

Mackenzie Valley
Review Board



Terms of Reference

Howard's Pass Access Road Upgrade Project

EA1516-01

Selwyn Chihong Mining Limited

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Mackenzie Valley Review Board

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ACRONYMS AND GLOSSARY OF TERMS

Acronyms

CCRP	Conceptual Closure and Reclamation Plan
DAR	Developer's Assessment Report
HPAR	Howard's Pass Access Road (the existing road)
HPARU	Howard's Pass Access Road Upgrade Project
KLOI	Key line of inquiry
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVRMA	Mackenzie Valley Resource Management Act
NWT	Northwest Territories
SELWYN	Selwyn Chihong Mining Ltd.
SON	Subject of note
ToR	Terms of Reference

Terms

Alternative means	An alternative project component or activity.
Alternative to the development	An alternate project that is fundamentally different to the one being proposed, but that achieves the same objective; or , a different undertaking altogether from the development being proposed (including a 'no-project' option')
Project specific baseline	Existing conditions prior to the proposed Project.
Cumulative baseline	The conditions that existed prior to any economic development in the area.
Bedrock Geology	The hard and consolidated rock beneath surface geological materials such as sand and gravel.
Borrow material	Soil, gravel or sand that has been dug for use at another location
Community wellness	The status of the physical, emotional, social, cultural and economic well-being of a community. The state of community wellness depends on the health and well-being of every aspect of a community, the individual, families, etc.
Concentrates	The product generally produced by a metal ore mine, whereby waste rock is removed and the raw ore is ground finely, thus concentrating the metal.
Cumulative effect	Those impacts (biophysical, socio-cultural or economic) that result from the impacts of a proposed development in combination with other past, present or reasonably foreseeable future developments.
Follow-up	A program for verifying the accuracy of the environmental assessment of a project and determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project.

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Height of land	Boundary between watersheds; in relation to this project, this is the boundary between the Mackenzie River drainage and the Yukon River drainage, and corresponds with the NWT/Yukon boundary.
Heritage Resources	Archaeological or historic sites, burial sites, artifacts and other objects of historical, cultural or religious significance, and historical or cultural records.
Howard's Pass Access Road Upgrade Project (HPARU)	The proposed upgrade the existing Howard's Pass Access Road (HPAR) to a two-lane all-season mine access road, eventually to be used for the bulk haul of zinc and lead concentrates.
Key line of inquiry	an issue or area of concern identified through scoping as requiring the most attention during the environmental impact assessment and the most rigorous analysis and detail in the Developer's Assessment Report
Merchantable timber	Timber that is considered to have financial value that is generally based on diameter, overall quality, location and other commercial factors.
Pre-feasibility study	An evaluation of a proposed mining project to determine whether the mineral resource can be mined economically.
Residual effect	An effect that remains after the application of mitigation measures.
Selwyn Mine Project	Selwyn's proposed zinc-lead mine on the Yukon side of Howard's Pass.
Subject of Note	an issue or area of concern identified through scoping that requires serious consideration and substantive analysis, but does not have the same priority or expected level of detail as a key lines of inquiry
Surficial geology	Surficial geology, can also be referred to as Quaternary Geology, refers to unconsolidated sediments and landforms that overlies bedrock.
Terrain hazard	Naturally occurring processes and conditions that present a risk to life and property.
Valued components	An element of the biophysical or human environment that is identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance.

1 INTRODUCTION

1.1 Overview

Selwyn Chihong Mining Limited (Selwyn or the developer) is proposing the Howard's Pass Upgrade Project (HPARU Project). The purpose of this project is to upgrade the existing Howard's Pass Access road (HPAR) to a two-lane road, referred to as the upgraded Howard's Pass Access Road. This document is the Review Board's Terms of Reference (ToR). The ToR provides direction to Selwyn on the Developer's Assessment Report (DAR) information requirements. The DAR will inform interested parties about the development, allow parties to assess potential project impacts, and provide the developer's views on those potential impacts. The DAR will also identify mitigation measures to reduce any predicted adverse project effects.

1.2 Background of the Howard's Pass Access Road

The HPAR is an existing 79 km gravel road located in southwestern Northwest Territories, and runs roughly parallel to the Yukon border. It branches off the Nahanni Range Road, near Tungsten, and ends at the height of land in Howard's Pass at the NWT–Yukon border.

1.2.1 History of the HPAR

The HPAR was originally built in 1978 to 1979 for access to the extensive zinc-lead deposit that straddles the Yukon–NWT border at Howard's Pass in the Selwyn Mountains (Figure 1 and Figure 2). The road underwent an assessment and approval prior to its construction. Nahanni National Park was created in 1972 and had a smaller footprint than it has today. At that time, the Park did not overlap with the area of the new mine access road. The expansion of Nahanni National Park Reserve in 2009 and the creation of Nááts'ihch'oh National Park Reserve in 2014 brought 46 km of the HPAR road (km 14 to km 60) into the jurisdiction of Parks Canada. The HPAR also passes through the Sahtu Settlement Area, Dehcho Traditional Territory, and (overlapping) Kaska Dena Traditional Territory, as shown on Figure 1.

When mineral exploration activity declined in the 1980s, the road fell into disuse. The lack of use and regular maintenance resulted in the gradual deterioration of the HPAR. Interest in the Howard's Pass mineral deposit was renewed in 2005. This created a new demand for access, both for exploration and eventual mine development. The HPAR would further serve as part of a route for transporting zinc and lead concentrates to market should a mine become operational. Based on this renewed interest, Selwyn is currently conducting a pre-feasibility study for a prospective zinc-lead mine on the Yukon side of Howard's Pass, referred to as the Selwyn Project.

Selwyn has held a number of authorizations that allow for the maintenance, reconstruction, and use of the HPAR to provide access to the Selwyn Project mineral leases for exploration purposes. The road was reconstructed to a single-lane all-season road under these authorizations during 2014. The purpose of the reconstruction was to return the road to its original purpose as a single-lane all-season road for exploration activities. As part of this reconstruction, new bridges and culverts were installed.

Figure 1: Project Location of the Howard's Pass Access Road: Regional View (source: Selwyn)

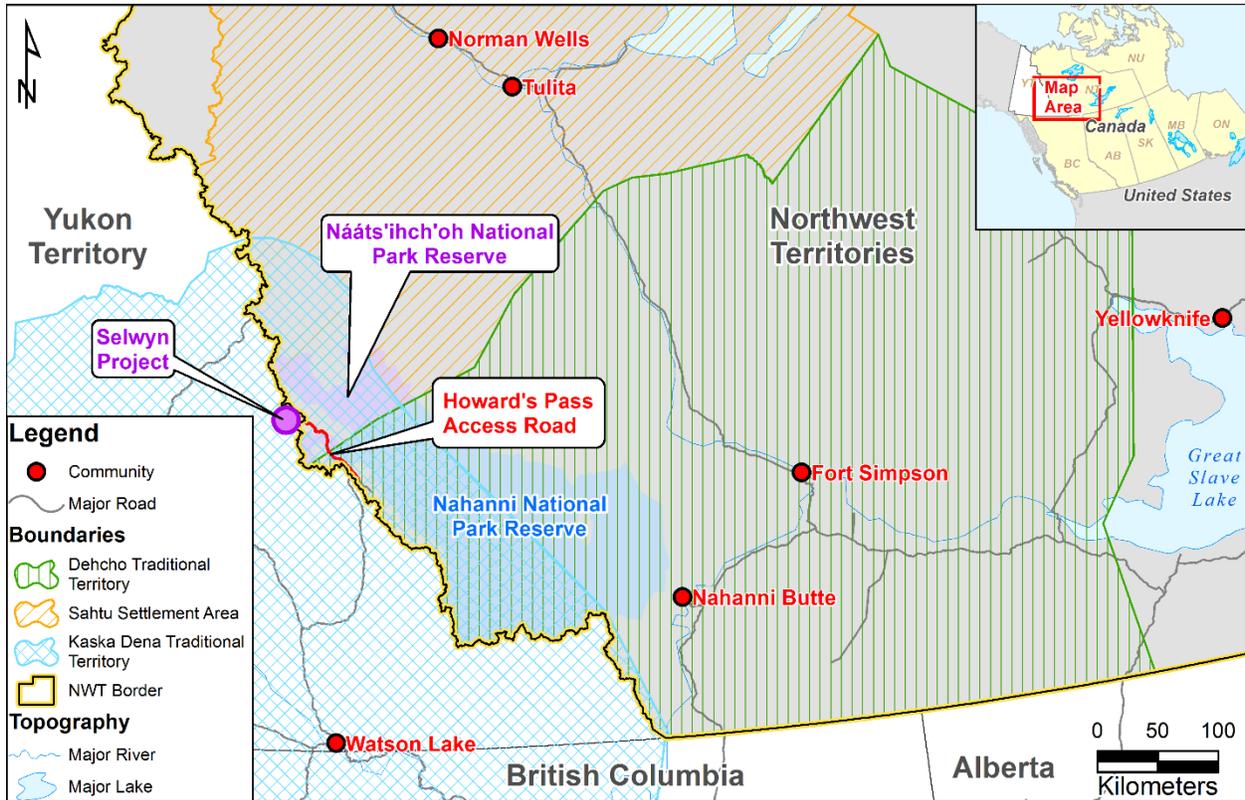
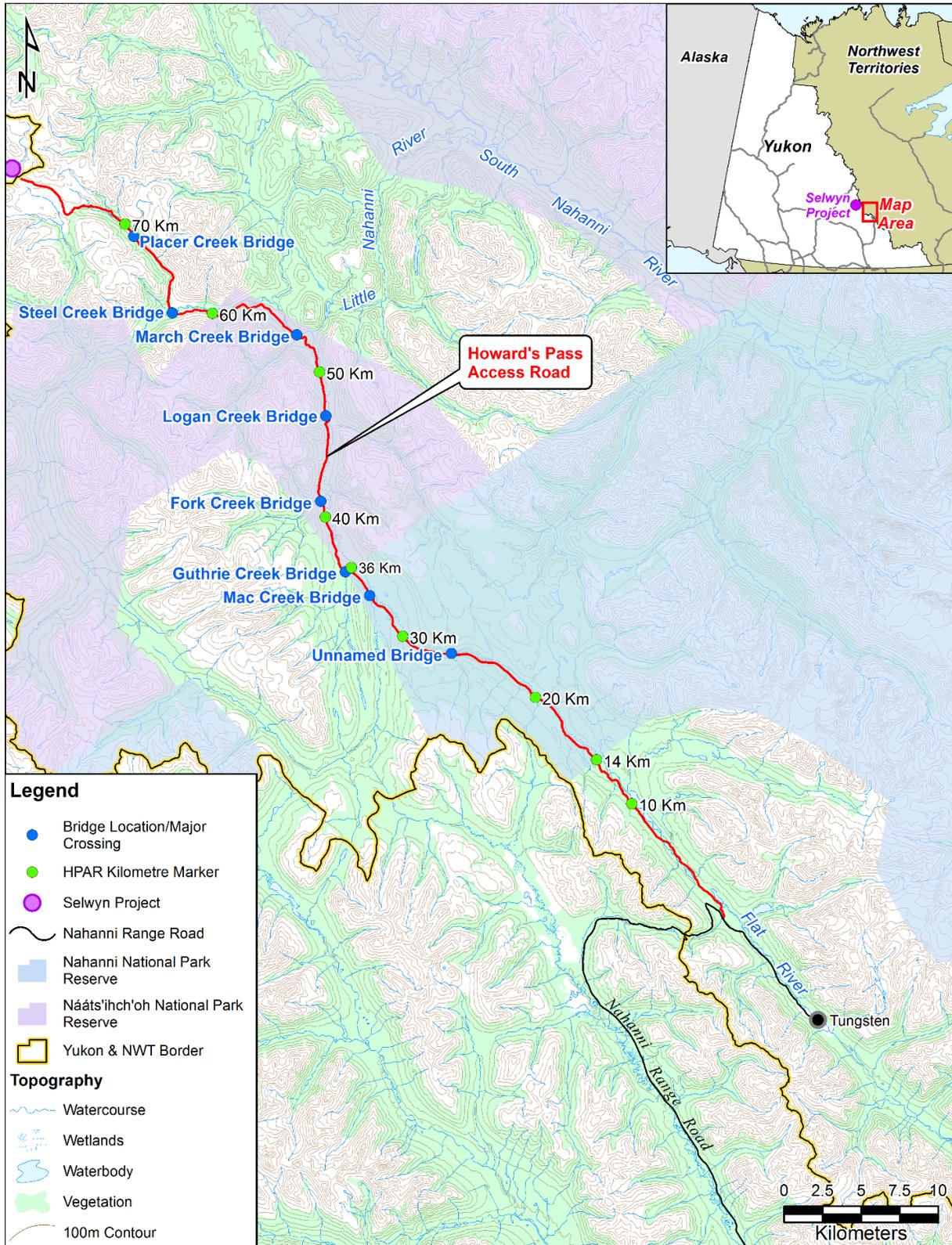


Figure 2: Howard's Pass Access Road: Route Map (source: Selwyn)



1.2.2 The Proposed Project

Selwyn is now proposing to upgrade the existing HPAR to a two-lane all-season mine access road and to use the access road to support the evolving needs of the Selwyn Project in the Yukon, including¹ the bulk transport of zinc and lead concentrates to market if the mine is built. According to the developer, the intent of the proposed upgrade is to make the road sufficient to meet the long-term needs of the Selwyn Mine Project.

