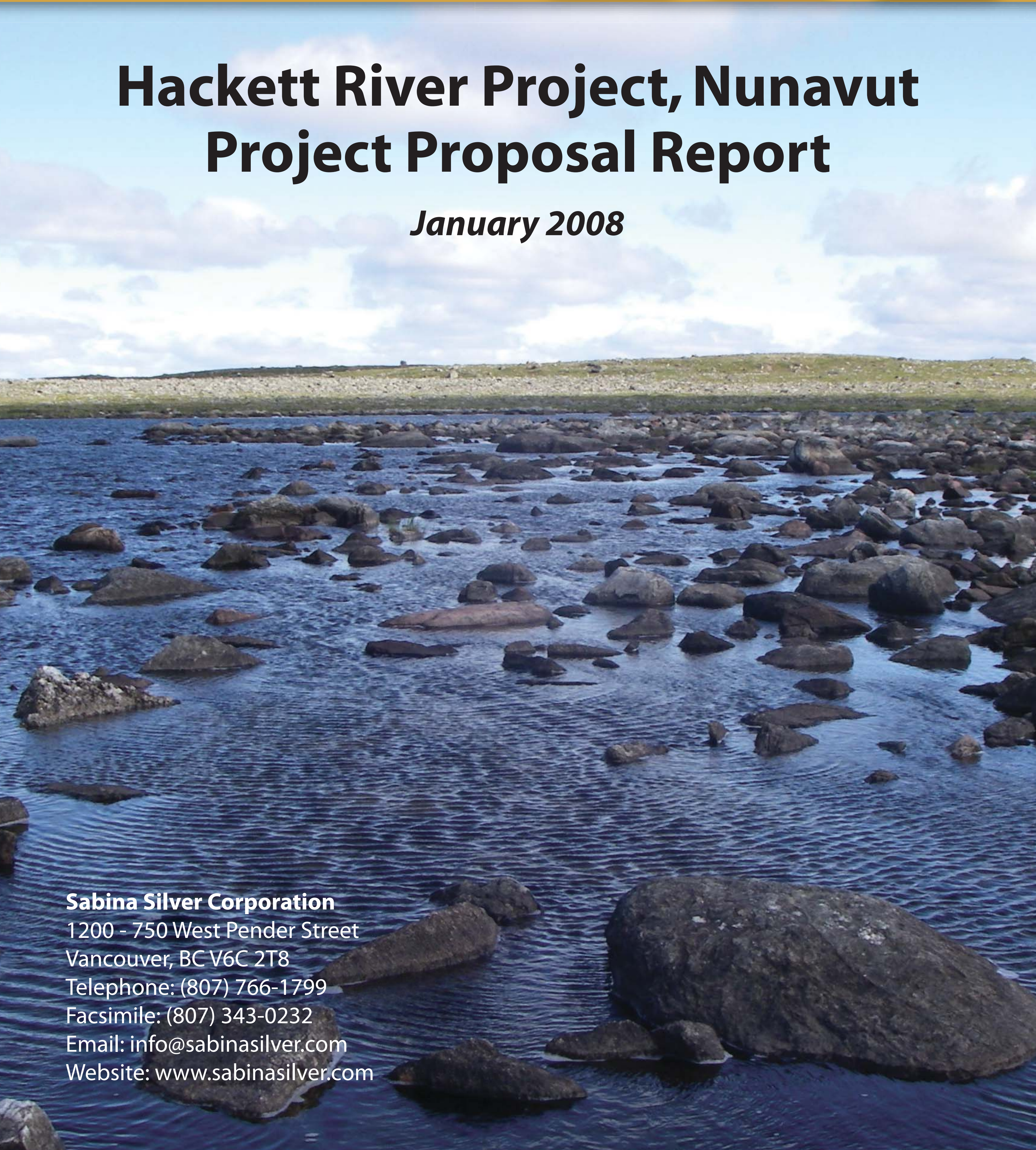
SABINA SILVER CORPORATION





Hackett River Project, Nunavut
Project Proposal Report

January 2008

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EXECUTIVE SUMMARY

Executive Summary

Sabina Silver Corporation (Sabina) has prepared a Project Proposal and permit applications for the development of the Hackett River Project (the "Project"). The Project is located in the West Kitikmeot Region of Nunavut about 75 km south of the southern portion of Bathurst Inlet. The mineral potential of the Project has been explored since the 1960's and recent work by Sabina has found three economical deposits of zinc, silver, copper, lead and gold.

Project Description

The proposed Project includes the development of two open pits (Main Zone deposit and East Cleaver deposit) and one underground mine (Boot Lake deposit). Ore would be mined and trucked to a conventional grinding and flotation plant on site to produce zinc, copper, and lead concentrates. Waste material from the mine would be placed on the land in certain areas and tailings would be deposited under water in a nearby impoundment. The mine and mineral processing plant would operate for about 14 years and employ a total of 225 to 350 people. Only about half of the employees would be on site at any one time because of the fly in/fly out rotational schedule.

The concentrate produced at the Project would be trucked to a port located at Bathurst Inlet using the proposed Bathurst Inlet Port and Road (BIPR). A 23 km all-weather access road would be constructed to connect the mine with the proposed BIPR road, and approximately 80 km of the northern portion of the BIPR road would be used to haul concentrate to the port and consumables back to the mine site. From the port, the concentrate would be shipped to overseas markets by using the shipping route to the east.

The Project would also include a camp, mineral processing plant, storage areas, maintenance and mechanical repair warehouses, fuel tanks, tailings impoundment, waste rock piles, airstrip, and local site roads. Sabina would also construct a concentrate storage and loading facility at the port site. Most of these facilities would be removed at the end of the mine life. Roads, the airstrip, the tailings impoundment and waste rock piles cannot be removed and would be returned to the land use agreed to at that time. This is determined with regulators and relevant communities.

Sabina is developing a mine plan that uses scientific information, public input and traditional knowledge. Location of the access road, the tailings impoundment, waste rock piles, mineral processing plant and camp will be finalized based on this input. Sabina is committed to construct, operate, close and reclaim the mine site in such a way that meets regulatory requirements, minimizes environmental and social impacts and provides opportunities for economic and social development in Nunavut.

A summary of the proposed Project is provided in the table below.

	Open Pit Mining	Underground Mining
Location	Main Zone (East and West) and East Cleaver Zone.	Boot Lake Zone and Main Zone and East Cleaver Zone below the pit.
Mining Method	Conventional truck and shovel.	Sub-level open stoping with backfill and/or sub-level caving.
Mine Life	13.6 years	
Production Rate (Ore)	10,000 t/d	
Production Rate (Waste)	33,400 t/d LOM average	
Millfeed Source	60%	40%
Mill Processing Rate	10,000 t/d	
Mill Processing Method	Standard grinding and flotation circuits	
Products	Copper, Lead, Zinc concentrate	
Transportation and Logistics	A 105 km all-season road construction to Bathurst Inlet Port (23 km mine site to BIPR route connection and 82 km to Bathurst Inlet Port along BIPR road). Concentrate haul will be operated by Sabina. Backhaul supplies and fuel to the mine site.	
Infrastructure and Site	Port Facilities at Bathurst Inlet – Loading/unloading facilities, fuel storage, consumables storage and concentrate storage facilities. Mine Site – Airstrip, power generation, mill and maintenance shop, camp, tailings management facility, waste rock piles, limited fuel, concentrate and consumables storage.	
Markets and Smelter	Mainly European and North American Smelters. Potential East Asian Market for Copper and Lead Concentrate.	

Public Consultation

Public participation is one of the five guiding principles that the Nunavut Impact Review Board (NIRB) uses to fulfill its mandate. Public participation is therefore fundamental to NIRB's environmental assessment process and to the project life cycle.

Sabina has initiated a phased consultation and public participation program. The initial phase, which is presented in this report, focuses on the period prior to the submission of the Project Proposal. Subsequent phases to fulfill consultation and participation needs across the project life (environmental assessment and review; construction; operations, closure and decommissioning) will be developed as the project proceeds.

The key objective of Sabina's consultation program is to ensure that all potentially-affected and interested groups are offered the opportunity to learn about, question, and comment on the development plans of the proposed Project.

Traditional Knowledge

The Hackett River Project lies in the traditional territory of the Copper Inuit of the West Kitikmeot. There are two major regional traditional knowledge projects in existence that cover this area, the Naonaiyaotit Traditional Knowledge Project (NTKP) and the Tuktu Nogak Project (TNP). These projects belong to the Inuit, as represented by the KIA (Kitikmeot Inuit Association).

There are two phases planned for the assessment of traditional knowledge for the Hackett River Project. The first phase is a compilation report of the existing traditional knowledge, from the NTKP, Tuktu Nogak and other sources. The second phase will be the application and integration of this knowledge with that collected by biologists and scientists within the environmental assessment.

At the time of writing this report, Phase 1 of the planned program is being conducted without utilizing the NTKP and TNP databases. Sabina has requested permission to the KIA to access the databases several times in 2007, but has not been granted access. Hence, Phase 1 of the program will likely consist of obtaining information from personnel interviews, and utilizing any other traditional knowledge that is publically available.

Description of the Existing Environment

Comprehensive baseline environmental studies were conducted in the Project area in 2007, and are planned to continue in 2008. The following components were monitored as part of the 2007 environmental baseline studies:

- Meteorology and Permafrost;
- Hydrology;
- Freshwater Water Quality, Sediment Quality and Aquatic Biology;
- Freshwater Fish and Fish Habitat;
- Marine Water Quality, Sediment Quality and Aquatic Biology;
- Marine Fish Habitat;
- Wildlife, including Caribou, Muskox, Birds, Waterfowl, Raptors, Dens, Small Mammals;
- Mapping, Vegetation and Soils;
- Archaeology;
- Minesite Drainage Chemistry;
- Public Consultation;
- Traditional Knowledge;
- Socio-Economic; and
- Land Use.

Results from the 2007 baseline studies are currently being written as a series of baseline reports.

In this report, the existing physical, biological, and socio-economic environments relevant to the proposed Project are described. Site-specific information along with literature and available historical sources were used to describe the existing environment. Species of concern that could interact with the project are also indentified. The report also includes a description of potential Valuable Ecosystem Components (VECs) and Valuable Socio-Economic Components (VSECs) that could be used for the preparation of a draft Environmental Impact Statement (draft EIS).

Identification of Potential Environmental Effects and Proposed Mitigation

Potential effects on the physical, biological, and socio-economic environments were identified based on the proposed Project development. Potential effects and proposed mitigation were described for the following environmental components:

- Physical Environment: Air Quality, Noise, Ground Stability and Permafrost, Groundwater, Hydrology and Limnology, Freshwater Water Quality, Freshwater Sediment Quality, Climate Conditions, Unique or Fragile Landscapes, Soil Quality;
- Biological Environment: Vegetation, Terrestrial Wildlife, Migratory Songbirds and Shorebirds, Raptors, Waterfowl, Freshwater Aquatic Organisms, Freshwater Fish and Habitat;
- Marine Environment: Air Quality, Noise, Marine Water Quality, Marine Sediment Quality, Marine Aquatic Organisms, Marine Fish and Habitat, Marine Wildlife, Marine Birds and Waterfowl;
- Socio-Economic Environment: Archaeology, Land and Resource Use, Socio-Economic (including Employment and Training).

Proposed mitigation measures to either avoid or minimize the potential effects are described for each environmental component.

The potential for transboundary effects are also described in this report. There are several animal species that potentially migrate through the Project area as well as areas outside of Nunavut, including grizzly bears, migratory birds, and caribou. There are also marine mammals that can occur along the shipping route and migrate to areas outside of the Nunavut portions of the Canadian high Arctic.

Potential cumulative effects are also described in this report. As requested in NIRB's Part 2 Screening Form, a discussion of how the potential effects of this Project interact with the potential effects of relevant past, present, and reasonably foreseeable projects in a regional context is included.

It should be noted that all potential effects discussed in this report, including potential transboundary effects and potential cumulative effects, are conservative in that only potential effects are indentified, not residual effects. A detailed environmental assessment that includes the nature and significance of residual effects (those effects remaining after mitigation measures are considered) will be conducted as part of a draft EIS.

Environmental Plans

As part of protecting the environment and minimizing environmental effects from the Project to the extent possible, many environmental plans will be developed both before and during the operation of the mine. Many plans will be required before various permits and authorizations will be granted, while others will help Sabina to educate and train employees, and provide feedback on how its operations are influencing the physical, biological, and socio-economic environments. At this early phase of the Project, only a few environmental plans are discussed in this report, including:

- An overall Environmental Management Plan
- An Environmental Awareness Program
- An overall Environmental Monitoring Program, of which there would be many specific monitoring programs for various environmental components; and
- A general Closure and Reclamation Plan.

These plans, among others, will be more fully developed for inclusion in a draft EIS in the future.

Hackett River Project
Project Proposal

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1. INTRODUCTION

1. Introduction

Sabina Silver Corporation (Sabina) is proposing to develop the Hackett River Project (the Project), which is located in the West Kitikmeot region of Nunavut, as shown in Figure 1-1.

This Project Proposal is submitted in accordance with Articles of the Nunavut Land Claim Agreement and the Nunavut Impact Review Board's (NIRB) requirements for proposed mine developments.

The objective of this report is to introduce the Project to the public and regulatory agencies and to initiate the review process. This report is also intended to support permit applications for the Project. Rescan Environmental Services Ltd. (Rescan) has prepared this Project Proposal on behalf of Sabina. AMEC has been retained by Sabina for engineering services, and contributed to the Project Description portion of this report.

1.1 Proponent Information and Current Authorizations

Sabina is a Canadian publicly listed mining company (SBB: TSX-V) that is focused on its 100%-owned Hackett River Project. Company contact details are as follows:

Sabina Silver Corporation (Legal Office)
1200-750 West Pender Street
Vancouver, BC V6C 2T8
Tel: 807-766-1799
Fax: 807-343-0232

Table 1.1-1 presents the current authorizations and permits that are in place for the mineral exploration activities and environmental baseline data collection activities occurring on the property.

1.2 Sabina Environmental and Social Policy

Sabina Silver Corporation is committed to environmentally responsible and socially acceptable exploration and mining practices. We are dedicated to creating and maintaining a safe environment for both the land we occupy and the people that drive its success. The company's philosophy is to conduct its operations to protect not only the environment, but the health and safety of its employees as well as the public.

Sabina also subscribes to the principles of sustainable development in mining. While mining cannot occur without an impact on the surrounding natural environment and communities, our responsibility is to limit negative environmental and social impacts and to enhance positive impacts.

FIGURE 1-1

General Hackett River Project Location

SABINA SILVER CORPORATION

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Table 1.1-1
Current Authorizations and Permits

Type of Authorization	Permit Number	Authorizing Agency	Governing Activity	Dates Valid
Water License (Type B)	2BE-HAK0709	Nunavut Water Board	Water use and waste disposal	March 2, 2007 to December 31, 2009
Land Use Permit	N2004C0005	Department of Indian and Northern Affairs Canada	Exploration activities on Crown Land	April 7, 2007 to April 7, 2008
Inuit Land Use Licence	KTL303C010	Kitikmeot Inuit Association	Staking and prospecting, exploration, drilling, fuel storage, camp on Inuit Owned Lands	Mar. 18, 2007 to Mar. 17, 2009
NRI-Social Sciences and TK Research Permit	0400807N-M	Nunavut Research Institute	Collection of socio-economic information from communities	June 1, 2007 to October 1, 2008
NRI-Land and Water Research Permit	0400607N-M	Nunavut Research Institute	Collection of biophysical baseline data	April 1, 2007 to December 31, 2010
GN-Wildlife Research Permit	WL 000828	Department of Environment, Government of Nunavut	Collection of wildlife baseline information, including conducting aerial surveys	May 15, 2007 to December 31, 2007
GN-Archaeology and Palaeontology Permit	07-022A	Department of Culture and Heritage, Government of Nunavut	Collection of archaeology baseline information	June 11, 2007 to December 31, 2007
DFO Licence to Fish for Scientific Purposes	S-07/08-1032-NU	Department of Fisheries and Oceans	Collection of fish and aquatic life baseline data	June 28, 2007 to October 30, 2007
DFO Animal Use Protocol Permit	FW1-ACC-2007-2008-050	Department of Fisheries and Oceans	Collection of fish and aquatic life baseline data	June 28, 2007 to October 30, 2007

To achieve these goals, Sabina is committed to:

- Seeking to be environmental leaders in the mining community by integrating responsible environmental management as an essential component of all business decisions;
- Complying with all applicable laws, regulations and standards; upholding the spirit of the law and where laws do not adequately protect the environment, applying standards that minimize any adverse environmental impacts resulting from the company's operations;
- Communicating openly with employees, the regulatory community and the public on environmental issues and addressing concerns pertaining to potential hazards and impacts;
- Assessing the potential affects of operations and integrating protective measures into the planning process to prevent or reduce impacts to the environment and on public health and safety;
- Taking appropriate corrective actions should unexpected environmental impacts occur. This will also include taking appropriate action to prevent reoccurrence of these impacts;
- Providing adequate resources, personnel and training so that all employees are aware of and able to support implementation of the environmental and social policy;
- Conducting and supporting research and programs that improve understanding of the local environment, conserve resources, minimize waste, improve processes and protect the environment;

- Working with the appropriate local regulators and agencies to maximize benefits to the affected communities and residents; and
- Balancing all decisions with best management practices, scientific principles and traditional knowledge.

1.3 Project Fact Sheet

The following information is designed to give a quick overview of the proposed Hackett River Project.

Project	Hackett River Project
Location	West Kitikmeot Region of Nunavut. The approximate centre of the Property is at 65˚ 55' North Latitude, 108˚ 30' West Longitude, approximately 75 km south of the southern portion of Bathurst Inlet.
Property	Project property covers 12,250 ha and is comprised of 7 mineral leases, overlain by surface rights of which approximately 72% is Inuit Owned Land and approximately 28% is Crown Land.
Metals	Zinc, Silver, Copper, Lead, Gold
Resource	Indicated Resource of about 47.1 million tones with an average grade of 0.32%Cu, 0.68% Pb, 4.67% Zn, 4.37 oz/st Ag (149.89 g/t), and 0.009 oz/st Ag (0.32 g/t). Inferred Resource of 12.4 million tonnes with an average grade of 0.27% Cu, 0.52% Pb, 3.77% Zn, 4.15 oz/st Ag (142.41 g/t), and 0.009 oz/st Au (0.31 g/t).
Mine	Three separate deposits: East Cleaver, Main Zone, and Boot Lake. East Cleaver and Main Zone to be mined using conventional open pit mining. Bottom portions of these deposits and the entire Boot Lake deposit to be mined by underground mining techniques.
Process	On-site processing of 10,000 t/d, using a standard grinding and flotation plant to produce zinc, copper, and lead concentrates. Most of the silver and gold value will report to copper concentrate with small portion reporting to lead concentrate.
Life of Mine	Approximately 14 years of operation, based on studies to date.
Access	To provide access between the Hackett River mine site and the port at Bathurst Inlet, a 23 km all-season spur road would be constructed connecting the mine site to the proposed BIPR road. Ocean-going vessels will be used to bring in materials and supplies, and to transport concentrate to markets during operations. A gravel airstrip along the spur road would be used during all Project phases.
Personnel	The permanent camp will house approximately 300 people. Approximately 250 to 325 personnel will be employed at the mine on a fly-in/fly-out rotation.

1.4 Required Permits, Approvals, and Licences

The West Kitikmeot Regional Land Use Plan is still in draft form. As such, this Project Proposal will not be sent to the Nunavut Planning Commission for a conformity review. This Project Proposal has been submitted to the Nunavut Water Board (as part of a Type A water licence application) and to NIRB simultaneously.

The development of the Hackett River Project (the "Project") will require a Project Certificate to be issued by NIRB. This is issued after the completion of the environmental impact review process and after it has been determined that the Project should proceed.

The Project will require a Type A Water Licence from the Nunavut Water Board, which can only be issued after a Project Certificate is obtained. The water licence process will only commence after the environmental review process.

A Fisheries Authorization will be required from the Department of Fisheries and Oceans (DFO). It is planned that Sabina will work with DFO such that the authorization process will occur concurrently with the environmental review process.

The Project may require a Schedule 2 Amendment to the Metal Mining Effluent Regulations, depending on the plans for tailings containment and management. Environment Canada is responsible for these regulations. If required, it is understood that the process for obtaining a Schedule 2 Amendment cannot commence until a final Fisheries Authorization is approved and issued by DFO.

The Project will also require long term surface rights from Indian and Northern Affairs Canada (INAC) for the access road on Crown Land, and from the Kitikmeot Inuit Association (KIA) for the mine site and roads on Inuit Owned Land.

The Project will require a land use permit from Indian and Northern Affairs Canada (INAC) for the access road connecting the mine area to the proposed BIPR road. The project will also require a land use permit from the Kitikmeot Inuit Association (KIA) for development of the mine and site roads on Inuit Owned Land.

Other permits and licences will also be required for the project. Table 1.3-1 presents the major permits that will be required for the Project, and Table 1.3-2 presents the applicable legislation and responsible authorities for all of the potential permits and licences that may be required.

1.5 DFO Operational Statement Conformity

The following Department of Fisheries and Oceans (DFP) Operational Statement (OS) activities will apply to the project:

- Bridge Maintenance;
- Clear Span Bridge; and
- Culvert Maintenance.

Table 1.3-1
Major Permits and Licences Required for the Hackett River Project

Permit/Licence	Agency	Activities
Project Certificate	Nunavut Impact Review Board	Required to proceed with Project
Inuit Impact and Benefit Agreement	Kitikmeot Inuit Association	Required to proceed with Project
Type A Water Licence	Nunavut Water Board	Water use and waste disposal related to all phases of Project; discharge limits to receiving environment
Class A Land Use Permit	Indian and Northern Affairs Canada	Development of mine and roads
Inuit-Owned Lake-Land Use License	Kitikmeot Inuit Association	Development of mine and roads
Fisheries Authorization	Department of Fisheries and Oceans	Harmful alteration, disruption, or destruction of fish habitat
Schedule 2 Amendment	Environment Canada	Use of a fish-bearing lake for tailings management
Navigable Waters Permit	Transport Canada-Canadian Coast Guard	Authorization if any part of development may interfere with navigation *e.g.*, installation of culverts or bridges

Table 1.3-2
Legislation and Responsible Authorities for Potential Permits, Licences, and Authorizations for the Hackett River Project

	Responsible Authorities		
Legislation / Acts*	**Federal**	**Territorial**	**IPGs/DIO**
Arctic Waters Pollution Prevention Act (AWPPR)	INAC		
Business Corporations Act (Nunavut)		DOJ – NU	
Canadian Environmental Assessment Act (Comprehensive Study List Regulations) (Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements) (Exclusive List Regulations) (Inclusion List Regulations) [ILR] (Law List Regulations)	INAC, NRCan, EC, DFO		
Canadian Environmental Protection Act	EC		
Commissioner’s Land Act* (Commissioner’s Land Regulations)*		CGS – NU	
Canada National Parks Act (CNPA)* (National Parks Wildlife Regulations)*	PCH		
Canada Wildlife Act (CWA)* (Wildlife Area Regulations) [WAR]*	EC		
Engineers, Geologists and Geophysicists Act (Nunavut)		DOJ – NU	
Emergency Medical Aid Act (Nunavut)		HandSS – NU	
Environmental Protection Act (Nunavut) (Spill Contingency Planning and Reporting Regulations (Nunavut))		DOE – NU	
Explosives Use Act (Nunavut) (Explosive Use Regulations (Nunavut))		WCB – NU	
Explosives Act (Explosives Regulations)	NRCan		

(continued)

Table 1.3-2
Legislation and Responsible Authorities for Potential Permits, Licences, and Authorizations for the Hackett River Project (completed)

	Responsible Authorities		
Legislation/Acts*	**Federal**	**Territorial**	**IPGs/DIO**
Fisheries Act (Metal Mining Effluent Regulations) (Northwest Territories Fisheries Regulations) [NWTFR]	DFO / EC		
Fire Prevention Act (Nunavut) (Fire Prevention Regulations (Nunavut)) (Propane Cylinder Storage Regulations (Nunavut))		CGS - NU	
Labour Standards Act (Nunavut)		DOJ - NU	
Migratory Birds Convention Act, 1994 (MBCA) (Migratory Birds Sanctuary)	EC		
Mine Health and Safety Act (Nunavut) (Mine Health and Safety Regulations (Nunavut))		WCB - NU	
Nunavut Archaeological and Palaeontological Sites Regulations (Nunavut)		CLEY - NU	
Nunavut Land Claim Agreement			
(LUP compliance)			NPC
(Project Certificate)			NIRB
(Land Use)			Regional DIO
(Mineral Rights)			NTI
(IIBA)			Regional DIO
Nunavut Waters and Nunavut Surface Rights Tribunal Act NWT Waters Regulations (Water Licence) (Inspection)	INAC		NWB
Public Health Act (Nunavut) Camp Sanitation Regulations (Nunavut)		HandSS - NU	
Transportation of Dangerous Goods Act (Transportation of Dangerous Goods Regulations)	TC		
Transportation of Dangerous Goods Act (Nunavut) (Transportation of Dangerous Goods Regulations (Nunavut))		CGS - NU	
Territorial Lands Act (Canada Mining Regulations) (Territorial Dredging Regulations) (Territorial Lands Regulations) (Territorial Land Use Regulations) (Territorial Quarrying Regulations)	INAC		
Territorial Parks Act (Nunavut)* (Territorial Parks Regulations (Nunavut)) [TPRNU]*		DOE - NU	
Wildlife Act Nunavut (Wildlife Sanctuaries Regulations (Nunavut))		DOE - NU	
Worker's Compensation Act (Nunavut) (Worker's Compensation Regulations (Nunavut)) [WCRNU] (Camp Sanitation Regulations (Nunavut)		WCB - NU	

*** unknown if applicable to Hackett at this time.**
INAC=Indian and Northern Affairs Canada, NRCan=Natural Resources Canada; EC=Environment Canada; DFO=Department of Fisheries and Oceans Canada; PCH=Parks Canada; TC=Transport Canada; DOJ=Department of Justice; CGS=Department of Community and Government Services; HandSS=Department of Health and Social Services; DOE=Department of Environment; WCB=Workers Compensation Board; CLEY=Department of Culture Language Elders and Youth; IPG=Institute of Public Government; DIO=Designated Inuit Organization

The Project does not include a winter road (ice bridge), any routine dredging or the installation of moorings.

Sabina agrees to meet the conditions of the three OS described above and incorporate these measures to protect fish and fish habitat as outlined in the applicable DFO Operational Statements. A signed letter to that effect is provided below.

1.6 Scope of this Report

The following Project Proposal has been prepared to meet the information requirements of the Nunavut Impact Review Board's (NIRB's) Screening Part 2 Form Project Specific Information Requirements (PSIR). This form is presented in Appendix A of this document as a conformity table.

Table 1 of NIRB's PSIR, entitled "Identification of Environmental Impacts", is included in Chapter 7 of this document.

Completed NIRB Part 1 forms in English, Inuktitut, and Inuinnaqtun are included in Appendix A of this document, along with non-technical project description summaries in English, Inuktitut, and Inuinnaqtun.

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15 November 2007

Fisheries and Oceans Canada – Eastern Arctic Region
P.O. Box 358
Iqaluit, Nunavut
Canada X0A 0H0
Tel: (867) 979-8000
Fax: (867) 979-8039

Re: DFO Operational Statement Conformity

This letter serves to indicate that Sabina Silver Corporation's proposed Hackett River Silver Project (the Project) may involve activities covered by DFO's Operational Statements, specifically:

- Bridge Maintenance
- Clear Span Bridges, and
- Culvert Maintenance.

Sabina Silver Corporation agrees to meet the conditions and incorporate the measures to protect fish and fish habitat as outlined in the applicable DFO Operational Statements.

Yours truly,

SABINA SILVER CORPORATION

per:

Albert Brantley, President and CEO

2. PROJECT DESCRIPTION

2. Project Description

2.1 Project Location and Resources

2.1.1 Location

The Hackett River Project is an advanced exploration metal project located in the West Kitikmeot region of Nunavut. The Project is approximately 75 km south of the southern portion of Bathurst Inlet (Figure 2.1-1). The Project would be connected to the proposed BIPR road by a 23 km spur road, and the northern portion of the BIPR road along with the port site on Bathurst Inlet would be used to transport concentrate from the mine to overseas markets, as well as backhauling consumables and supplies to the Project Site.

Figure 2.1-2 shows the boundaries of the mineral claims owned by Sabina in the Hackett River Project area. The approximate centre of the Property is at 65º 55' North Latitude, 108º 30' West Longitude.

The three minable resources, Main Zone (under Camp Lake), Boot Lake (just east of Boot Lake), and East Cleaver (east of Cleaver Lake), all lie within mining lease 2789. Figure 2.1-3 shows the locations of the three resource bodies to be developed, along with the location of the existing exploration camp.

2.1.2 Resources and Reserves

Sabina announced in March 2007 a preliminary economic assessment of the Hackett River Project which indicated a mine plan with average annual production of 324.7 million pounds zinc, 12.4 million ounces silver, 20.7 million pounds copper, 37.0 million pounds lead, and 17.2 thousand ounces of gold over a mine life of 13.6 years. Table 2.1-1 outlines the current mineable mineral resources. The 2007 drilling campaign included infill drilling to increase the confidence in the reported resources.

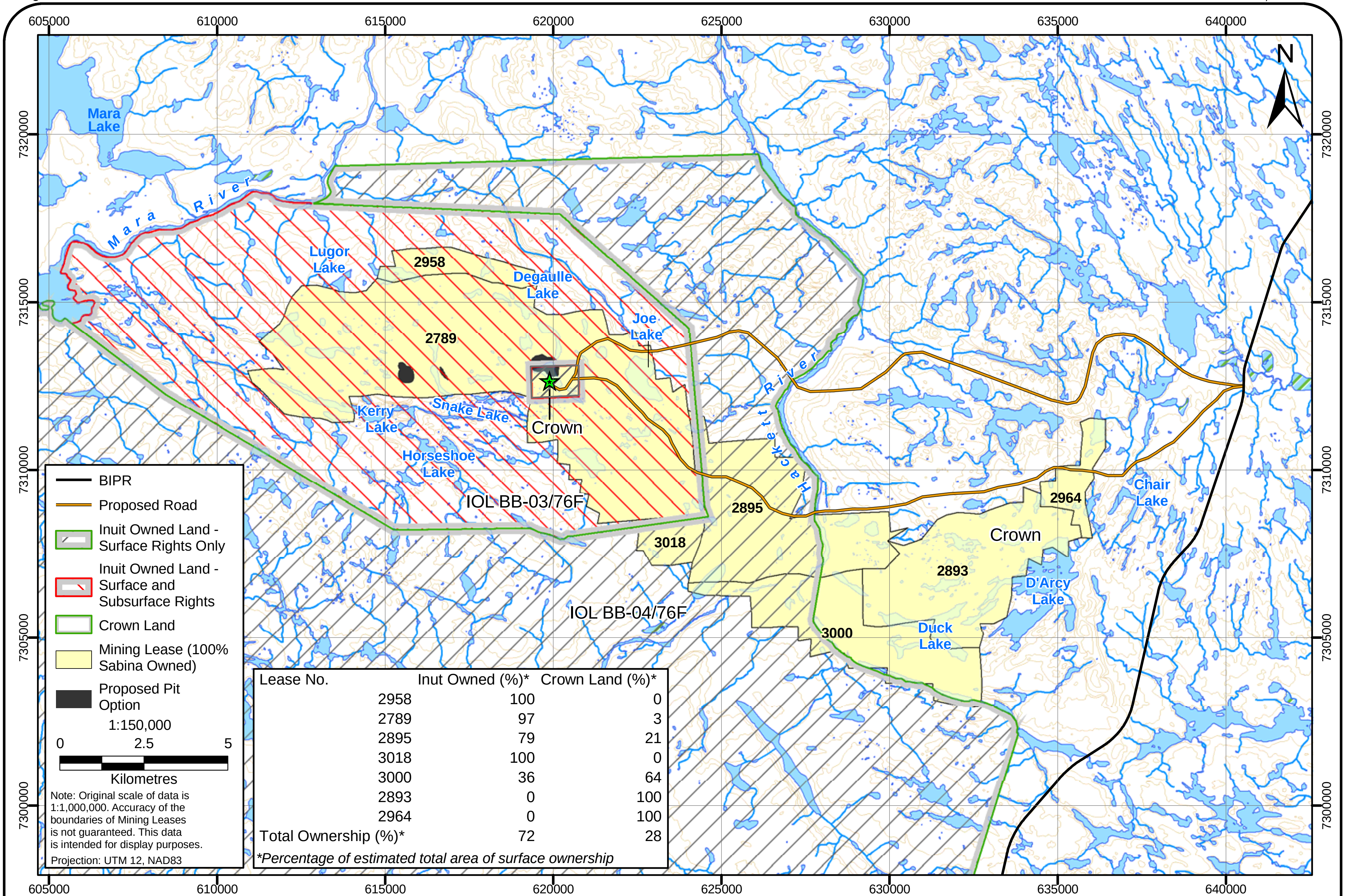
Table 2.1-1
Hackett River Mineable Mineral Resources

			Grade					Contained Metals				
Sources	Resource Class	Tons (x1000)	Silver (g/T)	Zinc (%)	Copper (%)	Lead (%)	Gold (g/T)	Silver (Mil oz)	Zinc (Bil lb)	Copper (Bil lb)	Lead (Bil lb)	Gold (Mil oz)
Open Pit	Indicated	25,615	126.4	4.07	0.38	0.58	0.33	104.10	2.298	0.215	0.328	0.269
	Inferred	3,375	99.7	2.57	0.37	0.37	0.25	10.82	0.192	0.028	0.027	0.027
Under-ground	Indicated	14,517	185.73	5.87	0.26	0.89	0.25	86.69	1.877	0.084	0.285	0.114
	Inferred	5,421	186.27	4.71	0.23	0.67	0.34	32.46	0.563	0.028	0.080	0.057

Notes: CIM Definition Standards on Mineral Resources and Mineral Reserves were used to estimate the Hackett River NI 43-101 compliant mineable mineral resource based on a Preliminary Economic Assessment.
Cutoffs are C$19.94/tonne NSR for open pit,C$59.94/tonne NSR for Boot Lake underground,C$44.94/tonne NSR for Main Zone and East Cleaver underground, respectively.
Dilution and mining losses were considered in mineable mineral resource calculations.
See Cautionary Note disclaimer regarding inclusion of Inferred resources (March 5,2007 release)

FIGURE 2.1-1

Hackett River Project Mine and Access Location



Lease No.	Inut Owned (%)*	Crown Land (%)*
2958	100	0
2789	97	3
2895	79	21
3018	100	0
3000	36	64
2893	0	100
2964	0	100
Total Ownership (%)*	72	28

**Percentage of estimated total area of surface ownership*

FIGURE 2.1-2

Sabina Mining Leases on IOL and Crown Land

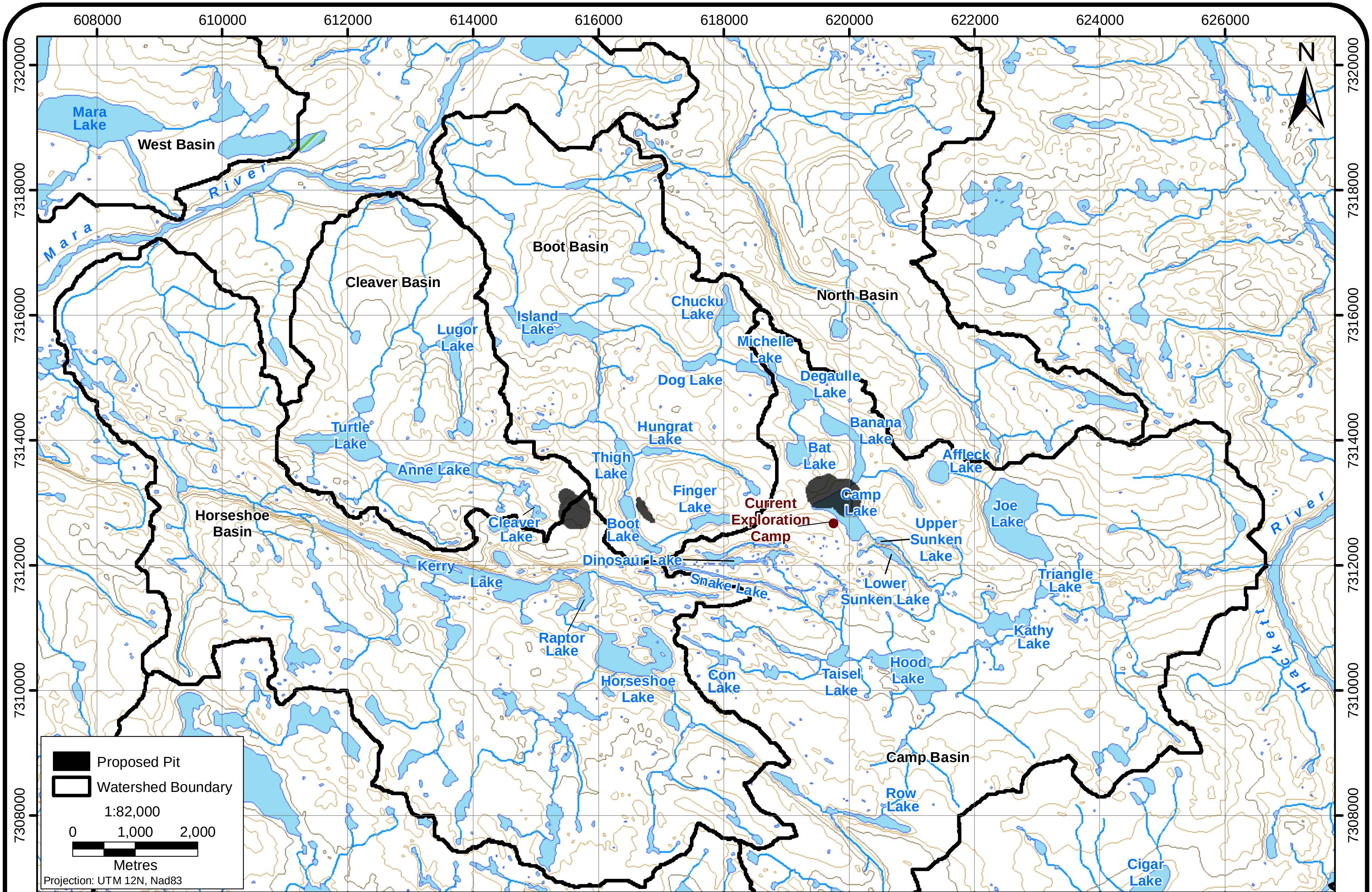


FIGURE 2.1-3

Location of Main Zone, Boot Lake, and East Cleaver Deposits

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2.1.3 Project Need and Purpose

The purpose of the Hackett River Project is to construct, operate and close and reclaim a base metal mine site in a manner that minimizes environmental impacts and provides opportunities for economic and social development in Nunavut. Agreements will be negotiated with Designated Inuit Organizations to ensure that benefits from the project are realized by registered beneficiaries and Nunavummiut.

Proposed operations start with an open pit mine at Camp Lake, approximately 105 km south of the community of Kingaok (Bathurst Inlet) in the West Kitikmeot. Over the mine life two other deposits in the area will be developed; one (East Cleaver) by open pit methods and the second (Boot Lake) using underground methods. Ore will be mined and processed year round. Waste material from the mine areas will be stockpiled on surface in designated areas and tailings will be deposited under water. With the current resources, the mine and processing plant will have an approximate mine life of 14 years and employ a total of 225 to 350 people. Approximately half that number will be on site at any one time due to the rotation schedule.

Sabina has actively explored for base metals in Nunavut since 2004. The company has identified a number of prospective mineral resource areas and will continue to explore and develop prospective areas throughout the life of the Hackett River Project. The goal is to find additional economic base metal deposits in the general area of Hackett River that would extend the life of the processing plant. Cash flow from the Project will be re-invested into exploration and development programs.

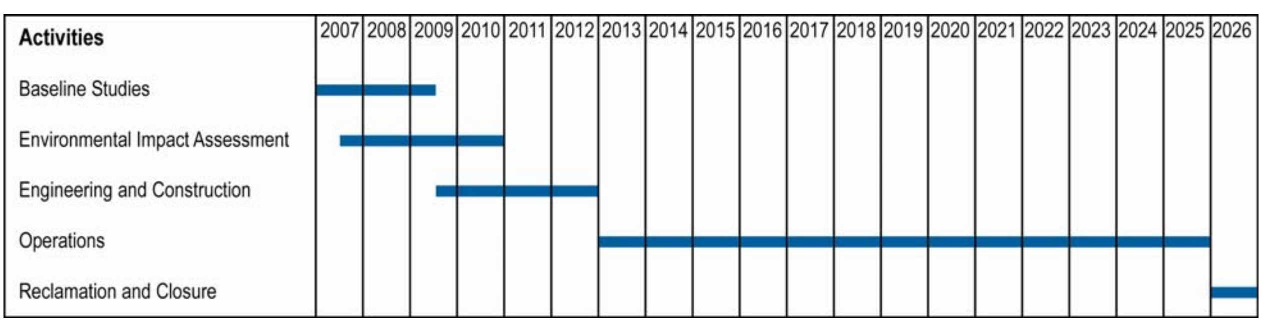
2.2 Project History

1956	Copper mineralization was discovered by Rio Tinto Exploration at Camp Lake. This showing was initially called the "A" Zone and is now more commonly known as the "Main Zone".
1966	The precursor to Bathurst Inlet Mining Corporation acquired the property and carried out prospecting, geological mapping and geophysics. The first drilling was completed in 1969.
1969	Norsemines and Atlin-Yukon made discoveries of significant mineralization on adjacent ground. These companies and Bathurst Inlet Mining Corporation amalgamated as Bathurst Norsemines Limited.
1970 - 1975	Cominco Limited optioned the property and carried out airborne and ground geophysical surveys, geochemical sampling, geological mapping and diamond drilling. In 1970 an airborne electro-magnetic survey delineated a 30 km strike length of prospective stratigraphy. Subsequent groundwork led to the discovery of the East Cleaver, Boot Lake and Finger Lake Zones.
1986	Bathurst Norsemines was consolidated and renamed Etruscan Enterprise Ltd.
1993-1994	Etruscan became operator of the Property, and carried out airborne and ground geophysical surveying as well as drilling. Emphasis was placed upon the Main and East Cleaver Zones.
1997 to 1998	Etruscan carried out a digital data compilation of geological, geophysical and

	drill data, and 300 line-kilometres of time-domain pulse electro-magnetic and gravity surveying over the area containing most of the known showings and drilling. Following Etruscan's work, the Property reverted to Teck Cominco, subject to a royalty payable to Etruscan.
2004	Sabina optioned the property from Teck Cominco, carried out 144 km of Max-Min geophysical surveying, and drilled 61 holes with an aggregate length of 15,179 m.
2005	Sabina exercised its options to earn 100% interest in the property. Teck Cominco declined to exercise its back-in rights and Sabina continue to fund the project.
	In 2005, 44 holes with an aggregate length of 9,357 m were drilled on the Main, Boot Lake and East Cleaver Lake Zones by Sabina. Upon completion of an additional $5 million in exploration expenditures on the Property, Cominco Mining Partnership (CMP) declined to exercise its back-in rights and now holds a 2% NSR royalty.
2006	The 2006 drill program included 52 new holes and one existing hole from the 2005 drill campaign was deepened. A total of 17,293 m of drilling were carried out during the campaign.
2007	Preliminary economic assessment indicated a mine plan with average annual production of 324.7 million pounds zinc, 12.4 million ounces silver, 20.7 million pounds copper, 37.0 million pounds lead, and 17.2 thousand ounces of gold over a mine life of 13.6 years.
	Additional definition and exploration drilling, geotechnical drilling and testing, further metallurgical testing and optimization, and selected geophysical surveys were also completed in 2007, and included a further 17,106 metres in 65 drill holes. Work also on-site also included the initiation of baseline environmental data collection to support the preparation of an Environmental Impact Statement.

2.3 Project Schedule

The current forecast for the overall project schedule is as follows:



2.4 Mine Plan

2.4.1 Geology and Mineralogy

2.4.1.1 Geology

The following descriptions are based on the work of Squires (1997), Castleman and Mioduszewsk (1982), and Hall (2007).

The Hackett River occurrences include a number of volcanogenic massive sulphide lenses hosted by metavolcanics and metasediments of the Archean Yellowknife Supergroup within the eastern part of the Archean to Proterozoic age Slave Province (Figure 2.4-1).

The Slave Structural Province, comprising approximately 192 square kilometres of the northwestern part of the Canadian Shield consists of highly deformed, metamorphosed Archean Supracrustal rocks and associated granitoid complexes of varied composition and age. Yellowknife Supergroup metavolcanic rocks, which comprise five to ten percent of the Slave Province, occur in 20 discrete north to northwest trending belts. Slave Province Greenstone Belts are elongate in plan, basin-shaped in cross section, and occur as homoclinal assemblages facing away from adjacent granitic rocks. Early Proterozoic (Aphebian) clastic sedimentary and carbonate sequences of the Goulburn Group unconformably overlie the Archean rocks locally. Intrusive rocks of Hudsonian age and younger diabase dykes crosscut the older lithologies.

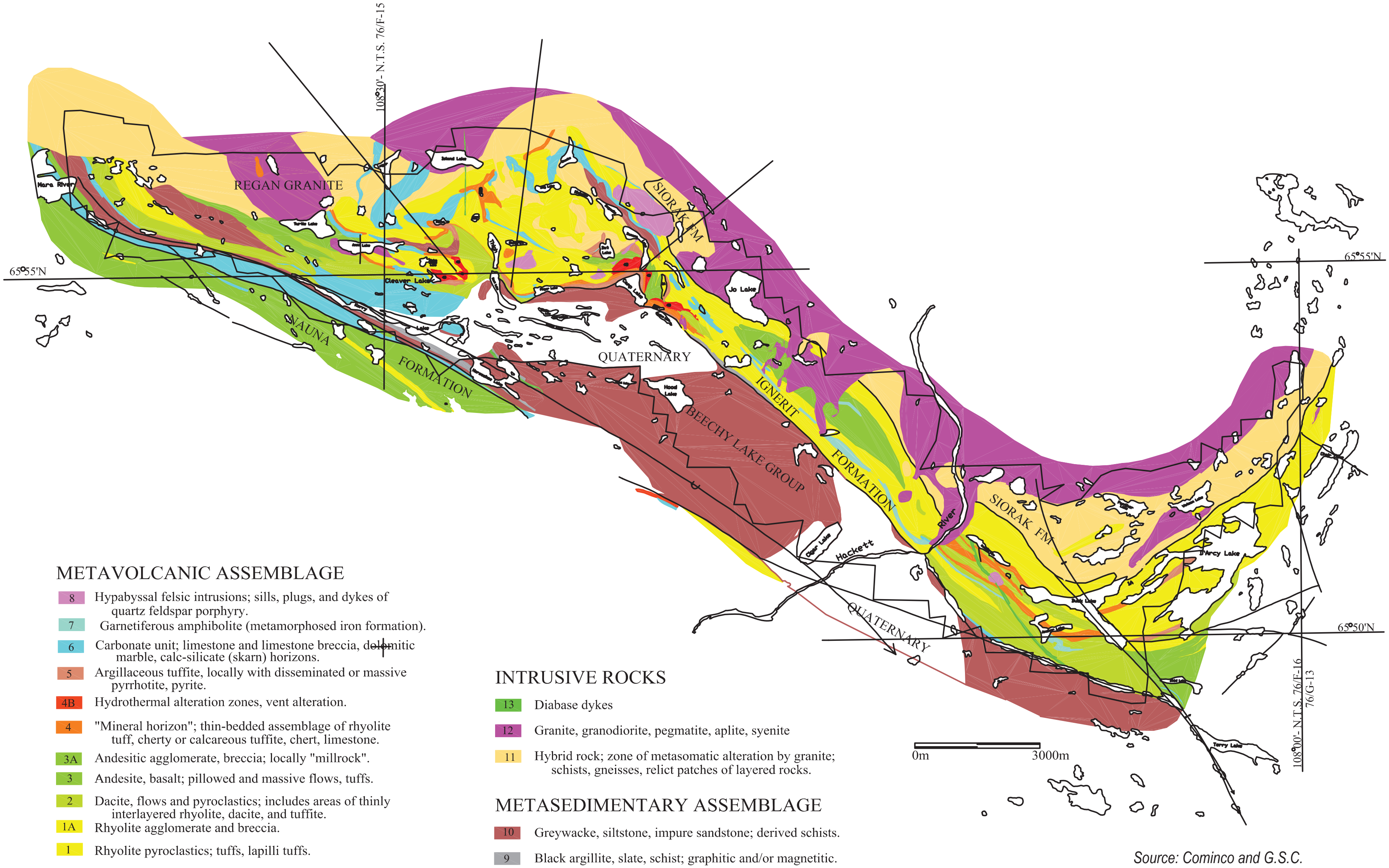
The Yellowknife Supergroup is divided informally into three major sequences. The Back Group is the lowest sequence and is comprised of felsic to intermediate flows, tuffs and breccias.

The Hackett River Group overlies the Back Group and consists of volcanic flows that range from felsic to mafic, as well as tuffs and chemical sediments. The uppermost sequence is the Beechey Lake Group, comprising turbidite sediments, greywacke, mudstone and iron formation. The Project area is underlain by the Hackett River Group which is comprised of three formations from oldest to youngest, the Siorak, Nauna and Ignerit Formations. The Ignerit Formation is gradational into the overlying Beechy Lake Group.

The Siorak Formation is comprised of gneissic and schistose metavolcanic and metasedimentary rocks that are in contact with the underlying Hanimor Gneiss Complex.

The overlying Nauna Formation is comprised of metamorphosed mafic and felsic flows and pyroclastic rocks. This unit is apparently not present in the immediate Project area where the Ignerit Formation overlies the Siorak Formation.

The Ignerit Formation hosts the known sulphide-bearing stratigraphy within the Project area. The Ignerit Formation is comprised of basal rhyolitic pyroclastics that are overlain by andesitic and dacitic pyroclastics that are in turn are overlain by rhyolitic tuffs and sediments; these are capped by clastic sediments. The Lower Rhyolitic Pyroclastic section is at least 450 m thick and is comprised of fragmental agglomerate to tuff with internal gradations to finer argillaceous tuffite and chert. The overlying Andesitic Pyroclastic section is from 60 to 180 m thick and is overlain by the Dacitic Pyroclastic section that ranges from 180 to 240 m in thickness.



Source: Cominco and G.S.C.

FIGURE 2.4-1

SABINA SILVER CORPORATION

Hackett River Property Regional Geology

Rescan™

The Upper Rhyolitic Tuff section contains the known sulphide deposits, is finer grained than underlying units, becomes progressively more argillaceous, and grades into the overlying fine-grained clastic sediments. This interval is comprised of three members, a lower and upper tuff, and an intervening Mineral Horizon/Calc-silicate Member.

The Mineral Horizon Member consists of a mixture of fine-grained chemical and clastic sediments and variably-altered rhyolite to dacite pyroclastics, and ranges from 3 to 100 m in thickness. The stratigraphy and mineral content of this Member vary along strike.

The Mineral Horizon Member is overlain by the Upper Rhyolitie Tuff, from 120 to 180 m in thickness, that is comprised of fine-grained rhyolitic pyroclastics, and argillaceous and cherty tuffite with individual units laterally discontinuous. Pyroclastic material increases in abundance to the east and west of the Main Zone area.

Regional alteration ranges from greenschist to amphibolite grade, with the development of garnet, biotite, cordierite, staurolite and sillimanite is superimposed upon synformational, hydrothermal alteration. Recrystallization has commonly obliterated primary textures.

Late leucocratic, coarse-crystalline pegmatite dikes of unknown age are common throughout the area.

2.4.1.2 Mineralization

The following descriptions are based on compilations by Hall (2007) and Peter (2007) and Sabina exploration staff.

Mineralization generally occurs in a mixed package of rhyolitic fragmentals, epiclastics, chemical and clastic sediments known as the Mineral Horizon sandwiched between a thick underlying sequence of fragmental rhyolites and overlying clastic sediments. Sulphides occur as tabular semi-massive to massive lenses, typically at or near the upper volcanic-sedimentary contact. Stringer sulphides are developed beneath the lower massive lenses in stratiform to pipe-like configurations. The massive sulphide and stringer zones are enveloped by stratiform disseminated sulphides. Massive sulphides grade laterally into less-massive fringes. The three principal sulphide occurrences for the Project occur over a 6 km distance and are referred to as the Main, East Cleaver Lake, and Boot Lake Zones.

The Main Zone deposit contains two massive sulphide lenses, the East and West Zones (limbs), consisting of conformable lenses of pyrite with lesser sphalerite, galena and chalcopyrite with an interbedded calc-silicate horizon that contains disseminated sulphides. The calc-silicate horizon constitutes a stratigraphic marker that is present throughout the Property and is proximal to all known sulphide occurrences and laterally grades into a marble horizon. Stringer sulphides are developed in the footwall of the massive sulphide lens with a stratiform to pipe-like distribution. Later tectonic activity has folded this tabular body into a south-plunging syncline with a north-trending east limb, and a west-trending west limb. The massive pyrite core, coincident with the axis of the fold, is barren. The Main Zone deposit overlies discordant, zoned alteration pipe/stringer zones containing chalcopyrite, pyrrhotite, pyrite and magnetite. Alteration consists of a sericite - quartz - (sillimanite - cordierite) assemblage developed along hydrothermal fluid channelways, interspersed with patchy anthophyllite - cordierite - biotite - garnet - quartz - (sillimanite - sericite). It is contained within a relatively wide envelope of characteristically spotted sillimanite - biotite - garnet - quartz - (cordierite - sericite) rock. The less-massive fringes of the massive sulphide lens are enriched in zinc and lead. Silver enrichment occurs in the margins of the lens near surface and copper enrichment occurs in the margins of the massive sulphide lens as well as in the footwall stockwork zone.

The Boot Lake zone also occurs within the Mineral Horizon although the latter is thinner in this area, with a less complex internal stratigraphy. Sulphides are present in small lenses and in continuous layers of pyrite, both containing variable amounts of pyrrhotite, sphalerite, galena and chalcopyrite. The East Cleaver zone is a single, fairly homogeneous sulphide body containing pyrite, sphalerite and galena, also situated within the Mineral Horizon. It has been deformed through folding and shearing and is now highly contorted, occupying the nose of an overturned anticline. Both zones are underlain by a stringer zone/alteration pipe.

The Hackett River sulphide deposits have associated footwall alteration zones; in particular, the Main Zone has a well-preserved pipe-like feeder zone that is perpendicular to stratigraphy. It is inferred that alteration zone dimensions and orientations approximate their original dimensions.

Three alteration types have been identified: spotted rock, main-conduit, and anthophyllite-cordierite. Spotted rock is comprised of sillimanite-biotite-garnet-quartz, ± cordierite, ± sericite, and is analogous to chlorite alteration in unmetamorphosed VMS footwall zones. The spots are sillimanite porphyroblasts. Main-conduit alteration (sericite-quartz, ± sillimanite, ± cordierite) and anthophyllite-cordierite alteration (anthophyllite-cordierite-biotite-garnet-quartz, ± sillimanite, ± sericite) are equivalent to quartz-sericite and anthophyllite-cordierite alteration zones in less metamorphosed Archean-age VMS deposits. At Hackett River, anthophyllite-cordierite alteration occurs only where hydrothermal alteration has crosscut andesitic strata.

Spotted rock locally contains from 2 to 10% combined chalcopyrite, pyrite, pyrrhotite and magnetite. Main-conduit altered zones and associated quartz veins contain the most significant concentrations of chalcopyrite, and from 3 to 10% combined sphalerite, pyrrhotite, pyrite and magnetite. Up to 3% pyrite and minor chalcopyrite occur in the anthophyllite-cordierite-altered rocks.

2.4.2 Mining - General

Preliminary economic assessment has identified three deposits: East Cleaver, Main Zone and Boot Lake.

The mine design and mine plan for the three deposits are currently at a preliminary level based on limited mineral resource, geotechnical and hydrological information. During the course of the prefeasibility study alternate mine design options and operating conditions will be examined in order to optimize the mine design and mine plan.

The East Cleaver deposit is located on a topographic high point 1 km to the west of Boot Lake. The Boot Lake deposit is located adjacent to Boot Lake on the eastern slope and extends down below the lake at depth. The Main Zone deposit is 2.8 km to the east of the Boot Lake deposit.

A portion of the Main Zone deposit is located beneath Camp Lake with the remainder outcropping on the north and east sides of the lake.

The East Cleaver and Main Zone deposits will be mined by open pit methods, as the geometry and relatively-shallow depth extent of both these deposits clearly favour open pit mining. Potential exists to economically extract additional mineralization from the East Cleaver and Main Zone deposits immediately below the respective final pit limits at the cessation of open pit mining, if sufficient underground resources can be defined. The prefeasibility study will evaluate the potential and scope of establishing underground mines below the East Cleaver and Main Zone open pits.

The geometry and extent of the Boot Lake deposit is such that the upper portion of the deposit could also be extracted by open pit methods and the lower portion mined by underground mining methods in later years. An open pit mine at the Boot Lake deposit would likely disturb Boot Lake. The existing preliminary study employed underground mining methods for the extraction of the Boot Lake deposit in its entirety in order to avoid disturbance to Boot Lake. The prefeasibility study will evaluate both an all-underground and a combined open pit and underground operation for the extraction of the Boot Lake deposit.

2.4.3 Operating Philosophy

The quantity of ore from the two open pits and the one underground operation have been balanced in the preliminary operating plan to provide a near simultaneous end of mine closure in all three deposits based on the currently delineated mill feed tonnages.

The preliminary production philosophy is based on 10,000 t/d of ore delivered to the mill which involves producing from all three deposits simultaneously for the majority of the project life. No blending of ore is planned other than what which will occur based on the annual open pit and underground production schedules. The open pits will employ an elevated cut-off grade strategy whereby high grade ore will be mined and sent directly to the mill for processing and low grade ore will be stockpiled until the end of the mine life and processed at the cessation of mining activities. Low grade ore requiring stockpiling currently accounts for approximately 17% of the total ore mined from the open pits.

The operating philosophy will see ore production commencing from the Main Zone open pit while the underground mine is being developed for initial production. The Main Zone open pit will initially provide all ore to the mill until the Boot Lake underground mine and the East Cleaver open pit become operational. Ore production from the Boot Lake underground mine will commence at a reduced rate as soon as practical, and will be ramped up to maximum capacity over a five year period upon commissioning of the permanent ore and waste handling system to surface. Ore production from the East Cleaver open pit will commence at approximately the same time as the Boot Lake underground mine. During the production ramp up of the Boot Lake underground mine and the introduction of East Cleaver ore to the mill, the Main Zone pit ore production rate will be reduced to accommodate the ore production from these two mines.

The preliminary operating philosophy, including the stockpile and cut-off strategy, will be reviewed during the prefeasibility study to determine if it is feasible to adopt alternate operating philosophies that have the potential to reduce the overall disturbed footprint of the project while achieving operational advantages and potential cost savings. One alternate operating philosophy would be to complete open pit mining in one of the deposits before commencing open pit mining in the other, while still providing a near simultaneous end of closure with the Boot Lake underground mine and the remaining open pit.

2.4.4 Open Pit Mining

Conventional open pit shovel-truck methods will be used for mining the Main Zone and East Cleaver deposits. The mining function will be performed by the mine operator with purchased equipment. The preliminary study has determined that the major open pit equipment fleet will consist of one 18 m^3 hydraulic excavator as the primary waste mining unit, a 17 m^3 front end loader as the primary ore loading unit, ten 180 tonne-class off road haulage trucks, three production drills, and various ancillary equipment. The prefeasibility study will review open pit mining equipment requirements, selection and sizing in order to optimize the mining fleet to the selected operating philosophy and material movement requirements.

2.4.4.1 Production Plan

The East Cleaver open pit will be in operation at the same time as the Main Zone open pit, with the Main Zone pit operating for 14 years and the smaller East Cleaver pit commencing 2 years later than the Main zone pit and operating for 8 years. The combined open pit total ore production will slowly decline over the years as the underground mine is brought up to full production and the smaller East Cleaver pit is mined out. Total ore production from both open pits will peak at just over 10,000 t/d prior to the commencement of initial underground operations at Boot Lake and fall to approximately 5,500 t/d in production year 7 upon commissioning of the permanent Boot Lake mine underground ore and waste handling system to surface. This mining rate will be maintained until the completion of open pit mining from the East Cleaver deposit 3 years later, whereupon the ore mining rate will be further reduced to approximately 3,000 t/d until the completion of open pit mining from the Main Zone pit. Waste stripping will vary over the life of the open pit mines, starting at approximately 14,700 t/d in production year -1, maintaining approximately 47,200 t/d for the first 6 years of production before slowly falling to an annual rate of approximately 1,600 t/d at the end of open pit operations. The average waste stripping rate is 30,000 t/d.

Only one year of waste pre-stripping will be required in the Main Zone open pit prior to the commencement of ore production due to the limited amount of overburden covering the Main Zone deposit. In addition, water inflows to Camp Lake will be diverted, the lake drained, and lake sediments removed prior to open pit production mining.

The preliminary plan has open pit mining occurring in two phases per deposit. Overlaps of the phases occur to balance waste stripping, high grade ore feed to the mill, and equipment requirements. The first phase of mining of the Main Zone deposit will occur on the northern shore of Camp Lake prior to commissioning of the mill and tailings facility. High grade ore produced during this period will be stockpiled for use immediately upon mill start-up. Mining of the first phase of the Main Zone pit will finish in Year 8. The second phase of the Main Zone pit will start in Year 4 and will be completed in Year 13. Mining of the first phase of the East Cleaver pit will commence in Year 2 of the schedule with the second phase of that pit starting the next year. The East Cleaver open pit will be completed in Year 9. The prefeasibility study will consider alternate open pit phasing and sequencing options during the review of the preliminary operating philosophy noted above.

2.4.4.2 High Grade Ore

High grade ore from the open pits will be hauled by truck to the surface crusher located immediately adjacent to the mill facilities. The currently proposed mill site is located on a topographic high point approximately 500 metres north east of the Boot Lake deposit. During the course of the prefeasibility study alternate locations for the milling and or surface crushing facilities will be explored and evaluated in order to optimize ore haulage routes and costs.

2.4.4.3 Waste Rock and Tailings Storage

Suitable waste rock from the initial mining of the Main Zone open pit will be used to construct the initial tailings facility. The remaining waste rock from both the Main zone pit and the East Cleaver pit will be hauled by truck and placed in a waste rock storage facilities.

An acid rock drainage (ARD) model will be developed for each deposit as part of the prefeasibility study, which will allow the potential for acid rock drainage to be addressed. Strategies will be developed once the waste rock materials are categorized and quantified, the results of which will be properly incorporated into the design of the waste storage facility and the starter dams required for the tailings facility. If waste rock is required for backfilling in underground stopes, it will be acquired from the waste rock storage facility rather than be quarried if the quality of waste rock is suitable.

During the course of the prefeasibility study alternate locations for the waste rock and tailings storage facilities will be evaluated in order to strike a balance between minimizing the environmental disturbance of the project and minimizing capital and operating costs. The evaluation will include the potential to provide a separate waste rock storage facility near or adjacent to the East Cleaver open pit.

2.4.4.4 Low Grade Ore

Low grade ore mined over the life of the Main Zone and East Cleaver open pits will be hauled by truck and placed in a single low grade stockpile facility located within the confines of the waste rock storage facility. The prefeasibility study will evaluate the potential to provide a separate low grade ore stockpile facility near or adjacent to the East Cleaver open pit.

2.4.4.5 Groundwater

The influence of groundwater inflows and pressures on pit slope stability, pit dewatering requirements and open pit operating conditions has been considered to be negligible due to permafrost conditions. The prefeasibility study will assess the potential for the existence of a talik under Camp Lake, quantify the possible extent of such a feature, determine how that will affect the hydrological and geotechnical conditions of that part of the Main Zone pit located beneath Camp Lake, and modify the design and operating conditions of the open pit to suit the expected conditions.

2.4.4.6 Explosives

The supply of explosives will be provided by a third party that would manufacture emulsion explosives on site and deliver the product to the blast hole as required. Under normal operating conditions, a limited amount of emulsion explosives would require storage on site at any one time, with the main storage area being at the Port Site. Blasting accessories and miscellaneous explosives products would be supplied via the port at Bathurst Inlet and stored on site in approved facilities.

2.4.5 Underground Mining

The preliminary study has employed underground mining methods for the extraction of the entire Boot Lake deposit as well as the lower portions of the East Cleaver and Main Zone deposits below the ultimate open pit limits. The prefeasibility study will also consider mining the Boot Lake deposit as a combined open pit and underground operation. The majority of the underground mining functions will be performed by the mine operator using purchased equipment, with the potential exception of specialist ongoing mining activities such as raise mining. The underground mine operations will be highly mechanised employing mobile trackless mining equipment and ramp access to all mining levels within the mine.

2.4.5.1 Mining Method

The Boot Lake underground mine will potentially extend to a depth of 650 metres or more below surface, which is well below the 500 metre depth of permafrost that has been estimated in the Boot Lake area. As such, underground mining of the Boot Lake deposit will take place in both frozen and unfrozen ground. The potential underground operations on the East Cleaver and Main Zone deposits is currently assumed to be within the permafrost zone, however additional work is planned to confirm these ground conditions.

The Boot Lake deposit is planned to be mined by underground methods in its entirely employing sublevel longhole stoping with both cemented and uncemented crushed rock backfill in the permafrost zone, and cemented paste backfill in the unfrozen zone below. A suitable supply of crushed rock for backfill will be sourced from the surface waste storage facility, supplemented with waste rock from ongoing underground development. The potential underground portions of the East Cleaver and Main Zone deposits are planned to be mined by the sub level cave method which do not require backfill.

The prefeasibility study will identify and evaluate other potential mining methods for all three potential underground operations in order to develop an optimum plan for underground operations. The mining methods to be reviewed will include an assessment of both caving and non-caving mining methods, the requirement for backfill associated with each mining method, as well as the productive capacity of each method. The type of backfill, if required, as well as backfill material sources will also be reviewed as part of the prefeasibility study.

2.4.5.2 Boot Lake Production Plan

The proximity of the Boot Lake deposit represents an opportunity to extract ore at a relatively early stage, either by underground or open pit methods. The current plan is to bring the underground operation into production as soon as possible at a relatively low rate, and increase underground production to a maximum sustainable level upon completion of the permanent ore and waste transport system to surface. This will be realised by accessing the upper portion of the Boot Lake deposit by a decline ramp from surface down to an optimum elevation determined by the overall project schedule. Production mining will take place in the upper levels while underground development for the permanent ore and waste handling system is established. The permanent ore and waste handling system will consist of ore and waste passes feeding an underground crusher located at the ultimate depth of the deposit, a vertical hoisting shaft to surface and an overland conveyor to the milling facility.

Initial ore production from the Boot Lake underground mine will commence in Year 2 at a rate of 2,000 t/d. Ore will be loaded into underground haul trucks located on the individual mining levels and trucked up the decline to the surface crusher located immediately adjacent to the mill facilities. The ore production rate will be increased to 3,000 t/d in Year 4, and 4,000 t/d in Year 5 as additional mining areas are developed and mining equipment introduced to the mine. In Year 6 ore production will increase to the ultimate rate of 5,750 t/d upon commissioning of the permanent ore and waste handling system to surface, whereupon truck haulage in the decline will be limited to the delivery of some bulk materials to the mining areas and some waste haulage to surface. This production rate will be maintained until the end of the life of mine in Year 12.

The initial production rate, as well as the build-up of the production rate and the ultimate productive capacity of the underground mine, are a function of the mining method, ore and waste handling system, and capital cost restrictions. The prefeasibility will identify and evaluate a number of permanent ore and waste handling systems with the view to provide a robust materials handling system that can allow for a quick build-up to full productive capacity at the lowest capital and operating cost. The materials handling systems to be evaluated will include shaft hoisting as well as conveyor and truck haulage. The prefeasibility study will also evaluate the requirement for an underground crusher. If an underground crusher is required, the prefeasibility study will evaluate potential ore and waste pass arrangements and crusher locations.

2.4.5.3 East Cleaver and Main Zone Production Plans

The current plan is to develop stand-alone underground operations at the East Cleaver and Main Zone deposits in order to extract mineralization immediately below the respective final pit limits at the cessation of open pit mining.

Each underground mine will be accessed by a decline ramp collared from within the respective open pit and underground development commenced such that stopes are ready to produce upon cessation of open pit mining. Ore production from the East Cleaver deposit is planned to run from Year 10 to Year 11 and from the Main Zone deposit from Year 11 to Year 13 at a combined ore production rate of 2,000 t/d.

Ore and waste from the underground operations will be hauled to surface by underground hauled trucks via the open pit ramp system and transferred to larger open pit trucks for haulage to the surface crusher or waste rock storage facility.

Due to the relative locations of the East Cleaver and Boot Lake deposits, the prefeasibility study will consider the potential to access the East Cleaver underground resource from the Boot Lake underground mine

2.4.5.4 Crown Pillar Extraction

The current mining method and extraction methodology for the Boot Lake underground mine requires that a crown pillar be left in place between surface and the operating mine during the initial underground mining phase. The preliminary mine plan includes mining of the crown pillar later in the operational life of the Boot Lake underground mine, which would necessitate the removal of overburden overlying the crown pillar area prior to mining. The crown pillar could be mined as a small open pit or by underground methods, whereby the crown pillar would be drilled and blasted as a series of stopes and extracted via the underground mine.

The current mining method for the East Cleaver and Main Zone underground mines does not require the provision of a crown pillar.

The prefeasibility study will review the requirement for a crown pillar for each underground mine and propose an appropriate method of extraction if any pillars are required.

