the level of certainty and any limitations for each CEA.

4.2.5.2 Mitigation Measures

The Application / EIS will describe mitigation and / or enhancement measures proposed for management of identified potential cumulative effects on the VC. The Application / EIS will make commitments to carrying out of regional monitoring and effect management as necessary. Where possible and in consultation with provincial agencies the proposed mitigation and / or enhancement measures will consider regional management plan strategies. The Application / EIS will clearly explain, where necessary, the probability of mitigation success for any potential cumulative effects.



4.2.5.3 Potential Residual Cumulative Effects

The Application / EIS will assess potential residual cumulative effects on the VC, which include beneficial effects and those adverse environmental effects which could not be avoided or mitigated through the application of environmental control technologies or other acceptable means, including emergency response and contingency plans. The Application / EIS will describe the findings of potential residual cumulative effects assessments for the VC and summarise the results in a table.

4.2.6 Proposed Significance Rating of Potential Residual Project Effects or Potential Residual Cumulative Effects

The Application / EIS will refer to and consider the Agency guide titled “Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects” (Reference Guide for Responsible Authorities) (Agency 1999b), in deciding whether the proposed Raven Project is likely to cause significant environmental effects under the *CEA Act*.

Significance determination will be done on potential proposed Raven Project residual effects if they are not likely to combine with other past, present and / or future projects / activities to result in potential cumulative effects. Otherwise, significance determination will be done after the CEA for potential residual cumulative effects on the VC.

Determining the significance of residual effects is usually considered the most important task when conducting an EA. The determination of significance is often more complex for cumulative effects than it is for individual subject areas because of the broader nature of what is being examined. For cumulative effects the approach requires determining the extent of further effects that could be sustained by a VC before the VC undergoes changes in condition or state that could not be reversed with mitigation / management.

The Application / EIS will summarise the potential residual cumulative effects identified for the VC and stage of development (construction, operations, closure / decommissioning or post-closure). The significance of any residual cumulative effects will be discussed. Available CEA information from each VC section per subject area will be compiled into a CEA that meets federal (*CEA Act 1992*) requirements. This information will be incorporated into the federal CEA section, Part E Requirements for Federal Environmental Assessment Section 22.13 of the Application / EIS.

In order to determine the significance of the potential residual effect or cumulative effect for the proposed Raven Project, the Application / EIS will consider existing environmental standards, guidelines and objectives, such as the BC water quality guidelines (BC MOE 2006); as well as the carrying capacity, tolerance level or assimilative capacity of the natural system(s), where possible. In the absence of defined environmental standards, guidelines and objectives for the VC, the Application / EIS will refer to the criteria discussed in the



Agency (1994) to determine the adversity, likelihood, and significance of environmental effects.

The framework consists of three general steps:

- Step 1: deciding whether the environmental effects are adverse;
- Step 2: deciding whether the adverse environmental effects are significant; and
- Step 3: deciding whether the significant adverse environmental effects are likely.

The Application / EIS will assess whether any potential proposed Raven Project residual effect or cumulative effect would be significant by analysing the following factors and applying the significance rating criteria presented in Appendix B:

- **Magnitude** - Magnitude describes the nature and extent of the environmental effect. The magnitude of an effect is quantified in terms of the amount of change in a parameter or variable from an appropriate threshold value, which may be represented by a guideline or baseline conditions;
- **Geographic Extent** - Geographic extents are similar to the spatial boundaries of the assessment (LSA, RSA);
- **Duration** - Duration is defined as a measure of the length of time that the potential effects could last. It is closely related to the project phase or activity that could cause the effect;
- **Frequency** - Frequency is associated with duration and defines the number of occurrences that could be expected during each phase of the proposed Raven Project;
- **Reversibility** - Reversibility is the ability of a physical parameter, biological or social community to return to conditions that existed prior to an adverse environmental effect. The prediction of reversibility can be difficult because environmental effects may, or may not, be reversible. Despite this, it is important to ascertain reversibility because it has an important influence on the significance of an effect;
- **Ecological Context (biophysical environment only)** - Ecological context is a measure of the relative importance of the affected ecological component to the ecosystem, or the sensitivity of the ecosystem to disturbance. It indicates the degree to which an effect on the component would affect the ecosystem;
- **Level of Confidence** - Using the previously described rating criteria, the significance of adverse environmental effects will be evaluated based on a review of project specific data, relevant literature, and professional opinion. To this will be added the level of confidence in the prediction; and



- **Certainty** - To arrive at a high level of confidence for a significance rating, rigorous scientific and / or statistical methods (i.e., a quantitative approach) will be employed where feasible. Where such methods are not feasible, professional judgment will be employed (i.e., a qualitative approach). Rating the certainty of the significance rating is an additional step that may be used to justify or substantiate the level of confidence in the evaluation.

For potential proposed Raven Project residual effects and / or cumulative effects, probability of occurrence, effect on ecosystem functioning, and effect on sustainability (capacity of renewable resources to meet future needs), would be evaluated in addition to the eight items listed above.

- **Probability of Occurrence** - The probability of effects is the likelihood that the effect would occur. Three categories will be considered:
 - **Low:** the effect on the VC is well understood and there is a low probability of effect on the VC as predicted;
 - **High:** the effect on the VC is well understood and there is a high probability of effect on the VC as predicted; and
 - **Unknown:** the effect on the VC is not well understood and based on potential risk to the VC, effects would be monitored and adaptive management measures taken as appropriate.

Each potential proposed Raven Project residual effect or cumulative effect determined to have an effect on the environment, economic health, social condition, heritage, or health will be evaluated based on these nine measures. Other metrics that will be considered in the assessment include direction, and cumulative or synergistic consequences as defined in Appendix B.

4.2.6.1 Quantitative Versus Qualitative Assessment

For each VC, one or more measurable or qualitative parameters will be selected to evaluate potential effects. Measurable parameters are indicators used to determine the level or amount of change to a VC (e.g., predicted sediment in water discharged from the mine is a quantifiable parameter; the potential infusion of cash from employment into a community is another). Qualitative parameters are used as subjective assessments of the state of a VC as a result of proposed Raven Project effects; perception of aesthetic effects on viewsapes or the quality of a wilderness experience are examples.

Since the proposed Raven Project has not yet been developed, much of the assessment would be based on known effects from similar projects and on quantitative or qualitative modelling of potential effects. The potential degree of change in these parameters is used to classify effects.



4.2.6.2 Evaluation of Effects Using Established Thresholds

An assessment of the significance of project-specific or cumulative environmental effects (CEE) will require the identification of ecological thresholds, management objectives or community / societal standards against which the level of an effect could be evaluated (where possible, quantitative thresholds would be used to evaluate significance as described above). Established standards, such as Canadian Council of Ministers of the Environment (CCME) water quality guidelines, will be employed where they exist; other metrics include government regulations, scientific literature, land use plans, and resource management agency goals.

4.2.6.3 Evaluation of Effects without Using Established Thresholds

Thresholds or regional objectives will not be available for some VCs. Where established thresholds are not available, professional judgement will be used to provide a qualitative classification based on a weight of evidence approach. The approach is based on the magnitude of expected change in the VC as a result of the proposed Raven Project. Four categories are established:

- Not significant (negligible);
- Not significant (minor);
- Not significant (moderate); and
- Significant.

Ratings will be established based on experience with similar projects, modified as appropriate by current community and regulatory perceptions of significance of a particular effect as determined through engagement throughout the assessment process. Ratings criteria are summarised in Appendix B.

In general, to be considered to have potential for a significant effect, the VC being assessed must meet one of the following criteria:

- Have a medium magnitude at a sub-regional spatial extent and be chronic (permanent) in duration;
- Have a medium magnitude at a regional spatial extent and have a long term or chronic duration;
- Have a high magnitude at a local spatial extent and be long term or chronic in duration;
- Have a high magnitude at a sub-regional spatial extent and be medium term, long term or chronic in duration; or
- Have a high magnitude at a regional extent of any duration.



Significance for VCs will be based on magnitude, spatial extent and duration, and if effects on VCs are rated as significant, the frequency, reversibility, ecological context, direction and certainty will be used to fully assess significance.

4.2.6.4 Monitoring / Follow-Up

Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

4.2.7 Conclusion

Based on the analysis presented, for each VC the Application / EIS will provide a conclusion with respect to potential proposed Raven Project residual effect or cumulative effect and their significance.

4.2.8 Limitations

The Application / EIS will describe any limitations that are associated with the CEA (e.g. some of the information included was based, in part, on public information provided by others).

4.3 Summary of Assessment of Potential Effects

The Application / EIS will provide a summary of any potential proposed Raven Project residual effect or cumulative effect and their significance for each project setting component using Tables 4.3-1 and 4.3-2 respectively.

Table 4.3-1: Summary of Potential Residual Environmental Effects Analysis¹

Valued Components (Note Phase of Proposed Project) ²	Potential Effect	Key Mitigation Measures	Potential Residual Effect	Significance Analysis of Residual Effects (Summary Statement)
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Note: 1. Additional tables to be prepared by the proponent for potential environmental, economic, social, heritage and health effects.

2. Construction Phase – C, Operation Phase – O, Closure Phase – CI, and Decommissioning Phase – D (other phases could be added as needed).



Table 4.3-2: Summary of Potential Residual Cumulative Environmental Effects Analysis¹

Valued Components (Note Phase of Proposed Project)²	Potential Cumulative Effect	Key Mitigation Measures	Potential Residual Cumulative Effect	Significance Analysis of Cumulative Effects (Summary Statement)
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- Note:**
1. Additional tables to be prepared by the proponent for potential environmental, economic, social, heritage and health effects.
 2. Construction Phase – C, Operation Phase – O, Closure Phase – Cl, and Decommissioning Phase – D (other phases could be added as needed).



5 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

The Application / EIS will provide a summary of environmental background information for all subject areas considered (Section 5.1). The following biophysical environment subject areas will be described in the Application / EIS: atmospheric environment; groundwater; hydrology, surface water quality and sediment quality; fisheries and aquatic resources; marine environment; terrestrial environment; wildlife and their habitat; and environmental health.

In general, the Application / EIS will report on the baseline characteristics of each relevant subject area in sufficient detail to permit the identification, assessment, and determination of the significance of potentially adverse effects and characterisation of the beneficial effects of the proposed Raven Project. For each subject area, the assessment will be completed on the basis of identified VCs as detailed in Section 4 preceding.

For each subject area (Sections 5.2 to 5.9, below), and for each VC, the format presented in Section 4 will be followed. An example is presented in the following text box:



5.2	<u>Subject Area 1</u>
5.2.1	Valued Component Scoping and Rationale
5.2.1.1	Spatial Boundaries
5.2.1.2	Temporal Boundaries
5.2.2	Selected Valued Component (e.g. VC #1)
5.2.2.1	Detailed Baseline for VC #1
	Information Source and Methods
	Relevant Legislation and Legal Framework
	Cultural Ecological or Community Knowledge
	Detailed Baseline Description
5.2.2.2	Potential Effects of the Proposed Project and Proposed Mitigation
	Identification and Analysis of Potential Project Effects
	Mitigation Measures
5.2.2.3	Potential Residual Effects
	Potential Residual Effects after Mitigation
5.2.2.4	Cumulative Effects Assessment
	Rationalization for Carrying Forward Project Related Residual Effects into the CEA
	Interaction between VC #1 and other Past, Present or Future Projects / Activities
	Mitigation Measures
5.2.2.5	Proposed Significance Rating of Potential Residual Project Effects or Potential Residual Cumulative Effects
5.2.2.6	Monitoring / Follow-up
5.2.2.6	Conclusion
5.2.2.7	Limitations
5.2.3	Valued Component #2
	<i>[The analysis above will be repeated for all VCs for each subject area.]</i>
5.3	Summary of Assessment of Potential Effects

5.1 Environmental Background

This section of the Application / EIS will provide a general description of the existing biophysical environment, including surrounding areas within the zone of potential influences of the proposed Raven Project. The Application / EIS will summarise information previously collected for the proposed Raven Project area and present current baseline information. A number of studies were completed for the proposed Raven Project by Hillsborough Resources Limited in 1996 in connection with a proposed bulk sample at the site. The studies focused on resource definition but a number of biophysical environmental investigations were completed as well. Biophysical studies were completed by Agra Earth & Environmental (AEE; now AMEC), Nanaimo office. The AEE report referenced a number of



other studies previously completed. In addition to that list, a number of other studies have been completed before and since. Consolidated historic and current databases will be presented where relevant. Historic and current baseline datasets will be carefully reviewed for compatibility.

The proponent's approach is to incorporate TK and traditional land use (TLU) information, where available, into the design of each baseline study where appropriate. The nature and sensitivity of the area within and surrounding the proposed Raven Project based on the results of baseline studies will be described. The VCs that are considered likely to be affected would be included in the description. The relationship of the VCs to the broader regional setting and its ecosystems and economy will also be considered. Relevant reports and documents will be appropriately referenced.

5.2 Atmospheric Environment

5.2.1 Valued Component Scoping and Rationale

Preliminary atmospheric environment VCs and rationale for selection are described in Table 5.2-1. The selected VCs for atmospheric environment are those VCs with identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary list and rationale provided will be updated to integrate results from consultation that reflect Aboriginal interests, scientific and / or regulatory concerns, conservation status, and biodiversity and sensitivity to proposed Raven Project effects.



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IMPACT STATEMENT GUIDELINES**

Table 5.2-1: Atmospheric Environment Valued Components

Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Air quality	Proposed Project related emissions of criteria air contaminants including particulate matter (PM _{2.5} and PM ₁₀) and nitrogen oxides, sulphur dioxide, volatile organic compounds, and dustfall	VC assessed in recent EA process, extensive scientific literature; professional judgement based on EA of other mining projects	K'ómoks First Nation has expressed concerns with respect to air quality and fugitive dust	BC MOE, EC	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Residents in the proposed Raven Project area including local Aboriginal groups, site employees, hunters, loggers, tourists, BC EAO	National and Provincial Ambient Air Quality Objectives, Canada-Wide Standards for Particle Matter and Ozone
Climate	Proposed Project related emissions of particulate matter	VC assessed in recent EA process, GHCN2 Beta: The Global Historical Climatology Network, Canadian Climate Normals	Aboriginal groups' historical knowledge of microclimate changes	BC MOE, EC, HC	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Residents in the proposed Raven Project area including local Aboriginal groups, site employees, hunters, loggers, tourists, BC EAO	<i>Clean Air Act of Canada</i> ; Canada - British Columbia Agreement in Principle on Climate Change; The Kyoto Protocol of the United Nations Framework Convention on



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IMPACT STATEMENT GUIDELINES

Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
							Climate Change
Noise	Proposed Project related noise	VC assessed in recent EA process; professional judgement based on EA of other mining projects	K'ómoks First Nation has expressed concerns with respect to potential noise effects	BC MOE, EC, BC EAO	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Residents in the proposed Raven Project area including local Aboriginal groups, site employees, hunters, loggers, tourists	Maximum permissible sound levels pertaining to industrial operations in proposed Raven Project area (i.e., Alberta ERCB, Irish EPA, IFC)
Vibration	Proposed Project related vibration	VC assessed in recent EA process; professional judgement based on EA of other mining projects	K'ómoks First Nation has expressed concerns with respect to potential vibration effects	BC MOE, EC, BC EAO	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Residents in the proposed Raven Project area including local Aboriginal groups, site employees, hunters, loggers, tourists	DIN Standard 4150

Notes: BC EAO-British Columbia Environmental Assessment Office, BC ILMB-BC Integrated Land Management Bureau, BC MOE-British Columbia Ministry of Environment, DIN- Deutsches Institut für Normung (German Institute for Standardization), EA-Environmental Assessment; EC-Environment Canada, ERCB-Energy Resource Conservation Board, HC-Health Canada, IFC-International Financial Corporation, Irish EPA-Irish Environmental Protection Agency; PM_{2.5}-fine particulate matter <2.5 micrometre diameter; PM₁₀-fine particulate matter <10 micrometre diameter.

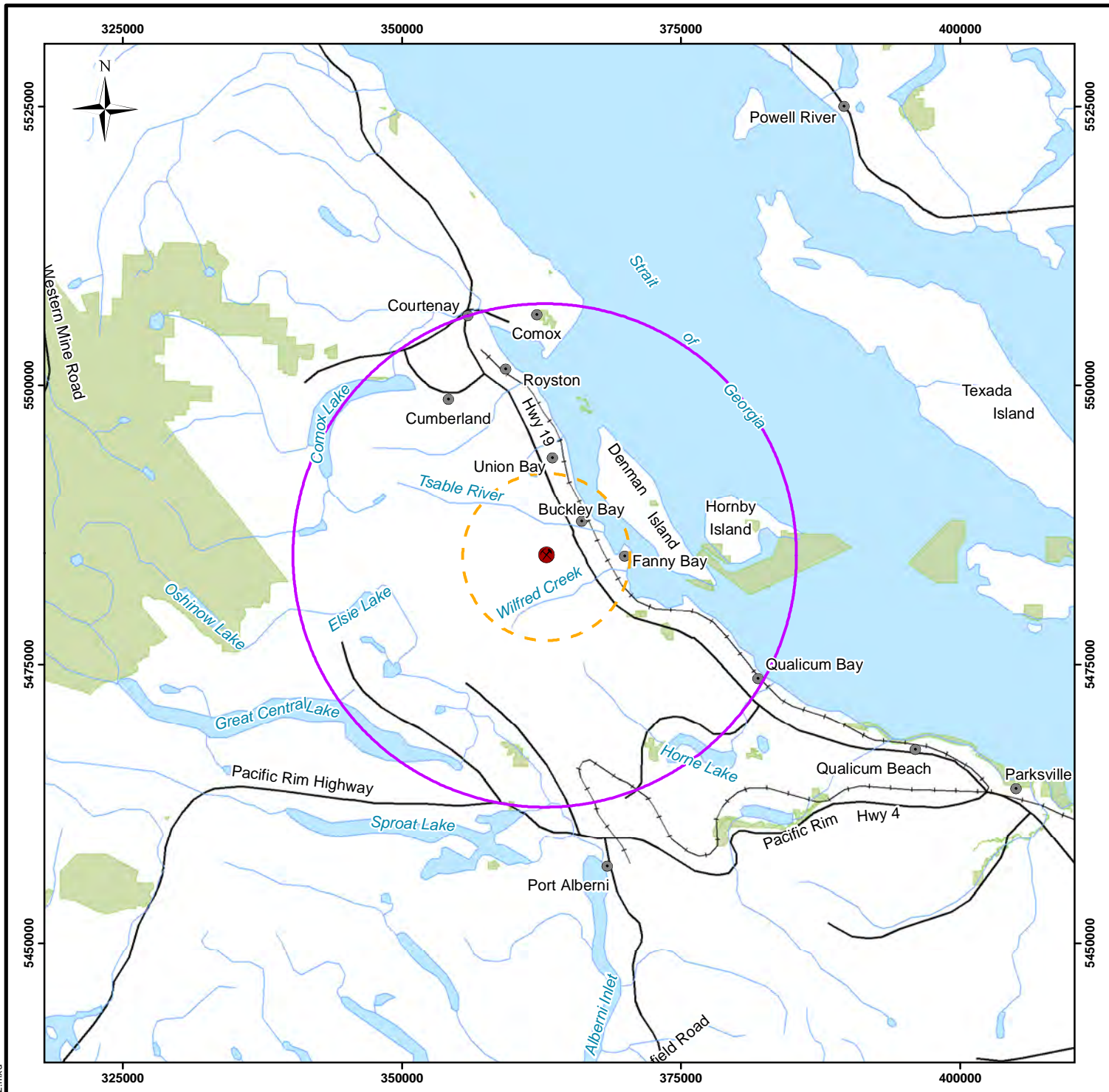


5.2.1.1 Air Quality Spatial Boundaries

The LSA is intended to cover the area that, by the operation of the proposed Raven Project at the designated site, may cause exceedance of air quality objectives. The LSA will be defined by a 3 km radius centred on the proposed Raven Project potential emissions sources. A 3 km radius was chosen as the probable extent of pollutants dispersion to acceptable concentration levels based on professional judgement and experience. The LSA will accommodate emission sources from the proposed Raven Project, the transportation routes within the property border line, the topographical and constructed features which may affect the dispersion characteristics of air pollutants.

The RSA is an estimate of the area of the Buckley Bay airshed which is characterised by baseline air quality pertaining to the proposed Raven Project. This is a conservative approach designed to ensure that humans, flora and fauna are protected from air contaminants. Climate data for the RSA has been collected for over a 30-year period by EC at the nearby YQQ meteorological station. Figure 5.2-1 shows the study areas for air quality.

The study area for the proposed Port Alberni Port Facility is defined as a 3 km buffer around the facility (Figure 5.2-2).



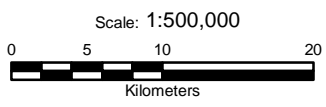
Legend

- Raven Coal Project
- Populated Place
- Road
- +— Rail line
- Watercourse
- Waterbody
- Park or Protected Area
- Air Quality LSA
- Air Quality RSA

Reference

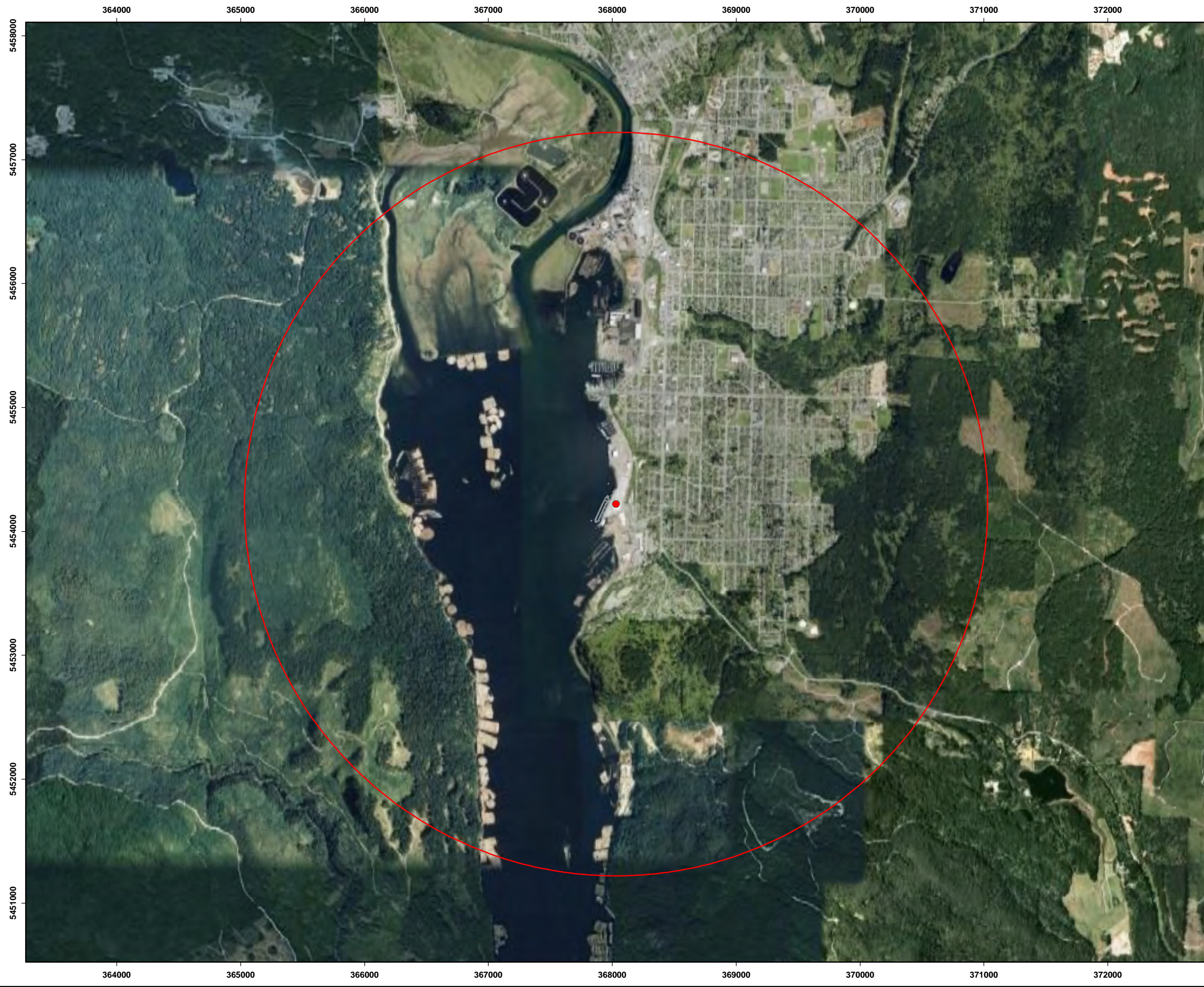
Base Data: 1:2,000,000 scale from the Land and Resource Data Warehouse

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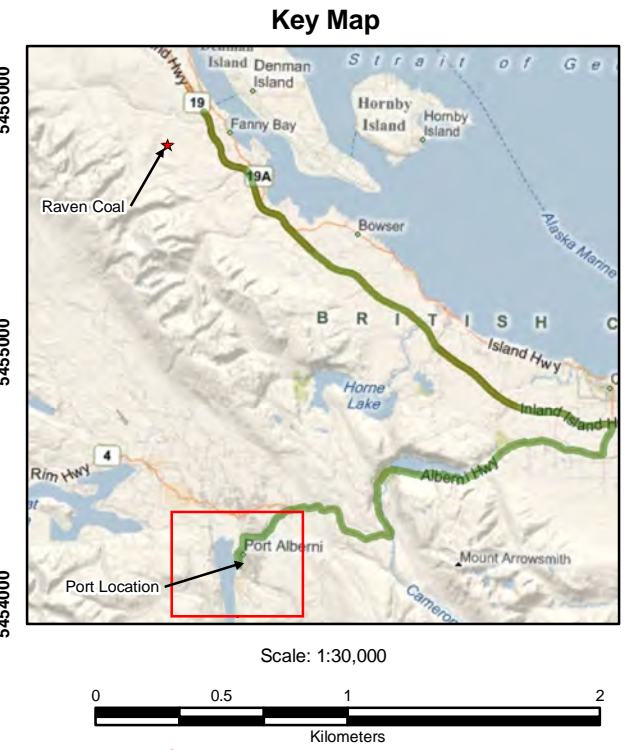


CLIENT:		Compliance Coal Corporation	
PROJECT:			
Raven Underground Coal Project			
<h2 style="margin: 0;">Air Quality Spatial Boundaries - Mine Site</h2>			
DATE:	February 22, 2010	ANALYST:	EO
Figure 5.2-1			
JOB No:	VE51897	QA/QC:	BO
PDF FILE:		04-50-001_AQ_study_area.pdf	
GIS FILE:		04-50-001	
PROJECTION:	UTM Zone 10	DATUM:	NAD83

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- Legend**
- Port Location
 - Border of the Study Area at 3 km Zone



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Note
 Aerial Photo is georeferenced with four control points and location is approximate. AMEC assumes no liability direct or indirect whatsoever for any third party or unintended use.

CLIENT:		 Compliance Coal Corporation
PROJECT:		
Raven Underground Coal Project		
Air Quality and Noise Spatial Boundaries - Port Facilities		
DATE:	ANALYST:	Figure 5.2-2
August 2010	MY	
JOB No:	QA/QC:	PDF FILE:
VE51897	RP	12-50-003_study_area_port_alberni.pdf
GIS FILE:		
12-50-003		
PROJECTION:	DATUM:	
UTM Zone 10	NAD83	



5.2.1.2 Air Quality Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

5.2.1.3 Climate Change Spatial Boundaries

Weather is basically the way the atmosphere is behaving in terms of temperature, humidity, precipitation, cloudiness, wind, and atmospheric pressure over a short period of time and small geographical extent. Climate, however, is the description of the long-term pattern of weather over a larger area. Therefore, the proposed Raven Project study area for climate will include the Buckley Bay airshed area and extend over Vancouver Island to include the Port Alberni airshed.

5.2.1.4 Climate Change Temporal Boundaries

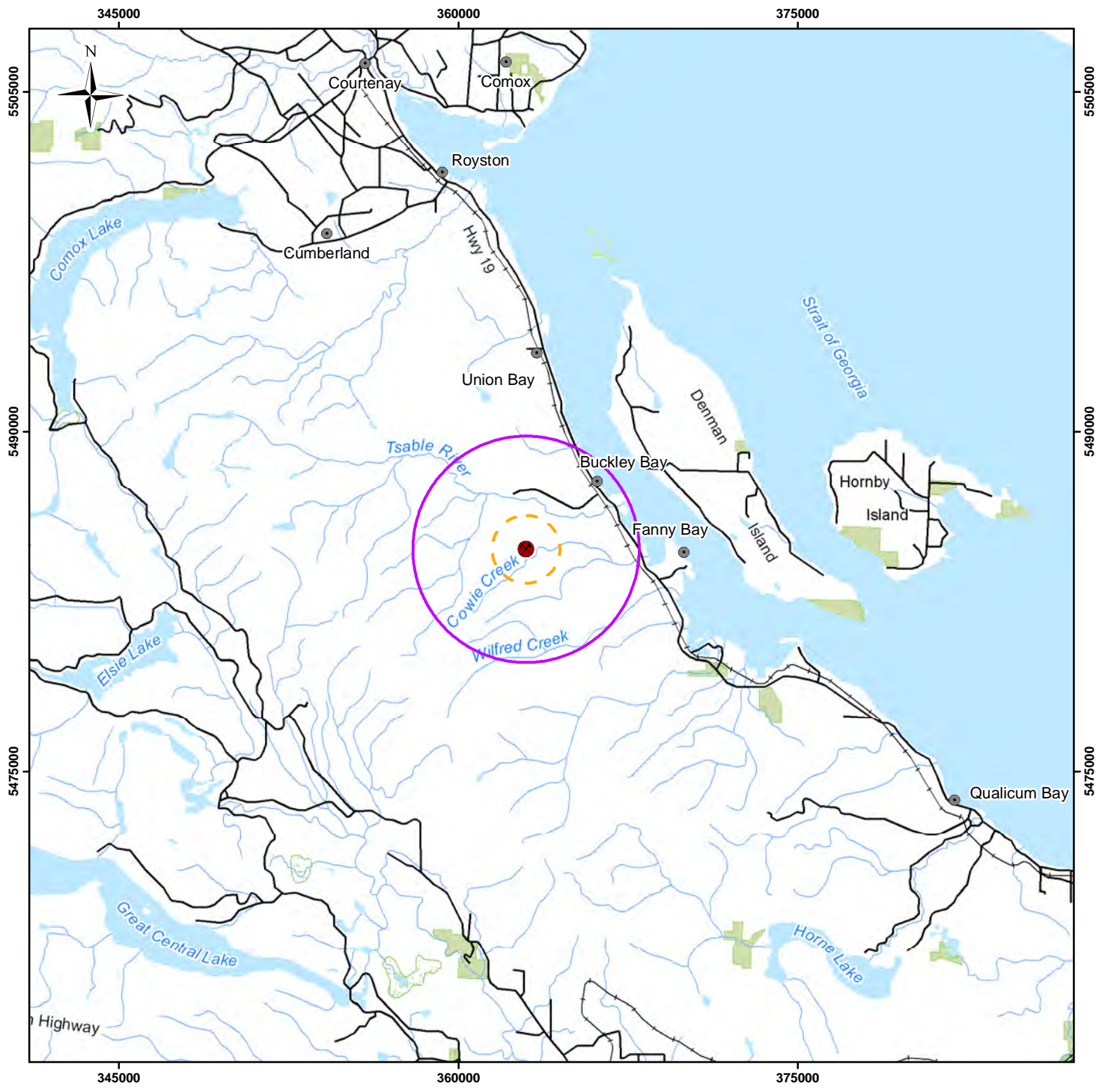
The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

5.2.1.5 Noise Spatial Boundaries

The LSA consists of an approximately circular area within a 1.5 km distance from the proposed Raven Project's permanent noise sources, which refers to permissible sound levels (PSL) adopted for the proposed Raven Project. The exact shape of the LSA will depend on results of noise modelling and will be presented as noise contours.

The RSA overlaps the proposed Raven Project footprint by 5 km in each direction. A distance of approximately 5 km is the maximum extent required for attenuating (to the background levels in the surrounding environment) the unmitigated high level blasting noise which could be expected during the construction phase of the proposed Raven Project. This is based on professional judgement and experience, and will be verified through modelling. The study area for noise associated with the mine site is shown on Figure 5.2-3.

The study area for the proposed Port Alberni Port Facility is defined as a 3 km buffer around the facility (Figure 5.2-2).



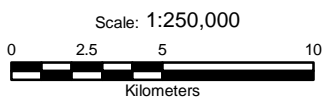
Legend

- Raven Coal Project
- Noise LSA
- Noise RSA
- Populated Place
- Road
- +— Railroad
- Watercourse
- Waterbody
- Swamp or Marsh
- Park or Protected Area

Reference

Base Data: 1:250,000 scale from the NRCAN Geogratis NTDB

DRAFT



CLIENT: Compliance Coal Corporation <small>(an Cameco Joint Venture)</small>		
PROJECT: Raven Underground Coal Project		
<h2 style="margin: 0;">Noise Spatial Boundaries - Mine Site</h2>		
DATE: February 22, 2010	ANALYST: MY	Figure 5.2-3
JOB No: VE51897	QA/QC: BO	PDF FILE: 12-50-001_Noise_study_area.pdf
GIS FILE: 12-50-001 PROJECTION: UTM Zone 10		
DATUM: NAD83		



5.2.1.6 Noise Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

5.2.1.7 Vibration Spatial Boundaries

Spatial boundaries will be the same as for the assessment of potential noise effects. See Section 5.2.1.5.

5.2.1.8 Vibration Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

5.2.2 Air Quality

5.2.2.1 Detailed Air Quality Baseline

Baseline meteorological data for the proposed Raven Project will be collected to support air quality monitoring and will describe the climate of the area in terms of:

- Wind: direction, velocity, temporal and spatial variability;
- Precipitation: volume, frequency, temporal and spatial variability of rain; and volume, depth profiles, frequency, temporal and spatial variability of snow;
- Temperature: averages, extremes, temporal and spatial variability;
- Humidity: averages, extremes, temporal and spatial variability;
- Solar radiation: total, net, averages, extremes, and temporal variability;
- Evaporation: total, net, averages, extremes, temporal and spatial variability; and
- Extreme weather events (to be determined).

Much of the above data will be required at a high level of detail to ensure the development of robust and scientifically defensible air quality modelling. Monitoring station data for the LSA will be obtained from the existing Buckley Bay station located on the Raven property. The station is operated by the UBC within the Canadian Carbon Program network, and has



been recording basic weather parameters since 2000. Monitoring station data will be reviewed in the context of the abundance, distribution, proximity and physical descriptions of potential obstacles to climate measurements (e.g., mountains, valleys, forests, objects created by humans). Climate normal data for regional stations published by EC every decade, to the most current update will also be obtained. For long-distance dispersion modelling, upper atmosphere data will be obtained from the EC advanced weather station at YQQ.

No local and regional anthropogenic emission sources exist in the Buckley Bay area where the proposed Raven Project would be located. For this reason, baseline air quality is similar to the air quality monitored in eastern and southern Vancouver Island. This approach was discussed by the proponent consultants with BC MOE. It was agreed that long term continuous monitoring of baseline air quality at the proposed Raven Project location is not warranted, and a desktop study would be sufficient to estimate the most likely baseline concentrations. All criteria air pollutants identified for the proposed Raven Project are available at referenced stations. Baseline concentration data for Port Alberni have been collected over a period of a few years by the monitoring station which is continuously operating in the mill located to the south of the proposed Port Facility. The station is included in the National Air Pollution Surveillance (NAPS) Network.

Regional baseline air quality data is readily available from Canadian federal and provincial environmental departments, research establishments, universities, the private sector, and US (federal and state) sources associated with long-distance travel of air pollutants. Such data could provide up-to-date information and also has the advantage of having been gathered over a number of years so it could be used to identify historical trends.

It is necessary to determine which pollutants should be assessed. This decision is influenced by the characteristics of the development, anticipated degree of air pollution, and the sensitivities of the receiving environment. Air emissions from the proposed underground coal mine would consist predominantly of diesel engine exhaust, potentially methane from mine ventilation, and potentially some fugitive dust from the coal handling operations and rejects disposal.

Analysis of baseline air quality will include review and adaptation of data gathered at numerous monitoring stations established within the Canadian Air and Precipitation Monitoring Network (CAPMoN), NAPS Network, and other relevant studies specific to Vancouver Island (e.g., Campbell River permittee monitoring network).

The CAPMoN is a non-urban air quality monitoring network with siting criteria designed to ensure that the measurement locations are regionally representative (not affected by local sources of air pollution). Scientists involved with the measurement of atmospheric pollution in urban centres would consider most CAPMoN sites to be remote and pristine.



The NAPS Network is operated by the NAPS Network agencies of the federal, provincial, territorial and municipal governments. The network is coordinated by the Environmental Science and Technology Centre, which is part of the Science and Technology Branch of EC.

Vancouver Island baseline air quality studies include a one-year intensive measurement program conducted by EC, BC MOE and the Cowichan Regional District on Vancouver Island's east coast. This program measures the chemistry of rainfall over the southern areas of Vancouver Island and is conducted by Royal Roads University through a partnership with EC. A study of air quality and transboundary transport of pollutants completed by EC, Pacific and Yukon Region, at the Christopher Point Border air quality station is also available. In the future, background air quality data would also be available from a newly installed (early 2010) EC / BC MOE monitoring station on the West Coast of Vancouver Island (Amphitrite Point south of Ucluelet).

The Application / EIS will include a description of the relevant legislation and legal framework as well as cultural and ecological or community knowledge in support of the detailed baseline description.

5.2.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

This section will present identification and analysis of potential proposed Raven Project effects on local air quality through each proposed Raven Project phase. Emission rates for area and point sources and spatial distribution of ground level concentrations will be assessed for criteria air contaminants (CAC), including but not limited to:

- **Total Suspended Particulates (TSP):** Air concentrations of TSP (dust), and the potential for project activities to increase TSP concentrations;
- **Fine Particulate Matter (PM):** Air concentrations of fine particulate matter (<2.5 micrometre diameter (PM_{2.5}) and <10 micrometre diameter (PM₁₀)), and the potential for project activities to increase concentrations of fine PM;
- **NO_x:** Air concentrations of nitrogen oxides, and the potential for proposed Raven Project activities to increase concentrations;
- **SO_x:** Air concentrations of sulphur oxides, and the potential for proposed Raven Project activities to increase concentrations;
- **O₃:** Air concentrations of ozone, and the potential for proposed Raven Project activities to increase concentrations;
- **CH₄/CO₂:** Project-related greenhouse gases (GHG) emissions of methane (including coal seam methane) and carbon dioxide, and the potential for proposed Raven Project activities to impact global warming;



- **Other:** Air concentrations of other potential project-specific air quality constituents (e.g., metallic elements of suspended particulates, diesel emissions, nitrous oxide (N₂O), other hydrocarbons and volatile organic compounds (VOC)), and the potential for proposed Raven Project activities to increase air concentrations.

Each of the above will require background on existing baseline concentrations determined in a desktop study.

Predictions of ambient air quality resulting from the operation of the proposed Raven Project will be achieved using an air quality dispersion model. The selection and use of that model will be based on the “Guidelines for Air Quality Dispersion Modelling in British Columbia” (BC MOE 2008). The AERMOD View dispersion model is proposed, subject to discussion with BC MOE. According to the above guidelines, the proposed Raven Project requires a Level 2 assessment for the following main reasons:

- Low risk sources (inert coal, dust, and diesel emissions);
- Small sources emitting at near-ground levels at the steady-state mode;
- No chemical transformation in the atmosphere; and
- No complex topography and meteorology.

The AERMOD View dispersion model will be used to predict the maximum ground level concentrations of air contaminants released from proposed Raven Project sources when the mine becomes operational.

The major input data for AERMOD is comprised of topographical data within the modelled domain, appropriate meteorological data, significant nearby structural data and emission data from the activities associated with the proposed Raven Project. The results of the dispersion modelling will be added to the measured or expected background levels of the relevant air contaminants. That total will be compared to relevant air guidelines or objectives for the appropriate time averaging periods to determine the significance, if any, of the proposed Raven Project on air quality.

The most current data on baseline GHG emissions which are on record for Canada and BC will be included in the assessment of proposed Raven Project-related GHG emissions to show changes in the provincial and Canadian inventories. In this way the baseline data will be linked with the potential effects assessment. GHG emission calculations will include each proposed Raven Project phase, including transportation of coal to the proposed Port Facility at Port Alberni and marine transportation from PAPA through Alberni Inlet and Trevor Channel to the Cape Beale Pilotage Station. GHG emissions for transport to and use of coal at overseas destinations will not be included.



Implications of GHG emissions from the proposed Raven Project, and the implications of climate change on the proposed Raven Project design considered in the climate and air quality analysis will be addressed. Assessment of potential proposed Raven Project-related effects on air quality will be described for point, area and mobile sources. This will include potential fugitive emissions from stockpiles and settling ponds, as well as vent raises and an incinerator (if included).

Mobile and stationary equipment will be quantified in the Application / EIS. The Application / EIS will also include a discussion of potential human receptors and the distance to the nearest human settlement.

Air quality analysis will include:

- Effects on biological receptors (e.g., vegetation, wildlife);
- A discussion of measures considered to minimise the release of air contaminants, such as coal dust, exhaust gases, greenhouse gases and other air contaminants including fugitive PM; this would include measures associated with coal transport (trucking, Port Facility and ship emissions);
- A description of best management practices (BMPs) to reduce emissions of PM and precursors to PM;
- Consideration of ambient air quality and meteorological monitoring requirements during construction and operation; and
- The proposed Raven Project's incremental contribution to total national and provincial GHG emissions on an annual basis where information is available (including an estimate of annual emissions from the operation of combustion equipment and methane release from coal mining).

Reference will be made to "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" (Agency 2003b) in compiling the Application / EIS.

The air quality next to the stretch of roads used for access to the proposed Raven Project site situated outside the LSA and RSA will be conservatively inferred by air quality predictions where the boundaries of these study areas intersect the roads.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described



and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.2.3 Climate change

Climate is a description of the long-term pattern of weather over a large area. Climate is usually described in terms of long-term (more than 30 years) meteorological parameters which are continuously monitored. Climate change refers to changes in long-term trends weather parameters such as temperature or precipitation. In addition to long-term climate change, there are shorter term climate variations. This so-called climate variability could be represented by periodic or intermittent changes related to El Niño, La Niña, volcanic eruptions, or other changes in the Earth's systems.