The history of the existing HPAR from its original construction to this proposal is summarized in Figure 3.

Figure 3: History of the Howard's Pass Access Road



The proposed HPARU Project would widen the road to a total width of 8.5 m and make adjustments in alignment to improve the road design. The surface area currently disturbed by the HPAR is approximately:

- 35.6 ha for the road footprint,
- 63.2 ha for cut/fill slopes and areas cleared of vegetation along the HPAR right of way, and
- 2.3 ha area that was cleared for the construction camp and laydown area for the 2014 road reconstruction.

¹ Throughout, “including” means “including but not limited to”.

Road widening and local re-alignments associated with the HPARU Project would result in a new disturbance estimated at 85.9 ha. In addition, construction activities will require land for additional temporary camps/laydown areas and for quarries, resulting in a disturbance of about 20.4 ha. Overall, the Project will roughly double the disturbed surface area from 101 ha to 207 ha. This includes the progressive reclamation of land during and immediately following the construction period.

The existing HPAR is currently a single-lane road with very little traffic. Prior to its reconstruction in 2014, the road was not readily passable by vehicles. In 2014 and 2015, the main use was for access by Selwyn and its contractors to the Selwyn Mine Project site and to undertake baseline studies on the road itself. Estimated current traffic, including mine access and public use, is less than one vehicle per day.

The proposed upgraded HPAR would be used for transportation of equipment and supplies during the period of development of the prospective Selwyn Project mine. Once the mine is in operation, the zinc and lead concentrates would be hauled by truck and trailer from the mine along the upgraded HPAR to the road's beginning near Tungsten, then southwest along the Nahanni Range Road, crossing into the Yukon about 5 km from the start of the upgraded HPAR. Trucks would continue on to port facilities at Stewart, BC. Fuel and supplies would be hauled to the mine site along the upgraded HPAR. The estimated traffic volume on the upgraded HPAR during mine operation is 100 trips per day in each direction. Personnel would access the prospective mine by air transport, not via the upgraded HPAR.

1.3 Referral to Environmental Assessment

On July 3, 2015 Selwyn applied to Parks Canada for a land use permit and water licence for the proposed HPARU Project. On July 10, 2015, pursuant to section 126 of the Mackenzie Valley Resources Management Act (MVRMA), Parks Canada referred the HPARU Project to the Review Board for an environmental assessment before any preliminary screening was completed (PR#4). Parks Canada referred the application over concerns that the Project might have significant adverse impacts to the environment, including to: wildlife, water resources, cultural and archeological resources, and the Nahanni and Nááts'icho'oh national parks. Parks Canada also raised concerns over impacts from potential accidents and malfunctions.

1.4 Legal Context for the Terms of Reference Development Process

In accordance with Section 115 of the MVRMA, the Review Board must conduct an EA of the proposed development with regard for:

- (a) the protection of the environment from the significant adverse impacts of proposed developments;
- (b) the protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley; and
- (c) the importance of conservation to the well-being and way of life of the aboriginal peoples of Canada to whom section 35 of the *Constitution Act, 1982* applies and who use an area of the Mackenzie Valley.

Subsection 114(c) of the MVRMA further requires the Review Board to ensure that concerns of Aboriginal people and the general public are taken into account.

To this end, the Review Board has based this ToR on an examination of information from the following sources:

- community scoping meetings held by Review Board staff in:
 - Tulita (October 20, 2015)
 - Norman Wells (October 21, 2015)
 - Nahanni Butte (November 27, 2015)
 - Ross River (December 1, 2015)
 - Watson Lake (December 2, 2015)
- technical scoping meeting held by the Review Board staff in Yellowknife (October 15, 2015);
- the developer's Project Description Report and the Developer's Proposed Terms of Reference; and
- evidence on the Review Board's public registry for this EA including comments received via the Online Review System for the review of the Developer's Proposed Terms of Reference and the Review Board's Draft Terms of Reference.

The Review Board is also informed by its experience in EA and from previous EA processes.

2 DEVELOPER'S ASSESSMENT REPORT GENERAL REQUIREMENTS

2.1 Presentation of Material

The Review Board encourages the developer to present information in user-friendly ways. The use of maps, aerial photos, development component and valued component interaction matrices, full explanation of figures and tables, and an overall commitment to plain language is encouraged. When it is necessary to present complex or lengthy documentation to satisfy the requirements of the ToR, the developer should make every effort to simplify its response in the main body of the text and place supporting materials in appendices. The developer will also produce all electronic documents in Adobe portable document format (pdf)².

The DAR will be submitted as a stand-alone document. Relevant information and analyses from previous project descriptions should be incorporated into the DAR and combined with the supplementary material and analyses required by the ToR. The developer will make all referenced information accessible.

² Refer to the Review Board's Reference Bulletin for [Document Submission Standards](#) for further guidance.

2.2 Incorporation of Traditional Knowledge

The Review Board values and considers both Traditional Knowledge (TK) and scientific information in its deliberation³. The developer will make all reasonable efforts to use TK as a tool to collect information, evaluate specific impacts, and determine their significance in the DAR. The methods used in the acquisition, analysis, and presentation of TK are at the developer's discretion, but will be consistent with the Review Board's *Guidelines for Incorporating Traditional Knowledge into the Environmental Impact Assessment Process*⁴. These guidelines support a consistent and transparent method for the use and consideration of TK in the EA process.

In addition, the DAR must contain a comprehensive summary on TK as a stand-alone section.

The summary will:

- list, by Aboriginal group, if Selwyn adhered to acceptable standards for working with TK holders and handling TK;
- describe, where policies and standards do not exist, what approach was taken in working with TK holders in the collection, use and validation of TK;
- when TK is collected from existing studies and reports, describe how the secondary sources are contextually appropriate;
- how TK and TK holders have influenced the developer's project design, impact assessment, and mitigation measures, as well as reclamation and closure planning; and
- provide a table-summary listing:
 - engagement sessions where TK topics were discussed;
 - what TK topics were discussed; and
 - cross-reference to sections of the DAR that incorporates TK.

2.3 Public Engagement

This section should describe engagement with communities, Aboriginal groups, governments, or organizations with interests related to areas that might be affected by the HPARU Project. Aboriginal groups, government agencies and other interested parties may have information useful to the conduct of this impact assessment; all reasonable efforts should be made to engage with them. The use of interpreters during meetings in Aboriginal communities is encouraged to allow for full participation and understanding by community members.

The following items are required for consideration of public engagement:

1. an engagement log describing dates, individuals and organizations engaged with, the mode of communication, discussion topics and positions taken by participants, including:
 - i. all commitments and agreements made in response to issues raised by the public during these discussions and how these commitments altered the planning of the proposed all season road;

³ S.115.1 In exercising its powers, the Review Board shall consider any traditional knowledge and scientific information that is made available to it.

⁴ [Guidelines for incorporating Traditional Knowledge in environmental impact assessment.](#)

- ii. all issues that remain unresolved, documenting any further efforts envisioned by the parties to resolve them;
2. a description of all methods used to identify, inform, and solicit input from potentially-interested parties and any plans the developer has for future engagement;
3. a description of how the developer has engaged, or intends to engage, Traditional Knowledge holders. Traditional Knowledge may be used to establish baseline conditions and the effects assessment of potential impacts. A summary table indicating where and how Traditional Knowledge was incorporated into the DAR should also be included (see Review Board's *Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment*); and
4. an engagement plan that conforms to the Mackenzie Valley Land and Water Board's *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*⁵ June 2013 and *Engagement and Consultation Policy*⁶.

The Review Board further encourages the developer to meet with interested groups outside the EA process. Any information from those discussions that may be relevant to the Review Board's decision should be submitted to the Review Board for inclusion on the public record.

2.4 Summary Materials

The following summary materials are required:

- a plain language summary in English, South Slavey, North Slavey, and Kaska;
- a detailed concordance table that specifically cross references each numbered item in the relevant ToR sections with its corresponding section and page number in the DAR and to any supporting documents;
- a commitments table listing all mitigation measures the developer will undertake, including mitigations described in the Project application. These should be organized by subject for easy reference (e.g. water quality, wildlife). This table of DAR commitments will be supplemented by an additional table of post-DAR commitments that includes commitments generated during the ensuing EA process. These two tables will help parties to understand what additional actions the developer will take to address concerns raised during the EA ; and
- a table of contents for the DAR and all supplementary materials, including appendices for placement on the Review Board's public registry.

⁵ See <http://mvlwb.com/sites/default/files/documents/wg/MVLWB%20Engagement%20Guidelines%20for%20Holders%20of%20LUPs%20and%20WLS%20-%20Jun%2013.pdf>

⁶ See <http://mvlwb.com/sites/default/files/documents/wg/MVLWB%20Engagement%20and%20Consultation%20Policy%20-%20May%2015.pdf>

2.5 Developer

The following information is required regarding Selwyn Chihong Mining Ltd. and all of its subsidiary companies, related corporations, and joint venture partners:

- a summary of the corporate history and operational experience in Canada and the Northwest Territories;
- how the developer will ensure that its employees, contractors and subcontractors will honour commitments made by Selwyn during this EA and an analysis of Selwyn's compliance with any existing socio-economic agreements or other agreements made, or inherited, by Selwyn Chihong Mining Ltd. with affected communities or Aboriginal groups;
- Selwyn's environmental performance records since activities commenced during Selwyn's use of the HPAR and by previous corporate entities inherited by Selwyn. This will include discussion of regulatory compliance, for example, regarding land use permits and water licences. List situations where compliance was breached, the issue and cause, and how and when it was mitigated to the regulator's satisfaction; and
- a description of any corporate policies, codes of practice, programs or plans concerning Selwyn's environmental, sustainable development, community engagement, and workplace health and safety commitments or policies.

3 SCOPE CONSIDERATIONS

3.1 Scope of Development

Under subsection 117(1) of the MVRMA, the Review Board determines the scope of development for every EA it conducts. The scope of development includes all the proposed physical works and activities required for the Project to proceed. Table 1, Table 2, and Table 3 list the scope of development for each project phase. The Review Board may amend the scope of development at any time during the EA if the proposed development changes.

In summary, the scope of development includes:

- upgrading the existing single lane all season HPAR to a two-lane all season road; and
- the use of the upgraded HPAR as an industrial haul road for the prospective Selwyn mine and its consumables and products.

3.1.1 Project Phases and Schedule

Selwyn will provide an overall activity schedule for the Project that will include all activities associated with the three project phases (construction, operation, closure). The schedule will include estimated start time and duration for each activity.

The scheduling will consider and discuss seasonal timing constraints and contingency planning. For example, if the planned timing for the extension of a culvert at a stream crossing is delayed, it may conflict with spawning times and inhibit construction – how would this be managed?

3.1.2 Development Scope

The developer will provide a description of the Project in the DAR, separated into project phases. Subjects to consider for each phase are listed in the following tables: Table 1 – construction phase; Table 2 – operations phase; and Table 3 – closure phase.