2.4.5.5 Groundwater

The influence of groundwater inflows and pressures on underground stope stability, dewatering requirements and underground operating conditions are expected to be negligible in that portion of the underground mines under permafrost conditions, namely all of the East Cleaver and Main Zone mines and the majority of the Boot Lake mine. Water inflows under these conditions will come mainly from production and development drilling activities associated with the underground operations, which will require the use of a re-circulating calcium chloride brine solution in order to prevent water freezing issues in drillholes.

The dewatering system for each underground mine will involve pumping unsettled water to surface and discharging into the re-circulation process water tank in the mill plant.

The prefeasibility study will review the mine dewatering requirements and discharge locations for each underground mine, with particular emphasise placed on estimating ground water inflows, pressure and water quality into the Boot Lake underground mine below the permafrost layer, and appropriate mine dewatering systems planned.

2.4.5.6 Explosives

The supply of explosives will be provided by the same third party supplier of emulsion explosives for the open pits, and would deliver product to underground storage magazines as required. Under normal operating conditions, it is envisioned that no more than one month's supply of emulsion explosives would require storage on site at any one time. Blasting accessories and miscellaneous explosives products would nominally be supplied via the port at Bathurst Inlet and stored on site.

2.4.6 Prediction of Project Drainage Chemistry

An important impact assessment component for many mineral development properties is associated with the exposure of geologic material to air and/or water and the resultant change to water quality in the area. The general term for this issue is “metal leaching and acid rock drainage” (ML/ARD). The Hackett River Project is also considering the potential of ML/ARD as part of the Project development and planning stages and this section outlines the Phase 1 findings of this work.

The overall objective of the characterization study is to assess the potential for acid rock drainage and metal leaching due to water-rock interactions within the open pit and underground workings and/or any surface stored materials. This objective will be met by:

1. Completing a detailed sampling and analyses program appropriate for submittal to the regulatory review process in Nunavut;
2. Characterizing the potential for acid rock drainage and metal leaching (ML/ARD) from ore, waste rock, tailings, and other potentially excavated/exposed materials for the Project; and
3. Identifying how the results will be interpreted in order to provide conceptual recommendations for the management of excavated materials for the Project.

Prediction of Project drainage chemistry often involves suites of analytical testwork, involving one-time “static” tests to long-term “kinetic” tests. It also incorporates information from other on-going work associated with the Project. Because of this prudent approach, a phased approach is needed to develop and refine predictions throughout mine planning, development and operation. The focus of the 2007 Phase 1 work has been the completion of static test analyses. These will be the basis for determining other studies, including kinetic tests, that will be needed to predict site drainage.

2.4.6.1 Phase 1 Samples

The 2007 Phase 1 study focused on conducting static tests. Sampling was initiated in May 2007 with the field program including sampling of drillcore (301 samples). Other samples collected included pulps remaining from assay analysis forwarded from GDL (147 samples) and Accurassay (104 samples).

Samples to be included in this program were selected based on the following rationale:

- The preliminary economic assessment identified three ore bodies - Main, Boot Lake and East Cleaver. Although lithology and mineralization are variable from deposit to deposit, there is sufficient similarity that it is assumed that the geologic units are geochemically the same across the property. The preliminary assessment also provided an indication of open pit and underground working boundaries in the subsurface. It will be important to assess ML/ARD potential and leach rates from any material to be exposed and managed on-site.

- Three ore zones have been identified on-site and to locate potential sample locations, cross-sections were examined across each to identify drillholes that intersect ore zones, geologic units and proposed pit/working boundaries. These drillholes were selected to obtain samples of ore zones and as many lithologic units as possible.
- Exploration work has occurred on the property since the 1960's with most of the core still available on site. This provides an opportunity to include older core that has been exposed to the on-site conditions over time for comparison with younger, less exposed, material.
- Sulphide type and occurrence within some of the individual lithologic units is variable and samples reflect the range of sulphide type and percentage.
- Initially a total of 600 samples were selected with approximately 200 from each deposit. During the field program, it was realized that some samples were unavailable because the core was lost or additional sampling for characterization would affect the integrity of the core. Pulp samples from the GDL and Accurassay laboratories were also unavailable because the samples were completely consumed for assay analysis or the sample was lost. This reduced the sample number to 556.

Phase 1 tests used to evaluate the ML/ARD potential and geochemistry of the Hackett River Project samples included:

- U.S. EPA 600-complaint Acid-base accounting (ABA) with expanded NP determinations; and
- ICP-MS total-element contents by ICP-MS and x-ray-fluorescence (XRF).

These tests were performed or coordinated by ALS- Chemex in Vancouver, B.C.

2.4.6.2 Results of Acid-Base Accounting

Paste pH was measured in a mixture of deionized water and pulverized sample. Paste pH values in the 556 samples ranged from 2.8 to 9.4, and approximately 22% of all samples were acidic at the time of analysis.

The range of total sulphur in the samples was <0.01% S to 45.9% S. All three ore zones had similar ranges of total sulphur, except Boot Lake had a higher minimum value (0.04%). For nearly all samples, sulphur occurs in sulphide minerals most commonly as iron-bound sulphide (primarily pyrite and pyrrhotite). The correlation between the total sulphur determination using Leco furnace methods and acid potential determined using Sobek methods is significant enough that total sulphur could be substituted in the calculation of Acid Potential, with little error.

U.S. EPA 600-compliant Sobek Neutralization Potentials (NP) ranged from -37 to 788 kg $CaCO_3$ equivalent/tonne in the 556 Hackett River core samples. However, most samples were relatively low, below 60 kg $CaCO_3$ equivalent/tonne. The amount of measured NP associated with acidic paste pH values, and thus "unavailable" for neutralization, was approximately 20 kg/t. However, this requires further confirmation by additional testwork. Sobek NP did not correlation well with inorganic carbonate or solid-phase calcium, which would suggest the NP was not fast-neutralizing calcite ($CaCO_3$). Thus, less-intensive calcium and carbonate analyses may not provide surrogate values for NP for the Project.

Net balances of acid potentials and neutralization potentials described here are “unweighted”. This means that they were not adjusted to tonnages or three-dimensional locations in the three ore zones. However, three-dimensional modelling and weighting will be conducted in 2008.

In order to classify the material for its potential for ML/ARD guidelines presented by INAC (1992) and Price (1997) were considered. In these references, the net potential ratio (NPR = NP/SAP, where SAP is calculated using sulphide sulphur content) is considered the principal indicator of ARD potential. For this characterization program, NPR criteria were used as a screening tool; in this case NPR = NP/SAP. Thus all material with an NPR below 1 is acid generating, in the range of between 1 and 2 were classified as having uncertain potential for acid generation, and above 2 as non-acid generating. These screening criteria will need to be further refined with additional characterization work.

Using these screening criteria, ~93% of samples are potentially net acid generating. By ore zone, approximately 94% the Main Zone samples, approximately 97% of Boot Lake samples, and approximately 91% of East Cleaver samples have the potential to be net acid generating. Thus, most samples from all three ore zones can be classified as potentially net acid generating, with Boot Lake having the highest percentage. It is important to note that screening criteria at this Phase of study are used as a preliminary screening tool and additional studies should work toward site specific criteria and build on the understanding of the their application to mine planning and operations under site conditions.

There was no narrow range of either AP or NP in which samples were consistently net acid generating or net neutralizing. Thus, the ARD potential screening of material at the Project may require both sulphide and NP analyses.

Some calcareous and other rock units did contain some samples classified as net-neutralizing, but even the limestone (Unit Sl) contained some net-acid-generating samples due to elevated sulphide levels in local areas. Three dimensional modelling is needed to outline potentially net-neutralizing material that could be used by the Project to better estimate its tonnage, continuity for mining and segregation, and depth.

2.4.6.3 Results of Total-Element Analyses

Total-element contents in the 556 Phase 1 samples were measured by ICP-MS analysis after strong four-acid digestion and by x-ray-fluorescence (XRF) whole-rock analysis. Most samples contained included silicon, aluminum (indicating the presence of quartz and various aluminosilicate minerals), calcium, iron, potassium, magnesium, sulphur, and Loss on Ignition (LOI).

Samples from all three primary ore zones, frequently to almost always, contained elevated solid-phase levels of silver, arsenic, bismuth, cadmium, copper, sulphur, selenium, thallium, and zinc. There are also limited samples that contain elevated levels of chromium, cesium, mercury, indium, lithium, lead, antimony, tin, tantalum, uranium, and tungsten.

Elements showing some correlation over a range of sulphide, and thus possibly leaching quickly only when sulphide is oxidizing, included silver, cadmium, copper, iron, germanium, lead, and antimony.

These solid-phase total-element analyses do not indicate what elements would leach into local waterways, nor at what rate, but highlight elements with elevated solid-phase concentrations.

2.4.6.4 Next Steps to Geochemical Characterization

Phase 1 static analyses conducted in 2007 provide a preliminary screening on the ML/ARD potential on site. However, in order to predict water quality changes to parameters such as pH and metal aqueous concentrations on a mg/L basis, long-term kinetic tests at various scales and under various conditions are required. The following kinetic tests are planned for the Project:

1. Laboratory-based humidity cells holding approximately 1 kg of fine-grained sample, where kinetic rates and aqueous concentrations are obtained under standardized, well-flushed, well-aerated conditions; and
2. On-site leach tests holding hundreds to thousands of kg, where kinetic rates and aqueous concentrations are obtained from precipitation under variable on-site conditions.

In 2008, six laboratory-based humidity cells will be started and operated for at least 40 weeks, and will include various pre-test geochemical and physical analyses. The cells will contain approximately 1 kg each of rock, with each cell containing rock of a different lithoplogic rock unit. To scale up these small-scale tests, drainage from the six 400-kg on-site barrels will be sampled approximately five times in 2008. Samples included in these tests represent the range of sulphide content and type in order to determine a range of reaction rates that are applicable to lithologic units across the site.

The next phase of geochemical characterization will also include metallurgical samples such as tailings solids and liquids (supernatants). Samples will be determined once the metallurgical program is finalized.

On-going work will also include continued development toward site specific screening criteria incorporating improved understanding of ML/ARD potential. This will provide conceptual recommendations for the management of excavated materials at the Project.

2.5 Process Description

2.5.1 General

The Hackett River ore can be described as a fine grained volcanogenic massive sulphide-copper-lead-zinc-silver ore; the predominant mineral is pyrite, the minerals of economic importance are chalcopyrite, galena and sphalerite as well as a variety of silver sulphide minerals.

The mill process design is currently at a preliminary level based on limited information from flotation and grinding tests performed on the Hackett River samples. During the course of the prefeasibility study alternate process options and conditions will be explored and evaluated in order to optimize process design.

The ore processing plant will be a conventional grinding and flotation plant which produces zinc, copper and lead concentrates. Most of the silver and gold value will report to copper concentrate with a small portion reporting to the lead concentrate.

A preliminary simplified process flowsheet is shown in Figure 2.5-1.

2.5.2 Crushing and Grinding

The Run of Mine ore will be crushed in a primary crusher to generate a feed for the grinding circuit. The crushed material will be conveyed to a crushed ore storage facility from whence it will be reclaimed continuously to feed the grinding circuit. The grinding circuit will consist of a SAG mill in close circuit with a pebble crusher followed by ball mills in close circuit with cyclone classifiers. The ore leaving the grinding circuit will have a size of about 80 percent minus 75 micron.

2.5.3 Copper-Lead Flotation

The overflow of the cyclone from the grinding circuit is pumped to the first copper-lead flotation conditioning tank, where lime, zinc sulphate and sodium cyanide are added to condition the ore so that copper and lead and silver sulphide minerals can be separated from zinc and iron sulphides and waste rock.

The overflow of this conditioning tank flows to a second conditioning tank where flotation collectors are added. During the course of the prefeasibility study metallurgical test work alternate reagent schemes will be explored.

The conditioned slurry flows to a bank of copper-lead rougher flotation cells where a copper-lead bulk rougher concentrate is generated.

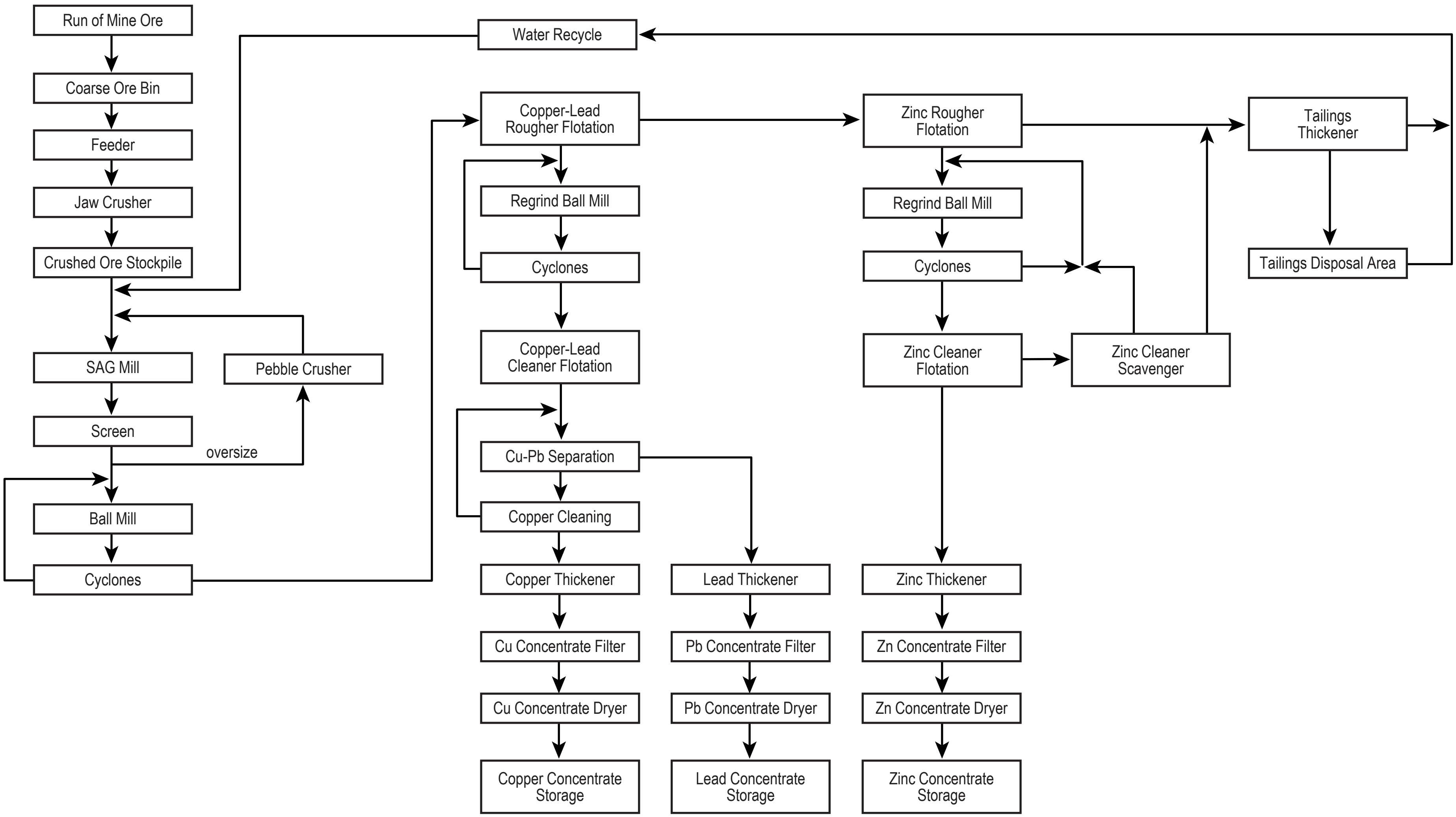
The copper-lead rougher concentrate needs further grinding to liberate individual sulphide minerals from each other and is therefore fed to a regrinding circuit consisting of a ball mill which is in close circuit with cyclones.

The reground bulk copper lead concentrate will be cleaned in a three stage bulk flotation cleaning circuit to remove unwanted minerals; the third cleaner flotation concentrate is fed to the copper-lead separation circuit.

The copper lead separation circuit feed is conditioned with a small amount of potassium dichromate to depress the lead minerals in the subsequent flotation stage in which the copper minerals are floated away from the rest and subjected to two more cleaning stages.

The tailing from the copper flotation is the lead concentrate.

MIBC is the only frother used in both copper-lead and zinc flotation circuits.



SABINA SILVER CORPORATION

Process Flow Diagram

FIGURE 2.5-1

Rescan™

2.5.4 Zinc Flotation

The tailings from the copper-lead circuit are sent to a tank, where it is conditioned with copper sulphate to activate the zinc minerals and with lime to depress the iron minerals. The overflow from this tank flows to the second conditioning tank where a collector for the zinc mineral is added.

There are five flotation stages in the zinc circuit; the zinc is first floated into a rougher concentrate which is sent to the regrinding circuit. The reground zinc rougher concentrate is cleaned in three subsequent flotation stages to produce the final zinc concentrate. The zinc rougher tailings and the tailings from the first zinc cleaner constitute the final flotation tailings; these are pumped to the tailings thickener area.

2.5.5 Concentrate and Tailings Dewatering

The final copper, lead and zinc concentrates are thickened separately with the aid of flocculents into a dense slurry to feed the filters. The underflow from the respective thickeners is pumped to separate filters and the filter cake conveyed to separate rotary dryers. The dried concentrates are conveyed to covered concentrate storage facilities.

Alternate concentrate dewatering unit processes will be evaluated during the prefeasibility study.

Water is recovered from the overflows of the concentrate and tailing thickeners for recycle in the process plant. The final tailings are thickened to about 50% solids and pumped to the tailing disposal area for underwater disposal. The tailings pond supernatant will be reclaimed for use as process water.

The quality of the surplus water released from the disposal area to the environment, if any, will be controlled to guarantee that its quality meets the federal and territorial regulations.

Part of the tailings will likely be processed to produce paste backfill when the underground mining is in operation.

2.6 Site Infrastructure

2.6.1 Plant Facilities

2.6.1.1 Power Supply

Base Power Supply ˜ Diesel Generation: Currently it is anticipated that two diesel generating stations will be provided: each rated 12.5 MW, 4.16 kV and consisting of five gensets connected in a radial system. The stations will be completely independent, with control autonomy, to meet the requirements for emergency backup power at remote Arctic sites. Each station will have sufficient heat recovery for process site heating requirements. Controls will be designed such that either station can be the master and the other a slave, ready to take over in the event of a failure of the original master.

The locations of the two diesel stations will minimize the distance to the major process loads, namely the grinding mills and the underground hoists.

The complete diesel power station including generating units and associated equipment will be supplied in a modular arrangement, complete with fuel handling, lubrication, air handling, exhaust, starting equipment, electrical distribution switchgear, heat recovery systems, and ancillaries. Provision will be allowed for the addition of one additional genset in each diesel power station for future power growth. The stations will be housed in pre-engineered buildings and incorporate outdoor areas for exhaust and (summer-use) radiators.

2.6.1.2 Main Substation

The main substation will be adjacent to the mill, where the largest loads are located, to minimize cabling costs and losses. The substation will include the following equipment:

- Primary Distribution Center (PDC)
- Metering transformers

Feeders from the substation will be run in cable tray or on power lines to the area loads.

2.6.1.3 Underground Mine Power Supply

The primary power supply to the underground mine will be two 13.8 kV feeds from step up transformers and powered from the main PDC located at the main substation. A third feeder will provide power to the Mine Hoist requirements.

Permanent electrical distribution centres will be provided at the shaft/hoist areas with lighting and small power receptacles and at the underground crushing, shops and mine dewatering facilities.

The underground substations will be low-profile, heavy-duty, skid-mounted units that are comprised of: main incoming visible fused load break disconnect switch, surge arresters, transformer, neutral grounding resistor, modular LV distribution equipment and grounding and ground check monitoring equipment. Cabling will be connected to the distribution gear with approved grounding type receptacles.

2.6.1.4 Process Plant and Ancillary Services Power Supply

The process plant distribution voltage will be 4.16 kV obtained from the PDC switchgear in the main substation. This switchgear will feed the following equipment:

Area	Electrical Distribution
Main Process Areas	Cable in tray located in utilidors and/or routed through process buildings
Primary Crushing and Reclaim and Pebble Crushing	Cable in tray located in utilidors and/or routed through process buildings and through conveyor galleries
Camp, Maintenance Shops, Warehouse	Cable in tray located in utilidors and/or routed through process buildings
Fresh Water System, Tailings Reclaim, Ancillary Services Explosives, Sewage, Paste Backfill and Incinerator	Dedicated 13.8 kV power lines

2.6.1.5 Site Power Distribution

The electrical distribution will consist of switchgear, transformers, starters and feeder breakers for the motor and non-motor loads in common lineups. Lighting and small power applications will be fed from transformers and power panels as required, and will be located in the electrical rooms.

Equipment utilization voltages will be obtained from step-down transformers. Plant substations shall be located near major concentrations of electric loads.

Cabling will use armoured, jacketed copper conductors with ground, shielded cables in heavy duty aluminum ladder tray systems. Transformers will be located in the process area electrical rooms and will be dry type.

Electrical coordination will be completed to minimize power interruption on operation of power system protective relay operation.

Plant equipment utilization voltages will be:

Plant Equipment		Voltages
Grinding Mill Motors, Hoists		4.16 kV 3 phase high resistance grounded
All drives over 200 HP		4.16 kV 3 phase high resistance grounded
All drives 0.5 HP – 200 HP		600 volt 3 phase high resistance grounded
Motors with VFD up to 500 HP		600 volt 3 phase high resistance ground (maximum HP rating to be determined at time of order)
Motors with VFD over 500 HP		4.16 kV 3 phase high resistance grounded
Small drives below 0.5 HP		120 volts 1 phase solidly grounded
Electrical Heaters over 1.8 kW		600 volt 3 phase high resistance grounded
Electrical Heaters up to 1.8 kW		120 volts 1 phase solidly grounded
Lighting		347 volts 1 phase solidly grounded
Small power and instrumentation		120 volts 1 phase solidly grounded
Heat tracing:	Short lengths	120 volt 1 phase or 208 volt 3 phase solidly grounded
	Long lengths	347 volt / 600 volt 1 or 3 phase solidly grounded
Welding Receptacles		600 volt 3 phase high resistance grounded

2.6.1.6 Emergency Standby Power

The diesel generation facility is split into two parts to provide capacity for site emergency backup power requirements. In remote Arctic locations, backup power is required for survival in adverse weather conditions. In the event of loss of one diesel power plant, the other will be able to provide the site emergency electrical power and process building heating requirements. This eliminates the need for smaller, emergency power units to be strategically located around the process plant.

In addition, an emergency power diesel genset will be installed adjacent to the camp to provide backup power in the event of a failure of the distribution system.

The airstrip will be connected to the overhead pole line and have a standby power diesel genset in the event of a pole line failure.

The control of the emergency power loads will be through the process control system. This system will stagger starts, automatically start and stop loads to keep process tanks properly agitated and run equipment such as lubrication pumps on the large Mills and underground mine requirements. The main requirements for standby power include:

- Mine ventilation
- Mine dewatering
- Process plant critical loads

Uninterruptible power supplies will be used to provide back-up power to critical control systems. The UPS equipment will be sized to permit operations to shut down and back up the computer and control systems to facilitate start-up on restoration of normal power.

Emergency battery power packs will supply back-up power to the fire alarm system and emergency egress lighting fixtures.

2.6.1.7 Fuel Storage and Distribution

Diesel fuel will be pumped from the on-site tank farm by pipeline to day tanks at the power stations. In accordance with environmental requirements, the generators will use Arctic grade, “ultra-low sulphur” diesel.

2.6.1.8 Electrical and Control Rooms

To minimize installation costs, the electrical rooms will be distributed around the site and located as close as possible to the major electrical loads.

All process electrical and control rooms will be modular units assembled off-site in a factory. The rooms will be installed outdoors on elevated steel structures adjacent to process areas or indoors on elevated structures. The rooms shall be self-supporting and designed for road shipment, lifting and transporting to site.

All electrical controls and instrumentation equipment will be installed, wired and completely tested before shipment to site.

The rooms will be built to meet a one-hour fire rating. All openings will be sealed and made water- and dust-tight by using approved fire-retardant materials.

All electrical rooms will have two means of egress at opposite ends of the room. Doors to the rooms will be supplied with panic exit type hardware. Each room will also have an equipment door sized to permit the largest piece of equipment to be installed/removed without removing the door from its hinges. The floors of the rooms will be elevated a minimum of 200 mm above the adjacent process concrete floors. No liquid or fluid piping will be routed through electrical rooms.

The electrical rooms and control rooms will be pressurized and designed in accordance with occupancy regulations.

Non-process buildings will incorporate electrical rooms as required as an integral part of the building.

2.6.1.9 Process Control System

Process control for the plant will use a network of distributed controllers and Human-Machine-Interface (HMI) equipment. The control system, HMI stations and all associated communications equipment will be of current technology that has been proven to be efficient and reliable in similar installations. The system shall be capable of direct expansion to control all equipment required to meet possible future requirements of the mine.

The Process Control System will be based on proven PLC or DCS technologies.

2.6.1.10 Field Instrumentation

Instrumentation and control will consist of equipment used and applied for measurement and control of process variables (*e.g.*, pressure, level, flow, temperature, density, weight, speed, *etc*.).

The degree of instrumentation will be the minimum required for safe operation of the plant and efficient control of the process using a minimum number of operators.

All instrumentation furnished will be standard catalogue products of suppliers. Component interchangeability to minimize spare parts and to simplify service and repairs will be attempted by using identical components, where practical.

The project will implement 4 to 20 mA isolated with HART Protocol as the standard for measurement instruments and control valves.

2.6.1.11 Communications Systems

Site communications will be a satellite telecommunications system based on the following:

- Fiber communications system backbone
- Key equipment built-in redundancy to enable hot equipment change without loss of service
- Voice, Data, Fax, Internet and Video (1000Base T devices) capabilities
- Satellite earth station in dedicated enclosure with heat, light suitable for outdoor Arctic installation. This shall include antenna, transceivers, power supplies and all other equipment requirements
- Communications equipment including all Routers, Switches, Controllers, Security Firewall, modems and all other requirements for a complete system
- UPS backup supply for a minimum 30 minute supply with system fully loaded
- Wireless Ethernet bridge Master – Slave for remote site requirements

- Modular design suitable for expansion, maintenance and trouble-shooting
- Design approved by recognized authorities
- Cabinets, cabinet wiring and equipment mounting
- All software
- Gateway services to North America
- VoiP (voice over internet protocol), Data, VoiP/Data receptacles for installation by others using CAT6 twisted pair cabling

2.6.2 Accommodations

The mine site will be located in order to place the foundations of structures with heavy loads on original ground. Fill is acceptable for lighter structures and for trafficked areas. The mine site will be graded to divert surface runoff water away from buildings to perimeter ditches. This water will be collected in sedimentation ponds before being released into the environment.

The mine and mine site will be surrounded by perimeter cutoff ditches to intercept surface water runoff from the surrounding area. This water will also be collected in sedimentation ponds. Existing water courses that cross the site will similarly be diverted to these ponds.

The camp accommodations will be located sufficiently far from the mine to satisfy the safe distance specified in blasting regulations.

2.6.3 Airstrip

Three alternative locations for the mine airstrip have been investigated and have been found to be feasible. Two are close to the option 1 north road alignment and one is close to option 2 south road alignment. All three alternative locations are feasible, but the location immediately west of the point where option 2 crosses Hackett River, which is on a long ridge, is ideal.

This location would be close to the access road, and it can be expanded to take larger planes if necessary. In addition, this location requires less movement of material for airstrip infill and leveling than other areas under consideration and should result in minimal construction costs. An analysis of the prevailing wind direction will be required to confirm the best alignment for the airstrip.

The airstrip will be designed in accordance with Transport Canada TP 312E, Aerodrome Standards and Recommended Practices, Volume I, Aeroplane Facilities. The airstrip, which will include a 160 m safety area at each end, will be 2000 m long.

A building containing a small maintenance garage and a waiting room will be located at the airstrip. Potable water will be delivered from the camp for use in a washroom in this building. Sewage from the building will be collected in an insulated holding tank and transported to the sewage treatment plant at the mine site. Power to the airstrip site will be supplied by the camp generators. Diesel and aviation fuel will be stored at the airstrip in a lined containment.

The airstrip will be constructed from rock fill, with a minimum of 1 m fill placed over the original ground without stripping. Where necessary, ditches will be constructed to divert runoff from adjacent land into existing watercourses. Ditches will be graded to avoid ponding of surface water next to the embankment, which would cause melting of the permafrost.

2.6.4 Tank Farms

Fuel trucks will deliver fuel from the port to tanks located at the mine site on a regular schedule. An estimated total of 5 million litres of fuel will be stored at the Hackett River fuel tank farm. For this purpose, two 2.5 million-litre storage tanks will be installed in a lined containment facility.

2.6.5 Explosives

As described in the mining section, the supply of explosives will be provided by a third party that would manufacture emulsion explosives on site and deliver the product to the blast hole as required. Under normal operating conditions, it is envisioned that a limited supply of emulsion explosives would require storage on site at any one time. Blasting accessories and miscellaneous explosives products would be supplied via the port at Bathurst Inlet and stored on site.

2.6.6 Hazardous Materials

A variety of supplies and materials classified as potentially hazardous will be required at the mine and mill for general operations. Materials will be backhauled from the port site on an ongoing basis. The largest volume hazardous materials to be handled will include the following:

To The Mine:

- Petroleum Products (diesel fuel, gasoline, lubricants, hydraulic fluids, oil and solvents)
- Propane
- Explosives
- Ammonium Nitrate
- Mill Reagents (*e.g.* MIBC, $ZnSO_4$, NaCN, and quicklime)

From The Mine:

- Copper/lead/zinc concentrates
- Waste Batteries
- Waste Oil
- Waste Solvents
- Empty petroleum and reagent drums, carboys, and pails

A Hazardous Materials Handling Plan will be in place to identify and monitor potentially hazardous materials that will be used at the site with regard to safety and environment. Transportation, storage, use and ultimate disposal will be considered. Safety of the workers and the surrounding communities will be taken into account for all stages of materials handling.

Training, discussions and reviews will include operations, maintenance, shipping/receiving, purchasing, and contractors at the planning, operations and closure stages of the project. Material Safety Data Sheets (MSDS) and the Workplace Hazardous Material Information System (WHMIS) will be utilized to screen and classify materials.

Hazardous materials and wastes require special handling and training procedures. All employees will be provided with training under the umbrella of the WHMIS system so that they can identify hazardous materials; know how to obtain appropriate information on special handling procedures required, *i.e.*, know where MSDS are to be found and how to read them; precautions required and protective equipment required; know how to label and package hazardous materials and wastes; know where and how hazardous wastes are to be stored; and how wastes are to be disposed of. Records of completion of WHMIS training will be kept for all employees.

Employees who are tasked with receiving, off loading and storing potentially hazardous materials or involved in the storage and shipment off-site of hazardous wastes will receive hazardous materials handling training. This training will be directed at ensuring that appropriate employees know how hazardous materials are to be packaged, handled and labelled during transport and during storage. Similarly this training will be directed at ensuring that appropriate employees know how to package, label and ship hazardous wastes including proper record keeping and manifesting.

2.6.7 Equipment

Table 2.6-1 presents a list of the production equipment required on site. Major equipment replacements were not required with the 14 year mine life due to the declining ore requirements as the mine matures which results in declining equipment hour requirements.

One 18 m^3 hydraulic excavator was chosen as the primary waste mining unit with a 17 m^3 front end loader as the back up. The front end loader is the primary ore loading unit. The haulage fleet was designed to be 180 tonnes in carrying capacity.

Mining has been scheduled to occur 360 days a year, 24 hours per day.

2.7 Waste and Water Management

2.7.1 Tailings Management Facility

This section describes the basic design, construction, operation and closure concepts for the Tailings Management Facility (TMF).

2.7.1.1 Site Selection

The site of the TMF has not been finalized. An alternative assessment process is under way to finalize selection of the optimum site in terms of volumetric considerations (ratio of storage volume to dam volume), proximity to the process plant, and aquatic impacts.

Table 2.6-1
Production Equipment Fleet on Site

		Year															
Equipment	**Unit Size**	**-1**	**-1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Production Drill	171 mm	2	3	3	3	3	3	3	3	3	2	2	2	2	2		
Production Loader	17 m^3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hydraulic Shovel	18 m^3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Haulage Truck	180 tonnes	3	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Breaker Loader	6.5 m^3		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Track Dozer	306 kW	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Grader	233 kW	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Rubber Tired Dozer	350 kW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Utility Backhoe	2.3 m^3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water Truck	20,000 litre	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Ancillary Equipment

Equipment	Size	Quantity
Tool Carrier	120 kW	1
Blasting Skid Steer Loader		1
Light Plants		7
Lube/Fuel Truck		1
Mechanics Truck and Welding Trucks		2
Crewcab Pickups/Pickups/Blasters Truck		8
Pumps	1 ton	4
Manbus	40 man	1
Ambulance and Fire Truck		2
Compactor	114 kW	1

Wardrop, 2007

2.7.1.2 Tailings and Water Management

Tailings from the process plant will be in slurry form, at a pulp density of about 50% solids by weight. The tailings will be pumped via a tailings pipeline to the TMF. The tailings pipeline will be high density polyethylene (HDPE). From experience at other Arctic operations, the tailings pipeline will not require insulation or heating, as the tailings will have sufficient heat from the milling process to avoid freezing.

The TMF will store all tailings produced over the life of the mine, and will also serve as a reservoir for process water, which will be reclaimed from the pond. A sufficient depth of water will be maintained to allow reclaim throughout the winter and to allow ice formation over the water pond. This assumption will require a depth of at least 4 m of water over the pond. This water storage requirement will dictate that the tailings dams will be designed as impervious structures.

All of the sites under consideration will have limited drainage areas, so that the volume of runoff and direct precipitation to the TMF will be small in relation to the volume of water that will be sequestered in the voids of the tailings. Water balance modelling indicates that the tailings pond will have a significant net water deficit. This is advantageous, as it shows that the TMF can be operated as a zero discharge facility. This deficit situation also presents the opportunity to use the tailings impoundment as a discharge location for other intercepted site waters, such as pit dewatering, dump drainage or any other runoff that would preferable not be discharged to the downstream water system.

2.7.1.3 Tailings Dams

The TMF will be formed by rockfill dams. Non acid generating (NAG) rock will be used to construct the bulk of the tailings dams. The rock will be either open pit waste rock or quarried rock. The face of the dam will be lined with an impermeable liner. To mitigate seepage beneath the dam, the liner will be extended beneath the dam to lengthen the seepage path. Seepage can not occur through frozen soils, and if the liner extends far enough downstream of the crest of the dam, the permafrost into which the liner is anchored will remain frozen. Thermal analysis will be carried out as part of final dam design studies, to optimize the seepage barrier.

The liner material for the dam face and foundation seepage barrier may be a plastic, such as low linear density polyethylene, or a bituminous liner such as Coletanche. Plastic liners have the advantage of having excellent strain resistance (*i.e.*, long extension to failure), but are more difficult to work with in cold temperatures. Bituminous liners are tough, long lasting materials that can be placed and welded in very cold temperatures.

To protect the liner, bedding layers would be placed between the liner and the rockfill shell of the dam to provide a smooth surface upon which to place the liner. The bedding material would be designed to filter the tailings in the event of any punctures in the liner. To create this filter, both a bedding layer for the liner and a coarser transition zone layer will be needed between the coarse rockfill and the liner. The liner would also be susceptible to damage from ice on the surface of the tailings pond, and an ice protection layer will be placed over the liner. Borrow material for bedding materials will be obtained from the esker deposits near the site, or if necessary, from crushed and screened rock.

The downstream dam slopes will be about 2 horizontal to 1 vertical downstream, dictated by normal closure requirements. The upstream slope will be about 3 horizontal to 1 vertical, to allow installation of the liner ice protection cover layer. A dam crest width of 20 m was selected for constructability.

It should be noted that the design cross section discussed above is one that has been successful for similar operations under similar climatic conditions. A comprehensive geotechnical investigation of the surrounding area will be completed to develop details of this design to site specific conditions.

The tailings dams will be constructed in stages. The starter dam will provide for 3 years of tailings and water storage, plus design freeboard. The dam will be raised in subsequent years by downstream construction.

2.7.1.4 Closure

Closure of the tailings impoundment will incorporate a cover to prevent oxidation of exposed tailings over the long term. The cover will consist of either:

- A water cover, in which case the 4 m deep operating pond would be maintained, and a secure spillway would be constructed to allow discharge of water from the impoundment, or
- A dry cover consisting of a depth of soil or rock, with the cover depth greater than the active permafrost zone, to keep the tailings in a permanently frozen condition.

The final choice of closure concept will be developed in detailed design studies.

2.7.2 Mine Waste Rock

Waste rock will be produced primarily from open pit operations. Preliminary mine models indicate a stripping ratio (waste to ore) of about 6:1, inferring that significant waste volumes will be generated. Geochemical characterization of waste materials is ongoing. It is indicated that there will be a significant proportion of the waste rock that will be classified as potentially acid generating (PAG) and some that will be non acid generating (NAG). Detailed management of the PAG wastes will be critical aspects of mine planning, operation and closure. During operation, drill cuttings from every blast hole will be assayed and materials will be assigned ore, PAG or NAG designations, and waste rock will be hauled to designated waste management locations.

Waste rock will be disposed in waste piles near the open pits. To minimize haul distances, there will be separate waste rock storage facilities for each of the Main and East Cleaver Pits. The waste rock storage area locations and construction plans are on going based on the general approach:

- All PAG wastes will be encapsulated within the waste rock dumps, beneath a depth of NAG cover materials equivalent to the active permafrost zone, so that the PAG waste will be maintained in a permanently frozen state. There may be the need for some re-handling of wastes at the end of mine life to place a NAG cover over the PAG materials
- Waste dumps will be located to minimize flow-through drainages, and diversions will be constructed to minimize surface runoff entering dumps
- Depending on final balance of PAG and NAG materials, the option of mining the pits consecutively may be used, with PAG wastes from the second pit placed in the mined-out first pit to provide containment and ultimately freezing of the backfilled waste material.

2.7.3 Wastewater and Sewage

During construction, a sewage treatment plant will be selected of sufficient size to process the effluent from the construction camp. The treated effluent from this plant will likely be discharged into the designated tailing pond during the construction period.

During operations, the treated sewage effluent will likely be discharged into the mill tailings system. The wastewater collection system, which will consist of insulated HDPE pipe installed in the site utilidors, will conform to all applicable regulations and good engineering practice. Where possible the pipes will be designed to flow by gravity. If necessary, a force main will be installed. If necessary, pipe that cannot be positively drained will be heat traced. The excess biomass (sludge) produced by the plant will be aerobically digested, stored in a sludge thickening/storage cells and likely disposed in specifically constructed cells in a landfill near one of the waste rock piles.

2.7.4 Solid Waste Management

Domestic waste will be incinerated, and industrial waste that cannot be incinerated will deposited as landfill in the waste rock pile.

2.7.5 Water Use (domestic and process)

Water required for camp use and operations makeup water will be pumped from a lake or river source into a water storage tank in the mill. To prevent fish entrapment, DFO's "Freshwater Intake End-Of-Pipe Fish Screen" guidelines will be followed.

Water will be drawn from the storage tank, treated, and pumped to the camp and other locations where potable water is needed. Potable water treatment will consist of filtration and purification treatment. Currently, several large lakes along the access road are being considered for water supply. The estimated water consumption volumes are being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.

2.7.6 Diversion and Collection Systems

The site water management system will be designed and operated to meet the following objectives:

- To intercept and collect any waters that may have been in contact with mining areas, mine wastes, tailings, or the process plant;
- To divert as much water as possible around the mine areas to avoid contact, and to direct these to downstream drainage systems; and
- To either store contact waters in the TMF, or otherwise to sample contact waters for potential contaminants and, if necessary, to treat to remove contaminants to meet permitted water quality guidelines prior to release.

Preliminary water balance analyses indicate that the TMF will have a net negative water balance, *i.e.*, water losses, primarily due to water storage in the voids of the tailings, will exceed the volume of direct precipitation and runoff in the TMF catchment. Hence, there will be an opportunity to direct other site contact waters to the TMF to be used as process makeup water.

Where contact waters have the potential to contain suspended solids, such as runoff from haul roads, all drainage will be directed to sedimentation ponds for removal of suspended solids. Drainage from haul roads would be released after removal of suspended solids, provided it is sampled and shown to meet water quality guidelines for discharge.

Drainage from open pit or underground mine dewatering or from ore stockpiles may have the potential to contain dissolved metals. These drainages would be preferentially directed to the TMF.

Diversion ditches will be established around the TMF, the mine and process plant areas to route non-contact water around these areas. Ditches would be constructed in bedrock, where accessible, or in overburden. Experience at other sites has indicated that effective diversions can be established in overburden by a combination of ditching and fill placement, with the objective of maintaining permafrost conditions beneath the fills to create an impervious barrier.

A detailed overall site water balance will be developed. The water balance will be used to sum the flows from individual drainage areas, and to assess which site contact waters would be routed to the TMF and which could be released, with appropriate treatment. A water quality sampling network will be established to confirm that all discharges from the site meet permit water quality criteria.

2.7.7 Dewatering of Camp Lake

Because the Main Zone deposit resides underneath and around Camp Lake, the lake will need to be dewatered prior to any mining activities.

A dewatering plan will be generated and approved by regulators prior to any dewatering activities. Only water that meets discharge criteria will be released into the receiving environment. Once lake water becomes too turbid to discharge and does not meet discharge criteria (due to side slumping and sediment suspension), water will be either retained in an enclosed system or transferred to the TMF.

Dewatering will coincide with the natural hydrological regime as much as possible in order to maintain baseline water quality and quantity conditions.

2.8 Access

2.8.1 Site Roads

The Hackett River region has an Arctic climate with long, very cold winters (lasting up to six months of the year), followed by short, cool summers. In this region, permafrost is wide-spread and often of great depth. In summer, only the top 1 m or so of ground thaws. Where the water cannot readily drain away, this active layer remains waterlogged. The severe climate in this region will necessitate appropriate design methods and innovative road building techniques. The goals of designers, who are experienced in cold-climate and permafrost conditions, will be to design civil structures suited to these severe northern conditions without causing damage to the Arctic environment.

The area of the mine is rugged and contains many boulder fields. The detailed design of the haul roads will be in accordance with standard design methods, which take into account the unique operating characteristics of mine haul trucks: elevated eye height and long stopping distances.

Storm water runoff will be channeled by roadside ditches to sedimentation ponds before being released into existing watercourses. Haul roads will be constructed from rock fill and erosion of side-slopes will not be a problem.

During summer operations, water will be sprayed on the roads to reduce dust problems.

2.8.2 All-Weather Access Road

2.8.2.1 Road Alignment

The route of the proposed Bathurst Inlet Port and Road Project (BIPR) passes approximately 20 km east of the Project. To provide access to the Project, a 23-km, all-season road from the mine site to the BIPR will be constructed, managed and maintained by Sabina.

The preferred option for overland access to the site is via the proposed BIPR Project. However, in the absence of BIPR, Sabina would construct its own all-weather road, and deep water port, to Bathurst Inlet.

The area through which the road will pass is characterized by low topographic relief, with gently-rounded hills and numerous small (and some large) lakes. Ground elevations range from 400 to 450 m above sea level, with a few hills exceeding these elevations.

Two options have been selected for the preliminary alignment of the access road between the mine site and the BIPR to minimize environmental problems, which will principally arise from the affect of the road construction on bodies of surface water. Lakes appear to be deep and have been avoided by the design alignment, because it may not be feasible or desirable to fill them. To minimize environmental problems, these alignments:

- follow watersheds where possible
- skirt lakes
- minimize the number of water crossings
- avoid eskers.

These are the only two feasible main alignments between the mine and the BIPR road because of the preponderance of lakes and water crossings in the area. However, in later design, minor variations will be made to these alignments to further reduce their impact on the environment. At an early stage, the road designer will coordinate the road design with other stakeholders to take into account hydrological, geological, archaeological and environmental issues. Areas of concern that have been identified in these discussions will be dealt with at the preliminary stage of the design. Mitigation techniques may include realignment of the road or the bridge over the Hackett River, or provision of special protection measures.

Both alignments that have been proposed avoid cuts in permafrost (where side slopes will continually melt and where snow will accumulate). In addition, the access road alignments cross few swampy areas (except in valleys and at their connection with the BIPR), and the ground along the routes is generally dry. It is likely that culverts can be used at water crossings (either multiple-culvert installations or large culverts). These culverts will be sized for runoff during spring snow-melt, which will be high. There will be a bridge required over the Hackett River crossing, and possibly other crossings as we the prefeasibility study assessment continues.

One additional requirement for the spur road is that it should run close to a potential water source for the mine. Sabina will be allowed to pump only a limited amount from each water source (which must therefore be large in area).

Option 2, south road, is considered to be the most feasible alignment, which meets the requirements listed above and, in addition, crosses the Hackett River at a better location than does option 1, north road (which crosses the river at a point with high banks). In addition, suitable water sources exist close to option 2 at D'Arcy Lake south of this alignment and another lake southeast of the spur road/BIPR connection.

About 7 km west of the BIPR and south of a long narrow lake, option 1 crosses an area of very rugged topography (bedrock). This harsh terrain will make it difficult to construct a road along this alignment and this would not be the preferred option from a constructability point of view. In addition, several archaeological sites exist along the Hackett River near the option 1 crossing. These sites would be difficult or impossible to avoid. Hence, option 2 is the preferred option from an archaeological point of view.

2.8.2.2 Evaluation of Geotechnical Conditions Along the Alignments

Preliminary tasks before road alignment begins will include the identification of unsuitable areas of subgrade. Geotechnical conditions along the alignments will be evaluated from existing maps and a site visit. The geotechnical engineer will pay particular attention to:

- permafrost areas
- eskers
- swamps
- unstable areas
- potential borrow pits and quarry sites

2.8.2.3 Establishment of Preliminary Road Alignment

Once sufficient information has been accumulated to identify the potential engineering, hydrological, geological, archaeological and environmental problems, a roadway alignment will be established that will minimize environmental impacts and maximize performance. The exact route will be determined in conjunction with the appropriate government environmental agency.

After evaluation of the preliminary road options, designers will develop a preliminary road alignment for further analysis. They will, while avoiding unfavourable construction areas, such as eskers, wildlife dens and habitat, areas with steep grades, and unstable areas:

- design a vertical alignment without steep grades that will slow haul trucks

- design a horizontal alignment with large radius curves for vehicle safety
- avoid cuts in hillsides, which will become areas of slides and continual melting
- build the road on the south sides of valleys to maximize heat from the sun
- avoid cuts that could become areas of melting permafrost and locations of deep snow drifts
- design a vertical alignment that will be swept clear of drifting snow by prevailing winds
- avoid stream valleys because of flooding
- place the road on ridges or benches to minimize sidehill cuts and drainage problems
- follow the contours of hills if possible
- provide adequate culverts, ditches and sedimentation ponds to manage storm water effectively and prevent erosion

During this phase of the design, the alignments of the access road will be discussed and coordinated with the appropriate environmental groups.

2.8.2.4 Design Standards

Provincial geometric low-volume road standards (for example, from British Columbia or Alberta) will be selected that are appropriate for the proposed design speed and the intended use and life-span of the road.

The gravel surface of the road will be designed to a suitable standard to accommodate year-round heavy truck traffic (40 return trips per day), at a design speed of 80 km/hr. Each truck will be carrying a 40-tonne load and the overall gross vehicle weight will be 65 tonnes.

2.8.2.5 Construction and Operation of Road

Rock for road construction will be quarried in areas close to the alignment and placed as a minimum 1 m fill on the original ground to form the road embankment and provide insulation over the permafrost. The ground will not be stripped, and the existing vegetation will be left in place to provide further insulation to the permafrost. Because road building equipment will not be allowed to run on the tundra in the summer for environmental reasons, the road will be built in the winter or by end-dumping in the summer.

Cross-road culverts will be installed at watercourses and in embankment areas to prevent water from ponding along the embankment, which would cause the permafrost to melt.

2.8.3 Bridges Over the Hackett River and Large Watercourses

There will be a number of bridges over the Hackett River and large watercourses. Preliminary tasks before road alignment begins will include the selection of the most suitable water crossing points.

2.8.3.1 Location

The bridge over the Hackett River will be located:

- at a narrow point on the river
- at right angles, where possible
- at a point where the banks are low

Option 3, which is a variation on option 1, crosses Hackett River at a point where the banks are low and is the best crossing point for all options (Figure 2.8-1). West of the river, the road must be aligned at about 240^{o} to miss a large rocky outcrop, which would, however, provide a quarry for road fill. However, option 3 is only appropriate if option 1 is the preferred routing.

Option 1 crosses the river at a point where the banks are so high that a crossing would be difficult. The banks of the river immediately north and south of this point are equally high and do not allow for any improvement in the crossing.

Option 2 crosses the river at a point where the river has moderately high banks. The west bank, which is close to the river, must be notched to allow the road to reach the bridge at a reasonably low level. The east bank is sufficiently far from the river to allow the road to climb up to the bench on that side. The river banks are lower to the north of this crossing and higher to the south. The road alignment in this location is constrained by the need to miss the two small and one large lake on either side of the river. An improvement in the location of this crossing could be made if the smaller lakes, which are often shallow and seasonal, could be filled in.

2.8.3.2 Design Constraints

Low-volume roads demand a different approach to bridge engineering, and this is particularly true for construction in remote locations where environmental issues are paramount. The design of the Hackett River bridge will be dominated by transportation issues, equipment availability, and the selected erection method. The small traffic flow to and from the Hackett River mine will require the provision of only a single traffic lane along the access road and across the bridge. The design of the bridge will be selected to suit:

- the site location
- the specified requirements of the crossing
- the method of transportation of the materials and erection of the girders
- environmental concerns.

For remote sites, bridges commonly use either twin steel I-girders and precast concrete decks or shear-connected precast concrete beams.

gis no. 833-2-04

Job No. 833-2

November 20, 2007

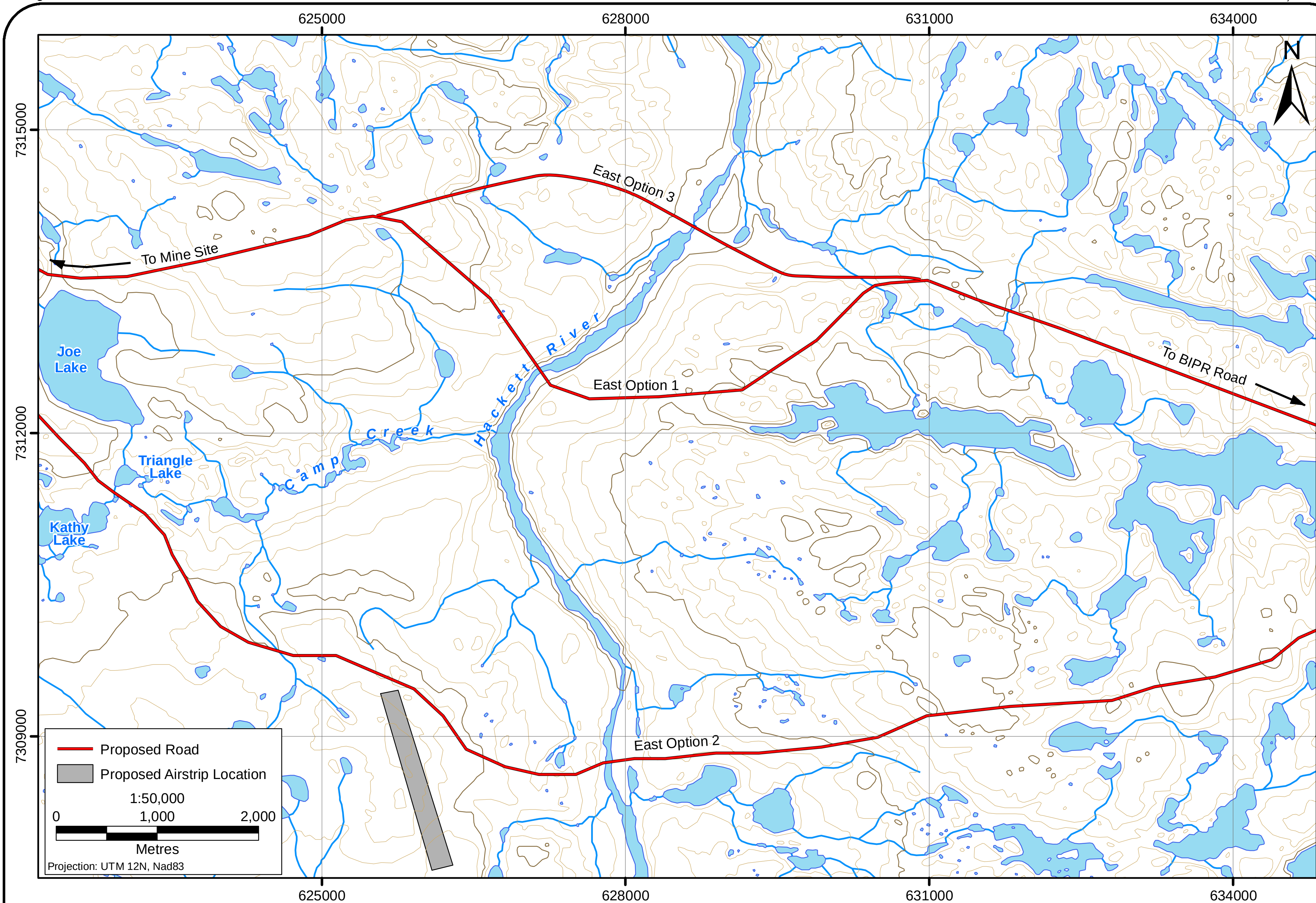


FIGURE 2.8-1

Hackett River Access Road Crossing Options

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Typical bridge design criteria must be modified for low-volume road bridges to account for the following constraints:

- Heavy industrial off-highway vehicular loading
- Remote sites resulting in limited access to conduct geotechnical investigations
- Limited access for construction equipment to transport materials to the site
- Limited sources for cast-in-place concrete supply
- Avoidance of environmental impact on the Arctic environment

To overcome these and other constraints, a bridge structure will be developed that is:

- easy to transport and install
- requires only limited quantities of cast-in-place concrete
- allows for construction flexibility if the ground conditions encountered are not as assumed.

2.8.3.3 Substructure

Due to the remote location of the majority of the low-volume road bridges, it will probably not be economical to conduct a detailed geotechnical investigation with borehole drilling. Geotechnical information will be deduced from site observations, geotechnical maps and past experience in the area. In the initial stage of construction, the excavation of footings or driving of piles will indicate what lies below the surface. To account for the limited amount of geotechnical information available, the preferred substructure will be precast concrete footings, founded on a gravel-leveling surface and lowered in place using an excavator or crane. Steel pipe columns will be bolted onto the footings and bracing will be welded in place, as required. The bridge bearings can then be directly placed onto the columns, eliminating the need for a concrete cap.

If rock is encountered and is considered suitable for direct bearing, small cast-in-place concrete rock pads (bagged grout containing coarse aggregate) can be readily installed on site. If geotechnical conditions indicate that precast concrete footings or cast-in-place concrete rock pads are not suitable, steel pipe piles will be considered.

For small structures over smaller watercourses, where a crane would not normally be used for installation, precast concrete footings will be the most economical solution. However, culverts will always be the first choice for small watercourses if of sufficient capacity.

Innovative substructure designs are required for large river piers that are subject to significant ice forces. In such a situation, the use of large steel pipe piles and bolted steel diaphragms for bridge piers would eliminate the use of cast-in-place concrete.

2.8.3.4 Superstructure

In the Hackett River area, good quality road fill will be hard to find. To avoid the construction of large abutments containing large amounts of road fill, the bridge deck length can be increased.

This solution results in small abutment fills, which can be retained by precast concrete ballast walls or concrete lock blocks.

The preferred deck system consists of twin steel girders, onto which full-width precast-deck concrete panels are placed. These panels are typically grouted to the girders by using a discrete grouping of studs and associated blockouts in the panels. Once the panels have been grouted, the system behaves as a composite steel girder.

For shorter span structures, precast concrete beams will be used. Due to the sensitivity of prestressed concrete beams to handling loads, plain reinforced concrete beams are preferred. Although slightly heavier and having a reduced span range, they are more robust and resist attrition from wheel loading better than prestressed box beams.

2.8.3.5 Typical Bridge Construction

In remote locations, construction equipment is limited to only that which is strictly necessary for the bridge installation: normally two excavators, unless a crane is required for pile installation. Excavators will be positioned on each side of the crossing to install the substructure. Then, the steel superstructure will be lifted or skidded into place. For longer-span steel structures, the girders will be launched from one side of the river using a temporary nosing. The precast concrete deck panels make effective counterweights during the girder launch. Finally, the precast deck panels will be placed using one of the excavators. For construction of bridges on the winter road network in the Northwest Territories and Nunavut, grouting of the deck panels has typically been delayed until the summer months.

Bridge construction will take place within the construction window specified by environmental authorities.

2.8.3.6 Borrow and Quarry Material

No equipment can reach the mine before the road has been built so the access road will have to be built from the BIPR road to the mine site. Therefore a quarry must be opened close to the spur road/BIPR junction to provide rock fill for the first stage of road construction. Other quarries will be opened at other points along the access road.

West of the river on the option 2 alignment, the road must be aligned at about 320 ^{o} to 340 ^{o} to miss high rock bluffs, which would, however, provide a quarry for road fill. At mid-point between the Hackett River crossing and the BIPR junction is a high rock knoll which should be a suitable location for another quarry.

Borrow pits and quarries will be developed in phases in accordance with borrow pit and quarry operation plans. Pits and quarries will be surrounded by berms to divert runoff from adjacent land. Runoff from the pits and quarries will be channeled by ditches to existing watercourses.

On closure, pits and quarries will be graded to conform with the surrounding ground, and permanent erosion control measures will be installed.

2.8.4 Overland Transport

Zinc, copper and lead concentrate produced at the Project will be transported by typical highway tractor-trailer units at an average total rate of 1,600 t/d to the proposed port at Bathurst Inlet. Room within the mill building will be allocated to stockpile a minimum of one month's production. The concentrate will be loaded with front-end loaders into highway tractor-trailer units, in an A or B train configuration for haulage to the Bathurst Inlet port. A 23 km all-season spur road that connects the mine to BIPR will be constructed. This road will be constructed of suitable engineering to accommodate year round heavy truck traffic of 40 return trips per day, at a design speed of 50 km/hr (average speed). Each truck will be hauling a 40 tonne load for an overall gross vehicle weight of 65 tonnes. Suitable delay times for road service and environmental factors have been taken into account with the truck haul schedule.

Typical A or B train truck/trailer configurations will be used so that the operation can take advantage of the back haul opportunity to return supplies as well as fuel to Hackett River from the Bathurst Inlet port. By operating in this manner the cost of the back haul of goods for the Hackett River operation is absorbed in the concentrate haul cost.

Trailer loading will be pre-staged for the truck drivers at both the mill and port locations so that the drivers would simply drive. The loading and unloading would be carried out by specific personnel with the required training to minimize the risk of cross contamination and spillage to the environment. Truck drivers can simply un-hitch from their trailers and re-hitch for the return trip.

The haulage of the concentrate over the 205 km distance will require a fleet of nine to ten tractor trailer units, each making four, 40 tonne return trips per day from the Project to the BIPR port.

2.8.5 Air Traffic

The airstrip at the mine site will have the capability to land heavy-lift type aircraft along with Boeing 727 and smaller aircraft for the transport of mine personnel, general freight and supplies. The smaller aircraft will likely fly daily scheduled flights between the mine site and Yellowknife. The larger aircraft will fly-out of Edmonton once-a-week transporting mine staff, support staff and other personnel, and supplies and general freight.

2.8.6 Marine Traffic

Concentrate will be shipped out by two ice-class bulk carriers with a DWT of about 50,000 t. Each vessel will make call at the proposed BIPR port about five times each season. The first ship will make its first call on or about the first part of August; the last vessel will depart around mid-October. The ice-class bulk carriers will transfer their cargoes to other vessels at a transfer terminal in Greenland for the onward journey to the final destination, smelters in Europe or North America.

The terminal will load a ship in about four days. Concentrate will be stockpiled in an A-frame storage building with sufficient capacity to hold about 450,000 tonne of concentrates. Concentrate will be reclaimed by front-end loader onto a conveying system that will deliver the concentrate to the shiploader.

Inbound cargoes, such as fuel (58,000 t/a) and mining and process supplies and consumables (100,000 t/a), will be delivered by the ice-breaking vessels as a back-haul cargo or by barge.

Ships will follow the eastern shipping route as depicted in Figure 2.1-1. This shipping route is the route proposed by BIPR.

2.9 Port Facilities

Inbound annual supplies of general cargo and fuel and outbound concentrates will be shipped through the proposed BIPR port located on Bathurst Inlet approximately 80 km north of the proposed Hackett River Project.

Estimated annual tonnages to be handled through the port will be as follows:

- 450,000 tonnes of lead, zinc, and copper concentrates for export
- 58,000 tonnes of fuel for the mine
- 100,000 tonnes of operating supplies for the mine

The port will be serviced by ocean going vessels capable of handling up to 50,000 dry weight tonne of bulk, general cargoes, or fuel. These vessels ice-strength classification will be Type B or higher. The shipping season will extend from the end of July to mid-October, or about 100 days, but will vary depending on local ice conditions.

As the market for export concentrates will be smelters in Europe or North America, concentrate will be shipped to a terminal in Greenland where it will be transferred to non-ice class vessels for the final leg of its journey to a smelter. Once unloaded, concentrate vessels will take on general cargo and fuel as backhaul for the return journey to Bathurst Inlet.

2.9.1 Port Facilities and Infrastructure

Sabina would utilize the proposed BIPR port facilities and infrastructure, should the BIPR project be available. However, the current BIPR project description does not include a concentrate storage area or ship loading facilities for concentrate, so these facilities would be constructed by Sabina. Additional storage space may also be needed for goods to be backhauled to the mine.

Salient features of the proposed port to be constructed by BIPR include the following:

- Berth for unloading and loading 50,000 DWT ice breaking bulk, general cargo, and fuel ships
- Fuel unloading facilities, terminal pipelines, tank farm, and dispensing systems
- General cargo short-term and long-term lay down areas
- General cargo handling mobile equipment including cranes, forklifts and reach trucks
- Administration office, maintenance offices and associated facilities
- Camp facilities and services, including an airstrip

- Desalination plant
- Site roads
- Waste management and disposal systems
- Power plant

Port facilities that would be constructed by Sabina include the following:

- Concentrate truck receiving, unloading, and wash-down facilities
- Concentrate receiving, conveying, reclaiming, and shiploading systems
- Concentrate dust control system
- Site run-off collection and treatment systems
- Possibly additional storage for goods to be backhauled to the mine.

2.9.2 Inbound General Cargoes

Most inbound general cargoes will be transported in containers as backhaul cargo on the 50,000 DWT concentrate carriers. Containers will be off-loaded by ship's crane direct to tractor-trailer units that will take them to a long term container storage area adjacent to the berth. Containers will reside in the long-term storage area until their cargoes are required at the mine-site. Hazardous and dangerous goods will be handled in accordance with Federal, Territorial, and Local legislation and regulations as well as those of the applicable codes and guidelines. Explosives, for instance, will be stored in a temporary holding area prior to their immediate transport to site.

2.9.3 Fuel

Vessels delivering fuel to Bathurst Inlet will unload at the berth. Fuel will be pumped to a tank farm for long-term storage. The tank farm, which will comprise six 10 million litre tanks, will hold up to 60 million litres of fuel. The fuel will be transported to the mine site by truck. Trucks will load at a fuel truck dispensing facility. The fuel truck fleet will operate seven-days a week throughout the year except when the road becomes impassable because of inclement weather conditions or due to other factors such as road maintenance or wildlife concerns.

If the berth is not available for vessels calling to offload fuel, they will unload using a floating manifold moored off the berth. The off-shore fuel unloading system will also include ship mooring buoys and a spill basin at the fuel hose connection on-shore. Terminal and ship operators will comply with international, federal, provincial, and local regulations and guidelines for handling fuel from ship-to-shore. Terminal staff will be trained to respond to a spill response. Equipment available at site to respond to a fuel spill will include containment booms, absorbents, collectors, and support vessels.

2.9.4 Concentrates

The concentrate truck fleet will operate seven day a week throughout the year except when the road becomes impassable because of inclement weather conditions, or due to other factors such as road maintenance or wildlife concerns.

Copper, zinc and lead concentrates will be transported by a fleet of 120 t capacity, dual trailer, side-dump haul trucks. The trailers will be fitted with hydraulically-actuated covers to contain fugitive concentrate dust during transport.

On arrival at site the trucks will enter a concentrate truck unloading shed where they will side-dump concentrate into a receiving hopper. Dust collector hoods over the receiving hopper and at the entry and exit doors will collect fugitive dust generated within the unloading shed and direct it to a bag house. On exiting the unloading shed, trucks will pass through a high-pressure water spray system that will wash-off fugitive dust on the exterior of the truck. The wash-down water will report to a water treatment plant and settling pond.

An apron feeder under the receiving hopper will meter concentrate onto a transfer conveyor system that will transport it to a concentrate storage shed where an overhead tripper conveyor will deposit it into a stockpile. All conveyors between the unloading shed and the storage shed will be mounted within enclosed galleries to contain fugitive dust. All transfer towers will be enclosed and equipped with dust suppression and control systems.

The concentrate storage shed will have sufficient capacity to store 450,000 t of concentrates, equivalent to one year's production. Concentrates will be separated by concrete walls to prevent intermixing.

Concentrates will be reclaimed by front-end loaders into a traveling reclaim hopper. The reclaim hopper will meter the concentrate onto a transfer conveyor system that will transport it to a shiploader. All conveyors between the concentrate storage shed and the shiploader will be mounted within enclosed galleries to eliminate any escape of wind-blown concentrate dust. All transfer towers will be enclosed and equipped with dust suppression and control systems.

With a shiploader capable of loading at an average rate of 1,000 tph, it would take between four and five days to load each 50,000 DWT ship. The shiploader will be designed to minimize the escape of fugitive dust. In addition to enclosing all conveyors, a rotating, extendable chute attached to the end of the shiploader boom will, by controlling the flow of concentrate into the ship's hold, reduce the generation and escape of concentrate dust.

2.9.5 Site Infrastructure and Facilities

The site infrastructure and facilities already in place as part of the BIPR project would be used by Sabina. Any additional site infrastructure and facilities that may be needed to support the Hackett River Project are currently being evaluated as part of the prefeasibility work.

2.9.5.1 Hazardous and Non-hazardous Waste Material

Hazardous waste material that is part of Sabina's operations will be stored in specially designated holding areas to await transport off-site on the concentrate ships to designated disposal sites. Non-hazardous waste material will be trucked to the mine site for treatment, if necessary, and disposal.

2.9.5.2 Water Collection and Treatment

Site run-off from any facilities constructed by Sabina will be collected by a system of collector ditches that will direct run-off to an applicable treatment system.

2.9.5.3 Power Plant

The need for additional power beyond what will be present as part of the proposed BIPR project will be evaluated as part of the Hackett River prefeasibility work. Sabina would provide any additional power systems if required to support its operations at the port.

2.9.6 Port Operations

Although the port will operate for only about 100 days a year, operations required to support the Hackett River mine including the truck transport of concentrates, general cargoes, and fuel will operate on a continuous basis except for shutdowns due to inclement weather, road maintenance, or wildlife concerns.

2.10 Preferred Options and Alternatives

Sabina is proposing to develop the Project using scientific information, public and regulatory input and traditional knowledge. Several of the Project components will be finalized based on this input and will be presented and assessed in the draft EIS. Alternatives assessment is also an important approach for prefeasibility and feasibility studies and incorporates both financial and environmental considerations. Many options and alternatives are currently being evaluated as part of the prefeasibility study.

The preferred option for transporting concentrates from the proposed mine to overseas markets is by using the proposed BIPR road (northern ~80 km portion) and the proposed BIPR port on Bathurst Inlet. However, in the absence of the BIPR road and port, Sabina would construct its own all-weather haul road to Bathurst Inlet, and construct a deep-water port on Bathurst Inlet.

A summary of the current preferred options for the Project is provided in table format in Section 2.11 below.

The following tasks for alternative assessment are being conducted as part of the prefeasibility work:

- Evaluate the potential and scope of establishing underground mines below the East Cleaver and Main Zone open pits;
- Evaluate both an all-underground and a combined open pit and underground operation for the extraction of the Boot Lake deposit;
- Review the feasibility of adopting alternate operating philosophies that have the potential to reduce the overall disturbed footprint of the Project while achieving operational advantages and potential cost savings. One alternate operating philosophy would be to complete open pit mining in one of the deposits before commencing open pit mining in

the other, while still providing a near simultaneous end of closure with the Boot Lake underground mine and the remaining open pit;

- Explore and evaluate alternate locations for the milling and surface crushing facilities in order to optimize ore haulage routes and costs;
- Evaluate alternate locations for the waste rock and tailings storage facilities in order to strike a balance between minimizing the environmental disturbance of the Project, and minimizing capital and operating costs. The evaluation will include the potential to provide a separate waste rock storage facility near or adjacent to the East Cleaver open pit;
- Evaluate the potential to provide a separate low grade ore stockpile facility near or adjacent to the East Cleaver open pit;
- Identify and evaluate other potential mining methods for all three potential underground operations in order to develop an optimum plan for underground operations. The mining methods to be reviewed will include an assessment of both caving and non-caving mining methods, the requirement for backfill associated with each mining method, as well as the productive capacity of each method;
- Identify and evaluate a number of permanent ore and waste handling systems with the view to provide a robust materials handling system that can allow for a quick build-up to full productive capacity at the lowest capital and operating cost;
- Review the requirement for a crown pillar for each underground mine and propose an appropriate method of extraction if any pillars are required;
- Mill process design options will be explored and evaluated during the prefeasibility in order to optimize process design;
- Determine alternate reagent schemes for the flotation process based on the results of metallurgical test work;
- Evaluate alternate concentrate dewatering unit processes;
- The airstrip location would need to be near the access road and three options are being considered; two are close to the northern road access option and one is near the southern road access option. The preferred location at this time is immediately west of the point where the south spur road option crosses the Hackett River is the preferred option at this time; and
- To provide access to the site, a 23 km all-weather road linking the mine to the proposed BIPR road is the preferred option. However, in the absence of BIPR, the alternative is for Sabina to have its own all-weather road to Bathurst Inlet and a deep water port;
- Two options for the all-weather road, connecting the Project to BIPR, are being considered; a northern route (Option 1, with 2 possible crossings), and a southern route (Option 2). Option 2, the southern route, is the preferred option at this time;
- All-weather access will require water crossings that would either be bridges or culverts depending on site conditions. Culverts (multi-or large individual systems) would be preferred as much as possible. However, larger rivers such as the Hackett River will

require bridge crossing. Considerations will involve determining bridge location and construction methods that meet the needs of the Project and protects the aquatic environment;

- The need for additional infrastructure at the proposed BIPR port site is also being evaluated as part of the prefeasibility work.