Studying climate and climate change is important because changes would affect people around the world. Rising global temperatures are expected to raise sea levels, and change precipitation and other local climate conditions. Changing regional climate could alter forests, crop yields, and water supplies. It could also affect human health, animals, and many types of ecosystems. Deserts may expand into existing rangelands, and features of some of our National Parks and National Forests may be permanently altered.

5.2.3.1 Detailed Climate Change Baseline

Existing climate descriptions for North America, BC and Vancouver Island will be obtained, analysed for relevance and quality, summarised and included in the Application / EIS. Long-term meteorological data collected over a minimum 30-year period at the nearest EC weather stations (known as Canadian Climate Normals) will be analysed to determine if there have been changes in weather parameters over the period of record. Long-term climate data for the Buckley Bay and Port Alberni airsheds have been collected by EC at the YQQ and Port Alberni meteorological stations.

5.2.3.2 Potential Effects of the Proposed Project and Proposed Mitigation

Anticipated proposed Raven Project emissions will be insignificant, so it is unlikely that they would cause measurable changes to the climate, even within the Buckley Bay airshed area. However, the proposed Raven Project will contribute to the GHG inventory for Vancouver Island, BC and Canada. Based on diesel fuel consumption by the proposed Raven Project diesel powered equipment, the emission rate of GHG (CH₄ / CO₂ and N₂O) will be calculated and analysed with reference to provincial and Canadian inventories and Canada's international obligations. Because the proposed Raven Project is relatively small, no climate



change predictive models such as Atmosphere-Ocean General Circulation Model (AOGCM) will be used to predict impacts on the global temperature. Extreme events observed in the past, such as cyclical anomalies (e.g., El Niño) will be considered for climate description.

Effects of GHG emissions by the proposed Raven Project sources will be examined with reference to GHG inventory for Vancouver Island, the Province of BC and Canada. Reference will be made to Canadian obligations under the ratified Kyoto Protocol.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.2.4 Noise

The Application / EIS will include an assessment of the potential impact of the proposed Raven Project on the environment, including changes in ambient noise levels during construction and operation, continuous versus acute exposure, and the effect of changes in noise levels on humans and wildlife. A description of background noise levels at the mine site will be included in the Application / EIS.

5.2.4.1 Detailed Noise Baseline

A noise survey will be conducted at the proposed Raven Project site, the proposed Port Facility and in nearby communities. Terrain features acting as potential noise barriers and reflectors may require inclusion in the noise assessment using a noise mapping computer model. Continuous 24-hour monitoring of sound parameters will be executed in accordance with the following two guidelines for environmental noise survey: (1) American National Standard Institute (ANSI) 1994: Procedures for Outdoor Measurement of Sound Pressure Level; (2) International Standard ISO / DIS 1996-1 & 1996-2.2 Acoustics – Description, Assessment and Measurement of Environmental Noise (ISO/DIS 1996-1:2003 and ISO/DIS 1996-2:2005). The System 824 Sound Level Metre / Real Time Analyser will be the instrument used in the survey.



During surveys, on-site weather data will be recorded using a hand-held Kestrel Weather Station. Exceptional sound events will be noted and described in terms of time and likely source by the instrument operator (present on-site at all times during the survey period). The location of the monitoring point will be selected in accordance with relevant guidelines for environmental noise surveys.

BC does not have ambient noise standards, usually expressed in a sound pressure unit of A-scale decibel, applicable to the area of the proposed Raven Project. CVRD has noise abatement guidelines for roads and both Comox and Qualicum Airports have noise abatement regulations for aircraft but none of these guidelines specify specific acceptable noise levels. Relevant noise standards existing in other jurisdictions (provincial and municipal) will be adopted for this project (e.g., “BC Noise Control Best Practices Guideline” (BC Oil and Gas Commission 2009) and Alberta Energy Resource Conservation Board (ERCB) “Noise Directive 038” (ERCB 2007).

The baseline sound survey data will be analysed for daytime and night time noise levels and other sound parameters and added to proposed Raven Project-specific levels for assessment of cumulative environmental noise levels. Quality Assurance / Quality Control (QA / QC), statistical analysis, data validation, removal of outliers, and error / accuracy analysis will be included.

5.2.4.2 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application / EIS will describe the nature and extent of potential increases in ambient noise levels resulting from proposed Raven Project related activities during each proposed project phase. Potential receptors, including on-site personnel and wildlife, will be identified and included in the assessment of potential noise effects related to the proposed Raven Project.

The SPM9613 sound mapping model will be used for prediction of noise levels. The model requires input data that includes atmospheric conditions, modelled equipment sound power levels at octave frequency spectrum, noise source directivity, barriers inclusion if present, reflecting surfaces data, observer (noise receiver) locations, ground cover, and hardness. Model findings will be used to make a comparison with proposed Raven Project-specific PSL for daytime and night time objectives. Each significant data source present during the operation phase will be included as inputs into the model, including crushers, processing plants, ventilation fans, and secondary power generation (if present). Design and location of noise sources will be considered and specific noise predictions at the proposed Raven Project area will be made. The model output will include noise contours, sound spectrum data, statistical descriptors of environmental sound, and sound pressure levels in a two-dimensional ground-level setting. Location of hills, forest and ground hardness contours will be shown. Discussion of results uncertainty will be included. Impact assessment of predicted noise levels on humans and wildlife will be discussed based on existing literature.



The Application / EIS will identify potential effects from increased noise levels from surface blasting (construction phase only), crushing, equipment operation, and coal transport on the environment. Impact of trucking noise occurring on public roadways in the Port Alberni area will be predicted with a highway noise model. The assessment of noise effects will include the construction and operation phases of the proposed Raven Project, point and mobile sources of noise, and tonal and impulsive noise. Assessment will be based on the ISO / Draft International Standard (DIS) “1996-1 & 1996-2.2 Acoustics – Description, Assessment and Measurement of Environmental Noise” (ISO 2003). Any identified residual effects of the proposed Raven Project will be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described, and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.2.5 Vibration

5.2.5.1 Detailed Vibration Change Baseline

Baseline data collection for vibration conditions is not required, as there are no existing sources of ground-borne vibration (e.g., blasting) within the LSA and RSA.

5.2.5.2 Potential Effects of the Proposed Project and Proposed Mitigation

Potential project vibration effects will be considered using empirical equations for ground vibration assessment for construction blasting and compactors (if needed) and heavy equipment movement. It is anticipated that operational blasting will be required very infrequently, as the coal could easily be removed with a continuous miner (i.e. without blasting). The infrequent operational blasting is not anticipated to cause surface vibration. Comparison with the recommended permissible vibration defined by Standard DIN 4150 (German Institute for Standardization (Deutsches Institut für Normung) 2001) will be completed and assessed. Potential residual effects from the proposed Raven Project will be discussed.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will



be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described, and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.3 Groundwater

5.3.1 Valued Component Scoping and Rationale

The selected VCs for groundwater are those VCs with identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale provided below will be updated to integrate results from consultation that reflect Aboriginal interests, scientific and / or regulatory concerns, conservation status, and biodiversity and sensitivity to proposed Raven Project effects. The preliminary rationale for selecting groundwater VCs is described below in Table 5.3-1.



RAVEN UNDERGROUND COAL PROJECT
DRAFT APPLICATION INFORMATION REQUIREMENTS / ENVIRONMENTAL
IMPACT STATEMENT GUIDELINES

Table 5.3-1: Groundwater Valued Components

Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Hydrogeology (flow, recharge / discharge, surface (marine and / or fresh) water - groundwater interaction)	Potential proposed Raven Project-related effects to the Cowie Creek and Cougar Smith Creek watersheds, underground mine works dewatering	VC assessed in recent EA process; professional judgement based on EA of other mining projects	K'ómoks First Nation has expressed concerns with respect to potential project effects on local hydrogeology	BC MOE, DFO, EC, VIHA	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Potential fisheries and wildlife impacts; concern regarding effects of mine dewatering on municipal and private groundwater drinking wells	<i>Water Act, Fisheries Act, Drinking Water Protection Act</i>
Groundwater quality	Seepage from underground mine walls exposure to air at depth, underground works build through fresh groundwater and saline deep groundwater zones	VC assessed in recent EA process; professional judgement based on EA of other mining projects	K'ómoks First Nation has expressed concerns with respect to potential proposed Raven Project effects on local water quality	BC MOE, DFO, EC, VIHA	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Potential impact with respect to fisheries and wildlife; concern with respect to municipal and private drinking water (well) quality	<i>Water Act, Fisheries Act, BCWQG, CEQG, BCCSR, Drinking Water Protection Act</i>

Notes: BC CSR- British Columbia Contaminated Sites Regulation, BC ILMB-BC Integrated Land Management Bureau, BC MOE-British Columbia Ministry of Environment, BCWQG-British Columbia Water Quality Guidelines, CEQG-Canadian Environmental Quality Guidelines, DFO-Fisheries and Oceans Canada, EA-Environmental Assessment; EC-Environment Canada; VC-valued component; VIHA-Vancouver Island Health Authority.



5.3.1.1 Groundwater Spatial Boundaries

The groundwater LSA and RSA will include all areas potentially affected by the project as reflected in Figure 5.3-1.

5.3.1.2 Groundwater Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

5.3.1.3 Groundwater Quality Spatial Boundaries

The LSA and RSA for groundwater quality are the same as for hydrogeology (Figure 5.3-1).

5.3.1.4 Groundwater Quality Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

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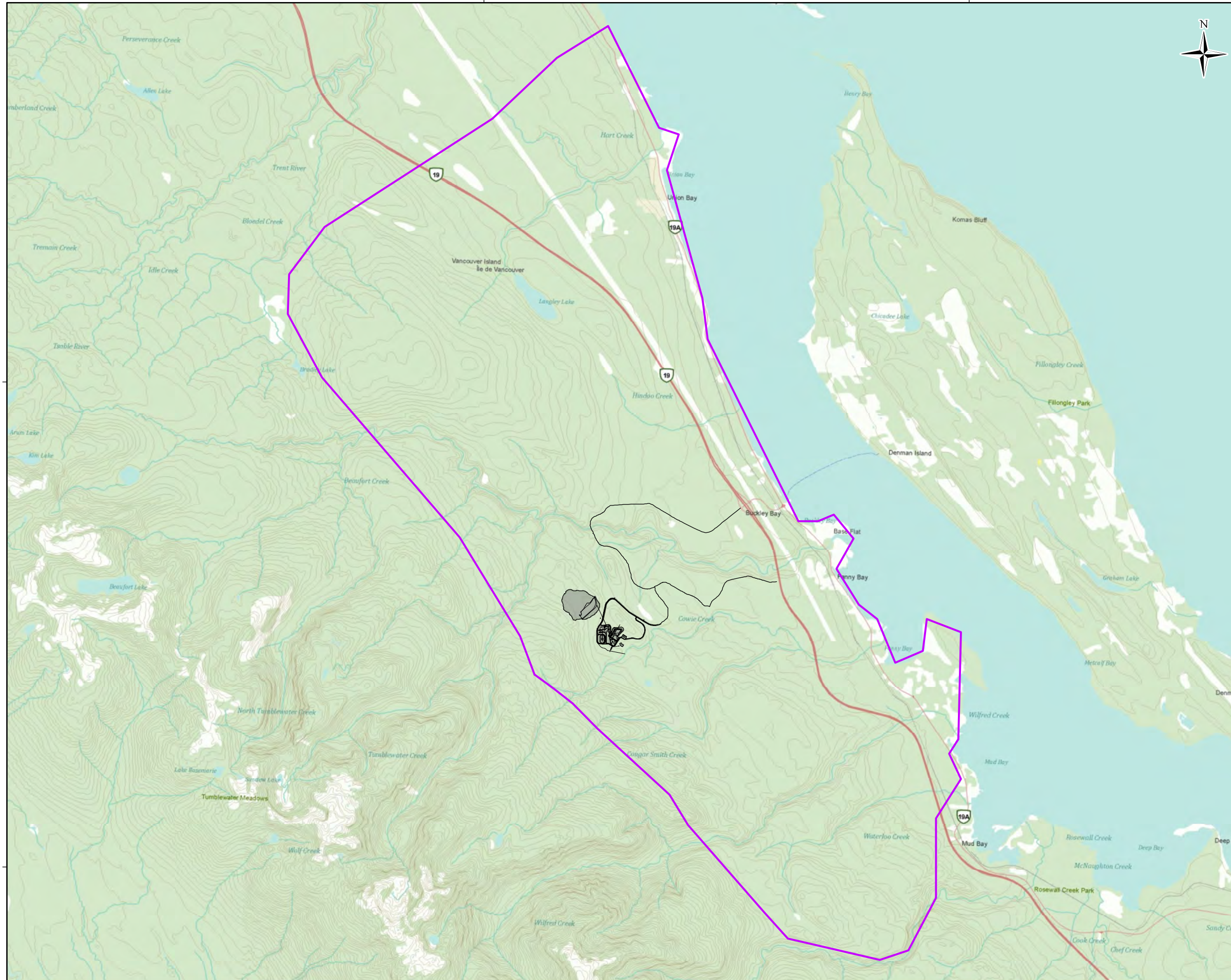


Legend

- Hydrogeology Model Boundary
- Proposed Access Road
- Potential Location of Site Facilities

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DRAFT

Scale: 1:80,000



Reference

Basemap: ESRI World Topographic Map
Model Boundary: Itasca Denver, Inc.

CLIENT:		Compliance Coal Corporation
PROJECT:	Raven Underground Coal Project	
Hydrogeology Study Boundary		
DATE: April 19, 2011	ANALYST: EO	Figure 5.3-1
JOB No: VE51897	QA/QC: LR	PDF FILE: 07-50-11_hydrogeo_study
GIS FILE: 07-50-11		
PROJECTION: UTM Zone 10	DATUM: NAD83	



5.3.2 Hydrogeology

5.3.2.1 Detailed Hydrogeology Baseline

The hydrogeology baseline characterisation will consist of a review and analysis of available geology and hydrogeological information. This will include: regional published reports and maps (including existing BC MOE aquifer maps); published reports of hydrogeological studies of coal deposits in other regions with similar geology; a search and analysis of local (on-site and nearby) water well stratigraphy and production information; and relevant data collected during the proposed Raven Project's resource exploration activities. A list of current and predicted future groundwater users in the immediate area and region, including Aboriginal users, would be provided, and potential groundwater conflicts will be identified.

The site hydrogeology characterisation also includes wells installed in drillholes at selected locations and data logging piezometers to record groundwater pressures in different units over time. The Application / EIS will provide a rationale for the locations and depths of wells and piezometers installed, the method of piezometer sealing, and the length of screen on wells and piezometers. The well screens are situated at specific depths to allow hydraulic testing of the units. The equipment was installed to characterise both permeability and storage properties of the main hydrogeologic units.

The investigation program was developed to characterise the main hydrostratigraphic layers across the Raven property, including sandstone, siltstone / mudstone and coal units. The assessment of these units was conducted through the installation of the following:

- Two vertically nested vibrating wire piezometers (VWP) with data loggers installed in single drillholes in different units;
- Two large diameter wells installed near the VWPs;
- One large diameter well screened in the overburden sandstone; and
- Three monitoring wells screened in coal units.

The VWPs were installed at strategic depths to allow the characterisation of several different units as well as the long term (several months) observation of groundwater pressures.

Testing included the following:

- The monitoring wells screened in the coal and sandstone units were purged and sampled and the recovery measured for hydraulic conductivity calculations; and
- The large diameter wells screened over several units were pumped and sampled, the recovery measured, and the response of the groundwater pressures in the VWPs was recorded.



Additional test work will include water quality surveys within the stream beds of Cowie and Cougar Smith Creeks during low flow periods to determine the interaction between deep groundwater and surface water.

The data obtained from the hydraulic testing, groundwater elevation measurements and long term groundwater pressure monitoring will provide support for numerical model development required for both engineering studies and the EA. Results of the information review and field investigations will allow for:

- Characterisation of aquifers and aquitards, including aerial extent, thickness and continuity, hydraulic properties, and the degree of aquifer confinement;
- Identification of natural discharges (spring, seeps, streams);
- Identification of groundwater recharge zones; and
- The relationship and connectivity of groundwater aquifers in the LSA to aquifers in surrounding areas.

The drawdown / recovery and VWP data will be analysed utilising appropriate conceptual models to calculate unit permeability and storage. The VWP data collected between October 2009 and February 2010 will be correlated with site precipitation and streamflow data to assess the interconnection between the surface water and groundwater systems.

The analyses of the field testing program, the regional geology and relevant published information will form the basis for the construction of models for an impact assessment analysis. A groundwater model will be developed as a component of the Application / EIS.

5.3.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

The Application / EIS will identify potential effects on groundwater levels and the quantity available for stream base flow. Effect conclusions will be based on predicted mine water discharge volumes due to seepage from underground mine workings and the effect this would have on local and regional groundwater flow. The assessment will consider:

- Water handling procedures;
- Water balance predictions;
- Contingencies for potential inflows that are higher than expected;
- Potential effects of mine-related groundwater pumping;
- Potential effects of underground mining (i.e., rock fracturing, joint dilation or bedding plane separation) resulting in potential changes to strata permeability and storage capacity, groundwater flow directions, groundwater chemistry, groundwater levels, and groundwater-surface water interactions;



- Potential effects on groundwater recharge (surficial and bedrock aquifers);
- Potential effects on local drinking water wells and drinking water quality; and
- The potential effect of mine collapse, potential surface subsidence, and resulting impacts to groundwater flow regime and groundwater-surface water interactions.

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

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described, and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.3.3 Groundwater Quality

5.3.3.1 Detailed Groundwater Quality Baseline

The existing baseline data set for groundwater quality, including physical parameters of waterbodies with the potential to be affected by the mine development, will be included in the Application / EIS.

Groundwater samples were collected from different geological units and from stream bed deposits to characterise the baseline water quality. The Application / EIS will include:

- Groundwater monitoring and sampling site locations, and justification for the selection and spacing of these sites;
- Groundwater sample data, including the frequency, timing and duration of sampling;
- Description of groundwater-surface water and groundwater-sea water interactions; and



- Water quality objectives for groundwater, including a rationale for the selection of the stated objectives.

Monitoring is currently scheduled to continue for one year to assess the potential for the presence of seasonal hydrostatic pressure variation. When the scheduled monitoring is completed, monitoring results will be reviewed and requirements for additional monitoring will be determined. Government databases will be reviewed to determine if there is historical drinking water quality data for local water wells and this information will be provided if available.

Groundwater samples were collected from the sandstone and coal units to characterise the quality of the water. Field parameters (pH, conductivity, temperature, total dissolved solids, and salt content) were monitored while purging the wells and the samples recovered once the parameters had stabilised.

A water quality survey will be conducted during low flow periods along Cougar Smith and Cowie Creeks to determine the groundwater contributions to creek baseflow. Samples will be collected from deep in the streambed deposits.

Laboratory analysis included physical parameters, major ions, nutrients, total metals and dissolved metals. Appropriate analytical techniques will be used. Table 5.3-2 provides a list of the analysed parameters.

Polycyclic aromatic hydrocarbons (PAH) will be analysed on post pumping samples.



Table 5.3-2: Groundwater Assay Parameter List

Physical Parameters	Dissolved Metals
pH @ 25°C	Aluminum
Conductivity @ 25°C	Antimony
Total Suspended Solids	Arsenic
Total Dissolved Solids	Barium
T-Alkalinity as CaCO ₃	Beryllium
T-Hardness as CaCO ₃	Boron
Turbidity	Cadmium
Anions	Calcium
Chloride	Chromium
Fluoride	Cobalt
Sulphate	Copper
	Iron
Nutrients	Lead
Ammonia - Nitrogen	Magnesium
Nitrate - Nitrogen	Manganese
Nitrite - Nitrogen	Mercury
TKN - Nitrogen	Molybdenum
Phosphorus (ortho-phosphate)	Lithium
Phosphorus (Total)	Nickel
	Potassium
Organics	Selenium
Carbon (Total Organic)	Silicon
	Silver
	Sodium
	Thallium
	Tin
	Titanium
	Uranium
	Vanadium
	Zinc

Note: CaCO₃-calcium carbonate

5.3.3.2 Potential Effects of the Proposed Project and Proposed Mitigation

The Application / EIS will identify potential effects on groundwater quality, including groundwater in the LSA and RSA with an identified potential to be used for drinking water.



Domestic wells in the proposed Raven Project area are all in the shallow (first) groundwater aquifer; mining would intersect deeper aquifers well below any domestic wells.

Effect conclusions will be based on the predicted water quality of mine water seepage, including both operational and post closure conditions. The assessment will consider potential effects on water quality in relation to metals, nutrients, major ions, and physical parameters. Both dissolved and total metals will be modelled as appropriate to the type of effects. Groundwater quality will be assessed against appropriate risk-based guidelines. The Application / EIS will compare background and predicted water quality to applicable guidelines.

The influence on geochemistry will be assessed from potential sources such as rock exposed in underground mine workings, potential subsidence and materials temporarily stored on surface (i.e., processed coal, reject materials, topsoil, and till). This will include information from assessments of ML/ARD potential. The Application / EIS will integrate results of the ML/ARD prediction work, water quality, hydrology, and water balance information to develop water quality predictions that will be used as a basis for impact assessment, to determine materials handling procedures and to assess and develop ML/ARD mitigation / management requirements for the proposed Raven Project. Geochemical modelling will be presented in a clear and transparent manner and the methods, assumptions and rationale used to estimate water quality would be thoroughly explained. The lag time to ML/ARD onset will be assessed for all potentially ARD generating materials and this information will be utilised in the assessment of potential effects to groundwater quality. Contingency plans will be provided where there are significant uncertainties or risks associated with the predicted water quality.

Potential effects of the proposed Raven Project on groundwater quality will also be incorporated into other relevant sections of the EA (e.g., fisheries and aquatic resources, hydrology, etc.). All parameter estimates reported in the Application / EIS will include sources of information (either estimates or empirical) and assumptions built into the data. Water quality predictions will be made for major mine components (coarse coal refuse, coal tailings, waste rock, overburden, stockpiles, underground workings including the gob), site surface water discharges, groundwater seepages and relevant receiving environment locations. Water quality predictions will be conducted for key flow conditions and relevant time-steps in the mine life (i.e., temporal boundaries will include operations, closure, post-closure, workings flooded and discharging, etc.). Water quality predictions and effects assessment will include pH, alkalinity, sulphate, cations, major and trace metal / metalloids, nitrogen species etc., and include comparison to all relevant water quality guidelines and objectives. Contingency plans will be provided where there are significant uncertainties or risks associated with the predicted water quality.

The Application / EIS will describe proposed measures available to manage the impacts identified above. The management strategy for any ML/ARD will be assessed in predictive



water quality modelling. Concepts for operational and post-closure monitoring and maintenance plans will be provided, including prevention and management strategies for temporary closure or early-permanent closure scenarios. The Application / EIS will also include a discussion and significance assessment of each identified residual effect following mitigation.

Potential effects will be based on the predicted water quality of each waste stream (potential seepage from topsoil and till storage areas, ponds and dams, general site, washed coal and raw piles, truck wash and oil-water separator, external sedimentary pond, diversion ditches and catchment ditches, and mine water) and containment ponds throughout the proposed Raven Project area. The Application / EIS will include an assessment of the data on groundwater quantity necessary to evaluate potential effects associated with mine development and operations, including providing water balance calculations.

Any identified residual effects of the proposed Raven Project will be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects corresponding proposed mitigation measures would be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.4 Hydrology, Surface Water Quality and Sediment Quality

5.4.1 Valued Component Scoping and Rationale

The selected VCs for hydrology, surface water quality and sediment quality are those VCs with identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale provided below will be updated to integrate results from consultation and Working Groups that reflect Aboriginal interests, scientific and / or regulatory concerns, conservation status, and biodiversity and sensitivity to proposed Raven Project effects. The preliminary rationale for selecting hydrology, surface water quality and sediment quality VCs is described below in Table 5.4-1.

Table 5.4-1: Surface Hydrology and Water Quality Valued Components

Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Surface Hydrology (Cowie Creek and Cougar Smith Creek watersheds)	Potential proposed Raven Project-related effects in Cowie Creek and Cougar Smith Creek watersheds	Identified by proponent, underground mine dewatering activities and surface water diversion may affect surface hydrology, underground mining may cause change to surface hydrology due to potential subsidence	K'ómoks First Nation has expressed concerns with respect to potential proposed Raven Project effects on local hydrology	BC MOE, DFO, EC	Vancouver Island Summary Land Use Plan (BC ILMB 2000); Nile Creek to Trent River Water Allocation Plan (BC MOE 1995)	Surface hydrology is valued by general public, non-government organisations and industry; potential impact with respect to fisheries and wildlife	<i>Water Act, Fisheries Act</i>
Freshwater and Sediment Quality	Potential proposed Raven Project-related effects in Cowie Creek and Cougar Smith Creek watersheds	Identified by the proponent and AMEC; streams provide fish habitat	Local Aboriginal groups have expressed concern with respect to potential proposed Raven Project – related effects on surface water quality	BC MOE, DFO, EC	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Surface water quality is valued by general public, non- government organisations and industry; potential impact with respect to fisheries and wildlife	<i>Water Act, Fisheries Act, BCWQG, CEQG, BCCSR</i>

Notes: BCCSR- British Columbia Contaminated Sites Regulation, BC ILMB-BC Integrated Land Management Bureau, BCWQG-British Columbia Water Quality Guidelines, BC MOE-British Columbia Ministry of Environment, CEQG- Canadian Environmental Quality Guidelines, DFO-Fisheries and Oceans Canada, EC-Environment Canada.



5.4.1.1 Water Balance Spatial Boundaries

The aquatic LSA and RSA is the Cowie Creek watershed, and is common to hydrology, surface water and sediment quality, fisheries and aquatic resources, groundwater quality and hydrogeology studies. The rationale for the hydrology LSA and RSA is based on watershed boundaries; the proposed Raven Project is confined to Cowie Creek and some of its tributaries. The possible proposed Raven Project influence on water quality and stream flows is therefore limited to the watershed in which it is located. The aquatics LSA and RSA are shown in Figure 5.4-1.

5.4.1.2 Water Balance Temporal Boundaries

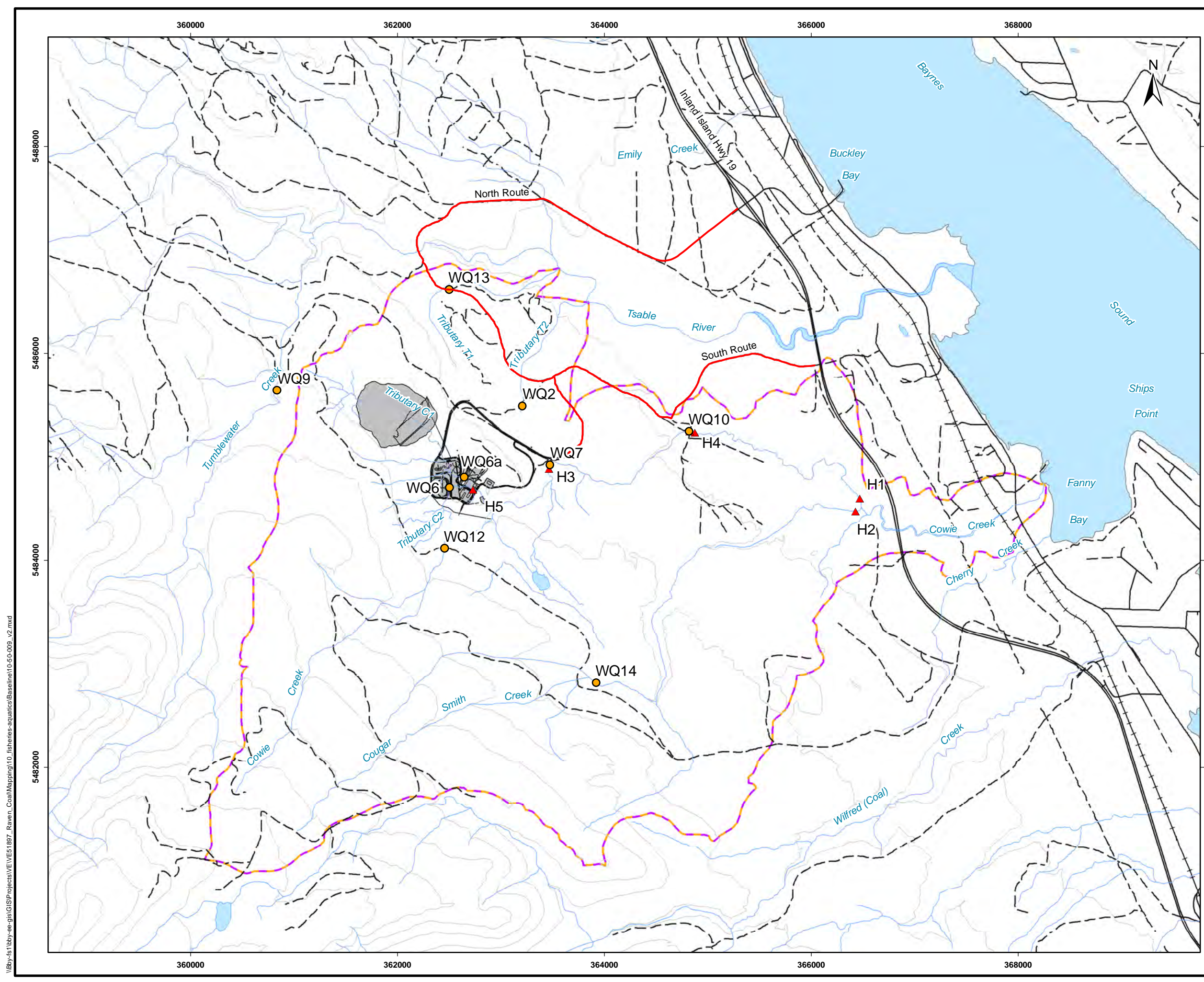
The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each project phase will be described.

5.4.1.3 Surface Water Quality and Sediment Quality Spatial Boundaries

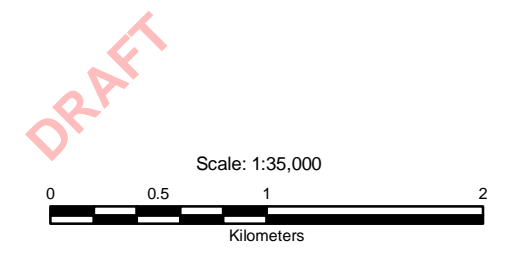
The LSA and RSA for surface water quality and sediment quality is the same as for hydrology (Figure 5.4-1). The rationale is based on watershed boundaries; the proposed Raven Project is confined to Cowie Creek and some of its tributaries. The possible influence on water quality and stream flows is therefore limited to the watershed in which it is located. Cougar Smith Creek is included for water quality as an adjacent, generally similar watershed that could serve as a reference stream. The Application / EIS will review biophysical and physico-chemical properties of the study area and reference sites, and provide a justification for the selection of reference sites.

5.4.1.4 Surface Water Quality and Sediment Quality Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each project phase will be described.





- Legend**
- Water Quality Monitoring Station
 - ▲ Hydrometric Station
 - Proposed Access Road
 - Paved Road
 - - Gravel/Rough Road
 - + + Railroad
 - - Elevation Contour (100 m)
 - Watercourse
 - Waterbody
 - Aquatic LSA and RSA
 - Potential Location of Site Facilities



Reference
 Tributaries T1, T2, C1 are local names used for reference and are not gazetted names

Reference
 LIDAR (5m) used to define Cowie and Cougar Smith Creek Watercourses
 TRIM used in other watersheds
 LSA/RSA: Cowie, Cougar Smith Creek watersheds, and two first order tributaries to the Tsable River
 Basedata: TRIM

CLIENT:		 Compliance Coal Corporation
PROJECT: Raven Underground Coal Project		
Aquatic Spatial Boundaries		
DATE: February 22, 2010	ANALYST: EO	Figure 5.4-1
JOB No: VE51897	QA/QC: NF	PDF FILE: 10-50-009_aquatic_study_area.pdf
GIS FILE: 10-50-009		
PROJECTION: UTM Zone 10	DATUM: NAD83	

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5.4.2 Surface Hydrology

5.4.2.1 Detailed Surface Hydrology Baseline

The Application / EIS will include a description of watersheds affected by the mine, power lines, roads, and existing water use. Surface hydrology will be described along with water quality and quantity, including potential reference areas for environmental effects monitoring. The assessment will include a description of:

- Methods used;
- Existing water use;
- Watersheds affected by the mine, roads and infrastructure including local wetlands, ponds and lakes;
- Flow data from regional hydrometric stations;
- Site flow monitoring data;
- Mean monthly and annual flows;
- Minimum daily and monthly flows;
- 10-year and 20-year seven-day low flow;
- Maximum monthly flows;
- Peak instantaneous flows;
- Flood events (e.g., 1 in 200 year flood event);
- Climate change considerations;
- Ice cover conditions;
- Baseline studies; and
- Effect of groundwater flows on surface water bodies (regional and local).

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

The hydrological program will include the following:

- Establish continuous water level recorders on Cowie Creek above its junction with Cougar Smith Creek;
- Measure stream discharges at least quarterly, including freshet and summer low flows on Cowie and Cougar Smith Creeks at the water level recorder stations;



- Download continuous water level recorders and check data whenever streams are gauged; and
- Survey reaches of Cowie Creek from above the proposed Raven Project facilities to its confluence with Cougar Smith Creek to determine baseline wetted width, water depth, spot flows, percentage of runs, riffles, pools, etc.

Analyses required include flood and low flow calculations for Cowie and Cougar Smith Creeks and determination of the effects of de facto water withdrawal from Cowie Creek by the proposed Raven Project development on flows, particularly low summer flows. It is understood that Cowie Creek flows are subsurface for a portion of the summer and thus potential effects from the proposed Raven Project may be limited to reduction of flows in Cowie Creek below Cougar Smith Creek junction. Analysis of the site-specific meteorological precipitation data, together with available EC data would be required to provide a measure of data representation, (i.e., how typical was the measurement period compared to climate normals which span a 30-year period). Analyses will also consider the potential impact of climate change scenarios, in the form of sensitivity analyses of the key hydrological parameters, such as precipitation and evaporation.

5.4.2.2 Water Balance

A water balance will be prepared that incorporates each proposed Raven Project component through each proposed Raven Project phase and under a range of climatic conditions. Reported parameter estimates (e.g., precipitation, evaporation, stream flows, groundwater flows, soil permeability, and hydraulic roughness) will include information sources (either estimates or empirical), and make reference to measurement standards or collection protocols which were used, as well as assumptions built into the data. Consideration of extreme events and years, both wet and dry, will be included. The Application / EIS will include all water balance calculations.

5.4.2.3 Potential Effects of the Proposed Project and Proposed Mitigation

The Application / EIS will identify potential effects on surface water quantity and flow. Effect conclusions will be based on predicted water volumes in and from waste streams and containment ponds throughout the proposed Raven Project area, including: mine water; seepage; surface runoff and collection ponds; process plant and water treatment facility discharges; settling ponds; and the sewage treatment facility. The assessment will consider the potential effects on water quantity and catchment areas in relation to:

- Water withdrawals and discharge related to the proposed Raven Project, including points of withdrawal and discharge;
- Quantity of runoff, groundwater and seepage from underground and other mine workings. This will include: a description of predicted mine inflows and hydrogeology;



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 and evaporation, will be applied to water balance;
- Receiving water quantity, including changes in timing, volume and deviation of peak and minimum flows resulting from the proposed Raven Project (e.g., de-watering of underground works); and
- ML/ARD and seepage potential associated with movement of material and use for foundations, dikes and dams.

The release of mine water will be managed to match the flow range observed in the creeks and to avoid unnatural effects on physical habitats. Potential effects on natural stream morphology and sediment transport will be assessed if changes are evidenced from changes to the hydrological flow regime.

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

The Application / EIS will assess the possible effects of the proposed Raven Project on existing water licences in the area to ensure that drinking water systems are evaluated with regard to the effects of the mine or any ancillary facilities such as the roads.

The Application / EIS will describe proposed measures available to manage the impacts identified above, including measures to contain and treat contaminated water. Relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures would be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated



with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.4.3 Surface Water and Sediment Quality

The Application / EIS will include an analysis of water quality and sediment quality. The water quality monitoring program will be comprised of two components. Water and sediment quality samples will be collected from relevant water quality monitoring stations established during previous studies and augmented with new sites reflecting current mine plans.

Additional samples will be collected for background total suspended solids (TSS) in conjunction with hydrology, fisheries, and aquatic resource studies along the proposed access road and power line right-of-way.

This information will be used as part of the basis for analysis of potential impacts on fish values and proposed fish habitat mitigation and compensation measures.

5.4.3.1 Detailed Surface Water and Sediment Quality Baseline

Water Quality

Water quality samples will be collected monthly commencing April 2009 at six of the historic (1996) sites and at two new sites. Collectively, these sites will provide water quality data above, within and below the proposed Raven Project. Water quality samples will also be collected from two control sites on separate drainages. Each water quality sampling site will be shown on appropriate maps. During the summer low flows (August) and fall high flows (late October-early November) water quality samples will be collected on Cowie and Cougar Smith Creeks for a reduced set of parameters on a weekly basis (for five weeks, per BC MOE guidelines). Low and high flow samples are collected at the same locations as monthly samples.

Field quality control will include one duplicate sample, field blanks and travel blanks. Temperature, pH and conductivity data are collected in the field, with other parameters assessed in the laboratory (see below).

Table 5.4-2 lists the proposed analyses for monthly sampling and Table 5.4-3 lists the proposed analyses for weekly sampling. Analytical methods and detection limits for each tested parameter will be detailed in the Application / EIS.



Table 5.4-2: Monthly Sampling Parameter List

Physical Parameters	Total and Dissolved Metals
pH @ 25°C	Aluminium
Conductivity @ 25°C	Antimony
Total Suspended Solids	Arsenic
Total Dissolved Solids	Barium
Turbidity	Beryllium
T-Alkalinity as CaCO ₃	Boron
T-Hardness as CaCO ₃	Cadmium
	Calcium
Anions	Chromium
Chloride	Cobalt
Fluoride	Copper
Sulphate	Iron
	Lead
	Magnesium
Nutrients	Manganese
Ammonia - Nitrogen	Mercury
Nitrate - Nitrogen	Molybdenum
Nitrite - Nitrogen	Lithium
Phosphorus (ortho-phosphate)	Nickel
Phosphorus (Total)	Potassium
	Selenium
	Silicon
Organics	Silver
Carbon (Total Organic)	Sodium
	Strontium
	Thallium
	Tin
	Titanium
	Uranium
	Vanadium
	Zinc



Table 5.4-3: Weekly Sampling Parameter List

Physical Parameters	Nutrients
pH @ 25°C	Ammonia - Nitrogen
Conductivity @ 25°C	Nitrate - Nitrogen
Total Suspended Solids	Nitrite - Nitrogen
	Phosphorus (ortho-phosphate)
	Total Phosphorus
	Sulphate
	Chloride
	Total and dissolved metals

Note: CaCO₃-calcium carbonate

Samples will be analysed for PAHs once during the summer at each site. Petrographic analysis will be performed on selected geochemical samples.

Sediment Quality

Sediment quality samples will be collected at the water quality stations once during the summer (August 2009). Five duplicates for each site will be analysed to assess variability. Table 5.4-4 lists the proposed parameter list for sediments. Polycyclic Aromatic Hydrocarbons (PAHs) and particle size will be analysed from one replicate at each site.

Table 5.4-4: Sediment Parameter List

Total Metals	
Aluminium	Mercury
Antimony	Molybdenum
Arsenic	Nickel
Barium	Potassium
Beryllium	Selenium
Boron	Silicon
Cadmium	Silver
Calcium	Sodium
Chromium	Strontium
Cobalt	Thallium
Copper	Tin
Iron	Titanium
Lead	Uranium
Magnesium	Vanadium
Manganese	Zinc



5.4.3.2 Potential Effects of the Proposed Project and Proposed Mitigation

The Application / EIS will identify potential effects on surface water (and sediment) quality. Assessment of potential effects on drinking water would be included, if applicable. Any surface water discharge from the mine would need to meet water quality objectives set by BC MOE. Effect conclusions will be based on the predicted water quality of waste streams and containment ponds throughout the proposed Raven Project area, including: mine water; seepage; surface runoff and collection ponds; process plant and any water treatment facility discharges; settling ponds; and the sewage treatment facility. If any potential effects on surface water or sediment quality are identified, potential effects on the marine environment will be assessed. Contingency plans will be provided where there are significant uncertainties or risks associated with predicted water quality.

The assessment will consider potential effects on water quality in relation to:

- Quality (particularly metals, nutrients and major ions) of runoff, groundwater and seepage influenced by geochemistry (including ML/ARD) from potential sources such as mine rock exposed on underground mine walls, subsidence and materials temporarily stored (i.e., processed coal, fine and coarse rejects, topsoil and till, and tailings);
- Receiving water quality, including:
 - A description of predicted effluent within the delineation plume to the limits of predicted changes caused by the proposed Raven Project;
 - A description of the predicted effects of releases of any effluents, surface runoff and seepages that may be directed to land, with particular attention to effect linkages on vegetation, soil and wildlife and effects on aquatic organisms;
 - Siltation and water chemistry (e.g., runoff along mine site roads, the access road, and drainage ditches);
 - Contaminant loading and dispersion including surface runoff and airborne contaminants;
 - Waste rock chemistry and toxicity, runoff characteristics, and the implications for wildlife and downstream water quality; and
 - Water quality along the selected access road and power ROW.

The Application / EIS will integrate results of the ML/ARD prediction work, water quality, hydrology, and water balance information to develop water quality predictions that will be used as a basis for impact assessment, to determine materials handling procedures and to assess and develop ML/ARD mitigation / management requirements for the proposed Raven Project. The potential for bacteria associated with coal reject piles will be



considered. Concepts for operational and post-closure monitoring and maintenance plans will be provided, including prevention and management strategies for temporary closure or early-permanent closure scenarios. Geochemical modelling will be presented in a clear and transparent manner and the methods, assumptions and rationale used to estimate water quality will be thoroughly explained. The lag time to ML/ARD onset will be assessed for all potentially ARD generating materials and this information will be utilised in the assessment of potential effects to surface water quality.