3.1.3 Existing Infrastructure

The scope of development for this EA includes the use of existing infrastructure required for the construction and use of the HPAR Upgrade Project.

The developer is required in the DAR to provide a detailed description of the proposed Project, which includes all components required for its construction and use. Specifically, this will include a detailed description of any existing components (such as bridges) and the environment that may interact with them. This will include a discussion of how the existing infrastructure will be used for the proposed Project, and discussion of the capacity of existing infrastructure to support the proposed Project.

This description of existing project components must provide sufficient detail to allow for an assessment of these project components as they relate to the Key Lines of Inquiry and Subjects of Note. Depending on the Key Line of Inquiry or Subject of Note being considered the level of detail required to describe a project component may require providing design standards (such as peak flow and geotechnical stability) and detailed hydrological information of the watercourses the bridges cross. The information will be used in this EA to determine whether there is the potential for significant adverse environmental effects.

The onus is on the developer to clearly demonstrate that any component required for the HPAR Upgrade Project to proceed is appropriate for that purpose.

TABLE 1: PROJECT DESCRIPTION OUTLINE FOR CONSTRUCTION PHASE

Project Component	Subjects to Consider
<p>Road upgrade Widening from 4.5 m to 8.5 m; improvements to horizontal and vertical alignments to meet design criteria.</p>	<ul style="list-style-type: none"> • land requirements (road alignment; footprint; licences of occupation and right-of-way widths); • road design, expanded upon in section 3.1.4, including standards and guidelines used in design, design criteria including maximum grade, minimum curve radius, minimum stopping sight distance, and maximum road cross-slope; • site preparation including cut and fill estimates, clearing of vegetation, stripping and management of organic rich topsoil, and storage or disposal plans for any other excess material; • proposed practices for the management of overburden; • pull-outs and safety barriers including specific locations for each and rationale for locations; • staging areas and laydown areas; • special engineering considerations for road design in areas of unstable terrain including areas of landslide risk, permafrost, near waterbodies, and wet conditions; • road construction and upgrades to design standards for commercial use, including any local re-alignments to improve horizontal and vertical alignment, increase sight distance, and improve overall safety for road operations; • avalanche control and management; • installation, operation, and maintenance of wireless communications system; • erosion and sediment control during construction; • construction activity schedule and seasonal restrictions; • construction equipment (including quantities and weights) and materials; • estimated traffic volume during construction periods; • dust control along the upgraded HPAR, including water requirements for this purpose; • access management and public safety measures; • spill contingency and response activities; • emergency response activities; • invasive species management; • measures for protection of water quality; • heritage resources; and • toxic or hazardous materials to be used, including explosives.

Project Component	Subjects to Consider
<p>Watercourse crossings Extension of all culverts to new road width; relocation of some culverts to match road realignment or reconfiguration; and use of existing bridges.</p>	<ul style="list-style-type: none"> • design of existing watercourse crossing, including bridges (for which no upgrades are needed) and culverts; • drainage construction including digging ditches, installing cross culverts, and construction of ditch blocks and check dams to help control surface water runoff; • extension of existing culverts to accommodate the wider road, and relocation of some culverts to accommodate upgraded road design; • construction of roadside barriers and bridge flares on bridge approaches to provide pullouts and improve road safety at bridges; • installation of road signs at bridge approaches and other locations where signs are required; • sediment and erosion control activities; • culvert upgrade design and methods including a discussion of the differences, if any, between design criteria for crossings inside and outside of the National Parks and Reserves; and • measures for protection of fish and fish habitat and water quality during construction and operation, including measures for erosion and sediment control.
<p>Borrow sources Selection of borrow sources; development of borrow pits; reclamation of borrow pits after use.</p>	<ul style="list-style-type: none"> • locations of borrow pits and quarries and their access roads; • surface and ground water avoidance, care, and management; • clearing of vegetation and site preparation; • stripping and stockpiling of organic topsoil; • construction and use of borrow pits to obtain construction material for the HPARU Project, including construction of access roads to the quarries as needed; • borrow material quality and quantities available; • geochemical characterization of potential borrow materials and selection of suitable materials; • borrow pit design criteria and development methods, including blasting, gravel crushing, sorting, and stockpiling of materials; • loading borrow material into trucks and hauling to work areas; • dust control at borrow sites, including water withdrawal and use for this purpose; • heritage resources; • measures for mitigations of water quality impacts associated with the use of management of explosives; and • objectives and methods for site restoration.

Project Component	Subjects to Consider
<p>Temporary construction camps Camps site locations during the pre-construction year and two construction years; reclamation of camp sites.</p>	<ul style="list-style-type: none"> • camp locations and footprints; • site preparation, including clearing; • camp mobilization; • camp design, facilities and operation; • fuel storage and management; • water use; • domestic wastewater disposal and measures for mitigating effects to water quality; • solid, liquid and gas waste management, including hazardous waste management and other waste streams, such as incineration; • wildlife attractant control and wildlife encounter minimization including bear safety training; • design, construction and ongoing implementation and monitoring of measures and practices to secure food, garbage and other wildlife attractants from bears, wolverines and other wildlife; • spill response; • construction laydown areas and areas for stockpiling stripped materials and for equipment maintenance; • camp demobilization; • heritage resources; and • objectives and methods for camp site restoration, including revegetation.
<p>Workforce, payroll and purchasing Workforce requirements and project spending on wages, salaries, goods and services.</p>	<ul style="list-style-type: none"> • direct employment opportunities (i.e., numbers of jobs or full-time equivalents); • contracting opportunities; • form of employment (full time, part time, seasonal) and skills category; • wages and salaries; • purchasing of goods and services; and • training and procurement policies and programs.

TABLE 2: PROJECT DESCRIPTION FOR OPERATIONS PHASE

Project Component	Subjects to Consider
<p>Traffic and traffic control Management of all traffic along the upgraded HPAR including public traffic and Mine traffic.</p>	<ul style="list-style-type: none"> • traffic volume and frequency, and vehicle types, weights and types of loads during the life of the Project; • traffic control systems and protocols including those for truck speed and weights; • access management and public safety measures; • communications along the road; and • measures to prevent and document wildlife-vehicle collisions and to reduce impact of the upgraded HPAR on wildlife.
<p>Emergency response Emergency response plans and spill contingency plans.</p>	<ul style="list-style-type: none"> • emergency response plans (e.g., wildfires, avalanches, vehicle collisions, medical emergencies); • explosives and components of explosives; and • spill contingency planning for fuels, mine reagents, zinc and lead concentrates and other materials to be transported on the upgraded HPAR.
<p>Use of the upgraded HPAR for hauling zinc and lead concentrates and other mine consumables</p>	<ul style="list-style-type: none"> • concentrate confinement during transport (e.g., truck and trailer design and performance); • options to reduce traffic frequency (e.g., use of backhauling, truck capacity, convoys); • prevention of contamination of soil and vegetation from trucks and equipment; • all mine consumables, both hazardous and nonhazardous, including quantities and containment methods; and, • the Material Safety Data Sheets (MSDS) for all reasonably foreseeable materials, reagents, and consumables to be used for the HPARU Project or transported by the Developer on the upgraded HPAR.

Project Component	Subjects to Consider
<p>Road maintenance Standard operations and maintenance of the upgraded HPAR.</p>	<ul style="list-style-type: none"> • monitoring of road conditions and routine maintenance measures (e.g., grading, brushing,); • inspection and maintenance of drainage works, bridges, culverts; • snow removal, scarification and sanding; • maintenance measures to facilitate wildlife crossing the road (e.g., for snow ploughing); • ongoing erosion and sediment control; • avalanche and terrain hazard management; • explosives and components of explosives (e.g. ammonium nitrate); • prevention and response to natural and human caused wildfires; • dust control activities including, if required, water withdrawal locations, amounts and timing; • heritage resources; • measures for protection of water quality during operations, including the use and management of substances or materials such as road salts; and • maintenance equipment and materials.
<p>Borrow sources Selection of borrow sources; development of borrow pits; reclamation of borrow pits after use.</p>	<ul style="list-style-type: none"> • requirements for borrow materials for ongoing road maintenance; • locations of borrow pits and quarries and their access roads; • clearing of vegetation and site preparation; • stripping and stockpiling of organic topsoil; • construction and use of borrow pits (quarries) to obtain construction material for the HPARU, including construction of access roads to the quarries as needed; • requirements for blasting; • borrow material quality and quantities available; • geochemical characterization of potential borrow materials and selection of suitable materials; • borrow pit design criteria and development methods, including blasting, gravel crushing, sorting, and stockpiling of materials; • loading borrow material into trucks and hauling to work areas; • dust control at borrow sites, including water taking for this purpose; • heritage resources; • measures for mitigations of water quality impacts associated with the use of management of explosives; and • objectives and methods for site restoration.

Project Component	Subjects to Consider
<p>Workforce, payroll and purchasing Workforce requirements and project spending on wages, salaries, goods and services.</p>	<ul style="list-style-type: none"> • direct employment opportunities; • contracting opportunities; • form of employment and contracting (full time, part time, seasonal) and skills category; • wages and salaries; • purchasing of goods and services; and • training and procurement policies and programs.

TABLE 3: PROJECT DESCRIPTION FOR CLOSURE PHASE

Project Component	Subjects to Consider
<p>Temporary suspension of road and bridge use</p>	<ul style="list-style-type: none"> • measures for temporary closure, including for prevention of washouts and erosion and slope stabilization; and • road access and signage.
<p>Permanent suspension of road and bridge use</p>	<ul style="list-style-type: none"> • planning for full road closure with other road users, including alternatives to permanent closure; • measures to close road including culvert removal, bridge dismantling, slope stabilization, erosion prevention; • progressive decommissioning and reclamation of maintenance borrow pits; • heritage resources; and • reclamation and re-vegetation.
<p>Workforce, payroll and purchasing Workforce requirements and project spending on wages, salaries, goods and services.</p>	<ul style="list-style-type: none"> • direct employment opportunities; • contracting opportunities; • form of employment (full time, part time, seasonal) and skills category; • wages and salaries; • purchasing of goods and services; and • training and procurement policies and programs.

3.1.4 Road Design Considerations

To address potential effects of the Project on valued components, the developer will provide a detailed description of road design considerations in the DAR. Subjects that will be considered include:

- design standards;
- road width;
- minimum horizontal and vertical curves;
- longitudinal slope and cross slope of the road;
- safety barriers;
- signage;
- cut and fill side slopes;
- drainage pathways leading to waterbodies;

- watercourse crossings (culvert extensions and realignments);
- pull-outs;
- dust control;
- reduction of risk of wildlife collisions;
- wildlife crossings;
- geotechnical stability;
- sediment and erosion control especially where immediately adjacent or near to a waterbody;
- geohazards and environmental hazards;
- heritage and archeological resources; and
- design features and controls that would enable the safe use of the road by public users.

The rationale for the road design considerations will be described and the basis for the selection of the criteria will be presented.

Where relevant, the applicability of these design considerations will be included in the discussions of the key lines of inquiry, subjects of note, and potential accidents and malfunctions.

3.1.5 Management and Monitoring Plans

Selwyn will provide a list of all standard operating procedures and monitoring and management plans for the upgraded HPAR, draft or final, and will summarize the purpose and details of these plans and procedures in this section. The developer will describe how these plans mitigate potential effects due to all project phases including construction, operations, closure, and post-closure. References to these plans will be made throughout the DAR where appropriate.

All monitoring and management plans, in either final or draft versions, will be submitted as appendices to the DAR. This may include plans for road operations, wildlife and wildlife habitat protection, emergency response, spill response, waste management, erosion and sediment control, or avalanche management.

Where applicable, the developer may satisfy some of the ToR requirements by providing an informative plain language summary in the body of the DAR to the appended management plans (e.g. waste management, spill contingency, closure, and reclamation).

Selwyn will consider opportunities for collaboration or linkages with existing regional monitoring programs and management plans for topics assessed.

3.1.6 Permits licences and other authorizations

In the DAR, Selwyn will identify all permits, licences or other regulatory approvals necessary for the different phases of the Project, including all land tenure agreements required.

3.2 Scope of Assessment

3.2.1 Overview

The Review Board determines the scope of assessment for every EA it conducts. The scope of assessment defines which project related effects and associated issues will be examined in the EA.