Sabina is committed to construct, operate and close a Project that is economically feasible, that regulatory requirements are met, environmental and social impacts are minimized and opportunities for economic and social development are provided. This commitment will guide additional prefeasibility studies and alternative assessment.

2.11 Summary of Scope of Project

	Open Pit Mining	Underground Mining
Location	Main Zone (East and West) and East Cleaver Zone.	Boot Lake Zone and Main Zone and East Cleaver Zone below the pit.
Mining Method	Conventional truck and shovel.	Sub-level open stoping with backfill and/or sub-level caving.
Mine Life	13.6 years	
Production Rate (Ore)	10,000 t/d	
Production Rate (Waste)	33,400 t/d LOM average	
Millfeed Source	60%	40%
Mill Processing Rate	10,000 t/d	
Mill Processing Method	Standard grinding and flotation circuits	
Products	Copper, Lead, Zinc concentrates	
Transportation and Logistics	A 105 km all-season road construction to Bathurst Inlet Port (23 km mine site to BIPR route connection and 82 km to Bathurst Inlet Port along BIPR road). Concentrate haul will be operated by Sabina. Backhaul supplies and fuel to the mine site.	
Infrastructure and Site	Port Facilities at Bathurst Inlet – Loading/unloading facilities, fuel storage, consumables storage and concentrate storage facilities. Mine Site – Airstrip, power generation, mill and maintenance shop, camp, tailings management facility, waste rock piles, limited fuel, concentrate and consumables storage.	
Markets and Smelter	Mainly European and North American Smelters. Potential East Asian Market for Copper and Lead Concentrate.	

3. TRAINING AND EMPLOYMENT

3. Training and Employment

3.1 Human Resources

The Preliminary Economic Assessment of the Hackett River Project provides an indication of the human resources that will be needed for construction, operation and closure. This section outlines preliminary conclusions on training and employment opportunities at the site and will be revised as more detail is available from pre-feasibility and feasibility studies.

3.2 Workforce

Preliminary workforce needs for the Hackett River Project are outlined in Table 3.2-1 and include positions in management/human resources, professional and science, office, administration and support, installation, maintenance and repair, construction and extraction, production, transportation and health and safety.

Project management and administration will be based at the Hackett River Project, with support from Sabina's headquarters in Vancouver, British Columbia. The Mine Manager will be responsible for project management, working with approximately 50 staff. The construction workforce will grow rapidly to approximately 150 persons within the first year of construction. During operations, the workforce will range from about 225 to 350 people, though only half this number will be on-site at one time due to staff rotations. The operations workforce will peak at about 582 persons in year 4 when underground mining overlaps with the latter stages of open pit mining.

Progressive reclamation will occur throughout the life of the Project and some closure work will begin in the last year of the operating phase. The reclamation workforce at the end of mine life will be about 30 persons. Most of the reclamation is planned for the three years following mine closure. After Year 17, follow-up monitoring will occur for about six years. Monitoring workforce estimates will be revised later in the Project.

3.3 Employment Opportunities and Conditions

The minimum qualifications for entry level (unskilled jobs) for construction and operation will be:

- Completion of Grade 10;
- The ability to pass a criminal check (leniency or pardons for minor crimes will be considered); and
- The ability to pass a health exam, including an alcohol and drug check.

3.4 Inuit Hiring Preference

- Preference will be given to hiring qualified Inuit workers, with the intention of maximizing Inuit employment. Specific initiatives will be implemented during operations so people have access to meaningful, long term employment.

Table 3.2-1
Projected Personnel Needs for Hackett River Project

Area	Jobs	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
Open Pit*	staff	0	26	26	26	26	26	26	26	26	26	25	21	19	12	0	0
	hourly	0	57	112	124	131	132	127	118	93	77	70	42	33	27	23	20
Underground		0	34	43	211	243	269	271	275	245	245	231	292	270	270	73	0
	Total	**0**	**117**	**181**	**361**	**400**	**427**	**424**	**419**	**364**	**348**	**326**	**355**	**322**	**309**	**96**	**20**
Mill	Mill superintendent	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	General Foreman	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Mill Maintenance Foreman	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Plant Foreman	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Senior Metallurgist	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Metallurgical Technicain	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Chief Chemist/Assayer	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Instrumental Technician	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Control Room Operators	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Assayers/Buckers	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Samplers	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Crusher Operator	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Grinding Operator	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Flotation Operator	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Filter & Driers	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Reagents Operator	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Labourers	0	0	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Millwright	0	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Electrician	0	0	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Total	**0**	**0**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**
Site/Camp		0	0	32	32	32	32	32	32	32	32	32	32	32	32	32	32
	Total	**0**	**0**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**
Administration	Head of health and security	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Computer Technician	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Purchasing Agent	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Mine Manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Accountant	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Payroll	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Personnel officer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Security officers/Paramedics	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Secretary	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Offsite Logistics	Logistics Coordinator	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Clerk	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Total	**9**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**	**16**
Port		0	0	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Concentrate Haulage		10	10	23	23	23	23	23	23	23	23	23	23	23	23	23	23
	Total	**10**	**10**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**

*** includes jobs such as: training & Safety Officer; Office Clerk; Warehouseman; Warehouse Stocker; Haul Truck Drivers; Mechanics;**

(from Wardrop, 2007)

3.5 Workforce Mobilization and Schedule

Access to the site will be by air, with two to three flights each week. Flights will connect with regional labour centres and pick-ups for local workers will be provided in Kugluktuk, Cambridge Bay and Yellowknife. Most construction workers will stay on-site for several months at a time, working until their jobs are finished. Most of the operational workforce will rotate every two weeks.

3.6 Contracting and Procurement

The following types of activities and services will be contracted out:

- Facility construction;
- Engineering;
- Concentrate shipping;
- Worker mobilization services;
- Open pit mining; and
- Services such as camp housekeeping, logistics and explosives may be also contracted out.

Sabina is committed to supporting Kitikmeot businesses where they can deliver a timely, competitive and efficient product. Support will be provided to Kitikmeot businesses to help them prepare for bidding on contracts and maximize Inuit content.

3.7 Inuit Impact and Benefit Agreement

Sabina acknowledges that the Hackett River Project is a major development that will result in a benefit to the Inuit within the local communities, the Kitikmeot and Nunavut. Sabina also acknowledges that some of those benefits will be addressed in the Inuit Impact and Benefit Agreement (IIBA). Negotiations for the IIBA will begin as soon as possible with the goal of reaching an agreement to include, but not be limited to:

- job opportunities
- training
- preferential hiring programs
- project contracting and procurement programs
- planning and design participation
- new business and contract arrangements
- participation in monitoring activities and dispute resolution.

4. DESCRIPTION OF PUBLIC INVOLVEMENT AND THE PUBLIC CONSULTATION PROCESS

4. Description of Public Involvement and the Public Consultation Process

Public participation is one of the five guiding principles that the Nunavut Impact Review Board (NIRB) uses to fulfill its mandate. Public participation is therefore fundamental to NIRB's environmental assessment process and to the Project life cycle.

Sabina has initiated a phased consultation and public participation program. The initial phase, which is presented here, focuses on the period prior to the submission of the Project Proposal. Subsequent phases to fulfill consultation and participation needs across the Project life (environmental assessment and review; construction; operations, closure and decommissioning) will be developed as the Project proceeds.

The key objective of Sabina's consultation program is to ensure that all potentially-affected and interested groups are offered the opportunity to learn about, question, and comment on the development plans of the proposed Project.

The development of the Hackett River consultation and participation program will be structured around the requirements of the Nunavut environmental assessment process, cover the life of the Project and include all Project components including the mine site, access road, port facility and shipping route.

This section provides details of consultation and public participation activities to date and an overview of future consultation plans.

4.1 Consultation Communities and Groups

An initial community, group and stakeholder analysis was conducted. Table 4.1-1 shows the consultation communities identified to date.

Table 4.1-1
Phase One Consultation Communities

Community, Group, Organization	Rationale
Primary Communities	
Bathurst Inlet	Closest settlements to project; proximity to proposed shipping route.
Omingmaktok	
Cambridge Bay	Primary communities due to proximity to project and likely source of workers and contractors.
Kugluktuk	
Secondary Communities	
Gjoa Haven	Communities within the boundaries of the Kitikmeot Inuit Association; likely sources of workers.
Taloyoak	
Kugaruuk	
Yellowknife, NWT	Transport hub for workers and provisions; likely source of goods, services and potentially workers

In addition, the following groups and agencies have been identified to be included on the consultation and participation program:

- Regional Inuit Association (Kitikmeot Inuit Association)
- Local, regional and national government agencies
- Hamlet councils and their staff
- Members of the Legislative Assembly (MLAs)
- Hunters and Trappers Associations and Wildlife Officers
- Community groups, *e.g.* Elders, youths, women
- Service providers, *e.g.* education, health, protection and social services
- Tenure holders and land users

These lists are generated from the Phase One scan. Consultation group and stakeholder analysis and updating will continue throughout the life of the consultation and participation program.

4.2 Community Meetings

Sabina completed a series of introductory community meetings in the summer of 2007. These meetings were designed to introduce the Project to primary project communities and provide an opportunity for information sharing, questions and the discussion of comments and issues. The communities included in the introductory meetings were Bathurst Inlet, Omingmaktok, Cambridge Bay, Kugluktuk and Gjoa Haven. Subsequently, discussions with the Kitikmeot Inuit Association have also identified the Kitikmeot communities of Taloyoak and Kugaaruk to be included in future consultation activities.

Community meetings were promoted two weeks in advance and in three languages; English, Inuinnaqtun and Inuktitut. A range of mediums were used including printed news (Nunatsiaq News and News North), community radio stations, local intranet services; posters in community accessed locations and personal letters of invitation to key agencies and organizations.

All community meetings followed the same format:

- Open house during late afternoon and early evening with an opportunity to meet Project staff and ask questions, raise concerns *etc*.
- Community feast hosted by Sabina
- Project Presentation with opportunity for questions, comments and answers

Project materials available at the meetings included presentation posters, Frequently Asked Questions (FAQ) Project summary sheet, a comment form and contact information and a PowerPoint presentation. All written materials were available in English, Inuinnaqtun and Inuktitut. The presentation was delivered in both English and Inuinnaqtun (with the exception of Gjoa Haven where interpretation was in Inuktitut).

Community meetings were led by Sabina's Vice President for Exploration who was supported by other Sabina staff members (including the environmental manager, camp manager, exploration technicians and local Inuit community members working for Sabina) and representatives from Rescan Environmental Services.

Table 4.2-1 provides details of the community meetings and visits held to date by Sabina.

Table 4.2-1
Community Meetings and Visits, 2007

Location	Date	Community attendance (numbers attending or signed in)
Omingmaktok	July 7th, 2005	5
Omingmaktok	September 16th, 2006	8
Site Visit to Hackett Camp with Bathurst Inlet residents	September 17th, 2006	5
Cambridge Bay	June 18th, 2007	44
Gjoa Haven	June 19th, 2007	99
Bathurst Inlet/ Omingmaktok (Residents from Omingmaktok were flown to Bathurst Inlet for the meeting)	July 23rd, 2007	38 (8 from Omingmaktok)
Kugluktuk	October 17th, 2007 (This date had been rearranged from June 2007 due to community deaths. A mail out of the FAQ and comment sheet was delivered to all community members in July 2007 and community feast donated)	169

A series of initial visits and meetings were also held with representative groups and organizations. These were:

- June 18th, 2007: Mayor and Council, Cambridge Bay
- June 18th, 2007: NIRB, Cambridge Bay
- June 19th, 2007: Kitikmeot Inuit Association (KIA), Cambridge Bay
- June 19th, 2007: Kitikmeot Corporation, Cambridge Bay
- June 20th, 2007: Nunavut Water Board, Gjoa Haven
- October 19th, 2007: Director of Lands, Environment and Resources, KIA, Kugluktuk
- October 19th, 2007: Mayor, Kugluktuk

4.3 Summary of Concerns

This section provides a summary of questions and issues raised during the 2007 community and organization meetings.

- Employment and training opportunities and how the project will meet its northern quotas.
- Education and training plans and commitments.
- Loss of community workers to mining sector employment.
- Family and community effects of shift work.
- Socio-economic effects, both positive and adverse of increased development, *e.g.* mining boom and bust, drugs and alcohol and increased violence.
- Effects on caribou, habitat and migration.
- Project relationship with BIPR and proposed shipping route and timing.
- Project mining processes and associated infrastructure, *e.g.* tailings facility.
- Land ownership and use.
- Cumulative effects including shipping routes, increased traffic, effects on caribou, potential contamination, and social and community effects and issues as a result of rapid change.
- Community communication including community-based Sabina representatives and early engagement to allow communities, especially Elders, to prepare for any hearings.

Where possible, responses were provided to each person or organization raising a question or issue. Where information was not available to respond, comments were noted for future consideration and response.

In order to track and address questions and issues, Sabina has developed a communication and issues tracking database to track issues, responses and actions. In addition, Sabina will develop further consultation and participation mechanism and activities over the development of the Project.

4.4 Future Consultation Plans

Sabina will develop future consultation plans to meet the needs of the different Project phases. The next phase (Phase 2) for consultation will be part of the environmental assessment and review phase. Whilst Project consultation activities will be guided by NIRB during this time, Sabina is also developing a company based consultation and participation plan to meet assessment requirements as well as broader community engagement needs. This planning will be based on NIRB guidelines as well as local and international best practice.

Future plans for the consultation and participation program will include, but will not be limited to:

- Further development of communication and issues tracking database
- Assignment of human and financial resources to lead and respond to questions and issues
- Development of a grievance mechanism
- Further community, organization and stakeholder analysis
- Information sharing activities
- Community, group and organization meetings and focus groups
- Participation activities

5. DESCRIPTION OF TRADITIONAL KNOWLEDGE

5. Description of Traditional Knowledge

5.1 Introduction

Sabina is committed to balance decisions with best management practices, scientific principles and traditional knowledge.

The Hackett River project lies in the traditional territory of the Copper Inuit of the West Kitikmeot. There are two major regional traditional knowledge projects in existence that cover this area, the Naonaiyaotit Traditional Knowledge Project (NTKP) and the Tuktu Nogak Project (TNP). These projects belong to the Inuit, as represented by the KIA (Kitikmeot Inuit Association).

The study area for the NTKP is some 750,000 km^2. The approach was regional, and information was collected at 1:250,000 scale. The Tuktu Nogak Project is more specific, and focused on caribou within the Bathurst Inlet area. Although regional in scope, the information in the NTKP is extensive and detailed. However, Sabina requires site specific information for planning decisions.

There are two phases planned for the assessment of traditional knowledge (TK) for the Hackett River Project. The first phase is a compilation report of the existing traditional knowledge, from the NTKP, Tuktu Nogak and other sources. The second phase will be the application and integration of this knowledge with that collected by biologists and scientists for project planning and environmental assessment.

Phase 1 of the planned program will not include the NTKP and TNP databases at this time. Sabina has requested permission from the KIA to access the databases several times in 2007. At the time of writing this Project Proposal, it is assumed that the Hackett River traditional knowledge program may have to proceed without being able to utilize the valuable information contained within the NTKP and TNP. Hence, phase 1 of the program will likely consist of obtaining information from personnel interviews, and utilizing any other traditional knowledge that is publicly available.

5.2 Methods

5.2.1 Databases

If permission is granted to Sabina for access to the GIS databases, the first activity that would take place is editing the TNP database. The TNP has not gone through the same kind of editing of transcripts and verification of placenames that has been completed for the NTKP. In order for the two databases to be used in conjunction, those tasks must be carried out.

5.2.2 Other TK

There are older studies that pre-date the databases with information on land, fish and wildlife from the past that will have applicability for the Hackett River area and will be researched.

There is extensive placenames research by others, such as the Kitikmeot Heritage Society that will be verified and included. Representatives will be invited to participate.

5.3 Gap Analysis and Informing Project

If permission is granted for access to the databases by the KIA, the information that is available in the NTKP and the TNP would be analyzed and used to identify which data are lacking and for which particular areas. The gap analysis will focus the site-specific interviews as it will be instrumental in developing a follow-up questionnaire. Individual interviews and workshops will be completed to address these gaps.

TK will be summarized to provide an understanding the natural history of the area. TK should be applied through all phases of planning and environmental assessment, and Sabina is committed to meeting this objective.

5.4 Community Workshops

The most time and cost-effective means of resolving the issues with placenames and addressing information gaps is to meet with the elders of the Kitikmeot and organizations involved in TK compilation. Most of the elders have moved to Kugluktuk and Cambridge Bay and a workshop will he held in each community.

The objectives of the workshops and follow-up discussions will be to:

- Resolve outstanding issues with placenames for the Project
- Identify elders and current land-users that have specific information for the Project and would participate in site-specific interviews. This will be a small-scale study; from 2-5 individuals will be needed.

The timing of the workshops is dependent on availability of elders, and of organization representatives. These are tentatively planned for January of 2008 and will be held regardless of whether access to the KIA TK databases has been provided.

A key facet of the TK specific area study is that it will be planned, administered, and compiled by the Inuit themselves.

5.5 Data Compilation

Placenames will be included in the NTKP as they are verified in the workshops. Once transcribed and digitized, interview information will need to be verified with the consultant who was interviewed, and the release form signed. Then, the data can be incorporated into the NTKP as per previously established methods.

6. DESCRIPTION OF THE EXISTING ENVIRONMENT

6. Description of the Existing Environment

Comprehensive baseline environmental studies were conducted in the Project Area in 2007, and are planned to continue in 2008. The following components were monitored as part of the 2007 baseline studies:

- Meteorology and Permafrost;
- Hydrology;
- Freshwater Water Quality, Sediment Quality, and Aquatic Biology;
- Freshwater Fish and Fish Habitat;
- Marine Water Quality, Sediment Quality, and Aquatic Biology;
- Marine Fish Habitat;
- Wildlife, including Caribou, Muskox, Birds, Waterfowl, Raptors, Dens, Small Mammals;
- Mapping, Vegetation, and Soils;
- Archaeology;
- Minesite Drainage Chemistry;
- Public Consultation;
- Traditional Knowledge;
- Socio-Economic; and
- Land Use.

Results from the 2007 baseline studies are currently being written as a series of baseline reports. Historical and/or regional information is available for some environmental components. Specific reports are cited in the sections below where applicable.

6.1 Physical Environment

6.1.1 Regional Setting

The Hackett River Project is located in the West Kitikmeot region of Nunavut at approximately 65˚ 55' North Latitude, 108˚ 30' West Longitude, approximately 75 km south of the southern portion of Bathurst Inlet.

The mine site area lies within the Takijuq Lake Uplands ecoregion, which covers the south central portion of the West Kitikmeot region. This area is made up of broad, sloping uplands, plateaus, and lowlands, along with the rugged ridges of the Bathurst Hills (WKRLUP, 2005). Much of the area is largely composed of unvegetated rock outcrops and boulder fields.

The port site area lies within the Bathurst Hills ecoregion, which extends by Bathurst Inlet and along the coastline of Coronation Gulf, and includes offshore islands. The landscape is characterized by higher elevations, which are moderated by open water during the late summer and early fall. The port site lies within the Tundra, High Shrub vegetation zone of the West Kitikmeot region (WKRLUP, 2005).

Both the mine site and port site lie within the Bathurst Inlet-Burnside Watershed. The land is dotted by thousands of lakes, collected by streams or by one of the major rivers in the area (*e.g.*, Burnside, Mara).

The mine site and port site lie within two geological provinces; the Slave Province and the Bear Province. The Slave Geological Province is underlain by granite and related gneisses, as well as by sedimentary and volcanic rocks (more than 2.5 billion years old). The Bear Geological Province contains mainly volcanic and sedimentary rocks ranging in age from about two billion years (WKRLUP, 2005).

The mean annual temperature is approximately -10.5ºC with a summer mean of 6ºC and a winter mean of -26.5ºC. The mean annual precipitation range is 200-300 mm (Environment Canada website).

The region is characterized by long dark winters and short summers. The ground is covered in snow from October to June most years. Lakes are ice-covered from approximately October to June most years, with ice thickness reaching depths of 2.0 metres. The area is one of continuous permafrost, meaning the ground is permanently frozen throughout the year.

6.1.2 Proximity to Designated Environmental Areas

There are several designated environmental areas within the West Kitikmeot planning region, including a National Park, Territorial Parks, and Conservation Zones.

Figure 6.1-1 indicates the locations of conservation areas within the West Kitikmeot, as well as conservation areas in the North Baffin region. RAMSAR sites (international wetland conservation areas) are also indicted on the map.

The Hackett River mine site area, the 23 km spur road, and the portion of the BIPR road connecting the mine site area to the port are not close to any designated environmental areas.

The BIPR port site, located on Bathurst Inlet, is approximately 50 km SE of Wilberforce Falls, a designated conservation zone. The area has unique features that are important to Inuit and which also offer tourism opportunities.

The BIPR port site is located approximately 75 km to the west, across the inlet, from the Hiukitak River conservation zone. The area is a critical traditional harvesting area, and the river supports healthy populations of fish and wildlife.

The BIPR shipping route passes within 50 km of several conservation areas. The following conservation areas are generally within 50-60 km of the shipping route, and are indicated in Figure 6.1-1:

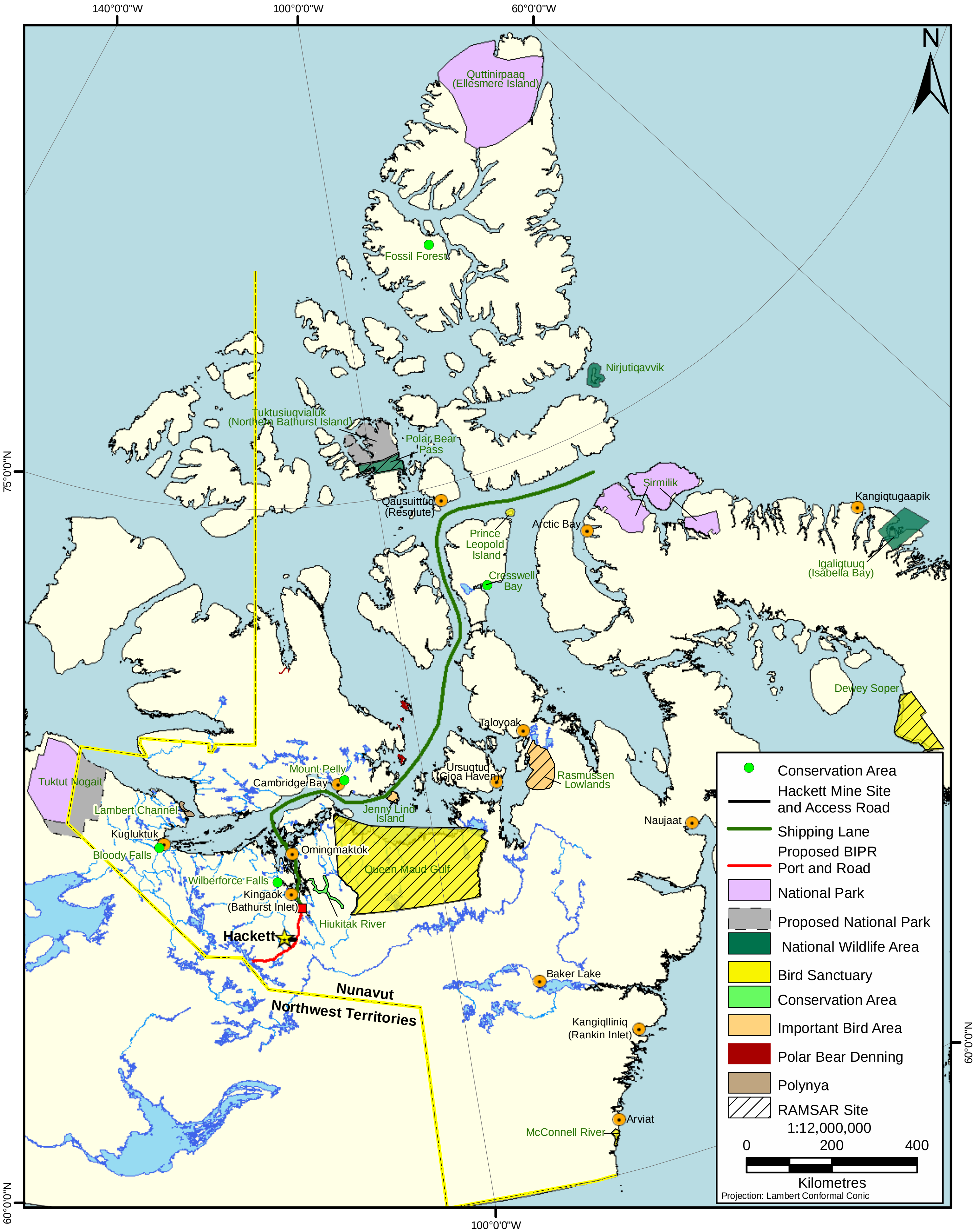

FIGURE 6.1-1

Parks and Conservation Areas

- Mount Pelly (Uvajuq). Territorial Park in Cambridge Bay. Important for tourism; viewing area for landscape and wildlife;
- NW tip of Queen Maud Gulf Migratory Bird Sanctuary (Iluilik Sanctuary). Also a RAMSAR site. The sanctuary supports virtually the entire world population of Ross' geese, and about 15% of the Canadian population of lesser snow geese;
- Jenny Lind Island. Critical migratory bird nesting area, especially for lesser snow geese;
- Polar Bear Denning conservation zones. Small islands off the southeastern coast of Victoria Island;
- Prince Leopold Island Bird Sanctuary (North Baffin Regional Area). Important for seabird species, and hosts the 4th largest seabird colony in Arctic Canada; and
- Sirmilik National Park (North Baffin Regional Area). Important as the most diverse bird community in the high Arctic during the summer; hosts over 70 species of birds, including 45 species of breeding birds. A migratory bird sanctuary lies within the park. The marine area NW of the park is Lancaster Sound, which is one of the most productive marine areas in the entire Canadian Arctic. It is also the eastern entrance to the Northwest Passage and an important route for marine transportation (Parks Canada website).

6.1.3 Caribou Protection Areas

There are currently no regulatory rules in place in the West Kitikmeot region to protect caribou habitat, or to protect caribou from harmful effects of development. INAC has incorporated Caribou Protection Measures in its land use permits in the Keewatin region of Nunavut for over twenty years (WKRLUP, 2005).

The territorial governments of Nunavut and the Northwest Territories are developing an inter-jurisdictional Bathurst Caribou Management Plan.

In the interim, the West Kitikmeot Regional Land Use Plan states the following:

1. Between May 15 and July 15, works and activities may not take place and, if operations have commenced, all operations must be suspended immediately if calving or post calving caribou are present in or near the area of work or activity;
2. During migration of caribou: a) migration must not be blocked or substantially diverted; b) activities that may interfere with migration, such as airborne geophysics surveys or movement of equipment, must cease until the migrating caribou have passed; and
3. Between May 15 and September 1: a) camps may not be constructed, fuel may not be cached, and blasting may not be conducted within 10 km of any 'Designated Crossing' as shown on the 'Caribou Designated Crossing Map", as updated from time to time; b) diamond drilling operations may not be conducted within 5 km of any Designated Crossing.

6.1.4 Regional Surface and Bedrock Geology

The Property is underlain by metasedimentary and metavolcanic rocks of the Yellowknife Supergroup (Wardrop, 2007). This occurs in the eastern part of the Archean to Proterozoic-age Slave Province. Within the Property area, the Yellowknife Supergroup is comprised of three conformable formations which include the Hackett River, the oldest formation, the Beechy Lake, which is younger, and the Back River Group, the youngest. The Hackett River Group is dominant in the Project area. It consists of three formations of which the Siorak is the oldest, the Nauna is younger, with the youngest being the Ignerit Formation. The Ignerit Formation grades into the overlying Beechy Lake Group.

The Siorak Formation is comprised of gneissic and schistose metavolcanic and metasedimentary rocks. These are in contact with the underlying Hackett River gneiss dome, assumed to be an intrusive into the Hackett River Group. The overlying Nauna Formation is comprised of metamorphosed mafic and felsic flows and pyroclastic rocks. This unit does not appear to be present on the Property area where the Ignerit Formation rests with apparent conformity upon the Siorak Formation. The Ignerit Formation contains known sulphide-bearing stratigraphy and is comprised of basic to felsic pyroclastics, tuffs, reworked volcanic sediments, and exhalative chemical sediments. These include limestone, chert, sulphide facies iron formation, and sulphide-bearing volcaniclastic rocks (Wardrop, 2007).

Within the Property area, the Ignerit Formation is comprised of basal rhyolitic pyroclastics that are overlain by andesitic and dacitic pyroclastics. These are overlain by rhyolitictuffs and sediments and are capped by clastic sediments. The Lower Rhyolitic Pyroclastic Section is at least 450 m thick and is comprised of fragmental agglomerate to tuff with internal gradations to finer argillaceous tuffite and chert. The overlying Andesitic Pyroclastic Section is from 60 to 180 m thick and is overlain by the Dacitic Pyroclastic Section that ranges from 180 to 240 m in thickness.

The Upper Rhyolitic Tuff Section contains the known sulphide deposits. It overlies a Mineral Horizon member that ranges from 120 to 180 m in thickness. The Mineral Horizon member is between 3 and 100 m in thickness. It is comprised of fine-grained rhyolitic pyroclastics and argillaceous and cherty tuffite. Pyroclastic material increases in abundance east and west of the Main Zone area.

A variety of surficial materials occur throughout the Project area. Morainal deposits are pervasive in the region, ranging from blankets (>1 m depth) to veneers (<1m) over bedrock. Frequently, the morainal material is covered with a thick layer of boulders such that only small pockets of surficial material is visible or it occurs in pockets between bedrock outcropping. (Plate 6.1-1). Boulder fields occur in the Project area but are extensive along the access road. Some sloping areas have only a scattering of boulders on the surface (Plate 6.1-2).

Plate 6.1-1. Boulder field with pockets of morainal material.

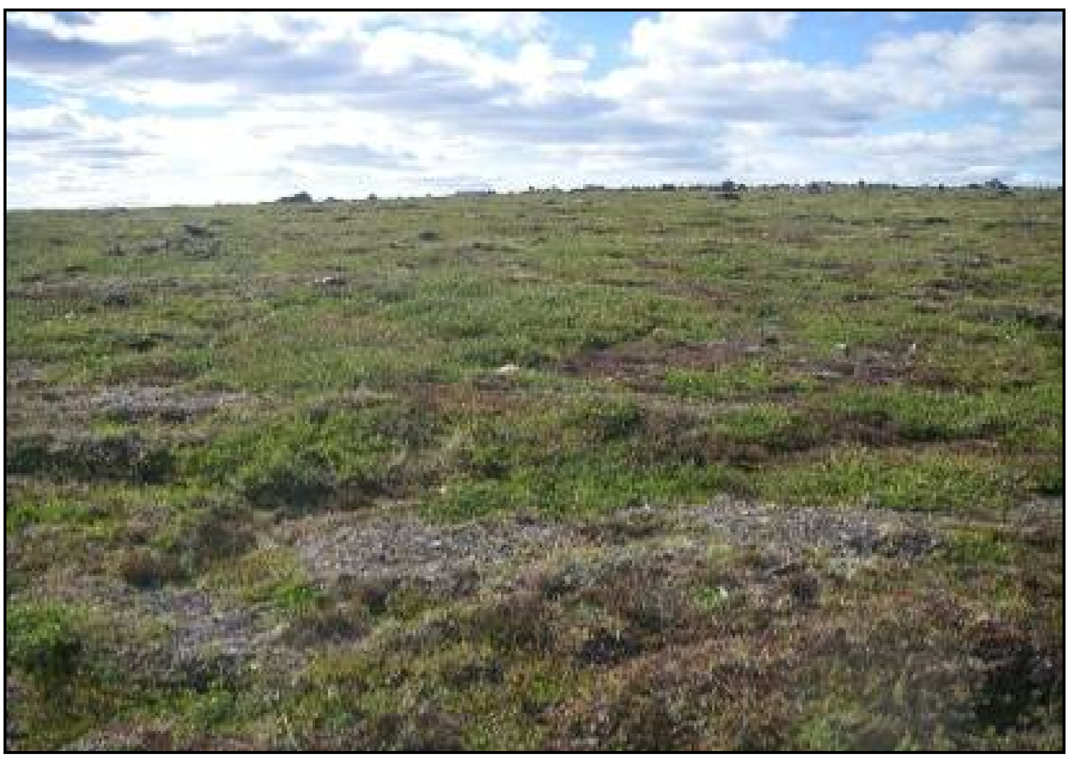

Plate 6.1-2. Light covering of boulders on morainal material.

Lacustrine material occurs where ice blocks have formed lakes. This material is generally fine textured and is limited in extent. Organic materials also occur in the project area. The accumulation of this material requires water to develop so it is frequently found in wet areas around lakes. Sedge meadows commonly occur in such areas (Plate 6.1-3). Some lakes are lined with boulders and have no vegetation except in the odd crevice between the boulders.

Plate 6.1-3. Wet sedge meadow common in depressional areas.

There are many creeks in the Project area. Boulders commonly occur on the creek bottoms. A limited amount of finer fluvial material is associated with the creeks.

Glaciofluvial deposits occur along the Hackett River. Such deposits are characterized by very coarse textured, well sorted sands and gravels. Large eskers, another form of glaciofluvial material, also commonly occur in the project area.

6.1.5 Topography

The topography in the region is low relief with gently rolling, ridges to large, flat areas. Slopes generally range from 0% to 7%. Irregular shaped water bodies occur at the base of slopes and in depressions (Plate 6.1-4). These are frequently connected by streams to provide a complex network of water bodies.

Plate 6.1-4. Gently rolling topography with a water body occurring in a depressional area (near Hungrat Lake).

The topography along the southern route of the road between the BIPAR road and the mine site ranges from wide, flat areas characterized by extensive boulder fields, to some gently rolling ridges, and a few steeper ridges (Plate 6.1-5). Bedrock exposure is common.

Plate 6.1-5. Steeper ridges along the southern road route.

6.1.6 Eskers and Other Unique Landscapes

Eskers occur in the Project area. They are developed from streams deposited below or within glaciers and consequently consist of well sorted sands and gravels. They occur as sinuous ridges (Plate 6.1-6) and provide borrowing opportunities for wildlife. Burrowing material is limited in the area because of the pervasiveness of boulder fields and shallow morainal material over bedrock resulting in eskers heavily used for this purpose. Eskers are high features on the landscape so they also provide escape terrain for wildlife, such as caribou. Wildlife also prefer to move along the tops of eskers, obtaining relief from insects.

Frost heaving causes fracturing of bedrock resulting in large boulder fields and belts in the area (Plate 6.1-7). Boulders are frequently concentrated in depressions (Plate 6.1-7) as frost heaving sorts and heaves boulders to the surface.

Mudboils and other patterned ground (Plate 6.1-8) are common in the area. These are features related to the cold climate where permafrost is common and causes sorting of course fragments and the flow of thawed soils.

Plate 6.1-6. Esker occurring in the Project area.

Plate 6.1-7. Boulders concentrated in depressions on the landscape.

Plate 6.1-8. Sorting of coarse fragments in morainal material due to frost action.

6.1.7 Permafrost and Permafrost-Related Features

The Hackett River Project is in a zone of continuous permafrost. The active layer through the Project area ranges from approximately 1 to 2 m, but may be greater in areas where there is loose, sandy soil at the edges of lakes or ponds. Talik features are potentially present in the area under larger lakes, and will be further investigated in 2008. The depth of permafrost in the region is on the order of 500 metres. Permafrost greatly increases ground stability at depth but at surface it can increase the rates of soil erosion through the formation of ice wedges, pingos, palsas, ice lenses, and thermokarst. In the Hackett River Project area only ice wedges and ice lenses have been identified.

6.1.8 Soil Quality

The collection of soils data was initiated in 2007. As part of this program, terrain mapping was carried out on 1:20,000 aerial photographs. Two field surveys were carried out to field check the terrain mapping, to collect soil samples at representative locations, and to provide soils baseline data.

A total of 87 sites were checked in the vicinity of the Project area and access road. In addition, four sites were assessed at the reference lakes, and six at the Port for a total of 97 sites. All sites were located with UTM co-ordinates. A vegetation and wildlife habitat inventory were made at each soil inspection site.

All data were collected following the guidelines established in the Field Manual for Describing Terrestrial Ecosystems (B.C. Ministry of Environment, Lands, and Parks (MELP) and B.C. MoF, 1998). Soil inspection sites required the excavation of a soil pit, to the depth of common rooting or to the parent material. Soils pits were excavated by hand where possible, being limited in some areas, by boulders or bedrock. The soils and sites were described in detail.

Further notes were recorded that included soil horizon designation and depth, colour (Munsell colour chart), and the depth to bedrock and the watertable. Sites and soil pits were photographed.

Fifty six soil samples were collected from the 0-10 cm and 10-20 cm depths at representative locations for metal analysis. Twenty two soil samples (from 11 sites) were collected in the Project area and along the access road. Twenty two soil samples were collected at the reference lakes and in the areas downstream from potential facilities. Twelve soil samples were collected from six sites at the Port facility (at Bathurst Inlet). The soils will be checked for metals to provide baseline information which will be compared to Canadian Council of Ministers of the Environment (CCME) guidelines. This will provide a benchmark to compare the soil chemistry over time as it relates to the project. Analyses will also include soil reaction (pH) and carbon. Fertility analysis will be carried out before soils are seeded or used for reclamation.

The amount of soils was limited in the Project area and along the road. The morainal soils are generally moderately coarse to coarse textured and contain between 20% and 30% coarse fragments, by volume (Plates 6.1-9 and 6.1-10).

Plate 6.1-9. Morainal soils common in the Project area.

Plate 6.1-10. Poorly drained fluvial soils with an organic surface layer.

Soils occurring in wetter areas such as in sedge meadows may be organic or have an organic capping (Plate 6.1-11).

Plate 6.1-11. Poorly drained, jelly-like soils that have poor stability. Located in wetland areas.

Wet soils can have a jelly-like consistency which shakes with pressure. These soils are poorly drained and may be found in depressional areas, also under sedge vegetation (Plate 6.1-12).

Plate 6.1-12. Typical tussock vegetation overlying jelly-like soils.

6.1.9 Groundwater

Deep groundwater exists below the permafrost layer in the area. Based on thermistors installed near Boot Lake, the estimated depth of the bottom of the permafrost at that location is approximately 500 m below the ground surface. Hence, deep groundwater exists below approximately 500 m depth.

Actual water quality samples of deep groundwater have not been collected. Salt (calcium chloride) is used in the drilling process to prevent freezing of the equipment while in the permafrost zone, and this salt would always be present within the drill hole. Flushing of the salt is possible, but the amount of flushing required would be unknown, and there would always be doubts regarding the salt content of the obtained sample.

Because of the technical difficulties associated with attempting to obtain a deep groundwater sample, as well as the uncertainties associated with the contamination of any samples that may be obtained, no groundwater water quality samples are planned to be collected. For a future draft Environmental Impact Statement, real data from other mines in the Northwest Territories and Nunavut will be used. In addition, as the Boot Lake underground is developed, real groundwater samples can be more reliably obtained when the depth of drilling is much less than 500 m.

It is expected that the deep groundwater in the area will be very saline, and potentially high in some metals.

Shallow groundwater may be present if there are thawed areas below large lakes in the area. This shallow groundwater would be expected to reflect surface waters to a large extent (*e.g.*, the surface water of the overlying lake), and be much closer in chemistry to surface water than the expected saline nature of the deep groundwater. There may be a talik (thawed zone within the continuous permafrost) below Camp Lake.

Geotechnical drilling may take place in the potential talik zone below Camp Lake in 2008. If such drilling takes place, water quality samples from the shallow groundwater may be obtained in 2008.

6.1.10 Freshwater

6.1.10.1 Hydrology and Water Quantity

Catchment areas around the Hackett River Project site are shown on Figure 6.1-2. In 2007, a total of 10 hydrometric stations and 5 lake level gauges were installed at the locations shown on the figure. In addition, the Water Survey of Canada (WSC) operates a long term hydrometric monitoring station near the mouth of the Burnside River which drains the streams from the Hackett River Project area. Regional watersheds along with the WSC stations are shown in Figure 6.1-3.

The extremely cold temperatures of the region, combined with permafrost ground conditions result in a short period of runoff that typically occurs from June to September. Maximum lake and river ice in the area can reach a thickness of approximately 2 metres which results in most rivers and creeks, with the exception of rivers deeper than 2 metres, freezing solid during the winter months. Streams and rivers typically begin to flow in late May or early June with the onset of snow and ice melt. Flows typically peak in June before dropping steadily through the summer and early fall to October when flows essentially cease. The peak runoff period is quite short and the volume of the annual hydrograph is low, relative to the rest of Canada, due the region's low average annual precipitation of approximately 270 mm. The annual runoff coefficient varies between watersheds but reasonable values range from 0.5 to 0.7 due to the low temperatures and the ground conditions of permafrost and minimal vegetative cover.

Correspondingly, surface water is abundant, and the region is dotted with thousands of small lakes and streams. The mean annual runoff in the area, based on a review of regional Water Survey of Canada (WSC) and Atmospheric Environment Service (AES) records of streamflow and precipitation, is estimated to be approximately 200 mm. Preliminary data for 2007 from watersheds monitored for the Hackett River Project produced annual runoff estimates ranging from 120 to 164 mm.

The ground conditions are conducive to a very rapid basin runoff response, and peak flows are correspondingly quite large. Annual peak flows are due to snowmelt, rainfall, or rain on snow events, occur most commonly in June, but may occur at any time during the non-freeze period.

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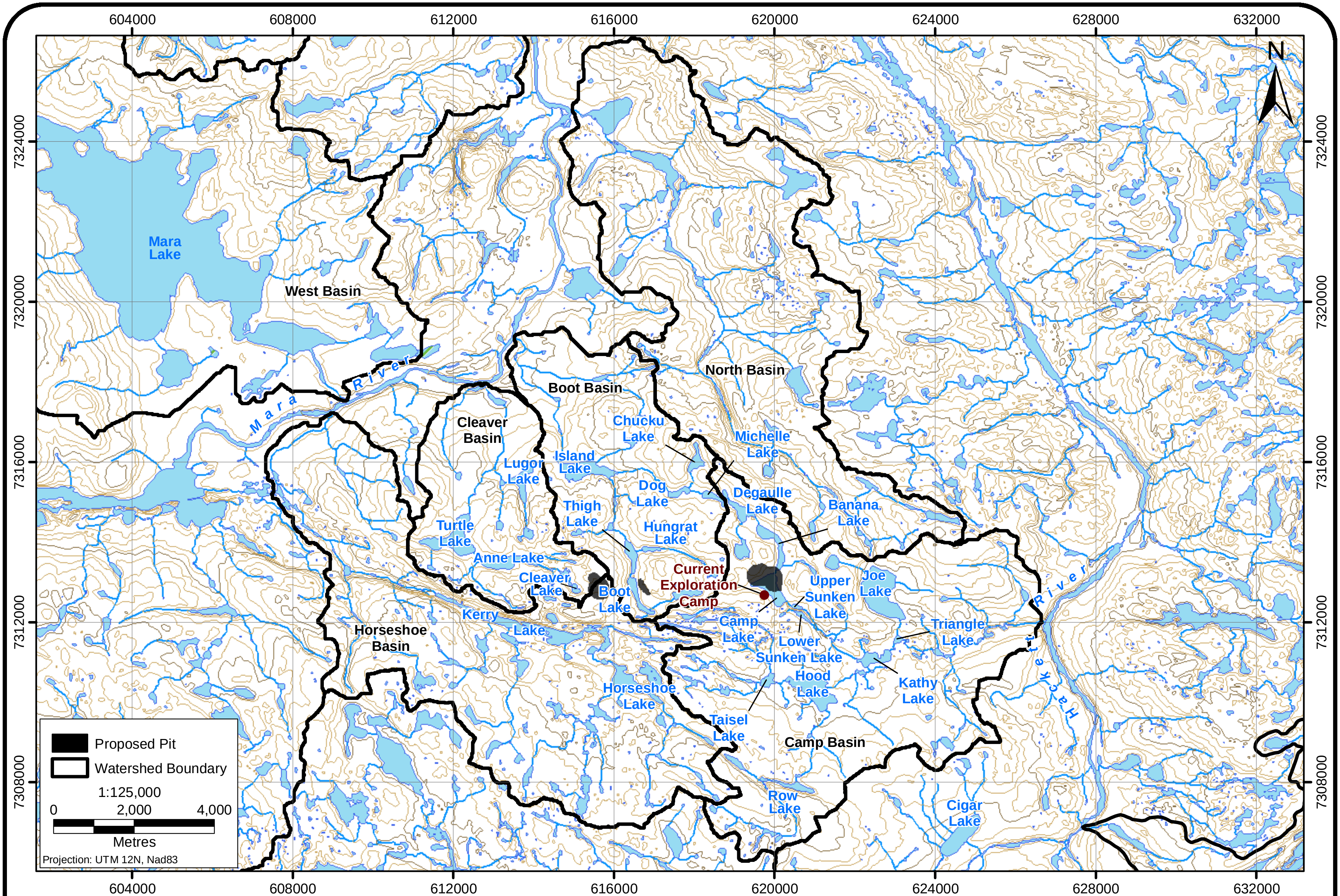


SABINA SILVER CORPORATION

FIGURE 6.1-2

Catchments of the Hackett River Project Area

Rescan

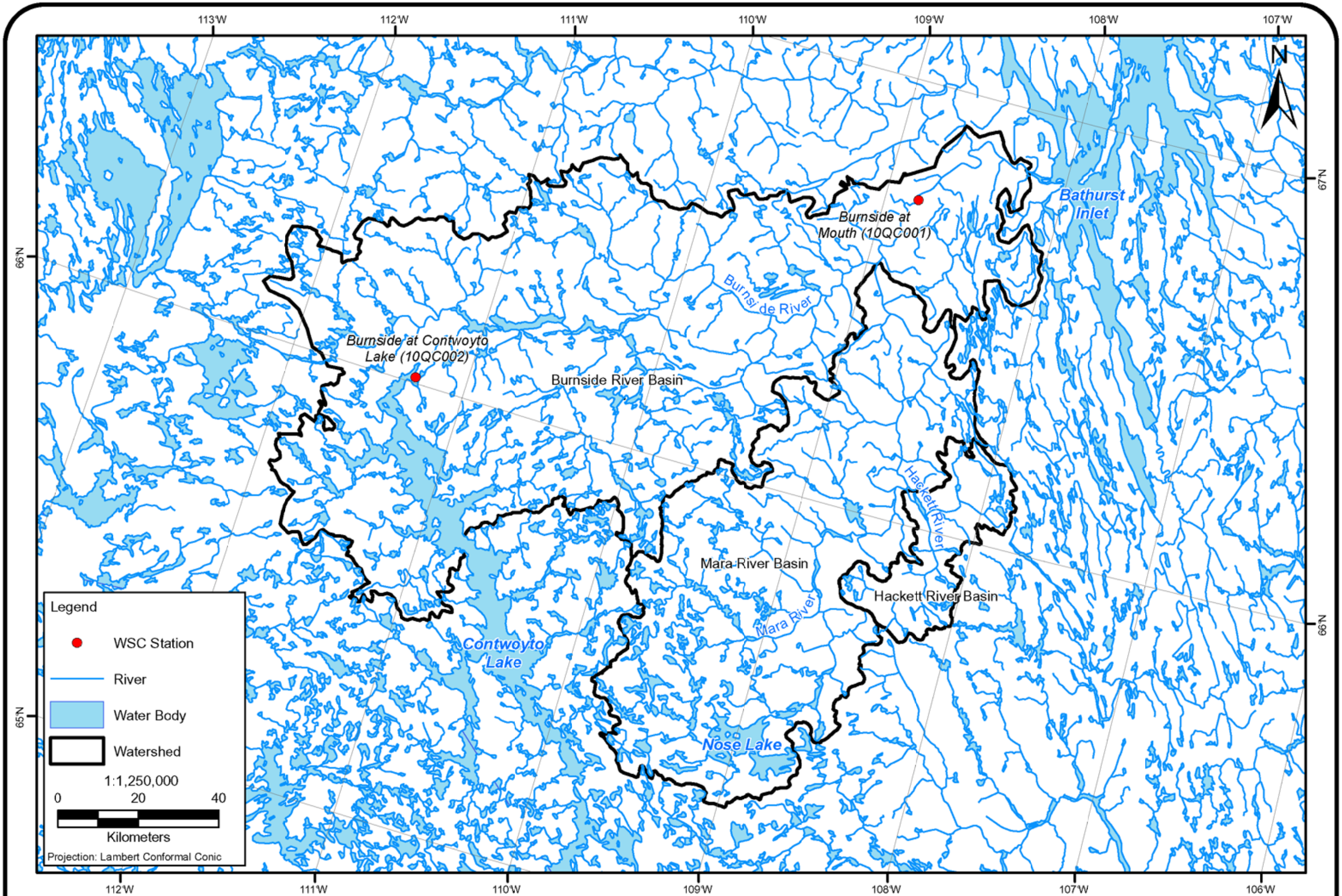


FIGURE 6.1-3

WSC Hydrometric Stations in the Burnside River Basin

6.1.10.2 Bathymetry and Limnology

Bathymetric surveys were conducted for 22 lakes during the summer of 2007 (Rescan 2008a). The lakes around the mine site area are small to medium sized lakes, with maximum depths ranging from 5.0 to 18.0 metres. Surface areas generally range from 47,000 m^2 to 840,000 m^2, and lake volumes generally range from 100,000 m^3 to 3,900,000 m^3 (Rescan 2008a). The exception is Kerry Lake, which is very deep (maximum depth of 37.8 m). Larger lakes are present outside of the immediate project area.

Winter physical limnological characteristics were measured in the lakes in May of 2007. Dissolved oxygen and temperature profiles were typical of ice-covered Arctic lakes. Water temperatures were coldest at shallow depths just below the ice (0.5 to 1.5˚C), and gradually warmed throughout the water column to maximum temperatures of around 3 to 4˚C near the water/sediment interface. Dissolved oxygen concentrations were highest near the water/ice interface (~10-12 mg/L), and gradually declined throughout the water column to minimum concentrations near the water/sediment interface. The amount of natural oxygen depletion at depth varied among lakes. Some lakes had bottom water dissolved oxygen concentrations of 1 mg/L at depth, indicating that there was oxygen-consuming organic matter in sediments. Other lakes maintained high levels of dissolved oxygen at depth (as high as 9 mg/L).

Open-water season limnological characteristics were measured three times during 2007; in July, August, and September.

Secchi depth, a measure of water clarity, varied from 4.2 to 12.2 m during the open-water season. Many lakes had clear enough water that the Secchi disk hit the bottom of the lake before it was no longer visible. The average Secchi depth for all lakes combined was lowest in July and highest in September. This corresponds with average chlorophyll *a* concentrations being slightly higher in July compared to the other months.

Secchi depth can be used to calculate the depth of the euphotic zone (the zone where photosynthesis can take place), and euphotic zone depths ranged from 11.4 to 33 m. This indicates that the majority of the water column for most lakes had enough light penetrating such that photosynthesis could take place in the entire water column.

Dissolved oxygen and temperature profiles were typical of Arctic lakes during the open-water season. The lakes in the area mix fully at least two times per year; during ice breakup in the spring, and during high winds/low temperature conditions in the fall just prior to freeze up. In addition, the lakes are small enough around the Project area to become fully mixed during the summer, depending on wind and temperature conditions. In 2007, thermal stratification was evident in most lakes in July, with surface waters warming up to ~17 C (bottom temperatures varied among lakes; some lake bottom water was as cold as 5 C). Strong winds in early August caused most lakes to be fully mixed, resulting in uniform temperature and dissolved oxygen values throughout the water column. Lakes were again fully mixed in September of 2007. Lakes remained well-oxygenated throughout the open-water season (~9-12 mg/L), with the exception of a few lower values just above the water/sediment interface.

6.1.10.3 Lake Water Quality

Lake water quality was measured four times during 2007: May (winter), July, August, and September (Rescan 2008a). Historical data are available from some lakes for the following periods: August 2004, July 2005, July 2006 (GLL 2004, 2005, 2006).

The 2007 lake water quality program focused on characterizing the potential natural variation in lake water quality with water column depth, season, and geographical location. A total of 28 lakes were sampled during 2007. Samples were obtained from different depths with a lake, from both winter and open-water seasons, and from lakes lying within a number of different watersheds. Two reference lakes, located ~10 km away from potential mining activities, were also sampled. Data collected during the years 2004-2006 consisted of mainly single surface grab samples from one time period per year.

General

In general, lakes in the area contain extremely clear, low nutrient, low metal water, indicative of pristine high Arctic lakes. Most lakes have near-neutral waters, with very low hardness and alkalinity. However, naturally high metal concentrations are present in some lakes, indicating their proximity to surface mineralized areas. These lakes can have metal concentrations exceeding CCME guidelines for the protection of freshwater aquatic life, and can have metal concentrations 10 to 100 times greater than other lakes in the area.

Water Column Depth Variation

As discussed in the limnology section above, lakes in the area fully mix numerous times throughout the year (open water season; just prior to freeze up, and during spring ice off). Given the mixed nature of the lakes, it would be expected that chemical stratification would not take place within a lake, unless there was an input source of a different characteristic water (*e.g.*, seepage from a mineralized area; sediment influence of overlying water chemistry during winter or times of periodic stratification).

However, despite the mixing, a few differences were found with depth in some lakes during the winter (due to sediment/water interactions) as well as at the beginning of the open-water season (likely due to surface seeps from mineralized areas). During the winter, bottom waters were naturally elevated in nitrate concentrations in many lakes. This is a natural process, and the main source of nitrate to the water column when the water mixes in the spring. Nickel and zinc concentrations were also slightly higher in deep water during the winter in three lakes that were sampled.

During the open-water season, lake water quality was generally uniform, with the exception of three lakes in July. One lake had very large differences in water chemistry with depth, with low pH, high Al, Cd, Cu, and Ni concentrations in surface waters (Row Lake; See Rescan 2008a). This lake was obviously influenced by a surface seep. Two other lakes exhibited smaller vertical differences, but were also likely influenced by seeps.

Seasonal Variation

There were significant differences in lake water quality between the winter and summer seasons, and also among months within the summer season. pH and sulphate values changed significantly with time at a few lakes, likely as a result of mineralized area seepage. Most metals also varied significantly with time at many of the lakes; Al, As, Cd, Cu, Pb, Ni, and Zn concentrations all varied substantially with time. Some lakes exhibited slightly higher metal concentrations during the winter, while others underwent drastic changes in metal concentrations during the open water season, as a result of changing hydrological conditions and seepage.

Spatial Variation

Lake water quality varied significantly with spatial/hydrological distance from the main minable mineralized areas, Main Zone (Camp Lake), Boot Lake, and East Cleaver. These three resources lie within three separate watersheds; Camp Basin, Boot Basin, and Cleaver Basin, respectively.

In general, lakes in the Camp Basin had the lowest average pH values, and the highest average Al values. Camp Lake overlies the mineral resource of the Main Zone, and has also hosted winter exploration drilling. As expected, the lake has relatively high concentrations of Al, Cd, Cu, Pb, Ni, and Zn.

The Boot Basin lakes in general had lower metal concentrations compared to lakes in the other basins, with the exception of high Ni concentrations in Boot Lake.

Cleaver Lake, located due west of the East Cleaver Zone mineralized area in the Cleaver Basin, had very high concentrations of Cd, Cu, Pb, Ni, and Zn. Metal concentrations measured in this lake (and in downstream Anne Lake) were the highest recorded in the area, with zinc concentrations reaching nearly 4.0 mg/L. Cd concentrations were also extremely high, averaging about 0.025 mg/L in 2007.

Annual Variation

There were differences in average annual concentrations of some parameters for some lakes, while other parameters (*e.g.*, Ni in the Camp Basin lakes) remained very stable over the period of record. No overall trends were evident, with the exception of apparently high values in 2006 for many metals and nutrients. However, this is an artefact of too high of detection limits being used for the 2006 study.

The 2007 data set encompasses much more natural variability in the lakes than the historical data from 2004 to 2006. In addition, lake samples collected in 2007 were obtained from a boat at various depths within a lake, as compared to shoreline grab samples from the historical studies. Hence, some of the annual variations observed may have been due to these factors.

6.1.10.4 Stream Water Quality

Stream water quality was measured three times during the open-water season in 2007: June (freshet), August (low-flow conditions), and September (Rescan 2008a). Historical data are available from some streams for the following periods: August 2004, July 2005, July 2006 (GLL 2004, 2005, 2006).

The 2007 stream water quality program focused on characterizing the potential natural variation in stream water quality with time (during the open-water season), and geographical location. A total of 21 streams were sampled during 2007. Samples were obtained from streams lying within a number of different watersheds. Two reference streams (the outflows of the reference lakes), located ~10 km away from potential mining activities, were also sampled.

General

In general, stream water quality followed the same patterns and characteristics as already described for lake water quality. Waters were generally clear, with TSS values remaining below 3 mg/L during the open-water season. pH values were slightly lower in streams compared to lakes, with stream pH values being generally neutral to slightly acidic. No streams had pH values lower than 6 pH units.

The Hackett and Mara rivers had lower concentrations of metals (Cd, Cu, Pb, Ni, Zn) compared to streams in the Camp, Boot, and Cleaver basins. The exception was As, which was present in similar concentrations in the two large rivers and the smaller streams.

Seasonal Variation

There were significant differences in stream water quality during the three sampling periods within the open-water season. The hydrological cycle varies dramatically during the open-water season, which can cause significant changes in stream water quality. Freshet is when the majority of water passes through streams due to melted snow and ice. This water has been in contact with the soil/tundra/rocks. In addition, the large volume of water passing through streams can cause mixing and erosion. Hence, freshet is usually when maximum concentrations of some nutrients and metals occur. This was generally true of the streams sampled in the Hackett River Property; ammonia, total phosphate, and aluminium values were all at their highest during freshet. Other metals were also at their highest during freshet in the Hackett and Mara rivers.

However, given the high degree of mineralization in the Project area, additional water volume can also mean additional dilution. Some streams had higher concentrations of metals during the low-flow periods of August and/or September, likely due to absence of dilution, thawing of the active layer and seepage from mineralized areas.

Annual Variation

There were differences in average annual concentrations for various parameters, particularly for physical and nutrient parameters. As with the lake data set, many of the 2006 values were not comparable with the 2007 data set (or the 2004 and 2005 data sets) because of high detection limits.

Cadmium and copper concentrations were relatively similar among years for streams in the Camp, Boot, and Cleaver basins. Aluminum, and to a lesser extent, Ni and Zn showed greater variability among years. However, as with the 2007 lake data set, the 2007 stream data set encompassed much more natural variability in the streams compared to the historical data from

2004 to 2006. As indicated by the monthly sampling in 2007, sample timing can significantly affect water quality values for these streams.

6.1.10.5 Lake Sediment Quality

As opposed to water, sediments are less temporally variable in their characteristics, providing useful composites of environmental conditions over time. Sediments also play an important role in benthic invertebrate habitat quality, and collecting samples of present sediment conditions provides baseline information for later monitoring studies.

In August 2007 sediment samples were collected from a number of lakes and streams within the Hackett River study area. All sediment samples collected were compared to guidelines for the protection of aquatic life provided by CCME, namely; the Interim Sediment Quality Guidelines (ISQG) and the Probable Effects Levels (PEL). The more conservative ISQGs are levels below which adverse biological effects are rarely observed, whereas the higher PELs corresponds to the concentration above which negative effects frequently occur.

Lake sediment samples were collected from 21 lakes in August, 2007. The 2007 sediment quality program focused on characterizing the natural variation in lake sediments with depth and geographic location. Lakes sampled lay within a number of different watersheds and included two reference lakes located ~ 10 km away from the location of potential mining activities.

General

Sampled lake sediments were predominantly composed of clay, silt, and sand with low gravel content and very little organic debris. As expected in Arctic oligotrophic lakes, sediments tended to be very low in nutrients, with nitrate + nitrite generally below detection limits and Available Phosphorus below 140 µg/g. In contrast, sediments tended to be very high in many metals. For variables for which CCME guidelines are available (arsenic, cadmium, chromium, copper, lead, mercury, and zinc), lake sediments frequently exceeded CCME guidelines for all parameters. ISQGs for Cd, Cu and Zn were exceeded in all lakes (with the exception of one of the reference lakes), and often by values many times that of the guideline. CCME PELs were also repeatedly exceeded, at times by as much as 3 to 40 times the PEL concentration. The high metal concentrations of the sediments in the Hackett River area are a natural product of the high levels of mineralization in the surrounding area, but do pose a concern in that any disturbance of the sediments may have significant impacts on water quality.

Depth Variation

In general, lakes within the study area are small to medium sized with a maximum lake depth of 18 m. Sediment samples were collected from each of the following zones within a lake, lake depth permitting: shallow depth zone (0 -5 m), mid depth zone (5.1 -10 m), and a deep depth zone (> 10 m). The shallow sediments of most lakes in the study area are primarily composed of medium to large boulders, with the exception of the southern Camp Basin lakes (Hood, Triangle and Kathy). Although some variables showed a trend of increasing concentrations of various metals and nutrients with depth, such as Total P, Total Organic Carbon, Ag, and Hg, most variables showed no consistent relationship to depth. Some Boot Basin lakes surrounding the possible Crown Pillar Pit (Boot, Thigh, Big Toe and Hungrat lakes) exhibited strong increases with *decreasing* depth in cadmium and zinc. This trend was not apparent in the other lake basins.

Spatial Variation

As mentioned above, proximity to mineralized areas affected some sediment quality parameters. CCME PEL exceedances occurred most frequently in the lakes nearest to the minable areas. In the Camp Basin, Camp and Bat lakes (near/within the Main Zone minable area) frequently exhibited high metal concentrations; in the Boot Basin, Boot, Thigh, Big Toe, and Hungrat lakes (near the Boot Lake minable area) were most affected; and in the Cleaver Basin exceedances frequently occurred in Cleaver and Anne lakes (near the East Cleaver minable area). Camp and Cleaver Basins were generally higher in copper, whereas Boot Basin tended to be slightly higher in chromium, and mercury. Both Cleaver and Boot Basin lakes showed high levels of cadmium and zinc.

6.1.10.6 Stream Sediment Quality

Many of the streams in the project area are ephemeral in nature (only have surface water flowing for a part of the open-water season; mainly for a short period during freshet), and all streams freeze to the bottom during winter. The exceptions are the Hackett and Mara rivers. Because of the nature of streams in the area, and because of the large number of lakes in the area, sediment sampling in 2007 focused primarily on the lakes. However, sediment samples were obtained from the Hackett and Mara rivers (2 sites per river), and from one stream within each of Camp and Boot Basins.

Reference river stations were sampled on both the Mara and Hackett rivers. Station locations were designated as far upstream as possible, while still maintaining similar characteristics to the downstream monitoring locations.

General

Stream sediments were predominantly composed of gravel and sand. In general, stream sediments tended to have significantly lower concentrations of nutrients and metals than lakes in the study area.

Sediments of the smaller streams (Dog Lake Outflow and Camp Creek Upstream) had higher concentrations of nutrients and metals than the rivers they entered (the Mara and Hackett, respectively). This was particularly noticeable for cadmium and zinc, and is likely due to the low flow and order of these streams in addition to the high mineral content of their respective basins. One of the samples collected from Dog Lake Outflow was particularly high in organic content, skewing values for some nutrients and metals. Dog Lake Outflow exceeded CCME ISQG guidelines for copper, while Camp Creek Upstream exceeded CCME ISQG for zinc. There were no exceedances of the CCME PEL in any of the streams.

For the Mara River, sediment concentrations for most parameters were higher at the downstream site compared to the upstream reference site. In contrast, the Hackett River had lower concentrations of most nutrients and metals at the downstream location compared to the upstream reference location. This difference may be attributable to the low discharge of the

Hackett at the upstream sampling location and the inflow of a number of tributaries uninfluenced by the Hackett Camp mineral deposits between the upstream sampling location and that of the downstream sampling location. Somewhat counter-intuitively, in both the Mara and the Hackett the increase in metals and nutrients was correlated with an increase in gravel and decrease in sand.

6.1.11 Marine Water

Three baseline studies have been completed in Bathurst Inlet; one in 2001, a small survey in 2002, and one in 2007 (Rescan 2002, 2008b). All studies focused on the area immediately around the proposed BIPR port site, and all studies were conducted in August.

In 2001, the following components were sampled: physical structure of the water column, water quality, sediment quality, phytoplankton, zooplankton, benthos (1 station only), fish community, and fish habitat. In 2002, benthos samples and a single sediment quality sample were collected. In 2007, the following components were sampled: bathymetry around port site area, physical structure of the water column, water quality, sediment quality, phytoplankton, zooplankton, benthos, and fish habitat.

6.1.11.1 Marine Physical Processes

Detailed nearshore bathymetric data were collected at the proposed BIPR port site in August 2007 (Rescan 2008b). A shallow water shelf extends at the slope of approximately 8% to a depth of 10 m and a distance of 120 m from the shoreline. Beyond this distance, the seabed slopes steeply at about 30% to depths greater than 40 m. Canadian Hydrographic Service bathymetric charts are available for the navigable areas with Bathurst Inlet and along the proposed BIPR shipping route.

There are no data available on tides within Bathurst Inlet near the proposed BIPR port site. The nearest government tidal monitoring point is at Omingmaktok (Baychimo, Station # 6250), which is located on the northeast edge of Bathurst Inlet near the mouth of the fjord, more than 120 km ‘upstream’ of the proposed port location.

For the period of July 1, 2007 to October 1, 2007, tides at Omingmaktok could be described as diurnal, or very weak semidiurnal. There was typically one maximum and one minimum tide per day. The maximum tidal height during this period was ~0.6 m, and the minimum tidal height during this period was ~0.07 m. The typical change in water height due to the tides ranged from about 0.2 to 0.4 m per cycle (GC tides website).

Marine currents within Bathurst Inlet are not well documented. CHS (1994) notes that tides within Bathurst Inlet are generally 0.3 m or less and contribute little to the currents in the inlet, and that several rivers flow into Bathurst Inlet (*e.g.*, the Western River at the southern end of Bathurst; Amagok Creek and No Name Creeks entering the bay to the west of the proposed port site).

River flow into the long fjord of Bathurst Inlet likely creates an estuarine circulation, and would therefore produce a predominately northward setting current near the surface in the port area, and a week south flowing return current at depth. A northward setting current has also been reported in CHS (1994). The estuarine influence is clear in the low salinity, warmer surface layer and the higher salinity, cold deep layer found in the water column structure studies conducted in Bathurst Inlet (Rescan 2002; Rescan 2008b).

6.1.11.2 Marine Water Column Structure and Characteristics

Secchi depth is a measure of water clarity or transparency, and is a field measurement that is sensitive to suspended solids and phytoplankton abundance. Secchi depth can be used to calculate the base of the euphotic zone (the zone in the water column where enough light penetrates so that photosynthesis can occur).

The average Secchi depth measured near the port site during the 2001 and 2007 surveys was 3.5 m. The resulting calculated average depth of the euphotic zone was 9.8 m deep.

The water column was highly stratified in August of both 2001 and 2007, with layering observed at several stations in 2001. Data show a warmer, fresher mixed layer approximately 7 m deep overlying a water column continuously stratified in both temperature and salinity. The surface temperature in both years was ~11˚C, and salinity was ~10 PSU in 2001 and 16 PSU in 2007. The exception was Station 01-1 in 2001, which exhibited a surface layer of freshwater (0 PSU) that was not present in August 2007.

Salinity approached 26 PSU and temperature approached 0˚C at depths greater than 30 m.

The water column structure present near the port site is typical of partially mixed estuaries, characteristic of the seaward reaches of fjords where there is relatively greater wind mixing, stronger tidal currents and action, and lower run-off than at the head of the fjord (which is sheltered and usually the location of the freshwater source).

Vertical profiles of dissolved oxygen collected in 2007 show an oxygen maximum at approximately 15 m depth, suggestive of highly oxygenated, cooler, and saltier offshore water sinking beneath the fresher surface layer.

6.1.11.3 Marine Water Quality

Marine water quality data are available from 2001 and from 2007 (Rescan 2002, Rescan 2008b). Both surveys were conducted in August. In 2001, 5 stations were sampled, with water samples being collected from 5 depths at each station. In 2007, 4 stations were sampled (including a reference station across the inlet), with water being collected from 4 depths per station. During both surveys, water sampling depth was calculated based on a CTD (conductivity, temperature, depth) profile and the measured pycnocline depth at the station being sampled. Pycnocline depths were generally around 10 m during both surveys.