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

Trace metals, including selenium, will be included in the modelling of water discharged by the mine. It is not anticipated that selenium will be an issue for the proposed Project. If, however, potential selenium issues are identified, risks will be assessed as appropriate. Both dissolved and total metals will be modelled as appropriate to the type of effects (e.g., seepage is presented as a dissolved phase, but if discharged, sediment ponds will be presented as total metal concentrations). Water quality predictions will be made for major mine components (coarse coal refuse, coal tailings, waste rock, overburden, stockpiles, underground workings including the gob), site surface water discharges, groundwater seepages and relevant receiving environment locations. Water quality predictions will be conducted for key flow conditions and relevant time-steps in the mine life (i.e., temporal boundaries would include operations, closure, post-closure, workings flooded and discharging, etc.). Water quality predictions and effects assessment will include pH, alkalinity, sulphate, cations, major and trace metal / metalloids, nitrogen species etc., and include comparison to all relevant water quality guidelines and objectives. Contingency plans will be provided where there are significant uncertainties or risks associated with the predicted water quality.

The effects of effluent discharge on water quality will be modelled as part of the surface water quality assessments. Potential effects of effluent discharge on the marine environment will be considered. If the predictive modelling demonstrates impacts on receiving waters, the Application / EIS will address how these exceedances would be mitigated during all phases of the mine life. Potential effects on the marine environment will also be assessed.

Water quality objectives, including total suspended solids during the construction phase, will be modelled and assessed. Water quality will be assessed against BC MOE protection of freshwater aquatic life guidelines, which have lower limits than drinking water standards. Where no aquatic life guideline exists, appropriate environmental quality guidelines will be determined. The proponent will work with BC MOE to develop water quality objectives on



the basis of background data collated in the Application / EIS. If any water is released to the environment, water quality will be assessed.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Section 10 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.5 Fisheries and Aquatic Resources

This section of the Application / EIS will describe scope, approach, methods, and analysis used to describe fisheries and aquatic resources within the proposed Raven Project's area of potential influence. The Application / EIS will include a description of the aquatic habitat, periphyton and benthic invertebrate communities, and fish species composition, relative abundance, distribution, habitat use, life history characteristics, seasonal movements, and fish tissue metal burdens in the Cowie Creek watershed.

5.5.1 Valued Component Scoping and Rationale

The selected VCs for fisheries and aquatic resources are those VCs with identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale for selecting fish species as VCs is described in Table 5.5-1. The preliminary rationale will be updated to integrate results from consultation and Working Groups that reflect Aboriginal, scientific and / or regulatory concerns, conservation status, biodiversity, and sensitivity to the potential effects of the proposed Raven Project.

Table 5.5-1: Fisheries and Aquatic Resources Valued Components

Valued Component			Rationale					
Common name	Scientific name	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations
Rainbow trout / steelhead	<i>Oncorhynchus mykiss</i>	Potential changes in habitat and stream flow in Cowie Creek may affect spawning and recruitment; effluent discharge at closure may affect fish health	Anadromous populations present in Cowie Creek (FISS 2010).	Local Aboriginal groups; K'ómoks First Nation has directly expressed concerns with respect to Cowie Creek	DFO	Freshwater fisheries program plan; Greater Georgia Basin Steelhead Recovery Plan	Important sport, commercial, and cultural fish species.	Federal <i>Fisheries Act</i> ; BC <i>Fish Protection Act</i>
Cutthroat trout	<i>Oncorhynchus clarkii clarkii</i>	Potential changes in habitat and stream flow in Cowie Creek may affect spawning and recruitment; effluent discharge at closure may affect fish	Resident and anadromous populations present in Cowie Creek (FISS 2010) species of special concern (blue-listed) in BC	Local Aboriginal groups; K'ómoks First Nation has directly expressed concerns with respect to Cowie Creek	DFO BC MOE	Freshwater fisheries program plan; Strategic plan for the conservation and management of cutthroat trout in BC	Important sport fish species	Federal <i>Fisheries Act</i> ; BC <i>Fish Protection Act</i> ;



RAVEN UNDERGROUND COAL PROJECT
DRAFT APPLICATION INFORMATION REQUIREMENTS / ENVIRONMENTAL
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Valued Component		Rationale						
Common name	Scientific name	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations
Coho salmon	<i>Oncorhynchus kisutch</i>	health Potential changes in habitat and stream flow in Cowie Creek may affect spawning and recruitment; effluent discharge at closure may affect fish health	Anadromous populations present in Cowie Creek (FISS 2010).	Local Aboriginal groups; K'ómoks First Nation has directly expressed concerns with respect to Cowie Creek	DFO	Pacific Region Integrated Fisheries Management Plan (South Coast); Wild Salmon Policy	Important sport, commercial, and cultural fish species.	Federal <i>Fisheries Act</i>
Chum salmon	<i>Oncorhynchus keta</i>	health Potential changes in habitat and stream flow in Cowie Creek may affect spawning and recruitment; effluent discharge at closure may affect fish health	Anadromous populations present in Cowie Creek (FISS 2010).	Local Aboriginal groups; K'ómoks First Nation has directly expressed concerns with respect to Cowie Creek	DFO	Pacific Region Integrated Fisheries Management Plan (South Coast); Wild Salmon Policy	Important sport, commercial, and cultural fish species.	Federal <i>Fisheries Act</i>



RAVEN UNDERGROUND COAL PROJECT
DRAFT APPLICATION INFORMATION REQUIREMENTS / ENVIRONMENTAL
IMPACT STATEMENT GUIDELINES

Valued Component		Rationale						
Common name	Scientific name	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations
Pink salmon	<i>Oncorhynchus gorbuscha</i>	Potential changes in habitat and stream flow in Cowie Creek may affect spawning and recruitment; effluent discharge at closure may affect fish health	Anadromous populations present in Cowie Creek (FISS 2010).	Local Aboriginal groups; K'ómoks First Nation has directly expressed concerns with respect to Cowie Creek	DFO	Pacific Region Integrated Fisheries Management Plan (South Coast); Wild Salmon Policy	Important sport, commercial, and cultural fish species.	Federal <i>Fisheries Act</i>

Notes: Agency-Canadian Environmental Assessment Agency; BC MOE-British Columbia Ministry of Environment, DFO-Fisheries and Oceans Canada, FISS-Fisheries Information Summary System.



5.5.1.1 Freshwater Fisheries and Aquatic Resources Spatial Boundaries

The LSA for fisheries and aquatic resources is the entire Cowie Creek watershed including Cougar Smith Creek, a 2nd order tributary of Cowie Creek. All surface infrastructure of the proposed Raven Project would be located within the Cowie Creek watershed boundaries and potential effects to fish and aquatic resources are therefore limited to Cowie Creek. Cougar Smith Creek is included in the LSA, even though no components of the proposed Raven Project would be located within its subwatershed catchment. It is included solely because of the potential for fish from Cowie Creek to move into Cougar Smith Creek; no direct effects to fish, fish habitat, or other aquatic resources in Cougar Smith Creek would occur from the proposed Raven Project. Such movements would be restricted to the lower 2 km of Cougar Smith Creek to the impassable falls. This LSA is consistent with the LSA used for the other surface water disciplines (Figure 5.4-1).

The RSA for fisheries and aquatic resources is the same as the LSA; the Cowie Creek watershed. This RSA boundary has been selected because the Cowie Creek watershed is the area within which any potential cumulative effects are most likely to occur from the proposed Raven Project interacting with any residual effects from other past, present, or reasonably foreseeable future projects. Other past, present, and reasonably foreseeable projects with potential residual effects that could interact with residual effects from the proposed Raven Project within this RSA include logging, associated road construction and maintenance, and the old and new Island Highway. Given that the residual effects from the proposed Raven Project are not expected to extend beyond Cowie Creek, and residual effects from other projects beyond the boundary of the LSA on Vancouver Island have no way of interacting with the residual effects of the proposed Raven Project.

5.5.1.2 Freshwater Fisheries and Aquatic Resources Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each project phase will be described.

5.5.2 Freshwater Fisheries and Aquatic Resources

5.5.2.1 Detailed Freshwater Fisheries and Aquatic Baseline

A review of the results of previous fisheries investigations along with information from online resources provided a basis for a new field program to supplement the description of fisheries resources in the Cowie Creek watershed including fish habitat, fish populations, and movements (see AMEC (2009) for details of previous studies).



The fisheries baseline section will present a synopsis of available documents presenting results from historic and current field work conducted to describe the aquatic habitat, periphyton and benthic invertebrate communities, and resident and anadromous fish communities. This will include descriptions of fish species composition, relative abundance, and distribution, by reach, as well as descriptions of habitat use, life history characteristics, seasonal movements, and metal burdens, by species, in the Cowie Creek watershed. Baseline metal burden concentrations will be described for resident cutthroat trout and rainbow trout populations in the watershed. The baseline will also summarise available data from external sources regarding the enumeration and distribution of spawning anadromous salmonids.

Baseline information will be used as part of the basis for impact analysis in the Application / EIS. This will be done where potential impacts on fish, fish habitat, and lower trophic communities and proposed fish habitat mitigation and compensation measures are presented and discussed.

The following provides an outline of the types of sampling and analysis that are proposed to collect and present baseline data needed to assess the potential impacts of the proposed Raven Project on fisheries and aquatic resources.

Habitat Assessment

Fish habitat will be assessed in the proposed Raven Project study area using two provincially standardised methods: the BC Resources Inventory Standards Committee 1:20,000 reconnaissance (RISC 2001a) and a modified Fish Habitat Assessment Procedure (FHAP) (Johnston and Slaney 1996).

The 1:20,000 reconnaissance assessments will be used during an initial spring survey to identify reach breaks, watershed features and drainages, and document habitat at a reach scale. Spring habitat assessments will be focused on Cowie Creek above and below the barrier to anadromous fish.

An FHAP will be used to map habitat at the mesohabitat level (e.g., pool, riffle, glide, cascade). The FHAP will be conducted in specific reaches of Cowie Creek as determined by the outcome of the reconnaissance level mapping and the development of the mine plan. It is anticipated these areas include Cowie Creek above and below the anadromous barrier and in the unnamed Cowie Creek tributary where the mine facilities may be located. These assessments will describe the composition of habitat.

Temperature loggers will be set in Cowie Creek, select tributaries, and in Cougar Smith Creek upstream and downstream of tributary confluences to continuously record water temperatures. Approximately seven loggers will be installed and downloaded at three month intervals during water quality sampling.



The single lentic system in the Cowie Creek watershed will be surveyed based on the RISC 1:20,000 reconnaissance level method. Habitat, fish utilisation, water quality profiles, substrate and inlet / outlet streams will be considered as part of the survey.

Stream flow assessments will be conducted in Cowie Creek using methods described in the BC Instream Flow Guidelines (Lewis et al. 2004). It is proposed that three visits under high, medium, and low flow levels be used to collect data and calibrate a hydraulic model. The timing of data collection will, where possible, be simultaneous with specific fish activity (e.g., spawning (spring) and rearing (summer)). Transects will be established at the mesohabitat level (e.g., riffles, runs, pools) of Cowie Creek and depth, water velocity, substrate composition, and cover will be measured at regular intervals across the stream.

Fisheries Resources

Seasonal sampling of sites in the LSA will be undertaken during spring and summer to assess fish distribution, habitat use and abundance in Cowie Creek, above and below the anadromous barrier. Spring sampling will also enable the assessment of spawning locations, distribution of spawning fish and size-at-maturity. Minnow trapping and backpack electrofishing will be the two primary fish collection methods used during the spring. Sampling would follow RISC standard protocols.

In summer, relative abundance and density of fish will be measured in Cowie Creek upstream and downstream of the anadromous barrier and in Cougar Smith Creek. Densities of fish in discreet habitat types, in each reach, will be determined by conducting multi-pass depletion estimates using a backpack electrofisher. Fish captured will be identified by species and measured for length and weight. Sexual maturity (where possible) and any deformities will be recorded. Captured fish will be fin-clipped and subsequent recapture of marked fish will be used to provide insight into fish movements within the Cowie Creek watershed.

To understand the importance of habitat and the seasonal use of habitat in the immediate vicinity of the mine facilities, sampling of fish in the spring, summer, and winter will be conducted in the unnamed tributary of Cowie Creek (Tributary C1). This sampling will include minnow trapping and / or backpack electrofishing to determine fish species presence / absence, extent of upstream distribution, habitat use and sexual maturity. Habitat will be assessed based on a modified FHAP. Additional sites will be sampled in headwater areas of Cowie Creek to determine the relative importance of habitat in this tributary to the resident fish populations of the watershed.

The single lentic system in the Cowie Creek watershed will be investigated for the presence of fish. Minnow traps will be the primary sampling method although short-set gillnets and shoreline electrofishing may also be used. Any fish captured will be enumerated, identified by species, and measured.



While fall spawning salmon are present in Cowie Creek below the anadromous barrier, direct sampling of spawning adults will not be conducted as the salmon species utilising Cowie Creek is already known and the habitat used by these species for spawning is well documented in the literature. Enumeration of fall spawning fish (anadromous salmonids) in the Cowie Creek watershed is not proposed. Information regarding the enumeration and distribution of spawning anadromous salmonids available from other sources will be included in the baseline information. Spawning salmonid populations vary considerably as a function of many factors, including freshwater and marine conditions. As a result, status assessments of anadromous populations are not considered appropriate to identify baseline conditions or to track potential future effects from the proposed Raven Project. As a result, baseline studies, effects assessment and future monitoring will be based in part on measures of available habitat.

Benthic Invertebrates

Benthic invertebrates will be collected from Cowie and Cougar Smith Creeks. Benthic invertebrates will be semi-quantitatively collected from sites using EC's Canadian Aquatic Biomonitoring Network (CABIN) protocol, a method recognised and supported by provincial and federal regulatory agencies. Dependant on summer stream flows and suitability of sites, samples will be taken at multiple sites on Cowie and Cougar Smith Creeks. The number of samples collected per site will be based on the CABIN protocol (Environment Canada 2010).

Periphyton & Chlorophyll a

Periphyton samples will be conducted at all of the same stream locations as benthic invertebrates. Samples will be collected by scraping attached periphyton from rocks within a 25 cm² quadrat with a toothbrush consistent with provincially approved methods. Replicate samples for periphyton analysis will be collected: five per site, based on provincial guidelines); and three samples for periphyton analysis to allow for statistical analysis.

Fish Tissue Sampling

Fish will be collected for determining natural background metal burden concentrations from the Cowie Creek watershed, including samples from the Cowie Creek mainstem and Cougar Smith Creek. Sampling will be conducted at approximately three sites with seven replicate samples collected for each species sampled at each site. Length, weight and age data will be collected for all sampled fish. The final trout species, sampling locations and the number of lethal samples will be determined with input from regulatory agencies. Sample size determination will consider the population impacts of lethal sampling. Sampling will be conducted simultaneously with other programs.

A combination of historical data and proposed Raven Project-specific data will be presented in the baseline information with the purpose of clearly and transparently describing the



fisheries and aquatic resources in the study areas. Comparisons, where appropriate, will be made to literature and other studies in adjacent watersheds. Baseline data will be used during the impact assessment to assess potential effects, identify mitigation measures, and to assess the level of significance of any residual effects.

Aquatic habitat will be mapped and documented, including barriers and features, cover, gradient, water depth and channel information. Composition of mesohabitats in reaches where an FHAP was conducted will also be calculated.

Hydraulic habitat data will be used to build a model to indicate how habitat conditions in Cowie Creek change with discharge. The data will also provide a means of assessing how flow changes may alter habitat quantity and quality and if, and to what extent, any changes to flows in Cowie Creek may affect fish.

Fish distribution, relative abundance, species composition, density and estimated population will be analysed. Life history characteristics for cutthroat trout will be calculated, including length-at-age and size-at-maturity. Fish movement will also be reported. Fish muscle and whole body tissue metal concentrations will be reported.

Periphyton samples will be identified to a taxonomic level depending on the occurrence and dominance in the sample, and densities will be reported. Samples will be analysed for concentrations of chlorophyll *a*, a pigment whose concentration in water is indicative of productivity and trophic status.

Benthic invertebrate samples will be identified to the taxonomic group consistent with CABIN methods and compared to the Georgia Basin reference condition model. Community metrics including dominance structure, mean densities, taxonomic diversity, and similarity indices will be calculated.

5.5.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

The Application / EIS will assess all potential effects on fish and fish habitat during each phase of the proposed Raven Project. The assessment will individually address each of the species VCs identified. Potential effects that will be assessed include:

- Direct effects due to the mine footprint;
- Subsidence effects of mining activities on water flow patterns and changes in water quantity and quality to habitats at and downstream of potential areas of alteration (including potential creation or exacerbation of fish barriers);
- Mine dewatering activities;
- Flow changes from water management, surface water diversions, and groundwater pattern alterations;
- Changes in fish harvesting patterns due to changes in access and human presence; and



- Changes in water quality due to mine effluent, surface water run-off, and / or air-borne contamination.

The Application / EIS will include identification of potential linkages between the proposed Raven Project to fisheries, fish habitat, and aquatic resources, identification of necessary mitigation measures, assessment of mitigation measures effectiveness to reduce or eliminate effects, and assessment of residual effects to fisheries, fish habitat, and aquatic resources that may remain after mitigation. Effectiveness of mitigation measures will be based on past uses, an understanding of the unique site conditions and biological characteristics of the system, and the complexity of the mitigations application. The significance of any residual effects to individual fish, populations of resident fish, and to fish habitat in the Cowie Creek watershed will be assessed using professional judgement, any quantitative models available and relevant (e.g., instream flow model), and the published literature. For quantitative models, assumptions will be described, and any uncertainty associated with assumptions and predictions will be detailed. The analysis of potential effects will consider:

- Productive capacity of fish habitat during each phase of the proposed Raven Project;
- Seasonality of fish utilisation and fish-bearing status of potentially affected streams;
- Watercourses that may experience changes in fisheries because of road crossings and power line ROWs;
- Habitat loss or alteration, including aquatic vegetation and sensitive areas such as spawning grounds, nursery areas, winter refuges and migration corridors;
- Natural barriers to fish migrations;
- Changes in stream flow;
- Changes in groundwater seepage quantity and quality;
- Any rare and / or sensitive species and habitat and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or SARA-listed species;
- Species of cultural, spiritual, or TU importance to Aboriginal groups;
- Traditional ecological knowledge, when and where available;
- Changes to the thermal regime of the aquatic environment;
- Changes to fish harvesting;
- Acoustic effects from blasting on fish and fish habitat in local aquatic systems;
- Entrainment and impingement effects from water withdrawals;



- Direct (chronic and acute toxicity) and indirect (changes in periphyton and benthic invertebrates) effects to fish due to changes in water chemistry (e.g., suspended solids, nutrients, major ions and metals) from runoff, discharges, or air-borne deposition from the proposed Raven Project; and
- Mitigation and / or compensation requirements based on DFO (1991) “Policy for the Management of Fish Habitat” and the related principle of “no-net-loss” of the productive capacity of fish habitat.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Any harmful alterations, disruption, or destruction (HADD) of fish habitat caused by the mine will be quantified. A conceptual compensation plan will be developed that meets DFO’s guiding principle of “no-net-loss” of productive capacity of fish habitat. Conceptual compensation alternatives will be developed that are consistent with regional fisheries management objectives and DFO’s preference hierarchy. The conceptual compensation plan will be included in the Application / EIS.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.6 Marine Environment

This section of the Application / EIS will describe scope, approach, methods, and analysis used to describe the marine environment within the proposed Raven Project’s area of potential influence.

5.6.1 Valued Component Scoping and Rationale

The selected VCs for marine environment are those VCs with identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale for selecting marine VCs is described below in Table



**Compliance Coal
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DBA Comox Joint Venture

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5.6-1. Species considered for the selection of VCs and focus species will include but not be limited to any species of Aboriginal or public interest, scientific and / or regulatory concerns, conservation status, biodiversity, and sensitivity to proposed Raven Project effects. The preliminary rationale for selecting marine VCs will be updated from consultation and Working Groups that reflect these interests.



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Table 5.6-1: Marine Environment Valued Components

Valued Component	Rationale							
Species of Focus	Interaction with Proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines	
Marine water quality	Potential effluent or coal dust discharge into Cowie Creek watershed or Alberni Inlet-Trevor Channel Shipping route may have an influence on the marine nearshore environment, marine fish or fish habitat from a chemical or water quality perspective	Identified by AMEC, the proponent, the Agency, DFO	Known to be important culturally and as a traditional food source for First Nations within Baynes Sound and Alberni Inlet-Trevor Channel	DFO, EC, BC MOE	Vancouver Island Summary Land Use Plan (BC ILMB 2000);	Marine surface water quality is valued by general public, non-government organisations, PRNPR and industry (incl. eco-tourism and shellfish aquaculture)	<i>Fisheries Act, Ocean Act;</i> Canadian Environmental Quality Guidelines, BC Water Quality Guidelines for the Protection of Fresh, Marine and Estuarine Life	



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Valued Component	Rationale							
	Species of Focus	Interaction with Proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Shellfish	Pacific oyster (<i>Crassostrea gigas</i>)	Potential changes in water quality may have an influence on the marine nearshore environment and shellfish species of commercial value or of conservation concern	Identified by the Agency, DFO, K'ómoks Maa-nulth First Nations	Known to be a significant traditional food source for First Nations; K'ómoks First Nation also have interests in shellfish aquaculture	DFO, EC, BC MOE	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Baynes Sound Coastal Plan for Shellfish Aquaculture	General public, and Shellfish Industry	<i>Fisheries Act, SARA, Wildlife Act</i>



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Valued Component	Rationale							
	Species of Focus	Interaction with Proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Marine fish	Sixgill shark (<i>Hexanchus griseus</i>)	Potential changes in water quality associated with coal transport (coal dust, accidental chemical spills or discharge) or increases in noise associated with port upgrade activities may have an influence on marine fish, their behaviour, and fish habitat.	Identified by Parks Canada and the Maa-nulth and Hupacasath First Nations	Known to be a significant traditional food source for First Nations	DFO	Pacific Region Integrated Fisheries Management Plan (South Coast), Wild Salmon Policy	General public, sport and commercial fishing industry, eco-tourism industry	<i>Fisheries Act, SARA,</i>



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Valued Component	Rationale							
Species of Focus	Interaction with Proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines	
Marine mammals	Humpback whale (<i>Megaptera novaeangliae</i>)	Potential disturbance from the presence of vessels and associated engine noise may alter the behaviour and distribution of marine mammals; Potential strike by vessels and exposure to hydrocarbons and other chemicals associated with spills and vessels' discharge	Species of conservation concern; Provincially and federally listed; Identified by Parks Canada and Maa-nulth First Nations	Conservation of marine mammals would remain a priority	DFO, EC, BC MOE	Vancouver Island Summary Land Use Plan (BC ILMB 2000), PRNPR Management Plan	General public, non-government organisations, PRNPR, and eco-tourism industry	<i>Fisheries Act, Marine Mammal Regulations, SARA</i>



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Valued Component	Rationale							
	Species of Focus	Interaction with Proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Marine birds	Marbled murrelet (<i>Brachyramp hus marmoratus</i>)	Potential changes in water quality may have an influence on the marine environment, and marine birds' foraging habitat; Accidental spills or discharge of hydrocarbons or other chemical may have potential lethal and sub-lethal effects on marine birds due to ingestion and or plumage fouling; Potential disturbance	Species of conservation concern; Provincially and federally listed; Identified by Parks Canada and Maa-nulth First Nations	Conservation of marine birds would remain a priority; Identified by the Maa-nulth and Hupacasath First Nations	BC MOE, CWS	Vancouver Island Summary Land Use Plan (BC ILMB 2000); Somass Estuary Management Plan	General public, non-government organisations, and eco-tourism industry	<i>Migratory Bird Convention Act, BC Wildlife Act, SARA</i>



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Valued Component	Rationale									
Species of Focus	Interaction with Proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines			
	from the presence of vessels may alter the behaviour and distribution of marine birds with adverse consequences on foraging.									

Notes: Agency-Canadian Environmental Assessment Agency; BC ILMB-BC Integrated Land Management Bureau, BC MOE-British Columbia Ministry of Environment; CWS-Canadian Wildlife Service, DFO-Fisheries and Oceans Canada, EC-Environment Canada, proponent-Compliance Coal Corporation dba Comox Joint Venture; PRNPR-Pacific Rim National Park Reserve, SARA-Species at Risk Act.



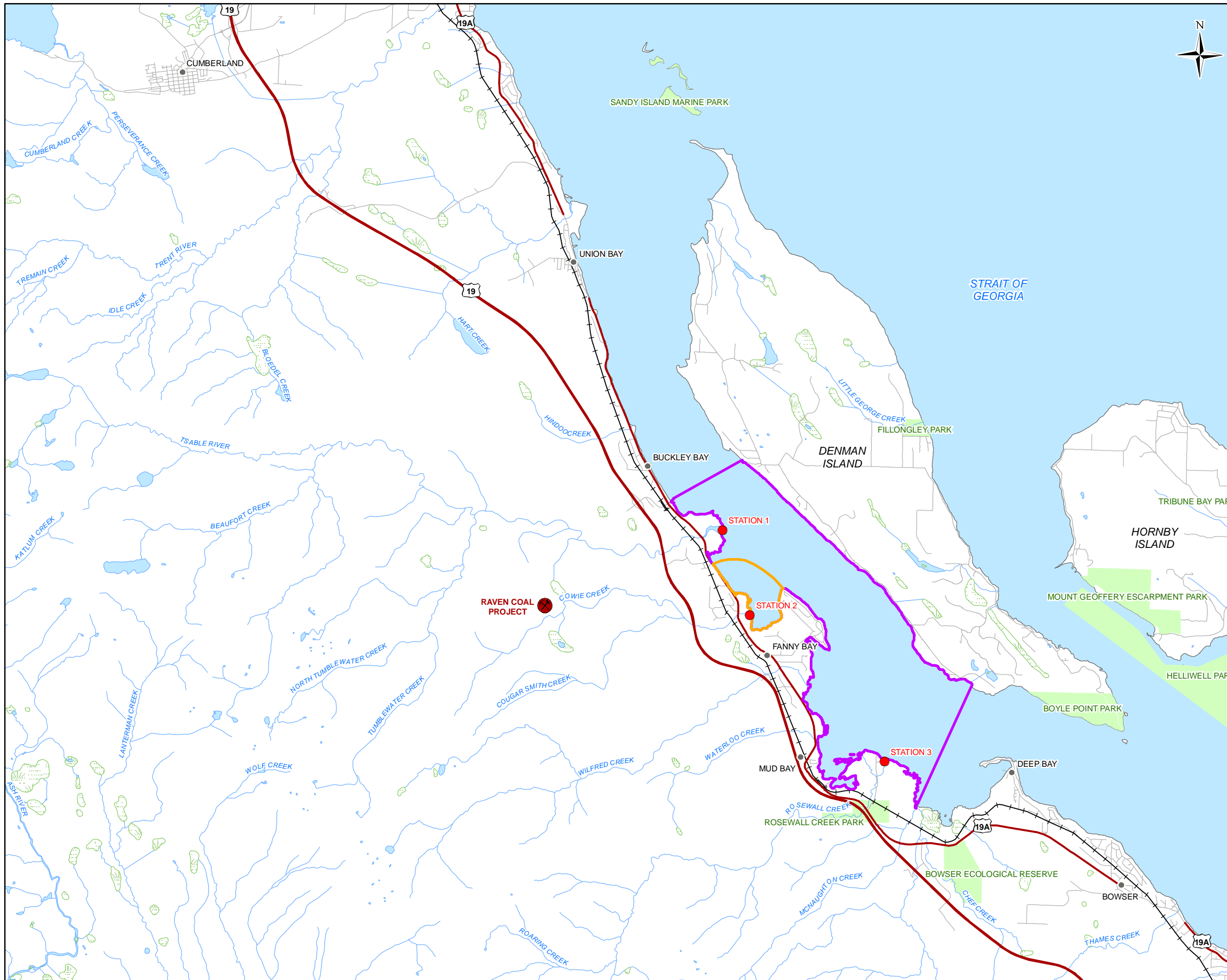
5.6.1.1 Marine Spatial Boundaries

The proposed Raven Project could potentially affect two separate marine areas: 1) Baynes Sound, located between the northeast side of Vancouver Island and Denman Island; and 2) Alberni Inlet / Trevor Channel, located on the west coast of Vancouver Island. The Application / EIS will include an assessment of potential project effects on the marine aquatic resources for each of these two areas.

The marine LSA for studies in Baynes Sound is defined as the nearshore subtidal area of Fanny Bay into which Cowie Creek flows (Figure 5.6-1). The marine RSA in Baynes Sound is defined as the nearshore subtidal area extending from just north of the T'sable River southward to the Qualicum National Wildlife Area (Figure 5.6-1). The spatial boundary for marine studies in Alberni Inlet / Trevor Channel includes two areas: a Port study area and a marine study area (Figure 5.6-2). The Port study area will include the proposed Port Alberni Port Facility footprint area plus a 200 m buffer. The Port study area boundary is based on the potential extent of unmitigated effects from the proposed Raven Project associated with the proposed upgrades to the Port Alberni Port Facility. The marine study area boundary for marine studies includes Alberni Inlet and Trevor Channel to the Cape Beale Pilotage Point, which have been active shipping areas for many years (Figure 5.6-2). The Application / EIS will examine the potential effects of possible increased vessel traffic due to coal transport within the marine study area.

5.6.1.2 Marine Temporal Boundaries

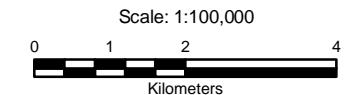
The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.



Legend



- Populated Place
- Water Quality Study Area
- ⊗ Raven Coal Project
- Road
- Highway
- + Railway
- Stream
- ▭ River & Lake
- ▭ Swamp or Marsh
- ▭ Parks & Protected Area
- ▭ Marine LSA
- ▭ Marine RSA

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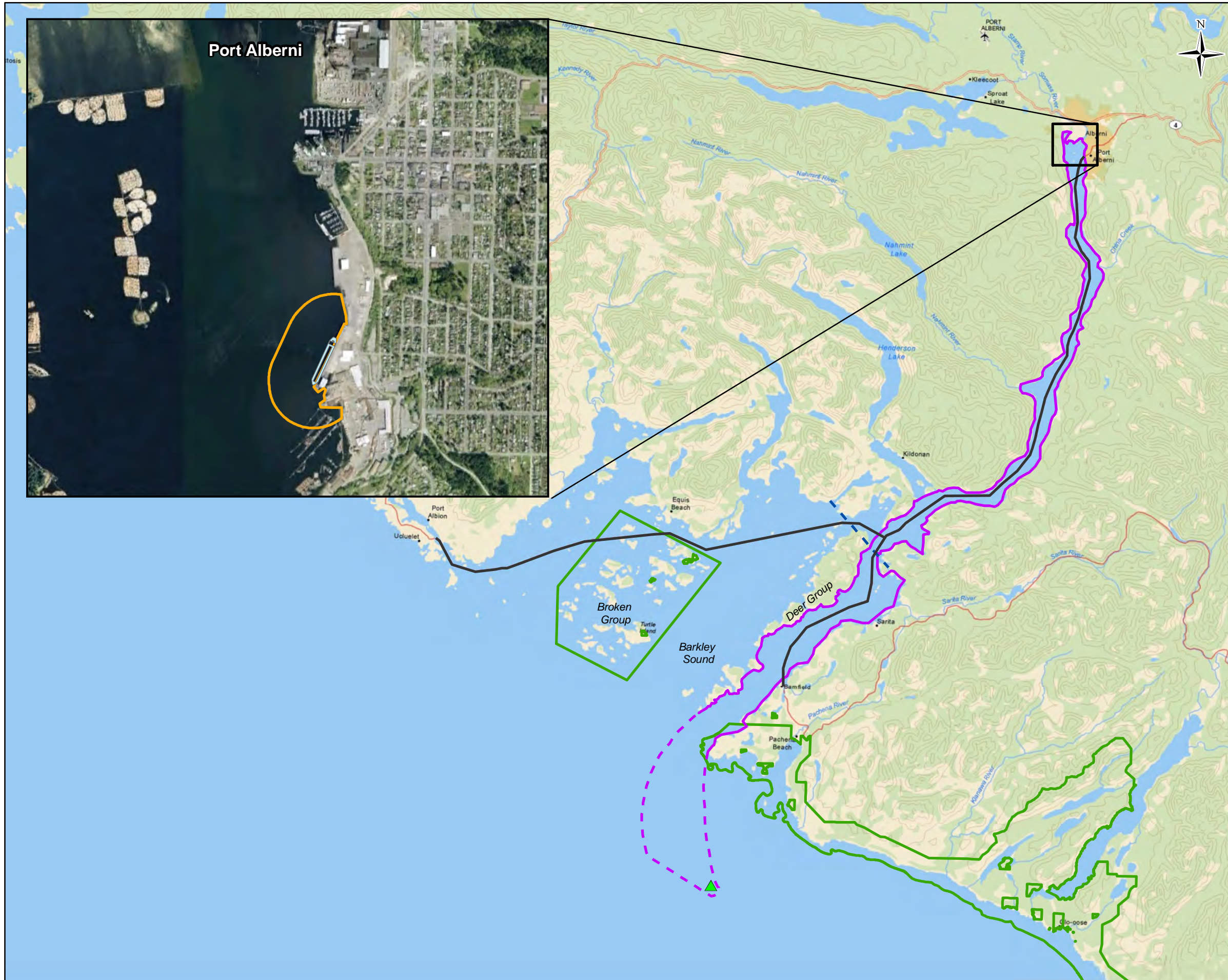


Reference

Basedata:
 Road: Geobase 1:20,000
 Water: Watershed Atlas 1:50,000

CLIENT:		 Compliance Coal Corporation
PROJECT: Raven Underground Coal Project		
Marine Spatial Boundaries, Baynes Sound, BC		
DATE: July 19, 2010	ANALYST: EO	Figure 5.6-1
JOB No: VE51897	QA/QC: SB	PDF FILE: 20-50-001_marine_wq_study_area.pdf
GIS FILE: 20-50-001.mxd		
PROJECTION: UTM Zone 10	DATUM: NAD83	

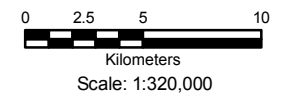
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Legend



- ▲ Cape Beale Pilotage Point
- Ferry Route
- - Port Alberni Port Authority Boundary
- ▭ Pacific Rim National Park Reserve of Canada
- ▭ Port Study Area
- ▭ Marine Study Area

DRAFT



Reference

ESRI Community Base Map

CLIENT:  Compliance Coal Corporation		
PROJECT: Raven Underground Coal Project		
Marine Spatial Boundaries, Port Alberni, Alberni Inlet – Trevor Channel, BC		
DATE: January 2011	ANALYST: MY	Figure 5.6-2
JOB No: VE51897	QA/QC: SB	PDF FILE: 18-50-020_port_alberni.pdf
GIS FILE: 18-50-020		
PROJECTION: UTM Zone 10	DATUM: NAD83	



5.6.2 Marine Environment

5.6.2.1 Detailed Marine Baseline

Baynes Sound

The proposed Raven Project will be designed to preclude potential effects in Baynes Sound. Background information on marine resources, specifically water quality and sediment quality, will be collected.

Water quality, sediment quality and benthic infauna community will be characterised within the nearshore subtidal area of the LSA and RSA. Water quality monitoring will consist of physico-chemical characterisation of the water column, metals and PAHs using standard oceanographic sampling techniques and semipermeable monitoring devices (SPMDs). Appropriate analytical techniques for marine waters will be used. Sediment quality (Total Organic Carbon), grain size, metals and PAHs) and benthic infauna community will also be characterised at each of the water quality sampling stations within the LSA and RSA.

Alberni Inlet and Trevor Channel

The assessment will include consideration of potential effects from the proposed Raven Project associated with: the proposed upgrades to the Port Alberni Port Facility; loading of coal at the Port; and possible increased vessel traffic associated with coal transport along the existing marine shipping route. The work will consider any available information from anticipated PAPA simulation modelling of the shipping route from Cape Beale to Port Alberni. The assessment will also consider past, current and foreseeable activities that may interact with the proposed Raven Project.

Within the Port study area:

- An underwater video survey will be completed at the Port to characterise existing habitat that may be impacted by the proposed Port upgrades. Video transects will include an area covering the footprint of the area proposed for dredging, and areas outside the shipping lanes within 200 m from the Port Facility; and
- A sediment quality survey (sediment sampling, physical and chemical analyses) will be completed to characterise existing contaminant levels of the sediments within the footprint of the proposed Port Facility upgrade and to determine an appropriate disposal method and disposal site prior to dredging.

Within the marine study area:

- Sensitive habitats along the intertidal region of Alberni Inlet and Trevor Channel will be characterised; and
- Marine mammal behaviour and movement patterns along the shipping route will be characterised.



5.6.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application / EIS will assess potential direct and indirect effects of the proposed Raven Project on marine aquatic resources and marine habitats. The assessment will individually address each of the VCs that are identified. The assessment will give consideration to, and demonstrate linkages between, predicted physical and biological changes resulting from the proposed Raven Project.

Baynes Sound

If evaluation suggests that the following potential proposed Raven Project-related effects may occur, their effects on marine water quality and sediment quality will be assessed, such as:

- Potential surface or groundwater quality effects within the Cowie Creek watershed and thus increased loading rates of contaminants to the marine environment;
- Potential effects to the timing or amount of freshwater discharge to the marine environment; or
- Potential changes to the timing, amounts, or particle characteristics of sediment transport to the marine environment.

Alberni Inlet and Trevor Channel

Within the Port study area:

- The potential effects of upgrade activities at the proposed Port Facility, including pile driving, dolphin placement and dredging will be assessed.

Within the marine study area:

- Air quality modelling will be used to assess potential water quality effects to Alberni Inlet associated with fugitive dust from coal loading;
- The probability of increased vessel collisions with marine mammals in Alberni Inlet and Trevor Channel will be assessed;
- The potential effects of increased noise both in air and underwater during Port Facility upgrades and vessel traffic on marine resources, including marine fish, marine birds and marine mammals will be assessed;
- The potential for marine habitat loss or alteration, including that of eelgrass / kelp beds and sensitive areas such as spawning grounds, nursery areas and bird colonies will be assessed;



- Potential project effects associated with increase vessel traffic along the shipping route on marine birds will be addressed;
- Potential proposed Raven Project effects on commercial, recreational and subsistence fisheries will be addressed;
- Potential project effects to 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 will be assessed; and
- Potential project effects to species of cultural, spiritual or traditional use importance to First Nations will be assessed.

The Application will include an assessment of potential effects on marine aquatic resources and marine habitats from various construction and post-construction activities (e.g., mine construction, mining operation, and coal transport along trucking route(s); upgrades to the proposed Port Alberni Port Facility and coal transportation along well established and well used shipping lanes).

Appropriate mitigation measures and management strategies will be based on the results of baseline data collection and an assessment of the potential effects of the proposed Raven Project. Mitigation options will be identified for direct effects to species of concern as well as for habitat effects. Important habitats will be identified for the marine aquatic resource VCs and mitigation or protection measures will be detailed in the Application / EIS.

Any identified residual effects of the proposed Raven Project will be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.7 Terrestrial Environment

This section of the Application / EIS will describe scope, approach, methods, and analysis used to describe terrestrial environment resources within the proposed Raven Project’s area of potential influence.



5.7.1 Valued Components and Scoping Rationale

The selected VCs for terrestrial environment are those VCs with an identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale for selecting terrestrial VCs is described below in Table 5.7-1. The preliminary rationale will be updated to integrate results from consultation and Working Groups that reflect Aboriginal interests, scientific and / or regulatory concerns, conservation status, and biodiversity and sensitivity to proposed Raven Project effects.



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Table 5.7-1: Terrestrial Environment Valued Components

Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Terrain, Soils and Surficial Geology							
Physiography and topography	Above ground proposed Raven Project facilities; changing physical topography of site	VC assessed in recent EA process, surface facilities, subsidence, reclamation	To be discussed with local Aboriginal groups	BC MOE, EC, Agency, DFO, NRCan	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	BC <i>Mines Act</i>
Soil cover	Removal of soil cover during construction and operations phases; change from baseline conditions	VC assessed in recent EA process, issue at reclamation	To be discussed with local Aboriginal groups	BC MOE, EC, Agency	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	BC <i>Mines Act</i> , specifically soil salvage and reclamation
Soil quality	Removal and storage of reclamation material; changes in soil quality with time; baseline soil metal analysis to measure change at reclamation	VC assessed in recent EA process, issue at reclamation; supports other discipline (environmental health) interactions	To be discussed with local Aboriginal groups	BC MOE, EC, Agency	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	BC <i>Mines Act</i> ; BC <i>CSR</i> and <i>CEQG</i> would be applied



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Surficial geology	Above ground proposed Raven Project facilities; conversion of baseline surficial geology to post mine materials	VC assessed in recent EA process, surface facilities, subsidence, reclamation	To be discussed with local Aboriginal groups	BC MOE, EC, Agency, DFO, NRCan	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	BC <i>Mines Act</i>
Vegetation and Plant Communities							
Biodiversity and plant community structure composition	Site clearing for above ground project facilities; above ground project facilities siting and potential reduction of habitat	VC assessed in recent EA process, surface facilities, subsidence, issues at reclamation	To be discussed with local Aboriginal groups	BC MOE, EC, Agency, PAPA	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	<i>BCEAA, CEA Act</i>
Species at risk	Site clearing for above ground proposed Raven Project facilities; above ground proposed Raven Project facilities siting and potential effect on species at	VC assessed in recent EA process, surface facilities	To be discussed with local Aboriginal groups	BC MOE, EC, Agency	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	SARA



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Ecological communities at risk	Site clearing for above ground proposed Raven Project facilities; proposed Raven Project facilities siting and potential effect on ecological communities at risk	VC assessed in recent EA process, surface facilities	To be discussed with local Aboriginal groups	BC MOE	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	Not Applicable

Notes: Agency-Canadian Environmental Assessment Agency, BC CSR-British Columbia Contaminated Sites Regulation, BCEAA-British Columbia Environmental Assessment Act, BC ILMB-BC Integrated Land Management Bureau, BC MOE-British Columbia Ministry of Environment, CEA Act-Canadian Environmental Assessment Act, CEQG-Canadian Environmental Quality Guidelines, DFO-Fisheries and Oceans Canada, EC-Environment Canada, NRCan-Natural Resources Canada, PAPA-Port Alberni Port Authority; VC-valued component.