The Review Board identifies the issues through the scoping phase of the EA by identifying potential impacts on valued components of the biophysical and human environment (for example, caribou, water, or cultural practices) from the development, by itself and in combination with other past, present and reasonably foreseeable future human activities and developments. This identification process considers material provided by the developer, the developer's views on what the issues are, parties' views, and the Review Board's views.

The identified issues are then prioritized into key lines of inquiry and subjects of note. During the course of the EA, the prioritization of issues may change or additional issues identified that can be added.

The scope of assessment for this EA includes all effects that may result from the developer's proposed project as described in Section 3.1. The scope of assessment for this EA will also consider effects to the environment that result from the use of existing infrastructure by the proposed HPARU Project. The impacts of past construction of previously assessed components will not be assessed retroactively, but the cumulative effects assessment will consider how the impacts of the currently proposed development interact with impacts of past, present, and reasonably foreseeable human activities and developments that affect the same valued components.

Additional considerations for the scope of assessment are described below.

3.2.2 Statutory Scope of Assessment Requirements

Section 117(2) of the MVRMA stipulates that the scope of assessment include a consideration of:

Cumulative Effects- the Review Board is required to assess the cumulative effects of the proposed development under Section 117 (2) (a) of the MVRMA. The Review Board's *Environmental Impact Assessment Guidelines (Appendix H)* describes its requirement for cumulative effects assessment. Direction on this topic is provided in section 4, which describes the assessment methodology, and in section 7, which requests a summary of cumulative effects.

Accidents and Malfunctions - The Review Board is required to assess the effects of potential accidents and malfunctions under Section 117 (2) (a). This topic has been identified as a key line of inquiry. Direction on this topic is found in section 6.1.2.

Consideration of Alternatives to the Development - The Review Board may consider alternatives to the Project under Section 117 (2) (e) of the MVRMA. Section 8 provides direction on this subject.

3.2.3 Transboundary Considerations

3.2.3.1 Project effects

Due to the Project's location, the Review Board has determined it likely that Project effects might extend into the Yukon Territory. Where it appears to the Review Board, during an environmental assessment of a development that is wholly within the Mackenzie Valley, that the development might have a significant adverse impact on the environment in a region outside the Mackenzie Valley, the Review Board is required to advise the authority responsible for the examination of the

environment in that region. Under subsection 140(1) of the MVRMA, the Review Board must request the cooperation of that authority in the conduct of the assessment.

On September 11, 2015 the Review Board notified the Yukon Environmental and Socio-economic Assessment Board that the HPARU Project might have a significant adverse impact in the Yukon and requested cooperation in the conduct of the assessment (PR#12). The Review Board's determination was based on:

- The referral letter by Parks Canada determined that the Project might have significant effects to the environment in the NWT, described in section 1.3; and
- the proximity of these effects to the Yukon.

The Review Board also understands that the Project might have effects on people who reside in the Yukon. The evidence provided to date and the developer's consultation and engagement record, indicates that this includes the communities of Ross River and Watson Lake and Aboriginal groups including the Ross River Dena Council (RRDC) and Liard First Nation (LFN).

Because of the considerations describe above, the Review Board held scoping sessions in the Yukon on December 2nd and 3rd, 2015 in order to hear from the Liard First Nation and Ross River Dena Council, and the communities of Watson Lake and Ross River. This scoping was used to identify and prioritize any concerns these Aboriginal groups and communities may have about the Project area within the NWT and to identify and prioritize any concerns about potential effects of the Project in the Yukon.

If, during the conduct of this EA, the Review Board determines that: (1) the HPARU Project is likely to have a significant adverse impact on the environment in the Yukon, and (2) there are no feasible mitigation measures that can be applied in the NWT to reduce these effects so that they are no longer significant, then the Review Board may engage the federal Minister and YESAB to take steps in accordance with s. 140(2) of the MVRMA.

3.2.4 Aboriginal Lands

This assessment will consider the traditional lands of the Liard First Nation and the Ross River Dena Council in the NWT that include the Project area. Section 115(1)(c) of the MVRMA requires the Review Board to have regard to Aboriginal peoples who use areas of the Mackenzie Valley. Accordingly, Project effects to aboriginal well-being and way of life will consider impacts to the Liard First Nation (LFN) and the Ross River Dena Council (RRDC) in addition to impacts to the Sahtu Dene and Métis or Dehcho First Nations (DFN) and Nahzà Dehé Dene Band (NDDB).

The Review Board notes that members of the LFN and RRDC reside mostly in the Yukon (Ross River and Watson Lake). If the Project adversely affects valued components related to Aboriginal well-being and way of life, mitigation efforts should focus on reducing the impact at the source (in the NWT) such that there are no residual effects occurring in Yukon communities.

3.2.5 The Prospective Selwyn Mine

The developer stated in its Project Description Report that the HPARU Project will be used by the prospective Selwyn mine⁷ and that the road is built for that purpose. During scoping, parties questioned why the mine is not part of this assessment and expressed concerns about project splitting.⁸ The Review Board understands these concerns, but finds that project splitting is not occurring. The HPARU Project is undergoing an EA and the prospective Selwyn mine will also be subject to impact assessment by the relevant jurisdiction. This may include an assessment by YESAB on its own, or jointly with the Review Board.

Consequently, although the HPARU and mine projects will be considered in separate EA processes, they will each undergo impact assessment in accordance with legislation. Because of this, they will both be subject to an appropriate level of examination of project effects on the environment. Separating the road and mine applications has not avoided environmental assessment, as might have been a result if project splitting had occurred. Further, in this EA, the cumulative effects assessment will ensure that the combined impacts of all relevant human activities, including the potential impacts of a foreseeable future mine, as they relate to this EA, are considered.

The assessment of the HPARU Project will include in its cumulative effects analysis a consideration of the effects of the haul traffic, which is an activity associated with the prospective Selwyn mine. This mine has not been proposed, since no permits have yet been applied for. Regardless, the developer included the use of the upgraded HPAR by the mine as a reasonably foreseeable activity in its Project Description Report. Haul traffic is an activity from the prospective mine that is also related to this project. The Review Board considers this traffic to be a reasonably foreseeable future activity with impacts that add cumulatively to the effects of the HPARU Project.

The effects of the haul traffic once they leave the upgraded HPAR are not part of this assessment because the mine haul traffic is not part of the proposed project. As described above, the effects associated with the haul traffic along the upgraded HPAR, and also past the terminus of the upgraded HPAR, will be considered as a direct effect of the Mine when it undergoes an assessment. For certainty, this EA will not assess the effects of haul traffic on areas outside of the upgraded HPAR, such as along the prospective haul route from the Selwyn mine to its ultimate destination in BC.

3.2.6 Effects Assessments – Valued Components

A valued component is an element of the biophysical or human environment that is identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance. The valued components listed below will be used where appropriate, and expanded upon as required, in the assessment of impacts for the key lines of inquiry or subjects of note. In addition, applicable

⁷ The developer has indicated that it will propose this mine, for which it is now proposing to upgrade the HPAR. The developer has not yet submitted an actual proposal for the mine.

⁸ Project splitting refers to an instance where individual parts of a project are only considered separately, at the risk of missing the bigger picture.

valued components must be assessed for potential cumulative impacts. Details about the baseline information requirements in the DAR for valued components are provided in Section 5.1.

Valued components include:

- bedrock geology, surficial geology and permafrost;
- air quality;
- terrain;
- water quality and quantity;
- sediment quality and quantity;
- noise;
- vegetation;
- fish and fish habitat;
- wildlife including caribou, grizzly bear, wolverine, moose, birds, nesting birds, songbirds, migratory birds and water fowl;
- species at risk;
- traditional land use and harvesting;
- cultural resources;
- heritage resources;
- potentially affected communities;
- potentially affected aboriginal groups; and
- public use of, and access to, the upgraded HPAR and surrounding lands, lakes and rivers.

3.2.7 Issues Prioritization

The purpose of scoping is to identify issues and to prioritize key areas that will require additional work. The prioritization of issues is described below in section 3.2.5.1 (Key Lines of Inquiry), and section 3.2.5.2 (Subjects of Note). Regardless of the prioritization, Selwyn will give serious consideration and substantive analysis to demonstrate whether the development is likely to be the cause of, or contribute to, significant adverse impacts.

3.2.7.1 Key Lines of Inquiry

Key lines of inquiry (KLOI) are the topics of the greatest concern that require the most attention during the EA and the most rigorous analyses in the DAR. They may refer to a single valued component (e.g. caribou), an effects pathway that impacts multiple valued components (e.g. accidents and malfunctions), public concern about impacts to important places or areas representing more than one valued component (e.g. national parks). In all cases, the developer must identify and provide rationale for which valued components were used when assessing impacts to KLOIs.

KLOIs are designated to ensure a comprehensive analysis of the issues most likely to cause significant environmental impacts or significant public concern. Because of the importance of KLOIs, the DAR should clearly describe the data, its collection and analyses used by the developer in its assessment. This will allow interested parties to have a robust understanding of the technical material before any technical sessions occur.

Each KLOI will be presented in a comprehensive, stand-alone section of the DAR. This will facilitate close examination of the developer's response to these topics with minimal cross-referencing to other parts of the report and appendices.

Based on the scoping activities for this EA, the KLOIs are:

- 1) **Caribou:** direct and indirect effects of the Project on individual caribou and on potentially affected caribou herds, including the Nahanni and Redstone herds;
- 2) **Accidents and malfunctions:** an assessment of potential effects from accidents and malfunctions using a risk assessment approach;
- 3) **National park reserves:** potential direct and indirect effects on Nahanni and Nááts'icho'oh national park reserves;
- 4) **Effects on communities:** including both positive and negative and direct and indirect effects; and
- 5) **Grizzly Bears:** direct and indirect effects of the Project on individual grizzly bears in the Project area as well as the regional grizzly bear population.

More specific considerations for each KLOI are presented in section 6.1.

3.2.7.2 Subjects of Note

The Review Board considers subjects of note to include topics of a lower priority than the KLOIs. These topics may include effects to a single valued component such as vegetation, or include effects to multiple valued components such as traditional land use and harvesting.

Based on the scoping activities for this EA, the subjects of note are:

- 1) bedrock geology and surficial geology;
- 2) air quality;
- 3) sensory disturbance including dust, noise, vibration, visual effects, scent and light;
- 4) water and sediment quality and quantity (excluding the impacts of accidents and malfunctions);
- 5) vegetation;
- 6) fish and aquatic habitat (excluding the impacts of accidents and malfunctions);
- 7) wildlife and wildlife habitat (excluding caribou because it is a Key Line of Inquiry);
- 8) species at risk;
- 9) traditional land use and harvesting;
- 10) cultural resources;
- 11) heritage resources; and
- 12) public use of, and access to, the upgraded HPAR and surrounding lands, lakes and rivers.

3.2.8 Geographic Scope of Assessment

In the DAR, the developer will describe the geographic scope (spatial extent) for each VC used in the assessment of the key lines of inquiry and subjects of note for all phases of the Project. These geographic areas will be based on the extent of potential project effects to each valued component. This geographic scope may include the habitat range of wildlife species such as caribou, or may extend to where project effects are no longer measurable, such as water quality. The developer will

include a consideration of applicable Land Use Plans. The developer will provide its rationale for the geographic scope of each valued component.

In the DAR, the developer will clearly distinguish any transboundary effects. The geographic scope will clearly describe the range for each VC that exists in the Yukon and the extent that any project related effects extend into the Yukon.

3.2.9 Temporal Scope of Assessment

The temporal scope includes the effects of the Project on valued components for all project phases. The developer will compare project related effects against baseline conditions. For the cumulative effects assessment, the temporal scope includes the period of the effects of past, present and reasonably foreseeable future projects that are predicted to combine with the impacts of the proposed Project. When considering CE the developer will identify and use appropriate baseline conditions to compare against-- the cumulative baseline. This will reflect conditions before economic development in the area.

The developer will identify and consider:

- times during the development when predicted effects are most intense (such as during initial construction);
- when valued components are most sensitive to potential impacts (such as key times for wildlife, fish spawning or wildlife harvesting periods); and
- the duration of effects, with attention to how these effects relate to the life of the Project.

The developer will also give special attention to appropriate temporal boundaries for considering any impacts that may require long-term monitoring and management.