TDS, major dissolved anions and cations (fluoride, silicate, bromide, sulphate, chloride, calcium, magnesium, potassium, sodium, strontium) all had similar profiles, with low concentrations in the upper water column, higher concentrations around the pycnocline, and high concentrations at depth. These parameters reflect the lower salinity water near the surface and the high salinity water (although still more dilute than oceanic seawater) at depth.

Major nutrients (nitrate, total phosphate, silicate) also followed the same general pattern, with concentrations being lowest in shallow waters and highest at depth. The pycnocline acts as a barrier to water mixing, and waters above the pycnocline typically become depleted in nutrients by phytoplankton during the summer, sun-lit months.

Physical parameters such as pH, TSS, and turbidity did not show strong profile trends.

For metals, only 2007 data are available. The concentration of metals in pristine marine waters is typically low, and the interference caused by seawater anions and cations make it difficult (but not impossible) to achieve low detection limits. The detection limits achieved for the 2001 study were too high, and all 2001 metal values were reported as below the detection limit.

However, above-detection limit values were measured during the 2007, and profile metal data were obtained for several metals. Element concentration-depth profiles can be classified into three categories; conservative, recycled, and scavenged (Open University, 1989).

Aluminum and manganese had clear ‘scavenged’ element concentration-depth profiles, having high concentrations in surface waters, decreasing to lower concentrations at depth.

Arsenic, cadmium, and molybdenum had clear ‘recycled’ element concentration-depth profiles, having low concentrations in surface waters, increasing to high concentrations at depth.

Chromium, copper, iron, and nickel all had concentration-depth profiles that did not follow a distinct trend. The remaining metals had values at or near the analytical detection limits.

Besides traditional oceanographic processes affecting the metal concentrations in the waters in Bathurst Inlet near the port site, estuarine processes and major river inflows will also affect metal concentrations during the open-water season. Metal data obtained during the 2007 survey represent the first set of data collected for Bathurst Inlet. Results will be presented in a Marine Baseline Report for the Hackett River Project (Rescan 2008b).

6.1.11.4 Marine Sediment Quality

Three major sources of riverine sediments exist in close proximity to the proposed BIPR port site: Western River, No Name Creek, and Amagok Creek. Sediment is deposited into Bathurst Inlet from No Name Creek (Plate 6.1-13). Sediment deposition occurs primarily during freshet. A delta has formed at the mouth of the Western River, indicating a significant sediment load carried by the river’s runoff.

It is probable that fine river-derived sediments are transported seaward in the surface layer of the estuarine system in Bathurst Inlet. Fine sediments will flocculate as they enter the marine environment so that deposition should be more pronounced as surface seawater salinity increases. Shoreline erosion and ice scouring also likely contribute to sediment loading and transport into the water column.

Sediment in the immediate vicinity of the proposed port site consisted mainly of gravel (particle size between 2 and 64 mm) and cobble (particle size between 64 and 256 mm) (Rescan 2008b).

Further from shore, sediment grab samples indicate a substrate of fines (particle size smaller than 2 mm) and gravel. The distribution of substrate material tends to confirm the process of shoreline scouring by ice.

Plate 6.1-13. Aerial photo taken in 2001 of riverine sediment input from No Name Creek, to the west of the proposed port site.

In general, the marine sediments of near the port site are of high quality reflecting a pristine aquatic environment. The sediments are loosely bound clay-silt complexes with no organic debris. Concentrations of total nitrogen were also low, indicating the absence of organic matter in the sediments. Hydrocarbon concentrations were low, reflecting the absence of industrial activity. Average concentrations of total metals showed that zinc, lead, mercury and cadmium had concentrations below the Canadian guidelines, and arsenic, chromium and copper had concentrations between the Interim Sediment Quality Guideline (ISQG) and the Probable Effect Level (PEL).

6.1.12 Air Quality

The air quality in the Hackett River area can generally be classified as pristine. Local emission sources are widely dispersed and include both stationary (power generation and heating) and mobile sources (trucks, snowmobiles, ATVs, *etc*.) operated by local residents. Combustion of fuel in generators, mining equipment, haul trucks and aircraft will generate air emissions of primarily airborne particulates, sulphur dioxide and nitrogen oxides. Ships and barges supplying local communities contribute additional emissions. Mines operating in the region represent the only major industrial emission source. Because of the limited local emissions sources, long-range transport of air contaminants is an important influence on ambient air quality. The atmospheric boundary layer in the Arctic is generally very stable with surface inversions occurring frequently. As a result, dispersion of air contaminants is less effective in the Arctic.

6.1.13 Climate and Predicted Future Climate Trends

A meteorological station was installed near Camp Lake in June of 2007. However, given the relatively short period of record of data from this station, regional information is presented below. As more site specific data are collected, understanding of site conditions will improve.

Climate data is available from the Lupin Airport station for the past 30 years or so. The general location of the Lupin met station is on the northern end of Contwoyto Lake, which is located approximately 130 km west of the Hackett project area. The yearly average temperature at Lupin Airport is -11.1 ºC (Environment Canada, 2007a). The warmest month is July with a daily average temperature of 11.5 ºC and a daily maximum temperature of 16.3 ºC. The coldest month is January with an average daily temperature of -30.4 ºC and an average daily minimum temperature of -34.0 ºC. Periods with frost-free conditions are short and extend from late-May to late-September.

The mean annual precipitation at Lupin is 333 mm, with 105.4 mm of precipitation falling as snow (Environment Canada, 2007b). Historical records show that snow can occur in any month, and rainfall may occur from April through October. The wettest month of the year is August, receiving an average 55 mm of rain. October receives the most snow with an average snowfall of 38 cm (Environment Canada, 2007b).

For future climate trends, the Arctic Climate Impact Assessment suggests that net high latitude precipitation will increase in proportion with increases in mean hemispheric temperature. Modeling conducted in the same assessment suggests increases in winter and spring runoff, which would increase the probability of extreme flooding (Christensen *et al.*, 2007). It is expected therefore that in the long term, the frequency and magnitude of flooding would increase, which may lead to increased erosion. Increased temperatures would over time degrade permafrost and release moisture trapped in ice, ice rich soils would settle, and the incidence of permafrost-related phenomenon such as thermokarst and solifluction would presumably increase.

6.1.14 Noise Levels

The noise environment in the Project area is pristine. There are no industrial sites or human settlements close enough to the Project to be audible; consequently, only natural sources such as wind and precipitation will contribute to background noise levels.

Measurements of noise levels at similarly remote locations in northern Canada were carried out as part of baseline studies for the diamond projects at Snap Lake (Golder Associates, 2002) and Diavik (Cirrus Consultants, 1998) in the Northwest Territories. At both sites noise levels ranged from 25 to 40 dBA with the dominant sound production coming from wind.

6.1.15 Other Potential Physical Environment VECs

No other physical environment valued ecosystem components (VECs) were identified in community meetings or literature reviews.

6.2 Biological Environment

6.2.1 Regional Setting

The Hackett River Project area lies north of the tree line in the West Kitikmeot region. Vegetation is in the form of low shrubs of willow, birch, Labrador tea, and mountain cranberry. Lichen tundra is also common. For vegetation zones, the Project area lies within the 'primarily unvegetated surface zone', and the BIPR port site area lies within the 'tundra, high shrub zone'. (WKRLUP 2005).

Close to a million caribou migrate through the region, belonging to one of four herds; the Bathurst, East Bluenose, Ahiak, and Dolphin/Union. The region also serves as habitat for ducks, loons, geese, swans, migratory birds, raptors, Arctic fox, wolverines, musk ox, and grizzly bears (WKRLUP 2005).

Eskers are common in the region, and serve as important habitat for caribou, grizzly bears, wolves, foxes, musk ox, wolverine, sandhill cranes and other birds, and small mammals. Wolves and foxes den in the sandy slopes, grizzly bears feed on the animals and berries found in them, some birds use eskers for feeding and nesting, and other animals use eskers for travel and as shelter from wind during the winter.

Arctic char are found in the region, in lakes and rivers, and along the coasts in some areas. Char are important to the traditional diet of Inuit, to sport fishing, and to commercial fishing. Other fish species are common in the hundreds of lakes and streams in the region, including lake trout and Arctic grayling.

The BIPR port site area and shipping route are located in Bathurst Inlet and marine waters north and northwest of the mainland coast. Marine mammals like seals thrive in the coastal waters and offshore. Polar bears dwell in land fast ice and coastal pack ice. The region also supports rich and diverse bird populations.

6.2.2 Ecosystems and Vegetation

6.2.2.1 Baseline Study Overview

Vegetation baseline studies were initiated in July and August of 2007. Surveys focused on characterizing the ecosystems and vegetation present within areas of proposed development and assessed preliminary terrain polygon typing that had been mapped to date.

Prior to the start of field work, preliminary terrain units were identified on air photos (1:10,000 scale) that covered the main proposed development areas. Additionally, a list of potentially rare plant species for Nunavut was compiled from a number of different sources (*e.g.*, McJannet *et al.*, 1993; McJannet *et al.*, 1995, Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists, the Species at Risk Act (SARA) registry, other reports compiled for the area). The list was sent to biologists at the Canadian Museum of Nature, who provided valuable feedback and guidance.

Field data was collected from plots measuring 10 m x 10 m. At each sampling location, a geographic coordinate was obtained, along with general site and vegetation information. General site information included slope, aspect, and elevation. Vegetation information included an overall assessment of the cover (as a percent) of shrubs, herbs, and mosses/lichens, as well as a list of predominant species (with a corresponding percent cover). A general ecosystem/vegetation class was also assigned to the site. Data entry and ecosystem mapping is still underway.

Efforts were made to assess unique terrain and vegetation features in the field that were identified during the air photo interpretation stage of the mapping process. These features often lead to the identification of unique and/or potentially rare ecosystems and plants.

A vegetation classification is being developed for the Project that is based loosely on the plant communities and associations identified for the nearby Bathurst Inlet Port and Road Project. Descriptions of units identified through both field surveys and ecosystem mapping will be provided.

Several plant specimens were collected to characterize baseline tissue chemistry. The genera collected include those commonly consumed by wildlife in the area and consisted primarily of willows, sedges, and cottongrass (*Salix* sp., *Carex* sp., and *Eriophorum* sp., respectively).

Sampling was carried out following common practices for plant tissue collection and methods specified by ALS Environmental who conducted the analyses. Only the above-ground portion of herbaceous plants and newest/younger growth of woody species (shrubs) were collected. Samples consisted of several individual herbs of the same species or the stems and leaves from shrubs of the same species.

6.2.2.2 Preliminary Site Characterization

The Hackett River Project is within the Southern Arctic Terrestrial Ecozone, as described by NRCan (2007), which is one of three Arctic ecozones defined in Nunavut. This ecozone has the most extensive vegetative cover and supports the highest diversity of both plant and animal species. The climate is characterized as cold, dry Arctic. Summers tend to be short and cool while winters are long and very cold.

Bedrock outcrops are common, and the general physiography is characterized by flat plains and broadly rolling uplands. Floristically, the area is known as the “low Arctic.” Vegetation is dominated by dwarf birch (*Betula nana*), willow (*Salix sp*.), heath species, and lichen, with sedge-moss wetlands occupying more depressional areas.

Based on a preliminary review of the field data collected in 2007, the plant communities and associations (ecosystems) present in the Hackett River area are typical of the low Arctic. Heath tundra communities are abundant and are frequently interspersed with scattered boulders.

More unique ecosystems in the area include localized wetlands composed of various sedge species (primarily *Carex* sp. and *Eriophorum* sp.), esker complexes, and snowbank communities. A possible range extension (west) of moss heather (*Cassiope hypnoides*) was identified in a late snowmelt area south of the existing exploration camp. No plant species currently considered to be "at risk" according to the compiled list were identified in the Project area.

A total of 30 plant samples (15 *Carex* sp., 13 *Salix* sp., and 2 *Eriophorum* sp.) were collected and will be used to characterize baseline plant tissue chemistry.

Ongoing work includes development of the ecosystem map, field data entry and summaries, and the completion of a baseline report summarizing the year's activities. Field work scheduled for 2008 will continue to focus on potential development areas, unique and interesting landscape features, and will verify the ecosystem map. Additional collections of plant tissue for baseline chemistry characterization will also be made.

6.2.3 Terrestrial Mammals

2007 was the first year of site-specific terrestrial vertebrate studies in the Hackett River Project area. Details of the 2007 wildlife work will be compiled into a baseline report (Rescan 2008d). However, historical information is available for areas outside of the immediate Hackett River area, mainly from work that has been done as part of BIPR (Rescan 2007a, b, d). These other studies provide useful supplemental information on a regional basis.

Longer term wildlife surveys have also been conducted in the region since at least the 1970s. Previous wildlife surveys have included descriptions and mapping of wildlife habitats, inventories of wildlife sightings and signs (*e.g.*, tracks, scat) collected during ground and helicopter reconnaissance trips, government radio-collar data, academic research projects and other historical work. Existing data sources from historical studies include:

- Canadian Endangered Species Conservation Council (CESCC) Status Reports;
- Committee on the Status of Endangered Species in Canada (COSEWIC) Assessment and Status Reports;
- Published literature on general ecology and population dynamics of wildlife species in the area (*e.g.,* McLoughlin *et al.* 2002; denning ecology of Barren ground grizzly bear);
- Satellite collar data from Bathurst caribou (West Kitikmeot/Slave Study (WKSS));
- Satellite-collar data from wolf studies (Walton *et al.*, 2001); and
- Satellite-collar data from barren-ground grizzly bears (Government of the Northwest Territories Department of Environment and Natural Resources (GNWT ENR, WKSS).

Inuit Traditional Knowledge is also available for the general region from the following sources: Zinifex, 2007, Thorpe *et al.*, 2001, Keith *et al.*, 2005 and Rescan, 2007c. Due to work conducted in 2001, 2002 and 2007 for the BIPR project, locations of mammal dens and raptor cliff nests are also available within a 5 km buffer zone on either side of the BIPR road and around the Port (Rescan, 2007a, b). Variable range point counts were also conducted within 1 km on either side of the BIPR road and a waterfowl survey was conducted in 2007 for the BIPR project (Rescan, 2007b), both of which can be used in order to characterize the fauna occurring in the Regional Study Area (RSA) for the Hackett project.

Two ungulates were observed in the Hackett RSA:

- Barren Ground Caribou (*Rangifer tarandus*)
- Muskoxen (*Ovibos moschatus*)

Six carnivores were observed in the Hackett RSA:

- Grizzly Bear (*Ursus arctos horribilis*)
- Wolverine (*Gulo gulo*)
- Wolf (*Canis lupus*)
- Arctic Fox (*Vulpes lagopus*)
- Red Fox (*Vulpes vulpes*)
- Ermine (*Mustela erminea*)

Three small mammals were observed in the small local study area (sLSA) during baseline small mammal inventories:

- Northern red-backed Vole (*Clethrionomys gapperi*)
- Meadow vole (*Microtus pennsylvanicus*)
- Arctic ground squirrel (*Spermophilus parryii*)

6.2.3.1 Baseline Study Areas

From April to September of 2007, terrestrial vertebrate studies were conducted at 3 different spatial scales depending on the species or group being investigated (Figure 6.2-1). Details of the baseline study dates and methodology will be included in the 2007 wildlife baseline report (Rescan 2008d). Spatial scales included the regional study area (RSA), local study area (LSA) and small local study area (sLSA). The RSA was developed to account for the extensive home ranges and seasonal movements of large mammals such caribou and muskoxen. The LSA, on the other hand, was for baseline investigations of species that have smaller, localized seasonal movements and ranges. The sLSA was created for those species with considerably smaller ranges, including small mammals, waterfowl and songbirds, which have restricted home ranges during the breeding season and are not normally limited by rare habitat features.

Surveys for caribou, muskoxen and large carnivores were conducted in the RSA. Surveys for cliff-nesting raptors and mammal dens were conducted in the LSA. Surveys for waterfowl species, productivity, and variable range point counts for terrestrial upland breeding birds were conducted in the sLSA. All lakes and bodies of water were assessed for waterfowl and the survey was duplicated in the late summer in order to document production of young waterfowl. Thirty-two variable range point counts (1 km in length with 5 point count stations each) were conducted within the sLSA in June.

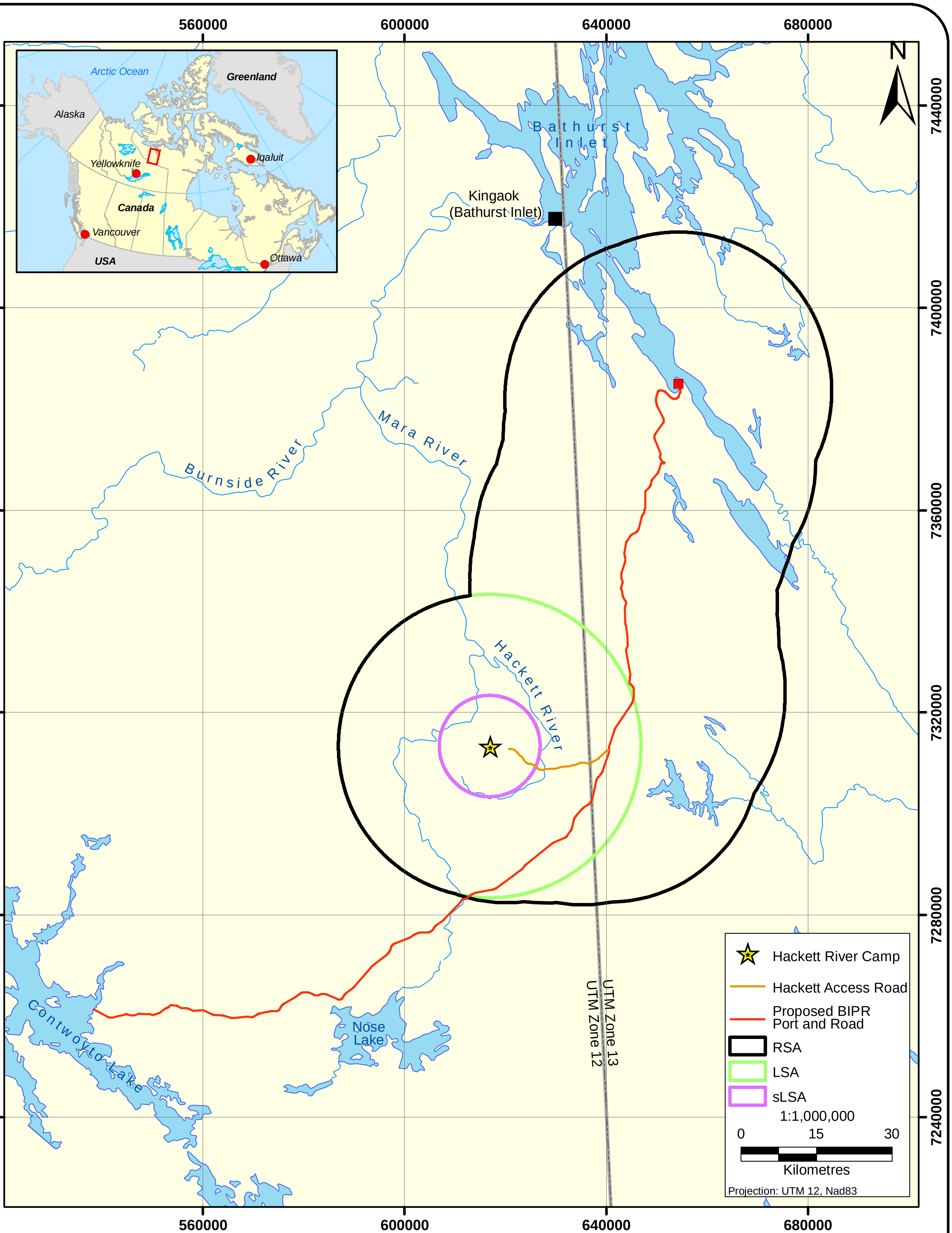


FIGURE 6.2-1

Hackett Wildlife sLSA, LSA and RSA

6.2.3.2 Barren Ground Caribou

Barren ground Caribou is a keystone species in the Arctic, both biologically and culturally. Caribou are a main prey item of grizzly bears, wolves, wolverines and foxes and can alter the landscape. Historically, the Inuit have relied on caribou for food and clothing. Four herds have been identified in the Hackett Project area. The Bathurst and Ahiak herds are found during certain periods of the year within the Project area and the proposed shipping route crosses the ice bridge used by Dolphin and Union and Peary herds during migration. The seasonal ranges and dates of movement patterns for Bathurst Caribou and Ahiak Herds are depicted in Figure 6.2-2. The seasonal ranges and dates of movement of the Peary and Dolphin and Union Caribou Herds are depicted in Figure 6.2-3.

Bathurst Caribou

The Bathurst herd (*Rangifer tarandus groenlandicus*) is 'secure' in Nunavut. Bathurst caribou are found in the RSA during five stages of their life cycle (Gunn *et al.,* 2002): Spring migration, calving, post-calving, summer and fall migration. The Bathurst herd migrates over a large area from their wintering range to their calving grounds. In spring, this herd migrates north and passes through the southern end of the RSA on their way to the calving grounds near Bathurst Inlet. In recent years, cows have calved northeast of Contwoyto Lake, between the Hood and Burnside Rivers (Gunn *et al.,* 2002; Gunn and D'Hont, 2002) and they return to the same general area each year. Cows disperse to the southeast during the post-calving and summer seasons and pass through the RSA (Gunn *et al.,* 2002). After several months they begin fall migration southwards towards the Taiga and some animals cross the RSA.

Ahiak Caribou

Few data exist on the Ahiak herd. The range of the Ahiak herd is to the east of the RSA with wintering grounds to the southeast of the RSA and calving grounds on the coast of Queen Maud Gulf (Gunn *et al.,* 2000). Ahiak caribou are found in the RSA for most of the year, except calving. The RSA overlaps the western extent of their annual range.

Dolphin and Union Caribou

The Dolphin and Union herd crosses the shipping route in Dease Strait during spring and fall migrations between Victoria Island and the mainland (COSEWIC, 2004). Dolphin and Union caribou calve and summer on Victoria Island and winter on the mainland (COSEWIC, 2004). Spring migration for this herd occurs from 21 April to 21 June and fall migration occurs from 14 October to 7 December (Adrian D'Hont, GNWT, ENR, *unpublished data*). Caribou require ice crossings in Dease Strait in order to migrate. Satellite-collared Dolphin and Union caribou do not occur in the RSA during winter.

Peary Caribou

Peary caribou (*Rangifer tarandus pearyi*) are a subspecies that inhabit the islands of the Canadian Arctic archipelago. They are Endangered (COSEWIC, 2004) and are in imminent danger of extinction. The World Conservation Union assessed these caribou as endangered in 1996. Peary caribou cross the BIPR shipping route at Peel Sound and Franklin Strait, between calving areas on Prince of Wales Island, and wintering areas on Somerset Island and the Boothia Peninsula (COSEWIC, 2004; Miller *et al.*, 2005). The exact timing of fall migration is unknown.

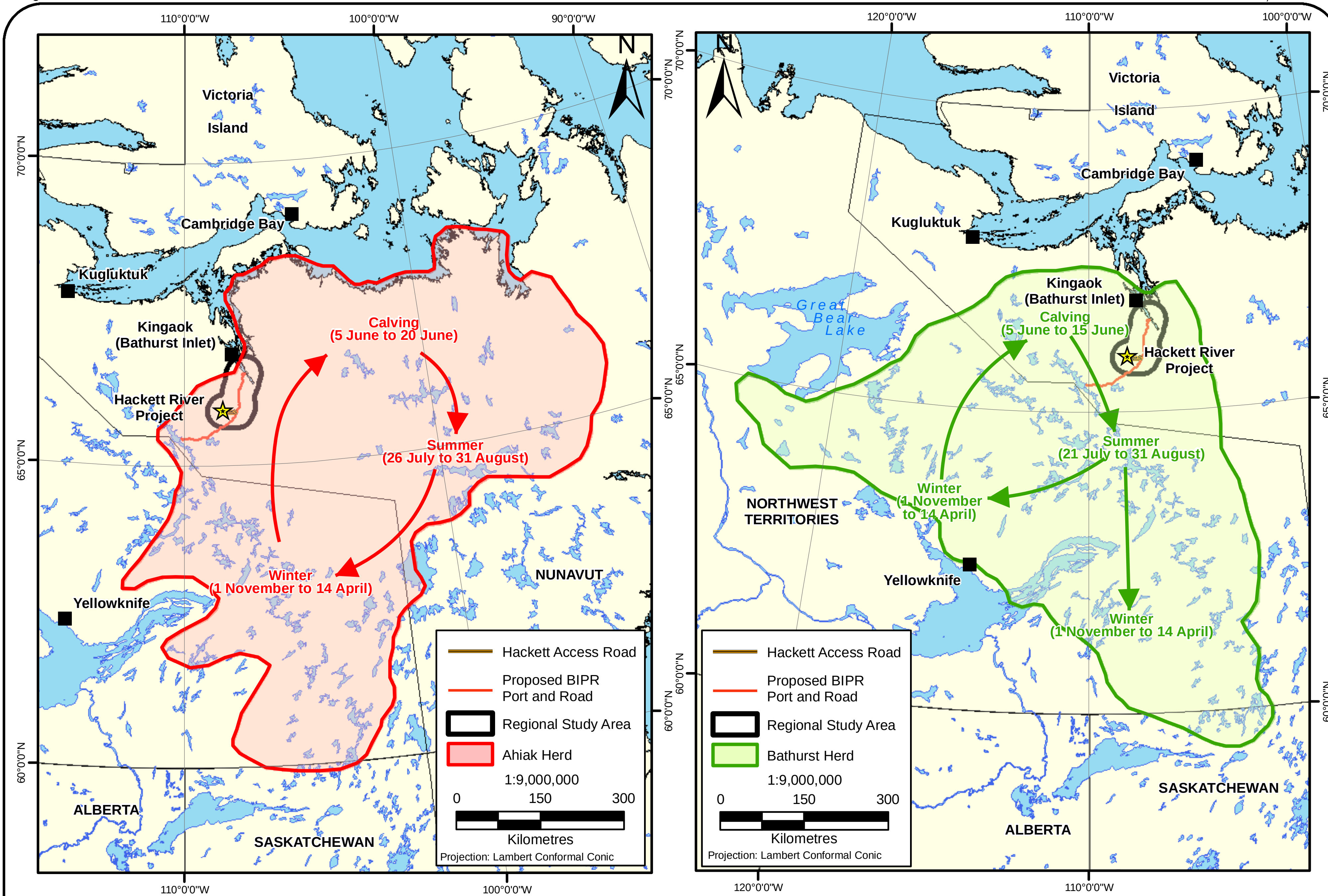
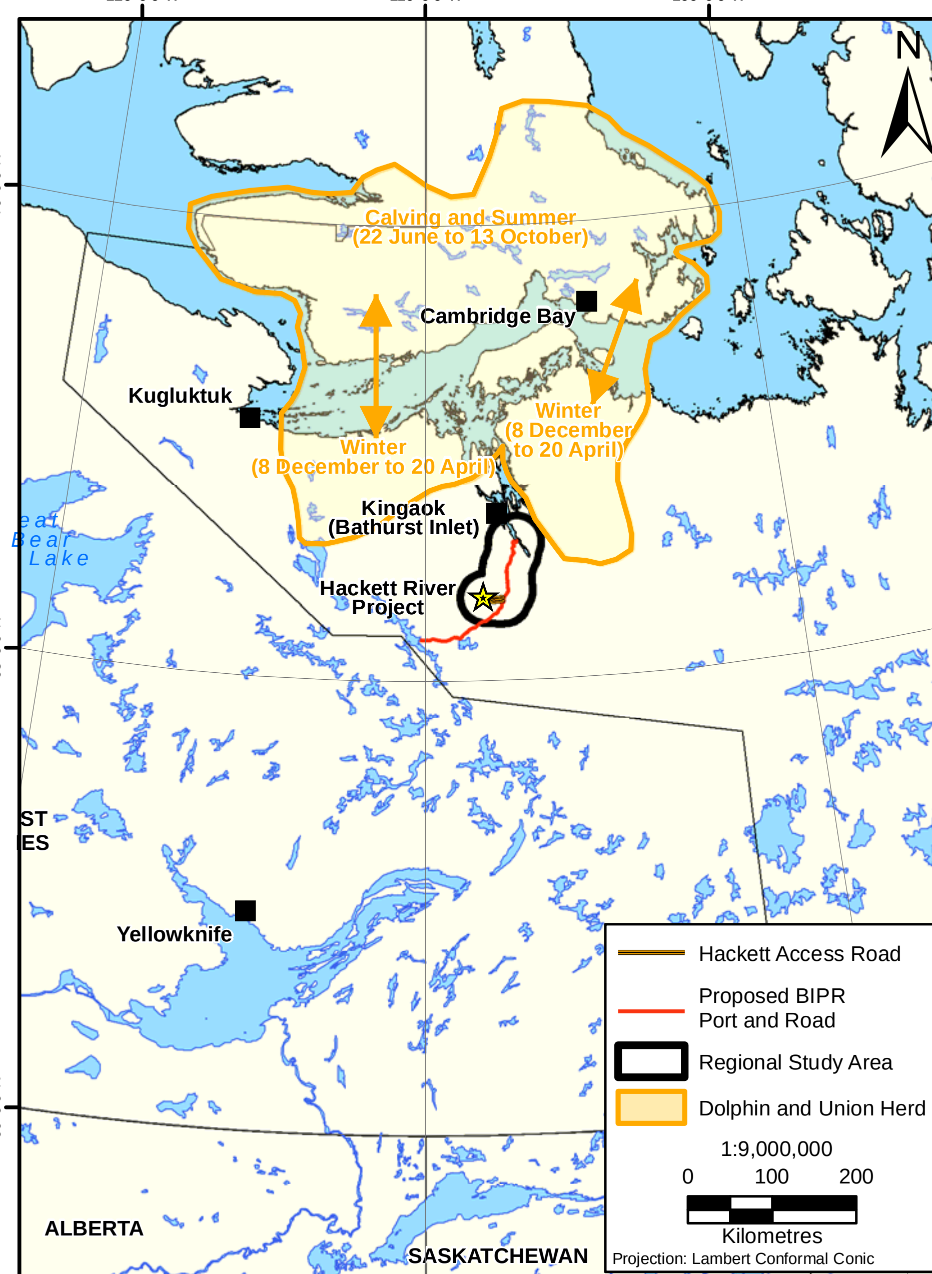


FIGURE 6.2-2

Range of the Ahiak and Bathurst Herds



SABINA SILVER CORPORATION

FIGURE 6.2-3

Range of the Peary Caribou and Dolphin and Union Herd

Rescan

Low densities of caribou were observed in the Project RSA during all aerial surveys except the third survey flight (mid- July), corresponding to the post-calving period; during this survey, many more caribou were observed. Caribou observed during the May surveys were light in colour, suggesting they were from the Ahiak herd, which winters in the study area. Additional observations collected from camp personnel indicated that large herds of caribou passed through the LSA near the proposed Hackett mine site on 24 Mar and 26 Aug, respectively.

6.2.3.3 Muskoxen

Muskoxen are the only other large ungulate aside from caribou that occupy the barren-grounds. Unlike caribou, muskoxen do not migrate long distances. Muskoxen in Nunavut and the Northwest Territories were estimated at 140,000 animals in 1997 (Fournier and Gunn, 1998). Nineteen-thousand of these animals were from mainland populations, while the remainder were from populations inhabiting the Canadian Arctic Islands. In 2001, muskox numbers in Canada were estimated at 166,000 animals (Gunn and Adamczewski, 2003). Although the abundance of muskoxen in the Kitikmeot has been increasing over the past 3 decades (Fournier and Gunn, 1998), mainland populations have experienced recent declines and calf production has been low (Dumont, 2006b). Muskoxen were observed in low densities in the RSA in May, June, and July, but not in September.

6.2.3.4 Grizzly Bears

Grizzly bears (*Ursus arctos horribilis*) are a species of Special Concern (COSEWIC, 2002) and are sensitive in Nunavut (CESCC, 2005). Approximately 800 grizzly bears are found in the West Kitikmeot region at low densities (COSEWIC, 2002). Grizzly bears are vulnerable to decline from increased adult mortality (McLoughlin *et al.,* 2003a, 2003b). They also have low ecological resiliency, are sensitive to human activity and are frequently displaced by industrial developments (Ross, 2002; Weaver *et al.*, 1996). Incidental observations of Grizzly bears and grizzly bear dens were made throughout the Hackett RSA at low density, and were mainly found in esker habitat. Grizzly bears were observed during the June aerial surveys (5 observed within 15 km of camp) and by camp personnel during the same period within 10 km of camp. Five grizzly bear dens were identified and mapped in the Hackett River LSA. Additional Grizzly bear dens were identified within 5 km of the proposed BIPR road at low densities as part of the BIPR baseline work (Rescan, 2007a,b,d).

6.2.3.5 Wolverine

Wolverine (*Gulo gulo*) in the central Arctic are stable (COSEWIC, 2003) and secure in Nunavut (CESCC, 2005), while the western Canadian population (which intrudes parts of Nunavut) is listed as a species of Special Concern (COSEWIC, 2003). Wolverines use reproductive dens from February through April (Magoun and Copeland, 1998). Food availability is the driving factor influencing movement patterns and home range selection by wolverines (Banci, 1994). Wolverines and wolverine dens have been observed in the RSA. Based on incidental observations made by camp personnel and biologists on 4 occasions wolverines were seen along Hackett River, the shore of camp lake and along the edge of Cleaver Lake. Tracks and scat were also observed along the esker complex to the south of Hackett camp.

6.2.3.6 Wolves and Foxes

Wolves and foxes are secure in Nunavut (CESCC, 2005); they are found throughout the RSA and den in the area. Satellite-collar data indicate that wolves in the central Arctic migrate over large areas in the fall, winter and early spring in pursuit of caribou (Walton *et al.*, 2001). Wolves occupy smaller home ranges around the den during parturition and pup rearing (May to September) (Walton *et al.*, 2001). Wolf and fox dens are preferentially located in eskers, which can be limiting (McLoughlin *et al.*, 2004). Carnivore den surveys located 2 fox and 2 wolf dens in the Hackett LSA; an additional 5 dens were found but the species that formed them was unclear. Three dens identified within the LSA produced pups; productive dens belonged to a coloured fox, Arctic fox and wolf pair.

6.2.3.7 Small Mammals, Other Mustelidae (weasel family), and Hares

One lagomorph (hare) species, the Arctic hare and one small mustelid species, the least weasel were observed during baseline research in 2007. Additional species of small mammals expected to occur in the RSA include: barren-ground shrew, northern collared lemming, brown lemming and tundra voles, American mink and ermine. The Victoria collared lemming may also occur in the RSA, with lower likelihood. The most common small mammal species observed in the Hackett sLSA was the northern red-backed vole, followed by the Arctic ground squirrel and meadow vole. During the 2001 and 2002 baseline studies conducted for the BIPR project only two species were caught during small mammal trapping: northern red-backed and tundra voles (Rescan, 2007a, b). Nests belonging to the brown and the northern collared lemming were also found during these surveys (Rescan, 2007a).

6.2.4 Birds

6.2.4.1 Terrestrial Breeding Birds

Bird species observed during variable range point count transects within the sLSA, and within 1 km of the section of the BIPR road to the port are indicated in Table 6.2-1. If breeding was observed at the time of the survey it is indicated in Table 6.2-1.

6.2.4.2 Waterfowl

The primary (24 Jun) aerial survey done in the Hackett sLSA identified the following species:

- American golden plover
- Canada goose (*Branta canadensis*)
- Common merganser
- Galucous gull
- Greater white-fronted goose
- Greater Scaup
- Herring gull
- Long-tailed duck
- Northern pintail
- Red-breasted merganser
- Yellow-billed loon

Table 6.2-1
Bird Species Observed during Variable Range Point Count Surveys within the Hackett sLSA

Avian Group	Species	Breeding Confirmed
Waterfowl and Geese	Canada Goose	N
	Long-tailed Duck	Y (Nest with eggs)
	Red-breasted Merganser	N
	Pacific Loon	N
	Yellow-billed Loon	N
	Tundra Swan	N
	Great White-fronted Goose	N
	Northern Pintail	N
	Greater Scaup	N
Gruids	Willow Ptarmigan	N
	Rock Ptarmigan	N
	Sandhill Crane	N
Corvids	Common Raven	Y (Nest)
Gulls	Herring Gull	Y (Nest nearby in Hackett)
	Galucous Gull	N
	Parasitic Jaeger	N
	Pomarine Jaeger	N
	Long-tailed Jaeger	Y (Nest with eggs)
	Arctic Tern	N
Songbirds	Lapland Longspur	Y (Nest with eggs
	Horned Lark	N
	Savannah Sparrow	Y (Nest with eggs)
	Common Redpoll	Y (Nest with eggs)
	American Tree Sparrow	Y (Nest with eggs)
	Hoary Redpoll	Y (Nest with eggs)
	Gray-cheeked Thrush	Y (Nest with eggs)
	American Pipit	Y (Nest with eggs)
	Yellow Warbler	Y (Nest with eggs)
	Harris' Sparrow	Y (Nest with eggs)
	White-crowned Sparrow	Y (Nest with eggs)
Shorebirds	American Golden-plover	Y (Aggressive defence behaviour)
	Semipalmated Plover	N
	Sanderling	N
	Semipalmated Sandpiper	N
	Least Sandpiper	N
	Stilt Sandpiper	N
	Red-necked Phalarope	N
Raptors	Rough-legged Hawk	N
	Peregrine Falcon	N
	Gyrfalcon	N
	Short-eared Owl	N

Rough legged hawk (*Buteo lagopus*), peregrine falcon and common raven were also observed incidentally during waterfowl surveys. The productivity surveys (01 Aug) yielded evidence for breeding (*i.e.*, adults with young observed) in only three of these species in the sLSA: Canada goose, greater white-fronted goose and red-breasted merganser. Arctic tern, least sandpiper, semipalmated plover and semipamated sandpiper were also observed as present, but without evidence of young, during the productivity survey. Sandhill crane (*Grus canadensis*) and tundra swan (*Cygnus columbianus*) were observed incidentally during terrestrial caribou surveys. Green winged teal were also observed during a waterfowl survey of Bathurst Inlet conducted during baseline work for the BIPR project (Rescan, 2007b).

6.2.5 Freshwater Aquatic Life

For the purposes of this document, freshwater aquatic life refers to plant and animal life that live within or on top of lake and stream water and sediment, not including fish.

In lakes, these organisms include phytoplankton (photosynthetic microscopic algae that live free-floating in the water), zooplankton (tiny animals that live in the water column), and benthos (aquatic insects and other animals that live on top of or within lake sediments).

In streams, these organisms include periphyton (photosynthetic algae that live attached to substrates like rocks), and stream benthos (aquatic insects and other animals that live on top of or within stream sediments including rocks).

In 2007, all of the above-mentioned organisms were measured in numerous lakes and streams in the project area, including two reference lakes and streams, and two reference river stations. All results from the 2007 aquatic baseline work will be compiled into an aquatic baseline report (Rescan 2008a).

6.2.5.1 Lake Phytoplankton

Phytoplankton constitute a large portion of the base of the aquatic food web, being consumed by zooplankton and benthic invertebrates which are in turn consumed by fish. Phytoplankton biomass and taxonomic composition can be affected by environmental changes and have been widely used to examine effects of nutrient and metal pollution.

Each phytoplankton cell possesses Chlorophyll *a*, a green pigment vital for photosynthesis and a convenient measure of algal standing crop and biomass. Chlorophyll *a* samples were collected from 28 lakes in the Hackett River area in July, August and September 2007. In August 2007 phytoplankton samples were also collected for taxonomic identification and quantification of abundance.

Biomass

Phytoplankton biomass (as measured by Chlorophyll *a*) varied among sampling sites and months, ranging from ~ 0.13 µg/L in Ref Lake A (August), to a high of ~1.6 µg/L in Ref Lake B (July). Marked increases in biomass were observed in some lakes (*e.g.*, Saddle, Row, Ref. Lake B), but the timing of these phytoplankton blooms differed between lakes, and were relatively small in scale (not exceeding 5x the biomass found during other months). There was a general overall seasonal trend in overall monthly lake averages of chlorophyll *a* concentrations being slightly higher in July compared to the other months.

Abundance

Phytoplankton abundance was highly variable between lakes and basins, ranging from a low of <5 cells/mL at Dinosaur Lake to a high of almost 500 cells/mL at Row Lake. Boot Basin exhibited the highest mean levels of phytoplankton (~205 cells/mL), followed by Camp Basin (~138 cells/mL). Cleaver Basin and the Reference Lakes had the lowest average phytoplankton abundances (87 cells/mL and 92 cells/mL, respectively).

Taxonomic composition

Lakes in the study area possessed a diverse array of phytoplankton taxa, and communities varied between lakes and lake basins. Cleaver Basin was heavily dominated by Chrysophyta (specifically, the mixotrophs *Dinobryon sp*. and *Ochromonas sp*.), which composed nearly 94% of the algal cells collected from these lakes. In contrast, Boot Basin phytoplankton were dominated by Bacillariophyceae (Diatoms). Camp Basin and the Reference Lakes exhibited a more even distribution of algae which included Chlorophyta (green algae), Chrysophyta, Bacillariophyceae (diatoms), Cyanophyta (cyanobacteria), and Cryptophyta.

6.2.5.2 Stream Periphyton

Periphyton, alga that grow on the surfaces of rocks or larger plants, are an important food item for many benthic invertebrates, which are in turn the main food source for fish in streams and rivers. Due to their short life cycles, periphyton are amongst the first organisms to respond to environmental stressors, and tend to exhibit taxon-specific changes to stressors, making them good indicators of current environmental conditions.

Periphyton samples were collected with the use of artificial sampling plates from 15 streams in the Hackett River study area, including two reference streams located ~ 10km away from potential mining activities, and two reference river stations. Periphyton samples collected represented algal growth occurring between mid August and mid September.

Biomass

There was a high degree of variability between replicates in periphyton biomass growth over the one month period between mid August and mid September. Chlorophyll *a* ranged from lows <100 µg/m^2 in Boot Basin outflow and Ref Lake B outflow to highs of ~ 650 µg/m^2 in Dog Outflow and Mara Ref 1. Both the Mara and the Hackett rivers had lower periphyton biomass at their downstream locations, though variability was high, and the differences were not large.

Abundance

Periphyton abundance ranged from lows of < 1,000 cells/cm^2 in Camp Creek upstream, Boot Basin outflow and Reference Lake B outflow, to a high of >6,000 cells/cm^2 in Turtle Outflow. No strong differences between watersheds were observed and confidence intervals tended to be large.

Taxonomic composition

Most stream periphyton communities were heavily dominated by diatoms, which comprised ~ 90% of the periphyton cells. Sunken Lakes Outflow and Reference Lake A outflow did, however, have significant numbers of other chrysophyta, which made up approximately a third of their algal abundances.

6.2.5.3 Lake Zooplankton

Zooplankton, the heterotrophic component of aquatic plankton, are an important link in the aquatic food web; being consumers of phytoplankton and prey to many fish species.

Zooplankton samples were collected from 27 lakes in the Hackett River study area in August, 2007, including two reference lakes.

Abundance

Within the study area zooplankton abundances averaged ~ 1,300 organisms/m^3, with lows of ~ 70 organisms/m^3 at Cleaver Lake, to highs of ~ 2,500 organisms/m^3 in the Boot Basin lakes Big Toe, Hungrat and Dog. Although zooplankton abundances were highest in Boot Basin lakes, in general, zooplankton abundance varied equally within and between watersheds.

Taxonomic Composition

In general, lake zooplankton communities were heavily dominated by copepods, although Plomia rotifers were also common. Cladocera tended to be scarce to non-existent in most lakes. Saddle Lake, Anne and Camp lakes had noticeably atypical zooplankton community compositions in comparison to other lakes in the study area. Saddle Lake zooplankton communities were predominantly Flosculariaceae rotifers, with few copepods or other rotifera. Anne, and to a lesser extent Camp Lake, were almost exclusively composed of cyclopoid copepods, a common taxon in the study area, but typically lower in abundance than other copepods.

Arctic Fairy shrimp (*Polyartemiella hazeni*), large brachiopods that typically inhabit ephemeral habitats in the absence of fish, were found in three lakes in the study area; Bat Lake, Affleck Lake, and Saddle Lake. Bat Lake and Affleck Lake were two of the few lakes in the study area lacking fish. Burbot were found in Saddle Lake, but their small size and low density may mean predation pressure is low enough to allow *P. hazeni* to persist.

6.2.5.4 Lake Benthic Invertebrates

Benthic macroinvertebrates (benthos) are organisms greater than ½ a millimetre in size, lacking a back-bone, that inhabit lake and stream bottoms. Being in close contact with the sediments of these habitats as well as feeding on algae, bacteria, and detritus within these systems make benthos very responsive to environmental changes. In addition to their direct contact with possible contaminants, benthos are generally less motile than fish, providing a better indicator of local conditions. In addition to their use as indicator species, benthic organisms are a very important food source for fish, particularly in streams, making their abundances an important habitat quality variable.

Lake benthos samples were collected from 26 lakes in August, 2007. Benthos samples were collected from the same depth zones and locations as the sediment samples (shallow depth (0 -5 m), mid depth (5.1 – 10 m), and deep depth (> 10 m)). This sampling design allowed characterization of the potential natural variation in lake benthos with both bottom depth and geographic location. Lakes sampled lay within a number of different watersheds and included two reference lakes located ~ 10 km away from the location of potential mining activities.

Densities

Lake benthos densities varied significantly by replicate, lake depth, and between lakes, regardless of lake basin. The highest benthos densities occurred in the Camp Basin lakes Joe, Kathy and Banana (densities between ~8,000 – 14,000 organisms/m^3 within a depth zone). Although the Camp Basin possessed the lakes with highest benthos densities, it also possessed the only lake to have no benthos found in any of the three replicates taken from a given depth zone; Camp Lake, Deep Depth.

Benthic organisms were generally most abundant at shallower depths, although this was not always the case.

Taxonomic composition

Lake benthic communities were dominated by a diverse assortment of Dipterans, although Pelecypoda and Ostracoda were also prevalent. Although Dipterans and Pelecypoda were generally ubiquitous in the study area and occurred in approximately equivalent relative densities in all depths and lakes, Ostracods tended to be prevalent in only a few lakes, and more so in shallow areas. In general, the higher density shallows also tended to be more diverse in benthos community composition.

Anne Lake was conspicuous in its high density of nematodes (particularly at depth), a taxon scarce in other lakes in the study area. High benthos densities in Joe Lake, shallow depth, and Kathy Lake, mid depth, were largely a product of large numbers of dipterans.

6.2.5.5 Stream Benthic Invertebrates

Stream benthos samples were collected from 15 stream locations in August, 2007. Streams sampled lay within the Camp, Boot and Cleaver Basins, in addition to two reference streams and two locations along each of the Mara and Hackett Rivers; one upstream and one downstream of any inflows potentially subject to future mining influence.

Densities

Stream benthos densities ranged from a high of ~ 2,700 organisms/m^2 in Degaulle and Dog Lake outflows, to lows of ~ 300 organisms/m^2 in Thigh and Reference Lake A outflows and the Mara river downstream sampling location (MR2). For the Hackett River, stream benthos densities were higher downstream compared to upstream, whereas this pattern was reversed in the Mara River.

Taxonomic composition

Stream benthos communities were dominated by a diverse group of dipterans, which composed ~ 80% of the stream benthos sampled. Oligocheats and ostracods were also common in most streams. Boot Basin outflow was notable for its high densities of ephemeroptera, an otherwise scarce taxon, while nematodes comprised significant components of the benthic communities of Hood Outflow and Camp Creek Upstream.

6.2.6 Freshwater Fisheries

6.2.6.1 Overview

The freshwater fish communities within the Hackett project area are representative of Arctic freshwater ecosystems. Many of these fish species serve an important role in the ecological, economic and cultural health of the region. The fish communities within the Hackett project area are not well known because of the remote location, small human population, and the absence of commercial fisheries.

2007 was the first year of fish baseline studies in the area. A total of 30 lakes were included in the 2007 baseline work used to assess freshwater fisheries, ranging in size from 837 hectares (*i.e.*, Joe Lake) to small ponds (*i.e.*, Pinky Toe Pond) (Table 6.2-2). Two large rivers and several streams were also examined (Table 6.2-3). Streams were generally ephemeral in the area and offered temporary habitat for fish during the spring and early summer months.

The 2007 baseline fish community work found a total of six freshwater fish species present in the area (Table 6.2-4). Lake fish communities displayed relatively low diversity. These simple fish communities are a function of oligotrophic freshwater environments common in Nunavut. Life history types and habitat preferences for the most culturally or commercially important species are summarized below. Information presented is summarized from McPhail and Lindsey (1970), Scott and Crossman (1973), Richardson *et al.* (2001), and references therein.

6.2.6.2 Lake Trout

Lake trout are found throughout Nunavut, mostly in deep water lakes, but may also be found in large, clear rivers. Lake trout exhibit both lacustrine and adfluvial life history types. They spawn in late summer and early autumn, from September to October in northern regions. Lake trout were observed commencing spawning behaviour in late August at the Mara River (Rescan, 2008c). Spawning grounds are almost always associated with cobble, boulder and gravel substrates, where there is no vegetative cover, in depths less than one metre to greater than ten metres. Eggs settle into cracks and crevices amongst the rocks, where they incubate for four to five months, with eggs usually hatching in March or April. Young-of-the-year remain in spawning areas from several weeks to several months, moving into deeper areas as water temperatures rise to greater than 15°C. Young-of-the-year and juveniles both prefer areas of cobble and boulder substrate for cover, and inhabit waters with a depth range of two to greater than ten metres. Juveniles are often associated with large boulders, which they use for cover. Adult lake trout disperse into deeper water habitats, greater than ten metres in depth, and are often found in the pelagic zone. Lake trout feed on a wide variety of prey items including fish, molluscs, crustaceans, freshwater sponges and small mammals.

Table 6.2-2
Bathymetric and Fish Presence Information for Freshwater Lakes in the Hackett River Project Area

Waterbody Name	Surface Area (m^2)	Volume (m^3)	Maximum Depth (m)	Average Depth (m)	Species
Anne Lake	326,000	1,489,900	15.5	4.6	LKTR, SLSC
Banana Lake	228,700	850,300	12.5	3.7	LKTR
Bat Lake	132,300	555,200	14.4	4.2	No Fish Present
Big Toe Pond (BL 1)	–	–	–	–	No Fish Present
Middle Toe Pond (BL 2)	–	–	–	–	No Fish Present
Pinky Toe Pond (BL 3)	–	–	–	–	No Fish Present
Boot Lake	150,200	596,900	14.4	4.0	LKTR
Camp Lake	298,200	2,002,300	18.0	6.7	No Fish Present
Chucku Lake	127,200	621,700	16.4	4.9	LKTR
Kathy Lake (CL1)	225,200	320,500	10.7	1.4	LKTR, SLSC, ARGR
Affleck Lake (CL 2)	–	–	–	–	No Fish Present
Rowan Lake (CL 3)	–	–	–	–	LKTR
Connor Lake (CL 5)	–	–	–	–	No Fish Present
Saddle Lake (CL 6)	–	–	–	–	BURB
Burbot Pond (CL 7)	–	–	–	–	BURB, SLSC
Triangle Lake (CL 8)	–	–	–	–	LKTR
Cleaver Lake	46,900	116,500	8.1	2.5	No Fish Present
Degaulle Lake	145,500	627,200	13.4	4.3	LKTR, SLSC
Dinosaur Lake	–	–	–	–	LKTR
Dog Lake	80,000	147,000	6.7	1.8	LKTR, SLSC
Hood Lake	500,700	1,384,600	12.4	2.8	LKTR
Hungrat Lake	64,900	101,900	5.7	1.6	LKTR
Island Lake	440,200	1,702,600	14.0	3.9	LKTR
Joe Lake	837,100	3,892,800	13.4	4.7	LKTR
Lower Sunken Lake	–	–	–	–	No Fish Present
Michelle Lake	75,300	278,200	12.0	3.7	LKTR, SLSC
Reference Lake A	430,500	2,407,900	17.4	5.6	LKTR, SLSC
Reference Lake B	293,200	87,600	12.4	3.0	LKTR
Snake Lake	–	–	–	–	LKTR
Thigh Lake	134,400	30,300	8.0	2.3	LKTR

Fish Species Codes: ARGR= Arctic grayling; BURB= burbot; LKTR= lake trout; NSSB= ninespine stickleback; RDWH = round whitefish; SLSC= slimy sculpin

Table 6.2-3
Fish Presence Information for Rivers and Streams in the Hackett River Project Area

Watercourse	Fish Species
Rivers	
Hackett River	LKTR, ARGR, RDWH, SLSC, NSSB
Mara River	LKTR, ARGR, SLSC
Streams	
BALO	No Fish Present
BALI-1	SLSC
BALI-2	No Fish Present
DLT-1	No Fish Present
DLT-2	SLSC
MLO	No Fish Present
CHLO	No Fish Present
DLO	No Fish Present
TLO	SLSC, BURB
SLO	No Fish Present
CCU	No Fish Present
CCD	ARGR, SLSC
BLBO	ARGR, SLSC
CLBO	ARGR, SLSC, NSSB
RLO-A	SLSC
RLO-B	ARGR, SLSC, BURB, LKTR
CC1	ARGR, SLSC

Fish Species Codes: ARGR= Arctic grayling; BURB= burbot; LKTR= lake trout; NSSB= ninespine stickleback; RDWH = round whitefish; SLSC= slimy sculpin

Table 6.2-4
Species of Fish Captured in the Hackett River Project Area

Common Name	Scientific Name	Habitat	Spatial Distribution*
Lake trout	*Salvelinus namaycush*	Freshwater	Benthopelagic
Arctic grayling	*Thymallus Arcticus*	Freshwater	Benthopelagic
Round whitefish	*Prosopium cylinraceum*	Freshwater	Demersal
Burbot	*Lota lota*	Freshwater	Demersal
Slimy sculpin	*Cottus cognatus*	Freshwater	Demersal
Ninespine stickleback	*Pungitius pungitius*	Freshwater	Benthopelagic

Habitat types and spatial distributions were taken from species descriptions shown on FishBase (2002).
Demersal = bottom feeders, pelagic = feed in open water, benthopelagic = feed in open water and on bottom.

6.2.6.3 Arctic Grayling

Arctic grayling are commonly found in clear water of large cold rivers, streams and lakes throughout Nunavut. In the Hackett project area, Arctic grayling are most commonly found in large rivers (*e.g.,* Mara and Hackett rivers) and small streams, and are rarely a component of fish communities in lakes. They exhibit lacustrine, adfluvial and fluvial life history types and spawn from April to mid-June, primarily in streams over gravel and rock substrates. However, they have also been observed spawning in shallow water in Alaskan lakes, in association with inlet and outlet streams. Spawning generally occurs at warmer water temperatures near midday, and no nest or redd is prepared. The female may spawn only once, or several times in different areas. Eggs incubate for 13 to 18 days before hatching, with young grayling remaining in the gravel for 3 to 4 days before emerging. Juveniles are found in lotic and littoral areas at shallow depths (<0.5 m). Arctic grayling in Great Slave and Great Bear lakes are reported to mature between 3 and 9 years of age. Adults are found associated with sand, silt and gravel substrates in lakes, as well as rocky shorelines, and are typically a shallow water species, inhabiting depths < 3.0 m deep. Although no specific information on overwintering habitat was found, grayling are assumed to overwinter in deep pools in rivers and in deep portions of lakes (Richardson *et al.*, 2001). Adult grayling feed on a variety of aquatic and terrestrial insects including mayflies, caddisflies, midges, bees, wasps, grasshoppers, ants and a variety of beetles. Items occasionally found in the diet include fish, fish eggs, lemmings and planktonic crustaceans.

6.2.6.4 Whitefish

Round Whitefish

Round whitefish are most commonly found in shallow areas of lakes, ponds, slow flowing rivers and streams as well as brackish waters. In the Hackett project area, round whitefish are found in both the Hackett and Mara rivers. They exhibit lacustrine and adfluvial life history types. Spawning occurs from fall to early winter with preferential spawning grounds occurring in waters less than a metre in depth with a gravel substrate. Eggs are released over the substrate and incubate for 4 to 5 months before hatching from March to May. Young-of-the-year are most often found over sand, gravel and cobble substrates in shallow water (<5 m). Adults are found in both shallow and deeper water habitats, commonly over cobble and boulder substrates. Round whitefish are benthic feeders.

Lake Whitefish

Lake whitefish are found throughout Nunavut, predominantly in lakes, although they are also found in large rivers and brackish waters. Lake whitefish were potentially observed in the Hackett River in the Project area. Lake whitefish may exhibit lacustrine, adfluvial and anadromous life history types. They spawn in both lakes and rivers over gravel, cobble and boulders at depths of less than 5 m. Eggs are released over the substrate and fall into interstices between rocks where they incubate for several months, hatching sometime from March to May. Young-of-the-year are commonly found in the spawning area in shallow water (<1 m) near the surface, and prefer substrates of boulder, cobble and sand with abundant emergent vegetation and woody debris. Adults are usually found in the open water at depths > 10 m and do not show a preference for substrate. Adults are predominantly benthic, although they may be found in the pelagic zone. Lake whitefish have been reported to make onshore movements into shallow water at night, possibly to feed.

6.2.6.5 Arctic Char

Arctic char occur in northern coastal regions in rivers, lakes, estuaries and marine environments. They exhibit both anadromous and resident lacustrine life history types. Arctic char have yet to be documented in the Hackett Project area; however, they may be present in the Mara and/or Hackett rivers. Further investigations of Arctic char presence/absence and spatial distribution will be conducted in the 2008 field program.

6.2.7 Marine Aquatic Life

For the purposes of this document, marine aquatic life refers to plant and animal life that live within the water column (pelagic), and non-fish animals that live associated with the marine sediments (benthic).

These organisms include phytoplankton (photosynthetic microscopic algae that live free-floating in the water), zooplankton (tiny animals that live in the water column), and benthos (aquatic insects and other animals that live on top of or within lake sediments).

In 2007, all of the above-mentioned organisms were measured near the proposed port site in Bathurst Inlet. All results from the 2007 marine baseline work will be compiled into a marine baseline report (Rescan 2008b). In addition to the information collected in 2007, historical information is available from 2001 and 2002 (Rescan 2002). These baseline data were collected near the proposed port site as part of the BIPR baseline studies.

6.2.7.1 Marine Phytoplankton

Primary productivity in the Arctic Ocean is limited by the long ice-covered season which reduces or eliminates light availability for photosynthesis. During ice melt in the spring, the surface layer becomes warmer and less saline. This stratification prevents mixing of surface water with deeper, more nutrient rich water. Although there is sufficient light for photosynthesis to occur in the top layer at this time, nutrients may become limited, further contributing to the low primary productivity characteristic of the marine Arctic environment.

Phytoplankton samples were collected from various depths in August 2001 and 2007, and were analyzed for chlorophyll *a* (all depths), and taxonomy and abundance (1 m depth).

Biomass and Abundance

Phytoplankton biomass ranged from 0.37 to 0.98 µg/L chlorophyll *a*, was similar among years, and generally declined with depth. Despite similarities in biomass between years, phytoplankton abundance was more than 100x higher in 2001 than 2007 (593-980 cells/mL, and 1-3 cells/mL, respectively). The reasons for this difference in abundances between years are unclear. Richness was also higher in 2001, with 10 to 13 genera per station, compared to only 6 to 8 genera per station in 2007.

Taxonomic Composition

In 2001, a large portion of the algae were represented by an unidentified flagellate (39 to 53%), with chlorophytes (23 to 31%) and cryptophytes (15 to 23%) also being present in large numbers. There were rare members of Bacillariophyceae, Chrysophyta, Pyrrhophyta also observed. Of the identified genera, members of *Plagioselmis* (21%) and *Chlorella* (29%) predominated the five stations. In 2007, only two groups of phytoplankton were observed, including diatoms (Bacillariophyceae) and dinoflagellates (Pyrrhophyta).

Diversity was moderate in 2001, and similar among stations, with Shannon diversity ranging from 1.30 to 1.41 and Simpson diversity ranging from 0.66 to 0.71. Diversity was higher in 2007, with Shannon and Simpson diversity ranging from 1.63 to 1.90 and 0.78 to 0.83, respectively.

6.2.7.2 Marine Zooplankton

Zooplankton samples were collected from locations in the port site area in August 2001 and 2007 and one reference location in 2007.

Zooplankton abundance was lower in 2001 (5,562 to 11,082 organisms/m^3) than 2007 (22,164 to 43,816 organisms/m^3) although in both years the zooplankton assemblages were dominated by Calanoid copepods. Cyclopoid copepods and cladocerans were present in smaller numbers. The number of genera ranged from 13 to 19 in 2001, and 11 to 15 in 2007. The predominant genera were *Pseudocalanus*, followed by *Acartia* (both are calanoids), and *Podon* (a cladoceran). Simpson diversity indices were similar among stations and slightly higher in 2007 (0.54 to 0.71) than in 2001 (0.34 to 0.66).

6.2.7.3 Marine Benthic Invertebrates

Benthic invertebrates were sampled around the port site in 2001 (at a single location), 2002 (four locations), and 2007 (three locations), in addition to a reference location in 2007. In 2001 and 2002 benthos and sediment sampling stations were much deeper than those sampled in 2007 (17 – 47 m in 2001/2 vs. 2.5 – 5 m in 2007). Thus, it should be noted that differences in density, richness and community composition between 2007 and other years may be largely attributable to the differences in sampling depths.

Densities

Benthos densities were highest in 2001, with an average of 22,752 organisms/m^2 at the location sampled. In 2002 densities were significantly lower (1,515 to 6,276 organisms/m^2), with an overall average of 3,419 organisms/m^2. At the shallower stations sampled in 2007, densities ranged from 736 to 3,478 organisms/m^2.

Taxonomic Composition

Dominant taxa varied yearly, with nematodes dominating numerically in 2001, annelids and foraminiferans in 2002, and molluscs in 2007. Richness and diversity were much higher at the deeper locations sampled in 2002 (18 to 39 genera per station, H’ = 2.39 to 2.98) compared to the shallow locations sampled in 2007 (2 to 7 genera, H’ = 0.15 to 1.50).

6.2.8 Marine Fisheries

In 2007 a marine fisheries habitat survey, including bathymetry, was conducted near the proposed port site in Bathurst Inlet. Results from the 2007 marine baseline work will be compiled into a marine baseline report (Rescan 2008c). In addition to the information collected in 2007, historical site-specific fish community information is available from 2001 (Rescan 2002). These baseline data were collected near the proposed port site as part of the BIPR baseline studies.

6.2.8.1 Marine Fish Community

The marine fish community of the Bathurst Inlet port study area is representative of an Arctic marine ecosystem. Many of these fish species serve an important role in the ecological, economic and cultural health of the region. The fish communities of Bathurst Inlet are not well known because of the remote location of the inlet, small human population, and the absence of significant commercial fisheries. Fish of Bathurst Inlet have been sampled on an opportunistic basis by scientists of the Department of Fisheries and Oceans and the Canadian Museum of Nature (Hunter *et al*., 1984). Other authors have reported fish captured in Bathurst Inlet as part of larger-scale surveys of the fisheries resources of Arctic Canada (Richardson, 1836; Johansen, 1926; Walters, 1953; Boulva and Simard, 1968; Renewable Resources Consulting Services Ltd., 1972; Friesen, 1975; Farquharson, 1976; Stewart and MacDonald, 1978; Sutherland and Golke, 1978; McAllister *et al*., 1987; Yaremchuk *et al*., 1989; Kristofferson *et al*., 1990; Riewe, 1992; McGowan *et al*., 1993; Stewart *et al*., 1993; Stewart, 1994).

During the 2001 baseline study (Rescan 2002), marine fish were sampled from three sites along the shoreline of the Bathurst Inlet peninsula. Sampling gear used included minnow traps, sinking and floating gillnets, sinking and floating longlines and a beach seine. The use of this combination of gear was designed to capture a wide range of fish species and size classes.

A total of 177 fish from 11 species were captured during the 2001 fisheries survey in Bathurst Inlet (Table 6.2-5). Fourhorn sculpin was the dominant species, followed by Arctic cisco, starry flounder, saffron cod, Arctic flounder, Pacific herring, broad whitefish, rainbow smelt, Arctic char, ogac and lake trout. The fish captured were mainly nearshore, shallow-water species with a relatively large component of anadromous species and species with low tolerance for salinity (compared to the historical records available for Bathurst Inlet). Most fish captured in the nearshore zone were demersal and moved along the sea bottom. All species captured are common fish in Canada's Arctic waters, and none are threatened or endangered.

6.2.8.2 Marine Fish Habitat

Studies of marine fish habitat were conducted at the Bathurst Inlet Port site in 2001 and in 2007 (Rescan 2002; 2008b).

Shoreline habitat at the port site is dominated by a shallow water shelf which extends at slope of 8% to a depth of approximately 10 m and a distance of 120 m offshore. Beyond this distance, a steep gradient of 30% extends to depths greater than 40 m.

Sediment sources in Bathurst Inlet include two rivers: Western River and No-Name River. Western River enters Bathurst Inlet at its southernmost point, and No-Name River enters Bathurst Inlet on the west side of the peninsula where the port site will be located. Sediment enters the inlet from these sources primarily during freshet in spring. This sediment settles to the bottom of Bathurst Inlet and provides a fine, marine clay substrate that likely supports flatfish, marine bivalves and crustaceans. Sediment may be deposited along the shoreline; however, yearly ice scour prevents significant amounts of fine sediment from occurring in the intertidal zone.

Table 6.2-5
Species of Fish Captured in Bathurst Inlet in August 2001

Common Name	Scientific Name	Habitat	Spatial Distribution*
Fourhorn sculpin[1]	*Triglopsis quadricornis*	Marine	Demersal
Starry flounder	*Platichthys stellatus*	Marine	Demersal
Saffron cod	*Eleginus gracilis*	Marine	Demersal
Arctic flounder[2]	*Liopsetta glacialis*	Marine	Demersal
Pacific herring	*Clupea pallasi*	Marine	Pelagic
Ogac[3]	*Gadus ogac*	Marine	Demersal
Broad whitefish	*Coregonus nasus*	Freshwater/Brackish	Benthopelagic
Lake trout	*Salvelinus namaycush*	Freshwater/Brackish	Benthopelagic
Arctic cisco	*Coregonus autumnalis*	Anadromous	Pelagic
Rainbow smelt	*Osmerus mordax dentex*[4]	Anadromous	Pelagic
Arctic char	*Salvelinus alpinus*	Anadromous	Benthopelagic

[1] formerly *Myoxocephalus quadricornis* (Kottelat, 1997).
[2] formerly *Pleuronectes glacialis* (Cooper and Chapleau, 1998).
[3] also known as Greenland cod.
[4] sub-species found in Arctic Canada. Not to be confused with *Osmerus mordax mordax*, the Atlantic rainbow smelt (Mc Allister, 1990).
Habitat types and spatial distributions were taken from species descriptions shown on FishBase (2002).
Demersal = bottom feeders, pelagic = feed in open water, benthopelagic = feed in open water and on bottom.

Substrate composition along the shoreline was mapped along zones in 2001 (Rescan, 2002), and along transects in 2007 (Rescan, 2008b). Habitat was mapped up to the high water line in both years. Gravel and cobble dominated the sites closest to the proposed development in 2001, while boulder and cobble dominated a third site on the west side of the peninsula (Rescan, 2002). Marine vegetation was almost non-existent and cover for aquatic organisms was low. In deeper waters, fine clay and silt dominated the substrate, and there was a paucity of organic material in sediment grabs from stations around the proposed development, particularly at depths greater than 40 m. This is reflective of the absence of woody material on shore (Rescan, 2002).

In 2007, substrate composition was determined for evenly spaced quadrats along transects which extended perpendicular to the shoreline from the high water mark to 1 m below the water level. These transects covered the entire length of shoreline that will be altered by the proposed development. All transects were dominated by gravel and cobble substrates; however, a few individual quadrats were composed mostly of fines or boulders. Three distinct habitat zones were present between the high water mark and the terrestrial vegetation, and likely indicate an area of ice scour. Sandy substrates are considered to be of high value due to their potential for supporting benthic invertebrate communities (RLandL/Golder, 2002; Urban-Malinga *et al.*, 2002). Such substrates were not common in the intertidal zone at the port site due to ice scour, but were present at depths exceeding 3 m.

The water column structure near the port site is typical of partially mixed estuaries. The water column exhibited a warmer, less saline layer of water over a more saline, colder layer. At the surface, summer water temperatures were approximately 11°C in 2001 and 2007, and salinity ranged from 11 to 16 psu. At depths greater than 30 m, salinity approached 26 psu, and temperature approached 0°C. The estuarine nature of the water column at the port site has led to the capture of some species that normally only inhabit fresh or brackish water (*i.e.*, lake trout and broad whitefish). Summer dissolved oxygen concentrations at the port site reached a maximum at approximately 15 mg/L at depth, indicating that colder, highly oxygenated salt water sinks below the fresh water that originates from the coastal rivers.