5.7.1.1 Terrain, Soils and Surficial Geology Spatial Boundaries

The LSA boundary for soils, terrain and surficial geology includes the footprint area for the proposed Raven Project, plus a 500 m buffer. The LSA boundary buffer is based on the maximum potential extent of unmitigated effects on soils and terrain from subsidence, and potential effects on soil chemistry from fugitive dust. The RSA boundary for soils, terrain and surficial geology is based on 1:50,000 soils mapping by BC MOE and follows the boundaries selected for wildlife and vegetation and wetlands for consistency. Figure 5.7-1 shows the boundaries for terrestrial study areas.

5.7.1.2 Terrain, Soils and Surficial Geology Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

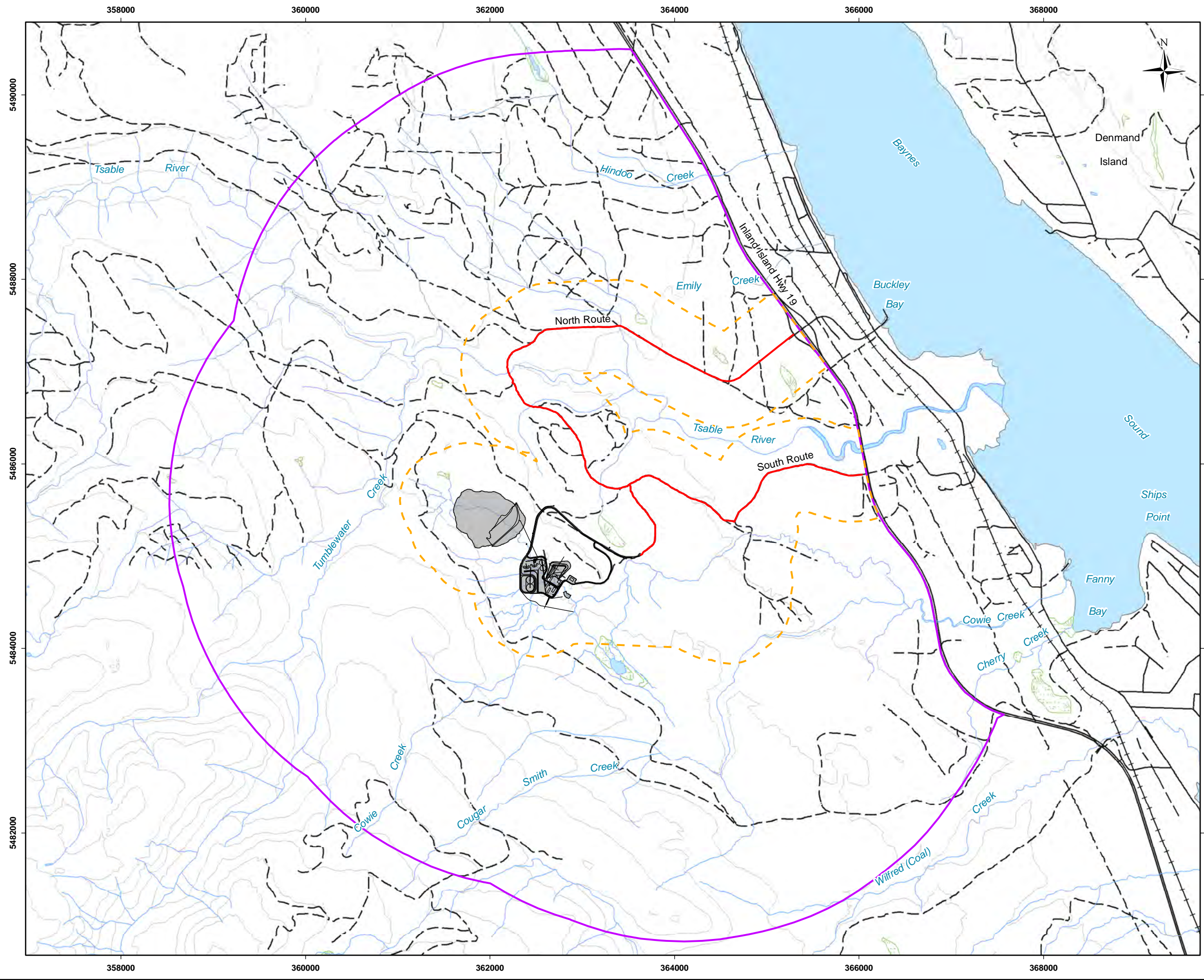
5.7.1.3 Vegetation and Plant Communities Spatial Boundaries

The LSA for vegetation and wetlands, which is the same as for other terrestrial studies (Figure 5.7-1), is set at 500 m beyond the footprint of the proposed mine and supporting facilities. Potential direct unmitigated effects on wildlife (i.e., noise and dust) are expected to be observed within this area. The RSA boundary is set so as to encompass all the vegetation community types that may potentially be affected by the proposed Raven Project development, and that may be used by wildlife in the area. Wetlands and riparian corridors are of particular importance in having special floristic characteristics as well as providing habitat for wetland dependent wildlife such as amphibians.

5.7.1.4 Vegetation and Plant Communities Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

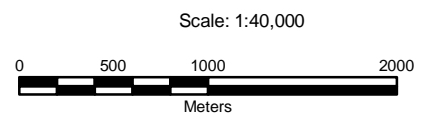
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- Legend**
- Proposed Access Road
 - Paved Road
 - - Gravel/Rough Road
 - + + Railroad
 - Elevation Contour (100 m)
 - Watercourse
 - Waterbody
 - Wetland
 - - - Terrestrial LSA
 - Terrestrial RSA
 - Potential Location of Site Facilities



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Note:
Wildlife and vegetation included in terrestrial study area

Reference
TRIM scale 1:20,000

CLIENT:	Compliance Coal Corporation <small>as Centre Joint Venture</small>	Compliance Coal Corporation
PROJECT:	Raven Underground Coal Project	
Terrestrial Spatial Boundaries		
DATE: February 22, 2010	ANALYST: EO	Figure 5.7-1
JOB No: VE51897	QA/QC: TB	PDF FILE: 11-50-001_terra_study_area.pdf
GIS FILE: 11-50-001		
PROJECTION: UTM Zone 10	DATUM: NAD83	



5.7.2 Terrain, Soils and Surficial Geology

5.7.2.1 Detailed Terrain, Soils and Surficial Geology Baseline

This section will describe the ground conditions and land suitability classification at the mine site, ancillary facilities, access road, and power line route.

Soils mapping will be completed in conjunction with Terrestrial Ecosystem Mapping (TEM) for vegetation and wildlife. The BC RISC has bioterrain and TEM standards that will be followed (RISC 1996; 1998a; 2002a). These require air photo type mapping followed by ground truthing at specific intervals dependent on the scale of the maps required. For the site footprint, 1:10,000 scale maps will be required; this would need confirmation with BC MOE prior to commencing work. Terrain hazards are identified by terrain mapping at the same scale as TEM. Terrain stability ratings (see also Section 22.6) will be assigned to each polygon through aerial photograph interpretation based on the criteria outlined in the "Mapping and Assessing Terrain Stability" (BC MOF 1999).

Field sampling follow up will be carried out by a combined team of soils / surficial geology / terrain, wildlife, and vegetation specialists to check preliminary type mapping of the proposed Raven Project area. This level of analysis will be required for the immediate footprint and a buffer of approximately 500 m around the proposed disturbance site. For regional level (i.e., RSA) information, existing reports and TEM mapping should suffice, but will have to be confirmed with BC MOE.

A description of surface soils and surficial geology will be provided, including:

- Physiography and topography;
- Terrain and surficial geology - landform, slopes, drainage characteristics, surficial material;
- Soils - classification, suitability for reclamation, quality, erosion potential;
- Geology - stratigraphy, bedrock, structural, coal seam development, correlation and potential for subsidence; and
- Geological cross sections that traverse the proposed underground mine areas and provide characterisation to appropriate depths.

Background concentrations of metals and soils suitability for reclamation will be required for the EA and the *Mines Act* permit. Lab and data analysis of selected soils samples will be analysed for pH, texture (particle size), total carbon, total nitrogen, cation exchange capacity, conductance, total sulphur, exchangeable cations (calcium, magnesium, sodium and potassium), available metals (aluminum, copper, iron, phosphorus, manganese, zinc), and sand salinity if applicable. Soil elemental analysis will be completed for samples taken within the proposed Raven Project footprint for the parameters listed below in Table 5.7-2.



This analysis would be compared against existing CCME guidelines to determine the baseline chemical conditions of the soil.

Analyses and data collected will be used for assessment of soil suitability for reclamation and characterisation of soil chemical properties (i.e., pH, electrical conductivity, sodicity and saturation percentage), and physical properties (i.e., texture, moist consistency, and volumetric stone content).

Table 5.7-2: Soil Elemental Parameter List

Trace Elements	Other Elements
Aluminum	Calcium
Arsenic	Magnesium
Barium	Potassium
Cadmium	Sodium
Chromium	Cation exchange capacity
Cobalt	
Copper	Physical Parameters
Lead	pH
Manganese	Conductivity
Mercury	Texture
Molybdenum	Volumetric stone content
Nickel	
Selenium	
Thallium	
Vanadium	
Zinc	

5.7.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

The Application / EIS will identify potential effects on the environment when terrain, surficial geology, bedrock, or soils are disturbed or used in any phase of the proposed Raven Project. For each VC, the assessment will consider the potential effects of:

- Erosion and sedimentation in relation to altered drainage in all parts of the proposed development infrastructure (e.g., power line ROW and mine roads);
- Effects on landform (terrain) diversity;
- Ground freezing occurrences and effects on containment structures;
- Coarse rejects stockpiles and fine rejects stockpiles and / or ponds, topsoil and till storage, borrow pits and aggregate use with resulting terrain disturbance;



- Rock types, including geochemistry and ML/ARD potential;
- Potential for subsidence, including possible resulting changes in surface and groundwater quality and flows;
- Existing geological faults within the potentially affected areas encompassed by both above and below ground operations;
- Interaction between existing geological faults with mine subsidence which create or exacerbate barriers to fish passage, and which interact with groundwater and surface water flow patterns;
- Seismicity and natural erosion potential, landslides and slope instabilities;
- Potential effects of climate change on natural hazard risk; and
- Volume and characteristics of material stockpiled for reclamation and changes to stockpiled material over time.

Proposed mitigation measures would be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.7.3 Vegetation and Plant Communities

5.7.3.1 Detailed Vegetation and Plant Communities Baseline

The Application / EIS will include a complete and detailed description of the local and regional vegetation and wetlands data near the proposed Raven Project, including but not limited to:

- **Aquatic Vegetation:** Documentation of: (a) aquatic macrophytes, vascular plants, and mosses (species composition, relative abundance and distribution) that provide cover for fish, bank stabilisation, and which moderate aquatic temperature extremes; (b) potential for activities (mine runoff or flow alterations) to affect aquatic vegetation;



- **Terrestrial Vegetation:** Documentation of: (a) trees, other terrestrial plants, lichens, mosses, invasive and noxious plant species (species composition, relative abundance and distribution, forest cover) that provide habitat and / or food for wildlife; (b) potential for proposed Raven Project activities to affect such terrestrial vegetation;
- **Wetlands:** Documentation of: (a) wetlands that provide habitat and / or food for wetland wildlife; (b) potential for activities to affect wetlands;
- **Rare and Listed Species:** Documentation of plant species covered by SARA; COSEWIC; BC Provincial Red- and Blue- Lists; and
- **Species of Importance to Humans:** Documentation of plant species that are of importance to the local economy, local communities, and Aboriginal communities.

Vegetation and plant communities within the study area will be mapped and will follow closely the protocol outlined in “Standard for Terrestrial Ecosystem Mapping in British Columbia” (RISC 1998). TEM uses a combination of pre-field photo interpretation and delineation followed by site visits to classify and map ecosystems within each polygon. During the TEM field program, representative polygons will be visited, classified to the site series level, assigned a structural stage and modifiers as appropriate. The final ecosystem map will be adjusted and revised based on the ground plots and field data collected. The final ecosystem map will be at a scale of 1:10 000.

Wetlands and riparian areas will be identified and classified based on MacKenzie and Moran (2004) and their distribution will be characterised as part of the TEM studies. Because of the importance of wetland areas, particular care will be taken to survey and map these areas during the TEM program.

In addition to online searches, BC MOE will be contacted for information on listed species that potentially may occur in the proposed Raven Project site (BC CDC 2010). A targeted investigation for these species and habitats will be combined with TEM studies. A list of potential rare vascular plant species given the biogeoclimatic subzone and geographic location of the project area will be used to stratify the landscape and focus rare plant searches. In advance of TEM, sampling locations will be governed by the distribution of biogeoclimatic (BGC) sub-zones and ecosystem units in the study area. Both vascular and non-vascular plants will be documented during these surveys. Herbarium voucher specimens may be collected for identification purposes when necessary. Rare plant associations will be identified and mapped in conjunction with the TEM studies, and Sensitive Ecosystems will be mapped as a separate layer based on the Sensitive Ecosystems Inventory (Ward et al. 1998). Sensitive ecosystems will be considered within the context of the Comox Sub-unit (Ward et al. 1998). A review of invasive plants and nuisance weeds as designated by the BC *Weed Control Act* (1985) will be completed and presence / absence recorded during the TEM program. Timber resource values will be



examined within the entire footprint area of the proposed Raven Project. This will include access roads, the mine site and powerline alignment. To assess economic effects, the work is planned to be initiated as part of the baseline data collection following finalization of the powerline alignment and ROW.

Data collected as part of this TEM program will follow the methodology standard found in “Describing Terrestrial Ecosystems in the Field” (Luttmerding 1990) and will be analysed to determine the distribution of ecosystems including listed and sensitive ecosystems. Species richness and diversity will be evaluated and invasive species distribution will be characterised.

Evaluation of the specific impacts to vegetation from construction and post-construction mine activities (i.e., land clearing, construction, mine operation and transmission line operation) on specific VCs will be determined.

The vegetation personnel will work in close communication with surficial geology, terrain, and wildlife personnel due to the extensive and logical overlap among these disciplines.

5.7.3.2 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application / EIS will identify potential effects on vegetation and plant communities from activities related to the proposed Raven Project. Areas of potential impact to be assessed include:

- Local plant associations classified as ecological communities, including trees, shrubs, herbs, mosses and lichens;
- Plant species of importance to Aboriginal groups, either directly as food, or indirectly as food for important harvest wildlife species (information to be obtained from available TK studies and published literature);
- COSEWIC and SARA-listed plant species;
- Habitat loss or alteration which is long-term, direct or indirect;
- Wetlands;
- Vegetation productivity;
- Vegetation capability and vegetation diversity, including but not limited to intra- and interspecific diversity and landscape diversity; and
- Potential for invasive, noxious plants, as defined in the BC *Weed Control Act*.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified



cumulative effects, corresponding proposed mitigation measures will be described, and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Section 10 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.8 Wildlife and their Habitat

This section of the Application / EIS will describe scope, approach, methods, and analysis used to describe wildlife and wildlife habitat within the proposed Raven Project's area of potential influence. The Application / EIS will include a description of wildlife habitat, mammals, birds, amphibians and reptiles, rare and endangered species, and species of importance to humans.

5.8.1 Valued Components Scoping and Rationale

The selected VCs for wildlife and their habitat are those VCs with an identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included a part of the rationale for selection. The preliminary rationale for selecting wildlife and wildlife habitat VCs is described below in Table 5.8-1. The preliminary rationale will be updated to integrate results from consultation and Working Groups that reflect Aboriginal interests, scientific and / or regulatory concerns, conservation status, and biodiversity and sensitivity to potential effects of the proposed Raven Project.



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Table 5.8-1: Wildlife and their Habitat Valued Components

Valued Component			Rationale					
Common name	Species of focus	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations
Ungulates	<i>Roosevelt elk</i>	Breeding, foraging, Use site for life requisites	First Nation concerns, BC MOE concern for population status, overwintering habitat in proposed Raven Project area. Provincially Blue-listed. Observed in study area during numerous field visits	Traditional knowledge and use study, Qualicum First Nation Traditional Knowledge Workshops, 19 January 2010 and 8 March 2010 and the Maa-nulth First Nation	BC MOE, CWS	n/a	Hunting importance to locals and guide outfitters in the area	SARA, BC <i>Wildlife Act</i>
Small mammals	American water shrew	In streams and associated riparian areas	Red-listed in the province	Maa-nulth First Nation	BC MOE	n/a	Local naturalists	BC <i>Wildlife Act</i>
Waterbirds	<i>Various (great-blue heron waterfowl, trumpeter swan)</i>	Along watercourses and wetland use	Various provincial and federal listed species	Maa-nulth First Nation	BC MOE, CWS	n/a	Public	SARA, BC <i>Wildlife Act</i> , <i>MBCA</i>
Songbirds	<i>olive-sided flycatcher,</i>	Footprint activities of the	Red and Blue-listed species	Maa-nulth First Nation	BC MOE,	n/a	Local naturalists	<i>MBCA</i> , BC <i>Wildlife Act</i>



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Valued Component			Rationale					
Common name	Species of focus	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations
	<i>purple martin</i>	Study Site	observed during field surveys during breeding season		CWS			
Raptors	<i>western screech-owl, bald eagle, osprey</i>	Footprint and above ground facilities and activities in the riparian areas.	Special Concern listed by COSEWIC and Red-listed in the province	Maa-nulth First Nation	BC MOE, CWS	n/a	Local naturalists	MBCA, SARA, BC Wildlife Act
Amphibians	<i>red-legged frog and western toad</i>	Footprint and above ground proposed Raven Project facilities and activities in the wetlands and riparian areas	Special Concern species present listed by COSEWIC and province. Identified breeders on-site	Maa-nulth First Nation	BC MOE, CWS	n/a	Local Naturalists	BC Wildlife Act, SARA
Carnivores	<i>Various</i>	Footprint and above ground Project facilities		Maa-nulth First Nation	BC MOE, CWS	n/a	Local Naturalists	BC Wildlife Act, SARA
Invertebrates	<i>Various</i>	Host plants may be lost due to infrastructure placement	Provincially Red- and Blue-listed	n/a	BC MOE, CWS	n/a	Local Naturalists	BC Wildlife Act

Notes: BC MOE-British Columbia Ministry of Environment; COSEWIC-Committee on the Status of Endangered Wildlife in Canada; CWS-Canadian Wildlife Service; MBCA-Migratory Birds Convention Act; n/a-not applicable; SARA-Species at Risk Act.



5.8.1.1 Wildlife and Wildlife Habitat Spatial Boundaries

The wildlife LSA and RSA are common to terrestrial studies (Figure 5.7-1). The LSA is set at 500 m beyond the proposed footprint of the mine and supporting facilities. Potential direct unmitigated effects on wildlife (i.e., noise and dust) may be observed within this area. The RSA boundary extends in an arc approximately 4 km from the mine site, into the hills above the mine site, and down to the Island Highway. The RSA boundary was set because this is the maximum probable extent of unmitigated effects on larger ranging species such as elk. This boundary of 4 km was based on professional judgement and experience.

5.8.1.2 Wildlife and Wildlife Habitat Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each project phase will be described.

5.8.2 Wildlife and Wildlife Habitat

5.8.2.1 Detailed Wildlife and Wildlife Habitat Baseline

The Application / EIS will include a description of the local and regional wildlife near the proposed Raven Project, including but not limited to:

- **Habitat:** Documentation of: (a) terrestrial habitat within the zone of influence for the proposed Raven Project (proposed footprint plus 500 m buffer). The rationale for this buffer is that the area enclosed would include all habitats potentially affected by mine activities such as actual habitat loss, dust and noise. Habitats further away in the RSA would be described as necessary and would be applicable in the context of the wildlife studies and species of concern use by; (b) known and potential critical habitats (i.e., feeding, nesting, denning, and reproductive habitats) of identified wildlife species VCs; (c) potential for proposed activities to cause loss in quantity or quality of habitat; (d) documentation of inventories and chosen wildlife VC suitability ratings based on vegetation / habitat mapping. It is probable that while wildlife may be sighted within the RSA, nesting and denning activities are likely to occur outside the RSA because much of the current area within the RSA is impacted by current and recent logging activities;
- **Mammals:** Documentation of: (a) mammalian wildlife such as ungulates, carnivores, furbearers, sensitive species and TU species; (b) potential for proposed activities to affect mammalian wildlife (e.g., disruption of seasonal and daily movements);
- **Birds:** Documentation of: (a) avian wildlife such as songbirds, waterfowl, shorebirds, raptors, sensitive species, TU species and possible breeding locations, impacts from



proposed site activities would be assessed for impacts to select species of management concern; (b) potential for proposed activities to affect avian wildlife in the RSA;

- **Amphibians and Reptiles:** Documentation of: (a) amphibian and reptilian wildlife such as frogs, toads, snakes, turtles, sensitive species, TU species (species composition, distribution, life history characteristics, habitat utilisation, and possible seasonal movements); (b) potential for project activities to affect amphibian and reptilian wildlife within the LSA;
- **Rare and Listed Species:** Documentation of wildlife species covered by SARA; COSEWIC; BC Provincial Red- and Blue- Lists (BC CDC 2010) and how they may be affected by the proposed Raven Project; and
- **Species of Importance to Humans:** Documentation of wildlife species that are of importance to the local economy, local communities, Aboriginal communities and how they may be affected by the proposed Raven Project.

Assessment of mammalian wildlife and habitat will involve direct field observation techniques such as visual and auditory observations and subsequent documentation and other indirect evidence. This includes the documentation of large mammal movement corridors, tracks in the ground, mineral licks and mineral springs, foraged or scratched vegetation, hair and other biological traces. Air photos will be used to select transect locations. Pre-field photo interpretation will be combined with site visits to classify and map habitats. Background information and knowledge shared by local Aboriginal groups will be used to assess the movements and site use of mammals in conjunction with the field surveys throughout the RSA.

Assessment of avian wildlife and habitat will involve direct field observation techniques such as visual and auditory observations and subsequent documentation during the appropriate breeding periods for all species of management concern. Where applicable, the surveyors will also take notes on the types of habitat present along transects (e.g., coniferous forest, deciduous forest, open habitat etc.). Vegetation mapping will be used to assess species use in each vegetation unit. Avian wildlife will be assessed with call playback techniques for raptors and other species where appropriate and at appropriate breeding periods. Vegetation and air photos will be used to select transect locations for breeding bird survey locations throughout the site at specific locations. Pre-field photo interpretation will be combined with site visits to classify and map habitats.

Evidence of amphibians, reptiles, and invertebrates, as well as all rare and listed species regardless of taxa, would be documented during the completion of all field activities. During the late spring and summer breeding times, all wetlands, watercourses and their riparian areas will be visited to identify species composition, breeding and dispersal potential for herpetofauna.



Invertebrate sampling for families of Odonata and Lepidoptera will be conducted using transect protocols through appropriate habitats for the species of management concern during breeding times. Each wildlife habitat will be identified with the aid of TEM studies. Aboriginal groups and BC MOE will be contacted when necessary for information on any threatened, rare, or endangered fauna potentially in the proposed Raven Project area and a targeted investigation for these species and habitats will be combined with TEM studies. All sampling locations will be discussed in the context of the BGC sub-zones in the study area and RISC (1999a).

All surveys for wildlife and wildlife sign will conform to RISC standards where applicable. For amphibians and reptiles, specific wetlands will be surveyed using systematic search protocols outlined in RISC (1998b). All other sightings of amphibians and reptiles will be collected from incidental sightings as part of the fisheries assessments. Songbird and water bird surveys will be performed as outlined in RISC (1999b). For raptor surveys, call-back methods will be used as described in RISC (2001b). Mammal surveys will be performed at the time of all field visits to the site. Mammal presence will be recorded as incidental and based on signs of presence and direct field observation. Any incidental small or large mammal sightings will be recorded as part of all surveys by the various disciplines. A winter snow survey for tracks on transects of known length will be completed (RISC 1999c). Traditional Knowledge (TK) and Use Study, Qualicum First Nation TK Workshop information will also be used to confirm mammal use. Where applicable, surveys will also follow RISC (1998c, 2002b). RISC (1998d) will be used for invertebrate association surveys at select locations.

Data collected as part of this program will be analysed according to standardised protocols for evaluation of wildlife, wildlife habitat and vegetation communities. Evaluation of the specific impacts to vegetation, wildlife, and wildlife habitat from construction and post-construction mine activities (i.e., land clearing, construction, mine operation and transmission line operation) on specific VCs will be determined.

The wildlife personnel will work in close and constant communication with surficial geology and terrain personnel, vegetation and wetlands personnel, and environmental health personnel, due to the extensive and logical overlap among these disciplines.

5.8.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application / EIS will identify potential direct and indirect effects on wildlife (including amphibians) and wildlife habitats (including habitats used by migratory birds defined and protected under the *Migratory Birds Convention Act* (1994)), giving consideration to, and demonstrating linkages between, predicted physical and biological changes resulting from the proposed Raven Project. The Application / EIS will individually assess each species identified as a VC.



The Application / EIS will include an assessment of potential effects on wildlife and wildlife habitat from various construction and post-construction activities (e.g., clearing, construction, mining operation, and power line operation). The Application / EIS will include an assessment of the potential effects of the proposed Raven Project on the following:

- Terrestrial habitat, including the quality and quantity of any lost habitat for relevant species;
- Feeding, nesting, 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 terrestrial wildlife, particularly ungulates and 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;
- Wildlife productivity;
- Species of cultural, spiritual or TU importance to Aboriginal groups; and
- Implications of the proposed Raven Project acting as an attractant for particular species.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.



5.9 Environmental Health

5.9.1 Valued Components Scoping and Rationale

The selected VCs for environmental health are those VCs with an identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale for selecting environmental health VCs is described below in Table 5.9-1. The preliminary rationale will be updated to integrate results from consultation and Working Groups that reflect Aboriginal interests, scientific and / or regulatory concerns, conservation status, biodiversity, and sensitivity to the potential effects of the proposed Raven Project.



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Table 5.9-1: Environmental Health Valued Components

Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Humans (non-carcinogenic toddlers, carcinogenic adult)	Exposure pathways such as inhalation, ingestion and dermal contact	VC assessed in recent EA process	Of interest to local Aboriginal groups; K'ómoks First Nation has expressed concerns with respect to potential health effects	BC MOE, EC, HC, Agency	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Of interest to public and non-government organisations	National and Provincial Ambient Air Quality Objectives, BC CSR and CEQG, Public Health Act
Mammals (large carnivores / omnivores, ungulates, furbearers)	Ingestion of food water and soil / sediment. Inhalation and dermal exposures	VC assessed in recent EA process	To be defined	BC MOE, EC, Agency	To be determined	Of interest to public and non-government organisations	BCEAA, CEA Act, BC CSR and CEQG
Birds (raptors, songbirds, waterfowl, shorebirds)	Ingestion of food water and soil/ sediment. Inhalation and dermal exposures	VC assessed in recent EA process	To be defined	BC MOE, EC, Agency	To be determined	Of interest to public and non-government organisations	BCEAA, CEA Act, BC CSR and CEQG
Amphibians	Direct contact with soil and water	VC assessed in recent EA	To be defined	BC MOE, EC, Agency	To be determined	Of interest to public and non-government	BCEAA, CEA Act, BC CSR and CEQG



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
		process				organisations	
Fish	Direct contact with water	VC assessed in recent EA process	To be defined	BC MOE, EC, Agency	To be determined	Of interest to public and non-government organisations	<i>BCEAA, CEA Act, Water Act, Fisheries Act, BCWQG, CEQG, BC CSR</i>
Invertebrates (terrestrial and aquatic)	Direct contact with water	VC assessed in recent EA process	To be defined	BC MOE, EC, Agency	To be determined	Of interest to public and non-government organisations	<i>Fisheries Act</i>

Notes: Agency-Canadian Environmental Assessment Agency, *BC CSR*-British Columbia Contaminated Sites Regulation, *BCEAA*-BC Environmental Assessment Act, *BC ILMB*-BC Integrated Land Management Bureau, *BC MOE*-British Columbia Ministry of Environment, *BCWQG*-British Columbia Water Quality Guidelines, *CEA Act*-Canadian Environmental Assessment Act, *CEQG*-Canadian Environmental Quality Guidelines, *EA*-Environmental Assessment; *EC*-Environment Canada, *HC*-Health Canada; *VC*-valued component.



5.9.2 Environmental Health

The Environmental Health section will integrate environmental chemistry data presented in other sections, and examine potential adverse impacts to the health of people and other organisms from cumulative exposure to chemicals in all environmental media. Each VC identified will be addressed individually in the Application / EIS.

Where analytical data was not collected, mathematical media concentration modelling will be completed to identify the potential adverse impacts to the health of humans and other organisms. Other sections typically begin and end their analyses of chemistry data by simply comparing to CCME guidelines, which is an approach that could lead to potential health risks being under- or over-estimated when looked at individually. The Environmental Health section will quantify and prioritize potential carcinogenic and non-carcinogenic health effects in accordance with risk assessment methodologies from HC, EC, and the BC MOE.

This section of the Application / EIS will describe the assessment of the potential effects of each phase of the proposed activities on the health of the natural environment. An analysis of potential contaminant pathways and environmental relationships that are important for project planning will be provided. The Application / EIS will identify vulnerable eco-system units, potential effects, and mitigation measures for any potentially significant adverse impacts identified during the assessment.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described, and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

5.10 Summary of Assessment of Potential Environmental Effects

A summary of any potential residual effects of the proposed Raven Project and their significance will be provided in the Application / EIS using the format presented in Table 5.10-1. Potential residual effects will be identified by phase (i.e., construction, operation, closure and decommissioning).



Table 5.10-1: Summary of Potential Environmental Effects Analysis

Valued Components (Note Phase of proposed Raven Project)	Potential Effect	Key Mitigation Measures	Potential Residual Effect	Significance Analysis of Residual Effects (Summary Statement)
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6 ASSESSMENT OF POTENTIAL ECONOMIC EFFECTS

6.1 Economic Background

The Application / EIS will include a general description of the existing economic environment, including surrounding areas within the zone of potential influences of the proposed Raven Project.

6.2 Economic Health

6.2.1 Valued Economic Component Scoping and Rationale

The selected VCs for economic health are those VCs with an identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale for selecting economic VCs is described below in Table 6.2-1. The preliminary rationale will be updated to integrate results from consultation and Working Groups that reflect Aboriginal interests, scientific and / or regulatory concern, conservation status, biodiversity, and sensitivity to the potential effects of the proposed Raven Project.



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Table 6.2-1: Economic Health Valued Components

Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Provincial economy and government revenues	The proposed Raven Project is considered as a Major Project, BC MRES D	VC assessed in recent EA process	Local Aboriginal groups have expressed interest in potential opportunities related to the proposed Raven Project, as well as possible economic and social effects	MPMO, BC MEMPR	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Electoral Area 'A' Electoral Area Plan (CVRD 1998), ACRD	Municipal government's interest in increased demands on infrastructure and services, including housing and transportation, as well as government finances.	To be determined
Regional employment	The proposed Raven Project is considered as a Major Project, BC MRES D	VC assessed in recent EA process	Local Aboriginal groups have expressed interest in potential opportunities related to the proposed Raven Project, as well as possible economic and social effects	BC MRES D, CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Electoral Area 'A' Electoral Area Plan (CVRD 1998), ACRD	Commercial and public interest on regional employment and income	To be determined



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Employment opportunities	The proposed Raven Project is considered as a Major Project, BC MRES D	VC assessed in recent EA process	Local Aboriginal groups have expressed interest in potential opportunities related to the proposed Raven Project, as well as possible economic and social effects	BC EAO, MPMO, CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Electoral Area 'A' Electoral Area Plan (CVRD 1998), ACRD	Local communities interests in potential employment effects	To be determined
Contract and business opportunities	The proposed Raven Project is considered as a Major Project, BC MRES D	VC assessed in recent EA process	Local Aboriginal groups have expressed interest in potential opportunities related to the proposed Raven Project, as well as possible economic and social effects	BC MRES D, BC EAO, MPMO, CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Electoral Area 'A' Electoral Area Plan (CVRD 1998), ACRD	Commercial and public interest on contact and business opportunities	To be determined



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Labour income	The proposed Raven Project is considered as a Major Project, BC MRES D	VC assessed in recent EA process	Local Aboriginal groups have expressed interest in potential opportunities related to the proposed Raven Project, as well as possible economic and social effects	BC EAO, MPMO, CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), ACRD	Government, business and public interest	To be determined
Local unemployment rate and trend	The proposed Raven Project is considered as a Major Project, BC MRES D	VC assessed in recent EA process	Local Aboriginal groups have expressed interest in potential opportunities related to the proposed Raven Project, as well as possible economic and social effects	BC EAO, MPMO, CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), ACRD	Government, business and public interest	To be determined
Regional government finances	Proposed Project contribution to regional government finances	VC assessed in recent EA process		CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), ACRD	To be determined	To be determined



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Employment and economic diversification	The proposed Raven Project is considered as a Major Project, BC MRES D	VC assessed in recent EA process	Local Aboriginal groups have expressed interest in potential opportunities related to the proposed Raven Project, as well as possible economic and social effects	BC EAO, MPMO, CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000); Electoral Area 'A' Electoral Area Plan (CVRD 1998); ACRD	Government, business and public interest	To be determined

Note: ACRD-Alberni-Clayoquot Regional District, BC EAO-British Columbia Environmental Assessment Office, BC ILMB-Integrated Land Management Bureau, BC MRES D-British Columbia Ministry of Regional Economic and Skills Development, CVRD-Comox Valley Regional District, EA-Environmental Assessment; MPMO-Government of Canada's Major Projects Management Office; VC-valued component.

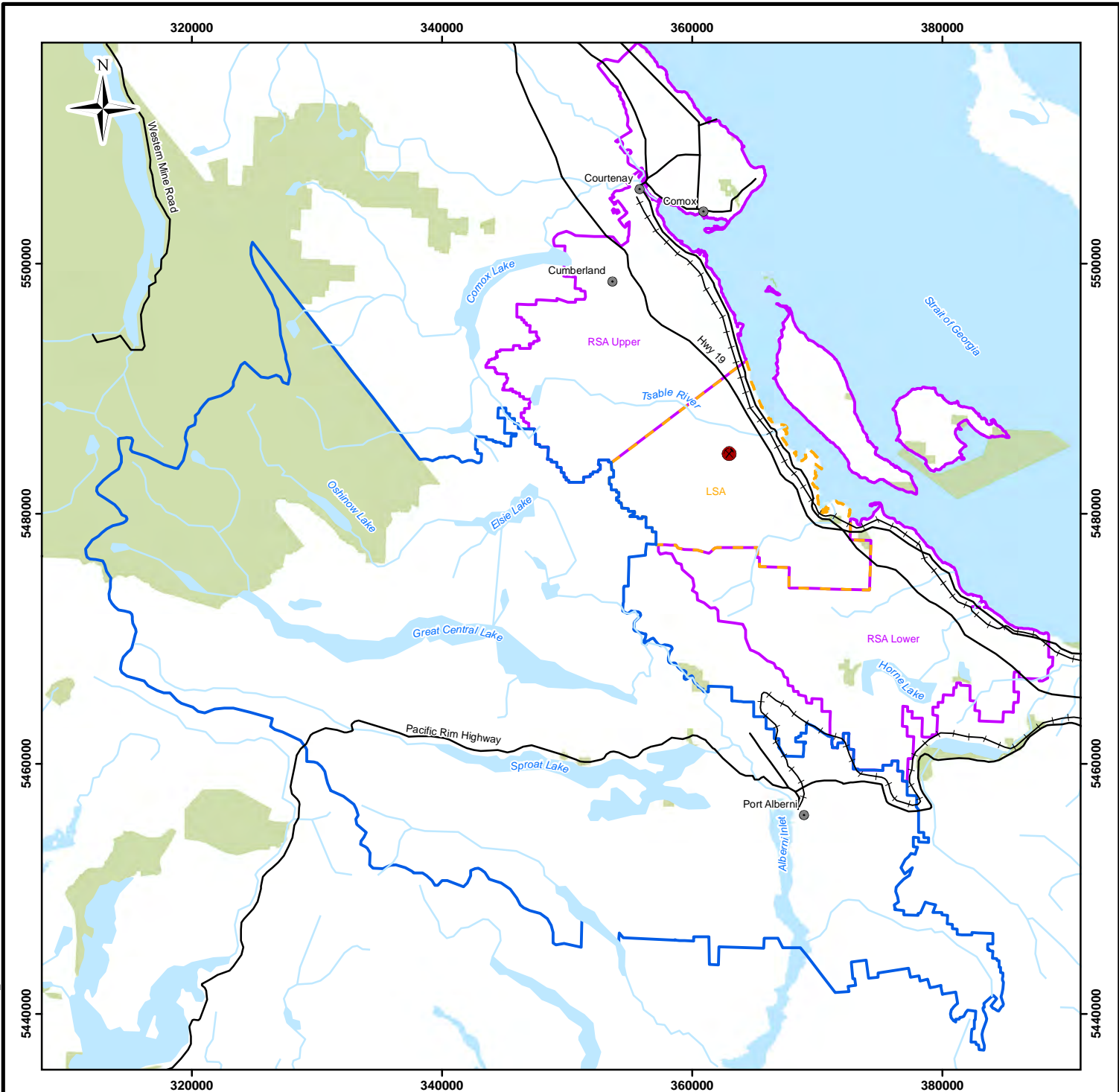


6.2.1.1 Economic Health Spatial Boundaries

The proposed Raven Project is located in the newly created CVRD, and it is expected that proposed Raven Project construction and operation could draw workers and involve businesses in the CVRD as well as the northern end of the Nanaimo Regional District. Construction and operation of the Port Facility would also provide employment and business opportunities in the Alberni-Clayoquot Regional District (ACRD). Consequently, the social and economic RSA generally consists of the urban and rural populations located within CVRD Area Regional District Electoral Area (RDEA) "A" (which includes Hornby Island); CVRD Area RDEA "B"; Nanaimo Regional District RDEA H; and ACRD RDEAs D, E and F. As well as these areas, the RSA includes the City of Courtenay, the Town of Comox, the Village of Cumberland, and the City of Port Alberni. The RSA also includes the following reserves: Comox 1, Qualicum, Tsahaheh 1, Ahahswinis 1, Klehkoot 2, and Alberni 2. Figure 6.2-1 shows the LSA and RSA boundaries for economic and social conditions.

6.2.1.2 Economic Health Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.



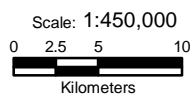
Legend



- Populated Place
- Raven Coal Project
- +— Rail
- Road
- Watercourse
- Waterbody
- Park or Protected Area
- - - Socio-Economic LSA
- Socio-Economic RSA
- Terminal RSA

Reference

Base Data: 1:1,000,000 scale from the Atlas of Canada, NRCAN

DRAFT



CLIENT:		 Compliance Coal Corporation <small>(a Columbia Joint Venture)</small>	
PROJECT:			
Raven Underground Coal Project			
<h2>Economic and Social Spatial Boundaries</h2>			
DATE:	ANALYST:	<h3>Figure 6.2-1</h3>	
November 17, 2010	MY		
JOB No:	QA/QC:	PDF FILE:	
VE51897	JT		
GIS FILE:			
14-50-003			
PROJECTION:	DATUM:		
UTM Zone 10	NAD83		



6.2.2 Economic Health

6.2.2.1 Detailed Economic Health Baseline

A range of economic information will be collected to characterise baseline conditions in the zone of the proposed Raven Project influence. At a minimum, local and regional economic profiles will be developed for Courtney, Comox and other communities in the CVRD. This will include Aboriginal reserves. However, the regional profile may be extended to include other communities for which the proposed Raven Project may have implications (e.g., employment catchment areas). The profiles will contain the following:

- Economic conditions will be described in terms of current labour force participation and unemployment rates, workforce experience by industry, income and economic diversification, community business and skills inventories, and local wage and information. The expected trends based on other economic development projects proposed for the region will also be described; and
- The status of municipal government finances, community plans, and any emerging community or regional issues will be described.

The proponent will initially develop community and regional profiles based on a review of available literature. The profiles will then be verified through interviews, meetings and consultations with knowledgeable individuals, and comments received through the public consultation program. The following approach will be applied to the data collection process:

- The boundaries of the study region will be confirmed;
- The profiles will be prepared using data from:
 - 2001 and 2006 Census data;
 - Relevant BC Statistics on community economic profiles (<http://www.bcstats.gov.bc.ca>);
 - Official Community Plans; and
 - Land and Resource Management Plans (LRMP).

The draft profiles will be confirmed and expanded following meetings and telephone conversations and interviews with: Chamber of Commerce representatives; CVRD; ACRD; and other regional district representatives including local, provincial and federal government representatives such as: the Comox-Strathcona Regional Hospital District; economic development officers; and BC MoTI.

The proponent will prepare initial profiles for each First Nation based on available literature research from BC Stats, Statistics Canada. These profiles will be refined and expanded



through meetings and consultations with representatives of the Aboriginal groups. Collated information will include summaries of Aboriginal employment and contracting capacity.

6.2.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

For the purpose of assessing economic effects, the proposed Raven Project will be described in terms of the construction and operations labour requirements, hiring standards, the operating work schedule, worker accommodation; transportation of people, materials and clean coal, capital and operating costs, and company procurement and purchasing policies. The assessment will include consideration of the economic effects attendant with the eventual closure and decommissioning of the mine. Other policies or strategies used to minimize adverse effects and enhance positive effects will also be described. Each of the VCs that are identified will be assessed individually in the Application / EIS.

The proponent will develop a detailed description of the proposed Raven Project that will be used to assess economic effects. This will include developing estimates of labour force requirements (including skill levels) for both construction and operation. It will also include estimates of the types and value of materials, goods and services that may be supplied by local businesses and what items would have to be imported into the region, and the costs of construction. Additional information on proposed policies related purchasing policies will also be summarised.

Two types of economic analysis will be undertaken. The first assessment will evaluate the extent to which proposed Raven Project construction and operation will affect the BC economy. The results of this assessment will help demonstrate the potential direct, indirect and induced economic effects that the proposed Raven Project would have on provincial GDP, employment and income, and will be used to determine what percentage of effects would be experienced outside the immediate region. This assessment will be undertaken by asking BC Stats to model the economic impacts using its provincial economic input-output model.