The developer is required to define and provide rationales for the specific temporal boundaries it used to examine the potential impacts on each of the valued components considered in its impact assessment.

4 ASSESSMENT METHODOLOGY

Selwyn will describe how the predicted impacts are expected to arise from the proposed development, as well as its opinion on impact significance. An assessment that considers applicable valued components, as described in section 3.2.4 will be completed for each KLOI and subject of note. The assessment steps for KLOIs and subjects of note are the same, but differ in depth and breadth of assessment to reflect the higher priority placed on KLOIs.

When assessing impacts on the biophysical and human environment for each KLOI and subject of note, the DAR will:

1. identify valued components and provide rationale for them;

2. identify the natural range of the cumulative baseline conditions (where historic information is available), and the Project-specific baseline of current conditions⁹, and analyze for discernible trends over time in each valued component, where appropriate, in light of the natural or existing variability for each;
3. identify likely future climate trends. When assessing predicted effects, the developer will consider likely climate change scenarios and how scenarios affect predicted effects of the Project and valued components. The developer will also provide a discussion on how this changing climate may impact the development, such as a consideration of road stability in areas of permafrost;
4. identify potential interactions of the Project with valued components and any potential direct and indirect impacts, identifying all analytical assumptions or where professional judgement was used. The developer will identify and provide rationale for quantitative or qualitative parameters used to measure potential environmental and cumulative effects on the valued component. This must include a consideration of:
 - a. causal mechanisms for the predicted effect;
 - b. Traditional Knowledge;
 - c. geographical extent of the impact and rationale for its selection;
 - d. timing of the impact including: duration, frequency, extent and a rationale for it;
 - e. magnitude of the impact (what degree of change is expected);
 - f. reversibility of the impact;
 - g. uncertainty associated with prediction; and
 - h. likelihood of the impact.
5. identify and evaluate any proposed mitigation measures during construction, operations, closure and post-closure as to their technical and economic feasibility to reduce the predicted impacts, discuss constraints, uncertainties and implementation challenges to the effective use of the proposed measures and clearly identify all mitigation commitments;
6. predict the likelihood of each impact occurring after the mitigation commitments are implemented, and provide a rationale for the confidence held in the prediction. The developer will also present the predictions in a manner that facilitates the formulation of testable questions for future follow-up programs, as well as textually and schematically indicate the pathways of predicted impacts;
7. compare the predicted impacts to the cumulative baseline conditions or to project-specific baseline conditions without the upgraded HPAR as appropriate. Include a description of any plans, strategies or commitments to avoid, reduce or otherwise manage and mitigate the identified potential adverse impacts, with consideration of best management practices in relation to the valued component or development component in question;

⁹ The project-specific baseline and cumulative baseline are described further in section 5.

8. describe techniques utilized in impact prediction, such as models, including where any uncertainty in impact prediction was identified;
9. predicted impacts that remain after mitigations are applied are referred to as residual effects. These will be clearly identified and the developer will provide its opinion on the significance of these impacts. The developer will provide the methodologies for reaching such conclusions;
10. provide a cumulative effects assessment for each predicted residual effect from the development. Cumulative effects result from a combination of residual effects of the development with effects from other past, present and reasonably foreseeable human activities and developments. The cumulative effect assessment will:
 - a. identify the valued components of the environment affected by the development and by other human activities
 - b. determine what other developments and activities could substantially affect those values components
 - c. predict the combined effects of the HPARU Project in conjunction with the developments and activities identified in (b) above, and provide the developer's views of the significance of any cumulative environmental effects
 - d. identify mitigations as needed to reduce or avoid the significant cumulative effects.

When doing (c) the developer will describe the way in which a cumulative effect may occur and its potential spatial and temporal scope, and describe the baseline or conditions used to compare the CE against. The developer will also include a separate cumulative effects section that provides a summary of the predicted cumulative effects.
11. describe monitoring, evaluation, and adaptive management plans used to:
 - a. detect potential unexpected changes;
 - b. ensure that EA predictions are accurate;
 - c. determine the effectiveness of mitigations; and
 - d. proactively manage against developing adverse impacts when they (or unexpected changes) are encountered.

The criteria described above will be used in the DAR as a basis for Selwyn's effects predictions. The developer will evaluate these predictions based on explicit significance thresholds (related to impact acceptability) to provide its opinions on the significance of impacts on the biophysical and human environment. The Review Board requires that these topics be addressed in order to understand the developer's views on the potential for significant adverse effects.

When developing its DAR Selwyn will consider all applicable guidelines, services, and programs including those listed in Appendix A.

The Review Board will make the ultimate determinations of significance after considering all the evidence on the public record in the EA. For more information on the above criteria, please refer to Section 3.11 of the Review Board's *Environmental Impact Assessment Guidelines*, available on the Review Board's website.

5 DESCRIPTION OF THE ENVIRONMENT

Selwyn will provide a description of existing conditions prior to the proposed Project (the *project-specific baseline*) and the conditions that existed prior to any economic development in the area (the *cumulative baseline*). The baseline conditions will be used as a frame of reference with which to compare the predicted effects of the Project. The description of these baseline conditions will include the area of the Project and any areas where valued components may experience project effects, referred to as the study area. The area will be specific to valued component, to reflect the relevant characteristics and vulnerabilities of each component. The description will contain enough detail to describe how the valued components might be affected by the proposed development. The developer will clearly distinguish between areas in the Yukon and NWT.

Depending on what valued component is being considered, the date for establishing the project-specific baseline may differ from the cumulative baseline. When assessing effects to valued components the developer must state whether it is comparing the effect against the project-specific baseline or the cumulative baseline.

Selwyn will use existing information and must generate its own information where there is insufficient existing data, providing the methodology, accuracy and precision of measurements. If baseline information for a particular valued component has not been collected, Selwyn will describe how and when this information will be provided. If Selwyn considers that baseline information for a particular valued component is not required, it will provide its rationale.

Selwyn will also describe any analysis conducted that uses data from outside the study area to characterize the baseline conditions within the study area. This would include, for example, a description of any models (including assumptions and discussion of accuracy) used to characterize baseline conditions where local measurements are not available.

5.1 Biophysical Information Requirements

The following subsections provide a framework for the minimum information required to conduct an effects assessment for each key line of inquiry and subject of note. As previously noted, for all subjects below, the descriptions must contain sufficient detail to enable an understanding of how the valued components might be affected by the proposed development.

5.1.1 Terrain, Geology, Soils, and Permafrost

Selwyn will provide a description of the baseline conditions for terrain, geology, soils, and permafrost conditions in the study area. Subjects to consider include:

- 1) topography (including slope aspect and slope angle along the alignment);
- 2) geology (bedrock, unconsolidated surficial materials);
- 3) soil types;
- 4) distribution and condition of permafrost and ice-rich soils in the area of the Project; and
- 5) terrain and terrain stability maps including permafrost descriptions. The methodologies and criteria used to determine stability will be made explicit by Selwyn in this description.

5.1.2 Environmental and Geologic Events That May Affect the Project

Selwyn will provide a description of the frequency, magnitude, and distribution of environmental and geologic events that have the potential to affect the Project. Subjects to be considered include:

- 1) geohazards such as:
 - a. avalanches;
 - b. earthquakes;
 - c. rockfalls; and
 - d. landslides.
- 2) extreme weather-related events such as:
 - a. floods;
 - b. droughts; and
 - c. extreme precipitation events.

5.1.3 Climate and Weather

Selwyn will provide a description of the climate conditions from available local and regional sources. If data from the immediate vicinity are unavailable, regional climate data may be presented with all assumptions being made explicit. Subjects to consider include:

- 1) the location of recording stations, length of record for any meteorological data presented, and the quality of the data (for example, are there data gaps present?);
- 2) the climatic trends and current conditions (predominant winds, precipitation, snow depths and distributions, temperature, etc.);
- 3) extreme weather-related events and the frequency of occurrence;
- 4) the current normal climate variability and trends, and the historical climate variability and trends (over the historical period of instrumental record) extreme weather-related events and the frequency of occurrence; and
- 5) the contribution of Traditional Knowledge to the understanding of climate conditions, trends and variability.

Changes in climate, in terms of direction, magnitude, and climate element affected, can be expected to vary at a regional scale. Accordingly, the description of baseline conditions should be presented in a manner that reflects this variability and facilitates subsequent discussion of how changes in climate could affect the Project.

5.1.4 Air Quality

Selwyn will provide a description of ambient air quality for the study area. Subjects to consider include:

- 1) ambient dust levels, for example, measures of total suspended particulates and fine particulate matter; and
- 2) concentrations in the air of pollutants from typical vehicle emissions, such as nitrogen oxides and sulphur oxides.

5.1.5 Sound

Selwyn will provide a description of the baseline levels of sound including:

- 1) identification of sound sources;
- 2) types of sounds;
- 3) when they occur; and
- 4) volume and duration.

5.1.6 Water Quality and Quantity

Selwyn will provide a description of baseline water quality and quantity for all water drainages within the study area. Subjects to consider include:

- 1) maps of the local and regional water bodies, major and minor drainages, watercourses, wetlands and lakes;
- 2) a description of the hydrological characteristics for each major drainage, watercourse, including discussion of bedload, erosion, peak flows, flood levels and flows;
- 3) a description of the hydrological characteristics for each water crossing (existing bridges and culvert extensions) including structural design hydraulics such as peak flow, freeboard, and fish passage;
- 4) a description of existing water quantity including timing and volume of peak and low flows; and
- 5) a description of existing water quality parameters for water bodies in the Project area and plans to augment the existing information where needed. Sufficient parameters must be provided to allow an assessment of potential effects to applicable valued components.

5.1.7 Sediment Quantity and Quality

Selwyn will provide a description of baseline sediment quantity and quality for all water drainages within the study area. Subjects to consider include:

- 1) sediment quality; and
- 2) sediment quantity.

5.1.8 Wildlife, Wildlife Habitat and Species at Risk

Selwyn will provide a baseline description of wildlife, including migratory birds and species at risk and wildlife habitat for the study area. Subjects to be considered include:

- 1) wildlife species;
- 2) distribution and abundance;
- 3) population status and trend;
- 4) habitat types, use and requirements;
- 5) existing levels of habitat disturbance within the geographic areas of assessment selected for specific wildlife VCs;
- 6) identification of habitat sites of special value or sensitivity;
- 7) sensitive time periods;
- 8) seasonal and migratory patterns, routes, and timing in relation to project facilities and activities;

- 9) any known issues with respect to the health of species (e.g. parasites, diseases, contaminants, condition);
- 10) locations of known raptor nesting sites or potential raptor nesting habitat within 1 km of the proposed Project footprint; and
- 11) invasive species and known distribution within the region.

5.1.9 Fish and Aquatic Habitat

Selwyn will provide a description of the baseline fish and aquatic habitat for the study area.

Subjects to be considered include:

- 1) local and regional fish species abundance, distribution and use of habitat types and known sensitive or important areas;
- 2) fish and fish habitat present at each water crossing or in close proximity to project infrastructure;
- 3) seasonal and life cycle movements and sensitive periods including overwintering areas and nursery sites;
- 4) habitat requirements for each life stage; and
- 5) invasive species and, any known issues with respect to the health of harvested species (e.g. parasites, diseases, contaminants, condition).

5.1.10 Vegetation

Selwyn will provide a description of the baseline vegetation within the study area, and with special focus paid to species at risk. Subjects to be considered include:

- 1) vegetation and vegetation assemblages;
- 2) any classification system followed, as appropriate;
- 3) identification, location and abundance of species and assemblages that are rare, protected or designated (e.g. vulnerable, threatened, endangered);
- 4) existing baseline contaminant concentrations in vegetation that may change as a result of the Project;
- 5) identification, location and abundance of existing invasive species; and
- 6) frequency and magnitude of forest fires and post-fire vegetation succession.