6.2.9 Marine Wildlife

Mammals that have the potential to occur in the proposed shipping lane for the Project include:

- Beluga Whale (Eastern High Arctic-Baffin Bay Population) *Delphinapterus leucas*
- Beluga Whale (Eastern Beaufort Sea Population) *Delphinapterus leucas*
- Bowhead Whale (Davis Strait-Baffin Bay Population) *Balaena mysticetus*
- Bowhead Whale (Bering-Chukchi-Beaufort Population) *Balaena mysticetus*
- Bowhead Whale (Eastern Arctic Population) *Balaena mysticetus*
- Narwhal *Monodon monoceros*
- Ringed Seal *Pusa hispida*
- Bearded Seal *Erignathus barbatus*
- Harp Seal *Pagophilus groenlandica*
- Atlantic Walrus *Odobenus rosmarus rosmarus*
- Polar Bear *Ursus maritimus*

Birds that have the potential to occur in the proposed shipping lane for the Project include:

- Ruddy Turnstone (*Arenaria interpres*)
- Red Knot (*Calidris canutus islandica and Calidris canutus rufa*)
- Purple Sandpiper (*Calidris maritime*)
- Dunlin (*Calidris alpine*)
- Buff-breasted Sandpiper (*Tryngites subruficollis*)
- Red Phalarope (*Phalaropus fulicarius*)
- Northern Fulmar (*Fulmarus glacialis*)
- Thayer's Gull (*Larus thayeri*)
- Black-legged Kittiwake (*Rissa tridactyla*)
- Ross's Gull (*Rhodostethia rosea*)
- Sabine's Gull (*Xema sabini*)
- Ivory Gull (*Pagophila eburnean*)

- Thick-billed Murre (*Uria lomvia*)
- Black Guillemot (*Cepphus grille*)
- King Eider (*Somateria spectabilis*)
- Common Eider (*Somateria mollissima*)
- Northern Wheatear (*Oenanthe oenanthe*)

Polar bears are found close to land masses in the Arctic year round. Denning occurs in late November to early December and lasts until April (Keith *et al.*, 2005). Key denning sites identified using traditional Inuit knowledge and literature include areas on King William sound and Jenny Lind Island (Keith *et al.*, 2005) and along Devon and Baffin Island using inferences from sightings of females with cubs (Schweinsburg *et al.*, 1982). Polar bears mainly rely on marine mammals (*e.g.*, ringed seals) for sustenance, hunted on sea ice and pressure ice along islands (Keith *et al.*, 2005). In August and September, polar bears may be encountered where there is moderate to heavy ice cover along northern portions of the shipping route (LGL Ltd, 2005). Two polar bears were recorded in 2004 baseline work for the BIPR project; one single bear off the western coast of the Boothia Peninsula south of Weld Harbour and the other adult and two cubs northwest of Gateshead Island in southern M'Clintock Channel (LGL Ltd, 2005). Both were in areas of heavy ice cover (95–99%). In addition, five polar bear kills and tracks were recorded.

Major seabird breeding colonies have been identified in coastal areas surrounding Devon, Baffin, Bathurst, Somerset and Victoria Islands, as well as Bathurst Inlet (Mallory and Fontaine, 2004; Zinifex, 2007). Migratory seabird species generally arrive in the northern shipping route by mid May and occupy those areas until September-October (Mallory and Fontaine, 2004). The southern areas would be occupied during ice-free months and used during migration staging in late summer. Thick-billed murres, black-legged kittiwakes, black guillemots and northern fulmars are the most abundant; other species that could be encountered include common and king eiders and Ross' and ivory Gulls, the later two are species at risk (SARA, 2006). Polynyas (areas where the sea ice opens up before the formal ice-break up) occur in the northern reaches of the shipping route and are important feeding areas for marine birds. The Lancaster Sound-Barrow Strait area is also an important feeding area for thousands of seabirds that nest in the vicinity.

6.2.10 Species of Concern

Species with the potential to occur within the Hackett RSA were determined using literature reviews, published range maps and baseline data. Species were assessed in taxonomic groups in order to determine species of concern that may be affected by the Project. Definitions for each ranking system are provided below:

1. Nunavut Ranking (www.wildspecies.ca)
    - At Risk - Species for which a formal, detailed risk assessment (COSEWIC status assessment or provincial or territorial equivalent) has been completed and that have been determined to be at risk of extirpation or extinction (*i.e.*, Endangered or Threatened).

- A COSEWIC designation of Endangered or Threatened automatically results in a Canada General Status Rank (Canada rank) of At Risk in Nunavut.
- May be at Risk - Species that may be at risk of extirpation or extinction and are therefore candidates for a detailed risk assessment by COSEWIC, or provincial or territorial equivalents.
- Sensitive - Species that are not believed to be at risk of immediate extirpation or extinction but may require special attention or protection to prevent them from becoming at risk.
- Secure - Species that are not believed to belong in the categories Extirpated, Extinct, At Risk, May Be at Risk, Sensitive.
- Undetermined - Species for which insufficient data, information, or knowledge is available with which to reliably evaluate their general status.

2. SARA Designation (www.speciesatrisk.gc.ca)
   - Species listed in Schedule 1 are protected under SARA as of proclamation in June 2003. These species were assessed by COSEWIC using the revised assessment criteria. The list classifies the species as being extirpated, endangered, threatened, or a special concern. Species listed in this schedule were assessed prior to October 1999, and require re-assessment using the revised criteria, following which the Governor in Council may, on the recommendation of the Minister, add the species to the Federal List of Wildlife Species at Risk.
   - Schedules 2 and 3 Species listed in these schedules were assessed prior to October 1999, and require re-assessment using the revised criteria, following which the Governor in Council may, on the recommendation of the Minister, add the species to the Federal List of Wildlife Species at Risk.
3. COSEWIC Ranking (www.cosewic.gc.ca)
   - Endangered - A wildlife species facing imminent extirpation or extinction.
   - Threatened - A wildlife species likely to become endangered if limiting factors are not reversed.
   - Special Concern - A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
   - Data Deficient - A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
   - Not At Risk - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

The likelihood occurrence rankings were as follows: ***Confirmed*** - Species observation confirmed from baseline studies, ***Likely*** - Occurs in project area but not detected during baseline studies, ***Possible*** - Range occurs within 200 km buffer of project area, ***Shipping*** - Range occurs along marine shipping route.

6.2.10.1 Mammals of Concern

The status of ungulates (caribou and muskoxen; considering each herd of barren ground caribou separately) potentially occurring in the Project area are presented in Table 6.2-6. The rankings of carnivores potentially occurring in the study area is presented in Table 6.2-7. Finally, Table 6.2-8 includes the status of small mammals potentially occurring in the study area.

Table 6.2-6
Status of Ungulates Potentially Occurring in the Project RSA

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Caribou (Peary subspecies)	*Rangifer tarandus pearyi*	Unavailable	Not currently scheduled	Endangered	Shipping Route
Caribou (Dolphin and Union Herd)	*Rangifer tarandus groenlandicus*	Sensitive	Not currently scheduled	Special Concern	Shipping Route
Caribou (Bathurst herd)	*Rangifer tarandus groenlandicus*	Secure	Not currently scheduled	Not assessed	Confirmed
Caribou (Ahiak herd)	*Rangifer tarandus groenlandicus*	Unavailable	Not currently scheduled	Not assessed	Likely
Muskox	*Ovibos moschatus*	Secure	Not currently scheduled	Not assessed	Confirmed

Table 6.2-7
Status of Carnivores Potentially Occurring in the Project RSA

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Grey Wolf	*Canis lupus*	Secure	Not currently scheduled	Data Deficient	Confirmed
Arctic Fox	*Vulpes lagopus*	Secure	Not currently scheduled	Not assessed	Confirmed
Coloured Fox	*Vulpes vulpes*	Secure	Not currently scheduled	Not assessed	Confirmed
Grizzly Bear	*Ursus arctos*	Sensitive	Not currently scheduled	Special Concern	Confirmed
Wolverine	*Gulo gulo*	Secure	Not currently scheduled	Special Concern	Confirmed
Ermine	*Mustela erminea*	Secure	Not currently scheduled	Not assessed	Confirmed
Least Weasel	*Mustela nivalis*	Secure	Not currently scheduled	Not assessed	Likely
American Mink	*Mustela vison*	Undetermined	Not currently scheduled	Not assessed	Possible
Canada Lynx	*Lynx canadensis*	Undetermined	Not currently scheduled	Not at Risk	Possible

Of the mammal species that may occur in the Hackett RSA, one caribou herd is considered endangered (the Peary caribou herd, associated with the shipping route) and one herd is considered of special concern (the Dolphin and Union herd). Important features that must be maintain for these species to persist in the region include ice bridges for migration across the Franklin straight and between Bathurst Inlet and Victoria Island, which are required for these herds during fall migration Two carnivore species are listed as species of special concern, the grizzly bear and the wolverine. Grizzly bear and wolverine prefer to den in esker and heath tundra habitat, and require a healthy prey base of caribou and other small mammals. No small mammal species are currently listed.

Table 6.2-8
Status of Small Mammals Potentially Occurring in the Project RSA

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Barrenground Shrew	*Sorex ugyunak*	Undetermined	Not currently scheduled	Not assessed	Likely
Arctic Hare	*Lepus Arcticus*	Secure	Not currently scheduled	Not assessed	Confirmed
Arctic Ground Squirrel	*Spermophilus parryii*	Secure	Not currently scheduled	Not assessed	Confirmed
Northern Red-backed Vole	*Clethrionomys rutilus*	Secure	Not currently scheduled	Not assessed	Confirmed
Tundra Vole	*Microtus oeconomus*	Undetermined	Not currently scheduled	Not assessed	Confirmed
Meadow Vole	*Microtus pennsylvanicus*	Secure	Not currently scheduled	Not assessed	Possible
Northern Collared Lemming	*Dicrostonyx groenlandicus*	Secure	Not currently scheduled	Not assessed	Confirmed
Victoria Collared Lemming	*Dicrostonyx kilangmiutak*	Secure	Not currently scheduled	Not assessed	Possible
Brown Lemming	*Lemmus trimucronatus*	Secure	Not currently scheduled	Not assessed	Confirmed

6.2.10.2 Birds of Concern

Terrestrial bird species with the potential to occur within the Hackett RSA and shipping route were determined in an identical manner to methods used to assess mammals. The results for raptors, waterfowl and geese, shorebirds and wading birds, seabirds, gamebirds and landbirds and songbirds are presented in Tables 6.2-9 to 6.2-14.

Table 6.2-9
Status of Raptor Species Potentially Occurring in the Project Area

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Bald Eagle	*Haliaeetus leucocephalus*	Undetermined	Not currently scheduled	Not assessed	Possible
Northern Harrier	*Circus cyaneus*	Undetermined	Not currently scheduled	Not at risk	Possible
Rough-legged Hawk	*Buteo lagopus*	Secure	Not currently scheduled	Not at risk	Confirmed
Golden Eagle	*Aquila chrysaetos*	Sensitive	Not currently scheduled	Not at risk	Confirmed
Merlin	*Falco columbarius*	Undetermined	Not currently scheduled	Not at risk	Possible
Peregrine Falcon (tundra)	*Falco peregrinus tundrius*	Secure	Schedule 3	Special Concern	Confirmed
Gyrfalcon	*Falco rusticolus*	Secure	Not currently scheduled	Not at risk	Confirmed
Great Horned Owl	*Bubo virginianus*	Undetermined	Not currently scheduled	Not assessed	Possible
Snowy Owl	*Bubo scandiacus*	Secure	Not currently scheduled	Not at risk	Likely
Northern Hawk Owl	*Surnia ulula*	Undetermined	Not currently scheduled	Not assessed	Possible
Short-eared Owl	*Asio flammeus*	Sensitive	Schedule 3	Special Concern	Confirmed
Common Raven	*Corvus corax*	Secure	Not currently scheduled	Not assessed	Confirmed

Table 6.2-10
Status of Waterfowl and Geese
Potentially Occurring in the Project Area

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Red-throated Loon	*Gavia stellata*	Secure	Not currently scheduled	Not assessed	Confirmed
Pacific Loon	*Gavia pacifica*	Secure	Not currently scheduled	Not assessed	Confirmed
Common Loon	*Gavia immer*	Secure	Not currently scheduled	Not at risk	Confirmed
Yellow-billed Loon	*Gavia adamsii*	Secure	Not currently scheduled	Not at risk	Confirmed
Greater White-fronted Goose	*Anser albifrons*	Secure	Not currently scheduled	Not assessed	Confirmed
Snow Goose	*Chen caerulescens*	Secure	Not currently scheduled	Not assessed	Confirmed
Ross's Goose	*Chen rossii*	Secure	Not currently scheduled	Not assessed	Likely
Canada Goose	*Branta canadensis*	Secure	Not currently scheduled	Not assessed	Confirmed
Cackling Goose	*Branta hutchinsii*	Secure	Not currently scheduled	Not assessed	Likely
Brant	*Branta bernicla*	Secure	Not currently scheduled	Not assessed	Likely
Tundra Swan	*Cygnus columbianus*	Secure	Not currently scheduled	Not assessed	Confirmed
Northern Pintail	*Anas acuta*	Secure	Not currently scheduled	Not assessed	Confirmed
Green-winged Teal	*Anas crecca*	Undetermined	Not currently scheduled	Not assessed	Confirmed
Greater Scaup	*Aythya marila*	Undetermined	Not currently scheduled	Not assessed	Confirmed
King Eider	*Somateria spectabilis*	Sensitive	Not currently scheduled	Not assessed	Likely
Common Eider	*Somateria mollissima*	Sensitive	Not currently scheduled	Not assessed	Likely
Surf Scoter	*Melanitta perspicillata*	Undetermined	Not currently scheduled	Not assessed	Possible
Long-tailed Duck	*Clangula hyemalis*	Secure	Not currently scheduled	Not assessed	Confirmed
Bufflehead	*Bucephala albeola*	Undetermined	Not currently scheduled	Not assessed	Possible
Common Merganser	*Mergus merganser*	Undetermined	Not currently scheduled	Not assessed	Confirmed
Red-breasted Merganser	*Mergus serrator*	Secure	Not currently scheduled	Not assessed	Confirmed

Overall, there were 15 species, of varying likelihood, could potentially occur in the project RSA and that have a conservation status. These species include: Golden Eagle, Peregrine Falcon (tundra), Short-eared Owl, King Eider, Common Eider, Black-bellied plover, American golden Plover, Eskimo curlew, sanderling, semipalmated sandpiper, Wilson's snipe, American tree sparrow, Harris' sparrow, white-crowned sparrow and snow bunting. Some of these species, such as the American tree sparrow, white-crowned sparrow, Harris' sparrow, and American golden plover were relatively common in the Hackett RSA.

Critical habitat features of golden eagle and the peregrine falcon includes cliffs for nesting nearby water bodies with an ample supply of shorebirds (prey) and small mammals. Critical habitat for the short-eared own includes ground nesting area with some vegetative cover nearby lakes with abundant shorebirds populations (prey). Three habitat features that separate out shorebirds and songbird populations in the region include: sedge wetlands, heath tundra/boulder field, and riparian shrub/birch seep habitats (Rescan, 2007b). Other important features for water-associated species include riparian habitat, water bodies with fish or plankton for feeding and/or beach materials.

Table 6.2-11
Status of Shorebird and Wading Birds Potentially Occurring in the Project Area

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Sandhill Crane	*Grus canadensis*	Secure	Not currently scheduled	Not assessed	Confirmed
Black-bellied Plover	*Pluvialis squatarola*	Sensitive	Not currently scheduled	Not assessed	Likely
American Golden-Plover	*Pluvialis dominica*	Sensitive	Not currently scheduled	Not assessed	Confirmed
Semipalmated Plover	*Charadrius semipalmatus*	Secure	Not currently scheduled	Not assessed	Confirmed
Common Ringed Plover	*Charadrius hiaticula*	Secure	Not currently scheduled	Not assessed	Possible
Lesser Yellowlegs	*Tringa flavipes*	Undetermined	Not currently scheduled	Not assessed	Possible
Spotted Sandpiper	*Actitis macularius*	Undetermined	Not currently scheduled	Not assessed	Confirmed
Eskimo Curlew	*Numenius borealis*	At Risk	Schedule 1	Endangered	Possible
Sanderling	*Calidris alba*	Sensitive	Not currently scheduled	Not assessed	Confirmed
Semipalmated Sandpiper	*Calidris pusilla*	Sensitive	Not currently scheduled	Not assessed	Confirmed
Least Sandpiper	*Calidris minutilla*	Secure	Not currently scheduled	Not assessed	Confirmed
White-rumped Sandpiper	*Calidris fuscicollis*	Secure	Not currently scheduled	Not assessed	Likely
Baird's Sandpiper	*Calidris bairdii*	Secure	Not currently scheduled	Not assessed	Confirmed
Pectoral Sandpiper	*Calidris melanotos*	Secure	Not currently scheduled	Not assessed	Likely
Stilt Sandpiper	*Calidris himantopus*	Secure	Not currently scheduled	Not assessed	Confirmed
Wilson's Snipe	*Gallinago delicata*	Sensitive	Not currently scheduled	Not assessed	Possible
Red-necked Phalarope	*Phalaropus lobatus*	Secure	Not currently scheduled	Not assessed	Confirmed

Table 6.2-12
Status of Seabirds Potentially Occurring in the Project Area

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Pomarine Jaeger	*Stercorarius pomarinus*	Secure	Not currently scheduled	Not assessed	Confirmed
Parasitic Jaeger	*Stercorarius parasiticus*	Secure	Not currently scheduled	Not assessed	Confirmed
Long-tailed Jaeger	*Stercorarius longicaudus*	Secure	Not currently scheduled	Not assessed	Confirmed
Bonaparte's Gull	*Larus philadelphia*	Undetermined	Not currently scheduled	Not assessed	Possible
Mew Gull	*Larus canus*	Undetermined	Not currently scheduled	Not assessed	Possible
Herring Gull	*Larus argentatus*	Secure	Not currently scheduled	Not assessed	Confirmed
Glaucous Gull	*Larus hyperboreus*	Secure	Not currently scheduled	Not assessed	Confirmed
Arctic Tern	*Sterna paradisaea*	Secure	Not currently scheduled	Not assessed	Confirmed

Table 6.2-13
Status of Gamebirds Potentially Occurring in the Project Area

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Spruce Grouse	*Falcipennis canadensis*	Undetermined	Not currently scheduled	Not assessed	Possible
Willow Ptarmigan	*Lagopus lagopus*	Secure	Not currently scheduled	Not assessed	Confirmed
Rock Ptarmigan	*Lagopus muta*	Secure	Not currently scheduled	Not assessed	Confirmed

Table 6.2-14
Status of Landbirds and Songbirds
Potentially Occurring in the Project Area

Species	Scientific Name	Species Status			Occurrence
		Nunavut	SARA Designation	COSEWIC	
Gray Jay	*Perisoreus canadensis*	Secure	Not currently scheduled	Not assessed	Possible
Horned Lark	*Eremophila alpestris*	Secure	Not currently scheduled	Not assessed	Confirmed
Cliff Swallow	*Petrochelidon pyrrhonota*	Undetermined	Not currently scheduled	Not assessed	Possible
Boreal Chickadee	*Poecile hudsonica*	Undetermined	Not currently scheduled	Not assessed	Possible
American Pipit	*Anthus rubescens*	Secure	Not currently scheduled	Not assessed	Confirmed
Gray-cheeked Thrush	*Catharus minimus*	Undetermined	Not currently scheduled	Not assessed	Confirmed
American Robin	*Turdus migratorius*	Secure	Not currently scheduled	Not assessed	Likely
Yellow Warbler	*Dendroica petechia*	Undetermined	Not currently scheduled	Not assessed	Confirmed
Yellow-rumped Warbler	*Dendroica coronata*	Undetermined	Not currently scheduled	Not assessed	Possible
Blackpoll Warbler	*Dendroica striata*	Undetermined	Not currently scheduled	Not assessed	Possible
Wilson's Warbler	*Wilsonia pusilla*	Undetermined	Not currently scheduled	Not assessed	Likely
American Tree Sparrow	*Spizella arborea*	Sensitive	Not currently scheduled	Not assessed	Possible
Savannah Sparrow	*Passerculus sandwichensis*	Secure	Not currently scheduled	Not assessed	Confirmed
Swamp Sparrow	*Melospiza georgiana*	Undetermined	Not currently scheduled	Not assessed	Possible
Harris's Sparrow	*Zonotrichia querula*	Sensitive	Not currently scheduled	Not assessed	Confirmed
White-crowned Sparrow	*Zonotrichia leucophrys*	Sensitive	Not currently scheduled	Not assessed	Confirmed
Dark-eyed Junco	*Junco hyemalis*	Undetermined	Not currently scheduled	Not assessed	Possible
Lapland Longspur	*Calcarius lapponicus*	Secure	Not currently scheduled	Not assessed	Confirmed
Smith's Longspur	*Calcarius pictus*	Secure	Not currently scheduled	Not assessed	Likely
Snow Bunting	*Plectrophenax nivalis*	Sensitive	Not currently scheduled	Not assessed	Likely
Common Redpoll	*Carduelis flammea*	Secure	Not currently scheduled	Not assessed	Confirmed
Hoary Redpoll	*Carduelis hornemanni*	Secure	Not currently scheduled	Not assessed	Confirmed

6.2.10.3 Marine Mammals and Marine Birds

Tables 6.2-15 and 6.2-16 present the status of marine mammals and birds that could potentially occur along the shipping route. Of the marine mammals, most of them are species of concern. For the marine birds, many of the species are poorly understood in the high Arctic and are not currently accessed by COSEWIC. Several species are, however, identified as species of concern (*e.g.*, Ross's Gull).

Table 6.2-15
Status of Marine Mammals Potentially Occurring in the Shipping Lane

Species	Scientific Name	Species Status		
		Nunavut	SARA Designation	COSEWIC
Beluga Whale (Eastern High Arctic-Baffin Bay Population)	*Delphinapterus leucas*	Sensitive	Not currently scheduled	Special Concern
Beluga Whale (Eastern Beaufort Sea Population)	*Delphinapterus leucas*	Secure	Not currently scheduled	Not at Risk
Bowhead Whale (Davis Strait-Baffin Bay Population)	*Balaena mysticetus*	At Risk	Not currently scheduled	Threatened
Bowhead Whale (Bering-Chukchi-Beaufort Population)	*Balaena mysticetus*	Sensitive	Schedule 2	Endangered
Bowhead Whale (Eastern Arctic Population)	*Balaena mysticetus*	At Risk	Schedule 2	Endangered
Narwhal	*Monodon monoceros*	Secure	Not currently scheduled	Special Concern
Ringed Seal	*Pusa hispida*	Secure	Not currently scheduled	Not at Risk
Bearded Seal	*Erignathus barbatus*	Secure	Not currently scheduled	Data Deficient
Harp Seal	*Pagophilus groenlandica*	Secure	Not currently scheduled	Not assessed
Atlantic Walrus	*Odobenus rosmarus rosmarus*	Secure	Not currently scheduled	Special Concern
Polar Bear	*Ursus maritimus*	Sensitive	Not currently scheduled	Special Concern

Table 6.2-16
Status of Marine Birds Potentially Occurring in the Shipping Lane

Species	Scientific Name	Species Status		
		Nunavut	SARA Designation	COSEWIC
Ruddy Turnstone	*Arenaria interpres*	Sensitive	Not currently scheduled	Not assessed
Red Knot (*islandica*subspecies)	*Calidris canutus islandica*	Sensitive	Not currently scheduled	Special Concern
Red Knot (*rufa* subspecies)	*Calidris canutus rufa*	Sensitive	Not currently scheduled	Endangered
Purple Sandpiper	*Calidris maritima*	Secure	Not currently scheduled	Not assessed
Dunlin	*Calidris alpina*	Secure	Not currently scheduled	Not assessed
Buff-breasted Sandpiper	*Tryngites subruficollis*	Sensitive	Not currently scheduled	Not assessed
Red Phalarope	*Phalaropus fulicarius*	Sensitive	Not currently scheduled	Not assessed
Northern Fulmar	*Fulmarus glacialis*	Secure	Not currently scheduled	Not assessed
Thayer's Gull	*Larus thayeri*	Secure	Not currently scheduled	Not assessed
Black-legged Kittiwake	*Rissa tridactyla*	Secure	Not currently scheduled	Not assessed
Ross's Gull	*Rhodostethia rosea*	At Risk	Schedule 1	Threatened
Sabine's Gull	*Xema sabini*	Secure	Not currently scheduled	Not assessed
Ivory Gull	*Pagophila eburnea*	May be at Risk	Schedule 1	Endangered
Thick-billed Murre	*Uria lomvia*	Secure	Not currently scheduled	Not assessed
Black Guillemot	*Cepphus grylle*	Secure	Not currently scheduled	Not assessed
King Eider	*Somateria spectabilis*	Sensitive	Not currently scheduled	Not assessed
Common Eider	*Somateria mollissima*	Sensitive	Not currently scheduled	Not assessed
Northern Wheatear	*Oenanthe oenanthe*	Undetermined	Not currently scheduled	Not assessed

6.2.10.4 Fish

Bering wolffish are a species of concern in Bathurst Inlet. While they have not been captured in the immediate vicinity of the port site, they have been captured further north in Bathurst Inlet and are thought to be rare. Bering wolffish have a known distribution that extends from Japan to the Russian coastline. Specimens have also been collected from Alaska, and three isolated specimens were collected from Bathurst Inlet (COSEWIC, 2002). Little is known of their distribution, biology, or habitat preferences in Bathurst Inlet and their official status is "Data Deficient" as of 2002 (COSEWIC, 2002). Because of their seemingly specialized and localized habitat, Bering wolffish are a species of concern for the Nunavut Planning Commission and special management is warranted (WKRLUP, 2005).

The freshwater fourhorn sculpin is a species of concern in the West Kitikmeot (WKRLUP 2005); however, the Hackett River Project is unlikely to interact with this species. The freshwater fourhorn sculpin is found in areas on Victoria Island, but has not been found anywhere on the mainland. The marine species of fourhorn sculpin is common in Bathurst Inlet and probably along parts of the shipping route, and is not a species of concern.

6.2.11 Other Potential Biological VECs

No other potential biological environment valued ecosystem components (VECs) were identified in community meetings or literature reviews.

6.3 Socio-Economic Environment

6.3.1 Proximity to Communities

The Hackett River project is located in the Kitikmeot region of Nunavut (Figure 6.3-1). The Kitikmeot Region has two land use planning regions: the West Kitikmeot Planning Region (where the project is located) and the Akunniq Planning Region, the latter of which spans the Eastern Kitikmeot and West Baffin areas.

The closest settlements to the project include Bathurst Inlet (102 km) and a seasonal camp at Omingmaktok (197 km). Distances in brackets are the approximate straight line distances from the Hackett River Project. The communities of Kugluktuk (360 km) and Cambridge Bay (381 km) are the closest major regional settlements. These four settlements and the West Kitikmeot planning region are considered the primary study communities due to their proximity to the project.

In addition, the communities of the Eastern Kitikmeot region are included as secondary study communities as they are within the boundaries of the Kitikmeot Inuit Association (KIA) and are likely sources of workers and contractors. These communities are Gjoa Haven (617 km), Kugaruuk (846 km) and Taloyoak (742 km). Yellowknife, NWT, (485 km) is also an important community as the likely transport hub and a source for workers, goods and services.

6.3.2 Archaeology and Culturally-Significant Sites

Collection of archaeological baseline information was initiated in 2007. In preparation for the field component for the baseline data collection, background research was conducted which indicated that no previously recorded archaeological sites were located within or immediately adjacent to the Hackett River Project footprint. Two field surveys were carried out, in July and September 2007, during which aerial and pedestrian surveys were conducted to identify any archaeological sites which may have been previously unrecorded.

A total of 32 archaeological sites were recorded within or immediately adjacent to the Hackett River project footprint (mine site facilities and proposed access roads). All sites were recorded with UTM coordinates, photographed, and detailed descriptions were taken of the archaeological features and surrounding terrain.

All data were collected following standard methodology set out in the permit application and in accordance to the *Guidelines for Applicants and Holders of Nunavut Territory Archaeology and Palaeontology Permits* and the *Nunavut Act – Nunavut Archaeological and Paleontological Sites Regulations*. Intensive surface examination and subsurface testing were conducted in areas assessed to have moderate to high archaeological potential while areas of low archaeological potential were judgementally examined. Where archaeological sites were encountered, extra care was taken to thoroughly examine the area and record relevant details pertaining to the site and the surrounding terrain and features. No archaeological materials or artifacts were collected during the field component of this study as no diagnostic artifacts were encountered. However, all archaeological materials were photographed and their context recorded.

Eleven archaeological sites were recorded along or immediately adjacent to the northern proposed access road alignment, the majority of which were located within close proximity to the Hackett River. Five archaeological sites were recorded along or immediately adjacent to the southern proposed access road alignment. Three archaeological sites were recorded along or immediately adjacent to the proposed airstrip location.

It is anticipated that as the locations and layout of project components are finalized, additional archaeological assessments will be undertaken to identify archaeological resources and include the information in design and planning decisions.

6.3.3 Palaeontological Component of Surface and Bedrock Geology

No fossils have been noted by geologists during exploration drilling in the project area. Based on the age of the rock units (Archean age) and its close affinity with volcanic/pyroclastic rocks as well as subsequent metamorphism, it is not expected to find visible indications of fossils in rocks in the Hackett River area.

No surface fossils have been found by geologists or archaeologists (or any of the other field personnel) on site to date.

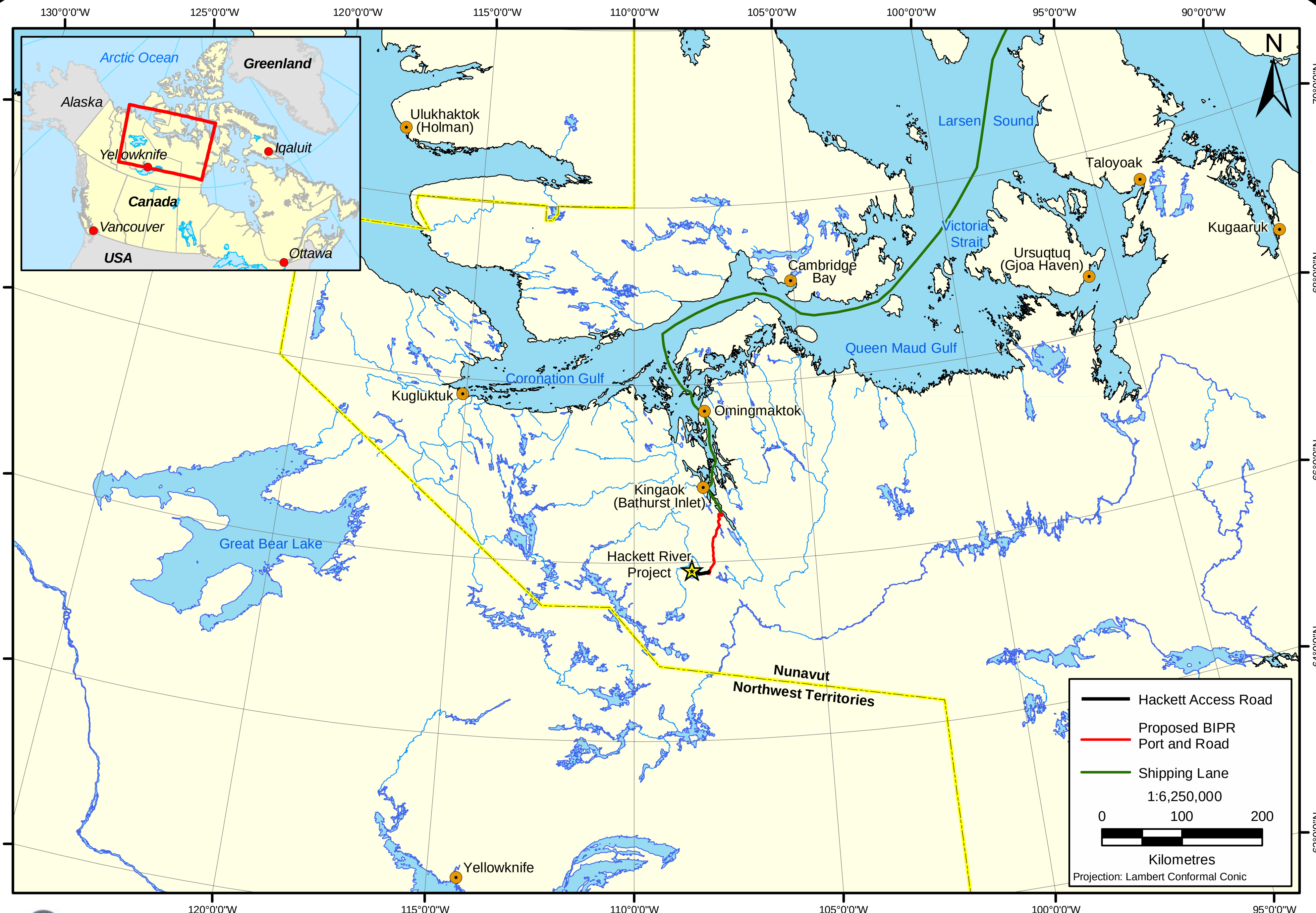


FIGURE 6.3-1

Socio-Economic Study Communities

SABINA SILVER CORPORATION

Rescan

6.3.4 Land and Resource Use

Contemporary land and resource use throughout the Kitikmeot Region reflects the continued importance of the traditional subsistence economy, including hunting, fishing, trapping and gathering. In addition, non-traditional activities – including mining and mineral exploration, and tourism – are of growing economic significance throughout the region.

Land use studies for the Hackett River Project will focus on the activities of the closest communities to the Project and access road; namely, Kingaok (Bathurst Inlet) and Omingmaktok. Cambridge Bay will also be considered, as these residents may be affected by the proposed shipping route. Figure 6.3-2 illustrates the land use study area.

The Hackett River Project may also affect land users in other communities, such as Taloyoak and Qausuittuq (Resolute), where land use activities (particularly wildlife-based traditional land uses) may overlap with the proposed shipping corridor. However, as the Hackett Project proposes to follow the shipping and hauling routes identified in the Bathurst Inlet Port and Road (BIPR) draft EIS, these studies will be deferred to at this time. Investigations of other land users are underway, and will be included in the draft EIS if appropriate.

6.3.4.1 Land Management

The Nunavut Planning Commission (NPC), established through the Nunavut Land Claims Agreement (NCLA), is the responsible land use planning agency for the territory. The NLCA works with territorial and federal governments to develop land use plans which reflect sustainable development and responsible use of natural resources; with a mandate to balance development with the traditional lifestyle of the Inuit, and the long-term preservation of the land and wildlife.

The proposed Hackett River Project is located within the boundaries of the West Kitikmeot Regional Land Use Plan (the Plan), with the exception of the northeast portion of the shipping route. It is bounded in Nunavut by the North Baffin (north, northeast), Akunniq (east), and Keewatin (southeast) land use planning regions; and in the Northwest Territories (NWT) by the Inuvialuit and Sahtu settlement areas (west), the Tlicho settlement area (southwest), and the Akaitcho area (south). The total area of the West Kitikmeot planning region is approximately 350,000 km^2, including approximately 66,400 km^2 of Inuit lands (WKRLUP, 20045).

The Plan envisions a future state where the land continues to support the cultural and economic needs of the people, including the harvest of wildlife, furs and country foods; as well as convenient and continued access to wildlife areas for harvesters. Core values include the preservation of Inuit culture and heritage; use of Traditional Knowledge (TK; also known as Inuit Quajimajatuqangit (IQ) in parts of Nunavut); respect for and protection of the land; sharing of the land and economic benefits; and encouragement for ongoing research and study of the land, people and their interconnections.

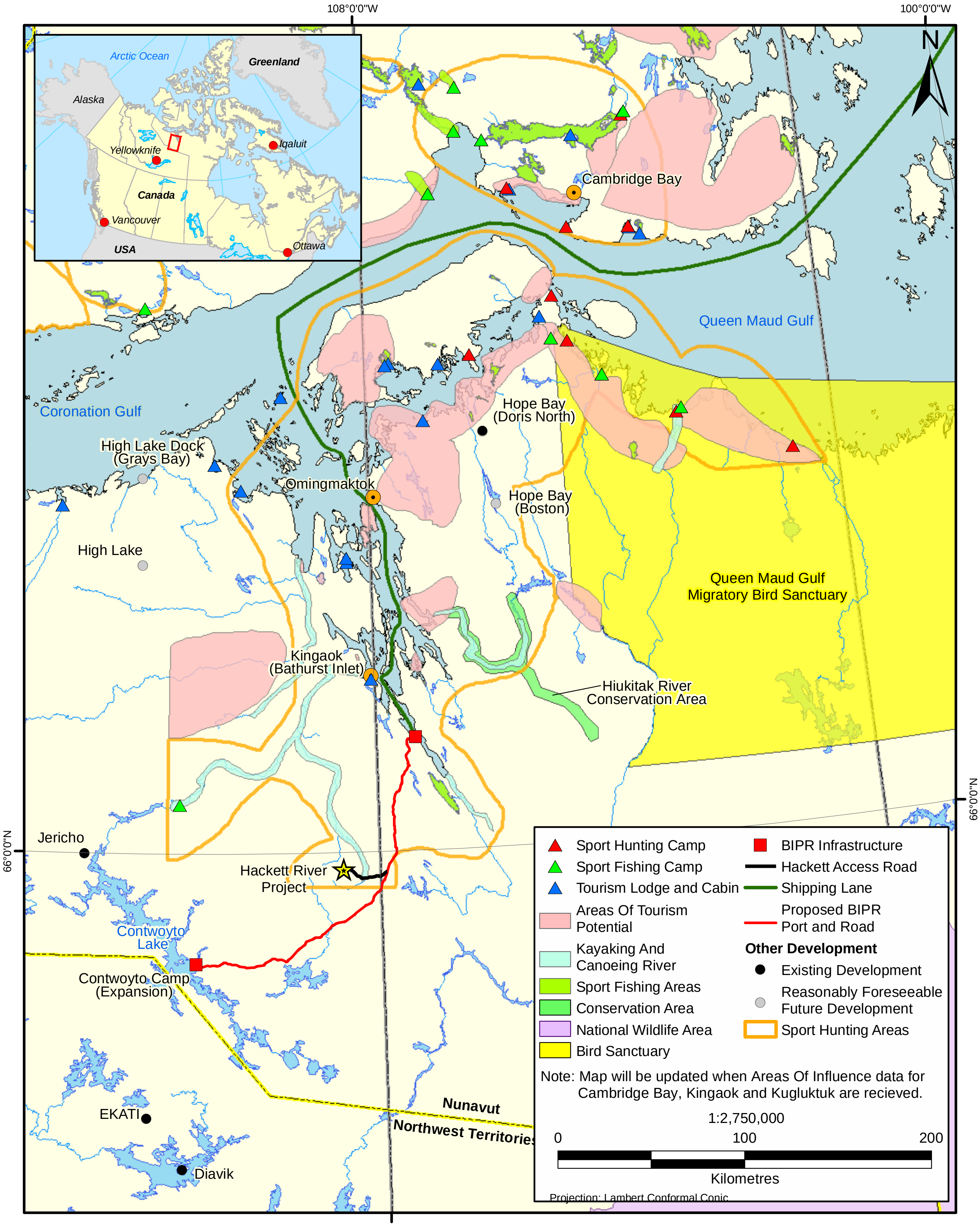


FIGURE 6.3-2

Land and Resource Use Study Area

The Plan recognizes the economic, and associated social, benefits that the use of renewable and non-renewable resources can bring; and also cites the need to minimize negative effects for people and wildlife, and the environment.

6.3.4.2 Subsistence Harvest Activities

The traditional subsistence economy includes hunting, trapping, fishing and gathering. Hunting, fishing and the gathering of plants and berries provide dietary contributions to residents and their families, while trapping activities primarily result in pelts for sale, personal use, and crafts.

The Project, including the shipping route, falls within the traditional Areas of Influence (Areas of Influence encompass broad areas of land and sea which are included in traditional land use patterns by community members) of the communities of Kingaok/Omingmaktok, and Cambridge Bay, as detailed by the West Kitikmeot Regional Land Use Plan.

Subsistence activities are actively practiced by a significant proportion of the Kitikmeot population. The 2001 *Aboriginal People's Survey* (Statistics Canada, 2001) reports that approximately 50-60% of residents (aged 15 years and older) in Kugluktuk, Cambridge Bay and Gjoa Haven reported hunting activity in the previous twelve months; nearly all of these incidences were for food. Fishing was an even more popular pursuit, with participation by 70-76% of residents, also primarily for consumption. The prevalence of gathering activities showed the greatest degree of variation, from 15% in Cambridge Bay, to 63% in Kugluktuk.

The Western Kitikmeot Regional Land Use Plan also recognizes the importance of traditional activities for the lifestyle and diet of many residents. Nearly a third (31%) of residents report eating caribou meat daily or almost daily, while only 16% report eating it rarely or never (The Conference Board of Canada, *ctd. in* NPC, 2004). Other country foods include fish, seal, ptarmagin and musk ox. An estimated 1,000-1,500 kg of hunting products, including meat and fish, are harvested by each hunter every year, with an estimated replacement value of $10,000-15,000 per hunter annually (WKRLUP, 2005).

Wildlife Harvests

Detailed information regarding participation in traditional activities for residents of Kingaok, Omingmaktok and Cambridge Bay is drawn from the Nunavut Wildlife Harvest Survey (NWMB, 2004). Conducted between 1996 and 2001, this survey remains the most comprehensive study of subsistence (commercial harvests were not included in this study) wildlife use throughout Nunavut, and includes the hunting, trapping, gathering and fishing of mammals, birds (and their eggs and feathers), fish and shellfish. Among large game, the importance of caribou is evident, with an annual average of seven to nine animals harvested per hunter. Wolverine harvest is also of noted importance, particularly to residents of Kingaok, Omingmaktok and Kugluktuk (NWMB, 2004).

For the purposes of the Nunavut Wildlife Harvest Survey, "hunter" has been defined as someone who is a beneficiary of the NLCA, who is 16 years of age or older, and who participates in hunting, fishing or trapping of animals at any time during the year. Approximately 17-18 hunters were registered annually in Kingaok; three were classified as intensive land users, four as active, and the remainder reported occasional activity (NWMB, 2004). "Intensive" hunters repeatedly and regular engaged in most of the various hunting activities throughout the year. "Active" hunters engaged in a limited number of major harvesting activities, often with short but intense commitment. "Occasional" hunters are usually short-term and irregular, focused on day-trips and weekend outings. It is noted that many hunters leave Kingaok for the winter to live in other centres, returning each to the community for the summer months. Harvest data indicates that the majority of hunters harvested caribou, with an average annual mean harvest of 93 animals. Arctic ground squirrel, Arctic- and coloured-fox, wolverine, wolf, Arctic hare and seals were also common prey. Ptarmigan were the most commonly-hunted bird species, and seagull eggs were also popular. Fishing activities were practiced by nearly all hunters, including Arctic char, cod, lake trout and whitefish.

In Omingmaktok, the number of hunters decreased from 31 in 1996/97, to only eleven in 2001 (NWMB, 2004). This reflects an overall decline in population in the community. There were no intensive hunters in any year. Approximately 20-30% of hunters were classified as active, although actual numbers varied greatly with the population. Caribou was the most-hunted game, with an annual average of 176 kills. Arctic ground squirrel, wolf, fox, wolverine, and seals were also common. Among birds, the Canada goose, eider duck and ptarmigan were the most popular, as were goose, duck and seagull eggs. Similar to Kingaok, fishing activity focused on Arctic char, cod and lake trout.

Cambridge Bay hunters – whose area of influence covers much of Victoria Island, Queen Maud Gulf, and the mainland – reported between 330-350 hunters each year (NWMB, 2004). Fifteen to seventeen hunters were classified as intensive each year, and around sixty classified as active. Caribou was by far the most popular game (811 harvests), followed by Arctic fox (226 harvests) and seals (97). Waterfowl, including geese and ducks, also exhibited high harvest levels. Fishing harvests again focused on Arctic char, lake trout and whitefish. Hunters in Cambridge Bay may also sell game to locally-based Kitikmeot Foods, thus supplementing household income with commercial activity, while maintaining traditional skills (WKRLUP, 2005).

Hunting and Trapping Organisations

Local Hunting and Trapping Organizations (HTOs) represent the interests of hunters and trappers at the local level, and are recognized by the Nunavut Department of Environment. Kingaok, Omingmaktok and Cambridge Bay each have a local HTO. Government funding to HTOs depend on the number of general hunting licenses within the community, fur returns and HTO workplans (Department of Environment, 2007).

Government support for traditional activities includes a guaranteed prime fur price schedule, which is reviewed annually, subsidies are available for fur vendors. The Community Harvesters Assistance Program also provides financial assistance to hunters and trappers (through the applicable HTO) to help cover fuel, supplies and capital costs (including dog teams, machinery and equipment, fish and seal nets, radios, repairs, *etc.*; Department of Environment, 2007).

HTOs can also apply for government funding to support community-organized hunts. This program has been developed to support those people who would not otherwise be able to access the caribou hunt (or other big game) due to financial restrictions, distance, or other factors (Department of Environment, 2007).

Hunters and trappers in the Kitikmeot Region are also represented by the Kitikmeot Hunters and Trappers Association, a regional body which oversees harvesting activities. In addition, the Nunavut Wildlife Management Bureau (NWMB) is responsible for wildlife management throughout the territory; NWMB liaises with local and regional HTOs and other groups, as well as the Nunavut Planning Commission and the Nunavut Impact Review Board – all of which were established under the Nunavut Land Claims Agreement (NLCA) to manage Inuit lands and resources.

6.3.4.3 Non-Traditional Land Use

Non-traditional use of lands and resources in the Kitikmeot region is focused on the tourism and mining industries.

Tourism

The Bathurst Inlet Lodge, an ecotourism venture located in the community of Kingaok, is one of the main tourism activities based in the regional area of the Project. The lodge is housed at an old Hudson Bay Company post, and markets the natural and cultural environment of the area to tourists. Established in 1969, the lodge is co-owned by the local Inuit, and has been lauded as one of the best eco-lodges in northern Canada and the world (Bathurst Inlet Lodge, 2007).

In partnership with Nahanni River Adventures, the lodge offers river rafting and canoeing on rivers throughout the area, including Burnside River, Mara River, and Hackett River (Bathurst Inlet Lodge, 2007). Hiking, fishing, canoeing and sightseeing flights are also popular; ancient Inuit heritage sites are an attraction, and a variety of birds and wildlife can also be viewed. Bathurst Inlet and Kingaok are also a popular destination for sea-kayakers, however, water sports are limited to the summer months (July/August) to avoid ice formation (Bathurst Inlet Lodge, 2007).

Bathurst Arctic Services runs wilderness trips throughout the Arctic, including remote flights, hunting, fishing and camping. This company also operates remote camps for tourists, including their Burnside River Lodge, near Kathawachaga Lake, which has five separate insulated cabins. Activities at these camps include watersports (canoeing, kayaking, rafting) and sport-fishing.

The West Kitikmeot Regional Land Use Plan specifies tourism as a priority for further economic development in the region. Various ecotourism opportunities are identified, including dog-sledding and bird watching tours. The importance of local waters – including the Burnside, Mara and Hood rivers – for rafting and canoeing activities is also identified (WKRLUP, 2005).

The Plan also stipulates that future development of land not interfere with existing tourism operations (*Conformity Requirement 2.3*; WKRLUP, 2005).

Exploration and Mining

The potential for mineral development in the West Kitikmeot region is recognized to be high (NPC, 2004). Mineral exploration and development activities expend millions of dollars annually, contributing to local and regional economies and employment patterns. Revenues from royalties and land use fees are also gained on both Crown and Inuit-owned lands (WKRLUP, 2005).

Local hiring for exploration and development is valued by the regional plan, which recognizes that local residents often have detailed knowledge of the land, land use patterns, and wildlife behaviours.

Existing development in the region is currently limited to the Jericho diamond mine (Tahera Diamond Corp.), which began operations in August, 2006. The Jericho mine is located at the north end of Contwoyto Lake, approximately 130 km west of the Hackett River Project. South of the Jericho mine, the Lupin gold mine (Kinross Gold Corp.) operated from 1982 to 2005. This property has now been transferred to Zinifex and is not operational at present.

There are a number of potential mining developments in the area (Figure 6.3-1). Details of these projects are summarized in Table 6.3-1.

Table 6.3-1
Potential Mining Developments

Proposed Project	Developer	Product
Hope Bay (Doris North)	Newmont	Gold
Hope Bay (Boston)	Newmont	Gold
High Lake	Zinifex	Copper, Zinc, Gold, Silver
Izok Lake	Zinifex	Zinc, Copper, Lead
Back River (George Lake)	Dundee Precious Metals Inc.	Gold

The Bathurst Inlet Port and Road (BIPR) project is currently in the environmental assessment process in Nunavut. If approved, this development could improve access to the region for mineral development. The project description for BIPR involves supporting the diamond mines by supplying fuel during the winter months. However, the project involves constructing an all-weather road, which may be used by metal mining operations in the future. The preferred option for the Hackett River Project is to use the upper portion of the BIPR road and the proposed BIPR port for hauling concentrate to overseas markets.

Other Land Uses

Commercial char-fishing activities are identified at and around the confluence of the Burnside River with Bathurst Inlet (WKRLUP, 2005).

A number of protected areas are also identified in the West Kitikmeot Regional Land Use Plan (Figure 6.3-1). The largest is the Queen Maud Gulf Migratory Bird Sanctuary (established

1961), which is a legislated conservation area and a wetland of international importance, as it supports nearly the entire global population of Ross' Geese (WKRLUP, 2005).

North of the Hackett River Project, on Hood River, Wilberforce Falls is a designated conservation zone. This region has cultural importance for local Inuit, as well as being a destination for tourists (NPC, 2004).

East of Bathurst Inlet, the Hiukitiak River watershed is also a conservation zone, a designation which arose largely from a request by residents of Omingmaktok, due to its importance as a traditional harvesting area for fish and wildlife (NPC, 2004).

6.3.5 Local and Regional Traffic Patterns

Regional traffic patterns are dominated by air travel. Other traffic includes barge, ATV and travel by snowmobile during winter months. Cruise ships also operate in the area. There are no roads between the Kitikmeot communities.

All Kitikmeot communities, with the exception of Bathurst Inlet and Omingmaktok, are accessible by scheduled air travel provided by First North and Canadian North. Air travel is used for cargo deliveries as well as passenger travel. All communities are serviced by chartered air travel. A weekly charter flight from Yellowknife travels to Bathurst Inlet during the operating season of the Bathurst Inlet Lodge (usually a 6 week period in the early summer).

Sea barges deliver annual provisions to communities during the ice free period. This includes food, household items and fuel. Most communities have a barge dock facility which receives barge service from the Northern Transportation Company or Nunavut Sealift and Supply Inc. each year.

Local traffic patterns are seasonally-dependent. During the ice season (usually late November to early June), travel is dominated by snowmobile and includes travel over ice and travel over land covered by ice. Travel over land in the ice free period is dominated by ATV use. Boats are also used during this period. Kitikmeot residents travel to hunting, fishing and camping areas.

6.3.6 Community Profile Summaries

This section provides summaries of the communities of the Kitikmeot region. Whilst the communities in closest proximity to the project are Bathurst Inlet (Kinguan), Omingmaktok, Kugluktuk and Cambridge Bay, all the Kitikmeot regional communities have been included as these are represented by the regional Inuit Association, the Kitikmeot Inuit Association (KIA). The section begins with an overview summary of the region.

6.3.6.1 Kitikmeot Region

The Kitikmeot region is the most western of the three administrative regions within Nunavut. This Arctic land mass incorporates the southern and eastern parts of Victoria Island and the adjacent part of the mainland up to Boothia Peninsular, along with King William Island and the southern portion of Prince of Wales Island.

The population of the Kitikmeot region is estimated to have grown to 5,361 persons in 2006, up 11.3% from 4,816 persons in 2001, with 1,371 private dwellings registered in 2006 (Statistics Canada 2007). The population growth rate jumped from 3.7% between 1996 and 2001. The most recent census data available on the Inuit population is for 2001, which estimates the population to consist of 4,335 Inuit, representing 90% of the population (Statistics Canada, 2002). The average age of the Inuit population in 2001 was 19.7, which is comparable to the Nunavut median age for aboriginal identity people of 19.1 (Statistics Canada, 2002).

Traditional economic activities are extremely important in Kitikmeot communities. A 1994 Government of Northwest Territories study found that 1,531 residents (56%) of the population over 15 years of age in Cambridge Bay, Kugluktuk, Omingmaktok, Gjoa Haven, Taloyoak and Kugaaruk either hunted or fished while 23% made crafts and 10% were participating in trapping. Data from Statistics Canada published in 2002 consolidates these findings, indicating that in 2001, over 50% of community members within the area of influence (excluding Bathurst Inlet and Omingmaktok) hunted, fished, or gathered wild plants for food consumption. Additional data showed that of residents in the greater Nunavut region, 57% hunted, 63% fished, 46% gathered wild plants and 9% trapped for food consumption (Statistics Canada, 2002).

The economy of the Kitikmeot region is a mixed economy based on both traditional and modern economic activities. The traditional economy is largely focused on subsistence economic activities that do not involve the exchange of money. Inuit people in the region often supplement their traditional livelihoods by participating in the wage and cash economies at different times often depending on factors such as seasonal harvesting activities and the availability of wage employment. There are approximately 170 businesses operating in the region. The number of Inuit residents aged 15 and over with income was 2,400. Their mean total income was $12,672, of which approximately 74.7% was derived from earnings. Additionally, government transfers made up 21.3% of the income received by income earners in the region. Unemployment in the region was estimated at 24% (Statistics Canada, 2002).

Macroeconomic activity pivots around the harvesting economy including Inuit subsistence activities and mineral exploration, while tourism is also becoming more prominent. The Nunavut government has estimated that the traditional economy accounts for approximately $40 million annually while mineral exploration yielded $150 million. There is significant potential for a period of dynamic growth in the Kitikmeot region over the next twenty-five years, as opportunities to develop mineral-based deposits and oil and gas are expected to materialize. This in turn is expected to fuel economic growth within local communities and provide substantial benefits to the Inuit of the Region.

6.3.6.2 Bathurst Inlet (Kingaok)

Bathurst Inlet is a deep inlet located on the northern coast of Canada's mainland which drains the Burnside and Western Rivers. Bathurst Inlet is one of the smallest communities in the Kitikmeot region, and can be most readily accessed by air from Yellowknife and from Cambridge Bay by chartered flights. Travel by snowmobile is also possible during the ice period.

Bathurst Inlet is a seasonal community, especially driven by the opening season of the Bathurst Inlet Lodge. This may account for the population count of zero in the 2006 census, down from five persons in 2001 and 18 persons between 1991 and 1996 (Statistics Canada, 2004; 2007). However, during the Hackett River community meeting, approximately nine households were identified in the community during summer months and an expected three households for the winter of 2008/09.

Due to the size of the community there are no school or health services or non-satellite phone service. An internet service was made available in the summer of 2007 with the assistance of Sabina. Electricity is sourced from personal generators and water from ice and river water. The closest school, RCMP station and medical services are in Cambridge Bay.

The Nunavut Planning Commission (WKRLUP, 2005) notes that the people of Bathurst Inlet follow a traditional and independent way of life, only having recently joined the modern workforce to support their traditional lifestyles. The population remains involved in the harvesting of seals on ice, inland hunting for caribou and fishing in the river mouths according to season, prompting regular migration habits.

The majority of economic activity generated comes from tourism, hunting, fishing, trapping and mineral exploration. The Bathurst Inlet Lodge is a main focus in the community and a joint venture between Bathurst Arctic Services and the community. Its operating season is over five weeks in June and July catering for groups of up to 25 eco-tourists per week.

6.3.6.3 Omingmaktok

Omingmaktok is located on Bay Chimo Harbour and was established around an abandoned Hudson's Bay Company post. The community is primarily a seasonal hunting and fishing camp. The community can be accessed by chartered flights from Yellowknife and Cambridge Bay and by boat barge service during the ice free period. Travel by snowmobile is also common during the ice period.

Similar to Bathurst Inlet, this small community recorded an official population of zero in the 2006 census. This may be due to the mostly seasonal nature of the community although census and anecdotal evidence suggests that population has still significantly decreased in recent years. Between 1991 and 1996, Omingmaktok hosted a stable population of approximately 50 people, which declined significantly in 2001 to 5 persons (Statistics Canada, 2004; 2007). A total of eight persons from Omingmaktok attended the Hackett River community meeting in Bathurst Inlet in the summer of 2007.

There is no employment data for the community. However, the majority of economic activity generated comes from tourism, hunting, fishing, trapping and mineral exploration. The Omingmaktok Hunter and Trapper Organization operate in the community (Zinifex, 2007).

The closest services for the community are in Cambridge Bay, including schools and health services. Phone services are available by satellite phone and electricity from portable generators.

6.3.6.4 Cambridge Bay

Cambridge Bay is situated on the southeast coast of Victoria Island in western Nunavut, 960 km northeast of Yellowknife and 1,600 km west of Iqaluit. Cambridge Bay is the largest community in the Kitikmeot region, acting as a regional transport hub and home to the regional government.

Census data for 2006 recorded the total population in Cambridge Bay at 1,477 persons which is up 12.8% from 1,116 persons in 1991, with 524 private dwellings documented in 2006 (Statistics Canada, 2007). The community has exhibited growth over recent years, excluding the period between 1996 and 2001, during which time population figures marginally decreased (-3.1%) in response to the government's decentralization policy. In 2001, 1,035 residents (79%) out of 1,309 person population were Inuit, with a median age of 21.3 (Statistics Canada, 2002).

Cambridge Bay is a traditional hunting and fishing location with a number of archaeological remnants. Residents undertake harvesting activities which include hunting caribou and fishing Arctic char, which are staple local foods. In 2001, 50% of adult residents hunted for food, 68% fished for food and 13.5% gathered wild food for plants (Statistics Canada, 2002). These figures, which are slightly lower than statistics for the Nunavut region as a whole, hint at the growing relevance of the diversified modern economy within the community.

There are approximately 70 businesses operating in the community, making up 40% of all businesses in the region (Wolfden Resources, 2006). The Inuit population own 56% of these businesses, which offer a range of goods and services, many of which are supported by the mining industry. Tourism is also an important industry, with three hotels operating in Cambridge Bay.

Inuit men are largely employed in trades, transport and equipment operations while Inuit women tend to work in business, finance and administrative occupations, social science, education and government services. Both genders also find work in sales, services and communications (Zinifex, 2007). In 2001, the number of Inuit residents aged 15 and over with income was 600, taking in a mean total income of $15,328 (Statistics Canada, 2002). An estimated 80.3% of this income was sourced from earnings, while government payments accounted for 15.1%. Unemployment in Cambridge Bay was estimated at 20% (Statistics Canada, 2002).

Services available in the community include two stores, a RCMP station, kindergarten, elementary and high schools, Arctic College annex, library, churches, health and wellness centre, recreation centre, arena and pool, visitors centre and government regional offices. Other offices in Cambridge Bay include the KIA, NIT, and NIRB.

6.3.6.5 Kugluktuk

Kugluktuk is located on the Coronation Gulf on the Arctic Coast near the mouth of the Coppermine River. It is approximately 600 kilometres north of Yellowknife and 450 kilometres southwest of Cambridge Bay. It is the second largest community in the region.

Census data shows that the population of Kugluktuk has been consistently increasing for more than a decade from 1,059 persons in 1991 by 23% to 1,302 persons in 2006, with private dwellings recorded at 407 in 2006 (Statistics Canada, 2007). This growth is associated with the increased number of employment opportunities in the community, within both the government and resource sectors (Rescan, 2007). Of the 1,210 population in 2001, 1120 residents (93%) were Inuit, with a median age of 20.9 (Statistics Canada 2002).

Residents undertake a variety of land based activities including trapping, hunting and fishing as well as arts and craft. In 2001, 61% of adult residents hunted for food, 75% fished for food, 60% gathered wild food for plants and 13% trapped (Statistics Canada 2002). These figures are slightly higher than statistics for the Nunavut region as a whole.

There are approximately 37 businesses operating in the community, accounting for 22% of all businesses in the region (Zinifex, 2007). The Inuit population own 68% of these businesses, which offer a range of goods and services, including contracting and equipment businesses, retail, tourism as well as accommodation and food services.

The principle forms of economic activity are centered on hunting, fishing, trapping, gardening, tourism, working within the government and mineral exploration. Inuit men are largely employed in trades, transport and equipment operations while Inuit women tend to work in business, finance and administrative occupations, social science, education, government services and sales (Zinifex, 2007). In 2001, 640 Inuit residents aged 15 and over were creating income. Their mean total income was $12,880, of which approximately 74.1% was derived from earnings. Government transfers represented 20.3% of this income. Unemployment was estimated at 26.2% (Statistics Canada, 2002).

Services in the community include two stores, an RCMP station, kindergarten and high schools, Arctic College annex, churches, health centre, rehabilitation centre, library and recreation centre with ice rink, golf course and Visitor's and Heritage Centre

6.3.6.6 Gjoa Haven

Gjoa Haven is located on south-eastern shore of King William Island, 1056km northeast of Yellowknife. It is the only settlement on King William Island, with air services operating out of Gjoa airport.

Census data shows that the population of Gjoa Haven has grown strongly for over a decade by 39% from 783 persons in 1991 to 1,064 persons in 2006, with 246 private dwellings recorded in 2006 (Statistics Canada, 2007). The population has approximately multiplied by 10 since 1961, when the population was just 110 people. In 2001, 925 persons (96%) out of the 960 residents were Inuit, with a median age of 19 years (Statistics Canada, 2002).

Hunting and fishing have long been regarded as important economic activities in the community. In 2001, 59% of adult residents hunted for food, 68% fished for food, 19% gathered wild food for plants and 9% trapped (Statistics Canada, 2002). These figures more or less correlate with statistics for the Nunavut region as a whole.

There are approximately 26 businesses operating in the community, representing 15% of all businesses in the region (Zinifex, 2007). The Inuit population own 50% of these businesses, which offer a range of goods and services in the area of contracting and equipment, retail, technical and communication services as well as accommodation and food services. The community also hosts a range of tourism and cultural businesses including an 18-hole golf course, an arena and skating rink, a curling rink and the Northwest Passage Interpretive Centre and Historical Park.

Gjoa Haven is mostly a traditional economy largely based on subsistence harvesting, with limited experience in the wage economy. In the modern economy, Inuit men are predominantly employed in trades, transport and equipment operations and sales and service, compared to Inuit women who mostly find work in business, finance and administrative occupations, social science, education, government services and sales (Zinifex, 2007). In 2001, the number of Inuit residents aged 15 and above earning income totalled 500 (Statistics Canada, 2002). Their mean total income was $10,827, which was comprised of earnings (70.9%) and government transfers (28.1%). Unemployment in the community was estimated at 27.7% (Statistics Canada, 2002).

6.3.6.7 Taloyoak

The community of Taloyoak is located on a narrow inlet on the western side of the Boothia Peninsular. Prior to 1992, the community was known as Spence Bay. It is the most northerly mainland community, best accessed by air from Yellowknife or Cambridge Bay or by barge during the month of July.

Census data shows that the population of Taloyoak has been steadily increasing in recent years by 12.4% from 720 persons in 2001 to 809 persons in 2006, with 205 private dwellings registered in 2006 (Statistics Canada, 2007). Of the 720 residents residing in Taloyoak in 2001, 670 people (93%) were Inuit, with a median age of 18.3 years (Statistics Canada, 2002).

The principle forms of economic activity in Taloyoak include hunting, trapping, crafts, carving, fishing and wage employment. In 2001, 77% of adult residents hunted for food, 85% fished for food, 60% gathered wild food for plants and 18% trapped (Statistics Canada, 2002). These figures are higher than statistics for the Nunavut region as a whole, signifying the importance of traditional activities in the community.

There are approximately 20 businesses operating in the community, making up 12% of all businesses in the region (Zinifex, 2007). The Inuit population own 40% of these businesses, which offer a range of goods and services in the area of contracting and equipment, retail, technical and communication services as well as accommodation and food services.

Locals are attempting to encourage the Taloyoak economy as a tourist, arts and craft centre in addition to welcoming mineral resource opportunities. In the wage-basede economy, Inuit men are mostly employed in trades, transport and equipment operations and sales and service, while Inuit women find work in business, finance and administrative occupations, social science, education, government services and sales (Zinifex, 2007). The number of Inuit residents aged 15 years and over with income was 355 in 2001 (Statistics Canada, 2002). Their mean total income of $12,224 is predominantly composed of earnings (70.1%) and government transfers (28.2%). Unemployment in the community was estimated at 28.9% (Statistics Canada, 2002).

6.3.6.8 Kugaaruk

Kugaaruk, known as Pelly Bay prior to 1999, is located on the northeastern Arctic coast within Pelly Bay, south of the Gulf of Boothia. Kugaaruk is one of the smallest, youngest, fastest growing yet most traditional communities in the region.

Census data shows that the population of Kugaaruk has increased rapidly since 1991 when it was just 409 persons, increasing by over 63% to 668 persons in 2006, with 137 private dwellings registered in 2006 (Statistics Canada, 2007). In 2001, 575 residents (95%), out of the 605 residents, were Inuit, with a median age of 15.8 years (Statistics Canada, 2002).

The traditional economy in Kugaaruk is primarily based on the trading of seal pelts and narwhale tusks. This is now mostly a part time activity, which residents are concerned is beginning to lose its cultural foothold as the younger community are demonstrating a preference for entering wage economy. In 2001, 83% of adult residents hunted for food, 90% fished for food, 56% gathered wild food for plants and 13% trapped (Statistics Canada, 2002). These statistics are significantly higher than those for the Nunavut region as a whole, indicating the prevalence of traditional activities.

There are approximately 13 businesses operating in the community, accounting for 8% of all businesses in the region (Zinifex, 2007). The Inuit population own 30% of these businesses, which offer a range of goods and services relevant to contracting and equipment, technical and communication services, tourism and culture, accommodation and food services and transport and shipping. Inuit men are largely employed in trades, transport and equipment operations and sales and service while Inuit women tend to work in business, finance and administrative occupations, social science, education, government services and sales (Zinifex, 2007). The number of Inuit residents aged 15 and over with income totalled 285 in 2001, with mean total income of $13,456. This income was mostly made up of earnings (70.7%) and government transfers (20.9%). Unemployment in the region was estimated at 12.8% (Statistics Canada, 2002).

6.3.7 Human Health

Human health is defined by the determinants of health which includes income and social status, education, employment and working conditions, physical environments, biology and genetic endowments, social support networks, personal health practices and coping skills, healthy child development, and health services (Health Canada, 2004). Health for Nunavummiut therefore includes the social, physical, psychological and spiritual aspects of health and well-being.

The Aboriginal Peoples Survey Community Profiles (2002) provides some health data for the study communities (with the exception of Bathurst Inlet and Omingmaktok). The main indicators available are health condition, numbers sought health advice in the last 12 months and numbers suffering from one of more long term health condition. In all communities the majority stated that their health was in good or excellent condition. On average, 10% reported that their health was in fair or poor condition.

Overall, around a third of study community members had seen or talked on the phone about physical, emotional or mental health in the past 12 months to a family doctor or practitioner. Meanwhile, around a fifth reported suffering from one or more long term health conditions. The lowest reported figures were in Kugaruuk and Taloyoak and the highest in Cambridge Bay and Kugluktuk.

All of the communities have health services available in the form of community nurses with the exception of Bathurst Inlet and Omingmaktok. There are no hospitals in any of the communities. Medical personnel make visits to these communities or community members travel to Cambridge Bay and Yellowknife for services.

Other studies in the region have highlighted a number of current health concerns and issues, some of which have been linked to economic growth and resource sector development . These include drug and alcohol use, accidents and premature deaths, suicide, violence, STDs, pregnancies and maternal health and mental health.

Human health in the study communities is also closely related to country foods. Studies are underway analysing local country foods and monitoring for contaminants.

6.3.8 Other Potential Socio-Economic VSECs

No other potential socio-economic components (VSECs) were identified in community meetings or literature reviews.

6.4 Summary of Potential VECs

This chapter described most of the components of the environment that data and information are available and/or can be obtained. However, all of these components will likely not be chosen as the final Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) to be included in a draft EIS. The final list of VECs and VSECs will be determined through the scoping process as carried out through NIRB, and through continued public consultation carried out by Sabina.

Table 6.4-1 presents a summary of VECs and VSECs that were used for the High Lake Project (similar to Hackett in that it involves the development of 3 mineral deposits) and for BIPR (relevant to Hackett due to geographic similarities). This list of VECs likely reflects the potential VECs that could be used for the Hackett River Project draft EIS. Public meetings held thus far for the Hackett River Project have not identified any VECs or VSECs not already included in Table 6.4-1.