The second assessment will describe the regional and local impacts of construction and operation of the proposed Raven Project. The analysis will examine the demands of the proposed Raven Project for labour, goods, and services in the context of current and expected future regional capacity. This will help to determine what labour and materials may have to be imported, potentially creating additional demands on regional infrastructure and services. Opportunities to enhance potential Raven Project benefits and mitigate potential adverse effects would also be described. This analysis will involve both qualitative and quantitative methods, such as supply and demand matching. It will also build on the results of interviews with officials and their knowledge of the provincial and regional economies, as well as professional judgement based on previous experience with similar types of projects.



Potential effects of the proposed Raven Project on Aboriginal groups will be determined by assessing demands for labour, goods and services in the context of the current capacity of Aboriginal groups to identify what labour and materials they may be able to contribute. Opportunities to enhance potential benefits and mitigate potential adverse effects will also be described. This analysis will involve both qualitative and quantitative methods, such as supply and demand matching, and would also build on the results of interviews with officials and their knowledge of the provincial and regional economies, and professional judgement based on previous experience with similar types of projects.

The Application / EIS will describe the following economic effects related to constructing and operating the proposed Raven Project, including possible accidents and malfunctions:

- Estimates of effects on provincial GDP and other macroeconomic indicators;
- Estimates of revenues to provincial governments;
- Opportunities for direct employment (reported in PY and income opportunities) of regional residents, including Aboriginal groups;
- Opportunities for local and regional businesses, including Aboriginal businesses;
- Estimates of effects on local government finances;
- Other economic effects, including:
 - The potential for inflation and cost of living impacts;
 - Opportunities for sustainable economic development;
 - Potential effects on official community plans and preferred future economies; and
 - Potential effects on the aquaculture sector.

The Application / EIS will provide a summary of economic impacts related to the proposed Raven Project, in the context of other proposed economic development in the region (cumulative effects).

For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated



with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

6.3 Summary of Assessment of Potential Economic Effects

A summary of any potential residual effects of the proposed Raven Project and their significance will be provided in the Application / EIS using the format presented in Table 6.3-1. Potential residual effects will be identified by phase (i.e. construction, operation, closure and decommissioning).

Table 6.3-1: Summary of Potential Economic Effects Analysis

Valued Components (Note Phase of proposed Raven Project)	Potential Effect	Key Mitigation Measures	Potential Residual Effect	Significance Analysis of Residual Effects (Summary Statement)
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7 ASSESSMENT OF POTENTIAL SOCIAL EFFECTS

7.1 Social Background

The Application / EIS will include a general description of the existing social condition, including surrounding areas within the zone of potential influences of the proposed Raven Project.

7.2 Social Conditions

7.2.1 Valued Component Scoping and Rationale

The selected VCs for social conditions are those VCs with an identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the Proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale for selecting social VCs is described below in Table 7.2-1. The preliminary rationale will be updated to integrate results from consultation and Working Groups that reflect Aboriginal groups', scientific and / or regulatory concern, conservation status, biodiversity, and sensitivity to the potential effects of the proposed Raven Project.



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Table 7.2-1: Social Conditions Valued Components

Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Social Conditions							
Regional population and demographics	Proposed Raven Project employment creates in-migration	VC assessed in recent EA process	To be defined	CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), ACRD	To be determined	To be determined
Housing	Employee and migrant potential housing needs	VC assessed in recent EA process	To be defined	CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Electoral Area 'A' Electoral Area Plan (CVRD 1998), ACRD	To be determined	To be determined
Regional services	Proposed Raven Project related pressure on regional services	VC assessed in recent EA process	To be defined	CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Electoral Area 'A' Electoral Area Plan (CVRD 1998), ACRD	To be determined	To be determined



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Regional infrastructure	Proposed Raven Project related use of regional infrastructure	VC assessed in recent EA process	To be defined	CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Electoral Area 'A' Electoral Area Plan (CVRD 1998), ACRD	To be determined	To be determined
Family and community wellbeing	Workforce demands (i.e., employment, higher income, more time away from home, new community dynamic)	VC assessed in recent EA process	To be defined	CVRD, ACRD	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	To be determined
Transportation Transportation	Pressure on transport system due to workforce and visitors travel to and from minesite	VC assessed in recent EA process	To be defined	BC MoTI	Vancouver Island Summary Land Use Plan (BC ILMB 2000), Electoral Area 'A' Electoral Area Plan (CVRD 1998), ACRD	To be determined	To be determined



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Non-Traditional Land Use							
Parks and protected areas	Potential effects due to land alterations, air emissions, associated mine facilities and traffic	VC assessed in recent EA process, Professional judgement	To be defined	BC MOE, PC	Vancouver Island Summary Land Use Plan (BC ILMB 2000), CVRD, ACRD, Somass Estuary Management Plan	To be determined	Requirement of both <i>BCEAA</i> and <i>CEA Act</i>
Mining and exploration activities	Potential effects due to land alterations, associated mine facilities and traffic	VC assessed in recent EA process, Professional judgement	To be defined	BC MEMPR	Vancouver Island Summary Land Use Plan (BC ILMB 2000), CVRD, ACRD	To be determined	Requirement of both <i>BCEAA</i> and <i>CEA Act</i>
Renewable resource use	Potential effects due to land alterations, associated mine facilities and traffic	VC assessed in recent EA process, Professional judgement	To be defined	BC MEMPR	Vancouver Island Summary Land Use Plan (BC ILMB 2000), CVRD, ACRD	To be determined	Requirement of both <i>BCEAA</i> and <i>CEA Act</i>



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Valued Component	Rationale						
	Interaction with proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Tourism and other recreational uses	Potential effects due to land alterations, associated mine facilities and traffic	VC assessed in recent EA process, Professional judgement	To be defined	BC MTTI, BC FLNRO	Vancouver Island Summary Land Use Plan (BC ILMB 2000), CVRD; ACRD, Somass Estuary Management Plan	To be determined	Requirement of both <i>BCEAA</i> and <i>CEA Act</i>
Marine uses and tenures	Potential effects to Baynes Sound, Alberni Inlet, Trevor Channel		Local Aboriginal groups have expressed concern with respect to Baynes Sound	TC, EC, Agency, PC, DFO	Vancouver Island Summary Land Use Plan (BC ILMB 2000), CVRD, ACRD; Somass Estuary Management Plan	Commercial aquaculture interests in Baynes Sound	Requirement of both <i>BCEAA</i> and <i>CEA Act</i>
Visual and Aesthetic Resources							
Visual landscape	Potential effects due to land alterations, air emissions, associated mine facilities and traffic	VC assessed in recent EA process, and Professional judgement	To be discussed with local Aboriginal groups	BC EAO, Agency	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Denman Island Local Trust Committee; City of Port Alberni	Requirement of both <i>BCEAA</i> and <i>CEA Act</i>

Notes: ACRD-Alberni Clayoquot Regional District, Agency-Canadian Environmental Assessment Agency *BCEAA-British Columbia Environmental Assessment Act*, BC ILMB-BC Integrated Land Management Bureau, BC FLNRO-BC Ministry of Forests, Lands and Natural Resource Operations, BC MOE-British Columbia Ministry of Environment, BC MoTI-British Columbia Ministry of Transportation and Infrastructure, BC MTTI-BC Ministry of Tourism, Trade and Investment, *CEA Act-Canadian Environmental Assessment Act*, CVRD-Comox Valley Regional District, DFO-Fisheries and Oceans Canada, EA-Environmental Assessment; EC-Environment Canada, PC-Parks Canada, TC-Transport Canada; VC-valued component.



7.2.1.1 Social Conditions Spatial Boundaries

The proposed Raven Project is located in the newly created CVRD, and it is expected that proposed Raven Project construction and operation could draw workers and involve businesses in the CVRD as well as the northern end of the Nanaimo Regional District. Construction and operation of the Port Facility would also provide employment and business opportunities in the ACRD. Consequently, the social and economic RSA generally consists of the urban and rural populations located within CVRD Area RDEA "A"; CVRD Area RDEA "B"; Nanaimo Regional District RDEA H; and ACRD RDEAs D, E and F. As well as these areas, the RSA includes the City of Courtenay, the Town of Comox, the Village of Cumberland, and the City of Port Alberni. The RSA also includes the following reserves: Comox 1, Qualicum, Tsahaheh 1, Ahahswinis 1, Klehkoot 2, and Alberni 2. Figure 6.2-1 shows the LSA and RSA boundaries for economic and social conditions.

7.2.1.2 Social Conditions Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

7.2.1.3 Transportation Spatial Boundaries

The transportation route for the proposed Raven Project is Highway 19 (Inland Highway Route) to Highway 4 to Port Alberni. The transportation study area to be used for the assessment of potential effects from proposed Raven Project transportation activities on regional and local transportation infrastructure includes the preferred transportation corridor between the mine site and Port Alberni as well as the area under the PAPA's jurisdiction.

7.2.1.4 Transportation Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

7.2.1.5 Non-Traditional Land Use Spatial Boundaries

The LSA and RSA for land use were selected following a review of the study areas for other related disciplines (e.g., air quality, vegetation and wildlife) as well as the economic and



social environment. Where available, LRMPs, management zones and official community plans were also reviewed for the area.

The LSA for the land use component was defined as the maximum area that captures potential direct disturbances from all of the alternatives being assessed. The non-traditional land use (NTLU) LSA is defined by a 500 m buffer around the proposed Raven Project footprint to ensure potential direct unmitigated effects of the proposed Raven Project on land use are addressed.

Two separate NTLU RSAs have been defined for the proposed Raven Project:

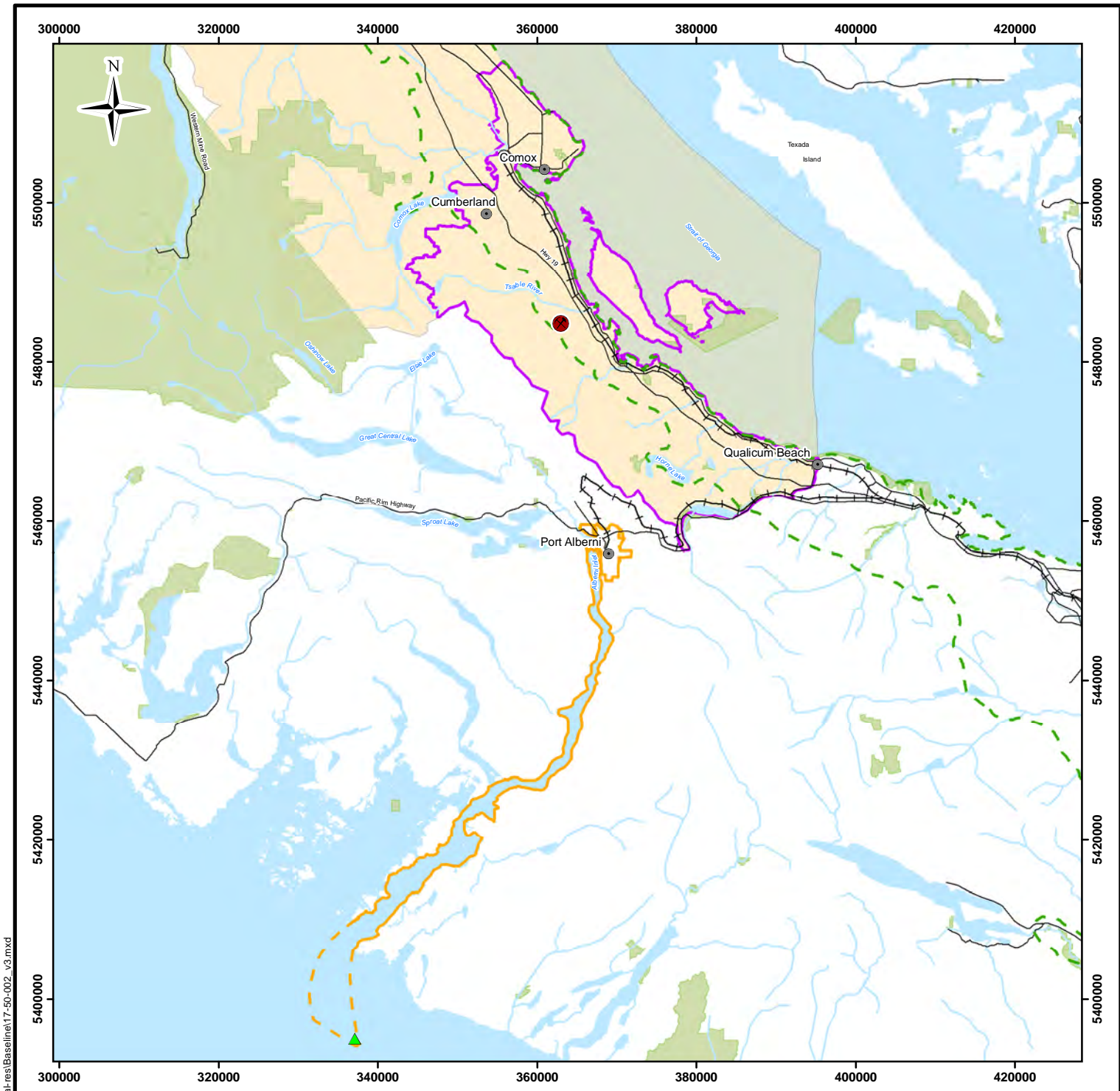
- Mine site NTLU RSA; and
- Port Facility NTLU RSA.

The proposed Raven Project mine site area and surrounding property are located on private land. The social and economic RSA (Figure 7.2-1) will be used as the basis for the mine site NTLU RSA as this area overlaps with representative biophysical and land use boundaries. The mine site NTLU RSA falls within Wildlife Management Unit 1-6, which includes Denman Island, and this boundary will be used for the eastern and southern limits of mine site NTLU RSA. The lower portion of this RSA also falls within the Regional Conservation Strategy Project Area (mainly within the southern portion of the Nanaimo Area Lowland Section) as described by the Comox Valley Land Trust. The mine site NTLU RSA will include commercial aquaculture operations in Baynes Sound. The mine site NTLU RSA considers land uses in the area as well as potential view points. The boundaries of the mine site NTLU RSA are as follows: the Beaufort Mountain Range north to Comox Lake and south to the Pacific Rim Highway down to Parksville. Courtenay and Comox are included as the most northern communities.

The proposed Port Facility NTLU RSA is based on the city limits for the City of Port Alberni and the marine study area Boundary. This RSA captures representative historical, current and potentially future land and marine uses located proximate to the proposed Port Facility. The study areas for NTLU are shown on Figure 7.2.-1.

7.2.1.6 Non-Traditional Land Use Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.



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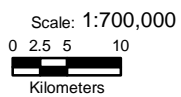
Legend

- ▲ Cape Beale Pilotage Point
- Populated Place
- Raven Coal Project
- +— Rail
- Road
- Watercourse
- Waterbody
- Park or Protected Area
- Mine Site RSA
- Port Facility RSA
- Ecoregion - Nanaimo Lowland
- Wildlife Management Unit 1-6

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Reference

Base Data: 1:1,000,000 scale from the Atlas of Canada, NRCAN



CLIENT: Compliance Coal Corporation		
PROJECT: Raven Underground Coal Project		
<h2 style="margin: 0;">Non-traditional Land Use Spatial Boundaries</h2>		
DATE: February 22, 2010	ANALYST: EO	<h3 style="margin: 0;">Figure 7.2-1</h3>
JOB No: VE51887	QA/QC: SB	
GIS FILE: 17-50-002		
PROJECTION: UTM Zone 10	DATUM: NAD83	



7.2.1.7 Visual and Aesthetic Resources Spatial Boundaries

The study areas for assessing potential effects on visual resources will be selected to ensure that representative viewpoints encompassing the components of the proposed Raven Project, including the load-out facility are included. The study areas will be defined to ensure that potential effects on protected areas, recreational use, residential and commercial land use and known tourism activities, which are landscape dependent, are adequately captured.

Local Study Area

The LSA is selected to ensure that a representative viewshed is reviewed around the proposed Raven Project components. For this project, the LSA consists of the footprint of the proposed Raven Project, plus one km beyond the areas proposed for mining, stockpiling, materials processing, access, and the power line. This is based on:

- The perceived extent of the primary effects of the proposed Raven Project on the terrestrial environment;
- The presumption that the effects on the terrestrial environment (e.g., mining and rejects management) also represent the primary effects to visual aesthetics in the area;
- Most of the light emissions from the proposed Raven Project and support facilities would fall within this defined area; and
- The nearest receptor, which is associated with Highway 19 (i.e., vehicle traffic), is located at a distance greater than 1 km east of the proposed Raven Project.

Recognising that the concept of the LSA has its limitations and does not completely capture the potential effects of a project; its primary function is as a focus for most of the zone of influence for proposed Raven Project-specific effects. Potential effects on receptors more than 1 km from the proposed area will be included in the assessment for the RSA.

A representative LSA will be defined for Port Alberni and included in the visual and aesthetic resources assessment.

Regional Study Area

To ensure that potentially affected scenic areas are adequately addressed, the information compiled for the land use section will be used as a guideline for selecting the visual and aesthetic resources RSA. The rationale for this is based on the proximity of potentially affected land uses including residential and commercial areas, protected areas, recreational use, and known tourism activities. The rationale for selecting the study areas for visual resources and aesthetics will be developed and reviewed to ensure it adequately captures potential effects as well as the landscape and associated land use in the area. The boundaries of the study area for assessing visual effects will be reassessed following a



review of the study areas being used by other disciplines (e.g., wildlife, vegetation, and air quality) to ensure potential effects on visual resources and aesthetics are adequately captured within the selected study area.

7.2.1.8 Visual and Aesthetic Resources Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

7.2.2 Social Conditions

7.2.2.1 Detailed Social Conditions Baseline

A range of economic and social information will be collected to meet the BC EAO (2006) guidelines regarding baseline conditions in the zone of project influence. At a minimum, local and regional social profiles will be developed for Courtney and Comox and other communities in the CVRD. The regional profile may be extended to include other communities for which the proposed Raven Project may have implications (e.g., employment catchment areas). The profiles will contain the following:

- Demographic conditions in the communities and the region would be described in terms of:
 - Their history;
 - The current population and demographics (age and gender);
 - Recent population and mobility, including migration patterns;
 - Expected population growth;
 - Family and household structure; and
 - Ethnicity.
- Social conditions in the region and the communities will be described using various indicators of wellness, such as the number of people using income support programs, community crime rates, number of children in care, key social issues, and the range of services available to manage the main social issues;
- Community and regional health will be described in terms of the incidence of key health issues and the availability of health services;
- Educational conditions will be described in terms of the current educational attainment of community and regional residents and the availability of educational services, programs



and learning institutions within communities and the region, especially in regard to trades and apprenticeship programs;

- Community infrastructure will be described in terms of the availability and capacity of existing housing, recreation, water and waste treatment facilities, power, etc.; and
- The status of municipal government finances, community plans, and any emerging community or regional issues will be described.

The proponent will initially develop these community and regional profiles based on a review of available literature. The profiles will then be verified through interviews, meetings and consultations with knowledgeable individuals, and comments received through the public consultation program. The following approach will be applied to the data collection process:

- The boundaries of the study region will be confirmed;
- The profiles will be prepared using data from:
 - 2001 and 2006 Census data;
 - Relevant BC Statistics on community economic and social profiles (<http://www.bcstats.gov.bc.ca>);
 - Official Community Plans; and
 - LRMPs.

The draft profiles will be confirmed and expanded following meetings and telephone conversations and interviews with: Chamber of Commerce representatives; CVRD; and other regional district representatives including local, provincial and federal government representatives such as: the Comox-Strathcona Regional Hospital District; economic development officers, and BC MoTI.

The proponent will develop a detailed description of the proposed Raven Project that will be used to assess social effects. This will include developing estimates of labour force requirements (including skill levels) for both construction and operation. It will also include estimates of the types and value of materials, goods and services that may be supplied by local businesses and what items would have to be imported into the region, the costs of construction. Additional information on proposed policies related to training and hiring of local residents and purchasing policies will also be summarised.

The proponent will prepare initial profiles for each First Nation based on available literature research from BC Stats, and Statistics Canada. These profiles will be refined and expanded through meetings and consultations with representatives of the Aboriginal groups.

The social assessment will describe the regional and local impacts of construction and operation of the proposed Raven Project. The analysis will examine the demands for



labour, goods and services in the context of current and expected future regional capacity to determine what labour and materials may have to be imported, potentially creating additional demands on regional infrastructure and services. Opportunities to enhance potential benefits and mitigate potential adverse effects will also be described. This analysis will involve both qualitative and quantitative methods, such as supply and demand matching, and will also build on the results of interviews with officials and their knowledge of the provincial and regional economies, and professional judgement based on previous experience with similar types of projects.

7.2.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

Potential effects of the proposed Raven Project on Aboriginal groups will be determined by assessing demands for labour, goods and services in the context of the current capacity of Aboriginal groups to identify what labour and materials they may be able to contribute. Opportunities to enhance potential benefits and mitigate potential adverse effects will also be described. This analysis will involve both qualitative and quantitative methods, such as supply and demand matching, and will also build on the results of interviews with officials and professional judgement based on previous experience with similar types of projects.

The Application / EIS will describe the methodology used to assess social impacts in terms of:

- Overall approach;
- Temporal and spatial boundaries;
- The measurement of social impacts; and
- CEA.

The Application / EIS will describe the methods used to identify valued social components of the proposed Raven Project setting. A rationale for their selection will also be included in the Application / EIS. Potential effects that have been identified during issues scoping include:

- Health and well-being of communities, families and individuals;
- Education and training; and
- Public safety and protection.

For the purpose of assessing social effects, the proposed Raven Project will be described in terms of: the construction and operations labour requirements; hiring standards; recruitment and placement policy; the operating work schedule; worker accommodation; transportation of people, materials and clean coal; capital and operating costs; and company procurement and purchasing policies. The assessment would include consideration of the social effects



attendant with the eventual closure and decommissioning of the mine. Other policies or strategies used to minimise adverse effects and enhance positive effects will also be described.

To the extent that the proposed Raven Project may directly or indirectly attract new people into the region, the assessment will identify the magnitude of these population increases. This will include demographic characteristics and the social impacts of a workforce with different characteristics, and describe the resulting effects on:

- Educational facilities;
- Community services;
- Community infrastructure; and
- Cultural impacts on regional lifestyle.

The assessment will also examine how the proposed Raven Project will add to traffic volumes on the provincial and regional road systems and the effects this may have on regional residents.

The Application / EIS will provide a summary of proposed Raven Project-related social impacts in the context of other proposed economic development in the region (cumulative effects), and will identify any residual effects that may result after the proposed mitigation and enhancement strategies have been implemented. The assessment will draw on other sections of the Application / EIS to identify social effects potentially associated with residual effects identified in other disciplines (i.e., wildlife, fisheries, water quality, and land use sections, as well as information from available TU and TK studies and published reports).

For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Section 10 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.



7.2.3 Transportation

7.2.3.1 Detailed Transportation Baseline

BC EAO (2006) has identified the need for assessments of mine projects to describe potential effects on regional and local transportation infrastructure. The following baseline information for roads and highways would be provided in the Application / EIS:

- Existing transportation infrastructure capacity;
- Existing traffic patterns / volumes and recent trends;
- Existing pedestrian use / safety issues; and
- Dangerous goods routes.

Appropriate access points on and off Highway 19 will be determined in consultation with BC MoTI. If direct access onto Highway 19 is requested, a rationale will be provided, including time savings per trip and economic impact. The Application / EIS will include a detailed description of the proposed trucking route through the Alberni Valley to the terminal. A detailed description of the shipping route from the terminal to the Cape Beale Pilotage Station will be provided. As well, a description of the existing railway infrastructure will be provided.

Traffic data as part of the feasibility study will be collected from BC MoTI. At minimum, collected data will include existing traffic and truck volumes for Highways 19 and 4. Vehicle accident and injury data will be collected from the Royal Canadian Mounted Police (RCMP).

A summary of marine traffic within the PAPA's jurisdiction will also be included in the assessment.

7.2.3.2 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application / EIS will identify potential effects on transportation infrastructure and safety from activities related to the proposed Raven Project.

Potential impacts on transportation infrastructure, traffic and safety will be analysed qualitatively and quantitatively. The analysis will examine project demands in the context of current highway and road capacity and use. The analysis will identify potential traffic issues and will identify opportunities for scheduling mine related traffic to minimize potential adverse effects, especially in areas that are determined to be possible "bottlenecks" in terms of capacity or risk.

The transportation route for the proposed Raven Project is Highway 19 (Inland Highway Route) to Highway 4 to Port Alberni. Traffic counts for Highway 19 south of Courtenay and Comox indicate an average traffic of about 8,300 vehicles per day, although traffic volumes are about 20 % higher in the summer. Since 2000, average annual daily traffic has been



increasing at an average rate of 1.6 % per year. Route alternatives within Port Alberni will be discussed with the City of Port Alberni and the PAPA.

The section will reference the Vancouver Island Highway Agreement and highlight the areas relevant to the proposed Raven Project, as well as refer to the original pavement design for Highways 19 and 4 and to the design life left in the existing pavement structure. The analysis will include consideration of urban areas, including Port Alberni and outskirts, and tourist areas that fall within the study area boundaries.

The assessment will include relative and absolute increase in traffic volumes on the two highways. Increase in truck volumes will be identified. The effect on BC MoTI access strategy will be reviewed. Effects of the mine related traffic on pavement structure and life span for the two highways will be considered, as well as required maintenance levels. The potential for increased truck traffic to create an additional need for Commercial Vehicle Safety Enforcement presence on transportation routes will be reviewed.

The assessment of potential transportation effects will include an assessment of the potential for spills and accidents, in terms of both safety and environmental effects. Safety considerations will include the number and characteristics of vehicles, speeds, proximity to existing developments, road crossings, and the condition of intersections with other roads (e.g. site distance, presence of acceleration lanes, existing road capacity).

Linkages between marine traffic within PAPA's jurisdiction and potential effects of the proposed Raven Project will be identified and described.

Traffic management plans, and safety considerations for site access roads (with high volumes of truck traffic) will be identified. Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.



7.2.4 Non-Traditional Land Use

7.2.4.1 Detailed Non-Traditional Land Use Baseline

The assessment will include review of formal LRMPs as well as land use information not formalised in plans (e.g., Aboriginal groups land use objectives). LRMPs are sub-regional integrated resource plans that seek to create a vision for use and management of public provincial lands and resources. In addition to guiding resource management activities including designation of new provincial parks and planning for forest development, LRMPs generally provide broad land use zones defined on a map and objectives that guide management of natural resources in each zone. Several management plans and maps exist for the Comox Valley and Strathcona areas as well as for the ACRD.

As indicated in the working draft of the AIR Template the EA process is strictly a proposed Raven Project-specific review mechanism. Where a land use plan exists, the process evaluates the degree of compatibility of a proposed project with any special land use planning objectives for the area. The process also examines the effects of projects on adjacent land uses and resource rights. Depending on the type of mine, a variety of land uses and resources may be affected including: recreational activities; agriculture; fishing; hunting; and trapping. The scope of the land use baseline would be determined based on review of the available information. A summary of the publicly available baseline data describing non-traditional activities that occur within the study area will be compiled. The Application / EIS will also summarise land status, including land owners, licensees, and ROW as well as the non-typical users of lands such as agro-forestry, shellfish production and harvest, adventure tourism, community watersheds, and railway and utility ROWs.

The land use baseline section will provide a description of the historical, current and potential future NTLUs within the selected study area. This information will facilitate the formulation of the project inclusion list for use in the CEA.

The following two methods will primarily be used to complete the compilation of available baseline information:

- Information from various government websites and reports will be summarised and referenced; and
- Telephone interviews with local and provincial government agencies will be conducted to confirm available references and identify any unforeseen information gaps.

Following the review of information compiled during the detailed desktop study, data gaps will be identified and reviewed with relevant local and provincial government agencies to determine if additional information is available (e.g., reports held by BC ILMB, Crown Land Use Agreements, etc.). 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 Raven Project. The mine site is on private land.

7.2.4.2 Potential Effects of the Proposed Project and Proposed Mitigation

This section will describe the effects of the proposed Raven Project on existing and foreseeable NTLU identified and described in the baseline section. The Application / EIS will incorporate the management objectives and strategies, defined in the Vancouver Island Summary Land Use Plan (BC ILMB 2000), for assessing impacts at a regional scale.

Maps and / or descriptions of existing and past land and resources uses in relation to the proposed development will be included. The assessment will focus on key issues related to NTLU, which are determined by the physical project and the natural environmental setting of the proposed Raven Project. Scoping and identification of potential effects may include the following non-traditional land and resource uses, if applicable potential proposed Project-related effects are identified:

- Seasonal and permanent camp areas and maintenance camps;
- Hunting, trapping, outfitting, and sport fishing areas;
- Commercial fishing and aquaculture in Baynes Sound;
- Tourism activities; and
- Protected areas, such as parks.

The compiled land use information will be analysed as follows:

- The significance of effects on adjacent land use and access will be determined for the proposed Raven Project, including potential laydown, setup, and new access areas;
- Potential constraints and effects with respect to parks, ecological reserves, and other protected areas in the vicinity of the proposed Raven Project will be identified;
- Potential effects of construction and operation activities on tourism and recreational opportunities, such as recreational boating, diving, nature-based tourism, hiking, horseback riding, hunting, and mountain biking will be assessed;
- Potential effects on commercial aquaculture in Baynes Sound will be assessed;
- Potential effects of loss of access or quality of recreational experience due to ROW clearing, and / or presence of project facilities will be addressed;
- Potential effects that construction and routine operations of the proposed Port Facility will be addressed.



The Application / EIS will include analysis of the above potential impacts. Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

7.2.5 Visual and Aesthetic Resources

7.2.5.1 Detailed Visual and Aesthetic Resources Baseline

The information in the land use section will be used to develop a description of the land use in the area that may be visually affected by the proposed Raven Project. Land use by residents and tourists identified in the area will be reviewed and various viewpoints identified as being scenic and / or accessible will be identified. The baseline analysis will describe the setting, whether or not a visual resource is present, and why it qualifies as a visual resource.

Recreational activities by residents and tourists identified in the area will be reviewed and various viewpoints identified as being scenic and accessible will be identified. The baseline analysis will describe the setting, whether or not a visual resource is present, and why it qualifies as a visual resource. An inventory of existing visual features will also be developed. This would include a summary of any existing visual landscape inventories done within the region.

The visual and aesthetics resources potentially affected by the proposed Raven Project will be identified by a variety of measures such as the following:

- A preliminary inventory of visual and aesthetic resources will be compiled following the review of the appropriate land and resource management plans which may include recreational values, protected areas and areas identified as scenic;
- Internet databases and available information on tourism, recreational use, scenic areas and aesthetic resources will be reviewed;
- Various individuals familiar with the area (e.g., tourism officers), will be interviewed; and



- Potential viewers' perspective based on proposed Raven Project component locations will be developed.

Literature and references reviewed as part of the visual land aesthetic resources baseline description will include:

- Visual Impact Assessment Guidebook. Forest Practices Code of BC (BC MOF 2001);
- BC ILMB - Internet based Land and Resource Data Warehouse. URL: <http://www.lrdw.ca/>;
- CVRD - <http://www.rdc.bc.ca/>;
- Strathcona Regional District - <http://www.strathconard.ca/>; and
- Vancouver Island Economic Trust - <http://www.islandcoastaltrust.ca/index.php>.

A separate field study will not be required for visual aesthetics. Team members who are undertaking field studies (i.e., fisheries, vegetation or wildlife) will be asked to take photographs from the identified viewpoints. The specific location and direction for each photograph will be recorded for reference purposes. Available literature and field observations (reported during field studies for other disciplines) will be analysed and the potential for scenic resources reviewed.

7.2.5.2 Potential Effects of the Proposed Project and Proposed Mitigation

This section of the Application / EIS will include an assessment of the visual and aesthetic impact of the proposed development, and will consider the possible effects of construction and operations, including air emissions and dust from mining operations, on visual and aesthetic resources. Potential effects from transportation and operations associated with the proposed Port Alberni Port Facility will also be assessed. Potential changes to the existing landscape, during construction and operation of the proposed Raven Project, will be evaluated. Potential effects on the visual and aesthetic resources will be assessed using the following two approaches:

- Indirect effects within the RSA will be assessed by identifying areas from which the site may be observed and determining if various "viewpoints" would be affected; and
- Direct and indirect effects on the visual landscape within and immediately adjacent to the LSA will be described and clarified for each project phase and component.

If required, a visibility assessment may be conducted using three-dimensional viewshed modelling. Input data is based on the digital elevation model from the NTS which provides three-dimensional topographic information. The viewshed analysis could identify areas that could be seen from the specific viewpoints and will take into account the elevation of various



proposed Raven Project structures (i.e. tallest project facility). The scope and costs of this assessment will be developed if needed.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

7.3 Summary of Assessment of Potential Social Effects

A summary of any potential residual effects of the proposed Raven Project and their significance will be provided in the Application / EIS using the format presented in Table 7.3-1. Potential residual effects would be identified by phase (i.e., construction, operation, closure and decommissioning).

Table 7.3-1: Summary of Potential Social Effects Analysis

Valued Components (Note Phase of proposed Raven Project)	Potential Effect	Key Mitigation Measures	Potential Residual Effect	Significance Analysis of Residual Effects (Summary Statement)
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8 ASSESSMENT OF POTENTIAL HERITAGE EFFECTS

8.1 Heritage Background

The Application / EIS will include a general description of the existing heritage resources, including surrounding areas within the zone of potential influences of the proposed Raven Project.

8.2 Heritage Resources

8.2.1 Valued Component Scoping and Rationale

The selected VCs for heritage resources are those VCs with an identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included as part of the rationale for selection. The preliminary rationale for selecting heritage VCs is described below in Table 8.2-1. The preliminary rationale will be updated to integrate results from consultation and Working Groups that reflect Aboriginal interests, scientific and / or regulatory concern, conservation status, biodiversity, and sensitivity to the potential effects of the proposed Raven Project.



RAVEN UNDERGROUND COAL PROJECT
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Table 8.2-1: Heritage Resources Valued Components

Valued Component	Rationale						
	Interaction with Proposed Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Archaeological sites	Potential effects due to land alterations associated with mine development	VC assessed in recent EA process, Professional judgement, Provincial guidelines	Aboriginal groups whose territory overlaps with proposed development	BC FLNRO	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	Are defined and protected by BC legislation – <i>Heritage Conservation Act</i>
Historic heritage sites	Potential effects due to land alterations associated with mine development	VC assessed in recent EA process, area of historic resource extraction activity	Individuals, Aboriginal groups and historical or heritage community groups	BC FLNRO	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	Individuals; local heritage groups	May be protected by Order-in-Council or by <i>Local Government Act</i> ; must be addressed under the <i>CEA Act</i>

Notes: BC ILMB-British Columbia Integrated Land Management Bureau, BC FLNRO-British Columbia Ministry of Forests, Lands and Natural Resources Operations, *CEA Act-Canadian Environmental Assessment Act*; EA-Environmental Assessment; VC-valued component.



8.2.1.1 Heritage Conditions Spatial Boundaries

The LSA and RSA will be developed in consultation with local Aboriginal groups and local historical societies. Figure 8.2-1 shows the preliminary study area boundaries for archaeology and heritage resources. Culturally modified trees (CMT) were scoped into the methodology and two CMTs were identified and recorded outside the study area. The Reconnaissance Karst Potential Mapping tool available at the Geographic Data Discover Service was overlaid against the archaeological overview study area resulting in no karst potential present within the study area. The Archaeological Impact Assessment (AIA) LSA is set at 50 m beyond the proposed footprint of the mine and supporting facilities including associated transportation corridors. Information about the proposed Raven Project indicates no risk for the development to extend near the shoreline. Currently the closest south-easterly portion of the facility is 3.5 km west of the shoreline therefore no shoreline or tidal zones would be included in any archaeological assessments.

8.2.1.2 Heritage Conditions Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed Raven Project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

8.2.2 Heritage Conditions

8.2.2.1 Detailed Heritage Conditions Baseline

The Application / EIS will include a complete and detailed description of the local and regional archaeological and heritage resources near the proposed Raven Project, potentially including archaeological sites, cultural landscapes, and paleontological sites.

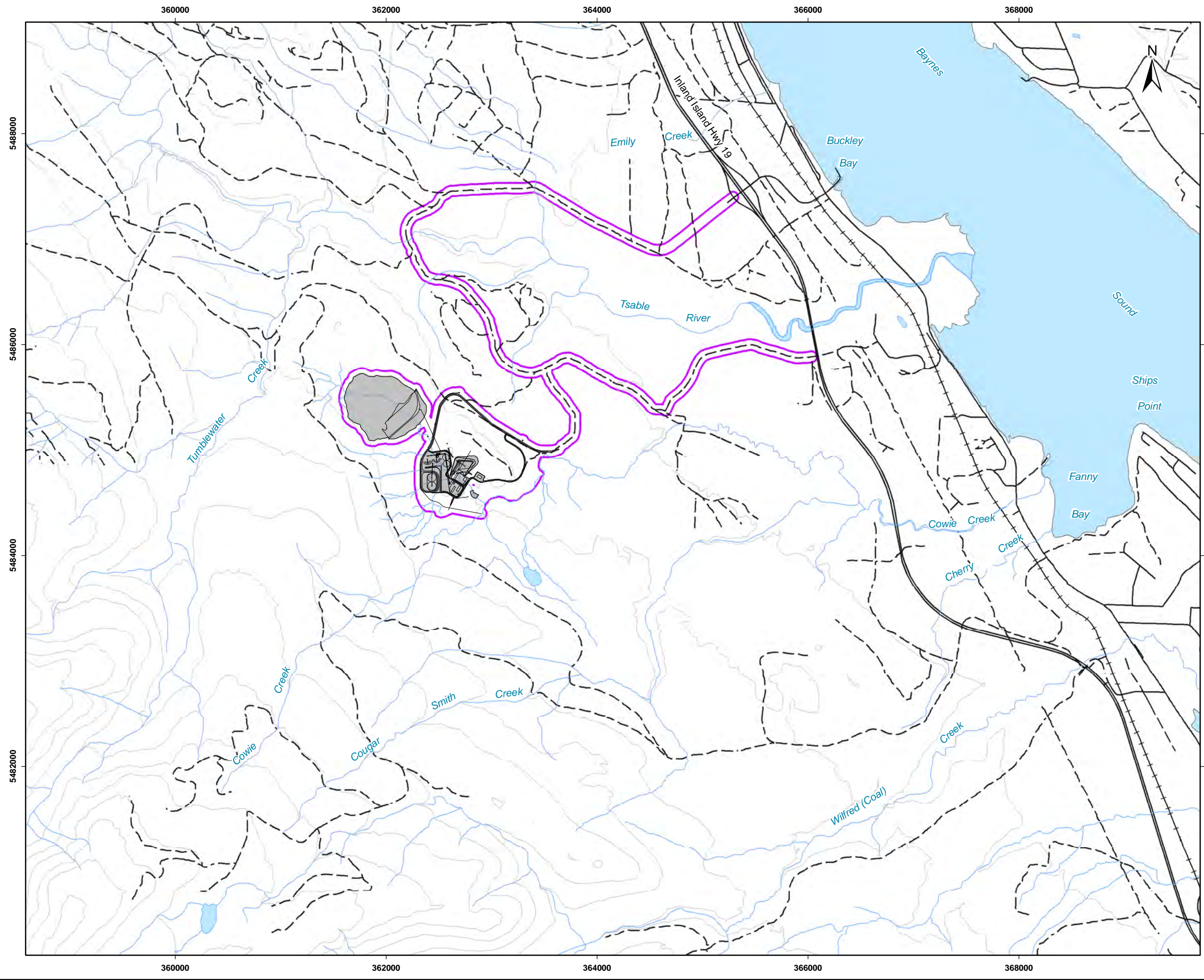
The methods for identifying potential or actual paleontological resources are the same as for archaeological site discovery techniques. The archaeological and heritage resources baseline study and impact assessment will be completed by a regional paleontological expert from the Courtenay Museum and Archives.

Cultural landscapes are included in the study, as individual archaeological sites belong to a larger regional cultural continuum.

8.2.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

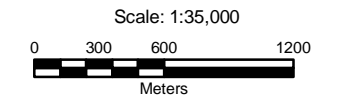
The section of the Application / EIS will identify potential effects on archaeological resources and consider each requirement of the *Heritage Conservation Act*, 1996. The approach to historic sites is identical to that for archaeological sites.

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- Legend**
- Paved Road
 - - Gravel/Rough Road
 - + Railroad
 - - Elevation Contour (100 m)
 - Watercourse
 - Waterbody
 - Archaeological Impact Assessment Study Area
 - Potential Location of Site Facilities

DRAFT



Reference
 LiDAR (5m) used to define Cowie and Cougar Smith Creek Watersheds
 TRIM used in other watersheds
 Basedata: TRIM

CLIENT:		Compliance Coal Corporation
PROJECT:	Raven Underground Coal Project	
Archaeology and Heritage Resources Spatial Boundaries		
DATE: October 4, 2010	ANALYST: EO	Figure 8.2-1
JOB No: VE51897	QA/QC: BO	PDF FILE: 15-50-002_arch_study_area.pdf
GIS FILE: 15-50-002		
PROJECTION: UTM Zone 10	DATUM: NAD83	



Results from the Archaeological Overview Assessment (AOA) will be used to define and describe the geographic boundaries of the AIA. The Application / EIS will identify proposed mitigation measures, as recommended in the AIA, for sites where impacts cannot be avoided

Local Aboriginal groups will be consulted to determine existing information and establish data gaps. Local historical societies will be consulted to determine data gaps from their perspective. An AOA will be conducted of the proposed Raven Project and surrounding areas by an archaeologist acceptable to Aboriginal groups whose traditional territory includes the proposed site.

The AOA in the Application / EIS will conform to the technical standards in the “British Columbia Archaeological Impact Assessment Guidelines” (Archaeology Branch 1998; Section 3.4 - Overview and Appendix A) and in “Archaeological Overview Assessments as General Land Use Planning Tools - Provincial Standards and Guidelines” (Archaeology Branch 2009). The Application / EIS will include collaboration, input, and feedback regarding archaeological methodology and TK.

Available TK and TU information will be used during development of the archaeological studies and included in the Application / EIS as appropriate. Considered information will include site-specific primary sources, as available, and the published literature.

An AOA report will be included in an Appendix to the Application / EIS which will contain a detailed description of how archaeological potential was assessed. AOA studies typically utilise several tools, including a fieldwork portion of the AOA, or a preliminary field reconnaissance to assist in assessing potential, and dependent on availability, also includes historic information, TU / TK sites, previous archaeological studies, archaeological sites located within the vicinity of a project area, biophysical data and paleo-ecological data.