5.2 Human Environment Information Requirements

Selwyn will develop the socio-economic baseline using existing local or regional data and information gathered from public engagements with communities and Aboriginal groups most affected by the Project. Selwyn will use the following considerations¹⁰ when conducting the socio-economic impact assessment:

¹⁰ As per "Appendix B: Considerations for Conducting SEIA" of the *Socio-Economic Impact Assessment Guidelines, Mackenzie Valley Environmental Impact Review Board*. Available online at: http://reviewboard.ca/process_information/guidance_documentation/guidelines.php

- data must be accompanied by a rationale for its use and a description of how the data was collected and analyzed;
- use indicators relevant to the involved communities and jurisdictions – understand and incorporate the socio-economic context and values;
- statistics and analysis should be broken down enough to determine whether different communities and demographic groups are vulnerable to change (for example, statistics on local/regional income may artificially mask extreme differences between aboriginal and non-aboriginal populations, or between men and women);
- incorporate Traditional Knowledge into socio-economic impact assessment, as per the Guidelines, while respecting specific local rules and customs; and
- use qualitative *and* quantitative data.

The HPAR crosses the Sahtu Settlement Area and traditional territories of the Dehcho and Kaska First Nations (Figure 1). Selwyn will consider how the Project will affect each of these Aboriginal groups. Additionally, each Aboriginal group has identified communities most affected by the Project development:

- Tulita and Norman Wells (Sahtu Dene and Métis);
- Nahanni Butte (Nahzà Dehé Dene Band, Dehcho First Nations); and
- Ross River (Ross River Dena Council) and Watson Lake (Liard First Nation).

These communities shall be included in the description of baseline conditions. Socio-economic impact assessment will focus on describing:

- 1) the cultural well-being and way of life for Aboriginal groups in the Project area; and
- 2) the social and economic environment within communities.

5.2.1 Socio-Economic Baseline

Selwyn will describe the baseline socio-economic trends occurring in communities affected by the Project. Baseline studies will focus on the socio-economic values likely to be impacted by the Project. For each indicator, distinguish between Aboriginal, non-Aboriginal, and gender where possible and appropriate.

5.2.1.1 Education, Training, and Skills

The developer will provide a description of the baseline conditions for:

- 1) types and levels of skills and education relevant to the Project available in each community;
- 2) description of available training and/or skills that would facilitate additional work opportunities with the Project (e.g., trade schools, environmental monitoring training, other educational facilities, services and skills programs);
- 3) the location of available training and skill development (e.g. online, in Yellowknife, Fort Smith, or Edmonton); and
- 4) the time required to achieve competency in the specified training or skill.

5.2.1.2 Regional and Local Economies

Selwyn will describe the local and regional economies using existing data relevant to the communities and regions most affected by the Project. This includes the communities of Tulita, Norman Wells, Nahanni Butte, Ross River and Watson Lake, the Dehcho and Sahtu regions, and the NWT as a whole. Subjects to be considered include:

- 1) labour force description, including:
 - a. levels of employment, unemployment rates and participation rates;
 - b. local job vacancy and unfilled positions;
 - c. income levels, including use of social assistance; and
 - d. trends in the labour force.
- 2) industry and business activity, including:
 - a. employment by industry and occupation, including occupations related to traditional activities; and
 - b. a breakdown of employment according to full-time, part-time, casual or seasonal work;
- 3) barriers to employment, including a description of groups most affected; and
- 4) community and regional economic and social development plans.

5.2.1.3 Tourism & Recreational Use

Selwyn will provide a description of the types and importance of various tourism activities in the vicinity of the HPAR, with particular emphasis on the Nahanni and Nááts'ihch'oh National Park Reserves. Subjects to be considered include:

- 1) tourist activities in the vicinity of the HPAR (e.g. hiking, camping, sight-seeing, canoeing, outfitting);
- 2) important recreational or tourism routes or trails, including river travel routes and outfitting;
- 3) commercial and recreational hunting and fishing, including non-Aboriginal harvesting;
- 4) revenue generated as a result of tourism in the vicinity of the HPAR, including from outfitting; visitor use and valuation of the National Parks, including an understanding of what draws tourists to the park and what values of the parks they perceive as intrinsic; and
- 5) existing and foreseeable management plans relevant to the National Parks over the Project's lifetime.

5.2.1.4 Existing Transportation Routes and Related Infrastructure

The developer will describe the characteristics of the local and regional transportation network and associated infrastructure. Subjects to be considered include:

- 1) describe how traffic use has changed with the restoration of the HPAR road to a useable single-lane road in 2014;
- 2) describe any existing traffic management practices related to public use of the existing HPAR;
- 3) describe the volume and type of traffic use on the existing HPAR, including point of origin and seasonal variation;
- 4) existing maintenance and operational management;
- 5) existing NWT highway infrastructure required to access the HPAR;

- 6) availability of fuel and other mechanical or auto assistance services;
- 7) number of existing reported accidents;
- 8) emergency public and private services available for HPAR users;
- 9) navigable waters and water transportation access points, routes and current use; and
- 10) air travel infrastructure and current use.

5.2.1.5 Human Health and Well-being

Selwyn will describe the local and regional indicators related to human health and well-being that contribute to community wellness. Selwyn will use existing data relevant to the communities most likely affected by the Project. Primary community-based research will be conducted where required to achieve meaningful data that can be tracked and reported on. Subjects to be considered include:

- 1) population demographics;
- 2) existing community health and well-being concerns and challenges;
- 3) community self-identified strengths and goals (e.g. NWT Community Well-being Plans);
- 4) identification of vulnerable groups; and
- 5) status and capacity of social infrastructure (i.e., policing, medical, fire protection and emergency response, wellness centres, victim support, women's shelters, etc.).

5.2.2 Aboriginal Cultural Well-being

5.2.2.1 Harvesting

Selwyn will provide a description of harvesting by Aboriginal users within the vicinity of the HPAR. Harvesting activities include hunting, trapping, fishing, berry picking, medicinal plant gathering, and non-commercial forestry. Subjects to be considered include:

- 1) the cultural and economic importance of harvesting to potentially affected communities and to the traditional economy;
- 2) harvest levels and participation;
- 3) harvesting locations, with specific attention to high use or sensitive areas (based on regulatory records, public engagements and traditional knowledge);
- 4) harvest pressures for species of particular importance to traditional harvesters by species or population, season and geographic area; and
- 5) abundance and health of harvested species (for example, describe any known issues with respect to health of harvested species, such as parasites, disease, contaminants, condition).

5.2.2.2 Heritage and Cultural Resources

Selwyn will provide a description of heritage and cultural resources within the vicinity of the HPAR and other culturally important areas potentially disturbed during any project phase. Selwyn will use input from affected Aboriginal groups to describe heritage and cultural resources. Subjects to be considered include:

By Aboriginal group:

- 1) the cultural values that shape the perspectives of community members;
- 2) Aboriginal language use;
- 3) participation in traditional activities; and

- 4) cultural strengths and vulnerabilities.

By proximity to HPAR:

- 5) heritage resource potential; and
- 6) identified heritage resources and their affiliation which includes culturally important sites, such as spiritual places, burial sites, trails or special landscape features, and their affiliation.

6 ASSESSMENT OF ENVIRONMENTAL IMPACTS AND CUMULATIVE EFFECTS

The developer will identify and assess effects of the development on the biophysical and human environment. Selwyn must generate its own data where there is insufficient existing data for a meaningful impact assessment, providing the methodology, accuracy, and precision of measurements. The developer will also assess cumulative effects resulting from the development in combination with past, present and reasonably foreseeable human activities and developments. The assessment of effects will be divided into the key lines of inquiry and subjects of note, as identified in Section 3.2.5.1 and 3.2.5.2.

The following subsections provide frameworks for the information required to undertake effects assessments for the key lines of inquiry and subjects of note. The developer will follow the assessment steps listed in section 4. As per instructions in 3.2.8, Selwyn will clearly identify if an effect will occur in the Yukon, NWT, or in both territories.

6.1 Key Lines of Inquiry

6.1.1 Caribou

Selwyn will describe and evaluate the potential direct and indirect effects of all Project phases on individual caribou and on potentially affected caribou herds, including the Nahanni and Redstone herds.

6.1.1.1 Mortality risk

Including:

- 1) mortality risk due to potential increased harvesting;
- 2) mortality risk due to changes in predator-prey relationships, including seasonal effects;
- 3) mortality risk from avalanches triggered by road construction or operations, or by avalanche control; and
- 4) mortality risk from vehicle collisions, especially during the operations phase.

6.1.1.2 Direct and indirect alteration of habitat, including disturbance

Including:

- 1) direct and indirect impacts on habitat from the road footprint;
- 2) the Project's influence as visual or other sensory disturbance, including effect on habitat avoidance and effective habitat loss; and
- 3) effects of the Project on caribou movement patterns, including any changes in the interaction with other herds.

6.1.1.3 Effects on caribou population

Including:

- 1) effects on predator–prey relationships;
- 2) effects on sensitive life stages or sensitive or important habitat;
- 3) how road-related changes in harvest pressures could affect caribou;
- 4) ability of habitat or populations to recover; and
- 5) overall effects on herd abundance and distribution.

6.1.2 Accidents and Malfunctions

Accidents and malfunctions will be evaluated using a risk-based approach for the construction, operational and decommissioning phases. Management plans for accidents and malfunctions will also be provided to ensure adequate tracking and verification of the risk-based approach and to ensure there is evidence for timely and effective follow up as required. Because the topic of accidents and malfunctions is a standalone KLOI, the developer will describe the potential effects related to accidents and malfunctions to the identified valued components in this section. Consequently, it is not necessary to include this information in the assessment of each subject of note.

6.1.2.1 Risk assessment

The developer will provide a risk assessment for project construction, operation, and closure. The risk assessment will use best practice and include:

- 1) a consideration of system(s) boundaries, the elements within and any interconnections between elements;
- 2) identification of hazards and failure modes of individual elements;
- 3) quantitatively evaluate the probability of hazards, elements and compound failure modes;
- 4) an assessment of the likelihood and consequence of each risk identified;
- 5) an evaluation of the acceptability of each risk identified;
- 6) an identification of factors that affect the likelihood and/or consequence of accidents and malfunctions including:
 - a. geohazards and areas of increased likelihood or consequence of geohazards;
 - b. seasonal conditions such as ice, snow, or fog;
 - c. fires;
 - d. human error;
 - e. road grade and alignment such as areas with sharp bends or line of site issues;
 - f. proximity to water courses;
 - g. location of sensitive or important areas; and
 - h. locations and conditions that would make spill response more challenging.
- 7) a description of the developer's proposed or existing emergency response plans and/or other contingency plans that will be in place for accidents, malfunctions, or unforeseen impacts of the environment on the development, or of the development on the environment. This will include a description of the response time for emergencies or spill response. The developer will describe how these plans factor into the assessment of the likelihood and consequence of the risks identified;

- 8) a description of applicable government emergency response authorities, jurisdictions and their responsibilities. This will include a description of spill response and emergency response authorities, confirmed response capabilities, and response times. The developer will describe how third party response roles factor into the assessment of likelihood and consequence of the risks identified; and
- 9) a description of health and safety considerations for both project related personnel and members of the public who may use the road. This will include consideration of the likely response times for medical emergencies by the developer, the GNWT, or the Yukon Government.

For each project phase, accidents and malfunctions to consider include (where relevant for the project phase):

- concentrate spills, fuel spills, spills of mine reagents, and risk of resulting contamination to the environment including consideration of particularly sensitive or important areas;
- explosives and components of explosives (e.g. ammonium nitrate), explosions and/or fires; and
- transportation / traffic accidents that do not result in contamination of soil and/or water.

To help inform parties the developer will provide worst-case scenarios and identify, in the view of the developer, the most likely scenarios. For instance, a worst-case scenario may be the total loss of a load of concentrate into a river where there is no possibility of retrieving the material. A likely scenario may be the partial loss of concentrate where the majority of the material is recovered. For both scenarios, the developer will provide an assessment of the potential effects to the environment including effects of the spill or accident, effects of response activity, and any residual effects. This will include effects on:

- water quality;
- sediment quality;
- aquatic biota;
- soil and vegetation;
- wildlife; and
- ecosystem services, including drinking water and recreation.

To help inform the discussion, Selwyn will describe how the road design considerations, methods for hauling material, and operational procedures will help minimize the risks associated with the Project.