Table 6.4-1
VECs and VSECs used for the High Lake and BIPR Projects

High Lake	BIPR
Physical Environment	
• Air Quality • Atmospheric Environment • Marine Environment • Surface Water Quality • Surface Water Quantity • Groundwater Quality • Groundwater Quantity • Sediment Quality • Marine Water Quality • Marine Sediment Quality • Uncommon or valuable landforms: eskers, and other glaciofluvial landforms, fluvial floodplains, steep bedrock cliffs • Soils and Landforms • Permafrost-sensitive landforms	• Climate (greenhouse gas emissions) • SO_2 atmospheric concentration • NO_2 atmospheric concentration • CO atmospheric concentration • TSP atmospheric concentration • $PM_{2.5}$ atmospheric concentration • Dustfall • Hourly and daily noise levels (L_{eq}) • Surface Water Quantity • Fluvial erosion and sediment transport • Freshwater Water Quality • Freshwater Sediment Quality • Navigable waters • Eskers • Soil Quality • Permafrost • Marine Water Quality • Marine Sediment Quality
Biological Environment	
• Fish Habitat including spawning and nursery habitat • Lake Trout • Arctic Char • Vegetation associations with limited distribution and with contributions to biodiversity in the area (Lichen heath, Riparian tall shrub and snowbank associations) • May be at risk species identified in the Draft General status rankings for Vascular Plants of Nunavut • Vegetation Health • Dolphin and Union Caribou • Grizzly Bear • Wolverine • Raptors (Peregrine) • Seabirds (eider duck) • Upland breeding birds • Seabirds (eider duck) • Ringed Seal • Beluga	• Freshwater Aquatic Resources • Arctic Grayling (*Thymallus Arcticus*) • Lake Trout (*Salvelinus namaycush*) • Arctic Char (*Salvelinus alpinus alpinus*) • Whitefish (general) • Fish Habitat • Plant Communities (with emphasis on those with particular ecological functions) • Plant Species/Groups with Particular Ecological Functions and of Value to the Inuit • Grizzly Bear (*Ursus arctos horribilis*) • Caribou (*Rangifer tarandus*) • Bathurst Herd; Ahiak Herd; Dolphin and Union Herd; • Peary Herd • Muskoxen (*Ovibos moshatus*) • Wolverine (*Gulo gulo*) • Wolf (*Canis lupus*) • Migratory Birds (excluding raptors and waterfowl) • Cliff-Nesting Raptors (tundra peregrine falcon selected as proxy) • Ground-Nesting Raptors (short-eared owl selected as proxy) • Waterfowl • Marine Aquatic Resources • Bering Wolffish (*Anarhichas orientalis*) • Fourhorn Sculpin (*Myoxocephalus quadricornis* – marine form)

(continued)

Table 6.4-1
VECs and VSECs used for the High Lake and BIPR Projects (completed)

High Lake	BIPR
Biological Environment (continued)	
	• Polar Bear (*Ursus maritimus*) • King Eider (*Somateria spectabilis*) • Thick-billed Murre (*Uria lomvia* • Bowhead Whale (*Balaena mysticetus*) • Beluga (*Delphinapterus leucas*) • Narwhal (*Monodon onoceros*) • Walrus (*Odobenus rosmarus*) • Ringed Seal (*Pusa hispida*)
Socio-Economic Environment	
• Numbers and types of sites • Disturbance of rock features • Disturbance or collection of artifacts • Employment • Education and Training • Business Opportunity • Renewable Resources • Community Economic Development • Infrastructure • Royalties and Taxes • Social Issues • Community Services • Institutional Capacity • Cultural Sustainability	• Heritage sites • Community Health and Well-being • Environmental Conservation • Education and Training Opportunities • Wage Employment Opportunities and Economic Development • Traditional Economic Activity and Pursuits • Cultural Sustainability

7. IDENTIFICATION OF POTENTIAL ENVIRONMENTAL EFFECTS AND PROPOSED MITIGATION

7. Identification of Potential Environmental Effects and Proposed Mitigation

7.1 Summary of Project Description

Table 7.1-1 presents a synopsis of the components for the proposed Hackett River Project.

Table 7.1-1
Summary of Hackett River Project Description

	Open Pit Mining	Underground Mining
Location	Main Zone (East and West) and East Cleaver Zone.	Boot Lake Zone and Main Zone and East Cleaver Zone below the pit.
Mining Method	Conventional truck and shovel.	Sub-level open stoping with backfill and/or sub-level caving.
Mine Life	13.6 years	
Production Rate (Ore)	10,000 t/d	
Production Rate (Waste)	33,400 t/d LOM average	
Millfeed Source	60%	40%
Mill Processing Rate	10,000 t/d	
Mill Processing Method	Standard grinding and flotation circuits	
Products	Copper, Lead, Zinc concentrates	
Transportation and Logistics	A 105 km all-season road construction to Bathurst Inlet Port (23 km mine site to BIPR route connection and 82 km to Bathurst Inlet Port along BIPR road). Concentrate haul will be operated by Sabina. Backhaul supplies and fuel to the mine site.	
Infrastructure and Site	Port Facilities at Bathurst Inlet – Loading/unloading facilities, fuel storage, consumables storage and concentrate storage facilities. Mine Site – Airstrip, power generation, mill and maintenance shop, camp, tailings management facility, waste rock piles, limited fuel, concentrate and consumables storage.	
Markets and Smelter	Mainly European and North American Smelters. Potential East Asian Market for Copper and Lead Concentrate.	

7.2 Identification of Potential Environmental Effects

The possible interaction between the proposed Project and the biophysical and socio-economic environment is summarized in the Matrix presented in Table 7.2-1.

This matrix is intended to fulfil NIRB's requirement to fill out Table 1, Identification of Environmental Impacts, from their Screening Part 2 Form (Project Specific Information Requirements).

NIRB requests that not only should the possible interactions between the Project and the environment be indicated in the matrix, but that the nature of the interaction also be indicated. NIRB asks that the following designations be used:

- P: Positive Impact

- N: Negative and Non-Mitigatable Impact
- M: Negative and Mitigatable Impact
- U: Unknown

The methodology employed in the table does not reflect the magnitude, duration, and frequency of an impact. As such, minimal to negligible negative impacts to environmental components for which no mitigation is proposed or justified receive an 'N' rating. For example, air emissions from combustion engines are unavoidable, as is the noise generated from operating equipment. These impacts are small but receive an 'N' rating.

7.3 Details of Potential Environmental Effects and Proposed Mitigation

The following sections present the Project activities that could potentially affect the relevant environmental component. The Project effects are presented by bullets, followed by a text description if necessary. Each section also contains proposed mitigation measures that can be taken to minimize or eliminate potential environmental effects.

7.3.1 Physical Environment

7.3.1.1 Air Quality

Potential Effects

Potential project-related impacts to air quality include:

- Air borne particulates
- Sulphur dioxide
- Nitrogen oxide
- Fugitive dust
- Green house gasses (GHG)

Combustion of fuel in generators, mining equipment, haul truck and aircraft will generate air emissions, primarily airborne particulates, sulphur dioxide and nitrogen oxides.

Fugitive dust emissions will arise to some degree from vehicle traffic on roads during the brief summer months. Dust from the road bed, consisting of local sand and gravel, may be blown into the air and deposited on nearby soils and vegetation. Fugitive dust from storing, handling or transporting the concentrate could introduce metals in the form of particulates into the air.

The Project, through combustion of approximately 46,100 metric tons of fuel per year, will generate roughly 153,000 metric tons of CO_2 equivalents per year (Environment Canada, 2005).

THE NUNAVUT IMPACT REVIEW BOARD
SCREENING PART 2 FORMS - TABLE 1

TABLE 7.2-1 - IDENTIFICATION OF ENVIRONMENTAL IMPACTS

Hackett River Project

Phase	PROJECT ACTIVITIES	ENVIRONMENTAL COMPONENTS	PHYSICAL	designated environmental areas (ie. Parks, Wildlife Protected areas)	ground stability	permafrost	hydrology/ limnology	water quality	climate conditions	eskers and other unique or fragile landscapes	surface and bedrock geology	sediment and soil quality	tidal processes and bathymetry	air quality **(includes dust)	noise levels	other VEC: Groundwater	other VEC:	other VEC:	BIOLOGICAL	vegetation	wildlife, including habitat and migration patterns	birds, including habitat and migration patterns	aquatic species, incl. habitat and migration/spawning	wildlife protected areas	other VEC: Marine Mammals	other VEC:	other VEC:	SOCIO-ECONOMIC	archaeological and cultural historic sites (Lisa)	employment	community wellness	community infrastructure	human health (Kelli)	other VEC: Business and Economic Development	other VSEC: Traditional and Current Land use (Ann
CONSTRUCTION	Hiring & Managing Labour and Construction Workforce																													P	P	M	M	P	
CONSTRUCTION	Construction Camp				M	M	M	M				M		M	N					M	M	M	M												
CONSTRUCTION	Camp and Mill Facility Construction (incl. storage for fuel, concentrate, explosives, reagents, goods)				M	M	M	M			M	M		M	N					N	M	M	M							P					
CONSTRUCTION	Local Site Roads, Airstrip, 23 km Spur Road, access to Water Source Lake (incl. culverts and/or bridges), Equipment Laydown Areas				M	M	M	M		M	M	M		M	N					N	M	M	M						M	P					
CONSTRUCTION	Quarry & Gravel Pit Development				M	M	M	M		N	M	M		M	N					N	M	M	M						M	P					
CONSTRUCTION	Water Use (withdrawal of water from Water Source Lake)						M	M														M	M												
CONSTRUCTION	Dam Construction (Tailings Impoundment, other)				M	M	M	M			M	M		M	N					N	M	M	M							P					
CONSTRUCTION	Lake Dewatering				M		M	M				M	N									M	M												M
CONSTRUCTION	Pit Pre-Stripping , Waste Rock Dump and Overburden Storage Pile Construction, Headframe and Underground Development				M	M	M	M			M	M	N	M	N					N	M	M	M							P					
CONSTRUCTION	Machinery and Vehicle Refuelling/Fuel Storage and Handling							M				M																							
CONSTRUCTION	Machinery and Vehicle Emmissions								N					N																			M		
CONSTRUCTION	Diesel Power Generation								N					N																					
CONSTRUCTION	Wind Power Generation								P					P																					
CONSTRUCTION	Air Transport of Personnel and Goods								N					N	N						M										U	P		P	
CONSTRUCTION	Sewage Treatment Plant and Outfall						M	M				M											M												
CONSTRUCTION	Landfill Construction/Solid Waste Management				M	M	M	M				M		M	N					N	M	M								P					
CONSTRUCTION	Incinerator							M	N					M																					
CONSTRUCTION	Chemical and Hazardous Material Storage and Management											M																							
CONSTRUCTION	Explosives Storage and Handling at Mine Site							M				M											M												
CONSTRUCTION	Port Site: Ore and Goods Storage Areas				M	M		M			M	M		M	N					N	M	M			M					P					
CONSTRUCTION	Port Site: Dock Loading Facilities							M							N								M		M					P					
CONSTRUCTION	Marine Transport of Goods			M				M	N			M		N	N						M	M	M	M	M					P					
CONSTRUCTION	Environmental Monitoring																													P					
CONSTRUCTION	Taxes, Contracts, Purchases																															P		P	
OPERATION	Hiring and Managing Operations Work Force																													P	P	M	M	P	
OPERATION	Camp and Mill Facility				M		M	M				M		M						M	M	M	M							P					
OPERATION	Open Pits: Drilling, Blasting, Excavation				M		M	M			N		N	M	N						M	M								P					
OPERATION	Underground: Drilling, Blasting, Excavation				M		M	M			N			M	N	M					M	M								P					
OPERATION	Waste Rock Piles & Low Grade Ore Stockpiles				M	M	M	M				M		M						M	M	M	M												
OPERATION	Mine Site Concentrate Storage Area				M		M	M				M		M						M	M		M												
OPERATION	Tailings Impoundment				M		M	M				M									M	M	M												
OPERATION	In-Pit and Surface Water Management						M	M				M								M		M	M												
OPERATION	Road and Airstrip Use & Maintenance				M		M	M				M		M	N					M	M	M	M							P					
OPERATION	Water Use						M	M				M										M	M												
OPERATION	Diesel Power Generation								N					N																					
OPERATION	Wind Power Generation								P					P																					
OPERATION	Incinerator							M	N					M																					
OPERATION	Sewage Treatment Plant and Outfall						M	M				M											M												
OPERATION	Equipment Maintenance/Fuel Storage and Handling							M				M																		P					
OPERATION	Chemical and Hazardous Material Storage and Management											M																							
OPERATION	Explosives Storage and Handling							M				M											M												
OPERATION	Air Transport of Personnel and Goods								N					N	N						M	M								U	M	P		P	
OPERATION	Machine and Vehicle Emissions								N					N																					
OPERATION	Port Site: Ore Storage											M		M						M															
OPERATION	Port Site: Ore Transfer to Ship							M				M		M						M			M		M					P					
OPERATION	Port Site: Fuel Storage and Handling							M				M											M		M										
OPERATION	Marine Transport of Goods and Ore			M				M	N			M		N	N						M	M	M	M	M					P				P	
OPERATION	Port Site: Storage of Goods																																		
OPERATION	On-going Environmental Monitoring																													P					
OPERATION	Taxes, Contracts, Purchases																															P		P	
DECOMMISSIONING	Hiring and Managing Decommissioning and Closure Work Force																													N	M	M		N	
DECOMMISSIONING	Open Pits				M		M	M			N		U	M	N	M					P		U							P					
DECOMMISSIONING	Underground Mine				M	M	M	M			N			M	N	M					P									P					
DECOMMISSIONING	Tailings Impoundment				M		M	M				M		M	N						M	M	M							P					
DECOMMISSIONING	Waste Rock Piles				M	M	M	M				M		M	N						P		M							P					
DECOMMISSIONING	Road Reclamation (local, 23 km spur road, water source access road)						M	M				M		M	N					P	P		M							P					
DECOMMISSIONING	Machine and Vehicle Emissions								N					N																					
DECOMMISSIONING	Airstrip Reclamation						M	M				M		M	N					N	P		M							P					
DECOMMISSIONING	Camp and Mill Facilities						M	M				M		M	N								M							P					
DECOMMISSIONING	Removal or Treatment of Contaminated Soils							P				P			N					P										P					
DECOMMISSIONING	Waste Incineration							M	N					M																					
DECOMMISSIONING	Landfill Closure						M	M						M	N					P										P					
DECOMMISSIONING	Quarry Decommissioning				M			M						M	N					P										P					
DECOMMISSIONING	Port Site: Ore and Goods Storage Area							M						M	N					P					M					P					
DECOMMISSIONING	Post-Closure Monitoring																													P				P	
DECOMMISSIONING	Taxes, Contracts, Purchases																															P		P	

Notes:
Please indicate in the matrix cells whether the interaction causes an impact and whether the impact is:
P: Positive
N: Negative and non-mitigatable
M: Negative and mitigatable
U: Unknown
If no impact is expected then please leave the cell blank

Proposed Mitigation

Mitigation for air emissions from fuel combustion will be addressed by necessity due to the high cost of fuel in the region. Vehicles used for the project will be high in fuel efficiency and movement of vehicles and aircraft will be managed to reduce fuel consumption.

Ore geochemistry results are pending and will provide some indication as to the likely chemical nature of airborne particulates released from the crusher. Ore dust and concentrate dust emissions, to the extent that they occur, will be mitigated inherently due to the value of the product. Dust suppression in stock pile areas may be conducted during the brief dry season. Trucks transporting concentrate to the port will be covered to minimize loss of concentrate and minimize airborne fugitive dust, and will be washed after delivery.

Dust suppression methods will be used for roads and the airstrip to help minimize dust generation from road and airstrip usage.

7.3.1.2 Noise

Potential Effects

Potential project-related impacts to noise include:

- Vehicles, aircraft, and equipment
- Blasting during mining
- Crusher

Noise emissions will primarily be localized to the Hackett River Project area and Bathurst Inlet with some additional noise along the trucking lanes. Noise at the Project will consist of periodic blasting, equipment operation and aircraft landing and takeoff. At Bathurst Inlet, the ship loading (operation of conveyors) will be the largest noise emitter.

Noise during construction along the road will be more intense but short in duration compared to the passage of regular truck traffic.

Proposed Mitigation

All mining and road construction equipment that will be used during the mining program will be modern or new, and equipped with appropriate mufflers. The focus of any mitigation at the Project will be on ensuring a safe work environment with appropriate personal protective equipment to minimize impacts. Options for further mitigation are limited, and impacts are relatively modest and short-term. Therefore, no other mitigation is proposed for land-based equipment.

Potential noise impacts to both people and wildlife from aircraft will be mitigated by restricting air traffic to a prescribed minimum height.

7.3.1.3 Ground Stability and Permafrost

Potential Effects

Potential project-related impacts to ground stability and permafrost include:

- Alteration of active layer and permafrost thickness
- Slope stability in quarries and borrow areas

The Project involves ground disturbances at watercourse crossings, cut and fill locations on the access road to the proposed BIPR road and borrow areas where excavation of sand and gravel will occur. Any ground disturbance may result in a change in the thermal regime of the ground active layer.

Modification to the thermal regime may induce a shift in the active layer and melting of ground ice, resulting in thaw settlement. Depressions caused by these settlements could form, leading to erosion and ponding of water.

Where thicker layers of engineered fill are placed on the road, the permafrost will rise over time, possibly creating a damming effect in the seepage through the active layer that results in ponding behind the road berm. This would not be expected to occur at well drained locations, but may occur at low-lying sections that form natural drainage courses.

Permafrost-related phenomena, such as mass wasting and erosion, are occurring under natural conditions; however, Project activity may accelerate these processes.

Proposed Mitigation

Effects to permafrost will be mitigated by reducing the extent of cut and fill areas. At low lying areas where roadbed fill is greater than 1 m, the permafrost can be expected to rise to a meaningful degree. Swales or culverts can be installed as part of road construction and maintenance to prevent the ponding of water that may arise from the damming effect of the raised permafrost level in the road bed. To address this issue upon closure, swales can be left in place, or alternatively, the road bed can be breached to allow drainage.

Increased soil erosion will be mitigated by controlling soil disturbance. In areas where soil disturbance is unavoidable, mitigation will focus on stabilizing cut and fill areas with gentle slopes less prone to erosion. Implementation of sediment and erosion control measures including compaction, silt fences and erosion control blankets will help mitigate effects to ground stability. Cut and fill areas are expected to be relatively small in extent. If they are located near watercourse crossings, there is increased need for sediment and erosion control measures to prevent siltation of the watercourses.

The area impacted from borrowing of materials will be more extensive by comparison. Efforts will be made to concentrate borrow activities to limit the area of disturbance. This will be accomplished by removing the thawed active layer of an area, and returning some time later to remove subsequently thawed layers.

Regular inspection of borrow locations will identify problem areas, followed by grading of unstable slopes, eliminating depressions and re-establishing natural drainage patterns to mitigate the impacts of any thaw settlement which has occurred. The ground surface will re-establish thermal equilibrium and will be suitable for re-colonization over time of natural vegetation. Since the resultant effects will take place over many seasons, ongoing monitoring will be necessary in the years following the mining activity, and mitigation will be implemented as required.

7.3.1.4 Groundwater

Potential Effects

Potential project-related impacts to groundwater quality include:

- Interaction between deep groundwater and mine water for the Boot Lake Underground;
- Interaction between shallow groundwater (via talik zone) and the Main Zone Open Pit (possible talik under Camp Lake);
- Interaction between shallow groundwater and possible Tailings Impoundment Area (if using a lake basin); and
- Active-layer water (very shallow groundwater) could be affected by poor-quality surface water.

The Boot Lake underground will be partially developed below the bottom depth of the permafrost, and hence be developed within the zone of deep groundwater. Deep groundwater will be under pressure, and will enter the underground workings, and this water will need to be pumped out of the underground mine to the Tailings Management Facility (TMF). Because the deep groundwater will be pressurized and flow into the underground mine, there will not be any changes in water chemistry to the deep groundwater. The groundwater itself is expected to be of poorer quality than surface waters.

The Main Zone is proposed to be mined by open-pit methods, and there is a possibility that a deep talik exists below Camp Lake. The shallow groundwater present in the talik under the lake may therefore be in contact with the deep groundwater. Camp Lake will need to be dewatered initially, and during mining, water seeping into the pit will be pumped out and transported to the TMF. However, water accumulating in the bottom of the pit could have high concentrations of nitrogen compounds (from the use of ANFO) and metals (from seepage from the pit walls). This water could influence the talik groundwater during operations. The interaction between water accumulating in the open pit and talik water during closure will depend on the closure scenario.

The tailings management area will include maintaining a water cover over the material, and will likely encompass a lake. As such, poor quality water contained in the tailings impoundment area could affect shallow groundwater in a talik under the lake. Not all lakes will have a deep talik present, and if a deep talik is not present, there cannot be any interaction with the deep groundwater.

Active-layer water refers to the water that exists in the soil that thaws during the summer months in a thin layer above the continuous permafrost. The water directly interacts with surface water for a short period of time in the summer. This water could be affected by all of the activities described in the surface water section below.

Proposed Mitigation

The proposed underground mine near Boot Lake will likely have a negligible effect on deep groundwater quality and quantity. Mitigation measures will include by necessity pumping potentially poor-quality sump water from the underground mine. This will reduce the interaction between mine sump water and seepage water with deep groundwater; however, deep groundwater will likely continue to flow into the underground mine (as compared to mine sump water flowing into the groundwater) for the relatively short duration of the operation phase of the deeper Boot Lake underground. It should be noted that there will only be interaction between the Boot Lake underground and groundwater when the mine reaches depths greater than approximately 500 m.

Mitigation measures to minimize interaction with potentially poor-quality open-pit sump water with shallow talik groundwater under the Main Zone will also include by necessity pumping and removing sump water in the pit.

No mitigation measures are proposed to help avoid interaction between poor-quality water in the tailings impoundment and shallow talik groundwater, should the impoundment area involve a lake.

Mitigation measures to ensure that active-layer groundwater remains similar to baseline conditions will be the mitigation and management of surface waters (see section below). If specific areas are identified that require special attention, active-layer leakage can be blocked as water is not able to flow through the underlying permafrost.

7.3.1.5 Hydrology and Limnology

Potential Effects

Potential project-related impacts to water quantity (hydrology) and limnology include:

- Water use; for camp and processing requirements
- Discharge of water to tailings management facility (TMF)
- Dewatering lake (Camp Lake) for open pit construction of Main Zone
- Diversion of water and alteration of natural flow patterns

Water use required for process plant and camp operations will be supplied by one or more larger lakes to the east of the Project near the spur road alignment.

The TMF will be designed to operate as a zero discharge facility for the life of the mine. All water and runoff from the open pit and underground mine including the waste rock piles will report to the TMF. Waste water effluent from the camp facility will also report directly to the TMF.

Dewatering of Camp Lake will be required for the development of the Main Zone. Camp Lake has a surface area of approximately 298,200 m^2 and an approximate volume of 2 million m^3. The lake has steeper sides on the west side compared with the east, and averages 6.7 m in depth with a maximum of 16 m. Dewatering of this lake is unavoidable if Main Zone is to be developed.

Diversion of water will be required to manage surface water quality. Water diverted from Project infrastructure such as buildings may produce slight changes in precipitation runoff response. Roofs and other more impermeable surfaces have higher runoff coefficients which could produce increased runoff responses. However, the affected area will be negligible compared to the size of the Camp and Boot Basins which are on the order of 22 to 50 km^2.

Proposed Mitigation

The lake or lakes selected for water supply will be large in order to minimize the effects of water withdrawal on littoral zone fish habitat, lake inflows and outflows, and to minimize the effects of removing oxygenated waters during the winter months.

Water from the TMF will be recycled for milling and operation purposes. This will eliminate discharge to of the TMF and mitigate water quality issues in the receiving environment, but it will also reduce watershed sizes of basins where infrastructure is located. This will not have significant effects on the hydrology of the area, but may reduce the magnitude of discharges naturally present.

Proposed mitigation for management of the TMF and for water quantity management in general include identifying any water courses that are critical for stream fish habitat, and determining whether water quantity levels need to be maintained. Water quantity will be mitigated alongside of fish habitat in this regard.

For the dewatering of Camp Lake, epilimnotic water low in total suspended solids (TSS) will be discharged to the downstream stream network with consideration of maintaining natural streamflow patterns. Water that is high in TSS will report to the tailings management facility and will not be discharged into the receiving environment.

7.3.1.6 Freshwater Water Quality

Potential Effects

Potential project-related impacts to water quality include:

- Dust-generating activities (*e.g.*, construction, road and airstrip use) (TSS)

- ANFO use and storage (release of nitrogen compounds to surface waters)
- Runoff from waste rock piles, stockpiles, roads (ANFO residues, high metals, TSS)
- Lake dewatering (high TSS water once partially dewatered)
- Runoff or fugitive dust from concentrate storage and handling (high metals)
- Fuel transport and handling (hydrocarbons)
- In-stream construction of dams, culverts, bridges (TSS, other)
- Discharge or leaking from Tailings Management Facility (poor quality water)
- Disposal of treated sewage effluent and/or sludge (nutrients)
- Disposal of open pit and underground sump water (ANFO residues, metals, salts)

Dust-generating activities include the construction of roads, the airstrip, dams, buildings, and the ongoing use of roads and the airstrip. These activities can introduce particulate material (such as TSS, aluminium, other metals associated with rock material being used) into surrounding surface waters. The use of ANFO (ammonium nitrate fuel oil) as an explosive to break apart rock also can leave nitrogen residues on rock, which is easily dissolved in water and introduced to surrounding surface waters. High concentrations of nitrate, nitrite, and ammonia can all be toxic to aquatic life, but can be limiting to aquatic life at extremely low concentrations.

The storage and use of ANFO can result in the introduction of high concentrations of nitrogen compounds to surface waters.

Runoff from waste rock pile, ore stockpiles, and roads could be of poor quality. Water could be acidic, neutral, or alkaline, and contain high metals and high levels of nitrogen compounds.

Camp Lake will have to be dewatered in order to mine the Main Zone. The initial portion of lake water to be dewatered will reflect the natural quality of Camp Lake water. However, once the water level drops to a certain level, suspension and erosion of exposed and near-surface lake sediments will cause the TSS levels to increase to unacceptable levels for discharge into natural waters. This water will then have to be treated or stored in some manner.

Concentrate is the end product of the mine, and will contain high metal concentrations. Fugitive dust from storing or handling the concentrate could introduce metals into surrounding surface waters.

Fuel handling and use on site could potentially cause the introduction of hydrocarbons to surface waters.

The in-stream construction of dams, bridges, and culverts could potentially disturb lake and stream sediments, and cause high TSS (and possibly high total phosphorus and metals) to be introduced to surface waters.

The water management plan will involve having all poor-quality water reporting to the TMF. This will include domestic wastewater, treated sewage effluent, runoff from around the mine site, and the tailings themselves. The impoundment facility will contain poor quality water that will be high in metals.

Proposed Mitigation

Dust: Dust generation from the use of roads and the airstrip will be mitigated by either road watering or by using some other non-toxic, non-wildlife attractant substance to suppress dust. Drainage and sediment control structures will be used according to best management practices during construction.

ANFO Use: ANFO will be stored in an enclosed building, and spillage around the storage and loading area will be minimized by having a solids management plan. Runoff from around the storage and loading area will be directed away from surface waters by bunded storage surfaces. Nitrogen residues in pit sump water will be minimized to the extent possible. Best management practices will be used for the handling and use of explosives to minimize excessive residue and nitrogen loading.

Runoff from Waste Rock Piles, Stockpiles, Roads: Poor-quality runoff from waste rock piles and any ore stockpiles will be collected and diverted to the Tailings Management Facility. The use of non-reactive rock will be used for the construction of roads to the extent possible. Road alignments will be sited along basin boundaries where possible, and avoid lakes and streams where possible.

Lake Dewatering: Once the water quality of Camp Lake is no longer acceptable to be discharged into the receiving environment, water will not be discharged, but will be transported to the TMF or some other contained facility.

Concentrate Fugitive Dust: As concentrate is the final product of the mine, great care will be taken to contain concentrate during storage, handling, and transport. Storage areas will always be covered and bunded, and transport will be by covered truck.

Fuel Transport and Handling: Fuel storage and handling areas will be lined to contain any hydrocarbon leakage.

In-Stream Construction: Coffer dams will be used to facilitate the construction of dams. Draining and sediment control structures will be used according to best management practices. Environmental monitoring will be provided during construction to ensure compliance with any fisheries authorizations, and to ensure the functioning of drainage and sediment control structures. The timing of in-stream construction will also comply with DFO regulations.

Discharge of Tailings Management Facility (TMF): Poor-quality water from the mine will be transported to the TMF, including site runoff, camp wastewater, sewage effluent, and the tailings themselves. Having all of the liquid waste in one facility allows for better control and management of the poor-quality water. The TMF will be designed as a zero discharge facility during the operation of the mine. Water will be reclaimed from the facility and used in the mill. Dams will be constructed with impermeable liners. The facility will be operated with sufficient water cover to minimize oxidation and re-entrainment of tailings solids. Future studies will be able to predict the potential water quality in the impoundment facility, and a closure plan will be based on the predicted water quality for the facility.

7.3.1.7 Freshwater Sediment Quality

Potential Effects

Potential project-related impacts to sediment quality include:

- Construction activities, and runoff of TSS (introduction of additional particulate material to sediments)
- fugitive dust from concentrate storage and handling (possibly settle and end up in sediments; elevated metals)
- Fuel transport and handling (hydrocarbons)
- In-stream construction of dams, culverts, bridges (disturb and mix up sediments)
- Discharge or leaking from Tailings Management Facility (could have suspended material that would settle into sediments)
- Disposal of treated sewage effluent and/or sludge (nutrients)

Construction activities can generate dust, and as with affecting surface water quality, sediment quality could be affected by the deposition of particulate material onto stream or lake sediments.

Fugitive dust from concentrate would be high in metals, and this material could settle onto the sediments of lakes and streams if it were introduced into surface waters.

Fuel handling could introduce hydrocarbons into lake or stream sediments if there was a spill or if not handled properly.

In-stream construction activities could disturb and suspend lake and river sediments, causing their transport downstream or to other locations.

The TMF will contain the solid fraction of the tailings. If allowed to escape, these tailings would alter natural lake and stream sediments, and affect metal concentrations as well as nutrient concentrations (from sewage effluent) in existing sediments.

Proposed Mitigation

Dust generation from the use of roads and the airstrip, and fugitive dust from concentrate handling, will be mitigated to minimize the effects on surface water quality and sediment quality as described in the surface water quality section above.

Fuel storage and handling areas will be lined and bunded to contain any hydrocarbon leakage.

In-stream construction mitigation measures to minimize the effects on surface waters will also minimize the effects on lake and stream sediment quality (see above section on surface water quality).

Tailings will be physically contained within the TMF in perpetuity. Dams will be constructed with liners to prevent the leakage of any particulate material. Dams will be designed and constructed so that tailings cannot overtop the dams. The closure scenario for the tailings impoundment will be such that tailings will remain physically stable and contained post-closure.

7.3.1.8 Climate Conditions

Potential Effects

Potential project-related impacts to climate conditions include:

- Release of green house gasses (GHG)

Combustion of diesel in generators, mining equipment, haul truck and aircraft will generate greenhouse gasses for the duration of the construction and operation of the Project. Approximately 46,100 metric tons of diesels will be required per year for running the mine. This will generate roughly 153,000 metric tons of CO_2 equivalents per year (Environment Canada, 2005). This is approximately equal to 1% of the 2005 GHG emissions from the Canadian Mining Industry and 0.02% of CO_2 equivalents for the 2005 Canadian total production (Environment Canada, 2006).

Proposed Mitigation

Mitigation for the release of greenhouse gasses from fuel combustion will be addressed by necessity due to the high cost of fuel in the region. Vehicles and equipment used for the Project will be high in fuel efficiency and movement of vehicles and aircraft will be managed to reduce fuel consumption. Additionally, alternative power sources such as wind power generation may be investigated to attempt to reduce the consumption and necessity of fuel combustion.

7.3.1.9 Unique or Fragile Landscapes

Potential Effects

Potential project-related impacts to Unique or Fragile Landscapes include:

- Removal of esker material for construction purposes

Eskers consist of gravels and sands deposited in and under glaciers and are the source of sand/gravel for construction. This material is limited in the area, and is important as wildlife habitat and potentially important for traditional land use.

Proposed Mitigation

Disturbance of eskers will not be done in any areas hosting archaeological sites. Disturbance of eskers will be avoided near wildlife denning sites, if possible.

For esker areas that are disturbed, the area will be re-sloped to an angle consistent with the pre-disturbance slope. Re-sloping will be carried out such that the slopes provide the same level of escape terrain as prior to the disturbance. Slopes will not exceed 30%.

Disturbed eskers can also be seeded to minimize erosion. Eskers can be seeded with a certified weed free native seed mix that has been found to be successful in this climate and region (Martens, 2007):

- alpine bluegrass (*Poa alpina*): 40%;
- tufted hairgrass (*Deschampsia ceaspitosa*): 40%; and
- spike trisetum (*Trisetum spicatum*): 20%.

The seed mix will be Canada No. 1 grade to minimize the potential of introducing unwanted plants.

7.3.1.10 Geology

Potential Effects

Potential project-related impacts to geology include:

- Removal of ore and other rock to develop the three deposits
- Exposure of new rock to the surface, thereby changing the metal leaching potential of the area

The removal of rock in order to develop the three deposits will permanently change the local geology. Exposure of new rock could potentially affect the leaching of metals from host rock into surface waters via sump water, waste rock pile runoff and tailings.

Proposed Mitigation

There is no mitigation possible for the permanent removal of rock from the development of the three deposits.

An ARD/ML program is underway that will help determine how to mitigate the effects of newly exposed rock material in the form of ore, waste rock and tailings. Management Plans will be developed for all of these materials based on results of the ARD/ML program and best management practices.

Mitigation of the waste rock piles could potentially involve the use of liners at the base of the piles, the construction of ditches and sediment ponds to capture runoff, and the covering of the waste dumps with a designed cover if the material required is available in sufficient quantities. The mitigation of the pit walls may require benching and covering of the benches with a designed cover to limit exposure of acid generating surfaces.

A Reclamation and Closure Plan will be developed in conjunction with regulators and communities for the long-term management of the rock and tailings materials upon completion of the Project. Mitigation of the tailings will likely involve permanent submergence below water to retain the tailings in a reduced state. The closure scenario for all rock materials will be such that the surface and groundwater quality will meet regulatory requirements and environmental standards as set out in the Closure Plan.

7.3.1.11 Soil Quality

Potential Effects

Potential project-related impacts to soil quality include:

- Covering or removal of soils by building roads, an airstrip, waste rock piles, other facilities
- Erosion of soils around road crossings
- Alteration of soils via dust-generating activities (road and airstrip use)
- Alteration of soils via concentrate storage, transport, and handling (increase soil metal concentrations)
- Hydrocarbon contamination of soils due to vehicle refueling, maintenance, and spills

The soils will be lost under the road and the various facilities' footprints. They will also be degraded adjacent to the various facilities in high traffic areas. The poorly drained soils will be subject to compaction.

Erosion of soils may occur along stream banks at creek crossings and other erodible areas, if denuded of vegetation. The soils along the road may be subject to dust from vehicles and with the dust, metals from the undercarriages. As well, ore dust can also add metals to the dust and therefore, to soils along the road. The heavy use of roads could also result in hydrocarbon contamination from grease, oil, lubricants, *etc.*, from vehicles and increase the risk of spills.

Proposed Mitigation

In order to mitigate the effects of covering or removal of soils, soils can be salvaged, where feasible, and stored. These soils could then be used for rehabilitation of disturbed areas including the access road at closure. Compacted soils will be ripped and seeded with a native species, if possible. Soil erosion will be minimized by avoiding vegetation removal, where possible, and using straw bales and erosion cloth along stream banks as a short term solution to minimize sediment entering water bodies and affecting fish and water quality. Ultimately, they could be armoured. Soil metal and hydrocarbon contamination will be minimized by ensuring that vehicles are properly maintained, maintenance is carried out at designated locations which are properly designed with liners, berms, *etc.* and cleaning up of spills in a timely manner. Extra care will be taken to ensure tarps on the trucks are in good condition and properly used.

7.3.2 Biological Environment

7.3.2.1 Vegetation

Potential Effects

The potential project-related impacts to ecosystems and vegetation include:

- Loss of ecosystems and vegetation to infrastructure development
- Degradation of ecosystems and vegetation including:
  - Increased dust/particulate deposition
  - Potential introduction of invasive plants due to increased site disturbance
  - Alteration of local hydrology
  - Effects related to chemical spills

The most severe effects on ecosystems and vegetation will occur during the construction phase of the Project and will be maintained until closure and decommissioning. During this time, plant cover will be removed and disturbed as infrastructure is built.

The effects of dust deposition on vegetation are primarily associated with physical and physiological damage caused to the plants and their photosynthetic processes. Dust has also been shown to change the microclimate of affected areas.

Invasive plants in the Arctic is a newer concern and was often not considered an issue due to factors such as harsh climatic conditions, limited land development and the presence of permafrost (Schrader and Hennon, 2005; Carlson and Shephard, 2007). Recent studies on Alaskan flora have shown that invasive species have become more prevalent and that they may become a problem in Arctic environments if not managed accordingly (Carlson and Shephard, 2007).

Infrastructure and roads in particular have been shown to disrupt surface water drainage patterns which can result in the alteration of both upstream and downstream plant communities (Pomeroy, 1985; Spellerberg and Morrison, 1998; Trombulak and Frissell, 2000). Wetter plant communities in the Project area are anticipated to be most affected by altered hydrological regimes (*e.g.*, sedge communities).

Chemical spills will result in localized disturbances to plant cover, the severity of which will vary with the extent of the spill and the type of chemical.

Proposed Mitigation

Limiting the size of the overall Project footprint and restricting Project activities to areas that have already been disturbed are the most effective mitigation strategies for ecosystems and vegetation.

Dust effects can be mitigated with the implementation of a fugitive dust management plan, where dust production is controlled (*e.g.*, through the use of dust suppressants and lower speed limits).

Preventing the introduction of invasive plant species to newly disturbed areas is the most effective mitigation measure for this potential effect. Prevention can be facilitated by ensuring machinery and vehicles have been thoroughly washed prior to their use on site.

Altered drainage patterns will likely not be restored until Project closure and decommissioning. Certain infrastructure components (*e.g.*, roads) may be built in an effort to maintain current drainage patterns, and options to do so will be assessed as the Project progresses.

7.3.2.2 Terrestrial Wildlife

Potential Effects

The potential project-related impacts to terrestrial wildlife include:

- habitat loss (direct and indirect);
- disruption to movements;
- disturbance to normal wildlife behaviors;
- mortality (direct and indirect);
- attraction of animals to human use sites;
- potential for chemical spills and toxicological (*e.g*., heavy metal) tissue burdens; and
- reduction in reproductive success.

Habitat Loss: Construction of the mine and haul road will result in vegetation removal and direct habitat loss for wildlife. Indirect habitat loss could potentially occur around the Project periphery, where land is degraded (*e.g*., vegetation covered by dust). Indirect habitat loss could also potentially occur whereby wildlife, particularly muskox and caribou, avoid Project facilities due to noise, traffic, or other disturbances (Johnson *et al*., 2005). Noise at the mine site will be intermittent and localized (*i.e*., blasting), while noise along the haul road will be relatively continuous. The responses of carnivores such as grizzly bears, wolves, foxes and wolverines are more complex. Most animals will avoid the Project area, while some may become habituated to human presence and activity.

Avian species may also be potentially affected by direct and indirect habitat loss. Raptors could potentially be impacted by habitat loss if infrastructure or human activity occurs close to cliffs used for nesting. Waterfowl habitat loss could potentially occur due to activity surrounding lakes. Migratory shorebirds and songbirds could potentially lose some nesting habitat within and surrounding the Project footprint, but would likely be able to nest in adjacent areas.

Disruption to Movements: Most wildlife species exhibit two types of movement: short range and long range. Short-range movements consist of day-to-day activities within a particular season and the extent of these daily movements defines the seasonal home ranges of these species. Some species have a single home range all year, while others have separate summer and winter home ranges. Long-range wildlife movements typically occur between winter and summer ranges, or when young disperse to new territories. When one habitat cannot support a species in various seasons (*i.e.,* winter and summer), moving between seasonal ranges is critical for survival. Similarly, dispersal (movement away from birthplace) is critical for the maintenance of many populations and young will disperse distances that can be many times as large as the species' home range. Typically, the greatest potential effects to wildlife populations occur as a result of disruption, blockage and impediments to these seasonal and dispersal movements. Roads typically have a larger potential to affect wildlife movements compared to mines, which are relatively small and localized.

The Project component with the greatest potential to effect wildlife movement is the 23 km access road between the mine site and the BIPR road. Sabina will be the only user of the access road. The northern 80 km of the proposed BIPR road would be used to transport concentrate and goods to and from the port, and Sabina would be one of multiple users of the BIPR road. Traffic on the 80 km northern section of the BIPR road would be extended from 4 months (proposed BIPR Project road usage; January 1 to April 30) to approximately 12 months as part of the Hackett River Project.

The mine, 23 km access road and added traffic on a portion of the BIPR road may create three potential issues for wildlife: (1) creation of a barrier that wildlife will not or cannot cross, (2) avoidance of habitats adjacent to roads as a result of traffic, noise and human presence and (3) mortality as a result of vehicle-wildlife interactions (Forman and Deblinger, 2000) or due to increased human access for hunting (Jalkotzy *et al.,* 1997; Jackson, 2000). Each of these effects are inter-related, particularly 1 and 2, as avoidance can create the "barrier". The Hackett River Project footprint itself will likely have a relatively small effect on animal movement compared to the haul road and BIPR road/port.

Movement patterns of mammals such as Bathurst, Ahiak, and Dolphin and Union caribou, muskox and carnivores could potentially be affected by the Project. Sabina is committed to developing robust wildlife monitoring plans and road management plans to avoid or minimize this potential effect. Movement patterns of raptors, songbirds and waterfowl are not expected to be altered due to the Project infrastructure itself; however, lights emanating from the project may attract birds and alter their movement patterns (discussed in attractants section).

Disturbance to Normal Wildlife Behaviours: The responses of wildlife to human presence and activities vary by species. Some species become acclimated, some react to each disturbance but remain in the area and others avoid areas with frequent disturbances. Animals may react to disturbance by avoiding important habitats and/or by taking time away from key behaviours such as feeding, breeding or watching for predators. These reactions can ultimately lead to reduced reproductive productivity and/or mortality.

Construction activities, particularly vegetation clearing, site levelling and blasting, will result in disturbance to wildlife. The potential for, as well as the significance of, disturbance effects due to construction would depend on the timing of construction relative to sensitive periods (*e.g.,* breeding). Disturbances during construction are expected to be short-term in duration and localized in extent. There is the potential for continuous disturbance of wildlife during the operations and closure phases of the Project. Disturbances include human presence, noise and traffic along the road and industrial noise associated with development and operations, including drilling and blasting.

Mammal and bird species have the potential to have their behaviours altered due to the Project. Stimuli, both auditory and visual, can elicit startle responses in most animal species that can affect their regular energy budgets and physiology. For instance, animals that are frequently disturbed may spend more time running and less time foraging. The degree of impact that occurs when animal behaviours are disturbed will depend on the life history phase in which disturbance occurs. Some examples of potential worst case behaviour disturbances are: a) disturbing muskox just after they have calved could have disproportionately negative consequences if adults abandon or trample young; b) disturbance of caribou during or just following the calving period could have negative effects on their reproductive success; c) disturbance of grizzly bears during the period in late fall when they are fattening up for winter hibernation could greatly impact this species; and d) disturbance of bird species prior to or following egg-laying could cause stress-induced nest abandonment. These potential negative effects can be mitigated by minimizing disturbance activities within sensitive life history phases, which involves knowing the life history progression of species of interest, and where they will be.

Mortality: The proposed Project has the potential to cause direct or indirect mortality of wildlife. Mortality of wildlife could occur by vehicle strikes along the access road and BIPR road, particularly where animals are attracted to the road (*e.g.*, due to the presence of carrion, waste attractants, or using the road as a travel corridor). Mortality could also result from increased hunting, due to the road and improved access to the area, and the growth of communities present along Bathurst Inlet (*e.g.,* Kingaok, Omingmaktok), which could further increase hunting pressure.

The likelihood and nature of mortality experienced by different species will differ. Caribou, muskox and many carnivores are expected to have the largest potential for mortality due to vehicle strikes along the roads and due to increased hunting pressure. Grizzly bears, on the other hand, may be attracted to human use sites where they have the potential to become a danger to workers; habituated grizzly bears are often destroyed as a means of protecting employees. Songbirds and shorebirds, which tend to fly close to the ground, may experience increased mortality due to vehicle strikes along the road or flying into Project infrastructure when they are attracted to lights. Finally, raptors and waterfowl could potentially be affected if water and the small mammal prey base become contaminated due to project activities.

Attraction of Animals to Human Use Sites: Features or materials that are of interest or provide resources to wildlife are considered to be wildlife attractants. Attractants may include roads acting as travel corridors that facilitate movement through otherwise difficult terrain or vegetation. Attractants can also take the form of refuge, shelter, nesting or roosting habitat provided by physical structures. Smells and food sources associated with food, incinerators, garbage or sewage around the Project footprint and in camps can also act as wildlife attractants.

Project development will include both features (*e.g.*, road) and materials (*e.g.*, food associated wastes) that have the potential to attract wildlife.

Attractants will differ in their effects on different species and groups of species. Caribou may be attracted to roads as movement corridors as they are flat surfaces with minimal obstacles to negotiate, which may increase their risk of mortality due to collisions. Carnivores and raptors may be attracted to road kill on road verges, which could increase their risk of being hit by haul traffic. Finally, human wastes and smells from camps may attract grizzly bears and other scavengers, which could indirectly lead to their death if they become problem animals that need to be destroyed to preserve human safety.

Potential for Chemical Spills and Increased Toxicological Burdens: Direct uptake of toxic substances by wildlife may occur if chemicals (such as grease or water-pollutants) are improperly stored or disposed-of and are then consumed by wildlife. Indirect uptake can occur where metals or hazardous chemicals from dust, spills, or wastes are taken up by plants along the road or near the mine or port and are subsequently consumed by wildlife. These chemicals can decrease the health and productivity of wildlife and may lead to mortality. Predators that feed high up on the food chain may bio-accumulate higher levels of chemicals than those that feed low on the food chain.

Reduction in Reproductive Success: Wildlife productivity, also known as reproductive success, is the number of young produced by each female. Often, effects such as habitat loss and disturbance do not cause direct mortality of adults, but will reduce their physical condition and their reproductive success. There is the potential for mammals and birds to experience this potential effect. The Bathurst caribou calve near the Project area, so mitigation measures to avoid or minimize this effect will be a priority.

There are two key components to reproductive success: female survival and survival of young. The number of years a female survives determines how many young she will reproduce, and even small changes in female lifespan can result in rapid population changes. The second major component that drives population dynamics is birth rate and survival of young. These factors are less critical than adult female survival, but are more variable. Birth rate and juvenile survival depend on good female condition as well as environmental and biological effects on juveniles. For instance, females displaced into lower-quality habitat with less food will often have fewer or less healthy young. Poor-quality habitats may also have reduced refuge from predators, leading to increased juvenile mortality, as juveniles are often preferred prey.

Proposed Mitigation

Some of the key mitigation measures that will avoid or minimize the potential project-related effects include:

- avoidance of wildlife sensitive areas (*e.g.*, riparian and wetland habitats, eskers, denning areas, bird nesting sites and wildlife movement corridors);
- management plans to help avoid wildlife sensitive periods;
- complying with the Interim Caribou Protection Measures of the draft WKRLUP (2005),

- road access restrictions and management (*e.g.*, road closed to public, restrict use of road to Project personnel and vehicles, enforced speed limits, temporary road closures);
- no hunting or trapping policy for Project employees;
- minimizing visual and sensory disturbances (*e.g.*, regular maintenance of equipment, limiting stray lighting, restrictions for blasting near wildlife);
- waste storage and incineration (*e.g.*, storing all attractants in bear-proof containers, incinerating waste in a timely manner, use of wildlife exclusion techniques);
- carrion control (*e.g.*, reporting of all road-kill occurrences, prompt removal of road-kill, proper disposal of carrion);
- employee wildlife education program which will cover such topics as access road restrictions and operating protocols, awareness of wildlife sensitive areas and wildlife sensitive periods, waste and wildlife attractant management, no-hunting policies, wildlife incidental observation reporting, and compliance requirements and disciplinary action that will be enforced by Hackett River Project management.

As part of the environmental monitoring program for the project, implementation of a Wildlife Effects Monitoring Program (WEMP) will be developed to evaluate the effectiveness of mitigation measures for reducing the impact of the Project on identified wildlife and wildlife habitat.

7.3.2.3 Migratory Songbirds and Shorebirds

Potential Effects

Potential project-related impacts to migratory song and shore birds include:

- disturbance to nesting and breeding, potentially leading to nest abandonment;
- lights from the mine facilities acting as attractants to migrating birds, leading to an increased probability of collisions with infrastructure and injury or mortality to birds;
- injury or death from collisions with vehicles along the roads; and
- reduced reproductive productivity due to synergistic effects of the Project.

Proposed Mitigation

Potential project impacts to migratory songbirds and shorebirds will be mitigated by developing and implementing wildlife management and mitigation plans as described in the terrestrial wildlife section.

7.3.2.4 Raptors

Potential Effects

Potential project-related impacts to raptors include:

- habitat loss may remove some high quality cliffs, or render them non-functional for use as nesting sites;
- sensory and auditory disturbances from the road and other activities may have a negative effect on cliff nesting raptors;
- increased heavy metal tissue burdens due to raptors feeding on small mammals with elevated tissue burdens; and
- reduced reproductive success of cliff nesting due to the additive effects of impacts discussed in this assessment.

Proposed Mitigation

Potential project impacts to raptors will be mitigated by developing and implementing wildlife management and mitigation plans as described in the terrestrial wildlife section.

7.3.2.5 Waterfowl

Potential Effects

Potential project-related impacts to waterfowl include:

- habitat loss at the port site will result in the direct loss of high quality waterfowl habitat and indirectly reduce habitat quality in the surrounding areas;
- disturbances at the port site, such as operations noise and lighting, may disturb waterfowl feeding, breeding and nesting behaviors;
- lights emanating for the mine and port site may act as attractants to migrating ducks, increasing the likelihood of injury and mortality; and
- reduced health in waterfowl feeding or reproducing in lakes and seawater with elevated concentrations of harmful chemicals and heavy metals.

Proposed Mitigation

Potential project impacts to waterfowl will be mitigated by developing and implementing wildlife management and mitigation plans as described in the terrestrial wildlife section.

7.3.2.6 Freshwater Aquatic Organisms

Potential Effects

Potential project-related impacts to freshwater aquatic organisms include:

- Project activities potentially affecting water quality (Dust-generating activities, ANFO use and storage, runoff from waste rock piles, stockpiles, roads, lake dewatering, dust from concentrate storage and handling, in-stream construction, discharge or leaking from TMF, discharge of sewage effluent and sludge);

- Project activities potentially affecting sediment quality (construction activities, fugitive dust, fuel transport and handling, in-stream construction, discharge or leaking from TMF, discharge of sewage effluent and sludge); and
- Project activities directly removing or altering aquatic habitat (lake dewatering, culvert installations, construction of dams in water courses, reduction in stream flows below normal low levels, reduction in lake levels below normal low levels).

Project activities that could potentially affect surface water quality and sediment quality could potentially affect aquatic organisms by causing a reduction in growth and/or health (*e.g.*, sublethal toxicity), enhancement of growth and abundances of organisms (*e.g.*, from minor nutrient enrichment), mortality of some species (toxicity from metals, or oxygen depravation due to excessive nutrient enrichment) resulting in shifts in community compositions, or direct mortality of all species (toxicity from metals, or oxygen depravation due to excessive nutrient enrichment), causing a reduction in abundances and densities of aquatic organisms in streams and lakes.

Project activities that will remove aquatic habitat will directly affect aquatic organisms by removing the organisms along with the habitat. Some activities, like lake dewatering, are permanent, in the sense that those organisms and habitat will be removed. Other activities, like temporarily lower water levels, are not permanent, and aquatic organisms will recolonize these areas when they become wetted again.

Proposed Mitigation

The mitigation measures already described for water quality and sediment quality will help minimize the potential effects to aquatic life, by minimizing changes to water and sediment.

The direct effects caused by habitat removal or alteration will be mitigated via fish habitat mitigation measures, which include creating new habitat for habitat that is lost.

Adverse effects to aquatic life (and fish) caused by nutrient enrichment and the subsequent oxygen drawdown inevitable in the lakes in the area can be avoided by having sewage effluent and sludge report to the TMF.

7.3.2.7 Freshwater Fish and Habitat

The environmental policy for the proposed Hackett River Project will be consistent with the National Policy for the Management of Fish Habitat (DFO, 1991). The guiding principle of the DFO policy is “no net loss of fish habitat productive capacity” and a net gain if possible for all industrial developments in Canada affecting surface waters. Management of the proposed Project will include stringent environmental protection policies and plans. Staff and management will work towards no net loss in fishery resources through a wide range of impact avoidance and mitigation measures, site reclamation and rehabilitation techniques, and habitat enhancement methods.

The key to management objectives with respect to freshwater resources in the proposed Hackett River Project area will focus on three key principles: HADD Avoidance; No Net Loss Policy; and the Protection of Sensitive Species and Species at Risk.

HADD Avoidance

Section 35(2) of the *Fisheries Act* (DFO, 1985) states that allowing fish habitat HADDs without authorization of DFO is not permitted. Section 36 states that no one shall permit the introduction of substances deleterious to fish in waters frequented by fish.

Fish habitat, as defined by the *Fisheries Act*, includes "the spawning grounds, nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes", including both fish-bearing and non-fish-bearing waterbodies.

To avoid and prevent HADDs and the introduction of deleterious substances to watercourses, and to minimize the adverse effects of any unavoidable disturbances to fish habitat, a range of specific and generally accepted techniques for sediment control, riparian care, site isolation, timing windows, reclamation and rehabilitation will be used.

No Net Loss Policy

The main policy objective of the Federal Government with respect to fish populations and fish habitat is that human activities should cause no net loss of fish productive capacity in Canadian waters. Productive capacity refers to the capability of fish habitat, including all of its physical, chemical and biological characteristics, to produce fish. In practice, productive capacity is measured in terms of aquatic habitat area, which includes both aquatic ecosystems and the associated riparian areas and vegetation.

Protection of Sensitive Species and Species at Risk

Particular attention will be paid to fish habitat containing or supporting regionally or locally sensitive species, including any rare or endangered species or locally threatened species. Although there are no endangered or threatened fish species in the project area, there are several fish species of local and traditional importance. Of the species identified in the project area, Arctic char, lake trout and whitefish are used for Inuit subsistence fisheries, and Arctic grayling are sought by sport anglers. Lake trout and whitefish are particularly sensitive to disturbance and environmental change, and as such, extreme care should be taken when working in or near their typical habitat.

Potential Effects

Several effects to freshwater aquatic organisms, fish and fish habitat may arise from the development of the proposed Hackett River Project. These effects may include the loss or alteration of fish habitat and quality, and alteration to the productive capacity of fish habitat. Specifically, potential project-related impacts to freshwater aquatic organisms, fish and fish habitat may include:

- Development of the Tailings Management Facility (loss of fish habitat);

- Discharge or leaking from the Tailings Management Facility (alteration to the productive capacity of fish habitat);
- Lake dewatering (loss of fish habitat);
- In-stream construction of dams, culverts, bridges (loss of fish habitat and limits to migration);
- Ammonium nitrate fuel oil (ANFO) use and storage (release of deleterious substance to fish habitat);
- Runoff from waste rock piles, stockpiles, roads (release of deleterious substance to fish habitat);
- Disposal of open pit and underground sump water (release of deleterious substance to fish habitat);
- Fuel transport and handling (release of deleterious substance to fish habitat);
- Disposal of treated sewage effluent and/or sludge (nutrients, release of deleterious substance to fish habitat); and
- Dust-generating activities (*e.g.,* construction, road and airstrip use) (sedimentation and smothering of benthos and fish eggs, leading to a decrease in productive capacity of fish habitat).

The loss of fish habitat will occur due to the development of the TMF, the dewatering of Camp Lake, and works in or around water (*e.g.,* installation of dams, culverts, bridges, *etc*.). These activities will result in the harmful alteration, disruption or destruction (HADD) of fish habitat.

Dust-generating activities include the construction of roads, the airstrip, dams, buildings, and the ongoing use of roads and the airstrip. These activities can introduce particulate material (such as TSS, aluminium, other metals associated with rock material being used) into surrounding surface waters. The use of ANFO as an explosive to break apart rock can leave nitrogen residues on rock, which is easily dissolved in water and introduced to surrounding surface waters. High concentrations of nitrate, nitrite, and ammonia can all be toxic to aquatic life, but can be limiting to aquatic life at extremely low concentrations.

Runoff from waste rock piles, ore stockpiles and roads could be of poor quality. Water could be acidic, neutral, or alkaline, and contain high metals and high levels of nitrogen compounds.

Concentrate is the end product of the mine, and will contain high metal concentrations. Fugitive dust from storing, handling or transporting the concentrate could introduce metals into surrounding surface waters. Fuel handling and use on site could potentially cause the introduction of hydrocarbons to surface waters.

The in-stream construction of dams, bridges, and culverts could potentially disturb lake and stream sediments, and cause high TSS (and possibly high TP and metals) to be introduced to surface waters.

The water management plan will involve having all poor-quality water reporting to the TMF. This will include domestic wastewater, treated sewage effluent, runoff from around the mine site, and the tailings themselves. The impoundment facility will contain poor quality water that will be high in metals.

Proposed Mitigation

Potential impacts will be at least partially mitigated through sound engineering practices that consider the impact on the freshwater environment. However, some effects on aquatic organisms, fish and fish habitat may be unavoidable.

Works In or Around Water: effects associated with work in or around water (*e.g.*, sedimentation) will be minimized through adherence to Best Management Practices and DFO Operational Statements. The scheduling of in-stream works will follow the recommended periods of least risk to the key regional fish species.

Dust: dust generation from the use of roads and the airstrip will be mitigated by either road watering or by using some other non-toxic, non-wildlife attractant substance to suppress dust. Dust generation will to some extent also be mitigated by conducting some construction activities during the winter months. Dust will not directly fall onto open surface waters during the winter, and particulate material will be somewhat attenuated by land during snow melt in the spring. Drainage and sediment control structures will be used according to best management practices during construction.

ANFO Use: ANFO will be stored in an enclosed building, and spillage around the storage and loading area will be minimized by having a solids management plan. Runoff from around the storage and loading area will be directed away from surface waters. Nitrogen residues in pit sump water will be minimized to the extent possible. Best management practices will be used for the handling and use of explosives to minimize excessive residue and nitrogen loading.

Runoff from Waste Rock Piles, Stockpiles, Roads: Poor-quality runoff from waste rock piles and any ore stockpiles will be collected and diverted to the TMF. The use of non-reactive rock will be used for the construction of roads to the extent possible. Road alignments will be sited along basin boundaries where possible, and avoid lakes and streams where possible.

Lake Dewatering: Once the water quality of Camp Lake is no longer acceptable to be discharged into the receiving environment, water will not be discharged, but will be transported to the TMF or some other contained facility. Discharge of clean Camp Lake water will consider the natural hydrograph, to minimize impacts to stream fish habitat.

Concentrate Fugitive Dust: As concentrate is the final product of the mine, great care will be taken to contain concentrate during storage, handling and transport. Storage areas will always be covered and bermed, and transport will be by covered truck.

Habitat Loss: Where mitigation is not possible (*i.e.*, habitat loss associated with development of TMF), a fish habitat compensation plan will be developed to ensure no net loss of fish habitat and adherence to DFO policies. In addition, an Aquatics Effects Monitoring Program (AEMP) will be developed to evaluate the effectiveness of environmental protection measures and to monitor the health of aquatic ecosystems associated with the proposed Hackett River Project.

7.3.3 Marine Environment

7.3.3.1 Air Quality

Potential Effects

Potential project-related impacts to marine air quality include:

- Engine exhaust emissions from marine vessels
- Fugitive dust emissions from conveyors and stockpiling activities
- Greenhouse gas emissions

Marine air quality effects are very similar to those presented for the land based potential effects. The predominant consideration to the marine environment is the exhaust from ships along the shipping lane which will primarily emit airborne particulates, sulphur dioxide and nitrogen oxides.

This emission of exhaust will be restricted to a period when ice free conditions allow ships to reach the port. The emissions will be distributed over a relative large distance from Bathurst Inlet and the North Atlantic Ocean which will result in a reduced spatial intensity in comparison to the stationary land based sources.

Mitigation will focus on the same principles as outlined in the land based air quality section.

7.3.3.2 Noise

Potential Effects

Potential project-related impacts to marine noise (both underwater and above) include:

- Ship operations required for the transport of concentrate and goods from Bathurst Inlet to Lancaster Sound (and onwards to overseas markets);
- Conveyors for loading ships, and port activity at Bathurst Inlet.

The majority of noise will be generated at the Bathurst Inlet Port site, where ships will be loaded and unloaded, but some underwater noise will be generated along the entire shipping route due to the passage of ships. The amount of noise generated as part of Sabina's Project will be primarily associated with ship loading/unloading activities. It is expected that the most underwater noise will be generated during times when a ship is entering or departing the area, or when concentrate is being loaded onto ships. Noise along the shipping route will be localized around the ship as it travels along its route.

Proposed Mitigation

As with land based activities, employee health and safety will be a priority, and personal protective equipment will be used during concentrate loading, if necessary.

For noise generated as a part of operating marine vessels, there is no proposed mitigation for the amount of noise generated.

7.3.3.3 Marine Water Quality

Potential Effects

Potential project-related impacts to marine water quality include:

- Dust-generating activities (*e.g.*, construction, road use) (TSS)
- Runoff or fugitive dust from concentrate storage area (high metals)
- Fugitive dust from transferring concentrate to ship (high metals)
- Fuel transport and handling (hydrocarbons)
- Accidents and malfunctions-concentrate or fuel spills
- Ballast water discharges (poor quality water)

Construction activities planned for the port site that could generate dust include the construction of a concentrate storage building and goods storage building. Other infrastructure will be in place should the BIPR project go ahead; no construction within Bathurst Inlet will be required for this Project (the docks will have been constructed as part of BIPR).

Concentrate is the final product of the mine, and will contain high levels of metals. Fugitive dust from handling and loading the concentrate into ships could introduce high metal particulate material into the marine waters of Bathurst Inlet. In addition, any spillage or fugitive dust around the concentrate storage area could potentially be transported to marine waters via rain or snow melt.

The handling of fuel for vehicles and ships has the potential to introduce hydrocarbons into marine waters.

Accidents and malfunctions could potentially cause the spillage of concentrate and/or fuel into marine waters.

The discharge of ballast water from ships at port could release poor quality water into Bathurst Inlet (hydrocarbons, metals, non-resident microorganisms or invertebrates).

Proposed Mitigation

In order to minimize the effects of dust during construction, drainage and sediment control structures will be used according to best management practices to prevent dust and sediment from entering the marine water of Bathurst Inlet.

In order to minimize the potential for fugitive concentrate in the form of dust or spills, concentrate will be stored in a completely enclosed building, and vehicle handling of the concentrate will also occur within an enclosed area. Concentrate will only be transported by covered truck. Concentrate will be transported onto ships via an enclosed ship loader. Dust collectors will be used along an enclosed conveyor system at transfer points to further minimize fugitive dust caused by ore concentrate. Additional mitigation measures may include suspension of concentrate transfer to ships under extremely windy conditions, and the washing of trucks delivering concentrate prior to returning to the mine for additional loads.

For vehicle fuel handling, the same mitigation measures used at the mine site will be used at the port site.

For potential accidental spills from ships (fuel or concentrate), a Spill Response Plan will be in place for ship activities. The required materials needed to respond to and contain a fuel spill will be on site. Spills would be isolated and contained as per the Spill Response Plan.

To prevent the effects of ship ballast water on marine water quality, the discharge of ballast water will not occur while ships are at port.

7.3.3.4 Marine Sediment Quality

Potential Effects

Potential project-related impacts to marine sediment quality include:

- Dust-generating activities (*e.g.*, construction, road use) (TSS)
- Runoff or fugitive dust from concentrate storage area (high metals)
- Fugitive dust from transferring concentrate to ship (high metals)
- Fuel transport and handling (hydrocarbons)
- Accidents and malfunctions-concentrate or fuel spills

Dust generating activities have the potential to affect marine sediment quality by the deposition of particulate material and settling onto marine sediments. However, the higher energy physical processes occurring in the marine environment (tides, estuarine circulation, waves) compared to freshwater lakes and streams will result in less direct deposition to marine sediments, as particulate material will remain within the water column for longer periods of time (compared to lakes and streams).

Fugitive dust that could be generated during concentrate loading to ships could potentially settle onto marine sediments and cause elevated metal concentrations.

Fuel transport and handling could potentially introduce hydrocarbons to shoreline marine sediments.

Accidents and malfunctions could potentially cause the spillage of concentrate and/or fuel into marine waters. Concentrate could more likely settle onto marine sediments, causing elevated metal concentrations. Fuel would likely remain on top of or within the water column to a large extent, but could affect marine sediments along the shoreline.

Proposed Mitigation

The same mitigation measures used to control dust and fugitive dust from concentrate storage and handling for marine water quality will also minimize the potential effects on marine sediment quality.

For vehicle fuel handling, the same mitigation measures used at the mine site will be used at the port site.

For potential accidental spills from ships (fuel or concentrate), the mitigation measures proposed to protect marine waters would also help minimize the effects on marine sediments. Shallow sediments along the shoreline could be potentially affected by accidental fuel spills, and the required materials needed to respond to and contain a fuel spill will be on site. Spills would be isolated and contained in accordance with a Spill Response Plan.

7.3.3.5 Marine Aquatic Organisms, Fish, and Habitat

The same principles that apply to avoiding and mitigating potential impacts to freshwater organisms, fish, and habitat are applicable to marine organisms, fish and habitat.

Potential Effects

Potential project-related impacts to marine aquatic organisms, fish, and habitat include:

- Noise from concentrate loading and vessel traffic (physical, biological and/or behavioral changes to fish);
- Dust-generating activities (*e.g.*, construction, road use) (potential sedimentation and smothering of benthos and fish eggs, leading to a decrease in productive capacity of fish habitat)
- Fugitive dust from transferring concentrate to ship (high metals-potential for contamination of aquatic organisms and a reduction in quality of fish habitat)
- Fuel transport and handling (hydrocarbons-potential for contamination of aquatic organisms and a reduction in quality of fish habitat)
- Accidents and malfunctions-concentrate or fuel spills (potential for contamination of aquatic organisms and a reduction in quality of fish habitat)
- Ballast water discharges (poor quality water, potential for foreign aquatic organisms and invasive species)

Noise levels could potentially affect the movement of fish (*e.g.*, avoidance), and if loud enough, could potentially affect fish health.

Dust generating activities could potentially introduce particulate material into the marine environment and alter the nature of sediments and hence fish habitat.

Fuel and concentrate loading and transportation has the potential to introduce contaminants into the marine environment, and have direct effects on aquatic life and fish (*e.g.*, fuel spill), increase metal loading within the food web (*e.g.*, concentrate spill), and potentially affect marine habitat by changing the nature of sediments and shoreline habitat.

Ballast water can contain organisms not indigenous to Bathurst Inlet. These organisms would be potentially harmful to the natural marine ecosystem currently existing in the area.

Proposed Mitigation

There are no proposed mitigation measures for the potential effect of noise on marine fish.

Mitigation measures for potential sediment introduction to marine water and sediments will be as described in the marine water and sediment sections. These measures will help minimize impacts to marine habitat.

The best mitigation measures for potential effects from fuel and concentrate spills is to have plans in place to avoid spills, and have plans in place (and equipment) in the event of a spill. Spill response and management plans will be developed for the marine portion of the project. Employees will be trained and familiar with the spill response plans.

To avoid the potential effects of ballast water on marine organisms, fish, and habitat, ballast water will not be released while ships are at port.

7.3.3.6 Marine Wildlife (Mammals, Birds, and Waterfowl)

Potential Effects

The potential project-related impacts to marine wildlife include:

- disruption to movements;
- disturbance to normal wildlife behaviours;
- mortality (direct and indirect); and
- reduction in wildlife productivity.

Marine wildlife considered in this section included all marine mammals and seabirds outlined in Chapter 6.

Disruptions to Movement: The use of the shipping lane for movement of supplies and concentrate to and from the port at Bathurst Inlet along the shipping lane could disrupt movements of marine wildlife. Ship traffic may increase ice breakup, especially during October. A review of ice conditions conducted for the High Lake Project noted considerable difficulty for vessels transiting through the proposed shipping lane, and the likelihood of encountering multiyear ice in Peel Sound (DF Dickins Associates Ltd., 2004). Shipping which results in ice break up may change movement pattern of marine mammals. Whales and seals may be attracted to open water after following ship passage to an area if ice is broken up and open areas can be used for breathing holes. Where ships are passing through open water, the shipping lane may be avoided by many species; however, avoidance is expected to be short term and negligible due to the infrequency of ship traffic.

Shipping traffic through Barrow Strait and Lancaster Sound could also disrupt daily and annual movements of seabirds such as thick-billed murres and common and King eiders. For instance, the fall migration of thick-billed murres through Barrow Strait/Lancaster Sound is undertaken almost entirely by swimming (Gaston and Hipfner, 2000). Thus, if ships are avoided by swimming murres, or if birds are attracted to the shipping lane due to creation of wider open water areas, there is potential for disruption of fall migration. To date, there is no evidence for effects of shipping on migrating seabirds in this region; however, there has not yet been much traffic through the Northwest Passage.

Disturbance to Normal Wildlife Behaviours: All marine mammal and seabird species that use habitat associated with the shipping lane and Bathurst Inlet may have their behaviours altered due to project-related activities. Given the localized zone of influence of noxious stimuli from boats and the infrequency of shipping traffic from the proposed project, activities in the marine environment are unlikely to have a direct impact on normal wildlife behaviours; when an impact is observed it is expected to be localized and short term in duration.

Mortality: Mortality could occur due to project related activities along the shipping route if marine mammals or marine birds collide with ships, or if indirect effect of the ship such as chemical spills, occur. The incidences of encounters causing direct mortality along the shipping lane are assumed to be rare, but there may be some incidences of mortality of whales or marine mammals. Indirect mortality could also occur as a result of a spill from a ship.

Reduction in Reproductive Success: There is suitable breeding habitat at various locations along the shipping route for multiple marine mammals and seabirds. Impacts of shipping on reproductive success of marine mammals are expected to be negligible due to the relatively small zone of impact of the ships and infrequency of disturbance. However, multiple seabirds using the shipping route and habitat around the port at Bathurst Inlet, such as feeding areas and behaviours may be affected by noise disturbances and the presence of ships, leading to habitat avoidance and abandonment of areas for relatively short periods of time. These changes may manifest as lower individual fitness, thus reducing reproductive success.

Proposed Mitigation

Proposed mitigation measures that can avoid or minimize potential effects to marine wildlife include:

- avoid wildlife sensitive areas (by 10-20 km where possible);
- minimize the use of ship horns in wildlife sensitive areas;

- minimize the use of ship horns during wildlife sensitive periods;
- develop a chemical spill emergency response plan;
- develop a management plan that minimizes potential effects to marine wildlife; and
- develop a shipping wildlife monitoring program to help alert the ship master to the presence of marine mammals for ship steerage or decreasing ship speeds.