The main activities of the AOA would include the following:

- Background literature review of relevant archaeological, historical, ethnographic and environmental information;
- Request for First Nation(s) perspectives on archaeological potential in the study area; including available archaeological TU / TK information;
- Preliminary assessment of distribution of archaeological potential in the study area;
- A preliminary field reconnaissance to help assess archaeological potential;
- Preparation (per the referenced standards) of recommendations for follow-up impact assessment studies; and
- Preparation of a report on methods and results.



Information gathered in AOA studies is meant to provide baseline data to select suitable locations for subsurface testing in addition to further intensive and thorough surface inspection coverage where additional locations may be identified and targeted for subsurface testing.

Cultural landscapes may be analysed through identification of site patterning. This is dependent on site density, distribution, and available traditional information as critical factors in identifying, quantifying, and qualifying cultural sites and how they fit into larger regional landscapes. Current available data suggests industrial impact to the study area has impacted available cultural evidence. Yield of anticipated archaeological data does not justify establishing a methodology for assessing cultural landscapes as a dataset. The same methodology for assessing archaeological sites would be employed for assessing historic sites for determining potential, identification, and recording techniques. An AIA has been recommended prior to any land alteration activities associated with the proposed development.

An AIA would be completed prior to any land alteration activities associated with the proposed development. The Application / EIS will include a chance find procedure that includes notification of Aboriginal groups if artefacts are found at any stage of activities related to the proposed Raven Project.

Archaeological data will be assessed by the archaeologist conducting the surveys using standards approved by the Archaeology Branch, BC Ministry of Forests, Lands and Natural Resource Operations (BC FLNRO). Cultural landscapes will be analysed through identification of site patterning. Reports will be prepared for both the Branch and the client for inclusion in the Application / EIS. Archaeological reports will also be provided to Aboriginal groups and to any other parties identified by the Archaeology Branch with interests in the study area.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects corresponding proposed mitigation measures would be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects would be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.



8.3 Summary of Assessment of Potential Heritage Effects

A summary of any potential residual effects of the proposed Raven Project and their significance will be provided in the Application / EIS using the format presented in Table 8.3-1. Potential residual effects will be identified by proposed Raven Project phase (i.e. construction, operation, closure and decommissioning).

Table 8.3-1: Summary of Potential Heritage Effects Analysis

Valued Components (Note Phase of proposed Raven Project)	Potential Effect	Key Mitigation Measures	Potential Residual Effect	Significance Analysis of Residual Effects (Summary Statement)
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9 ASSESSMENT OF POTENTIAL HEALTH EFFECTS

This section of the Application / EIS would describe scope, approach, methods, and analysis used to describe the human health component of the proposed Raven Project setting. The Application / EIS will include a current health profile and baseline description of public health parameters.

9.1 Health Background

The Application / EIS will include a general description of the existing health related conditions, including surrounding areas within the zone of potential influences of the proposed Raven Project.

9.2 Human Health

9.2.1 Valued Component Scoping and Rationale

The selected VCs for human health are those VCs with an identified interaction with the proposed Raven Project. Where available, supporting information which shows importance of the VC to the proponent, scientists, Aboriginal groups included by BC EAO and the Agency, government agencies, and the public is included a part of the rationale for selection. The preliminary rationale provided below will be updated to integrate results from consultation and Working Groups that reflect First Nation groups', scientific and / or regulatory concern, and sensitivity to potential effect of the proposed Raven Project. The preliminary rationale for selecting human health VCs is described below in Table 9.2-1.



RAVEN UNDERGROUND COAL PROJECT
DRAFT APPLICATION INFORMATION REQUIREMENTS / ENVIRONMENTAL
IMPACT STATEMENT GUIDELINES

Table 9.2-1: Human Health Valued Components

Valued Component	Rationale						
	Interaction with Proposed Raven Project activities	Scientific literature and professional judgement	Aboriginal groups included by BC EAO and the Agency	Applicable government agencies	Land and resource management plans	The public and other stakeholders	Federal and provincial regulations and guidelines
Public health	Health effects of potential changes to air quality, noise, drinking water quality and country foods on health of direct receptors (public) within the LSA	Health Effects of Air Pollution (HC 2006), Canadian Handbook on Health Impact Assessment (HC 2004)	To be discussed with local Aboriginal groups	BC MOHS, BC EAO, HC	Vancouver Island Summary Land Use Plan (BC ILMB 2000), CVRD, ACRD	WHO 1999, 2004, Denman Island Local Trust Committee	<i>Public Health Act, Drinking Water Protection Act</i>
Healthy living	Including healthy living choices in proposed Raven Project design may improve workers health		To be discussed with local Aboriginal groups	BC EAO	Vancouver Island Summary Land Use Plan (BC ILMB 2000); CVRD; ACRD	Potential for concerns related to public safety	To be determined
Worker safety and health	To be determined	To be determined	To be discussed with local Aboriginal groups	WorkSafeBC	Vancouver Island Summary Land Use Plan (BC ILMB 2000)	To be determined	To be determined

Notes: ACRD-Alberni-Clayoquot Regional District; Agency-Canadian Environmental Assessment Agency, *BCEAA-BC Environmental Assessment Act*, BC EAO-British Columbia Environmental Assessment Office, BC ILMB-British Columbia Integrated Land Management Bureau, BC MOHS-British Columbia Ministry of Health Services, *CEA Act-Canadian Environmental Assessment Act*, CVRD-Comox Valley Regional District; HC-Health Canada, LSA-Local Study Area; WHO-World Health Organization.



9.2.1.1 Public Health Spatial Boundaries

As the human health study is based on work of other disciplines, the LSA corresponds to other study areas such as air quality, noise, economic and social study areas. These areas will be defined in terms of potential human receptors (populations). The RSA would be based on a combination of areas including appropriate sections of the economic and social RSAs. The potential effects of the proposed Port Facility on human health will be considered in the Application / EIS.

9.2.1.2 Public Health Temporal Boundaries

The Application / EIS will present the rationale for the proposed temporal boundaries to be used for the EA relevant to each VC for the life of the proposed Raven Project, including consideration of each proposed project phase (i.e., construction, operations, decommissioning / closure, and post-closure) and the possibility of economic and social effects occurring before construction. Any annual or seasonal variation related to VCs and biophysical constraints for each proposed Raven Project phase will be described.

9.2.2 Public Health

9.2.2.1 Detailed Public Health Baseline

A range of human health information will be collected from other disciplines and supplemented to meet the BC EAO (2006) guidelines regarding baseline conditions in the zone of influence of the proposed Raven Project.

The Application / EIS will include a description of public health parameters affecting the public health setting of the proposed Raven Project, as required to meet BC EAO guidelines (BC EAO 2006, Mine Proponent's Guide: Appendix C: Checklist of Baseline Data Needs). The Application / EIS will also make reference to Health Canada (HC) guidance documents for health assessment (HC 2004, 2010).

A description of the following existing public health parameters will be included in the Application / EIS:

- Noise levels;
- Local landscape aesthetics;
- Water sources;
- Water quality;
- Air quality; and
- Services (e.g., water supply, waste disposal).



Data from these disciplines will be summarised in this human health section of the Application / EIS and reported from a human health perspective.

The human health discipline lead will work with the soil, water, air, vegetation, wildlife, economic and social discipline leads to identify data requirements for discussion from a human health perspective. Where possible, paired sampling of country foods and environmental media will be completed (i.e., soil and vegetation). Mathematical media concentration modelling will also be completed to identify the potential adverse impacts to the health of humans and other organisms.

9.2.2.2 Potential Effects of the Proposed Project and Proposed Mitigation

Public health and safety risks to the general population and to Aboriginal groups will be discussed as part of the health impact assessment. The human health section will qualitatively examine the potential for the proposed Raven Project to cause increased exposure to health hazards identified above (e.g., noise, air quality, water quality, environmental health). These will be reported in this section of the Application / EIS from a human health perspective. The human health risk assessment will include the analysis of effects from contamination of country foods, potable water and air emissions.

For the required public health parameters, the discussions are highly dependent on data obtained from other disciplines and their conclusions. The human health discipline lead will work with the soil, water, air, vegetation, wildlife and economic and social discipline leads to identify data requirements for discussion from a human health perspective.

Additionally, selected government agencies, local health agencies (e.g., VIHA) and local communities will likely have public health related concerns. For this information, a review of information gathered through the consultation program and review of TK information will be completed. Research will be completed by literature review, statistical analysis or in coordination with other disciplines (e.g., if other disciplines have produced or reported partial data sets that could be interpreted from a public health perspective).

A screening level risk assessment approach will be completed for the evaluation of human health. The human health assessment will include any contaminants of potential concern (COPC) associated with the proposed Raven Project that might adversely affect the long-term health of humans and animals. Emphasis will be placed on assessing the risks due to exposure to metal COPCs, as metals usually pose the most potential for chronic health risks at mines due to their concentrations and volumes in mining wastes, and their persistence in the environment. The assessment will focus on multiple exposure pathways as the COPCs are mobilised in the environment and in biological components.

Other disciplines will be consulted to determine which metals may potentially affect air, soil, country foods or water. If a metal is predicted by an environmental media quality group to impact the medium, then it would be included in a conservative COPC screening procedure.



In the screening procedure, the maximum predicted concentration of metal will be compared to a conservative risk-based guideline that is protective of environmental and / or human health.

A conceptual site exposure model of exposure pathways will be prepared in the risk assessment to identify the potential contaminant sources, release mechanisms, exposure routes and final receptors. For example, if water quality modelling indicates that residual effects remain after mitigation; potential cumulative effects to Baynes Sound shellfish will be assessed. The exposure model will evaluate potential exposure pathways (e.g., human consumption of potentially contaminated fish and shellfish).

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects will be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Sections 10 and 22.19 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g. some of the information included was based, in part, on public information provided by others) will be described.

9.2.3 Healthy Living

9.2.3.1 Detailed Healthy Living Baseline

The Application / EIS will describe public use of the lands in the vicinity of the proposed Raven Project, including recreational activities.

9.2.3.2 Potential Effects of the Proposed Project and Proposed Mitigation

The Application / EIS will:

- Describe those activities that may be impacted and the mitigation measures that are proposed to minimise impacts or otherwise replace opportunities to carry out those activities;
- For site-specific activities, indicate whether these activities could be enhanced by some action by the proponent (e.g., contributing to local organisations that support recreation); and



- Describe information and / or education programs that might be employed to encourage healthy living lifestyles for workers employed at the proposed Raven Project.

Proposed mitigation measures will be identified and relevant management plans will be referenced as appropriate. Any identified residual effects of the proposed Raven Project will be discussed, followed by assessment of potential cumulative effects. For any identified cumulative effects, corresponding proposed mitigation measures will be described and relevant regional management plans (including provincial regional management plan strategies) will be referenced as appropriate. Residual cumulative effects would be described and their significance will be determined. Reference to relevant monitoring / follow-up plans described in Section 10 of the Application / EIS will be included.

Based on the analysis provided in this section of the Application / EIS, a conclusion will be provided regarding potential residual effects of the proposed Raven Project or potential residual cumulative effects and their significance. Relevant limitations that are associated with the CEA (e.g., some of the information included was based, in part, on public information provided by others) will be described.

9.2.4 Worker Safety and Health

The Application / EIS will identify potential safety and health considerations for proposed Raven Project employees and contractors. The section will refer to the Occupational Health and Safety Management Plan described in Section 10.

9.3 Summary of Assessment of Potential Health Effects

A summary of any potential residual effects of the proposed Raven Project and their significance will be provided in the Application / EIS using the format presented in Table 9.3-1. Potential residual effects will be identified by phase (i.e., construction, operation, closure and decommissioning).

Table 9.3-1: Summary of Potential Health Effects Analysis

Valued Components (Note Phase of proposed Raven Project)	Potential Effect	Key Mitigation Measures	Potential Residual Effect	Significance Analysis of Residual Effects (Summary Statement)



10 SUMMARY OF PROPOSED ENVIRONMENTAL AND OPERATIONAL MANAGEMENT PLANS

This section of the Application / EIS will describe the components of the proponent's EMS for the proposed Raven Project. The Application / EIS will maintain as the objective of the EMS, to provide a consistent approach to environmental management through resource allocation, the assignment of responsibilities, and ongoing evaluation of environmental practices, procedures, and processes.

10.1 Environmental Management System

The Application / EIS will describe the components of the conceptual EMS for the proposed Raven Project. The EMS will be designed to ensure a consistent approach to responsible environmental management by inclusion of the following EMS elements:

- **Planning:** defining the scope of the EMS; establishing an environmental policy for the proposed Raven Project; identifying applicable legal and other (non-regulatory) requirements; setting environmental performance objectives and developing the environmental management plans (EMP), discussed);
- **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:** ongoing monitoring of environmental performance; inspection and evaluation of environmental management practices, including environmental compliance; and
- **Continual improvement:** senior operational management review of the EMS and identification of improvements in environmental performance of the proposed Raven Project.

The EMS will emphasise key stakeholder engagement initiatives for environmental management, including educational and consultation programs with First Nation and Aboriginal groups' communities and other key stakeholders.

10.2 Environmental Management Plans

The Application / EIS will provide a conceptual overview of the various EMPs that the proponent may be required to develop for the proposed Raven Project as part of the EMS. The EMPs will include both preliminary monitoring and management requirements, as appropriate, and will be designed to provide an integrated approach to environmental management and deliver assurance to interested parties regarding the phases and activities of the proposed Raven Project. The monitoring and management plans will be based on the



principle of adaptive management, and will describe the environmental practices and procedures to be applied during planning, construction, and operation / maintenance and decommissioning phases of the proposed Raven Project. A method for ongoing (post-Application / EIS) development of adaptive management strategies will also be provided. Monitoring program requirements will be further developed with regulatory agencies during the permitting phase. The Application / EIS will include an overview of individual or consolidated monitoring and management plans covering the following topics:

- Air Quality Management;
 - This EMP will ensure that all aspects of the proposed Raven Project that could potentially affect air quality (e.g., emissions from vehicles and equipment; fugitive dusts) are anticipated, identified, monitored, evaluated, and controlled so that air quality in the vicinity of the proposed Raven Project is protected;
- Aquatic Resources Management (including conceptual fisheries compensation plan per requirements of the *Fisheries Act* and monitoring plan);
 - This EMP will ensure that all aspects of the proposed Raven Project that could potentially affect aquatic resources (e.g., habitat loss) are anticipated, identified, monitored, evaluated, and controlled so that aquatic resources in the vicinity of the proposed Raven Project are protected;
- Archaeology and Heritage Resources Management;
 - This EMP will ensure that all aspects of the proposed Raven Project that could potentially affect archaeological and cultural heritage resources (e.g., chance finds) are anticipated, identified, evaluated, and controlled so that archaeological and cultural heritage resources in the vicinity of the proposed Raven Project are protected;
- Construction Management;
 - This EMP identifies the full extent of all construction phase environmental measures from all other EMPs. It functions as a master plan for ensuring coordinated comprehensive delivery of all construction related environmental commitments and supporting activities. It also establishes the protocol for regulatory environmental compliance monitoring and reporting;
- Dust Management;
 - This EMP will describe guidelines and procedures for ensuring that all environmental risks related to surface and underground fugitive dust



generation and emission are prevented, controlled, or mitigated, and will include monitoring requirements as appropriate. It will be developed based upon the potential environmental risks associated with all phases of the proposed Raven Project;

- Emergency and Spill Response (including consideration of existing spill response capacity at the PAPA);
 - This EMP is intended to provide a conceptual framework for emergency response at the proposed Raven Project. It will flow from the corporate commitments, goals and objectives, and would detail emergency spill response procedures and the protocol for communication in the event of an emergency. It will be developed concurrently with the Occupational Health and Safety Management Plan, since both address many of the same emergency situations;
- Erosion and Sediment Control;
 - This EMP will be designed to minimise the potential for erosion, sedimentation or loss of salvaged materials. It will specify standard operating procedures for erosion and sediment control for all phases of mine life. Description of strategy and measures will include protection of all components subject to erosion, such as salvaged till and topsoil stockpiles, working yard area, and coal storage and stockpiles, through short-term controls and, where possible, through re-vegetation for progressive and long term reclamation objectives. It will describe the method and design provisions for preventing interference of sedimentation with surface and groundwater conditions, and for controlling, collecting, and treating water that comes into contact with facilities in an environmentally sound manner;
- Hazardous Materials Management (including explosives and petroleum management);
 - This EMP will identify potentially hazardous materials and provide a system for monitoring these materials. Safety of the workers and the surrounding communities will be of paramount importance for all stages of materials handling. It will be developed to ensure the health, safety, and well-being of personnel and the environment is not compromised from hazardous materials. It will provide the policies and procedures for ensuring compliance with provincial and federal regulatory requirements and BMPs for all hazardous materials;
- Hazardous Waste Management;



- This EMP will identify potentially hazardous waste materials and would describe measures and procedures designed for the temporary storage, handling, and transport of these materials. Safety of the workers and the surrounding communities will be of paramount importance for all stages of materials handling. It will provide the policies and procedures for ensuring compliance with provincial and federal regulatory requirements and BMPs for all hazardous wastes;
- Incidental Mine Fires;
 - This EMP will provide management practices for responding to incidental mine fires;
- Mine Methane Management;
 - This EMP will establish methane monitoring safety procedures and systems for underground ventilation and degasification;
- Mine Waste Management;
 - This EMP will provide management practices for disposing of mine wastes;
- Noise Management;
 - This EMP will provide management practices to monitor and minimise noise from the proposed Raven Project;
- Non-Hazardous Solid Waste and Domestic Water Waste Management;
 - This EMP will provide management practices for disposing of non-hazardous solid waste and domestic waste water;
- Occupational Health and Safety Management;
 - This EMP will provide management practices for anticipating, identifying, evaluating and controlling all chemical, physical, biological, and ergonomic hazards at the proposed Raven Project;
- Reclamation and Closure;
 - This EMP will provide management practices for reclamation and closure activities for the proposed Raven Project;
- Recruitment, Training and Employment;
 - This EMP will provide management practices for recruitment, training and employment of construction phase and operations phase personnel;



- Soil Management;
 - This EMP will provide management practices for topsoil and till disturbed due to the proposed Raven Project;
- Transportation and Access Management;
 - This EMP will provide management practices for transportation and access to and from the proposed Raven Project;
- Waste Water Management;
 - This EMP will provide monitoring and management practices for waste water generated from the proposed Raven Project;
- ML/ARD Prediction and Prevention;
 - This EMP will provide management practices for waste rock and rejects that could pose an environmental risk due to ML or ARD;
- Marine Resources Management Plan;
 - This EMP will be developed in cooperation with regulatory and other potentially affected parties to ensure that potential effects to marine resources and marine habitats related to the construction and post-construction activities of the Raven Project (particularly but not limited to the upgrades to the proposed Port Alberni Facility and coal transportation along existing shipping lanes) are identified and adequately addressed, prevented and / or controlled.
- Dredging Management Plan;
 - This EMP will provide monitoring and management practices for any required dredging operations; on land disposal is anticipated;
- Water Management;
 - This EMP will provide monitoring and management practices for all surface and ground waters in and around the proposed Raven Project;
- Wildlife Management
 - This EMP will provide monitoring and management practices to ensure the health and well-being of wildlife, and the health and well-being of people potentially encountering wildlife in the vicinity of the proposed Raven Project.



11 COMPLIANCE REPORTING

The proponent commits to provide the following in the Application / EIS:

- Reporting structure as identified within the EMPs, monitoring plans and commitments, including a preliminary list of reporting procedures on environmental management and performance; and
- A preliminary list of anticipated compliance monitoring obligations associated with permits, authorisations and licenses issued.



PART C – MAA-NULTH FIRST NATIONS INTERESTS

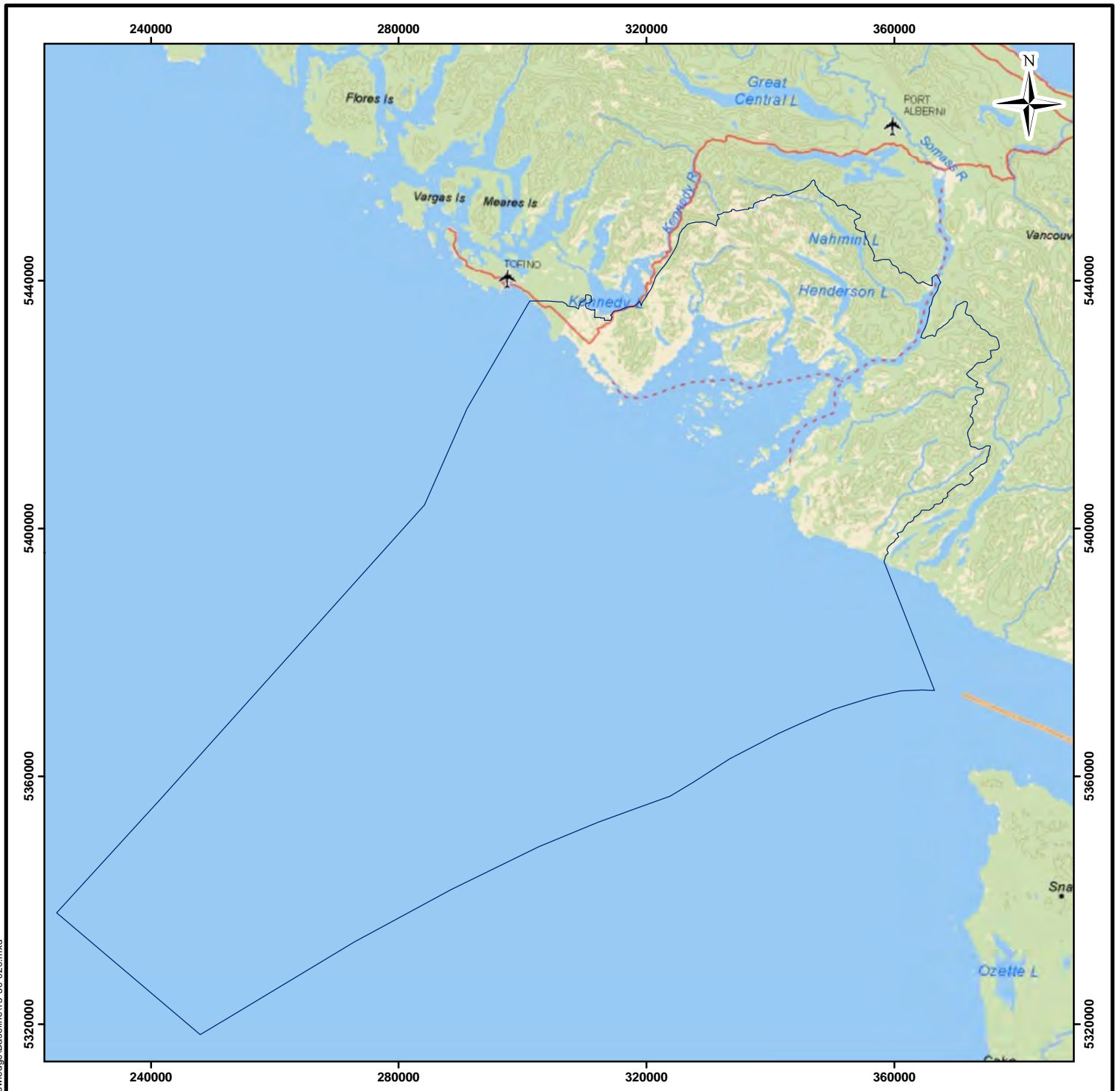
Part C of the Application / EIS will discuss all Maa-nulth First Nations considerations pertaining to the proposed Raven Project. In particular, this section of the Application / EIS will provide a summary of the Maa-nulth First Nations Final Agreement, Maa-nulth First Nations Governments and the Maa-nulth First Nations history. Part C of the Application / EIS will also discuss Maa-nulth rights and interests that may potentially be impacted by the proposed Project, as well as related issues raised by the Maa-nulth First Nations throughout the EA process. This information will be informed by discussions with the Maa-nulth First Nations as well as additional guidance provided by the Agency.

The introduction to this section will provide a summary of how regulatory requirements were followed, including outlining the Maa-nulth First Nations Final Agreement, and key chapters of the Maa-nulth First Nations Final Agreement that are applicable to the proposed Raven Project review.


12 MAA-NULTH FIRST NATIONS BACKGROUND INFORMATION AND MAA-NULTH FIRST NATIONS SETTING

This section of the Application / EIS will provide the following:

- Maps of the Maa-nulth First Nations areas (Figure 12-1) as well as those areas encompassed by Appendices N, O, P, Q and R of the Maa-nulth First Nations Final Agreement (Figures 12-2 to 12-11)-; and
- Provide background information for the potentially impacted Maa-nulth First Nations including but not limited to ethnography, language, land use setting and planning, governance, economy, and treaty implementation.



Legend

 Maa-nulth Domestic Fishing Area

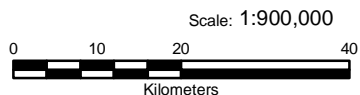
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Reference

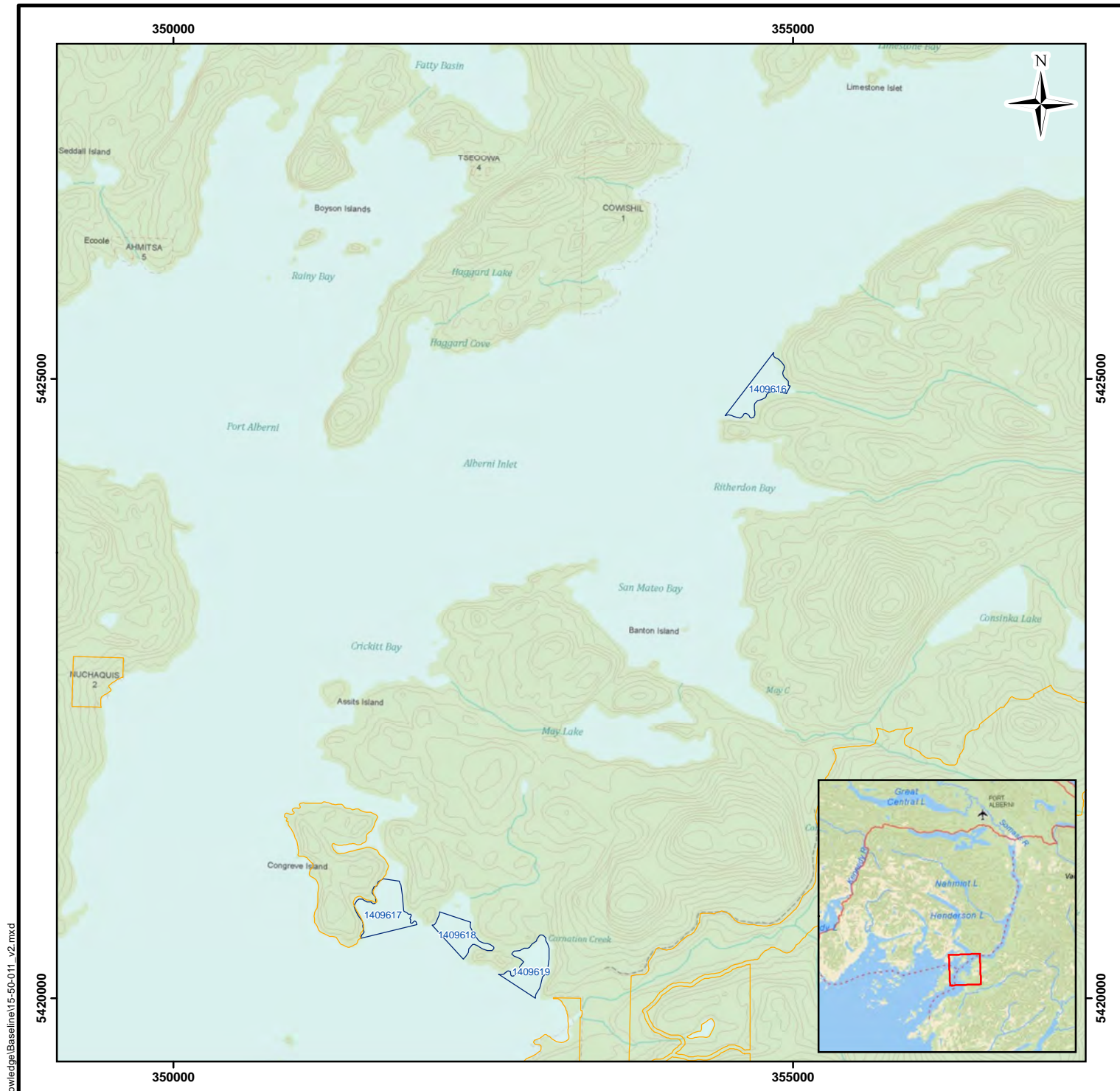
Base Data: DeLorme World Base Map
 Appendix N-2: Map of Maa-nulth Domestic Fishing Area Barkley Sound
 Maa-nulth Final Agreement

Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing



CLIENT:		 Compliance Coal Corporation
PROJECT:		
Raven Underground Coal Project		
Maa-nulth First Nation Domestic Fishing Area Barkley Sound		
DATE:	ANALYST:	Figure 12-2
April 18, 2011	EO	
JOB No:	QA/QC:	PDF FILE:
VE51897	LR	15-50-020_maa_nulth_N-2.pdf
GIS FILE:		
15-50-020		
PROJECTION:	DATUM:	
UTM Zone 10	NAD83	



Legend

- Maa-nulth First Nation Lands of Huu-ay-aht First Nations
- Designated Shellfish Aquaculture Site - Reserve File Number

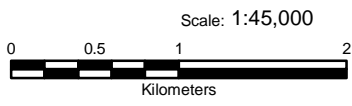
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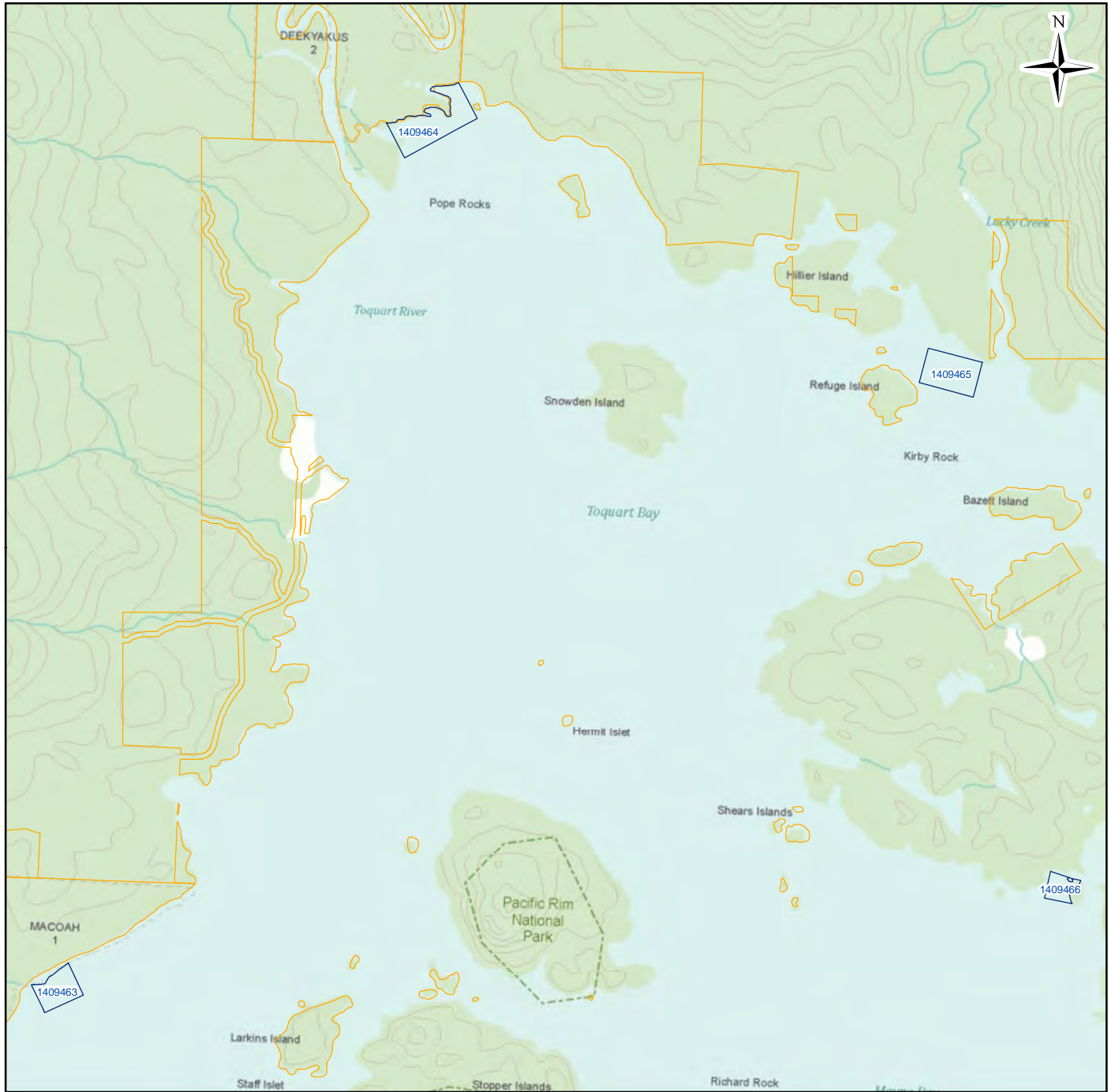
Base Data: ESRI World Topographic Map
 Appendix O-1: Maps of Designated Shellfish Aquaculture Sites of Huu-ay-aht First Nations Plans 1 and 2
 Final Agreement of Maa-nulth Final Agreement

Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing



CLIENT: Compliance Coal Corporation	
PROJECT: Raven Underground Coal Project	
Maa-nulth First Nation Designated Shellfish Aquaculture Sites of Huu-ay-aht First Nations	
DATE: April 06, 2011	ANALYST: EO
Figure 12-3	
JOB No: VE51897	QA/QC: LR
PDF FILE: 15-50-011_maa_nulth_O1.pdf	
GIS FILE: 15-50-011	
PROJECTION: UTM Zone 10	DATUM: NAD83



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- Maa-nulth First Nation Lands of Toquaht Nation
- Designated Shellfish Aquaculture Site - Reserve File Number

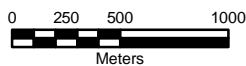
Reference

Base Data: ESRI World Topographic Map
 Appendix O-3: Maps of Designated Shellfish Aquaculture Sites of Toquaht Nation
 Maa-nulth Final Agreement

Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing

Scale: 1:35,000



CLIENT:		 Compliance Coal Corporation
PROJECT: Raven Underground Coal Project		
Maa-nulth First Nation Designated Shellfish Aquaculture Sites of Toquaht Nations		
DATE: April 12, 2011	ANALYST: EO	Figure 12-4
JOB No: VE51897	QA/QC: LR	PDF FILE: 15-50-012_maa_nulth_O3.pdf
GIS FILE: 15-50-012		
PROJECTION: UTM Zone 10	DATUM: NAD83	



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- Maa-nulth First Nation Lands of Uchucklesaht Tribe
- Designated Shellfish Aquaculture Site - Reserve File Number



Reference

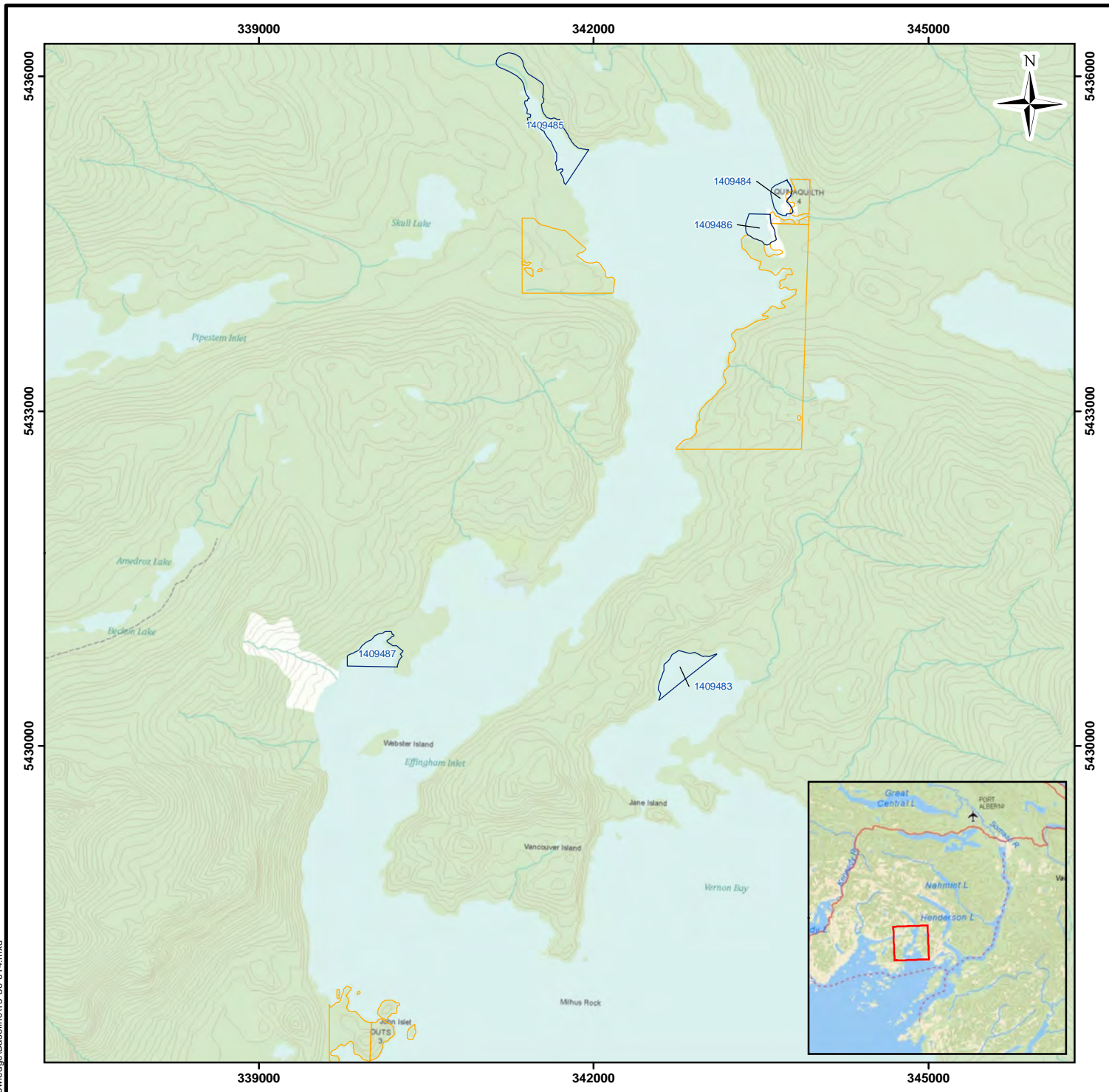
Base Data: ESRI World Topographic Map
 Appendix O-4: Maps of Designated Shellfish Aquaculture Sites of Uchucklesaht Tribe
 Maa-nulth Final Agreement

Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing



CLIENT:			Compliance Coal Corporation
PROJECT:			
Raven Underground Coal Project			
Maa-nulth First Nation Designated Shellfish Aquaculture Sites of Uchucklesaht Tribe			
DATE:	ANALYST:	Figure 12-5	
April 12, 2011	EO		
JOB No:	QA/QC:	PDF FILE:	
VE51897	LR	15-50-013_maa_nulth_O4.pdf	
GIS FILE:			
15-50-013			
PROJECTION:	DATUM:		
UTM Zone 10	NAD83		



Legend

- Maa-nulth First Nation Lands of Ucluelet First Nation
- Designated Shellfish Aquaculture Site - Reserve File Number

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Reference

Base Data: ESRI World Topographic Map
 Appendix O-5: Maps of Designated Shellfish Aquaculture Sites of Ucluelet First Nation
 Maa-nulth Final Agreement

Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing



CLIENT: Compliance Coal Corporation	
PROJECT: Raven Underground Coal Project	
Maa-nulth First Nation Designated Shellfish Aquaculture Sites of Ucluelet First Nation	
DATE: April 12, 2011	ANALYST: EO
Figure 12-6	
JOB No: VE51897	QA/QC: LR
PDF FILE: 15-50-014_maa_nulth_O5.pdf	
GIS FILE: 15-50-014	
PROJECTION: UTM Zone 10	DATUM: NAD83

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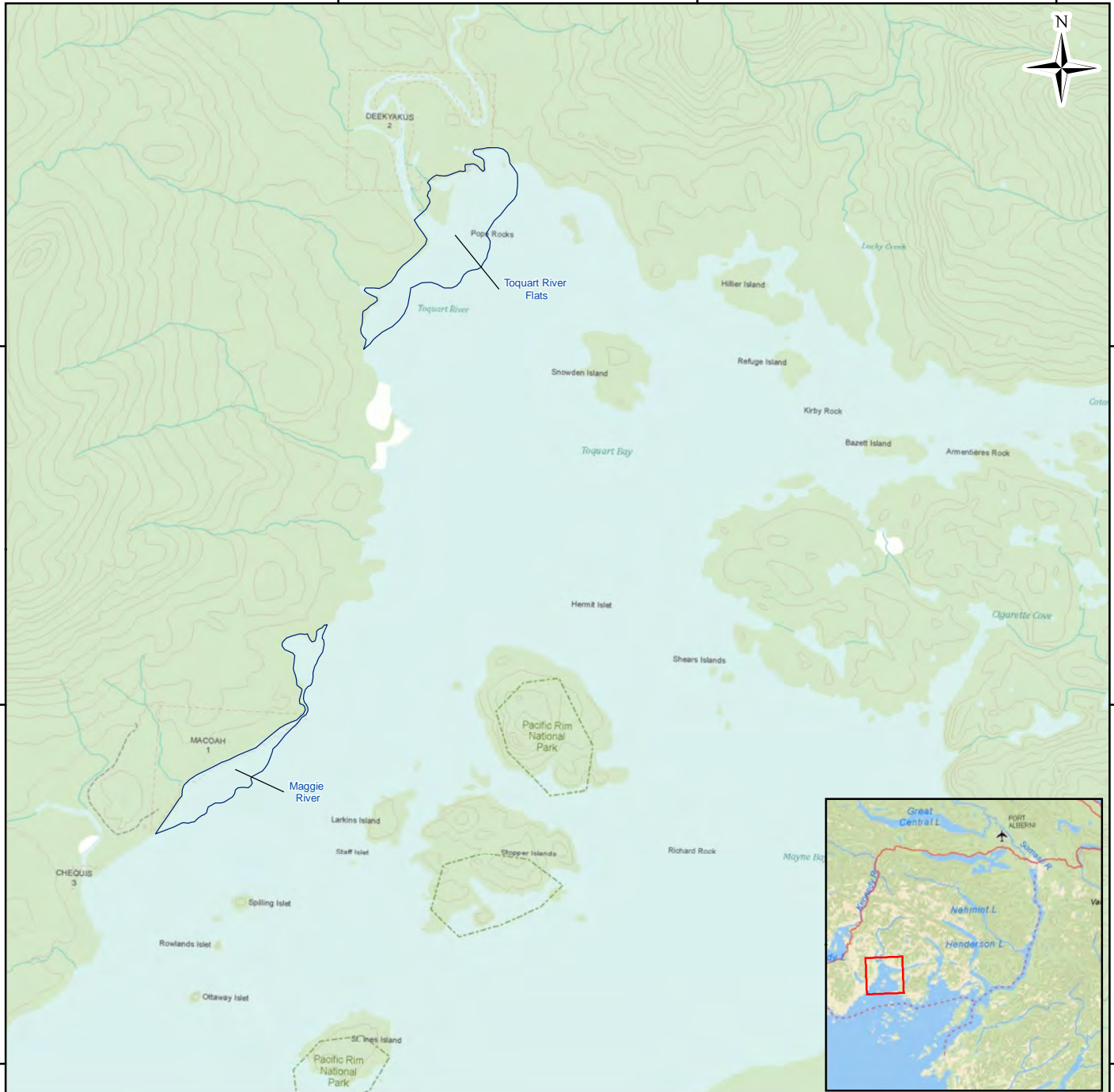
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-  Maa-nulth First Nation Lands
-  Inter-tidal Bivalve Harvest Area