6.1.3 National Park Reserves

Selwyn will describe how the construction, operation, and decommissioning activities will affect the two National Park Reserves. The evaluation shall be completed in the context of Parks Canada's legislated and mandated priorities, including current Park Management Plans. The assessment shall identify potential long-term changes to the Parks. Main subjects to be addressed are:

- 1) changes to visitor access to park areas;
- 2) compare anticipated project effects on park reserves by contrasting the impacts of a similar development through a protected area or national park;
- 3) changes to visitor experience, including potential changes to the aesthetic value of the park, and potential alteration of visitor's perception of the park as a nature reserve;

- 4) project effect on park heritage and cultural resources; and
- 5) changes to the ecological integrity of the Park Reserves.

For clarity, the developer must give specific consideration to the two National Park Reserves when considering each of the SONs and KLOIs.

6.1.4 Effects on Communities

The developer will describe the potential effects of the Project on each potentially affected community (see section 5.2) and their residents. For issues identified, answer the question, “will the development make the problem better or worse?” Selwyn should describe any proposed mitigation measures to manage identified project-related impacts. Any residual effects will be listed, by community, as per guidance in section 4. Subjects that will be considered include:

6.1.4.1 Socio-Economic opportunities

- 1) current or proposed socio-economic initiatives or agreements (please list and provide non-confidential details) aimed at maximizing potential benefits, such as commitments for maximizing local and Aboriginal employment, contracting and business activity, including any proposed training, skills development or procurement policies and program; and
- 2) how the HPARU Project affects local or regional socio-economic development plans.

6.1.4.2 Employment & Training

- 1) the human resources required versus the available human resources in potentially affected communities. Include direct and indirect employment opportunities and contracting opportunities generated by the HPARU Project;
- 2) basic training and skills required for project employment (either directly through Selwyn or indirectly through contractors) by community, region, and NWT;
- 3) training and skill gaps that hinder employability for the Project; and
- 4) other barriers to employing, retaining or advancing northern and/or Aboriginal residents.

6.1.4.3 Contracting

- 1) how well positioned potentially affected communities are to benefit from the HPARU Project; and
- 2) the direct and indirect business opportunities generated by the HPARU Project and the potential for uptake of these opportunities locally and/or by Aboriginal peoples.

6.1.4.4 Work conditions

- 1) anticipated job wages;
- 2) work schedules and workforce housing; and
- 3) how workers will be transported to and from site.

6.1.4.5 Tourism & Recreation

- 1) the anticipated project effects on tourist activities in the vicinity of the upgraded HPAR, including any new activities made available through increased access;

- 2) effects of a potential increase in public access to the upgraded HPAR, hiking trails, lakes and rivers. Discuss the corresponding potential for increased accidents or emergency situations; and
- 3) how project effects support or hinder tourism and recreational management plans for the region.

6.1.4.6 Human Health and Well-being

- 1) project effects on community well-being concerns and goals;
- 2) anticipated benefits and adverse impacts to communities and vulnerable groups, including how the effects resulting from an increased cash flow may affect local social infrastructure;
- 3) how local employment (direct and indirect) may impact the health and well-being of employees and their families; and
- 4) estimated increases or decreases in local and/or regional populations caused by the proposed development.

6.1.5 Grizzly Bears

Selwyn will describe and evaluate the potential effects of all project phases on individual Grizzly bears and Grizzly bear populations including direct and indirect effects of the Project.

6.1.5.1 Mortality risk

Including:

- 1) mortality risk due to potential increased habituation, food conditioning, bear/human conflicts and problem bear kills; and
- 2) mortality risk from vehicle collisions, especially during the operations phase.

6.1.5.2 Direct and indirect alteration of habitat, including disturbance

Potential changes to habitat including:

- 1) availability of denning habitat due to the road footprint and operation;
- 2) availability of foraging habitat;
- 3) availability of security areas; and
- 4) effects on habitat features (e.g., rub trees).

The effect of activities associated with all project phases will be considered, as will methods to minimize the effect of the all phases of the Project on grizzly bears, including strategies for mitigation and monitoring.

The evaluation of effects related to grizzly bears will be supplemented by management plans covering wildlife and wildlife habitat protection and wildlife effects monitoring.

6.2 Subjects of Note

6.2.1 Bedrock Geology and Surficial Geology

Selwyn will describe and evaluate the potential effects of the Project on geology and surficial geology.

6.2.1.1 Terrain stability

Including:

- 1) effects on landforms from road widening and alignment and borrow sources;
- 2) permafrost considerations such as degradation, changes in the ground thermal regime, or mass movement;
- 3) snow distribution and effects on ground thermal regime;
- 4) effects to organic-rich soil dominated landscapes such as peat lands;
- 5) flooding;
- 6) fluvial geomorphological processes including erosion and sedimentation; and
- 7) avalanche risks and the effect of avalanche management on the environment.

6.2.1.2 Erosion and sedimentation

Including:

- 1) drainage beside and beneath the road; and
- 2) channelization and non-channelization flow causing erosion and sedimentation.

6.2.1.3 Metals in soils

The developer will describe and evaluate the potential of the Project to contaminate soils along the road from the release or distribution of concentrate during transport.

6.2.1.4 Granular materials

Including:

- 1) locations, areas and volumes of material from each proposed borrow site;
- 2) excavation requirements;
- 3) ownership and operation of borrow pits;
- 4) potential for acid rock drainage and metal leaching;
- 5) abundance and distribution of granular materials for future users; and
- 6) plans for remediation and reclamation of borrow pits.

6.2.2 Air Quality and Sources of Sensory Disturbance (Light, Dust, Noise and Vibration)

Impacts to air quality will consider emissions from all project sources including vehicles, equipment, and fugitive dust. The developer will describe all emissions (including greenhouse gases) and will assess their effects on the environment. Sensory disturbances include dust, noise, light, and vibration. The effects of these sensory disturbances to wildlife will be discussed in the wildlife and wildlife habitat subject of note and the caribou key line of inquiry. Sensory disturbances to humans will be addressed in key lines of inquiry for National Park Reserves and areas outside the national parks.

6.2.2.1 Air quality

The assessment of air quality will consider ambient air quality within the HPAR corridor and the effects during construction and operation phases from point sources and non-point sources

including vehicle traffic, construction equipment, crushers, blasting, and other sources. Selwyn will describe and evaluate the potential effects of the Project on air quality including consideration of:

- 1) fugitive dust emissions from vehicles and other equipment, unpaved roads and stationary sources;
- 2) contaminants of concern emissions by source for each phase (construction, operation and maintenance, and closure), including emission rate, timing and duration; and
- 3) potential effects on human health.

Once potential effects of the Project on air quality have been identified, the Review Board must understand what mitigations are in place in order to minimize the adverse effects of these impacts. Towards this end, the developer will describe methods of dust suppression and emission control.

6.2.2.2 Noise, vibration and light

The developer will describe and evaluate the potential effects of the Project on sensory conditions, including ambient sound, smell, vibration, and vision. The effects of noise emissions, vibration, and artificial light on valued components will be addressed in the relevant sections. For example, effects of noise on breeding birds will be considered in the assessment of Wildlife and Wildlife Habitat while effects of noise on visitor experience to the park reserves will be addressed in the KLOI. Selwyn will describe and evaluate the potential effects of the Project on sensory conditions, including consideration of:

- 1) all types of noise emissions by source for each phase (construction, operation and maintenance, and closure), including:
 - a. magnitude, timing and duration;
 - b. under normal operating conditions and peak conditions (e.g. use of engine breaks);
 - c. in combination with other sources of noise and that may result from accidents and malfunctions. This will include, but is no limited to:
 - i. haul fleet including use of engine breaks;
 - ii. crushers;
 - iii. heavy equipment; and
 - iv. blasting.
- 2) vibration caused by blasting;
- 3) artificial light from road traffic and other project components (such as camps, quarries, new bridge lighting, etc.);
- 4) sensitivity of some species to strong smells, and strongest odour sources of the Project; and
- 5) potential effects of noise to humans.

6.2.3 Water and Sediment

The developer will describe and evaluate potential effects of the Project on water and sediment including the following.

6.2.3.1 Water drainage patterns and flows

Including:

- 1) changes to surface drainage patterns and surface hydrology including changes caused by road-related impacts on terrain, soils and permafrost;
- 2) changes to snow distribution and potential impacts on drainage;

- 3) water withdrawal and volume of withdrawal (e.g., for potable water, dust suppression);
- 4) changes to flow or water levels including potential for icings at watercourse crossings; and
- 5) issues related to borrow extraction including melting of ground ice and potential changes to drainage patterns.

6.2.3.2 Water and sediment quality

Including:

- 1) possible effects on surface water and groundwater including:
 - a. drinking water quality for humans and wildlife; and
 - b. recreational water quality;
- 2) changes to water quality due to thaw slumps and other slope instability at water crossing;
- 3) changes to sediment quality from dust and discrete point sources from all project phases and specifically related to road traffic and transport of concentrates, fuels and mine reagents;
- 4) discharge or seepage of wastewater effluent, contaminants and chemical additives;
- 5) potential for acid rock drainage and metal leaching from crushed rock used for the Project; and
- 6) changes to water quality due to erosion, sediment deposition and re-suspension.

The evaluation of effects related to water and sediment will be supplemented by material in management plans, including for road operations.

6.2.4 Vegetation

Selwyn will describe and evaluate the potential effects of the Project on vegetation including the following.

6.2.4.1 Vegetation cover and composition

Including:

- 1) amount of vegetation clearing by vegetation classification type;
- 2) changes to the soil, hydrological or permafrost regimes related to vegetation changes;
- 3) vegetation control during operations;
- 4) re-establishment of vegetation and reclamation of borrow sites and other disturbances (particularly identification of vegetation types and seed mixes to be used, and identification of the specific borrow site to be re-vegetated, and those borrow sites that will not be re-vegetated);
- 5) amount of merchantable timber removed during clearing and the potential for facilitating use of waste timber by communities;
- 6) introduction of invasive species and associated threats; and
- 7) alteration or loss of species, or vegetation assemblages that are rare, valued, protected or designated sensitive or important areas or habitat.

6.2.4.2 Contamination of vegetation

- 1) Effects of HPARU Project emissions including dust and deposition of metals.

6.2.5 Fish and Aquatic Habitat

Selwyn will evaluate potential alteration or loss of fish distribution, abundance, and habitat (including riparian areas) due to development activities during all project phases, including the following:

- 1) effects of watercourse crossings and temporary vehicle crossing methods;
- 2) effects on sensitive or important areas or habitat, including spawning and rearing habitat;
- 3) blockages to movement;
- 4) lake and wetland connectivity;
- 5) effects of road dust on fish and fish habitat;
- 6) effects of water withdrawal;
- 7) potential for increased fishing;
- 8) potential for and effectiveness of reclamation; and
- 9) relevant policies, management plans or other measures to protect or enhance fish and aquatic habitat, including timing restrictions, protected areas, or regulations.

6.2.6 Wildlife and Wildlife Habitat

This subject of note will not include detailed assessment of effects on caribou and grizzly bear, as they are designated as KLOIs. The developer will provide an assessment of all wildlife species potentially affected the Project. Species to consider include: moose, mountain goat, Dall's sheep, furbearers, song birds, breeding birds, and waterfowl.

The developer will describe and evaluate the potential effects of activities associated with all phases of the Project on wildlife and wildlife habitat (including birds) and methods to minimize the effect of the Project on wildlife, including strategies for mitigation and monitoring.

6.2.6.1 Mortality risk

Including:

- 1) mortality risk due to potential increased harvesting;
- 2) mortality risk due to avalanches or avalanche management;
- 3) mortality risk due to seasonal changes in predator-prey relationships, including seasonal effects;
- 4) mortality risk from vehicle collisions, especially during the operations phase; and
- 5) mortality from collisions with temporary or permanent structures and wires (such as those related to communications systems).

6.2.6.2 Direct and indirect alteration or disturbance of habitat

Including:

- 1) direct and indirect impact on habitat from all project components and phases including direct road footprint, borrow sources, quarries, temporary access road and temporary camps;
- 2) the Project's influence as a sensory disturbance (specifically to visual or auditory disturbance), including effect on habitat avoidance and effective habitat loss;
- 3) effects on wildlife movement patterns and wildlife movement corridors;
- 4) habitat fragmentation;
- 5) potential for road emissions (such as metals) and how this may affect wildlife;

- 6) potential disturbance to raptors nesting within 1km of the Project footprint;
- 7) effects on use of the Project area by resident and migratory birds protected by the *Migratory Birds Convention Act, 1994*;
- 8) response to edge effects; and
- 9) potential for and effects of invasive species.