7.3.4 Socio-Economic and Cultural Environment

7.3.4.1 Archaeology

Potential Effects

Potential project-related impacts to archaeological and culturally significant sites include:

- Destruction and/or loss of recorded and unrecorded archaeological or culturally significant sites as a result of mine development and associated activities.
- The increase of human population moving about the Project and surrounding areas and the improved access to the region could increase the risk of archaeological material being damaged or removed from recorded and unrecorded sites.

Activities typically associated with project development have the potential to negatively impact archaeological sites. Such activities include the disturbance, excavation, movement or removal of soils during road construction, land clearing, blasting, tailings storage, *etc.* Negative impacts resulting in the destruction and/or loss of archaeological sites which could occur as a result of development activities include the loss of scientific information which could enhance our understanding of heritage resources in the region and the loss of resources which could enhance public awareness, interest, understanding and appreciation of Nunavut's prehistoric or historic past.

The increase of human population and movement on foot or by vehicle within the Project and surrounding areas and the improved access to the region could greatly increase the risk that archaeological material could be damaged or removed from sites causing loss of critical contextual information. Archaeological sites are protected by the *Nunavut Act – Nunavut Archaeological and Paleontological Sites Regulations* and as such, individuals searching for archaeological sites, damaging or removing archaeological material from recorded or unrecorded sites are in violation of the *Act*, which protects any archaeological material that is more than 50 years old.

Proposed Mitigation

Proposed mitigation measures to address the aforementioned potential project-related effects include:

- Avoidance of recorded archaeological sites through changes in the Project design;

- When an archaeological site can not be avoided, the condition and significance of the site will be considered and appropriate mitigation measures will be developed;
- In archaeologically sensitive areas, where development activities will be conducted within close proximity to known archaeological sites or areas which have moderate to high archaeological potential, monitoring will be recommended to ensure the integrity of the site(s);
- An educational program, as a part of the overall project orientation, may help to minimize negative impacts from the increased human presence and activity in the area; and
- Develop a company policy that prohibits the disturbance of archaeological sites by company employees.

The avoidance of archaeological sites is always the preferred mitigation measure and is anticipated to be considered as a part of the Project design. However, if sites can not be avoided a detailed data recovery program will be implemented. For most site types, such data recovery will include the documentation and collection of a sufficient detailed sample of the cultural information from the site. Mitigation measures will be made on a site specific basis and will require consultation with the Government of Nunavut, Department of Culture, Language, Elders and Youth.

During construction and development activities which may take place in archaeological sensitive areas, a monitoring program will be recommended. Where construction will take place in close proximity to recorded archaeological sites or in areas which are considered to have moderate to high archaeological potential, monitoring will ensure that archaeological sites are not adversely affected.

To minimize the potential negative impacts to recorded and unrecorded archaeological sites by the anticipated increased human presence in the region, an educational program can be established, as part of the project orientation, which all personnel associated with the Hackett River Project will be required to attend. This educational program will clearly outline the significance of archaeological sites, the importance of leaving archaeological sites undisturbed, the legislation in place to protect archaeological sites and the job action and/or legal penalties which could result from disturbing archaeological sites. As well, in the unlikely event that archaeological material is encountered during construction activities, procedures can be put into place for any incidental archaeological discoveries.

7.3.4.2 Land and Resource Use

Potential Effects

Potential effects on the use of lands and resources include:

- Diminished ability to participate in traditional subsistence activities, including hunting, trapping, fishing, and gathering;

- Improved ability to participate in traditional subsistence activities, including hunting, trapping, fishing, and gathering;
- Altered knowledge and skill levels regarding traditional activities;
- Altered economic and lifestyle benefits associated with traditional activities;
- Diminished quality of traditional subsistence activities, including hunting, trapping, fishing, and gathering;
- Contamination of country food sources; and
- Diminished access to and quality of existing tourism activities (including canoeing, kayaking and rafting).

Access to traditional activities, including subsistence hunting, trapping, fishing and gathering, may potentially be affected by the development of the Project. The Nunavut Wildlife Harvest Survey (NWMB, 2004) and the West Kitikmeot Regional Land Use Plan (WKRLUP, 2005) indicate the importance of wildlife harvests to Inuit culture and diet, including residents of Kingaok, Omingmaktok, and Cambridge Bay, who are known to harvest caribou (and other wildlife), fish, fowl, and eggs throughout the year.

The development of the mine site overlaps with the land use area of impact for the communities of Kingaok and Omingmaktok. Shipping activities will also overlap with the land use range of Cambridge Bay residents, and potentially other communities (which may include Taloyoak and Qausuittuq (Resolute). Investigation into the land use activities of these residents is underway, but potential effects and mitigation measures will likely be similar to those discussed for Cambridge Bay residents. As such, Project development may interfere with existing access to hunting and gathering areas. In addition, work scheduling may result in some employees missing key times of year for hunting, fishing and other activities.

In contrast, employment associated with Project development may actually improve the ability of some residents to participate in traditional activities. Increased incomes through wage employment, and associated increases in purchasing power, may result in improved access to required equipment and supplies (*e.g.*, snowmobiles, ATVs, dog teams, rifles). In addition, the shift work schedule associated with the mine may provide employees with increased available time to dedicate to these activities, as employees will likely have one-or-more weeks off at a time.

The above changes in ability to practice traditional activities (improving or diminishing) may have subsequent effects on the economic, dietary and cultural benefits derived to these activities, as well as the skill levels and knowledge which are held by the individual or community. For example, diminished ability to hunt may result in decreased economic benefits through loss of sales to Kitikmeot Foods, decreased dietary benefits through a lack of traditional foods for the household, decreased cultural or lifestyle benefits in terms of removal from traditional land-based activity, and decreased skill levels due to lack of practice and experience. In contrast, if participation is improved, the opposite effects could result.

The quality of traditional pursuits in the area may also be diminished by the industrial presence (*e.g.,* noise, dust, traffic) of mine activities. This may result in a less-positive experience, and may lead to lower participation in these pursuits.

Contamination of country foods, including wildlife, birds (and eggs), fish and vegetation, may arise from possible dust and water contamination. This may potentially result in health effects for those who consume these products. These concerns will be covered in a separate assessment of potential human health effects.

Tourism activities also have the potential to be affected. Baseline data suggests that water sports activities have the largest potential for direct project effects, particularly the use of the Hackett, Mara and Burnside rivers for canoeing, kayaking and rafting. Tourism operators, including the Bathurst Inlet Lodge, Nahanni River Adventures, and Bathurst Arctic Services, may face financial losses if the quality of these activities diminishes and tourism levels decline.

Proposed Mitigation

Mitigation measures will be developed to minimize potential disturbances to existing land users and land use patterns, including traditional and subsistence activities, and tourism.

Mitigation will include consideration of local land users during Project planning and development. Residents of Kingaok and Omingmaktok will be informed of Project activities on an ongoing basis, and recommendations by locals for adjustments to project plans will be considered by Sabina. Similar consideration will be given to tourism operators in the area, and for residents of Cambridge Bay and other communities as applicable.

The Hackett River Project will follow recognized Best Practice standards for control of noise, dust, water quality and other undesirable effects arising from the mine and traffic.

Work schedules for employees will allow consideration for seasonal land use activities, including annual hunting and fishing harvests. Efforts will be made to accommodate employees who wish to participate in short-term annual activities.

Sabina will provide a local contact for residents and land users in Kingaok/Omingmaktok and Cambridge Bay. This person(s) will act as a liaison between residents and Sabina, will facilitate the ongoing recording and monitoring of issues and concerns as they arise, and will communicate these issues to Sabina. Solutions to issues and concerns will be developed as required, and will be communicated to residents.

7.3.4.3 Socio-Economic (Including Employment and Training)

Potential Effects

Potential project-related impacts to the socio-economic /cultural environment may be positive or adverse and may include:

- Employment and income opportunities: creation of direct, indirect and induced employment, associated income-generating, and spending, opportunities, transition to a wage economy, changes to cost of living and tax revenue generation.
- Training and skills: creation of training, skills development and work experience opportunities to meet Project and spin-off requirements and improved self-esteem.
- Economic and business development: contractor and business opportunities through Project procurement procedures, territorial and regional economic diversification, competition with other sectors *e.g.*, tourism and tax revenue generation.
- Community health and well-being: changes to quality of life and health due to increased access to goods and services, changed spending habits and work schedules, changing roles and social networks in communities, changes to traditional activities and diet and contamination of traditional foods.
- Community infrastructure: pressure on community infrastructure due to changing population demands, loss of community workers to project and increased access to communities.
- Cultural stability and sustainability: cultural and language dilution, change in traditional activities, practices and diet and demographic changes (in and out migration, gender and cultural balance changes).

The Hackett River Project proposes to employ between 225 and 350 persons during construction and operations. Upon closure, the same number of jobs will be lost. The project will therefore generate a significant number of direct, indirect and induced jobs for northern residents. Income generation will result from employment opportunities, benefitting individuals, families and households, communities, the Kitikmeot region and Nunavut through wages and benefits, spending and tax payments. Spending habits have the potential to be affected in both positive (*e.g.*, increased access to health services) and adverse ways (*e.g.*, increased disposable income for drugs and alcohol) depending on individual spending decisions. The transition to a wage economy will also be compounded for some individuals and communities and result in a loss of more traditional activities and diet. As a result of growing wages amongst some community members, the cost of living and community inequalities may be affected.

Training and skills development will be provided through courses and on-the job opportunities directly with the project and indirectly with contractors and spin-off businesses. This will especially be important to allow Sabina to meet northern employment targets during a time of economic growth. Such opportunities, along with employment and income attractions, may encourage early departure from school or movement away from communities.

The procurement of goods and services will result in opportunities for business development. In turn, this may result in greater economic diversification for the region and Nunavut. The territory will also benefit from tax revenues. Expanding economic development through mining, however, may also adversely impact other sectors such as tourism and traditional activities.

Community health and well-being can be affected in a number of ways, both positive and adverse depending on the receiving community or individuals. Incomes and skills may result in improvements to quality of life due to increased access to goods and services and improved self-esteem. However, well-being and health may be adversely affected due to inappropriate spending (*e.g.*, drugs, alcohol) and associated behaviours (*e.g.*, violence, pregnancies, STDs). In addition, the transition towards a waged economy may result in a decrease in traditional activities and cultural diet. Project shift patterns and resulting family separation may cause family stress, and for community and social support networks.

Changing demands by community members, either through demographic change or changing habits, may result in pressures on community infrastructure including health and social services. Community infrastructure may also be adversely affected by the loss of workers to the Project *e.g.*, truck drivers. The increased movement of workers and associated transportation may result in an increased access to communities for goods, services and people.

Population change and a waged economy may result in cultural and language dilution. Opportunity for participation in traditional activities and cultural practices may be reduced. In and out migration and demographic changes (*e.g.*, increase in male and non-Inuit populations) may change community and cultural balances.

Proposed Mitigation

Sabina will negotiate an Inuit Impact and Benefit Agreement (IIBA) with the Kitikmeot Inuit Association. This agreement will seek to address potential socio-economic/cultural effects on the Inuit of the Kitikmeot region. Sabina will also seek to support Hamlets in the West Kitikmeot region to address potentially affected services and infrastructure for their residents.

Targets for Inuit and northern employees and contracts will be established for the Project. Associated programs will be developed to encourage access to opportunities through training, procurement and job application assistance and preferential hiring. Sabina will develop a community presence in the Project's closest communities to assist with job training and contract applications. Joint ventures with local companies and contractors will be encouraged.

A training needs analysis will be conducted, in partnership with Nunavut agencies where relevant, to develop a Project training plan. Training will focus on access for Inuit and local community members. Project training will also include cross-cultural training, life skills and transferable skills.

Company policies will include equal opportunity, anti-discrimination and health and safety measures to promote well-being. Examples include employee codes of conduct, zero tolerance and testing for drug and alcohol as well as on-going education in areas such as financial skills, communicable diseases, family planning and parenting, cultural practices and language. Culturally appropriate counselling services will be sponsored at site and in communities.

Project shift rotations and flexibility around traditional activities, especially harvesting, will be developed with local and Inuit guidance. Cultural education and country foods will be available on site where possible. Cultural events will be recognised and celebrated. Sabina will provide support for cultural and language programs and enterprises.

7.3.5 Potential for Transboundary Effects

For the purposes of this section, it is assumed that the potential for transboundary effects refers to potential environmental effects that could occur across the geographical boundary of Nunavut.

Most effects from the Hackett River Project will remain in the localized area around the mine site, the road to the port and the port site. All of these geographical areas are within Nunavut. All major watersheds that Project activities occur in are within the boundaries of Nunavut.

Air quality is by nature a potential transboundary effect, as vehicle, airplane, and ship emissions all contribute to the global nature of climate change. However, the source of the emissions will all remain within Nunavut, with the exception of airplane traffic originating from Yellowknife.

Some animals migrate over large distances, and have ranges both within and outside of Nunavut. These animals have the potential to interact with the Hackett River Project while in Nunavut, and as part of their life is spent outside of Nunavut, any potential effects could be considered transboundary effects. The following animals potentially travel or migrate through areas in Nunavut near the Hackett River Project as well as areas outside of Nunavut:

- Grizzly bears (Nunavut, Northwest Territories)
- Migratory birds (Nunavut, many areas outside of Nunavut)
- Caribou, in particular, the following herds:
  - Bathurst Herd (mainland Nunavut and mainland Northwest Territories, and possibly northern part of Manitoba; (GNT DENR 2006);
  - Ahiak Herd (mainland and along north coast in Nunavut; mainland Northwest Territories (GNT DENR 2006);
  - Dolphin and Union Herd along shipping route (Victoria Island, both Nunavut and Northwest Territories portions, crossing ice to mainland Nunavut; WKRLUP, 2005).
- Marine mammals along the shipping route. Eight species of marine mammals can occur along the shipping route: beluga whale, narwhal, bowhead whale, ringed seal, bearded seal, harp seal, walrus, and polar bear. Of these mammals, the harp seal, beluga whale, bowhead whale, narwhal, and polar bear have the potential of migrating to areas outside of Nunavut.
  - Harp Seal (Nunavut, Quebec, Labrador; Richard, 2001)
  - Eastern High Arctic-Baffin Bay population of beluga whales (Nunavut, Greenland; McLaren and Davis, 1983)
  - The Davis Strait-Baffin Bay stock of bowhead whales (Nunavut, possibly Quebec, Manitoba, Greenland; Koski *et al.* 2005 in press)

- Narwhals (Nunavut, Greenland; McLaren and Davis, 1982)
- Polar bears (Nunavut, Northwest Territories; Lunn *et al.* 2002).

Some socio-economic effects may be transboundary in nature depending on the source of workers, contractors, goods and services. The project proposes to transfer some workers and goods to the project site through Yellowknife in the NWT, resulting in potential employment and business opportunities in that area.

8. IDENTIFICATION OF POTENTIAL CUMULATIVE ENVIRONMENTAL EFFECTS

8. Identification of Potential Cumulative Environmental Effects

Section 7 of NIRB's Screening Part 2 Form, Project Specific Information Requirements (PSIR) requests that the proponent "discuss how the effects of this project interact with the effects of relevant past, present, and reasonably foreseeable projects in a regional context".

Cumulative effects can arise from multiple activities that happen concurrently or sequentially and can have a greater combined impact on an environmental component than those of individual activities.

For the purposes of identifying potential cumulative environmental effects, Table 8-1 presents past, present, and reasonably foreseeable developments in the Kitikmeot region of Nunavut. Other activities that will be considered in a draft EIS will include subsistence and commercial fish and wildlife harvesting, eco-tourism, sports hunting, and mineral and diamond exploration.

Table 8-1
Past, Present, and Reasonably Foreseeable Future Projects in the Kitikmeot Region, and Potential Cumulative Effects

Project	Project Status	Estimated Operating Period	Potential Interaction with Hackett	Potential General Cumulative Effects
Bathurst Inlet Port and Road	Potential Development	2009-2032	a) use of road and port b) use of shipping route	a)Increased vehicle traffic, dust, effects on wildlife b)Increased ship traffic, potential for spills, potential effects on marine wildlife, caribou crossing
Back River Project (George and Goose Lake)	Potential Development	2012-2024 (George) 2013-2020 (Goose)	use of road and port; closest potential mine to Hackett; projects would have overlapping regional wildlife study areas	Increased traffic, density of mines, potential effects on wildlife
High Lake Mine and Dock	Potential Development	2008-2026	No physical interaction. Caribou ranges may encompass both projects.	Potential socio-economic interaction; potential effects on caribou
Doris North	Potential Development	2008-2019	No physical interaction. Caribou ranges may encompass both projects.	Potential socio-economic interaction; potential effects on caribou
Hope Bay-Boston	Potential Development	n/a	No physical interaction. Caribou ranges may encompass both projects.	Potential socio-economic interaction; potential effects on caribou
Jericho Diamond Mine	Operating	2006-2013	No physical interaction. Caribou ranges may encompass both projects.	Potential socio-economic interaction; potential effects on caribou
Izok Lake	Potential Development	2009-2024	No physical interaction. Caribou ranges may encompass both projects.	Potential socio-economic interaction; potential effects on caribou

8.1 Identification of Biophysical Cumulative Effects

Some biophysical environmental components have the potential to be affected by the Hackett River Project and other projects. These potential cumulative effects are described below.

Climate, air quality, and noise

All activities in Nunavut affect these physical environmental components. The Hackett River Project, as a potential user of BIPR, will add to the vehicle and ship traffic, vehicle and ship emissions, and noise associated with BIPR.

Surface and groundwater quality and quantity

There are no other past, present, or foreseeable future projects within the regional watershed of the Hackett River project. As such, the potential for cumulative effects on these environmental components is minimal. The exception is the use of the BIPR road. Increased vehicle traffic could potentially increase dust (minimal effects on surface water quality), and potentially increase the risk of accidents and spills (adverse effects on surface water quality).

Freshwater aquatic organisms and fish

As with surface water, there is no potential for cumulative effects on freshwater organisms and fish from the Hackett mine site and other projects. However, the use of the BIPR road will add to vehicle traffic and the potential for accidents and spills, which could affect aquatic organisms and fish.

Ecosystems and vegetation

The Hackett River mine site does not have the potential of interacting with any other projects to adversely affect ecosystems and vegetation. However, the increase in vehicle traffic on the BIPR road could potentially increase dust and affect vegetation adjacent to the road.

Caribou

Because of the large migration patterns of caribou, these animals have the greatest chance of being affected by multiple activities in Nunavut. The protection of caribou in Nunavut requires high level, intergovernmental coordination, along with cooperation of projects and communities. Several herds have the potential to be affected by the Hackett River Project and other project/activities. The Bathurst, Ahiak, Dolphin and Union, and Peary herds have ranges that potentially encompass the Hackett mine and/or its access via the BIPR road and shipping route. Potential cumulative effects on these herds include habitat loss, disturbance, disruption of movement, a reduction in reproductive productivity, and indirect or direct mortality.

Muskox

Muskox do not have large migration ranges as do caribou. Their home range size is typically around 70 km^2 (Reynolds, 1998). The Hackett River Project is close enough to one potential development (George Lake, Back River Project) to potentially result in cumulative effects to Muskox. The BIPR road is also within 70 km of the Hackett River mine site. Hackett River will also contribute to more vehicle traffic along the northern portion of the BIPR road. Mining activities and road use could potentially cause the disruption of movement and disturbance of Muskox, among other effects.

Grizzly Bears, wolverines, and wolves

These animals have large home ranges, and can therefore be affected by numerous projects. The presence of the Hackett River mine and other potential mines in Nunavut, and the presence and use of BIPR could potentially cause the disruption in movement, a reduction in reproductive productivity, and, and other disturbances to these animals. Projects can also act as attractants for these animals.

Migratory birds

Migratory birds have large ranges and have the potential to be affected by many projects in Nunavut. The Hackett River mine site and access, including the shipping route, encompasses the range of many migratory bird species. The Hackett River project in conjunction with other projects (*e.g.*, BIPR) have the potential to act as attractants to migratory birds (lights), and cause direct and indirect mortality.

Marine water quality, sediment quality, aquatic life, fish, and habitat

No construction activities will take place in marine waters as part of the Hackett River Project. The dock infrastructure will already be in place should BIPR proceed. Hence, the only potential for cumulative effects on these marine environmental components is via increased ship traffic to the port. The transfer and handling of fuel and concentrate has the potential to increase the risk of spills at the port and in Bathurst Inlet. Also, the increased traffic along the shipping route also has the potential to increase the risks of accidents and spills, and increases the presence of ships and noise associated with ships. These activities have the potential to affect marine environmental components.

Marine mammals, polar bears, and seabirds

The only potential for cumulative effects on marine wildlife is via increased ship traffic to the port. The increased traffic along the shipping route has the potential to increase the risks of accidents and spills, and increases the presence of ships and noise associated with ships. These activities have the potential to disturb marine wildlife (*e.g.*, disrupt their movement, feeding, *etc*.), potentially contaminate their food, and potentially cause indirect and direct mortality.

It should be noted that there are no other known projects in the immediate area of Hackett River. There are also no known projects within the regional watershed of the Hackett River Project. The only physical interaction with Hackett River and other projects would be via the BIPR port and road.

8.2 Identification of Social, Cultural and Economic Cumulative Effects

The development of the Hackett River project, as well as any number of other potential projects, may result in cumulative and compounded effects to the social, economic and cultural environments. Cumulative effects may be positive or adverse and be experienced at the territorial, regional, cultural, community, household and individual level. A discussion of potential cumulative effects is provided below based on project identified VSECs. Overall, cumulative effects mirror but compound those identified at the project level.

Economic

Employment, business and income opportunities for residents of the Kitikmeot region, as well as other areas of Nunavut and the Northwest Territories, are potentially significant cumulative effects. Given current levels of unemployment and income, economic opportunity and diversification may result in benefits for those directly engaged in the projects as well as broader community members and regions through spin-off effects and induced development. The combination of outcomes such as incomes, benefits, training and tax revenues may bring about positive effects such as improved quality of life, access to goods and services, increased purchasing power, improved individual and community well-being, declining unemployment and regional economic development. The development of business opportunities to support the projects will further enhance and diversify local and regional development and the sustainability of the economy.

However, if all projects proceed there will be a shortage of local workers to take up opportunities. As a result, companies may have difficulty meeting northern worker quotas and the numbers of non- Nunavummiut and non-Inuit workers would increase. This in turn may result in competition between companies for workers, the inability of less high paying sectors to compete for local workers, the leakage of benefits away from local communities and changing demographics as more non- Nunavummiut are attracted to the area.

In addition, if sustainable and diversified development has not been planned for then job and business losses upon closures could be substantial. This would potentially result in increasing unemployment and associated trends.

Social

Current levels of social capital and issues are likely to be affected by the cumulated pressures of multiple projects. Cumulative impacts might include improved social status, health and quality of life due to economic improvements, as well as compounded social issues as spending habits and behaviours change. For example, social issues like drug and alcohol use may grow with project developments due to increasing disposable incomes and access. In turn, this can further magnify associated issues such as violence, STIs/STDs, pregnancies, physical and mental health issues, and criminal offenses.

An increase in such social issues could lead to pressures on social capital and coping strategies and so create a growing demand for more and new social and health services. Social capital will also be affected as increasing numbers of households are engaged in shift work. As more projects develop and more community members are employed there, family stress and changing family, cultural and gender roles may also increase.

However, with an increased number of IIBAs and mitigation measures provided by projects, the provision for communities and individuals to deal with social issues may improve.

Culture

The pursuit of traditional economic and cultural activities may decline as increasing numbers of Nunavummiut are engaged in waged employment and shift work with resource developments.

This is seen to interrupt the learning process between youths and Elders, result in a loss of skills and cultural dilution and change local diets. However, evidence from NWT suggests that increased incomes and shift work can also result in increased activity levels due to improved financial and time resources. Also, increased support for cultural activities and events by resource projects may help to sustain traditional and cultural learning.

The dilution of language is also a concern as growing numbers of Nunavummiut are engaged in waged opportunities with non- Nunavummiut resource companies. Again, increased support and recognition by resource companies may help to preserve languages.

Land use

Increased mineral development in the Kitikmeot region may limit the land use by Inuit groups and other users within the area. Despite the small footprint of each project, the cumulative effects of increased access and competing use of areas may result in adverse effects and decline in other activities.

9. ENVIRONMENTAL PLANS

9. Environmental Plans

As part of protecting the environment and minimizing environmental effects from the Project to the extent possible, many environmental plans will be developed both before and during the operation of the mine. Many plans will be required before various permits and authorizations will be granted, while others will help Sabina to educate and train employees, and provide feedback on how its operations are influencing the physical, biological, and socio-economic environments. At this early phase of the Project, only a few environmental plans are discussed in this report, including:

- An overall Environmental Management Plan
- An Environmental Awareness Program
- An overall Environmental Monitoring Program, of which there would be many specific monitoring programs for various environmental components; and
- A general Closure and Reclamation Plan.

These plans, among others, will be more fully developed for inclusion in a draft Environmental Impact Statement (EIS) in the future.

9.1 Monitoring and Maintenance Plans

A project EMS (Environmental Management System) will be implemented to provide a systematic method for managing the expected and potential interactions of the Project with the biophysical environment. It will consist of three key elements: an integrated environmental management plan, a formal environmental awareness program, and an ongoing environmental monitoring program. These elements are described below.

9.1.1 Environmental Management Plan

An integrated *Environmental Management Plan* (EMP) will outline how the Project will be operated to manage the interaction between the project components, activities, and the biophysical environment to prevent or mitigate adverse impacts. The EMP will be prepared by Sabina prior to Project construction and will include some or all of the following plans:

- Environmental Protection Plans
- Quarry Management Plan
- Aquatic Management Plans
- Processed Ore Containment Management Plan
- Wildlife Management Plans
- Mine rock and Till Storage Management Plan
- Emergency Response and Contingency Plans
- Dredged Lakebed Sediment Management Plan

- Occupational Health and Safety Plan
- Closure and Reclamation Plan
- Human Resources Plan
- Exploration Environmental Management Plan
- Traffic Management Plan
- Community/Inuit Involvement Plan
- No-Net-Loss Plan
- Waste Management Plan
- Construction Area and Activity Management Plan
- Water Management Plan
- Operations Area and Activity Management Plan.
- Hazardous Materials Management Plan
- Blasting/Explosives Management Plan

Mitigation procedures for construction, operation, temporary closure, and closure will be integrated into the EMP to ensure that development is proceeding as predicted and can be maintained in an acceptable state. The Project will be monitored on a "first alert" basis to allow any problems to be quickly detected and clearly understood so changes in mitigation measures or design can be made accordingly. The EMP will also ensure mitigation measures are implemented correctly, project effects on biophysical or socioeconomic VECs/VSECs are documented, natural changes in the environment (distinguishing them from project-related impacts) are measured, the effectiveness of reclamation efforts is measured and permit requirements are being met.

9.1.2 Environmental Awareness Program

A *formal environmental awareness program* will inform employees, contractors and visitors to environmental commitments made by Sabina, as well as the expected code of conduct and environmental stewardship of all people on site. The objective is to inform and raise awareness of the EMS in the workforce and with visitors to ensure that environmental protection is a constant priority with everyone on site.

9.1.3 Environmental Monitoring Program

An ongoing *environmental monitoring program* will be integrated into the EMS as a tool to provide feedback on how well impacts have been predicted and to allow appropriate corrective actions to be taken, should unexpected impacts occur. A comprehensive monitoring program will be developed for the project as required by the terms and conditions of the Project's permits and licenses.

Monitoring programs that will likely form components of the overall environmental monitoring program for the Hackett River Project include, but are not limited to, the following:

- Environmental Effects Monitoring Program
- Aquatic Effects Monitoring Program
- Wildlife Effects Monitoring Program
- Air Quality Monitoring Program
- Surveillance Network Monitoring Program
- Site Drainage Chemistry Monitoring Program

Sabina is committed to working with the regulatory agencies and landowners to develop an appropriate environmental monitoring program for the Hackett River Project. It is expected that the requirements for monitoring the biophysical, socioeconomic, cultural and heritage resources throughout the life of mine will be part of the terms and conditions of the Project's licenses, permits and the IIBA.

Monitoring programs will be modified throughout the life of mine to address policy and regulation changes and to benefit from technological advances where improvements can be clearly demonstrated. The primary objective will be to maintain compliance with the regulations and requirements governing the project. ISO 14001 protocols will be used as a guide to audit project performance and demonstrate continuous improvement during the operating period.

9.2 Closure and Reclamation Plan

A Closure and Reclamation Plan will be developed for the proposed Hackett River Project, which will address how the facilities associated with the mining operations, local and access roads and the air strip will be reclaimed and closed.

Planning for reclamation and closure is mandated by the Nunavut Impact Review Board (NIRB) (NIRB, 2006) as well as through the Mine Site Reclamation Policy for Nunavut (DIAND, 2002) as part of receiving a permit to construct the Project. Therefore, the Closure Plan must be sufficient to provide confidence to the government bodies that closure, decommissioning and reclamation will be successful. The abandonment and reclamation activities will present practices and treatments that are available to achieve appropriate abandonment goals and objectives. All reclamation activities will be done in accordance with the final closure plan as approved by the land use authorities and will be subject to terms and conditions including those required by Sabina and the various government agencies.

9.2.1 Objectives

The closure and reclamation plan will be designed to meet several objectives:

- to protect the environment through sound reclamation practices;
- to restore the land to its original state as closely as possible;

- to restore land uses (*e.g.*, creating wildlife habitat and/or promote habitat recovery);
- to minimize effects to aquatic habitat and water quality with proper engineering; and
- to ensure that reclaimed and abandoned areas are safe and do not pose health and safety risks.

The goal of the Closure and Reclamation Plan will be to carefully plan the development of the Project such that all facilities can be closed and the lands they occupy can be reclaimed with minimum residual effect on the environment. Planning for reclamation, construction, and operation/maintenance of the components of the Project will incorporate techniques to minimize surficial disturbance and to progressively reclaim areas affected during the construction and operation phases. Progressive reclamation is critical for minimizing the effects on the environment. Stabilizing and rehabilitating surfaces reduces the potential for degradation of the resources due to extended exposure to climatic factors. Careful planning before beginning Project construction will allow for the successful closure and reclamation of the Project.

The environmental management and monitoring systems developed for the Project will ensure terrestrial, aquatic, heritage, and archaeological resources are sufficiently protected on an on-going basis during Project construction, operations, and post-closure.

Closure of the pits, waste rock piles, and TMF will be developed based on the final design of these facilities. Generally, efforts will be made to treat and/or to store safely all contaminated soils, in accordance with land use regulations, as expeditiously as possible and on an on-going basis to minimize the accumulation of such materials on-site. Areas not used for the operation phase will be progressively reclaimed as time and equipment permits. Revegetation of disturbed sites as soon as possible will reduce the potential for environmental degradation as it will minimize the amount of surface disturbed and exposed to erosion.

Native seed will be used for revegetation purposes throughout the Project area. The use of native seed on reclaimed areas will provide a preliminary vegetative cover which will likely infill naturally with native plants from adjacent areas resulting in a more complex vegetative community with time. The invasion of native plants, with time, will vary according to site conditions.

9.2.2 Reclamation Planning/Soil Handling

Reclamation planning will require the salvage and storage of soils suitable for reclamation and the design of all earth structures, cuts, fills, and stream embankments, as near as possible, to closure conditions. This will include contouring all erosion prone surfaces and slopes, excavations, and embankments (except when in solid rock) to a stable slope.

The Project area is characterized by low lying ridges and wide, level areas. Boulder fields are common as well as exposed bedrock. Moranial material is common and occurs as thin, thick or intermittent deposits. This is the dominant surficial material that could be used for reclamation. The Project area also consists of several large and small lakes often linked by creeks lined with boulders. Sedge meadows are common around some of these water bodies. The soils in these areas are generally developed on fluvial and lacustrine materials and may have an organic capping.

The following information will be considered for reclamation activities:

- pre-mine land use and proposed land use objectives;
- pre-mine land capability or productivity and proposed post-mine capability or productivity objectives for all significant land uses. This information is required to create the proposed reclamation program and is used to measure reclamation success;
- pre-mine trace element concentrations in soils and vegetation;
- characterization of the soils and overburden resource for reclamation purposes;
- characterization of surficial and bedrock materials for geotechnical and geochemical assessments;
- plans for salvaging, stockpiling, and replacing soils and other suitable growth media; and
- consideration of future erosion and mass wasting for long-term stability.

Ideally soils will be salvaged from areas which will be disturbed due to the Project, but available soil is limited. The presence of boulders on the surface can interfere with salvaging of soils. Rock picking of boulders may be an option in order to salvage soil. Soils suited for reclamation that can be salvaged will be stockpiled in an area where they will not be disturbed until required for reclamation.

Stockpiled soils are susceptible to water erosion, and wind erosion when dry. Therefore, the stockpiled soils will be seeded with a certified weed free native seed mix that has been found to be successful in this climate and region (Martens, 2007):

- alpine bluegrass (*Poa alpina*): 40%;
- tufted hairgrass (*Deschampsia ceaspitosa*): 40%; and
- spike trisetum (*Trisetum spicatum*): 20%.

The seed mix will be Canada No. 1 grade to minimize the potential of introducing unwanted plants. The seed will be applied at a rate of between 8 to 10 kg/ha with fertilizer (16-16-16 NPK) at approximately 50 kg/ha (Martens, 2007) on the stockpiles. A chemical analysis will be carried out to assess the appropriate fertilizer rate.

Where the soils to be salvaged have a thick organic cover, it will be mixed with the underlying soils during the salvage operation as this material has a tendency to become desiccated and hydrophobic if stored separately. It is also subject to wind erosion when dry. The incorporation of this material with the subsoil should support the soil structure, be a source of nutrients, and improve the moisture and nutrient holding capacities of less suitable soils.

Effort will be made not to salvage the soils when they are excessively wet. They can be salvaged when they are frozen. Topsoil will be salvaged and stockpiled separately from the underlying soils, if possible. Topsoil is nutrient rich and therefore this material, when used as a cover, generally results in more successful revegetation. Salvage will also include the vegetation growing on the soils. The plant material can provide maintenance of the soil structure due to the benefits of roots and the incorporation of plant material. Further, the incorporated plant material generally includes native seeds and plants as well as microorganisms which can accelerate the establishment of native vegetation when used as a cover.

Wet soils have poor stability. They may require temporary berming to allow for them to drain sufficiently to be stockpiled.

9.2.3 Monitoring and Reporting

Post closure monitoring will be conducted in the Mine Site area, along the road, at stream crossings, quarry sites and the port area to ensure closure and associated reclamation efforts remain effective in the longer term. Post closure monitoring will include, but not be limited to:

- soil erosion monitoring;
- revegetation success;
- terrestrial habitat use; and
- water quality and possibly quantity in water courses adjacent to or downstream of decommissioning and reclamation activity, according to parameters and guidelines agreed by NIRB and the Nunavut Water Board.

Monitoring and reporting will be performed as required in the final Closure and Reclamation Plan as approved by NIRB, INAC, the Nunavut Water Board and other regulatory agencies.

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APPENDIX A
NIRB SCREENING FORMS

A1 – PART 1 FORM (ENGLISH)

PART 1 FORM
PROJECT PROPOSAL INFORMATION REQUIREMENTS

For more information about the Nunavut Impact Review Board (NIRB) please visit our web site http://nirb.nunavut.ca/ or to access NIRB documents, project screenings, and project reviews please visit the Nunavut Impact Review Board ftp site http://ftp.nunavut.ca/nirb.

IMPORTANT!

Please be advised that your application will not be processed until the Sections 1 - 9 are completed in their entirety, in both English and Inuktitut (+ Inuinnaqtun, if in the Kitikmeot).

SECTION 1: APPLICANT INFORMATION

1. Project Name **Hackett River Project**

2. Applicant's full name and mailing address:

Sabina Silver Corporation

1004 Alloy Drive
Thunder Bay, ON P7B 6A5

Phone: 807-766-1799
Fax: 807-343-0232
Email: abrantley@sabinasilver.com

3. Primary contact's full name and mailing address:

Albert Brantley, President & CEO

1004 Alloy Drive
Thunder Bay, ON P7B 6A5

Phone: 807-766-1799
Fax: 807-343-0232
Email: abrantley@sabinasilver.com

SECTION 2: AUTHORIZATION NEEDED

1. Indicate all authorizations associated with the project proposal:

X	Regional Inuit Association (RIA)		Canadian Launch Safety (CLS)
X	Nunavut Water Board (NWB)	X	Environment Canada (EC)
	Nunavut Planning Commission (NPC)	X	Government of Nunavut (GN)
X	Indian and Northern Affairs Canada (INAC)		Department of National Defense (DND)
X	Department of Fisheries and Oceans (DFO)		Hamlet
	Community Government & Services (CG&S)		Parks Canada (PC)
X	Nunavut Research Institute (NRI)		Canadian Wildlife Service (CWS)
X	Department of Culture, Language, Elders, and Youth (CLEY)		Other (please specify):

2. List the active permits, licenses, or other authorizations related to the project proposal, and their expiry date(s):

Water Licence (Type B) 2BE-HAK0709 March 2, 2007 to December 31, 2009
Surface Lease # 76F/16-1-3 October 2, 1976 to October 2, 2018
Mining Lease 2958 Lot number 076F16 Sept. 19, 1979 to Sept. 19, 2021
Mining Lease 2789 Lot number 076F15 February 10, 1976 to February 10, 2018

Mining Lease 2895 Lot number 076F16 January 4, 1979 to January 4, 2021
Mining Lease 2964 Lot number 076F16 January 15, 1980 to January 15, 2022
Mining Lease 2893 Lot number 076F16 July 12, 1978 to July 12, 2020
Mining Lease 3018 Lot number 076F16 February 24, 1981 to February 24, 2023
Mining Lease 3000 Lot number 076F16 June 26, 1980 to June 26, 2022
Land Use Permit N2004C0005 April 7, 2007 to April 7, 2008
Inuit Land Use Licence KTL303C010 March 18, 2007 to March 17, 2009
NRI Social Sciences and TK Research Permit 0400807N-M June 1, 2007 to October 1, 2008
NRI Land and Water Research Permit 0400607N-M April 1, 2007 to December 31, 2010
GN Wildlife Research Permit WL000828 May 15, 2007 to December 31, 2007
GN Archaeology Permit 07-022A June 11, 2007 to December 31, 2007
DFO License to Fish for Scientific Purposes S-07/08-1032-NU June 28, '07 to Oct. 30, '07
DFO Animal Use Protocol Permit FW1-ACC-2007-2008-050 Jun 28, '07 to Oct. 30, '07

3. List the pending permits, licenses, or other authorizations related to the project proposal:

Water Licence (Type A)-Nunavut Water Board
Fisheries Authorization-DFO
Schedule 2 Amendment to MMER-Environment Canada
Land Use Permit-INAC
Inuit Land Use Licence-KIA

Research Permits:
NRI Social Sciences and TK Research Permit
NRI Land and Water Research Permit
GN Wildlife Research Permit
GN Archaeology and Palaeontology Permit
DFO License to Fish for Scientific Purposes
DFO Animal Use Protocol Permit

4. Has this project or any components of this project been previously screened or reviewed by NIRB?

X YES **NO**

If YES, indicate the previous project name and NIRB File No.

NRI Land & Water Research Permit-NIRB# 07YN030
Inuit Owned Land Licence-NIRB #04EN012
BIPR Project Proposal & Draft EIS Guidelines-
NIRB# 03UN114

Note: Hackett will use the BIPR road from the mine site to the Port. Hackett will also use the Port Facilities.

SECTION 3: PROJECT PROPOSAL DESCRIPTION

1. Indicate the type of project proposal (check all that apply)(1,2):
(See Appendix A for Project Type Definitions)

1	All-Weather Road/Access Trail	X	**9**	Site Cleanup/Remediation	
2	Winter Road/ Winter Trail		**10**	Oil and Natural Gas Exploration/Activities	
3	Mineral Exploration		**11**	Marine Based Activities	X
4	Advanced Mineral Exploration	X	**12**	Scientific/International Polar Year Research*	
5	Mine Development /Bulk Sampling	X	**13**	Harvesting Activities*	
6	Pits and quarries	X	**14**	Tourism Activities*	
7	Offshore Infrastructure (port, break water, dock)	X	**15**	Other(2):	
8	Seismic Survey				

Please note:

1. All project types listed above, except those marked with an asterisk (*), will also require the Proponent to submit a **Part 2 Project Specific Information Requirement (PSIR) Form**. The NIRB application process will not be considered complete without the Part 2 PSIR Form.
2. Please be advised that in order to complete the NIRB process, the NIRB may request additional information at any time during the process.
3. If "Other" is selected, contact NIRB for direction on whether a Part 2 PSIR Form is required.

2. **If Project Type 3, 4 or 5 was selected above, please indicate the mineral of interest that is being extracted. Include a brief description.**

X	Base Metals (zinc, copper, gold, silver, etc)	zinc, copper, lead, silver, gold; 2 open pits, 1 underground
	Diamonds	
	Uranium	
	Other:	

3a. **If Project Type 13, 14 or 15 was selected above, complete the table and questions below.**

Not Applicable

Transportation Type	Quantity	Proposed Use	Length of Use

3b. Describe any docks, piers, air strips or related structures that are to be used in conjunction with the proposed project activities. **Please note**: the building of new structures may require a Part 2 Form.

Not Applicable

3c. If a temporary camp site is to be established, describe the proposed structures in detail and indicate the type and source of power for the camp site if applicable.

Not Applicable

4. **Personnel (these numbers are based on camp capacity)**

Total No. of personnel on site = (A)	Total No. of days on-site = (B)	Total No. of Person days (A) x (B)
300	365/yr	**(A) x (B) = 109,500/year**

5. **Timing**

Period of operation: from **2011 (start construction)** to **2027 (does not include decommissioning)**

Proposed term of authorization: from **January 2010** to **December 2030**

6a. Region **(check all that apply):**

- [ ] North Baffin
- [ ] South Baffin
- [ ] Kivalliq
- [ ] National Park
- [X] Kitikmeot
- [ ] Transboundary: ____________

6b. Describe the location of the proposed project activities in a regional context, noting the proximity to the nearest communities and any protected areas.

Mine Site: Approximate centre is 65°55; North Latitude, 108°30' West Longitude, approximately 75

km south of Bathurst Inlet. Approximately 360 km SE of Kugluktuk, and 360 km SW of Cambridge Bay. The Mine Site is not located near any existing or proposed conservation areas.

Access to the mine site will include air, marine, and overland considerations. An airstrip will be constructed at the mine site and concentrate storage and loading facilities will be constructed at the proposed Bathurst Inlet Port and Road (BIPR) Port Site, approximately 100 km to the north. Hackett River will be a customer to BIPR. Overland considerations include an all-weather road, approximately 25 km, that will connect the mine site with the BIPR road.

Approximately 80 km of the BIPR road will be used to transport concentrate to the Port Site located on Bathurst Inlet.

The BIPR Project is currently in the review process with NIRB. However, the following details the locations of the Port and Shipping Route.

Port Site: Located on southern part of Bathurst Inlet. The Port Site is 50 km away from Wilberforce Falls and the Hiukitak River conservation area.

The shipping route used for transporting goods in and out of the Port has been screened and reviewed as part of the BIPR Project. Within the West Kitikmeot Region, the shipping route passes near the Queen Maude Gulf Migratory Bird Sanctuary, and conservation areas for bird habitat (Jenny Lind Island) and polar bear denning locations in Victoria Strait and Larsen Sound. Outside of the West Kitikmeot Planning Region the shipping lane passes near Prince Leopold Island Bird Sanctuary and Sirmilik National Park. The Northwest Passage is currently a proposed sanctuary/heritage site.

6c. Discuss the history of the site if it has been used for any project activities in the past.

Geological exploration activities have taken place around the Mine Site Area from 2004 to present by Sabina. Comprehensive environmental baseline studies were conducted in 2007, and will continue in 2008.

6d. Indicate if there are any known archaeological/palaeontological historical sites in the area.

Archaeological sites were recorded in the Project Area during the 2007 field investigation (see permit 07-022A). Approximately 30 sites were recorded. These sites will be detailed in the required permit report.

7. Land Status (check all that applies):

[x] Crown	[ ] Commissioners'	[ ] Municipal
[x] Inuit Owned Surface Lands	[ ] Inuit Owned Sub-Surface Lands	

8a. Co-ordinates (box around Mining Leases):

UL (degree/minute)	108° 39' 40.10" W 65° 59' 11.58" N	UR (degree/minute)	107° 58' 16.39" W 65° 53' 55.46" N
LL (degree/minute)	108° 43' 41.73" W 65° 55' 43.57" N	LR (degree/minute)	108° 4' 48.20" W 65° 48' 33.29" N

NTS Map Sheet No: Mine: 76F-16, 76F-15 (1:50,000) Spur Road: 76G-13 (1:50,000)
(Please ensure that maps of the project are attached (1:50,000 **if available**, 1:250, 000 **Mandatory**) available from Natural Resources Canada)

8b. If the project proposal includes a **camp**, please provide the coordinates of the camp location
Note: this is one possible location for a camp; alternate sites are also being considered

Min Lat (degree/minute)	65° 55' 11.45" N	Min Long (degree/minute)	108° 32' 2.50" W
Max Lat (degree/minute)		Max Long (degree/minute)	

If different from above for the camp:
NTS Map Sheet No: 76F-16 (1:50,000)
Please ensure that maps of the project are attached (1:50,000 **if available**, 1:250, 000 **Mandatory**) available from Natural Resources Canada

Please note that additional location information may be required in a subsequent Project Specific Information Requirement (PSIR) submission. This may take the form of a digital Geographic Information Systems (GIS) file.

SECTION 4: NON-TECHNICAL PROJECT PROPOSAL DESCRIPTION

Please include a non-technical description of the project proposal, no more than 500 words, in English and Inuktitut (+Inuinnaqtun, if in the Kitikmeot). The project description should outline the following:

- The project activities, their necessity and duration;
- Method of transportation;
- Any structures that will be erected (permanent/ temporary);
- Alternatives considered; and
- Long-term developments, the projected outcome of the development for the area and its timeline.

The Non-Technical Project Proposal Summaries are included in Appendix A of the Project Proposal. Summaries are provided in English, Inuktitut, and Inuinnaqtun.

IMPORTANT: IF THE PROPOSED ACTIVITIES REQUIRE SUBMISSION OF A **NIRB PART 2 PSIR FORM**, PLEASE COMPLETE **SECTION 8** ONLY, OTHERWISE CONTINUE ON WITH **SECTION 5**.

SECTION 5: MATERIAL USE

This section is left intentionally blank-a NIRB Part 2 PSIR Form has been completed

1. **List equipment to be used (including drills, pumps, aircraft, vehicles, etc.):**

Equipment type and number	Size – dimensions	Proposed use

2a. **Detail fuel and hazardous material use:**

Fuel	Number of Containers and Capacity of Containers	Total Amount of Fuel (in Litres)	Proposed Storage Methods
Diesel			
Gasoline			
Aviation fuel			
Propane			
Other			
Hazardous Materials and Chemicals		**Total Amount of Hazardous Materials and Chemicals (in Litres)**	

2b. Describe the proposed Spill Prevention Plan.

____

____

____

____

3a. Detail the anticipated daily water consumption rates

Daily amount (m^3)	Proposed water retrieval methods	Proposed water retrieval location

3b. Have you applied for a water License with the Nunavut Water Board?

☐ **YES** ☐ **NO**

If yes, what class of licence?

☐ **Class A Water Licence**

☐ **Class B Water Licence**

SECTION 6: WASTE DISPOSAL AND TREATMENT METHODS

This section is left intentionally blank-a NIRB Part 2 PSIR Form has been completed

1. **List the types of waste associated with the proposed project activities:**

Type of waste	Projected amount generated	Method of Disposal	Additional treatment procedures

Sewage (human waste)			
Greywater			
Combustible wastes			
Non-Combustible wastes			
Overburden (organic soil, waste material, tailings)			
Hazardous waste			
Other:			

2. Describe the proposed Waste Management Plan.

SECTION 7: COMMUNITY INVOLVEMENT & REGIONAL BENEFITS

This section is left intentionally blank-a NIRB Part 2 PSIR Form has been completed

1. List the community representatives that have been contacted and provide the minutes of the meetings if available:

Community	Name	Organization	Date Contacted

SECTION 8: GENERAL QUESTIONS

1. Will you be disturbing any known archaeological sites?

YES **X NO**

Please sign and date your application:

[signature] President / CEO 15/01/08

Signature **Title** **Date**

APPENDIX A
Project Type Definitions

Access Trail: A project proposal with the objective of providing vehicular access to an area of interest involving minimal alteration to the terrain.

Advanced Exploration: A project proposal with the objective of identifying size, grade, and physical characteristics of a mineral occurrence and to assess the economic and technical feasibility of developing the mineral deposit into a producing mine

All-Weather Road: A project proposal with the objective of road construction for use in all seasons.

Bulk Sampling: A project proposal with the objective of extracting of large samples of mineralized material involving hundreds to thousands of tonnes. Samples are selected as representative of the potential mineral deposit being sampled. May involve crushing/milling (on small-scale)

Harvesting activities: A project proposal with the objective of harvesting animals, marine mammals and/or fish from their natural habitats by means of hunting or trapping for traditional and commercial use.

Marine Based Activities: Any activity occurring in the marine environment, such as vessel use associated with land-based activities or disposal at sea.

*Please note that normal community re-supply or individual ship movements not associated with land-based project proposals shall not be screened by NIRB (Section 12.12.2 of NLCA).

Mine Development: A project proposal with the objective of extracting broken rock with mineralization of sufficient grade and tonnage to sustain commercial mining operations (ore). Mining a body of ore can be achieved by either open pit and/or underground development. Mine development may involve milling. Milling involves treatment of the extracted ore through a combination of mechanical and chemical processes to selectively recover the valuable mineral.

Mineral Exploration: A project proposal with the objective of exploring an area to find geological anomalies. It involves site reconnaissance (ground and/or air) to locate broad and fiscal mineral deposits.

Offshore Infrastructure: A project proposal with the objective of building off loading facilities constructed off the shoreline and connected to the mainland of the marine or freshwater environment. Examples include a jetty, dock, or port facility.

Oil and Gas Exploration/Activities: A project proposal that includes 1) exploration, such as seismic or geological mapping, 2) drilling of oil and gas wells, 3) construction and operation of a pipeline, a gas processing plant or any oil and gas facility within Nunavut.

Pits and Quarries: A project proposal with the objective of pitting, which involves the extraction of granular material (i.e. sands and gravels) and quarrying, which involves the removal of consolidated rock (i.e. bedrock, frozen soil).

Scientific Research: A project proposal with the objective of implementing a series of site activities comprised of observation of phenomena, measurement and collection of data necessary for scientific investigation in designated areas within a limited time period.

Seismic Survey: A project proposal with the objective of conducting a survey to map the depths and contours of rock strata by timing the reflections of sound waves released from the surface. Survey site locations may be offshore (not within 12 nautical miles of any coast), near shore, and extended onshore.

Site Cleanups: A project proposal with the objective of site cleanups (includes DEW line site cleanups), which focuses on the remediation of chemically contaminated soils, stabilization of landfills and dumps, demolition/disposal of infrastructure and debris and monitoring after cleanup is completed.

Tourism Activity: A project proposal with the objective of conducting travel predominantly for recreational, sport or leisure purposes within a designated area and limited time period.

Winter Road: A project proposal with the objective of building a road for winter use by leveling and compacting surface snow and ice. Winter road is removed at end of season.

Winter Trail: A project proposal with the objective of building a trail for winter use by a single pass of a tracked vehicle using a blade, if necessary.

A2 – PART 1 FORM (INUKTITUT)

ᐃᓚᖓᑦ 1 ᑕᑕᑎᕈᑦ
ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᒻᒧᑦ ᑐᑭᓯᐊᕈᑎᓄᑦ ᒪᓕᒃᑯᔭᐅᔪᑦ

ᑐᑭᓯᐊᒃᑲᓂᕈᒪᒍᕕᑦ ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᖃᐅᔨᓴᖅᑎᐅᔪᑦ ᑲᑎᒪᔨᖏᓐᓂᒃ (NIRB) ᐊᑏ ᐳᓚᕋᕐᓂᐊᖅᐸᐃᑦ ᖃᕆᑕᐅᔭᑎᒍᑦ ᐅᐸᒃᕕᖓᓄᑦ http://nirb.nunavut.ca/ ᐅᕙᓘᓐᓃᑦ ᐱᔪᒪᒍᕕᑦ NIRB-ᑯᑦ ᑎᑎᖅᑲᕐᑯᑎᖏᓐᓂᒃ, ᐱᓕᕆᐊᓂᒃ ᖃᐅᔨᓴᕐᓂᕆᔭᐅᔪᓂᒃ, ᐊᒻᒪ ᐱᓕᕆᐊᓂᒃ ᕿᒥᕐᕈᓂᕐᒥᒃ ᐅᐸᒡᒍᒍ ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᖃᐅᔨᓴᖅᑎᐅᔪᑦ ᑲᑎᒪᔨᖏᑦᑕ ᑎᑎᖅᑲᓂᒃ ᓂᑕᐅᔪᓐᓇᖅᑐᓂᒃ ᐅᐸᒃᕕᖓᓂᒃ http://ftp.nunavut.ca/nirb.

ᐱᒻᒪᕆᐅᓂᓚᒃ!
ᐊᑏ ᖃᐅᔨᒪᒋᑦᑎ ᐱᓇᓱᐊᕈᑏᑦ ᑲᔪᓯᑎᑕᐅᓂᐊᖏᑦᑐᖅ ᑭᓯᐊᓂ ᐃᓚᖏᓐᓂᑦᑐᑦ 1-ᒥ 9-ᒧᑦ ᑕᑕᑎᑦᑎᐊᖅᓯᒪᒍᑎᒃ, ᑕᒪᒃᑯᖅ ᐊᑐᕐᓗᒋᑦ ᖃᑦᑐᓈᑎᑐᑦ ᐊᒻᒪ ᐃᓄᒃᑎᑐᓪᓗ (ᐃᓚᓕᐅᑎᖃᑕᐅᓗᒍ ᐃᓄᐃᓐᓇᖅᑐᑎᑐᑦ, ᕿᑎᕐᒥᐅᑕᐅᔪᖃᕈᓂ).

ᐃᓚᖓᑦ 1: ᐱᓇᓱᐊᖅᑑᑉ ᑐᑭᓯᐊᕈᑎᖓᑦ

1. ᐱᓕᕆᐊᑉ ᑕᐃᔫᓯᖓᑦ <u>Hᐋᑭᑦ ᓇᕗ ᐱᓕᕆᐊᖅ</u>

2. **ᐱᓇᓱᐊᖅᑑᑉ ᐊᑎᓗᒃᑖᖓ ᐊᒻᒪ ᑐᕌᕝᕕᖓᑦ:**
Sabina Silver Corp.

		ᐅᖃᓘᑦ:	807-766-1799
1004 Alloy Drive		ᓱᑲᔪᒃᑯᑦ:	807-343-0232
Thunder Bay, ON P7B 6A5		ᖃᕆᑕᐅᔭᒃᑯᑦ ᑐᕌᕝᕕᒃ:	abrantley@sabinasilver.com

3. **ᖃᐅᔨᒋᐊᕐᕕᐅᓯᔪᓐᓂᖅᐸᖕ ᐊᑎᓗᒃᑖᖓᑦ ᐊᒻᒪ ᑐᕌᕝᕕᖓᑦ:**
ᐃᐅᑉᐳᑦ ᐳᕌᓐᓕ, ᐊᖓᔪᖅᑳᖅ ᐊᒻᒪ ᐊᐅᓚᑦᑎᔨᒪᓇᒃ

		ᐅᖃᓘᑦ:	807-766-1799
1004 Alloy Drive		ᓱᑲᔪᒃᑯᑦ:	807-343-0232
Thunder Bay, ON P7B 6A5		ᖃᕆᑕᐅᔭᒃᑯᑦ ᑐᕌᕝᕕᒃ:	abrantley@sabinasilver.com

ᐃᓚᖓᑦ 2: ᐊᖏᖅᑕᐅᓯᒪᓂᖃᓇᐊᓕᒃ

1. **ᓇᓗᓇᐃᔭᐃᒃᑭᑦ <u>ᑕᒪᒃᑯᖅ</u> ᐊᖏᖅᓯᒪᓂᖃᖅᑐᑦ ᑐᕋᖓᔪᖅ ᐱᓕᕆᐊᑉ ᑐᒃᓯᕋᐅᑎᖓᓄᑦ:**

X	ᐊᕕᒃᑐᖅᓯᒪᔪᑦ ᐃᓄᐃᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ (RIA)		ᑲᓇᑕᒥᐅᑦ ᐊᑦᑕᓇᖅᑕᐃᓕᒪᑎᑦᑎᔩᑦ (CLS)
X	ᓄᓇᕗᑦ ᐃᒪᓕᕆᓂᕐᒧ ᑲᑎᒪᔩᑦ (NWB)	X	ᐊᕙᑎᓕᕆᔩᑦ ᑲᓇᑕᒥ (EC)
	ᓄᓇᕗᒻᒥ ᐸᕐᓇᐃᓂᕐᒧᑦ ᑲᒪᔩᑦ (NPC)	X	ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ (GN)
X	ᐃᓄᓕᕆᔩᑦᑐᕐᑲᒃᑯᑦ ᑲᓇᑕᒥ (INAC)		ᑲᓇᑕᒥ ᐅᓇᑕᖅᑐᒃᓴᓕᕆᔨᒃᑯᑦ (DND)
X	ᐃᖃᓗᓕᕆᔨᒃᑯᑦ ᐊᒻᒪ ᐃᒪᕐᒥᐅᑕᓕᕆᔨᒃᑯᑦ (DFO)		Hᐋᒻᓚᑦᑯᑦ
	ᓄᓇᓕᖕᓂ ᒐᕙᒪᓕᕆᔨᒃᑯᑦ ᐱᔨᑦᑎᕋᖅᑎᖏᓐᓄ (CG&S)		ᑲᓇᑕᒥ ᒥᕐᖑᐃᕐᓯᕐᕕᓕᕆᔨᒃᑯᑦ (PC)
X	ᓄᓇᕗᒥ ᖃᐅᔨᓴᖅᑐᓕᕆᔨᒃᑯᑦ (NRI)		ᑲᓇᑕᒥ ᓂᕐᔪᑎᓕᕆᔩᑦ (CWS)
X	ᐃᓕᖅᑯᓯᓕᕆᔨᒃᑯᑦ ᒐᕙᒪᒃᑯᓐᓂ (CLEY)		ᐊᓯᖏᑦ (ᓇᓗᓇᐃᔭᑦᑎᐊᕐᓗᒋᑦ):

2. **ᓇᓗᓇᐃᕐᓗᒋᑦ <u>ᐊᑐᕐᑎᖅᑲᖅᑐᑦᓚᖓ</u> ᐱᔪᓐᓇᐅᑏᑦ, ᓚᐃᓴᓐᓯᑦ, ᐅᕙᓘᓐᓃᑦ ᐊᓯᖏᑦ ᐊᖏᖅᑕᐅᓯᒪᔪᑦ ᑐᕋᖓᔪᑦ ᐱᓕᕆᐊᑉ ᑐᒃᓯᕋᐅᑎᖓᓄᑦ, ᐊᒻᒪ ᐅᑉᓗᐊᑕ ᐃᓱᓕᕝᕕᖓᑦ(ᖏᑦ):**

ᐃᒪᕐᒧᑦ ᓚᐃᓴᓐᓯ (ᖃᓄᐃᑦᑑᓂᖓ B) 2BE-HAK0709 ᒫᔾᔮ 2, 2007 ᑎᑭᐅᑎᓗᒍ ᑎᓯᐱᕆ 31, 2009

ᓄᓇᐅᑉ ᐊᑐᖅᑐᐊᖅᑕᐅᓂᖓ ᓈᓴᐅᑦ 76F/16-1-3 ᐅᒃᑑᐱᕆ 2, 1976 ᑎᑭᐅᑎᓗᒍ ᐅᒃᑑᐱᕆ 2, 2018

ᐅᔭᕋᖕᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑐᐊᖅᑕᐅᓂᖓ 2958 ᐃᓂᐅᑉ ᓈᓴᐅᑎᖓ 076F16 ᓯᑎᐱᕆ 19, 1979 ᑎᑭᐅᑎᓗᒍ ᓯᑎᐱᕆ 19, 2021

ᐅᔭᕋᖕᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑐᐊᖅᑕᐅᓂᖓ 2789 ᐃᓂᐅᑉ ᓈᓴᐅᑎᖓ 076F15 ᕕᕗᐊᕆ 10, 1976 to ᕕᕗᐊᕆ 10, 2018

ᐅᔭᕋᖕᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑐᐊᖅᑕᐅᓂᖓ 2895 ᐃᓂᐅᑉ ᓈᓴᐅᑎᖓ 076F16 ᔮᓄᐊᕆ 4, 1979 to ᔮᓄᐊᕆ 4, 2021

ᐅᔭᕋᖕᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑐᐊᖅᑕᐅᓂᖓ 2964 ᐃᓂᐅᑉ ᓈᓴᐅᑎᖓ 076F16 ᔮᓄᐊᕆ 15, 1980 ᑎᑭᐅᑎᓗᒍ ᔮᓄᐊᕆ 15, 2022

ᐅᔭᕋᖕᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑐᐊᖅᑕᐅᓂᖓ 2893 ᐃᓂᐅᑉ ᓈᓴᐅᑎᖓ 076F16 ᔪᓚᐃ 12, 1978 ᑎᑭᐅᑎᓗᒍ ᔪᓚᐃ 12, 2020

ᐅᔭᕋᖕᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑐᐊᖅᑕᐅᓂᖓ 3018 ᐃᓂᐅᑉ ᓈᓴᐅᑎᖓ 076F16 ᕕᕗᐊᕆ 24, 1981 ᑎᑭᐅᑎᓗᒍ ᕕᕗᐊᕆ 24, 2023

ᐅᔭᕋᖕᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑐᐊᖅᑕᐅᓂᖓ 3000 ᐃᓂᐅᑉ ᓈᓴᐅᑎᖓ 076F16 ᔫᓂ 26, 1980 to ᔫᓂ 26, 2022

ᓄᓇᒧᑦ ᐊᑐᖅᑭᓐᓇᕐᓂᕆᒧᑦ ᐱᔪᓐᓇᐅᑦ N2004C0005 ᐁᐳᕆ 7, 2007 ᑎᑭᐅᑎᓗᒍ ᐁᐳᕆ 7, 2008

ᐃᓄᐃᑦ ᓄᓇᖁᑎᖓᓂᒃ ᐊᑐᕆᓐᓇᕐᓂᕐᒧᑦ ᓚᐃᓴᓐᓯ KTL303C010 ᒫᔾᔮ 18, 2007 ᑎᑭᐅᑎᓗᒍ ᒫᔾᔮ 17, 2009

NRI-ᑯᑦ ᓱᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᕐᒧᑦ ᐊᒻᒪ ᐃᓕᖅᑯᓯᑎᒍᑦ ᖃᐅᔨᓴᕆᓐᓇᐅᑎ 0400807N-M ᔫᓂ 1, 2007 ᑎᑭᑦᑐᒍ ᐅᒃᑑᐱᕆ 1,

NRI-ᑯᑦ ᓄᓇᖏᑦ ᐊᒻᒪ ᐃᒪᖏᑦ ᖃᐅᔨᓴᕆᓐᓇᐅᑎ 0400607N-M ᐁᐳᕆ 1, 2007 ᑎᑭᑦᑐᒍ ᑎᓯᐱᕆ 31, 2010

ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᑦ ᐆᒪᔪᓕᕆᔩᖏᑦ ᖃᐅᔨᓴᕆᓐᓇᐅᑎ WL000828 ᒪᐃ 15, 2007 ᑎᑭᑦᑐᒍ ᑎᓯᐱᕆ 31, 2007

ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᑦ ᐃᑦᑕᕐᓂᑕᓕᕆᓂᕐᒧᑦ ᐱᔪᓐᓇᐅᑦ 07-022A ᔫᓂ 11, 2007 ᑎᑭᑦᑐᒍ ᑎᓯᐱᕆ 31, 2007

DFO-ᑯᑦ ᓚᐃᓴᓐᓯᖓᑦ ᐃᖃᑦᓕᕿᔪᓐᓇᕐᓂᕐᒧᑦ ᖃᐅᔨᓴᕐᓂᐊᕐᓗᑎᒃ S-07/08-1032-NU ᔫᓂ 28, '07 ᑎᑭᑦᑐᒍ ᐅᒃᑑᐱᕆ 30, '07

DFO-ᑯᑦ ᓂᕐᔪᑎᓂᒃ ᐊᑐᕐᓂᕐᒧᑦ ᒪᓕᒋᐊᓖᑦ ᐱᔪᓐᓇᐅᑦ FW1-ACC-2007-2008-050 ᔫᓂ 28, '07 ᑎᑭᑦᑐᒍ ᐅᒃᑑᐱᕆ 30, '07

3. ᓇᓗᓇᐃᔭᕐᓕᑦ <u>ᐅᑕᖅᑭᔭᐅᔪᑦ</u> ᐱᔪᓐᓇᐅᑎᑦ, ᓚᐃᓴᓐᓯᑦ, ᐅᕙᕘᓐᓃᑦ ᐊᓯᖏᑦ ᐊᖏᕈᑏ% ᑐᕌᖓᔪᑦ ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᒪᒃ:

ᐃᒪᓕᕐᓂᕐᒧᑦ ᓚᐃᓴᓐᓯ (ᖃᓄᐃᑦᑑᓂᖓ A)-ᓄᕗᑦ ᐃᒪᓕᕆᓂᕐᒧᑦ ᑲᑎᒪᔨᖏᑦ

ᐃᖃᑦᓕᕿᔪᓐᓇᐅᑦ-DFO-ᑯᓐᓂ

ᓇᓗᓇᐃᔭᐅᑎ 2 ᐋᖅᑭᒋᐊᖅᑕᐅᓗᓂ MMER-ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᑲᓇᑕᒥ

ᓄᓇᒥ ᐊᑐᕆᓐᓇᐅᑎ-ᐃᓄᓕᕆᔨᑐᖅᑲᒃᑯᑦ

ᐃᓄᐃᑦ ᓄᓇᖁᑎᖓᓂᒃ ᐊᑐᖁᓐᓇᐅᑦ-KIA-ᑯᓐᓂ

ᖃᐅᔨᓴᕆᓐᓇᐅᑎᑦ:

NRI-ᑯᑦ ᓱᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᕐᒧᑦ ᐊᒻᒪ ᐃᓕᖅᑯᓯᑎᒍᑦ ᖃᐅᔨᓴᕆᓐᓇᐅᑎ

NRI-ᑯᑦ ᓄᓇᒥ ᐊᒻᒪ ᐃᒪᕐᒥᒃ ᖃᐅᔨᓴᕆᓐᓇᐅᑎ

ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ ᖃᐅᔨᓴᕆᓐᓇᐅᑦ

ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ ᐃᑦᑕᕐᓂᑕᓕᕆᓂᕐᒧᑦ ᐊᒻᒪ ᐆᒪᔪᕕᓂᕐᓂ ᐱᔪᓐᓇᐅᑎ

DFO-ᑯᑦ ᓚᐃᓴᓐᓯᖓᑦ ᐃᖃᑦᓕᕿᔪᓐᓇᕐᓂᕐᒧᑦ ᖃᐅᔨᓴᕐᓂᐊᕐᓗᑎᒃ

DFO-ᑯᑦ ᓂᕐᔪᑎᓂᒃ ᐊᑐᕐᓂᕐᒧᑦ ᒪᓕᒋᐊᓖᑦ ᐱᔪᓐᓇᐅᑦ

4. ᑖᓐᓇ ᐱᓂᕆᐊᖅ ᐅᕙᕘᓐᓃᑦ <u>ᓇᓕᒥᐊᖓᓂᒃ ᐃᓗᓕᖕᒋᓐᓂᒃ ᑖᓯᒪ ᐱᓕᕆᐊᑉ</u> ᖃᐅᔨᓴᖅᑕᐅᓯᒪᕖᑦ ᐅᕙᕘᓐᓃᑦ ᕿᒥᕐᕈᔭᐅᓯᒫᕖᑦ NIRB-ᑯᓐᓄᑦ?

X ᐄ ᐋᒃᑲ

ᐊᖏᖅᓯᒪᒍᓂ, ᓇᓗᓇᐃᕐᓗᒍ ᑭᖑᓪᓕᐅᓚᐅᖅᑐᑦ ᐱᓕᕆᐊᑉ ᑕᐃᔫᓯᖓᑦ ᐊᒻᒪ NIRB-ᑯᑦ ᑎᑎᖅᑲᖓᑕ ᓈᓴᐅᑎᖁᑖ.

<u>NRI-ᑯᑦ ᓄᓇᒥ ᐊᒻᒪ ᐃᒪᕐᒥᒃ ᖃᐅᔨᓴᕆᓐᓇᐅᑎ -NIRB# 07YN030</u>

<u>ᐃᓄᐃᑦ ᓄᓇᖁᑎᖓᓂᒃ ᓚᐃᓴᓐᓯ -NIRB #04EN012</u>

BIPR-ᑯᑦ ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ & ᐊᕙᑎᒥᒃ ᐊᒃᑐᐃᓂᐊᕐᓂᕐᒥᒃ ᐅᓂᒃᑳᖅ
ᒪᓕᒋᐊᓖᑦ- -
NIRB# 03UN114

ᐃᖅᑲᐅᒪᒋᐊᕈᖅ: Hᐋᑭᑦ ᐊᑐᕐᓂᐊᖅᑐᖅ BIPR ᐊᖅᑯᑎᖓᓂᒃ ᐅᔭᕋᖕᓂᐊᕐᕕᖕᒋᒥᒃ ᑐᓚᒃᕕᖕᒧᑦ. Hᐋᑭᑦ ᐊᑐᕐᓂᐊᕐᒥᔭᖅ ᑐᓚᒃᕕᐅᑉ ᐱᕐᑯᑎᖕᒋᓐᓂᒃ.