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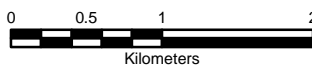
Reference



Base Data: ESRI World Topographic Map
Appendix P: Maps of Inter-tidal Bivalve Harvest Areas
Maa-nulth Final Agreement

Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing

Scale: 1:50,000



CLIENT:		 Compliance Coal Corporation plus Concor Joint Venture	Compliance Coal Corporation
PROJECT: Raven Underground Coal Project			
Maa-nulth First Nation Inter-tidal Bivalve Harvest Area Toquart Bay			
DATE: April 12, 2011	ANALYST: EO	Figure 12-7	
JOB No: VE51897	QA/QC: LR	PDF FILE: 15-50-015_maa_nulth_P-1.pdf	
GIS FILE: 15-50-015			
PROJECTION: UTM Zone 10	DATUM: NAD83		

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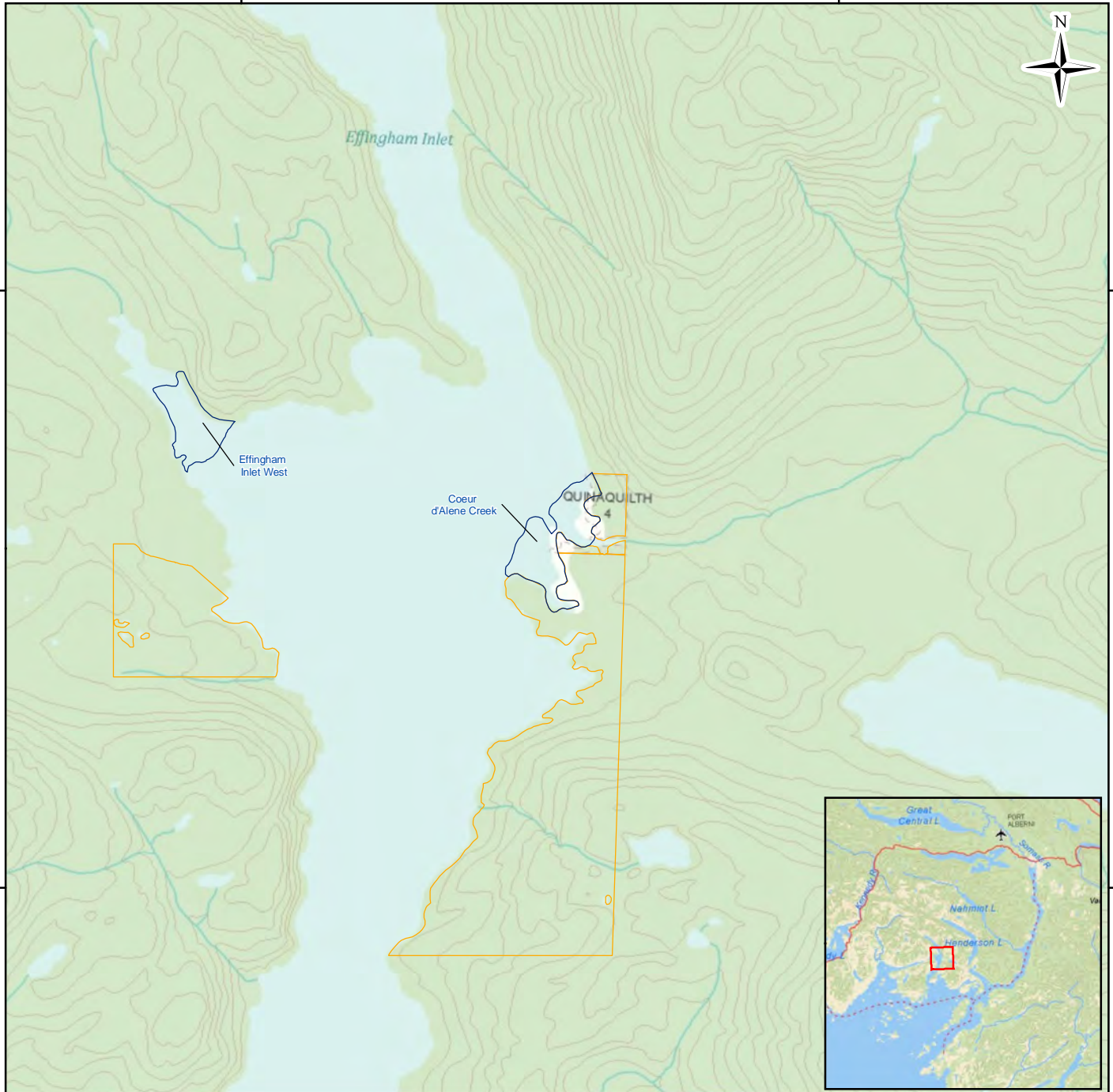
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Legend

-  Maa-nulth First Nation Lands
-  Inter-tidal Bivalve Harvest Area

Reference

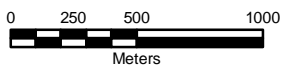
Base Data: ESRI World Topographic Map
Appendix P: Maps of Inter-tidal Bivalve Harvest Areas
Maa-nulth Final Agreement


Note

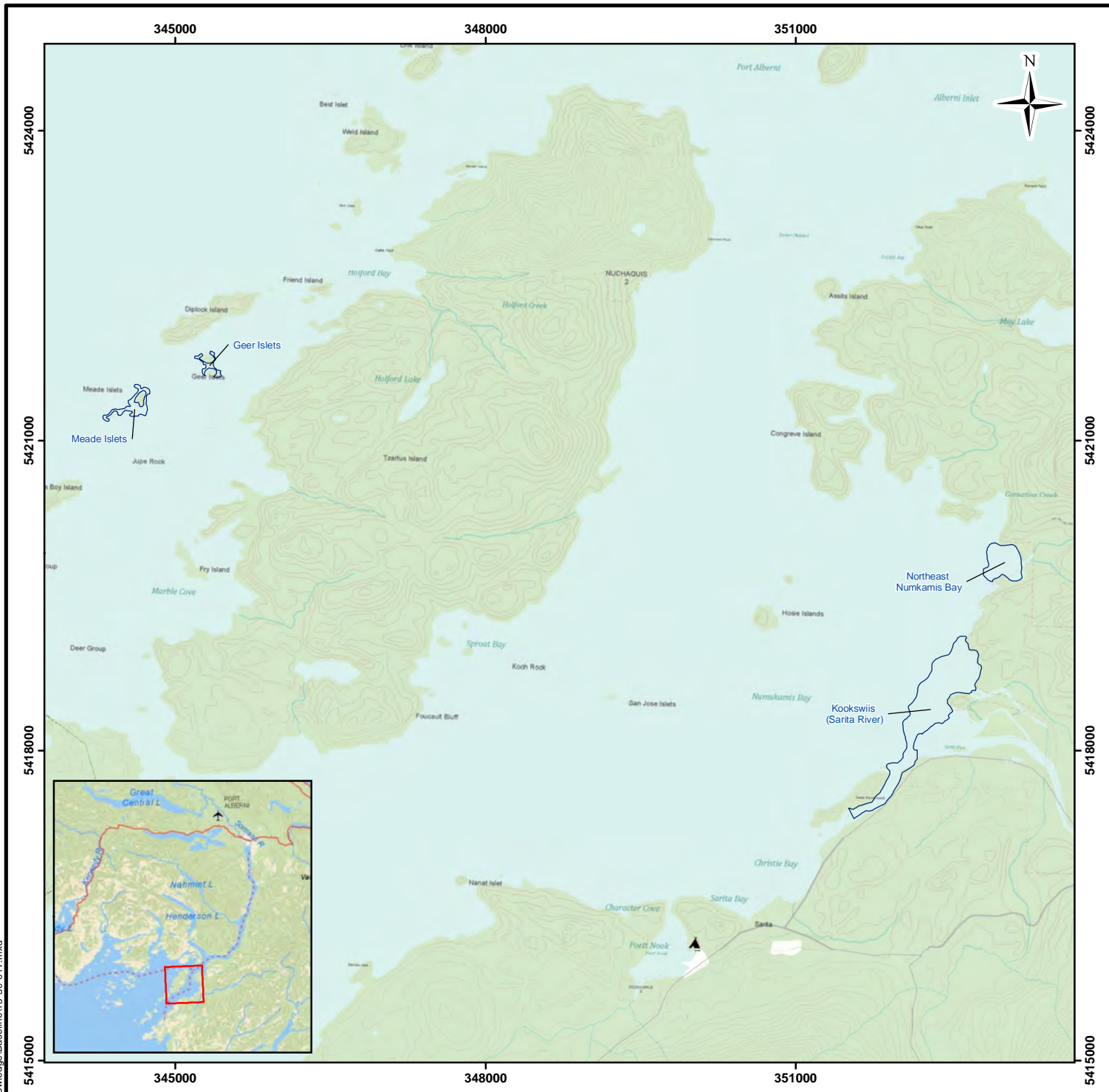
Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing

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Scale: 1:30,000



CLIENT:		 Compliance Coal Corporation
PROJECT: Raven Underground Coal Project		
Maa-nulth First Nation Inter-tidal Bivalve Harvest Area Effingham Inlet		
DATE: April 12, 2011	ANALYST: EO	Figure 12-8
JOB No: VE51897	QA/QC: LR	PDF FILE: 15-50-016_maa_nulth_P-2.pdf
GIS FILE: 15-50-016		
PROJECTION: UTM Zone 10	DATUM: NAD83	



Legend

- Maa-nulth First Nation Lands
- Inter-tidal Bivalve Harvest Area

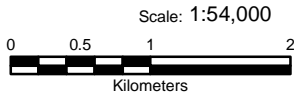
Reference

Base Data: ESRI World Topographic Map
 Appendix P: Maps of Inter-tidal Bivalve Harvest Areas
 Maa-nulth Final Agreement

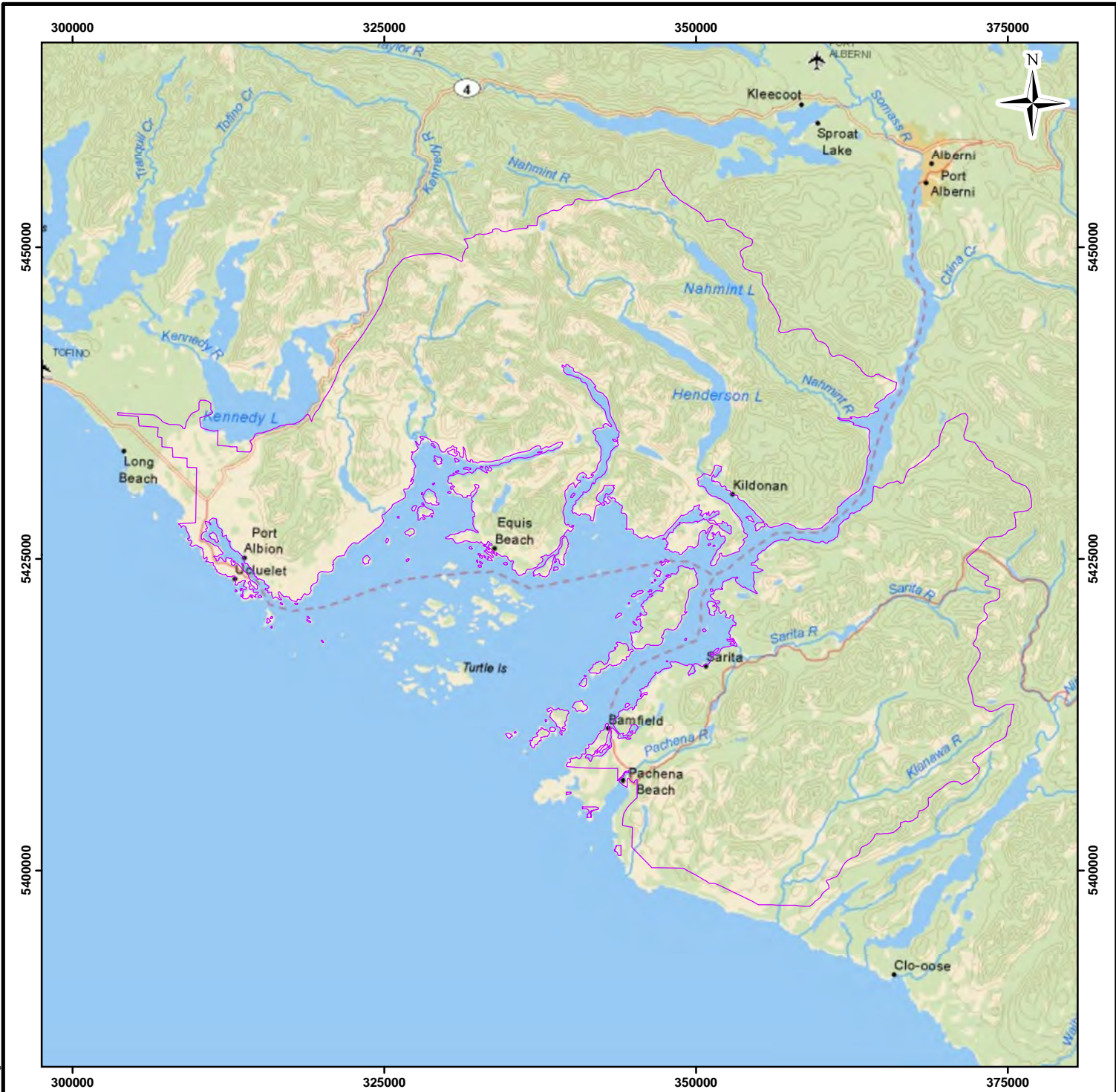
Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing

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CLIENT: Compliance Coal Corporation	
PROJECT: Raven Underground Coal Project	
Maa-nulth First Nation Inter-tidal Bivalve Harvest Area Tzatus Island and Sarita River	
DATE: April 12, 2011	ANALYST: EO
Figure 12-9	
JOB No: VE51897	QA/QC: LR
PDF FILE: 15-50-017_maa_nulth_P-3.pdf	
GIS FILE: 15-50-017	
PROJECTION: UTM Zone 10	DATUM: NAD83



Legend

 Maa-nulth Wildlife Harvest Area

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Reference

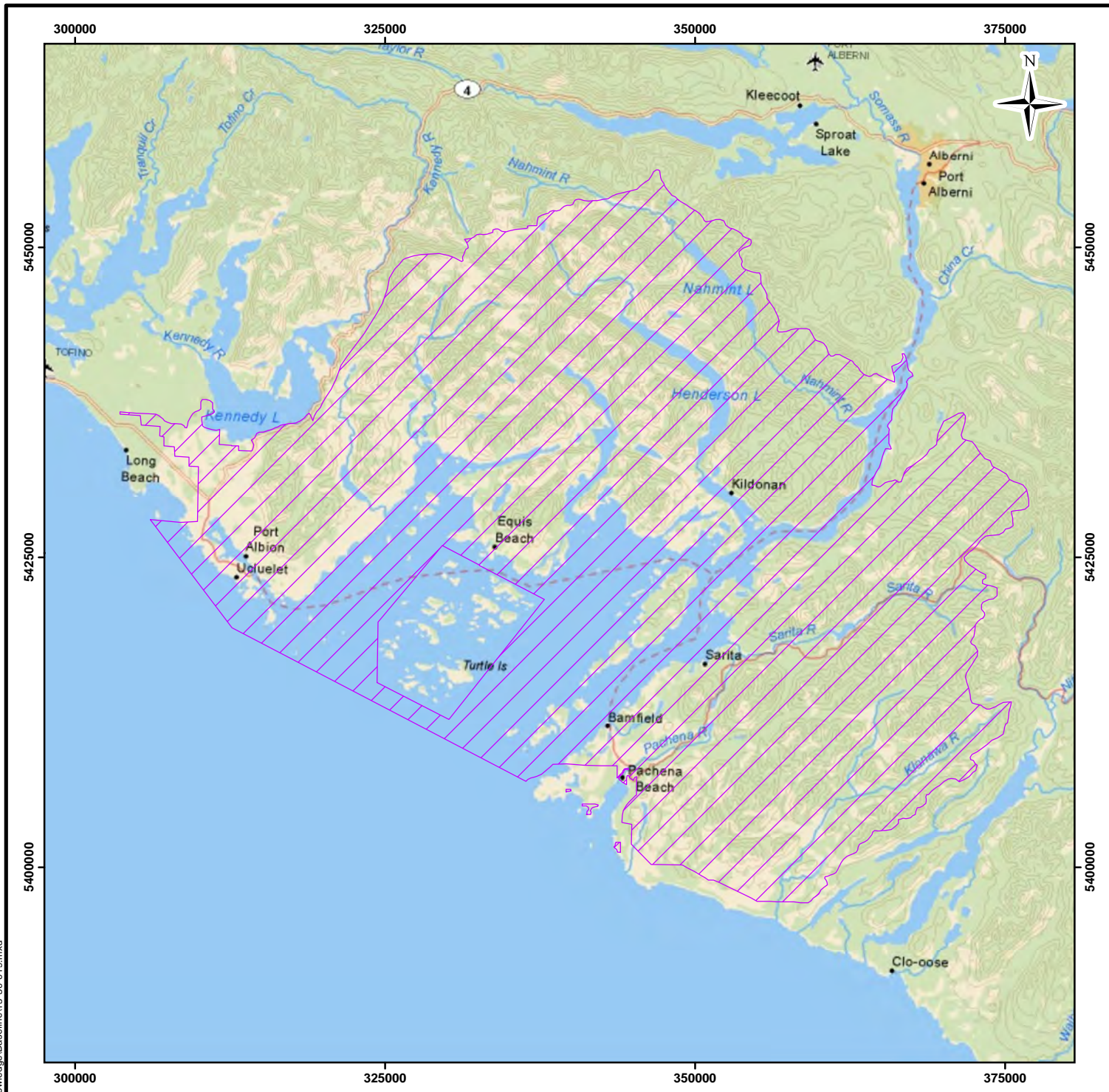
Base Data: DeLorme World Base Map
 Appendix Q: Map of Maa-nulth Wildlife Harvest Area Barkley Sound
 Maa-nulth Final Agreement

Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing



CLIENT:		 Compliance Coal Corporation
PROJECT:		
Raven Underground Coal Project		
Maa-nulth First Nation Wildlife Harvest Area Barkley Sound		
DATE:	ANALYST:	Figure 12-10
April 18, 2011	EO	
JOB No:	QA/QC:	PDF FILE:
VE51897	LR	15-50-018_maa_nulth_Q-2.pdf
GIS FILE:		
15-50-018		
PROJECTION:	DATUM:	
UTM Zone 10	NAD83	



Legend

 Maa-nulth Migratory Birds Harvest Area

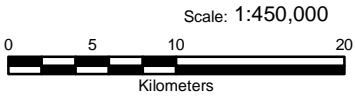
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Reference

Base Data: DeLorme World Base Map
 Appendix R-2: Map of Migratory Bird Harvest Area Barkley Sound
 Maa-nulth Final Agreement

Note

Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing



CLIENT:		 Compliance Coal Corporation
PROJECT:		
Raven Underground Coal Project		
Maa-nulth First Nation Migratory Birds Harvest Area Barkley Sound		
DATE:	ANALYST:	Figure 12-11
April 18, 2011	EO	
JOB No:	QA/QC:	PDF FILE:
VE51897	LR	15-50-019_maa_nulth_R-2.pdf
GIS FILE:		
15-50-019		
PROJECTION:	DATUM:	
UTM Zone 10	NAD83	



13 MAA-NULTH FIRST NATIONS RIGHTS

This section of the Application / EIS will provide the following:

- Identification of any specific Maa-nulth First Nations rights, and activities related to carrying out those rights, about which the proponent receives information from Maa-nulth First Nations or other sources (including the Maa-nulth First Nations Final Agreement);
- Identification of potential impacts of the proposed Raven Project on Maa-nulth's treaty-protected rights and related activities identified by way of the preceding bullet point; and
- Description of mitigation measures to avoid or reduce such impacts.

Consideration will be given to the potential for effects of the proposed Raven Project on Maa-nulth First Nations' rights to:

1. Harvest fish (including shellfish) and aquatic plants, in accordance with Chapter 10 of the Maa-nulth First Nations Final Agreement;
2. Harvest wildlife, in accordance with Chapter 11;
3. Harvest migratory birds, in accordance with Chapter 12;
4. Shellfish aquaculture; and
5. Land and economic interests under the Maa-nulth First Nations Final Agreement that may potentially be impacted by an environmental effect, as defined by the *CEA Act*, resulting from the proposed Raven Project.



14 MAA-NULTH FIRST NATIONS INTERESTS

This section of the Application / EIS will provide the following:

- Identification of past, present and anticipated future uses of the proposed Raven Project area by Maa-nulth First Nations;
- Identification of Maa-nulth First Nations interests with respect to the potential for the proposed Raven Project to cause a change in the environment that will adversely impact health, socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, and structures of historical, archaeological, paleontological or architectural significance; and
- Description of how these interests will be addressed.

This section of the Application / EIS will discuss other interests of the Maa-nulth First Nations, to the extent not addressed above in Section 13 of the Application / EIS. This will include discussion of potential effects that may result from an environmental effect of the proposed Raven Project to the following components: economic interests; social and health interests; and heritage resource interests for areas potentially affected by the proposed Raven Project's Port Alberni and the marine shipping route. This is different to provincial EA which considers economic, social, health, and heritage in addition to environmental effects.

The proposed Port Alberni Port Facility is located on federal lands from PAPA. Where available, the Application / EIS will present TU and TK information for Maa-nulth First Nations. This information will be collected from existing studies made available to the proponent, and from published literature. The objectives and approach taken to collect, verify and record the information will be considered and discussed. Results of the TU impact assessment will also be presented. The TU impact assessment will consider all potential "environmental effects" as they are defined under section 2(1) of the *CEA Act*.

A description of baseline economic conditions of the Maa-nulth First Nations will be provided, including appropriate connections to social considerations. Opportunities for Maa-nulth First Nations' employment, contracting, and business development will be detailed, as well as efforts by the proponent to work with Maa-nulth First Nations communities to enhance proposed Raven Project benefits. Section 6 of the Application / EIS will present a detailed description of economic components.

Social and health baseline conditions of the Maa-nulth First Nations will be described. These will include descriptions of appropriate connections to economic considerations. A detailed description of the social component will be presented in Section 7 of the Application / EIS.



Archaeological resource baseline conditions and related Maa-nulth First Nations heritage considerations will be described. Other aspects of heritage and archaeological resources will be presented in Section 8 of the Application / EIS.

The Application / EIS will also identify key issues, concerns, and proposed Raven Project design interests from the Maa-nulth First Nations at any phase of proposed Raven Project development (i.e., during construction, operations, or where relevant, decommissioning), and will contain a description and summary table of the proponent's agreements with, and commitments to, the Maa-nulth First Nations. A summary of proposed management commitments including specialised and standard management practices will be included in Section 24 of the Application / EIS.

Preliminary EMPs related to Maa-nulth First Nations issues for the proposed Raven Project will be described. The EMPs (Section 10 of the Application / EIS) will be designed to provide an integrated approach to environmental management and deliver assurance to interested parties regarding the components and activities of the proposed Raven Project. The EMPs will describe the environmental practices and procedures to be applied during planning, construction, and operation of the proposed Raven Project.



15 MAA-NULTH FIRST NATIONS CONSULTATION

This section of the Application / EIS will summarise past consultations undertaken during the pre-application stage with Maa-nulth First Nations. It will describe the proponent's objectives for engagement with Maa-nulth First Nations and the methods used to ensure that there were as many opportunities as possible for Maa-nulth First Nations to identify rights, interests and concerns related to the proposed Raven Project. Planned Maa-nulth First Nations consultation activities will also be discussed. The Application / EIS will describe the key Maa-nulth issues of relevance to the EA and provide responses to these issues.

Engagement methods may include the following:

- Project website;
- Formal and informal meetings;
- Printed material;
- Video simulation;
- Meetings;
- Open houses;
- Working Group (orientation meeting, issues scoping workshops, terms of reference review meeting, site visit, process update and status review meeting);
- AIR / EIS Guidelines review;
- Draft Application / EIS review;
- Workshops;
- Site visits; and
- Community Advisory Group.

A summary of discussions, engagements and consultation with the various Maa-nulth First Nations will be presented in the Application / EIS.



16 SUMMARY

16.1 Summary of Potential Effects on Maa-nulth First Nations

This section of the Application / EIS will include an assessment and description of identified potential environmental effects of the proposed Raven Project that could affect Maa-nulth First Nations treaty rights at each phase of the proposed Raven Project development – during construction, operations, or where relevant, decommissioning. The Application / EIS will include a description of identified Maa-nulth First Nations’ rights and interests that would be, or could be, affected by proposed development. It will include a summary of impact assessment findings, indicating the potential impacts identified, and document any relevant non-confidential agreements with Maa-nulth First Nations (e.g., communications and process agreements). The Application / EIS will also include a summary of mitigation and management measures, including design considerations and potential adjustments the proponent proposes to manage potential effects on Maa-nulth First Nations rights.

This section will also articulate any outstanding concerns, and propose approaches to address or resolve concerns through the Application / EIS Review stage. Any potential residual effects and their significance will be described. Table 16.1-1 below is an example of how the potential effects, mitigation and accommodations will be presented.

Table 16.1-1 Summary of Potential Effects on Maa-nulth First Nations Activities and Accommodation Measures

Potential Effects On Maa-nulth First Nations Activities	Accommodation Measures
e.g., Disruption of food fishing activities by the marine transportation of coal down Alberni Inlet and Trevor Channel	e.g., Proponent commitment to an adaptive management strategy, the Aquatic Resources Management Plan and Transportation and Access Management Plan to inform fishers of the transportation schedule and minimise disruption and effects on harvesting. Proponent commitment to maintain trip log and meet with Maa-nulth First Nations prior to, during and after each food fishing season to identify potential effects and appropriate methods to address potential impacts.



PART D – ABORIGINAL INFORMATION REQUIREMENTS

Part D of the Application / EIS will discuss all non-treaty Aboriginal interests pertaining to the proposed Raven Project. This information will be provided by following the guidance found in BC EAO's "Proponent Guide for providing First Nation Consultation Information (Non-Treaty First Nations)" (BC EAO 2010b).

The introduction to this section will provide a summary of how regulatory requirements (as outlined in the section 11 Order, as well as under *BCEAA* and *CEA Act*) were followed. It is the Crown's duty to consult. The Crown has delegated procedural aspects of consultation to the proponent. This Section of the Application / EIS will provide a summary of the proponent's principles for sustainable relationships with Aboriginal groups. The Application / EIS will contain a plan designed to provide the following:

- Ensuring early participation by Aboriginal groups;
- Opportunity for employment;
- Open houses and information sessions for interested Aboriginal groups;
- Training and opportunity to gain experience and knowledge;
- Minimising intrusive sampling and impacts;
- Placing the highest priority on safety and respect for the land; and
- Incorporating available TK in its mine plan, baseline environmental studies and assessments.



17 ABORIGINAL BACKGROUND INFORMATION

This section of the Application / EIS will identify the non-treaty Aboriginal groups that could potentially be affected by the proposed Raven Project. These include the following:

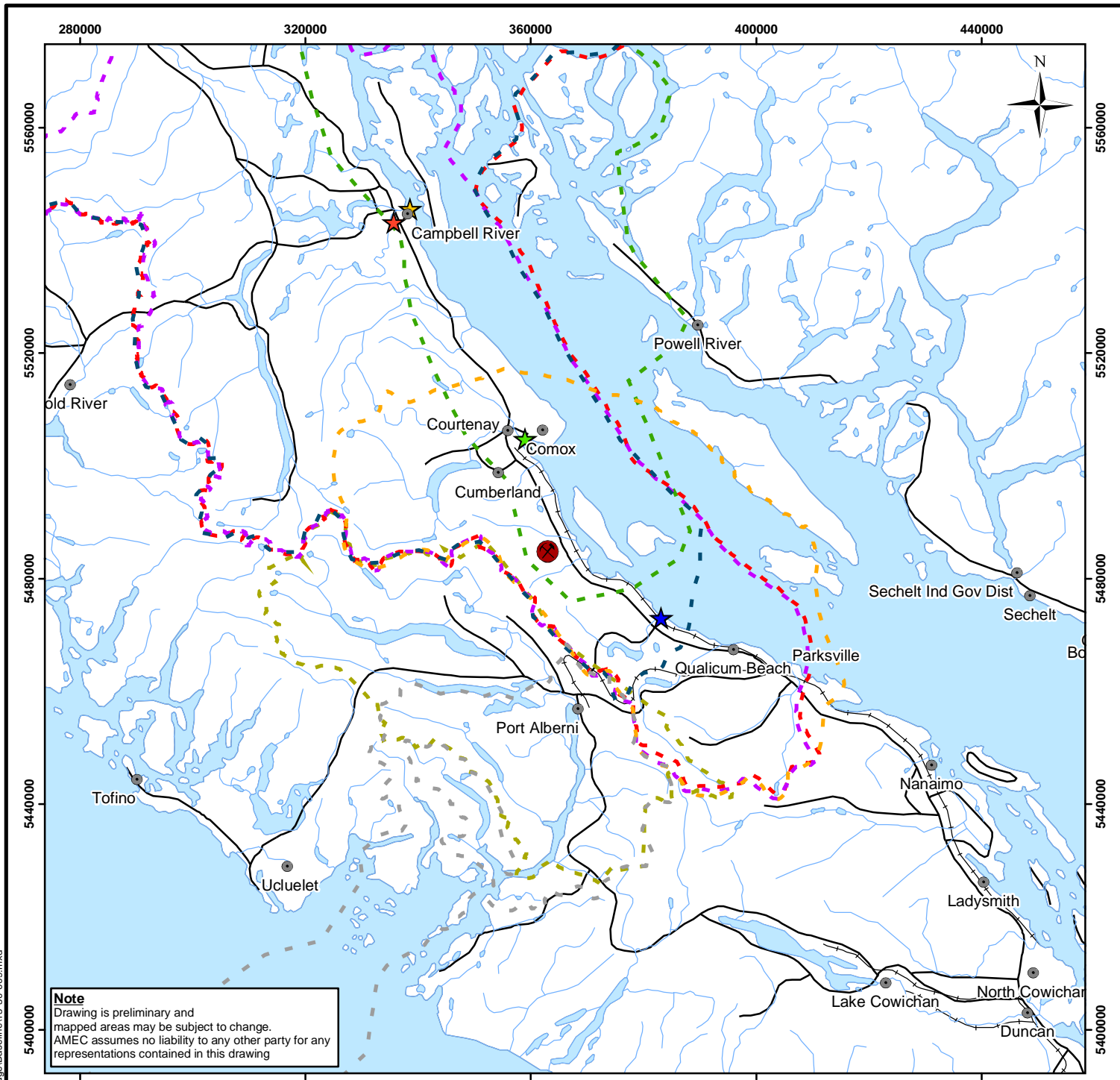
- Qualicum First Nation;
- We Wai Kai Nation;
- Wei Wai Kum First Nation;
- Xwémalhkwa (Homalco) First Nation;
- K'ómoks First Nation;
- Sliammon First Nation;
- Métis Nation BC;
- Members of the Hul'qumi'num Treaty Group (Cowichan Tribes, Chemainus First Nation, Penelakut Tribe, Lyackson First Nation, Lake Cowichan First Nation and the Halalt First Nation);
- Hupacasath First Nation; and
- Tseshaht First Nation.

Maps will be provided that describe the asserted or traditional territory of the potentially impacted Aboriginal groups and treaty nations (Figure 17-1).

Background information for each of the potentially impacted Aboriginal groups, including but not limited to ethnography, language, land use setting and planning, governance, economy and reserves will be provided.

The BC EAO may at any time notify the proponent, in writing, that one or more Aboriginal groups are to be added to the definition of "First Nations" as set out in section 1 of the section 11 Order; and in so doing may identify any modifications to any of the procedures and obligations contained in the section 11 Order, having regard to status of the existing procedures and obligations at the time the additions to the definition are made.

Contact information will be provided for each Aboriginal group.



Note
 Drawing is preliminary and mapped areas may be subject to change. AMEC assumes no liability to any other party for any representations contained in this drawing

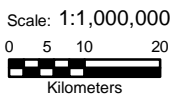
Legend

- Raven Coal Project
- Populated Place
- Road
- Railway Line
- Watercourse
- Waterbody
- Campbell River First Nation
- Cape Mudge First Nation
- K'ómoks First Nation
- Qualicum First Nation
- Tsehaht First Nation Asserted Territory
- Qualicum Asserted Territory
- Statement of Intent**
 - Comox (K'ómoks) First Nation
 - Hamatla Treaty Society
 - Hupacasath First Nation
 - Xwemalhwu Nation (formerly Homalco Indian Band)
 - Laich-Kwil-Tach Treaty Society

Reference

Base Data: 1:1,000,000 scale from the Land and Resource Data Warehouse
 Aboriginal data from various sources including: BC Treaty Commission, Federal National Framework Canada and other digitized sources

DRAFT



 Compliance Coal Corporation		
Raven Underground Coal Project		
<h2 style="margin: 0;">First Nations Asserted Territories</h2>		
CLIENT:		
PROJECT:	Raven Underground Coal Project	
DATE: April 11, 2011	ANALYST: EO	Figure 17-1
JOB No: VE51897	QA/QC: LR	PDF FILE: 15-50-009_FN_terr.pdf
GIS FILE: 15-50-009	PROJECTION: UTM Zone 10	DATUM: NAD83



18 ABORIGINAL RIGHTS

This section of the Application / EIS will describe the following:

- Identification of past, present and anticipated future uses of the proposed Raven Project area by Aboriginal groups;
- Identification of any specific asserted aboriginal rights (including title) provided by First Nations or other sources;
- Identification of potential effects of the proposed Raven Project on identified uses and asserted rights; and,
- A description of mitigation measures to avoid or reduce such impacts.



19 OTHER ABORIGINAL INTERESTS

This section of the Application/EIA will provide the following:

- Identification of aboriginal interests with respect to potential social, economic, environmental, heritage and health effects of the proposed project (to the extent not already identified in Section 18 above; and
- Description of how these interests have been addressed.



20 ABORIGINAL CONSULTATION

The Application / EIS will provide the following:

- Summary of past and planned aboriginal consultation activities; and,
- Description of key aboriginal issues of relevance to the EA and responses to these issues.

The proponent will set out a consultation plan with Aboriginal groups. The proponent will engage Aboriginal groups on the consultation plan, seek feedback, and make necessary adjustments. In principle, the consultation plan will include the following steps:

Step 1: Define the consultation area for the proposed Raven Project and adjacent area.

Step 2: Develop an information gathering plan to identify Aboriginal rights and other Aboriginal interests.

The plan has two components for obtaining information about Aboriginal rights and other Aboriginal interests:

- a. Identify sources of information – (e.g. Aboriginal and non-Aboriginal); and
 - b. Gather information in accordance with the document entitled “Proponent Guide for providing First Nation Consultation Information (Non-Treaty First Nations)” (BC EAO 2010c):
- Conduct an initial information search on the Aboriginal group potentially impacted by the proposed Raven Project:
 - Review Aboriginal group’s website (where applicable);
 - Review other government decisions involving the Aboriginal group;
 - Review pertinent court decisions;
 - Review the BC EAO e-Pic for information that may be relevant;
 - Meet with BC EAO and the Agency to discuss any existing reports or information available through BC EAO and the Agency;
 - Research available ethno-historical, ethnographic or historical information relevant to the proposed Raven Project area, and Aboriginal group’s use;
 - Meet with Aboriginal groups to explain the proposed Raven Project and the identity of the proponent, which Aboriginal groups are or are likely to be involved, what information the proponent has regarding the Aboriginal group, and requirements under the EA process;



- If possible, establish an agreed upon consultation approach with Aboriginal groups for obtaining the necessary information directly from appropriate knowledge-holders within each community. This may include:
 - Gaining information directly from the Aboriginal groups through Chief(s), Council(s), Elders or Community Members;
 - Funding the production of the Aboriginal group's information reports or studies (although not required by BC EAO and the Agency); and / or
 - Obtaining existing information already in the possession of the Aboriginal group.

Types of Information

Through written mechanisms, the proponent will seek to engage with Aboriginal groups as early as possible regarding how information should be gathered and what information would be included in the Application / EIS on Aboriginal group's interests, rights and title. Any publicly available information that the proponent may have on the Aboriginal group they are consulting with should be shared with the Aboriginal group early in the process. Specifically, the following questions may be discussed with Aboriginal groups in relation to the proposed Raven Project area:

1. What practices, traditions or customs have been engaged in by Aboriginal groups in the past in the vicinity of or in relation to the area in which the proposed Raven Project would be situated?
2. What practices, traditions or customs are currently engaged in by Aboriginal groups in the vicinity of or in relation to the area in which the proposed Raven Project would be situated?
3. How might the proposed Raven Project potentially impact the practices, traditions or customs identified above?
4. What measures could be used in the proposed Raven Project's design or operation to avoid, reduce or eliminate those potential impacts?
5. Can all or some of the identified practices, traditions and customs be engaged in elsewhere within the Aboriginal groups' asserted traditional territory?

Step 3: Identify impacts of the proposed Raven Project on identified rights and other interests of the Aboriginal groups.

Step 4: Develop options to generate solutions to mitigate effects.



This section of the Application / EIS will include information regarding changes to the proposed Raven Project or measures used to mitigate impacts to Aboriginal rights or interests.

Step 5: Consult the affected Aboriginal groups on options / solutions developed.

Steps 4 and 5 are related and will be either integrated or timed closely together. Aboriginal group views will be solicited early in the process to benefit working relationships and the EA process.

Step 6: Adjust the proposed Raven Project accordingly.



21 SUMMARY

21.1 Summary of Potential Effects on Aboriginal Groups

This section of the Application / EIS will include an assessment and description of identified potential effects of the proposed Raven Project that could directly and/or indirectly affect Aboriginal groups at each phase of the proposed Raven Project development – during construction, operations, or where relevant, decommissioning. The Application / EIS will include a description of proposed Raven Project setting components identified by Aboriginal groups' that would be, or could be, affected by proposed development.

The Application/ EIS will identify accommodation measures including design considerations, mitigation measures and specific commitments which address potential effects on the matters identified in section 18 above and provided in the form of Table 21.1-1 below.

Table 21.1-1 Summary of Potential Effects on Aboriginal Activities and Accommodation Measures

Potential Effects On Aboriginal Activities	Accommodation Measures
e.g., Disruption of food fishing activities by the marine transportation of coal down Alberni Inlet and Trevor Channel	e.g., Proponent commitment to an adaptive management strategy, the Aquatic Resources Management Plan and Transportation and Access Management Plan to inform fishers of the transportation schedule and minimize disruption and effects on harvesting. Proponent commitment to maintain trip log and meet with Aboriginal groups prior to, during and after each food fishing season to identify potential effects and appropriate methods to address potential impacts.



PART E – FEDERAL INFORMATION REQUIREMENTS OF THE APPLICATION / EIS

Part E will provide the following information requirements corresponding to the federal scope of the EA. The information provided in this draft AIR / EIS Guidelines document concerning federal information requirements was extracted from the Agency's February 2011 "Comprehensive Study Scope of Assessment for the Proposed Raven Underground Coal Mine document for the proposed Raven Project" (Agency 2011), and from the BC EAO AIR Template (BC EAO 2010a). The Agency February 2011 Scope of Assessment defines the requirements for a Comprehensive Study of the proposed Raven Project subject to the *CEA Act*.



22 REQUIREMENTS FOR FEDERAL ENVIRONMENTAL ASSESSMENT

22.1 Environmental Effects

The Application / EIS will provide an examination of the potential environmental effects of the proposed Raven Project corresponding to the federal scope, including both the mine site and the Port Facility, as appropriate. Where potential environmental effects are adequately addressed in Part B of the Application / EIS to meet federal standards and guidelines, reference to corresponding sections in Part B will be included in this section of the Application / EIS.

22.2 Environmental Changes

The Application / EIS will provide a description of any change that the proposed Raven Project may cause in the environment corresponding to the federal scope. The factors to be considered and their federal scope (Table 2.4-1) are defined by the Agency's February 2011 Scope of Assessment document for the proposed Raven Project (Agency 2011).

The environmental context, valued ecosystem components and potential effects have been described previously in Part B, except for the assessment of navigable waters and natural hazards, which will be discussed in this section. Light emissions will be considered as a component of the Visual and Aesthetic Resources assessment (Section 7.2.5).

Where information relevant to the federal requirements is presented to meet provincial requirements, references to Part B of the Application / EIS will be made as appropriate. If additional information is required it will be included in this section.

22.3 Need for and Purpose of the Proposed Project

The Application / EIS will include a description of the need for, and purpose of, the proposed Raven Project. This information will be provided as described in Part A, Section 2, and will be referenced as appropriate.