6.2.6.3 Human-wildlife conflicts

Potential for and measures to reduce conflicts (such as bear encounters) in camps, and during construction and maintenance activities.

6.2.6.4 Effects on wildlife populations

- 1) effects on predator-prey relationships, including for birds and bird eggs;
- 2) effects on sensitive life stages (e.g., migration, breeding, calving, denning, overwintering) or sensitive or important habitat;
- 3) how road-related changes in harvest pressures from traditional, commercial and recreational hunting could affect the resource;
- 4) potential for road emissions to affect contaminant levels in wildlife;
- 5) ability of habitat or populations to recover; and
- 6) overall effects on wildlife abundance and distribution.

6.2.7 Species at Risk

In addition to the requirements outlined in sections 6.2.5 and 6.2.6, the developer will identify and evaluate the impacts of the Project to any species assigned a special conservation status by COSEWIC or SARA or assigned a rank other than secure through the NWT General Status Ranks and confirmed to be present in the Project vicinity. This includes bird species at risk, and bats and other mammals. Subjects that will be considered include:

- 1) the geographic extent of the species;
- 2) the timing and duration of key life cycle stages; and
- 3) methods to minimize the effects of the Project on the species.

6.2.8 Traditional Land Use and Harvesting

Selwyn will describe and evaluate the potential impacts of the construction, operation, and closure of the Project on traditional land use and harvesting, including the effects of the Project on potential future traditional use of the area. Traditional land use and harvesting is considered to include fishing, hunting, trapping, and gathering of fish, wildlife, and vegetation for human use. Human use includes, for example, food, medicine, furs, or the dissemination of culture.

6.2.8.1 Harvesting

- 1) describe changes to access levels including increased access to the land and surrounding waters, as well as increased access to important areas or routes used for traditional harvesting;
- 2) describe any changes to harvest patterns arising from changed access, including travel patterns, costs and seasonal use;

- 3) describe the potential for increased hunting and fishing pressures and how this could impact valued harvested species and locations; and
- 4) describe the potential for increased competition between Aboriginal and Non-Aboriginal harvesters and the impact of such.

6.2.8.2 Mitigations

Once potential effects of the Project on traditional harvesting have been identified, the Review Board must understand what mitigations are in place in order to minimize the negative effects of these impacts. Towards this end, Selwyn will describe:

- 1) measures to avoid or minimize changes in the abundance, distribution, or quality of harvested species, or mitigate the consequences of such changes;
- 2) mechanisms to control project workforce-related hunting, fishing, or disturbance of wildlife; and,
- 3) mechanisms of resource management agencies and other parties to manage hunting, and fishing by:
 - a. resident hunters and fishers;
 - b. non-resident hunters and fishers; and
 - c. Aboriginal harvesters.

6.2.9 Non-Aboriginal Hunting and Fishing

Selwyn will describe potential project effects to recreational and subsistence hunting and fishing (excluding harvesting from Aboriginal groups). The description will include issues of cross-jurisdictional licencing and management issues. Selwyn will compare anticipated project effects on recreational hunting and fishing to the impacts of a similar development through an undeveloped and northern environment.

6.2.10 Cultural Resources and Land Use

Selwyn will describe and evaluate the potential effects of the Project on cultural resources (beyond those described in response to the discussion of impacts on harvesting). Selwyn should clearly describe how they came to their conclusions and what sources of information were used to get there. Where project activities have the potential to adversely impact valued cultural components, Selwyn will describe how the impact will be managed so that it does not become significant.

6.2.10.1 Traditional lifestyles, values and culture

- 1) describe any project-related changes to the perception of the land by traditional users; and
- 2) describe project effects to Aboriginal way of life and well-being.

6.2.10.2 Cultural and spiritual sites and activities

Selwyn will describe activities taken with community members to ensure that all spiritual and cultural sites, including burial sites, along the route have been identified, and Selwyn's degree of confidence that it has identified all such sites.

6.2.11 Heritage Resources

Selwyn will describe and evaluate the potential effects of the development on heritage resources.

6.2.11.1 Disturbance of heritage resources

Selwyn will describe activities taken with community members to ensure that all heritage resources along the route have been identified, and the company's degree of confidence that it has identified all such sites.

6.2.11.2 Management and documentation of heritage resources

Selwyn will describe how identified heritage resources will be preserved, managed, and documented as required.

6.2.12 Road, Lake and River Access and Use

Selwyn will describe how the Project will affect the use of roadways, lakes, and rivers and will describe measures to avoid or minimize adverse impacts.

6.2.12.1 Access

- 1) changes in access to areas, lakes and rivers for residents and visitors; and
- 2) access control and management.

6.2.12.2 Use and effects on existing transportation routes

Including:

- 1) increased traffic and potential for accidents along other public roadways;
- 2) integrity of other roadways (e.g., surface damage from increased use) and whether existing infrastructure is adequate to meet increased demands;
- 3) changes to the volume and type of traffic use on the HPARU, including aspects of seasonal variation;
- 4) any changes to the management of operations, maintenance or public access; and
- 5) effects on existing water transportation routes and navigation on navigable waters.

The evaluation of effects related roadways, lake and river access and use will be supplemented by management plans related to road access and road operations.

7 ASSESSMENT OF CUMULATIVE EFFECTS

As described in section 4 the developer will include an assessment of cumulative effects for each KLOI and SON as required. This section will include a summary of the cumulative effects assessment that considers the residual adverse effects of the proposed HPARU Project on valued components, placing particular attention on key lines of inquiry (see Section 3.2.5.1). The developer will consider the effects of the prospective Selwyn mine, other transportation infrastructure, other resource development activities, and Park operations now and into the reasonably foreseeable

future. The developer will apply a similar geographic scope to its cumulative effects assessment as it did for its analysis of direct project effects.

8 ALTERNATIVES ASSESSMENT

Selwyn will describe and evaluate technically and economically feasible alternatives to the Project that would allow Selwyn to achieve the same objective as the proposed development (e.g., alternate road routes, using a railroad or a pipeline to transfer zinc and lead concentrates and/or other materials rather than the proposed road).

Given that the Project involves upgrades to an existing road, the developer will also provide commentary on the potential alternatives within the Project, and their role in avoiding and/or minimizing impacts (e.g., selected roadway design features, construction camps, and borrow pits, seasonal use of the road).

The analysis of alternative to the Project should take into account the *Multiple Accounts Analysis* described by Roberson and Shaw (2004)¹¹. The alternatives analysis should include technical feasibility, cost-benefit analysis, socio-economic effects, and environmental effects. The alternatives should be ranked with an explanation behind the ranking, why certain alternatives were rejected, and why the proposed Project was selected.

Within the alternatives assessment, Selwyn will additionally consider alternatives from a socio-economic perspective, including:

- alternatives to work schedules, work areas, and transportation;
- compare development utility with economic and social utility of alternative land uses for the area (e.g. tourism or local economic development); and
- explain merit of the development proceeding as opposed to no development happening.

A no-project scenario will also be described. When describing and evaluating this scenario the developer will take into account that the prospective Selwyn mine is dependent on the road and hence, this scenario will also include no Selwyn mine.

9 FOLLOW-UP AND MONITORING

The DAR will include a section that summarizes commitments to follow-up and monitoring plans and programs. Follow-up and monitoring will also be covered in specific sections, where relevant, such as sections related to key lines of inquiry and subjects of note. Information and plans related to follow-up and monitoring will be part of relevant management and monitoring plans.

"Follow-up" means a program for verifying the accuracy of the EA of a project and determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the Project.

The developer will:

¹¹ See guidance at http://technology.infomine.com/enviromine/issues/cls_maa.html

- 1) clearly describe the regulatory and non-regulatory monitoring requirements for the life of the Project;
- 2) provide a description of the purpose of each program, responsibilities for data collection, analysis and dissemination, and how results will be used in an adaptive management process;
- 3) describe how project-specific monitoring will be compatible with the NWT Cumulative Impact Monitoring Program or other regional monitoring and research programs; and
- 4) describe how the results of follow-up monitoring and the management response framework would be used and incorporated into land use permit and water licence applications in support of the Project construction and operations.

Selwyn is encouraged to discuss and adopt common data collection and monitoring protocols with local and regional monitoring programs including GNWT-Environment and Natural Resources to facilitate project impact analysis.

In addition, Selwyn is encouraged to use management response plans to accomplish adaptive management. Guidance on a management response framework, how to link monitoring results to management decisions, and how management activities are developed adaptively in response to changes in the environment can be found in the Wek'eezhii Land and Water Board document *Guidelines for Adaptive Management – a Response Framework for Aquatic Effects Monitoring. Draft. Oct 17, 2010.*

10 CLOSURE AND RECLAMATION

Closure and reclamation will be covered as part of the development description and elsewhere in the DAR where required and applicable. Closure and reclamation sub-sections will also be included in relevant management and monitoring plans.

The developer will provide a conceptual closure and reclamation plan (CCRP) for the temporary construction camps, the road, and borrow pits, based on the guidance in the Mackenzie Valley Land and Water Board / Government of Northwest Territories *Northern Land Use Guidelines for Pits and Quarries, Camp and Support Facilities and Access: Roads and Trails* and other appropriate information sources. In addition to addressing the items outlined in the guidelines, the CCRP will:

- explicitly state the proposed post-closure land use(s) for the Project footprint; and
- clearly link both the post-closure land use and the closure objectives to the information collected through the public and Aboriginal engagement process.

APPENDIX A: GUIDELINES FOR MONITORING AND MANAGEMENT PLANS

In the interest of fair, efficient, and effective EA that successfully meshes with integrated resource management in the Mackenzie Valley, the Review Board encourages Selwyn to review the following non-comprehensive list of documents while assessing potential impacts from the development, as well as in creating and presenting monitoring and mitigation programs for the Project. The documents include:

Mackenzie Valley Environmental Impact Review Board

- *Environmental Impact Assessment Guidelines (2004)*
- *Socio-Economic Impact Assessment Guidelines (2007)*
- *Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment (2005)*

Mackenzie Valley Land and Water Board

Any relevant guidelines published by the Mackenzie Valley Land and Water Board including:

- *The Mackenzie Valley Land and Water Board Document Submission Standards (2012)*
- *Standards for Geographical Information Systems Submissions (2012)*
- *Guide to Completing Land Use Permit Applications (2013)*
- *Guide to Completing Water Licence Applications (2003)*
- *Engagement and Consultation Policy (2013)*
- *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits (2013)*
- *Water and Effluent Quality Management Policy (2011)*
- *Guidelines for Developing a Waste Management Plan (2011)*
- *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (2013 MVLWB/AANDC)*
- *Draft Guidelines for Adaptive Management (2010)*

Fisheries and Oceans Canada

- *Freshwater Intake End-of-Pipe Fish Screen Guideline (1995)*
- *Protocols for Winter Water Withdrawal in the Northwest Territories (2005)*
- *Fish Screen Design Criteria for Flood and Water Truck Pumps (2011)*

Indigenous and Northern Affairs Canada

- *Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories (2009)*
- *Mine Site Reclamation Policy for the Northwest Territories (2002)*
- *Guidelines for Spill Contingency Planning (2007)*

Canadian Council of Ministers for the Environment

- *Canadian Environmental Quality Guidelines for the Protection of Aquatic Life*

Government of the Northwest Territories

- *Guideline for Ambient Air Quality Standards in the Northwest Territories Government of the Northwest Territories Guideline for Dust Suppression (2004)*
- *Northwest Territories Cumulative Impact Monitoring Program*¹²
- *Draft Wildlife and Wildlife Habitat Protection Plan and Wildlife Effects Monitoring Program Guideline (2013)*
- *Guidelines for Dust Suppression (2013)*
- *Northern Land Use Guidelines: Camp and Support Facilities*
- *Northern Land Use Guidelines: Pits and Quarries*
- *Northern Land Use Guidelines: Access: Roads and Trails*
- *Guidelines for Developers for the Protection of Archaeological Sites in the Northwest Territories*
- *socio-economic programs and services* <http://services.exec.gov.nt.ca/service-directory>.

¹² See <http://www.enr.gov.nt.ca/programs/nwt-cimp>