22.4 Spatial and Temporal Boundaries

Spatial and temporal boundaries will be described in Part B of the Application / EIS and will be referenced as appropriate.

Spatial boundaries will be determined specific to each factor in order to effectively assess the potential environmental effects of the proposed Raven Project. Spatial boundaries are based on the zone of the proposed project's influence beyond which the effects of the project are expected to be non-detectable. Multiple study area boundaries are to be employed to reflect the range of geographic areas and seasonal / annual fluctuations within which specific effects may be experienced.

Spatial boundaries assessing the marine vessel traffic component of the proposed Raven Project will be established in such a way as to ensure proper evaluation of the effects of the



proposed Raven Project on Maa-nulth treaty rights within the Trevor Channel area, as set out in Appendix N (Domestic Fishing Area), Appendix O (Designated Shellfish Aquaculture Sites), Appendix P (Inter-tidal Bi-valve Harvest Areas), Appendix Q (Wildlife Harvest Area), and Appendix R (Migratory Bird Harvest Area), of the Maa-nulth First Nations Final Agreement.

The temporal boundaries will encompass the entire lifespan of the proposed Raven Project, which is the duration of use until it is deemed necessary to be decommissioned. The Application / EIS will discuss the effects of the proposed Raven Project on each factor beginning with the construction phase and throughout the operations phase, including maintenance and / or modifications, and through to the completion of the decommissioning phase. However, it should be noted that the temporal boundary for certain components of the proposed Raven Project, such as mine reject piles and treatment / tailings management ponds / facilities, would extend into the closure and reclamation phase, as appropriate. Potential malfunctions and accidents that could occur during any phase will also be considered, along with the likelihood and circumstances under which these events could occur.

22.5 Effects on Navigable Waters

The Application / EIS will identify potential effects on navigability of waterbodies that may be affected by the proposed Raven Project, the nature of the effect, and mitigation measures to be implemented. For each affected waterbody, the Application / EIS will provide data on location (latitude and longitude), width, depth, and any navigation use or issues, and data on legal description / nearest community, the upland owner, and the nature of the work (i.e. proposed, existing, modification).

22.6 Natural Hazards

This section will describe the approach and methods used to assess seismology, and earthquake potential (including detailed mapping of geologic faults), tsunami potential; avalanche potential, landslide and debris flow potential, flood potential and fire potential components of natural hazards within the proposed Raven Project's potential area of influence. Baseline data and maps for each component would be provided and conditions described for the mine site, port facility, and regions around these two proposed Raven Project components. A description will be provided of natural hazards including:

- Seismology and earthquake potential;
- A seismic hazard analysis would be conducted to assess risk to proposed Raven Project facilities such as stock and reject piles;
- Tsunami potential;
- Avalanche and flood potential;



- Slope stability - landslide and debris flow potential;
- Flood potential; and
- Forest fires.

The implications of these to the proposed Raven Project and to the integrity of the property and facilities as the Port will be analysed and presented. Results from a probabilistic seismic hazard calculation carried out for the proposed Raven Project by the Pacific Geoscience Centre in Sidney, BC will be described in the Application / EIS. Maximum ground accelerations will be estimated using the Cornell-McGuire probabilistic method. The results will be summarised in terms of earthquake return period and the probability of exceedances for each return period, for a design life of 16 years. Appropriate spectral acceleration values used by the National Building Code of Canada (NBCC 2005) will also be provided by the Pacific Geoscience Centre as part of the seismic hazard analysis.

Avalanche and flood potential information will be obtained from results of climate and meteorology studies, including the potential effects of climate change.

A terrain description will be completed at every soil study location using systems and terminology in the “Canadian Soil Classification” (Soil Classification Working Group 1998). Any topographical features that may require special consideration in facility development and reclamation will be identified. Terrain polygons will be mapped with Geographic Information System (GIS) software and terrain map units would be created and applied to the polygons using the “Terrain Classification System for BC” (Howes and Kenk 1997). Terrain stability ratings will be assigned to each polygon through aerial photograph interpretation based on the criteria outlined in the “Mapping and Assessing Terrain Stability” (BC MOF 1999). This classification system is based on the parent material type, drainage conditions, slope gradient, and presence of geomorphic processes. A terrain hazard assessment of the proposed Raven Project area will be completed to identify potential terrain hazards. The results of this desktop study will be confirmed by ground proofing in the field with surface mapping, test pitting, and soil sample collection for laboratory testing. Reconnaissance Terrain Stability Mapping of the mine site and coarse and fine rejects stockpiles will be conducted to a Terrain Survey Intensity Level D standard. A terrain classification and terrain stability map will be prepared using Light Detection and Ranging (LiDAR) survey data and aerial photographs.

Results from a forest fire hazards desktop study for the proposed Raven Project will be summarized in the Application / EIS.

22.7 Species at Risk

The Application / EIS will provide a description of any change that the proposed project may cause to a listed wildlife species, its critical habitat or the residences of individuals of that



species, as those terms are defined in subsection 2(1) of the federal *SARA*. Species at risk will be described previously in Section 5 and references will be provided as appropriate.

22.8 Effects of the Environment on the Project

The Application / EIS will assess the potential environmental factors that may affect the proposed Raven Project and the predicted effects of those environmental factors. The range of climate conditions including extreme weather events, wet, dry, and normal precipitation and extreme temperature spells, freeze-thaw cycles and climate change (e.g., global warming scenarios) will be considered. The effect of global climate change on the proposed Raven Project including the settling pond, reject piles, and the access road will be examined.

The Application / EIS will describe the potential effects of extreme events such as regional seismic activity and natural hazards, such as avalanches, landslides and mudflows, floods, forest fires, sinkholes, climate extremes such as extreme precipitation events, tornados, and tsunamis on the integrity of the proposed development infrastructure, water retention dikes, underground works stability, road operation, reject piles, and facilities at PAPA. The assessment will include events that do not affect the physical integrity of structures (e.g., unanticipated discharges from the settling pond following extreme precipitation events). Effects of the environment on the proposed Port Facility will also be considered. Where feasible, measures to mitigate these effects will be identified.

22.9 Potential Accidents and Malfunctions

Consistent with section 16(1)(a) of the *CEA Act*, the Application / EIS will describe potential accidents and malfunctions associated with the proposed Raven Project, and the conditions under which they could occur. The probability and potential magnitude of an accident or malfunction associated with the proposed Raven Project would be identified. The Application / EIS will include a description of the management of environmental risk for the proposed Project assessed from two perspectives:

- Evaluation of failure modes (risk assessment) of major components of the proposed Raven Project; and
- Consideration of potential accidents and malfunctions primarily related to spills or failure of mitigation measures

This will include the likelihood of a failure of containment or storage facilities, underground works, rejects slope, diversion channels, and clean coal spills. It will also assess the probability and potential magnitude of potential coal seam fires, spontaneous combustion, above ground fires, hazardous substance releases / spills and fuel spills outside of secondary containment areas. It will also consider potential accidents or malfunctions associated with coal transport (traffic hazards, Port Facility, including the effect on the



proposed Raven Project of an emergency shut down at the Port Facility, shipping), electrical supply, and development activities such as clearing and blasting.

The assessment will link and describe the outcome of accidents or malfunctions with a probability analysis of consequential impacts on the environment. Reference to historical incidents and mitigation measures will be included as appropriate. The Application / EIS will identify risk management plans, contingency plans, mitigation measures, and response options for probable accidents or malfunctions. All assumptions, assessment data sources, and outputs will be included in the Application / EIS.

The potential residual effects of an accident or malfunction on the environment will be identified. Significance of identified residual effects will be determined.

22.10 Mitigation Measures

The Application / EIS will provide a description of any measures that are technically and economically feasible that would avoid or mitigate adverse environmental effects. Potential impacts on VCs and proposed mitigation measures will be described in appropriate previous sections of the document, with references to subsections provided in Part E.

22.11 Residual Environmental Effects

The Application / EIS will provide a description of any residual environmental effects expected to remain following implementation of the mitigation measures proposed. Residual effects would be described in appropriate previous sections of the document, with references to subsections provided in Part E.

22.12 Significance Assessment / Analysis

For each residual environmental effect, the Application / EIS will provide a discussion of the significance of the effects following the methodology in Section 4. The significance of any residual effects will be provided in Part B and references to these subsections will be described in the appropriate sections of the document, with references to subsections provided in Part E.

22.13 Cumulative Environmental Effects

This section of the Application / EIS will report on the findings of the CEE assessment conducted for identified residual effects under the *CEA Act*. It will describe the approach, methods, and information used to identify and assess cumulative effects for the proposed Raven Project. The Application / EIS will include a map showing all of the projects included in the CEE assessment. The Application / EIS will identify levels of uncertainty and information limitations with regards to the CEE. Available quantitative data that are verifiable in nature will be included in the analysis. In the absence of verifiable knowledge, best professional judgement or expert opinion will be used, whether it is from traditional or scientific sources.



The CEE assessment will consider the effects of the proposed Raven Project in combination with the effects of other past, present or reasonably foreseeable projects, and / or activities within the proposed Raven Project's zone of influence (or zone of potential effects). The Application / EIS will also discuss the effectiveness of proposed mitigation, as well as the implications for monitoring and follow-up programs described in earlier sections.

Methods used for the CEE will follow guidelines set out by the Agency in Operational Policy Statement "Addressing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*" (Agency 2007a).

Where it is predicted that the proposed Raven Project would have a residual effect on a VC, the residual effect will be brought forward into the CEE. Where it is predicted that there is not likely to be a residual effect on a VC with mitigation, that VC would not require further consideration in the CEE assessment; assessment of cumulative effects may extend to the health, economic and social conditions, TUs, and heritage resources, if a biophysical effect of the proposed Raven Project impacts these values.

22.14 Maa-nulth First Nations Engagement and Consultation

The federal government has identified the First Nations of the Maa-nulth Treaty Society as requiring consultation for the proposed Project. The Application / EIS will provide a summary, of any consultation activities with the Maa-nulth First Nations. Due to the fact that engagement and consultation with Maa-Nulth First Nations will be documented and addressed in Part C of the Application / EIS to meet federal standards and guidelines, reference to corresponding sections in Parts C will be included in this section of the Application / EIS.

22.15 Aboriginal Engagement and Consultation

The Application / EIS will provide a list of Aboriginal groups which the Agency has identified as requiring consultation, and a summary, if applicable, of any groups or consultation activities different from provincial requirements provided in previous sections of the Application / EIS. Due to the fact that engagement and consultation with non-treaty Aboriginal groups will be documented and addressed in Part D of the Application / EIS to meet federal standards and guidelines, reference to corresponding sections in Part D will be included in this section of the Application / EIS.

22.16 Comments from the Public

Comments from the public that have been received in accordance with the *CEA Act* will be considered by the RA and the Minister of the Environment. A record of how comments have been considered and incorporated into the EA will be prepared. Where comments from the public are adequately documented and addressed in Section 3.4 of the Application / EIS to meet federal standards and guidelines, reference to corresponding sections in Section 3.4 will be included in this section of the Application / EIS.



22.17 Need for other Information as Required by a Responsible Authority Pursuant to the CEA Act

The Application / EIS will provide other information as required by a responsible federal authority.

22.18 Alternative Means of Carrying Out the Proposed Project

This section of the Application / EIS will refer to Section 2.5 to avoid duplication. The assessment of alternative means presented in Section 2.5 will be sufficient to meet both federal and provincial requirements.

22.19 Follow-Up Program

The Application / EIS will provide a description of the need for, and requirements of, any planned follow-up programs to be implemented to verify the accuracy of the assessment and to determine the effectiveness of mitigation measures. The Application / EIS will describe the type, frequency, duration and location of any follow-up monitoring, including Baynes Sound and the shipping terminal at Port Alberni, along with the planned approach to data management, analysis and reporting. The Application / EIS will include:

- Discussion / justification for the length of monitoring required;
- Details on frequency, timing, locations and parameters for sampling and analysis in the operations and post-closure periods; and
- Contingency plans in the event that exceedances are detected by monitoring (e.g., interception, pumping, and treatment options if a contaminated groundwater plume is detected, etc.).

The Application / EIS will provide an overview of the proposed monitoring programs to be incorporated into each phase of the proposed Raven Project including the approach, objectives and proposed methodologies. Responsibility for implementing the components of the various monitoring programs will be summarised. The Application / EIS will provide a description of how the results of the follow-up program will be used to inform an adaptive management approach, if applicable. The Application / EIS will also describe the proposed reporting procedures for both routine monitoring and for spills and emergencies.

22.20 Capacity of Renewable Resources

The Application / EIS will include an analysis of the capacity of renewable resources to meet the needs of the present and those of the future where these resources are likely to be significantly affected by the proposed Raven Project. Renewable resources will include but not necessarily be limited to forestry, shellfish aquaculture, fishing, trapping, and tourism.



PART F – CONCLUSIONS

23 SUMMARY OF RESIDUAL EFFECTS

The Application / EIS will summarise findings of the EA including the potential effects on the biophysical and human environment. Avoidance, mitigation, and compensation measures will be described. The potential for residual effects and their significance will be presented in summary along with mitigation measures. This will include the results summary of the CEE assessment and tabular or graphical representation of the significance levels following implementation of impact management measures.

23.1 Summary of Potential Residual Effects of the Proposed Raven Project

The Application / EIS will summarise the environmental, economic, social, heritage or health effects that cannot be completely avoided or mitigated through the redesign or relocation of the proposed Raven Project or through the implementation of control measures associated with ancillary activities. Summary information for residual effects will be presented as shown in Table 23.1-1.



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Table 23.1-1: Summary of Residual Effects

Potential Effect	Proposed Project Phase	Contributing Proposed Project Activity or Physical Works	Proposed Mitigation	Significance
EFFECT CATEGORY (e.g., Archaeology)				
e.g., Impacts to archaeological sites	e.g., Construction; Operation, Decommissioning / Closure	e.g., Ground disturbance associated with the construction of towers and / or power poles along the transmission line ROW, detailed design of transmission ROW and location of structures	e.g., Final design to avoid as many sites and CMTs as possible	e.g., No significant residual adverse effect; negligible, low, moderate or severe significant residual adverse effect
EFFECT CATEGORY (e.g., Wildlife)				
e.g., Disturbance to bald eagle nests	e.g., Construction; Operation, Decommissioning / Closure	e.g., Physical disturbance from access road bridge footprint	e.g., Conduct updated nest survey at detailed design stage, and during construction maintain a 100 to 200 m vegetated buffer around active eagle nests (based on site-specific assessment)	e.g., No significant residual adverse effect; negligible, low, moderate or severe significant residual adverse effect

Notes: 1) Example provided is from BC EAO AIR Template (BC EAO 2010a), and does not reflect issues specific to the proposed Raven Project; 2) Final significance determination rests with BC EAO and federal RA; CMT-culturally modified tree; ROW-right-of-way.



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Table 23.1-2: Summary of Residual Cumulative Effects

Potential Cumulative Effect	Proposed Project Phase	Contributing Proposed Project Activity or Physical Works	Proposed Mitigation	Significance
CUMULATIVE EFFECT CATEGORY (e.g., Archaeology)				
e.g., Impacts to archaeological sites from proposed Project activities in combination with other past, current and reasonably foreseeable human activities.	e.g., Construction; Operation, Decommissioning / Closure	e.g., Ground disturbance associated with the construction of towers and / or power poles along the transmission line ROW, detailed design of transmission ROW and location of structures	e.g., Final design to avoid as many sites and CMTs as possible	e.g., No significant residual adverse effect; negligible, low, moderate or severe significant residual adverse effect
CUMULATIVE EFFECT CATEGORY (e.g., Wildlife)				
e.g., Disturbance to Bald Eagle nests	e.g., Construction; Operation, Decommissioning / Closure	e.g., Physical disturbance from access road bridge footprint	e.g., Conduct updated nest survey at detailed design stage, and during construction maintain a 100 to 200 m vegetated buffer around active eagle nests (based on site-specific assessment)	e.g., No significant residual adverse effect; negligible, low, moderate or severe significant residual adverse effect

Notes: 1) Example provided is from BC EAO AIR Template (BC EAO 2010a), and does not reflect issues specific to the proposed Raven Project; 2) Final significance determination rests with BC EAO and federal RA; CMTs-culturally modified trees; CMT-culturally modified tree; ROW-right-of-way.



24 SUMMARY OF COMMITMENTS

The Application / EIS will include a summary of the proponent's commitments to minimise the potential for the proposed Raven Project to generate environmental, economic, social, heritage or health effects.

24.1 Summary of Commitments to Minimise Potential Effects

The summary will include a table that identifies the specific commitments that the proponent would implement. The format of the summary information for commitments is shown in Table 24.1-1.



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Table 24.1-1: Summary of the Proponent's Commitments

Commitment Number	Specific Proposed Project Effect	Commitment	Proposed Project Phase Timing	Source of Commitment	Responsible Agency	Status
COMMITMENT CATEGORY (e.g., Air Quality, Environmental Management Plans, Fish and Fish Habitat)						
Numbers would continue for each section. Commitments drafted in the Application / EIS Review stage may be numbered such as AR1 for ease in numbering and to identify the commitments that are a result of consultation in Application / EIS Review.	e.g., Greenhouse gases from vehicle emissions; Environmental Management Plan - Construction, Follow up and Monitoring Plan - Fish and Fish Habitat Compensation	Each commitment would be worded taking into account the guidance language that has been provided. Commitments would be grouped into the categories followed in the Application, for example, air quality commitments are grouped together. Commitment wording would be: a. Clear in terms of what is required in terms of the standard or action and its timeframe; b. Measurable or readily ascertainable as to whether the commitment has been met; c. Clear about who would decide, in the case of uncertainty, whether the required standard or action has been met; and, d. Flexible, where appropriate. For example, "Standard X must be met unless agency Y later specifies in writing that an alternative standard or action would be adequate." Proponent would use 'must'	e.g., Construction; Operation; Decommissioning / Closure, Post-Closure.	Entries would follow guidance from the AIR Template, Table 5.	Entries would follow guidance from the AIR Template, Table 5.	Entries would follow guidance from the AIR Template, Table 5.



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Commitment Number	Specific Proposed Project Effect	Commitment	Proposed Project Phase Timing	Source of Commitment	Responsible Agency	Status
COMMITMENT CATEGORY (e.g., Air Quality, Environmental Management Plans, Fish and Fish Habitat)						
		rather than 'would' in commitments. The Proponent would suggest timing for commitments.				

Notes: Example provided is from BC EAO AIR Template (BC EAO 2010a), and does not reflect issues specific to the proposed Raven Project.



25 CONCLUSION

The Application / EIS will include the following:

- A summary of effects of the proposed Raven Project, proposed mitigation measures, and commitments;
- A summary of the proponent's understanding of the BC EA process in promoting sustainable development while minimising effects to environmental, economic, social, heritage and health values;
- A description of how the proposed Raven Project aligns with the goal of the BC EA process and the *CEA Act* process; and
- A statement of request for an EA Certificate for the proposed Raven Project, and the need to successfully complete a federal EA and subsequent permitting / authorisation processes prior to proceeding with proposed Raven Project pre-construction / construction, operation, closure / decommissioning and post-closure activities.



26 REFERENCES

Each volume of the Application / EIS (or each section within a volume of the Application / EIS where necessary due to the size of the volume) will list the references cited, and documentation with respect to consultations with public, Aboriginal groups and government agencies.

Records of key meetings (e.g., Working Group meetings), including discussion topics completed before filing the Application / EIS will be included.

The following is a list of references cited in this draft AIR / EIS Guidelines.

Agency (Canadian Environmental Assessment Agency). 1994. A Reference Guide for the *Canadian Environmental Assessment Act*. Addressing Cumulative Environmental Effects. Prepared by the Federal Environmental Assessment Review Office. November 1994.

Agency. 1999a. Cumulative Effects Assessment Practitioners Guide. Prepared by The Cumulative Effects Assessment Working Group and AXYS Environmental Consultancy, February 1999.

Agency. 1999b. Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects. (Reference Guide for Responsible Authorities). November 1999.

Agency. 2003a. *Canadian Environmental Assessment Act* Federal Coordination: An Overview. www.ceaa-acee.gc.ca. October 2003.

Agency. 2003b. Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners. Prepared by The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment. November 2003.

Agency. 2007a. Operational Policy Statement. Addressing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*. Original: March 1999. Update: November 2007.

Agency. 2007b. Operational Policy Statement Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act*. Original: October 1998. Update: 2007.

Agency. 2008. Comprehensive Study Process Guide. September 2008.

Agency. 2011. February 2011 Comprehensive Study Scope of Assessment for the Proposed Raven Underground Coal Mine. Proposed by: Compliance Coal Corporation. Canadian Environmental Assessment Registry Reference Number: 10-03-55529.

AGL (Associated Geosciences Limited). 2007. Preliminary Assessment of an Underground Mining Operation on Compliance Energy Corporation's Raven Coal Deposit, Tsable River, Vancouver Island BC. National Instrument 43-101 Compliant Resource Report.



- Prepared for Compliance Energy Corporation. Prepared by Peter Cain (Ph.D., P.Eng.) and Alan Craven (P.Eng.), of Associated Geosciences Limited, Calgary. AGL Project No. 2007CC10. 5 September 2007.
- AMEC. 2009. Raven Underground Coal Project: Draft Work Plan for Environmental Studies. Prepared for Compliance Coal Corporation by AMEC Earth and Environmental, Burnaby, BC. June 2009.
- ANSI (American National Standard Institute). 1994. Procedures for Outdoor Measurement of Sound Pressure Level. S12.18-1994. New York: American National Standards Institute, 1994.
- Archaeology Branch (BC Ministry of Small Business, Tourism and Culture). 1998. British Columbia Archaeological Impact Assessment Guidelines (Revised Edition).
- Archaeology Branch (BC Ministry of Tourism, Culture and the Arts). 2009. Archaeological Overview Assessments as General Land Use Planning Tools - Provincial Standards and Guidelines.
- Associated Geosciences Ltd. 2007. Preliminary Assessment of an Underground Mining Operation on Compliance Energy Corporation's Raven Coal Deposit, Tsable River, Vancouver Island BC. Report prepared for Compliance Energy Corporation.
- BC CDC (British Columbia Conservation Data Centre). 2010. BC Species and Ecosystems Explorer. BC MOE, Victoria, BC. Available: <http://srmapps.gov.bc.ca/apps/eswp/> (accessed July 11, 2006). BC EAO (British Columbia Environmental Assessment Office). 2006. Mine Proponents Guide.
- BC EAO (British Columbia Environmental Assessment Office). 2002. *British Columbia Environmental Assessment Act*. SBC 2002. Assented to May 30, 2002. Chapter 43.
- BC EAO. 2007. A Guide to Preparing Terms of Reference for an Application for an Environmental Assessment Certificate. September 2007.
- BC EAO. 2010a. Application Information Requirements Template with Respect to an Application for an Environmental Assessment Certificate pursuant to the *Environmental Assessment Act*, S.B.C. 2002, c.43. October 2010.
- BC EAO. 2010b. Proponent Guide for providing First Nation Consultation Information (Non-Treaty First Nations). http://www.eao.gov.bc.ca/pdf/Guide_Proponents_Non_Treaty_FN.pdf (accessed 2010).
- BC EAO. 2010c. The Environmental Assessment Process. http://www.eao.gov.bc.ca/ea_process.html (accessed July 21, 2010).
- BC ILMB (British Columbia Integrated Land Management Branch). 2000. Vancouver Island Summary Land Use Plan. February 2000.
- BC MEM (British Columbia Ministry of Energy and Mines). 1998. Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. August 1998.



- BC MEM and BC MELP (British Columbia Ministry of Environment, Lands and Parks). 1998. Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. July 1998.
- BC MEMPR (British Columbia Ministry of Energy, Mines and Petroleum Resources). 2008. Health, Safety and Reclamation Code for Mines in British Columbia. 2008.
- BC MOE (British Columbia Ministry of Environment). 1995. Nile Creek to Trent River, Water Allocation Plan. (Written by Chris Braybrook, George Bryden and Arnis Dambergs).
- BC MOE. 2006. A Compendium of Working Water Quality Guidelines for British Columbia. Science and Information Branch. Updated: August 2006.
- BC MOE. 2008. Guidelines for Air Quality Dispersion Modelling in British Columbia, British Columbia Ministry of Environment, Environmental Protection Division, Environmental Quality Branch, Air Protection Section, Victoria, BC.
- BC MOF (British Columbia Ministry of Forests). 2001. Visual Impact Assessment Guidebook. Forest Practices Code of BC, January 2001 (second edition).
- BC MOF. 1999. Forest Practices Code of British Columbia. Mapping and Assessing Terrain Stability Guidebook. Now part of the *Forests and Range Practices Act*. 1999.
- BC Oil and Gas Commission. 2009. British Columbia Noise Control Best Practices Guideline. March 2009
- BC Oil and Gas Commission. 2009. BC Noise Control Best Practices Guideline.
- BC Reg. 1988. *Hazardous Waste Regulation*. 63/88. O.C. 268/89. Includes amendments up to BC Reg. 63/2009. Deposited February 18, 1988. Effective April 1, 1988.
- BC Reg. 1994. *Migratory Birds Convention Act*. Chapter 22.
- BC Reg. 1996. *BC Weed Control Act*. 1985. RSBC 1996. Chapter 487.
- BC Reg. 1996. *Health Act*. RSBC 1996. Chapter 179.
- BC Reg. 1996. *Mines Act*. RSBC 1996. Chapter 293.
- BC Reg. 1996. *Land Act*. RSBC 1996. Chapter 245.
- BC Reg. 1996. *Water Act*. RSBC 1996. Chapter 483.
- BC Reg. 1996. *Forest Act*. RSBC 1996. Chapter 157.
- BC Reg. 1997. *Fish Protection Act*. SBC 1997. Assented to July 28, 1997. Chapter 21.
- BC Reg. 2002. *Environmental Assessment Act. Reviewable Projects Regulation* 370/2002. O.C. 1156/2002. Deposited December 19, 2002. Effective December 30, 2002.
- BC Reg. 2003. *Environmental Management Act*. SBC 2003. Assented to October 23, 2003.
- BC Reg. 2002. *Environmental Assessment Act. Concurrent Approval Regulation* 371/2002. O.C. 1158/2002. Deposited December 19, 2002. Effective December 30, 2002.



- BC Reg. 2006. *Heritage Conservation Act*. RSBC 1996. Chapter 187.
- 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. Quarterly Regional Statistics – http://www.bcstats.gov.bc.ca/pubs/pr_qrs.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>.
- Canadian Reg. 2011. *Marine Mammal Regulations*. Part of the *Fisheries Act*. SOR/93-56. Registration: 1993. Last amended February 10, 2011.
- Canadian Reg. 2008. *Explosives Act*. R.S.C. 1985. c. E-17. Last amended June 1, 2008.
- Canadian Reg. 2002. *Canadian Environmental Assessment Act*, S.C. 1992, c. 37. Assented to June 23, 1992. Current version: in force since Jul 12, 2010.
- Canadian Reg. 1994. SOR/94-638. *Comprehensive Study List Regulations*, Registered October 7, 1994 pursuant to paragraph 59(d) of the *Canadian Environmental Assessment Act*
- Canadian Reg. 2002. *Species at Risk Act*, S.C. 2002, c. 29. Assented to December 12, 2002. Current version: in force since Feb 23, 2010.
- Canadian Reg. 2009. *Public Health Act*. CCSM c. P210. Assented to June 13, 2006.
- Canadian Reg. 2009. *Fisheries Act*. R.S.C. 1985, c. F-14. Current version: in force since April 3 2009.
- Canadian Reg. 2009. *Navigable Waters Protection Act*. R.S.C. 1985. C. N-22. Last amended March 12, 2009.
- Canadian Reg. 2010. *Wastewater Systems Effluent Regulations*. Vol. 144, No. 12. Current version: March 20, 2010.
- Canadian Reg. 2010. *Wildlife Act*. R.S.C 1985, c. W-9. Last amended December 10, 2010.
- CCC (Compliance Coal Corporation). 2009. Raven Coal Project, Map of Proposed Drilling Program 2008, Schedule A2. March 2009.
- CVRD (Comox Valley Regional District). 2010. Regional Growth Strategy. Bylaw No. 120: A bylaw to adopt the Comox Valley regional growth strategy, 2010.
- CVRD. 1998. Electoral Area 'A' Electoral Area Plan. Schedule "F" to bylaw no. 2042, being the Rural Comox Valley Official Community Plan, bylaw, 1998.
- CVRD. 2009. Home Web Page. <http://www.rdcv.bc.ca/>
- DFO (Fisheries and Oceans Canada). 1991. Policy for Management of Fish Habitat. Communications Directorate. Department of Fisheries and Oceans, Fish Habitat Management Branch, 1986.



- DFO. 2005. *Oceans Act*. S.C. 1996. c.31. Last amended October 5, 2005.
- EC (Environment Canada). 2003. *Species at Risk Act*. Statutes of Canada 2002. Assented to from June 14, 2002 to December 12, 2002.
- EC. 2010. CABIN (Canadian Aquatic Biomonitoring Network). Field Manual: Wadeable Streams. March 2010.
- ERBC (Energy Resources Conservation Board). 2007. Directive 038: Noise Control. February 16, 2007.
- FISS (Fisheries Information Summary System). 2010.
<http://www.env.gov.bc.ca/fish/fiss/index.html> (accessed October 2010).
- German Institute for Standardization (Deutsches Institut für Normung). 2001. DIN 4150 Part 1; Prediction of vibration parameters. Beuth Verlag GmbH, Berlin, June 2001.
- Government of BC. 2009. Regions of BC: Vancouver Island and Coast / Victoria: Climate.
http://www.welcomebc.ca/en/regions/vancouver_island/climate.html.
- Government of Canada. 2010. Maa-nulth First Nations Final Agreement. Treaty and land claims agreement within the meaning of section 25 and 35 of the *Constitution Act, 1982*. Original: December 9, 2006.
- HC (Health Canada). 1996. Health Effects of Air Pollution. 1996.
- HC. 2004. Canadian Handbook on Health Impact Assessment. Ministry of Health. Health Canada, Ottawa, Ontario. ILMB (Integrated Land Management Branch). 2000. Available online at <http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/handbook-guide>.
- HC. 2010. Useful Information for Environmental Assessments. Available online at http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/environ_assess-eval/index-eng.php.
- Howes D., and Kenk E. 1997. Terrain Classification System for British Columbia. Version 2. Fisheries Branch, BC Ministry of Environment and Surveys and Resource Mapping Branch, Ministry of Crown Lands Province of British Columbia. 1997.
- ISO/DIS (International Organization for Standardization / Draft International Standard). 1996-1:2003. Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures. Second edition 2003-08-01. Switzerland.
- ISO/DIS. 1996-2:2005. Acoustics – Description, assessment and measurement of environmental noise – Part 2: Determination of environmental noise levels. Draft 2005. Switzerland.
- Johnston, N.T., and P.A. Slaney. 1996. Fish Habitat Assessment Procedure. 1996. Watershed Restoration Technical Circular No. 8. Watershed Restoration Program, BC Ministry of Environment, Lands, and Parks and the BC Ministry of Forests.



- Lewis, A., T. Hatfield, B. Chilibeck, and C. Roberts. 2004. Assessment methods for aquatic habitat and instream flow characteristics in support of applications to dam, divert, or extract water from streams in British Columbia. A report prepared for BC Ministry of Water, Land, and Air Protection and the BC Ministry of Sustainable Resource Management.
- Luttmerding, H., D.A. Demarchi, E.C. Lea, D.V. Meidinger, T. Vold. 1990. Describing Ecosystems in the Field. BC MOE Manual 11, 2nd Edition. BC MOE and BC MOF, Victoria, BC.
- MacKenzie, W.H. and J.R. Moran. 2004. Wetlands of British Columbia: A guide to Identification. Victoria, BC Land Management Handbook 52.
- NBCC (National Building Code of Canada). 2005. National Building Code of Canada.
- ORCRC (O.R. Cullingham Resource Consultant Limited). 2007. Technical Report: Raven Coal Property, Comox Basin, Vancouver Island. National Instrument 43-101 Compliant Resource Report. Prepared for Compliance Energy Corporation. Prepared by O.R.Cullingham Resource Consultant Limited, Calgary. 7 June 2007.
- PAH (Pincock, Allen, and Holt). 2010. Technical Report on the Raven Underground Coal Project, Comox Valley, British Columbia. Prepared for Compliance Energy Corporation and its wholly-owned Subsidiary, Compliance Coal Corporation, dba Comox Joint Venture October 14, 2010. DE-00033.
- RISC (Resources Inventory Standards Committee). 1995. Soil Inventory Methods for British Columbia 1995. Victoria, BC.
- RISC. 1996. Guidelines and Standards to Terrain Mapping in British Columbia 1996. Victoria, BC.
- RISC. 1998a. Standard for Terrestrial Ecosystem Mapping in British Columbia. Province of British Columbia, Victoria.
- RISC. 1998b. Inventory Methods for Pond-breeding Amphibians and Painted Turtle Standards for Components of British Columbia's Biodiversity No. 37 Prepared by Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee March 13 1998 Version: 2.0
- RISC. 1998c. Ground-based Inventory Methods for Selected Ungulates: Moose, Elk and Deer Standards for Components of British Columbia's Biodiversity No. 33.
- RISC. 1998d. Inventory Methods for Terrestrial Arthropods Standards for Components of British Columbia's Biodiversity No. 40 Prepared by Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee October 19, 1998 Version 2.0.
- RISC. 1999a. British Columbia Wildlife Habitat Rating Standards: Version 2.0. Ministry of Environment, Lands and Parks.



- RISC. 1999b. Inventory Methods for Forest and Grassland Songbirds Standards for Components of British Columbia's Biodiversity No. 15 Prepared for: Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee March 16, 1999 Version 2.0.
- RISC. 1999c. Inventory Methods for Medium-sized Territorial Carnivores: Coyote, Red Fox, Lynx, Bobcat, Wolverine, Fisher and Badger. Standards for Components of British Columbia's Biodiversity No. 25 Version 2.
- RISC. 2001a. Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Standards and Procedures. Version 2.0. Victoria, BC: Prepared by BC Fisheries the Resources Inventory Committee (RIC).
- RISC. 2001b. Inventory Methods for Raptors: Standards for Components of British Columbia's Biodiversity No. 11. Version 2.0. Victoria, BC: Prepared by Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee (RIC).
- RISC. 2002a. Standard and Procedures for Integration of Terrestrial Ecosystem Mapping (TEM) and Vegetation Resources Inventory (VRI) in British Columbia Version 1.0. Victoria, BC.
- RISC. 2002b. Aerial-based Inventory Methods for Selected Ungulates: Bison, Mountain Goat, Mountain Sheep, Moose, Elk, Deer & Caribou. Standards for Components of British Columbia's Biodiversity No. 32. Victoria, BC: Prepared by Ministry of Environment, Lands and Parks, Resources Inventory Branch for Terrestrial Ecosystem Task Force, Resources Inventory Committee (2002).
- Seacor, n.d. Remediation of Coal Waste Pile in Union Bay, B.C.
- SCWG (Soil Classification Working Group). 1998. The Canadian System of Soil Classification. Third Edition. Agriculture and Agri-Food Canada Publication. 1998.
- VIHA (Vancouver Island Health Authority). 2011. *Drinking Water Protection Act*. S.B.C. 2001. Assented to April 11 2001.
- Ward, Peggy, G. Radcliffe, J.Kirkby., J. Illingworth and C. Cadrin. 1998. Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993 – 1997. Volume 1: Methodology, Ecological Descriptions and Results.
- WHO (World Health Organization). 2010. Health Impact Assessment. Available online at <http://www.who.int/hia/en/>.



**Compliance Coal
CORPORATION**
DBA Comox Joint Venture

**RAVEN UNDERGROUND COAL PROJECT
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27 APPENDICES

As appropriate, detailed information relevant to the Application / EIS would be provided in Appendices to the Application / EIS. For example, where information is prepared by professionals and provided under their professional seal, this would be identified in the Application / EIS and copies of the studies would be appended to the Application / EIS.



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**APPENDIX A
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**APPENDIX B
SIGNIFICANCE RATING CRITERIA**



Criteria	Description
Significance	
Not significant (negligible)	<p>Biophysical Environment Impacts are point-like or local in scope, short-term or chronic, low frequency (once or intermittent), and their effects are indistinguishable from natural physical, chemical and biological characteristics and processes.</p> <p>Human Environment No effects.</p>
Not significant (minor)	<p>Biophysical Environment Impacts are local to sub-regional, short-term or chronic, low frequency, and their effects could be distinguished at the level of individual organisms or subpopulations.</p> <p>Human Environment Low-level effects are distinguishable. These are usually limited to the short-term and are geographically circumscribed but are not considered disruptive to normal economic or social conditions even if wide-spread and sustained¹.</p>
Not significant (moderate)	<p>Biophysical Environment Impacts are local to sub-regional in scope, medium-term to chronic, occur at all frequencies, and their effects and consequences are distinguishable at the level of populations, communities, and ecosystems.</p> <p>Human Environment Effects are clearly distinguishable and result in elevated awareness or concern among stakeholders or materially affect the well-being of defined populations/communities. Usually are short-to-medium term in duration but are amenable to management if they occur over the longer term.</p>
Significant	<p>Biophysical Environment Impacts are local to regional in scope, long-term to chronic, occur at all frequencies, and are consequential in structural and functional changes in populations, communities and ecosystems.</p> <p>Human Environment Effects are highly distinguishable and result in strong concern among stakeholders or result in substantive changes in the well-being of defined populations/communities. Usually are long-term in duration or if short-term are not easily managed.</p>
Magnitude Scale	
Nil or none	<p>Physical and Biological Environment Effects are unmeasurable.</p> <p>Human Environment No effects</p>
Low	<p>Physical Environment 1 to 10% change, depending on the parameter</p> <p>Biological Environment Up to 10% of the local populations are affected but could continue to function</p> <p>Human Environment</p>

¹ Typically, minor economic and social effects are not considered to require mitigation or management action to either enhance benefits or control adverse impacts. Both moderate and significant effects require cooperative and coordinated impact management on the part of the Proponent, governments and affected populations. Moderate effects could typically be managed by such action to result in a range of outcomes that is acceptable to most key stakeholders. Significant effects require decisive management action to either reduce adverse or optimize beneficial impact outcomes.



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Criteria	Description
Medium	<p>Low level effects; individuals are affected</p> <p>Physical Environment 5 to 20% change, depending on the parameter</p> <p>Biological Environment > 50% of local populations are affected and functioning may be impaired; up to 10% of subregional populations may be affected but continue to function</p> <p>Human Environment Effects are clearly distinguishable and affect the majority of the local population</p>
High	<p>Physical Environment 20 to >50% change, depending on the parameter</p> <p>Biological Environment 100% of local populations are affected and functioning may not be possible; over 10% of subregional populations are affected and some impairment of functioning may be evident.</p> <p>Human Environment Has a measurable and sustained effect on economic or social components.</p>
Geographic Scale	
Point	<p>Physical Environment Impact area does not exceed 100 m² or distance from the source is less than 5 m.</p> <p>Biological Environment On the organism level.</p> <p>Human Environment Not applicable</p>
Local	<p>Physical Environment Impact area does not exceed 3 km² or distance from the source is less than 1 km.</p> <p>Biological Environment On the level of a group of organisms up to a part of the local population.</p> <p>Human Environment Within one or more communities.</p>
Sub-regional	<p>Physical Environment Impact area does not exceed 30,000 km² or distance from the source is less than 100 km.</p> <p>Biological Environment At the local population level.</p> <p>Human Environment Within portions of one or two regional districts and along main transportation corridors.</p>
Regional	<p>Physical Environment Impact area exceeds 30,000 km² or distance from the source is more than 100 km.</p> <p>Biological Environment At the level of the whole population or species.</p> <p>Human Environment North-Central British Columbia or greater</p>
Duration	
Short-term	<p>Physical Environment From less than one day to 10 days.</p>



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Criteria	Description
Medium-term	Biological Environment Life activity from one day to one month.
	Human Environment Less than two years.
	Physical Environment From 10 days to one season (three months).
Long-term	Biological Environment Activity cycle from one month to one season.
	Human Environment Between two and ten years.
	Physical Environment From one season to one year.
Chronic (permanent)	Biological Environment Activity cycle from one season to one year.
	Human Environment Extends throughout the operations phase or beyond.
	Physical Environment Duration of project.
	Biological Environment Duration of project.
Direction	
Negative	Effect is worsening or is not desirable.
Positive	Effect is improving or is desirable.
Frequency	
Once	Impact occurs on one occasion.
Intermittent	Impact occurs several times.
Continuous	Impact occurs continuously.
Reversibility	
Yes	Physical Environment Effect is reversible over one to a few cycles of the physical event after the impact ceases
	Biological Environment Effect is reversible over one to a few life cycles after the impact ceases
	Human Environment Effect is reversible within part of a whole generation after the impact ceases (VC and impact dependent)
No	Effect is not reversible over the time scales listed
Ecological Context	Biological Environment and specific to each effect (categories given are general)
None or nil	The impact has no effect, i.e. the linkage is invalid
Low	Affects some population and community functioning
Medium	Affects 10 to 50% of population and community components functioning to some extent
High	Affects most population and community functioning or a critical population or community component



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Criteria	Description
Level of Confidence	Subjective based on professional opinion
Low	Low to moderate correlation of data and single or few lines of evidence supporting the conclusion
Medium	Moderate correlation of data and a moderate number of lines of evidence, at least some of which are quantitative; alternately a relatively high amount of corroboration from qualitative data sets
High	High correlation of data and multiple lines of evidence supporting the conclusion, some or all of which are quantitative
Certainty	
Low	Based on third party professional judgement (literature, comparison to other sites)
Medium	Based on personal professional judgement from firsthand experience at the site and similar sites within the same or very similar contexts
High	Based on quantitative evaluation of reliable site-specific data
Probability	
Low	The effect on the VC is well understood and there is a low probability of effect on the VC as predicted.
High	The effect on the VC is well understood and there is a high probability of effect on the VC as predicted.
Unknown	The effect on the VC is not well understood and based on potential risk to the VC, effects would be monitored and adaptive management measures taken as appropriate.
Cumulative and Synergistic Consequences	
Cumulative	When the effects of two or more impacts combine and exceed the assimilation capacity of the environment.
Synergistic	When the magnitude of effects of two or more simultaneous impacts is larger than a sum of magnitudes of these effects if they occur separately.
None or nil	The impact has no residual effect.