ᐃᓚᖓᑦ 3: ᐱᓕᕆᐊᒃ ᑐᒃᓯᕋᐅᑎᖓᓄᑦ ᓇᓗᓇᐃᔭᐃᔾᔪᑎ

**1. ᓇᓗᓇᐃᕐᓕ ᖃᓄᐃᑦᑑᓂᖓ ᐱᓕᕆᐊᒃ ᑐᒃᓯᕋᕈᑎᖓ (ᓇᓗᓇᐃᖅᑳᕐᓗᒋᑦ ᐊᑐᖅᑐᒃᑳᑦ) [1,2]:
(ᑕᑯᓗᒍ Appendix A ᐱᓕᕆᐊᒃ ᖃᓄᐃᑦᑑᓂᖏᑦᑕ ᑐᑭᓕᐅᖅᑕᐅᓯᒪᓂᖏᑦ)**

1	ᖃᓄᐃᑦᑐᑐᐃᓐᓇᕐᓂ ᓯᓚᖅᑲᕐᓗᓂ ᐊᖅᑯᑦ/ᐊᑐᕐᕕᒃ All-	X	**9**	ᐃᓂᐅᑉ ᓴᓗᒻᒪᖅᓴᖅᑕᐅᓂᖓ/ᐋᖅᑭᒋᐊᖅᓯᓂᖅ	
2	ᐅᑭᐅᒃᑯᑦ ᐊᖅᑯᑦ/ᐅᑭᐅᒃᑯᑦ ᐊᑐᕐᕕᒃ		**10**	ᑭᓂᖅᑐᒥᒃ ᐊᒻᒪ ᒫᓯᓪᓚᕆᓂᒃ ᕿᓂᕋᓯᐊᕐᓂᖅ/ᖃᓄᐃᓕᐅᕐᓃᑦ	
3	ᐅᔭᕋᖕᓂᐊᓚᒃᓴᓄᑦ ᕿᓂᕋᓯᐊᕐᓂᖅ		**11**	ᐃᒪᕐᒥᐅᑕᓕᕆᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕐᓃᑦ	X
4	ᐱᕙᓪᓕᐊᓂᖅᓴᒥᒃ ᐅᔭᕋᖕᓂᐊᓚᒃᓴᓄᑦ ᕿᓂᕋᓯᐊᕐᓂᖅ	X	**12**	ᑭᓯᓕᕆᑲᓘᔭᕐᓂᕐᒧᑦ/ᓄᓇᖕᔪᐊᓕᒦᑦ ᐅᑭᐅᖅᑕᖅᑐᖕᒋᑦ ᐊᕐᕌᒍᖓ ᖃᐅᔨᓴᕐᓂᖅ*	
5	ᐅᔭᕋᖕᓂᐊᕐᓂᕐᒧᑦ ᐱᕙᓪᓕᐊᓂᖓᑦ/ᐊᖏᔪᒐᓪᓚᖕᓂ ᖃᐅᔨᓴᕈᑎᑦ	X	**13**	ᐊᖑᓇᓯᐊᕐᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕐᓂᖏᑦ*	
6	ᓴᒃᓚᖅᓯᒪᓃᑦ ᐊᒻᒪ ᑐᐊᐸᒃᑳᕐᕖᑦ	X	**14**	ᐳᓚᕋᖅᑐᓕᕆᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕐᓂᖏᑦ*	
7	ᓯᓈᓃᖅᐸᓯᖕᒋᑦᑐᑦ ᒪᑭᑎᑕᐅᓯᒪᔪᑦ (ᑐᓚᒃᑕᕐᕕᒃ, ᐃᖕᒋᐅᓕᕈᐊᖅᑕᐃᓕᔾᔪᑎᑦ, ᑐᓚᒃᕕᒃ) ᒪᑭᑎᑕᐅᓯᒪᔪᑦ (ᑐᓚᒃᕕᒃ, ᐃᖕᒋᐅᓕᕈᐊᖅᑕᐃᓕᔾᔪᑎᑦ, ᑐᓚᒃᕕᒃ)	X	**15**	ᐊᓯᖏᑦ[2]:	
8	ᓄᓇᐅᑉ ᓇᔭᒃᓴᓪᓚᖕᓂᖓᑕ ᖃᐅᔨᓴᕐᓂᖅ				

<u>ᖃᐅᔨᒪᓂᐊᖅᐳᑎᑦ:</u>

1. ᑕᒪᒃᑭᖅ ᐱᓕᕆᐊᑦ ᖃᓄᐃᑦᑑᓂᖏᑦ ᓇᓗᓇᐃᖅᓯᒪᔪᑦ ᕿᑳᓂ, ᑭᓯᐊᓂ ᑕᐃᒃᑯᐊ ᓇᓗᓇᐃᒃᑯᑕᖅᓯᒪᔪᑦ ᐃᒪᐃᑦᑐᒥᒃ (*), ᐱᕐᖃᓇᐊᕐᑲᕐᓂᐊᖅᑐᑦ ᐃᑲᔪᕈᑎᒥᒃ ᑐᓂᓯᓂᐊᕐᓗᓂ **ᐃᓚᖓᑦ 2 ᐱᓕᕆᐊᖅ ᖃᓄᐃᑑᓪᓚᑦᑖᕐᓂᖓᑦ ᑐᑭᓯᒋᐊᕈᑎᖃᕆᐊᖃᕐᓂᕐᒧᑦ (PSIR) ᑕᑕᑎᕈᓪᒥᒃ**. NIRB-ᑯᑦ ᐱᓇᓱᐊᕈᑎᒋᕙᒃᑕᖏᑦ ᐱᔭᕇᖅᓯᒪᓂᕋᖅᑕᐅᓂᐊᙱᑦᑐᖅ ᐱᑦᖃᙱᒃᑯᓂ ᐃᓚᖓᑦ 2 PSIR ᑕᑕᑎᕈᑎᖓᓂᒃ.
2. ᖃᐅᔨᒪᓂᐊᖅᐳᕈᑎᑦ ᐱᔭᕇᕐᓂᐊᕐᓗᒍ NIRB ᑲᒪᒋᔭᐅᓂᖓ, NIRB-ᑯᑦ ᑐᒃᓯᕋᑐᐃᓐᓇᕆᐊᖃᕐᒪᑕ ᑐᑭᓯᒋᐊᕈᑎᒃᑲᓐᓂᕐᓂᒃ ᖃᖓᒥᐊᑦᑎᐊᖅ ᑲᒪᒋᔭᐅᕙᓪᓕᐊᑎᓪᓗᒍ.
3. ᑭᓯᐊᓂ "ᐊᓯᖏᑦ" ᓂᕈᐊᖅᑕᐅᒍᓂ, ᖃᐅᔨᒋᐊᕐᕕᒋᓗᒋᑦ NIRB-ᑯᑦ ᖃᓄᖅ ᐱᔭᕆᐊᖅᓴᖕᒫᖅᐱᑦ ᐃᓚᖓᓂᒃ 2-ᒥ PSIR ᑕᑕᑎᕈᑎᖓᓂᒃ.

2. ᐱᓕᕆᐊᐸ ᖃᓄᐃᓪᓗᓂᖓ 3, 4 ᐅᑉᐸᓘᓐᓂᑦ 5 ᓂᕈᐊᖅᑕᐅᓯᒪᔪᓂ ᖁᓛᓂ, ᐊᑏ ᓇᓗᓇᐃᕈᒃ ᐅᔭᕋᓐᓂᐊᒐᒃᓴᑦ ᐱᕝᕆᓇᖅᓴᖓᓂᒃ ᐃᖅᑕᐅᕝᕕᐅᓂᐊᖅᑎᓪᓗᒍ. ᐃᓚᓕᐅᑎᓂᐊᖅᐸᐃᑦ ᓇᐃᒍᒥᒃ ᖃᓄᐃᓪᓗᓂᖅᓴᕆᓐᓂᒃ.

X	ᐊᑉᑭᑦᑐᒃᓴᔭᐃᑦ ᓴᕕᕋᔭᒃᓴᑦ (ᓯᐊᕐᓇᖅ, ᑲᓐᓄᔭᒃ, ᒨᓗ, ᖃᕐᑯᓕᖅ, ᑕᐃᒪᐃᑦᑐᕈᐃᑦ ᓯᐊᕐᓇᖅ, ᑲᓐᓄᔭᒃ, ᐋᕐᕿᒃᓴᖅ, ᒨᓗ; ᒪᕐᕉᒃ ᓴᒡᒐᖅᑕᐅᓯᒪᔪᖅ 1 ᓄᓇᐅᐸ ᐊᑖᓃᑦᑐᑦ ᐱᐅᙱᓐᓂᔭᖅᓯᒪᔪᑦ
	ᑕᐃᒪᓐ
	ᓄᕐᖑᐃᑦᑐᑦ
	ᐊᓯᖏᑦ: ______

3a. ᐱᓕᕆᐊᐸ ᖃᓄᐃᓪᓗᓂᖓ 13, 14 ᐅᑉᐸᓘᓐᓂᑦ 15 ᓂᕈᐊᖅᑕᐅᓯᒪᓐᓂᕈᑎᒃ ᖁᓛᓂ, ᑕᑕᑎᕐᓗᒍ ᓴᖅᑭᑕᐅᓯᒪᔪᑦ ᐊᒻᒪ ᐊᐱᖅᑯᑏᑦ ᐊᑖᓂ.

ᐊᑐᕆᐊᑐᙱ

ᐃᖏᕐᕋᔪᑎᐅᐸ ᖃᓄᐃᓪᓗᓂᖓ	ᖃᐸᓯᑦ	ᐊᑐᕈᑎᒥᓂᐊᖅᑕᖓᑦ	ᐊᑯᓂᐅᑎᒥᓂᖓᑦ

3b. ᓇᓗᓇᐃᒃᑭᑦ ᑐᓚᒃᑕᕐᕖᑦ, ᒥᑉᕖᑦ ᐅᑉᐸᓘᓐᓂᑦ ᒪᑭᒪᑎᑕᐅᔪᑦ ᐊᑐᖅᑕᐅᓂᐊᕐᓗᑎᒃ ᐊᑕᐅᑦᑎᒃᑯᑦ ᐱᓕᕆᐊᖑᔪᒪᔫᑦ.
ᐃᖅᑲᐅᒪᓂᐊᖅᐳᑎᑦ: ᐃᒡᓗᕐᔪᐊᑦ ᓄᑖᑦ ᒪᑭᑎᑕᐅᔪᑦ ᐃᓚᖃᓇᐊᖃᑐᐃᓐᓇᓇᐊᓕᒃ ᐃᓚᖓᑦ 2 ᑕᑕᑎᕈᒻᒥᒃ.
ᐊᑐᕆᐊᑐᙱ

3c. ᑕᕐᒫᕐᕕᖃᓚᐅᐱᓪᓚᕐᓂᐊᕐᓂᕈᓂ, ᓇᓗᓇᐃᔭᐃᕆᑦ ᖃᓄᐃᓪᓗᓂᐊᕐᒪᖔᑕ ᒪᑭᑎᑕᐅᓂᐊᖅᑐᑦ ᐊᒻᒪ ᓇᓗᓇᐃᕐᓗᒍ ᖃᓄᐃᓪᓗᓂᐊᕐᓂᖓᑦ ᐊᒻᒪ ᓇᑭᑦ ᐆᒪᖅᑯᑎᖃᕐᓂᐊᕐᒪᖔᑦ ᑕᕐᒫᕕᐅᓂᐊᖅᑐᖅ ᐱᑦᑲᕐᓂᐊᕐᓂᕈᓂ ᑭᓯᐊᓂ.
ᐊᑐᕆᐊᑐᙱ

4. ᐱᓕᕆᔩᑦ (ᓈᓴᐅᑎᑦ ᐊᑐᖅᑕᐅᔪᑦ ᑕᐅᑐᒡᓗᕆᑦ ᑕᕐᒪᕐᕕᐅᐸ ᐃᓂᖃᕈᓐᓇᕐᓂᕆᑦ)

ᑲᑎᓪᓗᕆᑦ ᖃᐸᓯᐅᓂᕆᑦ ᐱᓕᕆᔩᑦ ᑕᐃᑲᓂ ᐃᓂᒥᒃ = (A)	300	ᖃᑎᓪᓗᕆᑦ ᖃᐸᓯᐅᓂᕆᑦ ᐅᐸᓗᑦ ᑕᐃᑲᓃᓐᓂᕆᔭᐅᔪᓂᒃ = (B)	365/ᐊᕐᕌᒍᑕᒫᑦ	ᑲᑎᓪᓗᕆᑦ ᐱᓕᕆᔩᑦ ᐅᐸᓗᕆᑦ **(A) × (B) = 109,500/ᐊᕐᕌᒍᑕᒫᑦ**

5. ᐊᑯᓂᐅᑎᒥᓂᕆᑦ

ᐊᑯᑭᓂᐅᑎᒥᓂᖓᑦ ᐅᑉᐸᖓᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ:	**2011 (ᓴᓇᔭᐅᒥᐊᖅᑎᓪᓗᒍ)**	ᑎᑭᐅᑎᓗᒍ	**2027 (ᐃᓚᓕᐅᑎᓯᒪᙱᑦᑐᖅ ᓄᖅᑲᖅᐸᓪᓕᐊᓂᖅᓴᕆᓐᓂᒃ)**
ᐊᕆᖅᑕᐅᓯᒪᔪᑦ ᐊᑯᓂᐅᑎᒥᓂᐊᕐᓂᖓᑦ: ᐅᑉᐸᖓᑦ	**ᔮᓄᐊᕆ 2010**	ᑎᑭᐅᑎᓗᒍ	**ᑎᓯᐱᕆ 2030**

6a. ᐊᕕᒃᑐᖅᓯᒪᓂᖅ (ᓇᓗᓇᐃᕐᓗᒋᑦ ᑕᐃᒃᑯᐊ ᐊᑐᕐᓂᖅᑲᖅᑐᓗᒃᑖᑦ):

	ᕿᑭᖅᑖᓘᐸ ᐅᐊᕐᓇᖓᑦ		ᑭᐅᓪᓕᖅ	X	ᕿᑎᕐᒥᐅᑦ		ᓴᐳᒻᒥᔭᐅᔪᑦ ᑭᒡᓕᙳᐊᕆᑦ:

ᓄᓇᕗᑦ ᐊᕐᕌᒍᓂ ᖃᑎᒪᔩᑦ
NUNAVUT IMPACT REVIEW BOARD
Nunavutmi Kanogiivalianikot Elittohaiyoopotik Katimayit

☐ ᕿᒃᑲᓛᓘᑉ ᓂᒡᓕᖓᓐᓂ ☐ ᒥᕐᖑᐃᓯᕙᒃ

6b. ᓇᓗᓇᐃᔭᕐᓕ ᐃᓂᖓᑦ ᐱᓕᕆᐊᖑᔪᒪᔪᑦ ᖃᓄᐃᓕᐅᕐᓂᑦ ᐊᕙᑦᑐᖅᓯᒪᓂᖅ ᒪᓕᒃᓗᒍ, ᓇᓗᓇᐃᕐᓗᒍ ᐅᖓᓯᒃᑎᒋᓂᖓᑦ ᖃᓂᓐᓂᖅᐸᓗᑦ ᓄᓇᓕᖕᒍᑦ ᐊᒻᒪ ᓵᓚᒥᔭᐅᓂᖅᖃᖅᑐᑦ ᐃᓃᑦ.

ᐅᔭᕆᓐᓂᐊᕙᒃ: ᐃᒻᒪᖄ ᕿᑎᒋᔭᖓᑦ 65°55; ᐅᐊᖕᓇᖓᓂᒃ ᓴᓂᒧᑦ, 108°30’ ᐅᐊᓕᓂᕐᒥ ᑐᑭᒧᑦ, ᐃᒻᒪᖄ 75-ᑭᓖᒥᑕᓂᒃ ᓂᒋᖅᐸᓯᖓᑕ ᕿᖓᐅᑦ. ᐃᒻᒪᖄ 360-ᑭᓖᒥᑕᓂᒃ ᑲᓇᖕᓇᖅᐸᓯᖕᒥᒃ ᖁᕐᓗᖅᑰᑉ, ᐊᒻᒪ 360-ᑭᓖᒥᑕ ᐅᐊᓕᓂᖅᐸᓯᖕᒥᒃ ᐃᖃᓗᒃᑰᑦᑎᐊᑉ. ᐅᔭᕆᓐᓂᐊᕙᒃ ᐃᓂᖃᖅᐳᖅ ᖃᓂᒋᔭᖃᙱᕐᓗᓂ ᓵᓚᒥᔭᐅᓂᖃᖅᑐᓂᒃ ᐃᓄᓐᓂᒃ.

ᐅᐸᒍᓐᓇᕐᓂᖅ ᐅᔭᕆᓐᓂᐊᕙᖕᒧᑦ ᐃᓚᖃᕐᓂᐊᖅᑐᖅ ᖃᖓᑕᓂᒃᑯᑦ, ᐃᒪᒃᑯᑦ, ᐊᒻᒪ ᓄᓇᒃᑯᑦ ᐃᓱᒪᒃᓴᖅᓯᐅᖅᑕᐅᓂᐊᖅᑐᑦ. ᒥᖁᓕᐅᕐᓂᖃᕐᓂᐊᖅᑐᖅ ᐅᔭᕆᓐᓂᐊᕙᕆᔭᐅᔫᑉ ᐃᓂᖓᓂᒃ ᐊᒻᒪ ᓯᕐᓗᐊᕆᔭᐅᓂᐊᖅᑐᖅ ᐱᐅᙱᓐᓂᔭᖅᓯᒪᔪᓄᑦ ᐅᔭᕆᓐᓂᐊᖅᑕᐅᓯᒪᔪᑦ ᐊᒻᒪ ᐅᓯᒋᔭᐅᓂᐊᖅᑐᑦ ᐃᓂᖓᓂᒃ ᓴᓇᔭᐅᓂᐊᖅᑐᑦ ᕿᖓᐅᑉ ᑐᓚᒡᕙᖓᓂᒃ ᐊᒻᒪ ᐊᖅᑯᑎᖓᑦ (BIPR) ᑐᓚᒃᑕᕐᕙᖓᓂᒃ, ᐃᒻᒪᖄ 100-ᑭᓖᒥᑕᓂᒃ ᐅᖓᓯᒃᑎᒋᔫᒃ ᐅᐊᖕᓇᖅᐊᓯᖓᓂᒃ. Hᐋᑭᑦ ᕆᕝ ᓂᐅᕙᖅᑦᑕᕐᓂᐊᖅᑐᖅ BIPR-ᑯᓐᓂ. ᓄᓇᒥ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑕᐅᓂᐊᖅᑐᑦ ᐃᓚᖃᖅᐳᖅ ᓯᓚ ᖃᓄᐃᒃᑲᓗᐊᖅᐸᑦ ᐊᖅᑯᒪᒃ, ᐃᒻᒪᖄ 25-ᑭᓖᒥᑕᓂᒃ ᐅᖓᓯᒃᑎᒋᓂᓕᒃ, ᑑᕿᑕᐅᓂᐊᕐᓗᓂ ᐅᔭᕆᓐᓂᐊᕙᖕᒧᑦ BIPR-ᑯᑦ ᐊᖁᑎᖓᓄᑦ.

ᐃᒻᒪᖄ 80-ᑭᓖᒥᑕᓂᒃ BIPR ᐊᖅᑯᑎᖓᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᖅ ᐱᐅᙱᓐᓃᔭᖅᓯᒪᔪᓄᑦ ᐅᔭᕆᓐᓂᐊᖅᑕᐅᓯᒪᔪ ᐊᒃᓱᖅᑐᖅᑕᐅᓂᐊᕐᓗᑎᒃ ᐱᐅᙱᓐᓃᔭᖅᓯᒪᔪᓄᑦ ᐅᔭᕆᓐᓂᐊᖅᑕᐅᔪᑦ ᑐᓚᒃᑕᕐᕙᖕᒧᑦ ᕿᖓᐅᒻᒥ.

BIPR ᐱᓕᕆᐊᖓᑦ ᕿᒥᕿᔭᐅᔫᖅ ᒫᓇ BIPR-ᑯᓐᓄᑦ. ᑭᓯᐊᓂᑦᑕᐅᖅ, ᑖᒃᑯᐊ ᓇᓗᓇᐃᔭᑎᐊᖅᓯᒪᓂᐅᕗᑦ ᐃᓂᒋᔭᕐᒧᑦ ᑐᓚᒃᑕᕐᕙᐅᑉ ᐊᒻᒪ ᐊᖅᑯᑎᒋᓂᐊᖅᑕᖏᑦᑕ ᐊᒃᓱᖅᑐᐃᓂᐊᖅᑎᑦᓗᒋᑦ.

ᑐᓚᒃᑕᕐᕙᒃ: ᐃᓂᓕᒃ ᕿᖓᐅᑦ ᓂᒡᓕᖓᓂᒃ. ᑐᓚᒃᑕᕐᕙᒃ ᐅᖓᓯᒃᑎᒋᓂᓕᒃ 50-ᑭᓖᒥᑕᓂᒃ ᐅᐃᑦᐳᕝᐊᕐ ᖁᕐᓗᕐᓂᖓᓂ ᐊᒻᒪ Hᐃᐅᑭᑕᒃᑯᖓᓂ ᓵᓚᒥᔭᐅᓯᒪᔪᕐᒥᒃ ᐃᓂᒥᒃ.

ᐊᒃᓱᖅᑐᐃᖖᕙᖓᑕ ᐊᖅᑯᑎᒋᔭᐅᓂᐊᖅᑐᑦ ᐱᕐᑯᑎᓂᒃ ᑐᓚᒃᑕᕐᕙᒃᑯᑦ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᓕᖅᑐᖅ ᐊᒻᒪ ᕿᒥᕿᔭᐅᓯᒪᓕᖅᓱᓂ ᐃᓚᒋᔭᖓᓐᓂᒃ BIPR-ᑯᑦ ᐱᓕᕆᐊᖓᓄᑦ. ᐃᓗᐊᓂ ᐅᐊᓕᓂᕐᒥ ᕿᑎᕐᒥᐅᒥ, ᐊᒃᓱᖅᑐᐃᖖᕙᖓᑕ ᐊᖅᑯᑎᒋᔭᐅᓂᐊᖅᑐᖅ ᐊᖅᑰᓴᖅᑦᑕᕐᓂᐊᖅᑐᖅ ᑯᐃᓐ ᒫᑦ ᐃᒪᖓᓂᒃ ᑎᖕᒥᐊᓄᑦ ᐸᒡᕙᓴᖅᑕᐅᒋᐊᖃᙱᑐᖓᓂ (Queen Maud Gulf), ᐊᒻᒪ ᓵᓚᒥᔭᐅᓯᒪᔪᑦ ᐃᓃᑦ ᑎᖕᒥᐊᓄᑦ ᓇᔪᒐᕙᖓᓂ (Jenny Lind Island) ᐊᒻᒪ ᓇᓄᐃᑦ ᓯᑎᒋᕚᑕᖓᑕ ᐃᓂᖓᓂᒃ ᕙᒃᑐᐊᕆᔭ ᐃᒪᖓᓂ ᐊᒻᒪ ᓚᐅᓴᓐ ᐃᒪᖓᓂ. ᓯᓚᑎᐊᓂ ᐅᐊᓕᓂᕐᒥ ᕿᑎᕐᒥᐅᑦ ᐸᕐᓇᒡᕙᖓᑕ ᐊᕙᑦᑐᖅᓯᒪᓂᐅᑉ ᐳᕆᓈ ᓕᐅᐳ ᑎᖕᒥᐊᓄᑦ ᐸᒡᕙᓴᖅᑕᐅᒋᐊᖃᙱᑐᖓᓂ ᐊᒻᒪ ᓯᕐᒥᓕᒃ ᒥᕐᖑᐃᓯᕙᖓ. ᐅᐊᓕᓂᕐᒥᑦ ᕿᑭᖅᑖᓗᖕᒧᑦ ᑕᕆᐅᒃᑯᑦ ᐊᖅᑯᑎᖓ ᐃᓱᒪᒃᓴᖅᓯᐅᖅᑕᐅᔫᖅ ᐸᒡᕙᓴᖅᑕᐅᕙᐅᓂᐊᖕᒋᑦᑐᓂ/ᐃᑦᑕᕐᓂᑕᖅᑲᕙᐅᓗᓂ.

6c. ᐅᖃᐅᓯᕆᒍᒃ ᐊᑐᖅᑕᐅᓯᒪᓚᐅᕐᓂᕈᓂ ᐃᓂ ᐱᓕᕆᐊᓄᑦ ᑭᖑᓂᕐᒥ.

ᓄᓇᓕᕆᓂᕐᒧᑦ ᕿᓂᕈᓘᔭᕐᓂᖅᑲᓚᐅᖅᑐᖅ ᖃᓂᖓᓂ ᐅᔭᕆᓐᓂᐊᕙᐅᑉ 2004-ᒥ ᒫᓇᒧᑦ ᓴᐳᓇᒃᑯᓐᓄᑦ. ᐊᕝᑎᓕᕆᓂᕐᒧᑦ ᖃᐅᔨᓴᓪᓚᑦᑖᕐᓂᖅᑲᓚᐅᖅᑐᖅ 2007-ᒥ, ᑲᔪᓯᓗᓂ 2008-ᒧᑦ.

6d. ᓇᓗᓇᐃᖅᓯᒋᑦ ᖃᐅᔨᔭᐅᓯᒪᔪᖃᕐᒪᖔᑦ ᐃᑦᑕᕐᓂᑕᖃᕐᕙᓂᒃ/ᐃᓄᖃᕐᕙᕙᓂᕐᓂᒡᓗ ᐃᓂᖏᓐᓂᒃ ᑕᐃᑲᓂ.

ᐃᑦᑕᕐᓂᑕᓕᕆᓂᕐᒧᑦ ᐃᓂ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᔪᑦ ᐱᓕᕆᐊᑉ ᐃᓂᖓᓂᒃ 2007-ᖑᑎᑦᓗᒍ ᖃᐅᔨᓴᕐᓂᕆᔭᖓᔪᒥᒃ ᓄᓇᒥ (ᑕᑯᒋᐊᕐᓗᒍ ᐱᔪᓐᓇᐅᑦ 07-022A). ᐃᒻᒪᖄ 30-ᓂᒃ ᐃᓂᐅᔪᓂᒃ ᓇᓗᓇᐃᖅᓯᓯᒪᔪᑦ. ᑖᒃᑯᐊ ᐃᓃᑦ ᓇᓗᓇᐃᔭᑦᑎᐊᖅᓯᒪᓂᐊᖅᑐᑦ ᐱᔪᓐᓇᐅᑎᑖᕈᒪᒥᒃ ᐅᓂᒃᑳᓕᐊᕐᒥᒃ.

7. ᓄᓇᐅᑉ ᖃᓄᐃᓐᓂᖓ (ᓇᓗᓇᐃᒃᑭᑦ ᑕᐃᒃᑯᐊ ᐊᑐᖅᑐᑦ):

X	ᒐᕙᒪᒃᑯᑦ ᐱᕐᑯᑎᖏᑦ		ᑲᒥᓯᓇᐅᑉ		ᓄᓇᓕᐅᑉ
X	ᐃᓄᐃᑦ ᓄᓇᕐᑯᑎᖏᑦ ᖄᖕᒪᓂ ᓄᓇᐅᑉ		ᐃᓄᐃᑦ ᓄᓇᕐᑯᑎᖏᑦ ᓄᓇᐅᑉ ᐃᑭᐊᖕᒪᓂᑦᑐᓂᒃ		

8a. ᐊᒃᑎᒥᓂᖏᑦ (ᑭᒃᐹᓇᖕᓂᖕᒐ ᐊᕙᑖᓂ ᐅᔭᕋᖕᓂᐊᕐᕕᐅᑉ ᐊᑐᖅᑐᐊᕐᕕᒋᔭᖕᒐᑕ):

UL (degree/minute)	108° 39' 40.10" W 65° 59' 11.58" N	UR (degree/minute)	107° 58' 16.39" W 65° 53' 55.46" N
LL (degree/minute)	108° 43' 41.73" W 65° 55' 43.57" N	LR (degree/minute)	108° 4' 48.20" W 65° 48' 33.29" N

NTS ᓄᓇᙳᐊᑉ ᓈᓴᐅᑎᖕᒐᕐ: ᐅᔭᕋᖕᓂᐊᕐᕕᒃ: 76F-16, 76F-15 (1:50,000) ᐊᐸᕐᑯᑦ: 76G-13 (1:50,000)

(ᐊᑏ ᖃᐅᔾᒥᐊᑦᑎᐊᓇᑦ ᓄᓇᙳᐊᖏᑦ ᐱᓕᕆᐊᕐᒎᑦ ᐊᑕᒐᓗᐊᕐᒪᖖᒐᑕ (1:50,000 **ᑭᓯᐊᓂ ᐊᑐᐃᓐᓇᐅᒍᑎᒃ**, 1:250,000 **ᐱᖅᑲᓇᐊᖅᑲᒻᒪᕆᒃᑐᖅ**) ᐊᑐᐃᓐᓇᐅᑎᑕᐅᔪᑦ ᑕᐃᑲᙵᑦ ᓄᓇᒥᐅᑕᓂ ᐱᕕᒃᓴᐅᕙᒃᑐᑦ ᑲᓇᑕᒥ)

8b. ᐱᓕᕆᐊᕐᒎᑦ ᑐᒃᓯᕋᑦ ᐃᓚᖅᑭᓂ **ᑕᖕᒫᕐᕕᒥᒃ**, ᐊᑏ ᐊᑐᐃᓐᓇᐅᑎᑦᑎᒥᑦ ᐊᒃᑎᒥᓂᔭᖏᓐᓂᒃ ᑕᖕᒫᖅᕕᐅᑉ ᐃᓂᖕᒐᓂᒃ

Min Lat (degree/minute)	65˚ 55' 11.45" N	Min Long (degree/minute)	108˚ 32' 2.50" W
Max Lat (degree/minute)		Max Long (degree/minute)	

ᐊᔾᔨᙳᒥᒃᑯᓂᐅᒃ ᕐᑯᑖᓂ ᑕᖕᒫᕐᕕᐅᑉ:

NTS ᓄᓇᙳᐊᖕᒐᑕ ᓈᓴᐅᕐ: 76F-16 (1:50,000)

ᐊᑑ ᖃᐅᔾᒥᐊᑦᑎᐊᓇᑦ ᓄᓇᙳᐊᑦ ᐱᓕᕆᐊᕐᒎᑦ ᐊᑕᒐᓗᐊᕐᒪᖖᒐᑕ (1:50,000 **ᑭᓯᐊᓂ ᐱᑕᖅᑭᓂ**, 1:250,000 **ᐱᑕᖅᑲᓇᐊᖅᑲᒻᒪᕆᒃᑐᖅ**) ᐊᑐᐃᓐᓇᐅᔪᑦ ᓄᓇᒥᐅᑕᓂᒃ ᐱᕕᒃᓴᐅᕙᒃᑐᑦ ᑲᓇᑕᒥ

ᖃᐅᔾᒪᒥᑦ ᐃᓚᓕᐅᑎᒃᑲᓐᓂᖅᓯᒪᔪᑦ ᐃᓂᒎᑦ ᑐᑭᓯᒥᐊᕈᑎᑦ ᐱᓯᒪᔭᐅᔭᓇᐊᖅᑲᕐᓂᐊᖅᑐᒃᓴᐅᖕᒪᑕ ᑭᖑᓪᓕᕐᒥ ᐱᓕᕆᐊᕐᒎᑦ ᑐᑭᓯᒥᐊᕈᑎᑦᓚᑦᑖᖅᑲᓇᐊᖅᑲᕐᓂᕐᒎᑦ (PSIR) ᑐᓂᓯᓂᐊᕐᓗᓂ. ᐃᒪᐃᑦᑑᔪᓐᓇᖅᑐᖅ ᖃᓇᑕᐅᔭᖅᑎᒍᑦ ᓄᓇᓕᓇᓂᕐᒎᑦ ᑐᕋᖕᒐᔪᓂᒃ ᐃᓗᓕᖏᓐᓂᒃ.

ᐃᓚᖕᒐᑦ 4: ᐃᓗᓕᖅᑲᓗᐊᔾᔪᐊᕋᓗᙱᑦᑐᓂᒃ ᐱᓕᕆᐊᕐᒎᑦ ᑐᒃᓯᕋᐅᒻᒥᒃ ᓇᓗᓇᐃᔭᐃᔾᔪᑎ

ᐊᑏ ᐃᓚᓕᐅᑎᖅᑲᑕᐅᓗᒍ ᐃᓗᓕᖅᑲᓗᐊᔾᔪᐊᕋᓗᙱᑦᑐᓂᒃ ᓇᓗᓇᐃᔭᐃᔾᔪᑎᓂᒃ ᐱᓕᕆᐊᕐᒎᑦ ᑐᒃᓯᕋᐅᑎᖕᒐᓂᒃ, ᐅᖕᒐᑖᓅᕆᔾᔨᖏᓪᓗᑎᑦ 500-ᓂᒃ ᐅᖅᑲᐅᓯᓂᒃ, ᖃᐸᓗᓈᑎᑑᕐᓗᒥᑦ ᐊᒻᒪ ᐃᓄᒃᑎᑐᑦ (ᐃᓚᖅᑲᑕᐅᓗᒍ ᐃᓄᐃᓐᓇᖅᑐᓐ, ᕿᑎᕐᒥᐅᑕᓃᓐᓂᕿᓂ). ᐱᓕᕆᐊᖅ ᓇᓗᓇᐃᔭᐃᔾᔪᑎᖕᒐᑦ ᓇᓗᓇᐃᖅᓯᓯᒪᔭᕆᐊᖅᑲᖅᐳᖅ ᐅᑯᓂᖕᒐ:

- ᐱᓕᕆᐊᕐᒎᑦ ᖃᓄᐃᓕᐅᕐᓃᑦ, ᐊᑐᕆᐊᖅᑲᖅᑕᖏᑦ ᐊᒻᒪ ᐊᑯᓂᐅᑎᒥᓂᐊᕐᓂᖕᒐᕐ;
- ᖃᓄᐃᑦᑐᑦ ᐃᖏᕐᕋᔾᔪᑎᕐ;
- ᖃᓄᐃᑦᑐᑐᐃᓐᓇᐃᑦ ᒪᑭᑎᑕᐅᓯᒪᔪᑦ ᐃᒡᓗᕐᔪᐊᑦ (ᒪᑭᑕᐃᓐᓇᕐᓂᐊᖅᑐᑦ/ᒪᑭᒪᐃᓐᓇᔾᔭᖏᑦᑐᕐ);
- ᐊᓯᐊᒎᑭᑏᑦ ᐃᓱᒪᒃᓴᖅᓯᐅᖅᑕᐅᓯᒪᔪᕐ; ᐊᒻᒪ
- ᐱᕙᓪᓕᐊᖏᓐᓇᐅᔭᕐᓂᐊᖅᑐᕐ, ᐃᓱᓕᔾᔪᑎᒋᔭᐅᓂᐊᕋᓱᒋᔭᐅᓂᖕᒐᑦ ᑕᐃᑲᓂ ᐃᓂᖕᒐᓂᒃ ᐊᒻᒪ ᖃᓄᐃᓕᐅᕿᑎᒥᓂᐊᖅᑕᐸᓯᓐᓂᒃ. .

ᐃᓗᓕᖅᑲᓗᐊᔾᔪᐊᖏᑦᑐᓂᒃ ᐱᓕᕆᐊᕐᒎᑦ ᑐᒃᓯᕋᐅᑦ ᓇᐃᓈᖅᓯᒪᓂᖏᑦ ᐃᓚᓕᐅᑎᓯᒪᕗᑦ ᑖᐸᓯᒪ ᐅᓂᒃᑳᓕᐊᑉ ᓯᕗᓂᐊᓂ. ᓇᐃᓈᖅᓯᒪᔪᑦ ᐊᑐᐃᓐᓇᐅᑎᑕᐅᕗᑦ ᖃᐸᓗᓈᑎᑐᕐ, ᐃᓄᒃᑎᑐᕐ, ᐊᒻᒪ ᐃᓄᐃᓐᓇᖅᑐᑎᑐᕐ.

<u>ᐱᒻᒪᕆᐅᔪᖅ:</u> ᖃᓄᐃᓕᐅᕐᓂᕆᔭᐅᔪᒪᔪᑦ ᑐᓂᓯᒥᐊᖅᑭᕖᑦ NIRB ᐃᓚᖕᒐᓂᒃ 2-ᒥ PSIR-ᒥᒃ ᑕᑕᑎᕿᒻᒥᒃ, ᐊᑏ ᑕᑕᑎᑐᐃᓐᓇᕐᓗᒍ ᐃᓚᖕᒐᓃᑦᑐᖅ 8-ᒥ ᑕᐃᖕᓇᑐᐊᖅ, ᑕᐃᒪᐃᙱᒃᑯᓂ ᑲᔪᓯᑐᐃᓐᓇᓇᑦ ᐃᓚᖕᒐᓂᒃ 5-ᒥ..

ᐃᓚᖓᑦ 5: ᑭᓱᑦ ᐊᑐᖅᑕᐅᔪᑦ

ᑖᒃᓱᒪ ᐃᓚᖓᑦ ᑕᑕᑎᖅᑕᐅᓯᒪᙱᑦᑐᖅ - NIRB-ᒥᒃ ᐃᓚᖓᓂᒃ 2-ᒥᒃ PSIR-ᒥᒃ ᑕᑕᑎᖅᑕᐅᓯᒪᖕᒪᑦ

1. ᓇᓗᓇᐃᕐᓕᑦ ᐱᕐᑯᑎᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᑦ (ᐃᓚᖃᕐᓗᒍ ᐃᑯᑕᕐ, ᐳᓪᓚᒃᓴᐅᑎᕐ, ᑎᖕᒥᓲᑦ, ᔪᓇᓯᐅᑎᕐ, ᑕᐃᒪᐃᑦᑐᕈᓘᔭᖅ):

ᐱᕐᑯᑎ ᖃᓄᐃᑦᑑᓂᖓ ᓈᓴᐅᑎᖓᓗ	ᐊᒃᑎᒋᓂᖓᑦ - ᐊᖏᑎᒋᓂᖏᑦ	ᐊᑐᕈᑕᐅᓂᐊᕐᓂᖏᑦ

2a. ᓇᓗᓇᐃᔭᐃᑎᐊᖅᓯᒪᓂᖏᑦ ᐅᖅᓱᐊᓗᒃ ᐊᒻᒪ ᐅᓗᕆᐊᓇᖅᑐᓖᑦ ᑭᓱᑦ ᐊᑐᖅᑕᐅᓂᖏᑦ:

ᐅᖅᓱᐊᓗᒃ	ᖃᐸᓯᐅᓂᖏᑦ ᐅᖅᓱᐊᓗᖅᑲᐅᑏᑦ ᐊᒻᒪ ᖃᔪᑎᒥ ᐃᓗᓕᖅᑲᕈᓇᕐᒪᖔᑕ	ᑲᑎᓪᓗᒋᑦ ᖃᐸᓯᐅᓂᖏᑦ ᐅᖅᓱᐊᓘᑉ (ᓖᑕᖏᓐᓃᓪᓗᒋᑦ)	ᖃᔪᖅ ᑐᖅᑯᖅᓯᒪᓂᕐᓂᖏᑦ
ᐃᑯᒪᔪᑦ ᐅᖅᓱᐊᓗᒃ			
ᒑᓴᓖᖅ			
ᑎᖕᒥᓲᔪᑦ ᐅᖅᓱᐊᓗᒃ			
ᐳᓪᓚᔫᖅᑐᔪᑦ			
ᐊᓯᖏᑦ			
ᐅᓗᕆᐊᓇᖅᑐᑦ ᐱᕐᑯᑎᑦ ᐊᒻᒪ ᐃᓚᒃᓴᑦ		ᑲᑎᓪᓗᒋᑦ ᖃᐸᓯᐅᓂᖏᑦ ᐅᓗᕆᐊᓇᖅᑐᑦ ᐱᕐᑯᑎᑦ ᐊᒻᒪ ᐃᓚᒃᓴᑦ (ᓖᑕᐅᓈᕐᓗᒋᑦ)	

2b. ᓇᓗᓇᐃᔾᓕᑦ ᑯᕖᑎᑦᑎᑦᑕᐃᓕᒪᓂᕐᒧᑦ ᐸᕐᓇᐅᑎ.

3a. ᓇᓗᓇᐃᔾᓕᑦ ᖃᔪᑎᒥ ᐃᒪᕐᒥᒃ ᐊᑐᕐᓂᐊᕌᓯᒋᔭᐅᓂᐊᕐᒪᖔᑕ ᐅᓪᓗᑖᑦ

ᐅᓪᓗᑖᑦ ᖃᔪᑎᒥ (m³)	ᖃᔪᖅ ᐃᒥᖅᑕᖅᑲᑦᑕᕐᓂᐊᕐᓂᖏᑦ	ᓇᓂ ᐃᒥᖅᑕᖅᑲᑦᑕᕐᓂᐊᕐᓂᖏᑦ

3b. ᐱᓇᓱᐊᖅᓯᒪᕚᑦ ᐃᒪᕐᒧᑦ ᓚᐃᓴᓐᓯᒥᒃ ᓄᓇᕗᑦ ᐃᒪᓕᕆᔨᒃᑯᖏᓐᓄᑦ?

☐ ᐄ ☐ ᐋᒃᑲ

ᐊᖏᕐᓂᕈᕕᑦ, ᓇᓕᐊᖕᓂ ᓚᐃᓴᓐᓯᕐᖅᐱᑦ?

☐ Class A ᐃᒪᕐᒧᑦ ᓚᐃᓴᓐᓯ

☐ Class B ᐃᒪᕐᒧᑦ ᓚᐃᓴᓐᓯ

ᐃᓚᖓᑦ 6: ᐊᒃᑖᕐᑲᑦᑕᕐᓂᖅ ᐊᒻᒪ ᓴᓗᒻᒪᖅᑕᐅᔾᔨᑎᑦ

ᑖᑉᓱᒪ ᐃᓚᖓᑦ ᑕᑕᑎᖅᑕᐅᓯᒪᙱᑦᑐᖅ - NIRB-ᒥᒃ ᐃᓚᖓᓂᒃ 2-ᒥᒃ PSIR-ᒥᒃ ᑕᑕᑎᖅᑕᐅᓯᒪᖔᑦ

1. ᓇᓗᓇᐃᔾᕐᓕᑦ ᖃᓄᐃᑦᑑᓂᖏᑦᑕ ᐊᒃᑖᕐᖅᓯᓂᕐᒧᑦ ᑐᕌᖓᓗᒍ ᐱᓕᕆᐊᑉ ᖃᓄᐃᓕᐅᕐᓂᕆᓂᐊᖅᑕᖏᓐᓄᑦ:

ᖃᓄᐃᑦᑐᖅ ᐊᒃᑖ	ᖃᓄᑎᒋ ᐊᒃᑖᕐᑲᕋᓱᒋᔭᐅᓂᐊᖅᓂᖏᑦ	ᖃᓄᖅ ᐋᖅᑕᐅᓂᐊᖅᐸᑦ	ᖃᓄᒃᑲᓐᓂᖅ ᓴᓗᒻᒪᖅᓴᖅᑕᐅᓂᐊᖅᐸᑦ
ᕿᓈᓗᒃ (ᐃᓅᑉ ᕿᓈᓗᖏᑦ)			
ᐃᒪᖅ ᐃᐱᖅ			
ᐃᑭᓴᕋᐃᑦᑐᑦ ᐊᒃᑖᑦ			
ᐃᑭᑦᑐᓐᓇᖏᑦᑐᑦ ᐊᒃᑖᑦ			
ᐊᑐᕐᓂᖁᙱᑦᑐᑦ ᐅᔭᕋᖕᓂᐊᖅᑕᐅᔪᓂᒃ (ᐃᑉᔪ, ᐊᑐᖅᑕᐅᓂᐊᖏᑦᑐᑦ ᓄᓇᒦᙳᖅᑐᑦ, ᓱᕋᐃᑦ)			
ᐅᓗᕆᐊᓇᖅᑐᑦ ᐊᒃᑖᑦ			
ᐊᓯᖏᑦ:			

2. ᓇᓗᓴᐃᔾᕐᓕᑦ ᐊᒃᑖᕐᑲᑦᑕᕐᓂᐊᕐᓂᒧᑦ ᐊᐅᓚᑦᑎᓂᐊᕐᓗᓂ ᐸᕐᓇᐅᑎᒥᒃ.

ᐃᓚᖓᑦ 7: ᓄᓇᓕᒃ ᐃᓚᐅᖅᑕᐅᓂᖓᑦ ᐊᒻᒪ ᐊᕙᒃᑐᖅᓯᒪᓂᕐᒧᑦ ᐃᑲᔪᕐᑕᐅᓂᐊᖅᓂᖏᑦ

ᑖᑉᓱᒪ ᐃᓚᖓᑦ ᑕᑕᑎᖅᑕᐅᓯᒪᙱᑦᑐᖅ - NIRB-ᒥᒃ ᐃᓚᖓᓂᒃ 2-ᒥᒃ PSIR-ᒥᒃ ᑕᑕᑎᖅᑕᐅᓯᒪᖔᑦ

1. ᓇᓗᓇᐃᔾᕐᓕᑦ ᓄᓇᓕᖕᒧᑦ ᑮᓪᓚᖅᑐᐃᓃᑦ ᖃᐅᔨᒃᑲᖅᑎᑕᐅᓯᒪᔪᑦ ᐊᒻᒪ ᑐᓂᔭᐅᑉᓗᑎᒃ ᑲᑎᒪᔾᔪᑕᐅᓚᐅᖅᑐᓂᒃ ᐱᑕᕐᑲᕐᓂᕈᓂ ᑭᓱᐊᓂ:

ᓄᓇᓕᒃ	ᐊᑎᖅ	ᑎᒥᕐᑯᑎ	ᐅᑉᓗᖓᓂᒃ ᖃᐅᔨᒃᑲᖅᑎᑕᐅᔪᖅ

1. ᐃᑦᑕᕐᓂᑕᖅᑲᕐᕕᓂᒃ ᖃᐅᔨᒪᔭᐅᔪᓂᒃ ᐊᒃᑐᖅᓯᓂᐊᖅᐱᓰ?

X ᐋᒃᑲ NO

ᐄ YES

ᐊᑏ ᐊᑎᓕᐅᕐᓗᒍ ᐊᒻᒪ ᐅᑉᓗᖓ ᓇᓗᓇᐃᕐᓗᒍ ᐱᓇᓱᐊᕈᑎᒥᔭᐃᑦ:

[signature]	President / CEO	15/01/08
ᐊᑎᓕᐊᕈᓯᐊᑦ	ᑕᐃᔭᐅᔾᔪᓯᖅ	ᐅᑉᓗᖓᓂᒃ

APPENDIX A

ᐱᓕᕆᐊᒃ ᖃᓄᐃᑦᑑᓂᖓ ᑐᑭᓕᐊᖅᑕᐅᓂᖏᑦ

ᐊᑐᕆᐊᕆᔭᐅᓂᐊᖅᑐᖅ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓗᓕᖅᑳᕐᓗᓂ ᓄᓇᒃᑰᕈᑎᓄᑦ ᐊᑐᕆᐊᕆᔭᐅᓂᐊᖅᑐᒥᒃ ᑕᐃᒃᑯᖓ ᐃᓂᒋᔭᐅᔪᒪᔪᒧᑦ ᑕᐃᒫᒃ ᐊᓯᔾᔨᓗᐊᖅᑕᐃᓕᓇᓱᐊᕐᓗᒍ ᓄᓇᖓᑦ.

ᐅᔭᕋᖕᓂᐊᖅᑕᐅᓂᐊᖅᑐᒥᒃ ᕿᓂᕐᓂᖅ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓗᓕᖅᑳᕐᓗᓂ ᖃᓄ ᓇᓗᓇᐃᖅᓯᓂᐊᕐᒪᖔᑕ ᐊᒃᑎᒋᓂᖓᑦ, ᖃᓄᐃᑦᑑᓂᖓᑦ, ᐊᒻᒪ ᐃᓕᑕᕐᓇᕈᑎᖏᑦ ᐅᔭᕋᖕᓂᐊᓚᒃᓴᓂᒃ ᐊᒻᒪ ᕿᒥᕐᕈᓗᒍ ᑮᓇᐅᔭᑦ ᐊᒻᒪ ᑭᓯᓕᓇᕈᓘᔭᕐᓂᕐᒧᑦ ᐊᑑᑎᖅᑲᕋᓱᐊᕐᒪᖔᑕ ᓴᖅᑭᑦᑎᓂᕐᒥᒃ ᐅᔭᕋᖕᓂᐊᓚᒃᓴᓂᒃ ᐱᑦᑲᕐᓂᕋᖅᑕᐅᔪᒥᒃ ᐅᔭᕋᖕᓂᐊᕐᕕᖑᖅᑎᑕᐅᓂᐊᕐᓗᑎᒃ

ᐊᕐᕌᒍᓕᒫᖅ ᐊᑐᖅᑕᐅᕙᓐᓇᖅᑐᖅ ᐊᖅᑯᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓗᓕᖅᑳᕐᓗᓂ ᐊᖅᑯᓯᐅᕐᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᓂᐊᕐᓗᓂ ᐊᕐᕌᒍᓕᒫᖅ.

ᐊᖏᔫᑎ5ᑦ ᖃᐅᔨᓴᒐᒃᓴᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓗᓕᖅᑳᕐᓗᓂ ᐹᖅᓯᓂᐊᕐᓗᓂ ᐊᖏᔪᒥᒃ ᖃᐅᔨᓴᖅᑕᐅᕙᒃᓴᓂᒃ ᐅᔭᕋᖕᓂᐊᓚᒃᓴᓂ Hᐊᓐᓇᓚᓂᒃ ᑕᐅᓴᓐᑎᓂᒃᑑᓐᓃᑦ ᐅᕐᑯᒪᐃᓐᓂᕐᑲᐅᕐᓗᑎᒃ. ᖃᐅᔨᓴᒐᒃᓴᑦ ᓂᕈᐊᖅᑕᐅᕙᒃᑐᑦ ᓇᒡᒎᕐᓂᖏᑦ ᐅᔭᕋᖕᓂᐊᕐᕕᒃᓴᐅᓇᔭᖅᑐᒥᒃ ᖃᐅᔨᓴᖅᑕᐅᔪᓂᒃ, ᐃᓚᖅᑐᐃᓐᓇᓗᐊᖅᑲᓗᒃᑲᖅ ᓯᕐᑲᑦᓕᓇᓂᕐᒥᒃ/ᓯᕐᑲᑦᓕᖅᑐᐃᓂᕐᒥᒃ (ᒥᑭᔪᓂᒃ)

ᑲᑎᖅᓱᐃᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕐᓃᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓗᓕᖅᑳᕐᓗᓂ ᑲᑎᖅᓱᐃᓂᕐᒧᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓗᓕᖅᑳᕐᓗᓂ ᑲᑎᖅᓱᐃᓂᕐᒧᑦ ᓂᕐᔪᑎᓂᒃ, ᐸᐃᕆᓂᒃ ᐊᒻᒪ/ᐅᕝᕙᓘᓐᓃᑦ ᐃᕐᑲᓗᖕᓂ ᓇᔪᒐᕐᕕᖏᓐᓂᒃ ᐊᖑᓇᓱᓪᓗᑎᒃ ᐅᕝᕙᓘᓐᓃᑦ ᒥᑭᒋᐊᕐᓂᐊᕐᓗᑎᒃ ᐱᖅᑯᓯᑎᒎᕐᓗᑎᒃ ᐅᕝᕙᓘᓐᓃᑦ ᓂᐅᕐᕈᑎᒋᓂᐊᕐᓗᒋᑦ.

ᑕᓇᐅᕐᔫᖓᔪᓄᑦ ᖃᓄᐃᓕᐅᕐᑕᐅᓂᖏᑦ: ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ ᑕᓇᐅᑉ ᒥᒃᓴᓂ, ᓲᕐᓗ ᐅᒥᐊᖅ ᐊᑐᖅᑕᐅᓗᓂ ᑐᕌᖓᔪᓄᑦ ᓄᓇᒦᖅᑐᓅᖓᔪᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐃᒋᑦᑎᓂᐊᕐᓗᓂ ᑕᓇᐅᕐᒧᑦ.

* ᖃᐅᔨᒪᒋᑦ ᓄᓇᓕᖕᓂᖕᖏᖅᐸᒃᑐᑦ ᑎᑭᓴᐃᒃᑲᓐᓂᕐᓂᕐᒧᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᑕᐅᓯᖅ ᐅᒥᐊᕐᔪᐊᖅ ᐃᖏᕐᕋᓂᖓᑦ ᑐᕌᖓᒻᒥᑦᑐᓄᑦ ᓄᓇᒥᖕᖏᖅᑐᓂᒃ ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑎᓂ ᖃᐅᔨᓴᖅᑕᐅᔾᔭᖕᒋᓪᒪᑕ NIRB-ᑯᓐᓄᑦ (ᐃᓚᖕᒋᓐᓂᑦᑐᑦ 12.12.2 NLCA-ᒥ).

ᐅᔭᕋᖕᓂᐊᓂᕐᒥᒃ ᓴᖅᑭᑦᑎᓂᖅ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓗᓕᖅᑳᕐᓗᓂ ᐄᔭᐃᓂᐊᕐᓗᓂ ᓯᕐᑯᐸᑎᖅᑕᐅᓯᒪᔪᓂᒃ ᐅᔭᕋᖕᓂ ᐅᔭᕋᖕᓂᐊᓚᒃᓴᑦᑎᐊᕙᐅᓂᐊᕐᓗᓂ ᐱᐅᔪᓂᒃ ᐊᒻᒪ ᐅᕐᑯᒪᐃᑎᒋᔪᓂᒃ ᑕᐃᒫᒃ ᓂᐅᕐᕈᑎᒋᔭᖅᑭᓐᓇᕐᓂᐊᕐᓗᑎᒃ ᐅᔭᕋᖕᓂᐊᓂᓇᔭᐅᔪᓂᒃ (ᓴᕕᕋᔭᒃᓴᖅ). ᐅᔭᕋᖕᓂᐊᕐᓂᖅ ᓴᕕᕋᔭᒃᓴᓂ ᐱᔭᐅᔪᓐᓇᖅᐸᑦ ᓴᓪᓚᐃᓗᑎᒃ ᐊᒻᒪ/ᐅᕝᕙᓘᓐᓃᑦ ᓄᓇᐅᑉ ᐃᑭᐊᖓᓂᒃ. ᐅᔭᕋᖕᓂᐊᕐᓂᖅ ᐃᓚᖅᑕᐃᓐᓇᓗᐊᖅᑲᖅᐸᖅ ᓯᕐᑲᑦᓕᓇᓂᕐᒥᒃ. ᓯᕐᑲᑦᓕᓇᓂᖅ ᐃᓚᖅᑲᖅᐸᖅ ᓴᓗᒪᖅᓴᕐᓗᒋᑦ ᐲᖅᑕᐅᕙᑦᓕᐊᔪᑦ ᓴᕕᕋᔭᒃᓴᐃᑦ ᐊᑕᐅᑦᑎᒃᑯᑦ ᐅᐊᔪᑎᒍᑦ ᐊᒻᒪ ᐃᓚᒃᓴᓕᖅᑐᖅᑕᐅᐸᓗᑎᒃ ᑕᐃᒫᒃ ᓴᖅᑭᑦᑎᔾᔪᑕᐅᓂᐊᕐᓗᑎᒃ ᐊᑭᑐᓂᖅᑲᖅᑐᒥᒃ ᐅᔭᕋᖕᓂᐊᓚᒃᓴᓂᒃ.

ᐅᔭᕐᓂᐊᒃᓴᓂ ᕿᓂᕐᓂᖅ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᕿᓂᕐᓂᕐᒥᒃ ᐃᓂᒥᒃ ᓇᓂᓯᓇᓱᐊᕐᓗᑎᒃ ᓄᓇᓕᕆᓂᕐᒧᑦ ᓈᒻᒪᐅᒪᙱᓐᓂᖏᓐᓂᒃ. ᐃᓚᖅᑲᖅᐳᖅ ᖃᐅᔨᓴᕐᓂᕐᒥᒃ ᐃᓂᕆᔭᕐᒥᒃ (ᓄᓇᒃᑰᕐᓗᑎᒃ/ᖃᖓᑕᓗᑎᒡᔫᓐᓃᑦ) ᑕᐃᒫᒃ ᓇᓂᓯᓇᓱᐊᕐᓗᑎᒃ ᐊᖏᔾᔩᒥᔪᓂᒃ ᑮᓇᐅᔭᓕᐊᕈᑕᐅᔪᓐᓇᕐᓗᑎᒃ ᐅᔭᕐᓂᐊᕈᑎᒃᓴᓂᒃ.

ᓯᓈᓐᖅᐸᓯᕐᒋᑦᑐᑦ ᒪᕿᑕᐅᓯᒪᔪᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᒪᕿᑕᐅᓯᒪᔪᑦ ᓂᐅᕋᐃᖕᕙᐅᖅᑳᑦᑕᕐᓂᐊᖅᑐᒥᒃ ᓯᓈᓐᖅᐸᓯᕐᒋᑦᑐᒥᒃ ᐊᒻᒪ ᐊᒃᑐᐊᓂᖅᑳᕐᓄᓂ ᓄᓈᕐᒥ ᑕᕿᐅᑉ ᐅᖓᓖᓐᓃᑦ ᑕᓯᐅᑉ ᐊᖓᑎᖓᓂᒃ. ᐆᒃᑑᑎᑦ ᐃᓚᖅᑲᖅᐳᖅ ᑐᓚᒃᑕᕐᕕᒃ, ᑐᓚᒡᕕᒃ, ᐅᖓᓖᓐᓃᑦ ᐅᒥᐊᕐᔪᐊᓄᑦ ᑐᓚᒃᑕᕐᕕᐅᑉ.

ᑭᓂᖅᑐᖅ ᐅᖅᓯᐊᓗᒃ ᐊᒻᒪ ᒫᓯᓂ ᕿᓂᕐᓂᖅ/ᖃᓄᐃᓕᐅᕐᓂᕐᒋᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓚᖅᑳᓂ 1) ᕿᓂᕐᓂᕐᒥᒃ, ᓲᕐᓗ ᓴᕝᕙᑦᓚᓂᒃ ᐅᖓᓖᓐᓃᑦ ᓄᓇᓕᕆᓂᕐᒥᒃ ᓄᓈᙳᐊᖏᓐᓂᒃ, 2) ᐃᑰᑦᑕᕐᓂᖅ ᑭᓂᖅᑐᓂᒃ ᐅᖅᓯᐊᓗᖏᒃ ᐊᒻᒪ ᒫᓯᓂᒃ, 3) ᓴᓇᔭᐅᓂᖅ ᐊᒻᒪ ᐊᐅᓚᑕᐅᓂᕐᒋᑦ ᓱᑉᓗᐊᓗᖕᓂ, ᒫᓯᑖᕐᕕᒃᓕᐅᕐᓂᖅ ᐅᖓᓖᓐᓃᑦ ᓇᓕᒥᐊᖓᓂᒃ ᑭᓂᖅᑐᓂᒃ ᐅᖅᓯᐊᓗᖅᑳᕐᕕᓂᒃ ᓄᓇᖁᑦ ᐃᓗᐊᓂ.

ᓴᒡᒐᖅᑕᐅᓃᑦ ᐊᒻᒪ ᑐᐊᐸᑖᕐᕖᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᓴᒡᒐᕐᓂᕐᒥᒃ, ᐃᓚᖅᑳᖅᑐᖅ ᐋᔭᐃᓄᓂ ᓯᐅᕋᕈᔪᖕᓂ (ᐆᒃᑑᑎᑦ ᓯᐅᕋᖅ ᐊᒻᒪ ᑐᐊᐸᐃᑦ) ᐊᒻᒪ ᑐᐊᐸᒃᑖᕐᕕᓂ, ᐃᓚᖅᑳᖅᓗᑎᒃ ᐋᔭᐃᓂᕐᒥᒃ ᓯᑎᒡᓕᒋᐊᖅᑕᐅᓯᒪᔪᑦ ᐅᔭᕋᐃᑦ (ᐆᒃᑑᑎᒋᓗᒋᑦ ᖃᐃᖅᑐᐃᑦ, ᐃᐸᐃᑦᓗ ᖁᐊᖅᓯᒪᔪᑦ).

ᑭᓱᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᕐᓂᖅ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᐱᒋᐊᖅᑎᑦᑎᓗᑎᒃ ᖃᓄᐃᓕᐅᕈᔫᔭᐅᑎᓂᒃ ᐃᓚᖅᑳᕐᓗᑎᒃ ᖃᐅᔨᓴᕐᓂᕐᒥᒃ ᐊᔾᔨᐅᙱᑦᑑᔪᓂᒃ, ᐆᒃᑐᕋᕐᓂᕐᒥᒃ ᐊᒻᒪ ᑲᑎᖅᓯᐃᓂᕐᒥᒃ ᑲᑎᖅᓱᖅᑕᐅᕈᔫᔭᖅᑐᓂᒃ ᓱᓕᓂᐅᔪᓂᒃ ᑕᐃᒫᒃ ᑭᓱᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᕐᓂᐊᕐᓗᑎᒃ ᑎᒃᑯᐊᖅᑕᐅᓯᒪᔪᓂᒃ ᐃᓂᓂᒃ ᐊᑯᓂᐅᑎᒋᓂᖅᐹᓗᑎᒃ ᑭᒡᓕᓕᖕᒥᒃ.

ᓇᔪᒃᓴᑦᓚᖕᓂᕐᒧᑦ ᖃᐅᔨᓴᕐᓂᖅ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᖃᐅᔨᓴᖅᑲᑦᑕᕐᓂᕐᒥᒃ ᓄᓈᙳᐊᓕᐅᕐᓗᑎᒃ ᐃᑎᓂᖓᑕ ᐊᒻᒪ ᖃᓄᐃᓕᙵᓂᕆᔭᕐᒋᑦᑕ ᐅᔭᕋᐃᑦ ᓄᓇᐅᑉ ᐃᑭᐊᖏᓐᓃᑦᑐᑦ ᖃᐅᔨᓴᕐᓗᑎᒃ ᐅᑎᕐᓂᖓᑦ ᓂᐱᐅᑉ ᓴᒃᑯᑕᐅᓗᓂ ᑕᐃᑲᙳᑦ ᖄᖓᓂ. ᖃᐅᔨᓴᕐᕕᐅᔪᑦ ᐃᓅᑦ ᓯᓈᓂᖅᐸᓯᐅᕐᒋᑦᑐᒥᒃ (ᐃᓗᐊᓂᐅᙳᕐᒋᑦᑐᖅ 12-ᒪᐃᓕᓂᒃ ᓯᒡᔭᒥᒃ), ᓯᒡᔭᐅᑉ ᖃᓂᖓᓂᒃ, ᐊᒻᒪ ᐅᖓᑎᒃᑲᓐᓂᖓᓄᑦ ᓯᓈᑉ.

ᐃᓂᒥᒃ ᓴᓗᒪᖅᓴᐃᓂᖅ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᐃᓂᒥᒃ ᓴᓗᒪᖅᓴᐃᓂᕐᒥᒃ (ᐃᓚᖅᑳᕐᓗᒍ ᑎᐅᓚᐃᓐᓂᒃ ᓴᓗᒪᖅᓴᖅᑕᐅᓂᕐᒋᑦ), ᐅᔮᖅᑐᖅᓗᑎᒃ ᐋᖅᑮᒍᑎᓂᒃ ᐃᓚᒃᓴᖅᑲᖅᑐᓂᒃ ᐃᐸᔪᓂᒃ, ᐋᖅᑭᒋᐊᖅᑕᐅᓗᑎᒃ ᓴᐅᖕᕕᕐᒋᑦ ᐊᒻᒪ ᐊᒃᑕᑯᕐᒋᑦ, ᐃᑐᑉᑎᓇᓂᖅ/ᐃᒋᑦᑎᓂᖅ ᒪᕿᑕᐅᓯᒪᔪᓂᒃ ᐊᒻᒪ ᐊᒃᑕᑯᕐᒋᑦ ᖃᐅᔨᓴᖅᑳᕐᓗᑎᒡᓗ ᓴᓗᒪᖅᓴᐃᖅᑯᓂᒃᓯᒪᓕᖅᑎᓪᓗᒋᑦ.

ᐳᓚᕋᖅᑳᕐᓂᐅᔪᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᐃᖏᕋᔭᖅᑳᕐᓂᕐᒧᑦ ᒥᕐᖑᐃᖅᓯᕐᓗᑎᒃ, ᖁᕕᐊᓯᒍᑎᑐᐃᓐᓇᓄᑦ ᐅᖓᓖᓐᓃᑦ ᕿᑲᕆᐊᑐᐃᓐᓇᖅᑐᓄᑦ ᑎᒃᑯᐊᖅᑕᐅᓯᒪᔪᒧᑦ ᐃᓂᒧᑦ ᐊᒻᒪ ᐊᑯᓂᐅᑎᒋᓂᕐᒋᑦ ᑭᒡᓕᖅᑲᕐᓗᒋᑦ.

ᐅᑭᐅᒃᑯᑦ ᐊᖅᑯᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᐊᖅᑯᓯᐅᕐᓂᕐᒥᒃ ᐅᑭᐅᒃᑯᑦ ᐊᑐᖅᑕᐅᖅᑳᕐᓂᐊᖅᑐᒥᒃ ᓇᓚᒧᑎᒋᐊᓂᖅ ᐊᒻᒪ ᐊᔭᒃᑐᖅᑕᐅᓯᒪᔪᑦ ᐊᐳᑦ ᐊᒻᒪ ᓯᑯ. ᐅᑭᐅᒃᑯᑦ ᐊᖅᑯᑦ ᐋᖅᑕᐅᕈᑉᓗᓂ ᐅᑭᐅᖅ ᓄᖑᒃᑳᖓᒥ.

ᐅᑭᐅᒃᑯᑦ ᐊᑐᒐᐅᔪᓐᓇᖅᑐᒥᒃ ᐊᖅᑯᑦ: ᐱᓕᕆᐊᕐᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐃᓄᓕᖅᑳᕐᓄᓂ ᐊᑐᖅᑕᐅᕙᓂᐊᖅᑐᖅ ᐅᑭᐅᒃᑯᑦ ᐊᑕᐅᓯᑐᐃᓐᓇᕐᒥᒃ ᓄᓇᓯᐅᑎᒧᑦ ᐊᑐᖅᑕᐅᔪᓐᓇᕐᓗᓂ ᐊᑕᐅᓯᓕᖕᒥᒃ ᐱᕿᓕᖕᒥᒃ, ᐊᑐᕆᐊᖅᑳᖅᑎᑕᐅᒍᓂ.

A3 – PART 1 FORM (INUINNAQTUN)

ilangat 1 tatatirut
Piliriarmut tuksiraummut tukisigiarutinut maliqujaujut

Tukisigiakkannirumaguvit nunavumi avatilirinirmut qaujisaqtiujut katimajinginnik (NIRB) atii pulararniaqpait qaritaujatigut upagvinganut http://nirb.nunavut.ca/ uvvaluunniit pijumaguvit NIRB-kut titiqqaqutinginnik, pilirianik qaujisarnirijaujunik, amma pilirianik qimirrunirmik upaglugu nunavumi avatilirinirmut qaujisaqtiujut katimajingitta titiqqanik nuutaujunnaqtunik upagvinganik http://ftp.nunavut.ca/nirb.

Pimmariunilik!
Atii qaujimagitti pinasuarutiit kajusititauniangittuq kisiani ilanginniittut 1-mi 9-mut tatatittiaqsimagutik, tamakkiq aturlugit qaplunaatitut amma inuktitullu (ilaliutiqataulugu inuinnaqtutitut, qitirmiutaujuqaruni).

Ilangat 1: pinasuaqtuup tukisigiarutingat

1. Piliriap taiguusingat haakit rivu piliriaq

2. pinasuaqtuup atiluktaanga amma turaarvingat:
sapiina qakulliq kuapuriisan

		807-766-1799
1004 Alloy Drive	sukajukkut:	807-343-0232
Thunder Bay, ON P7B 6A5	qaritaujakkut turaarvik:	abrantley@sabinasilver.com

3. Qaujigiarviugajungniqpaaq atiluktaangat amma turaarvingat:
iulput puraanli, angajuqqaaq amma aulattijimmarik

	uqaluut:	807-766-1799
1004 Alloy Drive	sukajukkut:	807-343-0232
Thunder Bay, ON P7B 6A5	qaritaujakkut turaarvik:	abrantley@sabinasilver.com

Ilangat 2: Angiqtausimaniqarialik

1. nalunaijaikkit <u>tamakkiq</u> angiqsimaniqaqtut turaangajuq piliriap tuksirautinganut:

X	aviktuqsimajut inuit katujjiqatigiingit (RIA)		kanatamiut attanaqtailimatittijiit (CLS)
X	nunavut imalirinirmu katimajit (NWB)	X	avatilirijiit kanatami (EC)
	nunavummi parnainirmut kamajit (NPC)	X	nunavut gavamangat (GN)
X	inulirijituqakkut kanatami (INAC)		kanatami unataqtuksalirijikkut (DND)
X	iqalulirijikkut amma imarmiutalirijikkut (DFO)		haamlatkut
	nunalingni gavamalirijikkut pijittiraqtingillu (CG&S)		kanatami mirnguirsirvilirijikkut (PC)
X	nunavumi qaujisaqtulirijikkut (NRI)		kanatami nirjutilirijit (CWS)
X	iliqqusilirijikkut gavamakkunni (CLEY)		asingit (nalunaijattiarlugit):

2. Nalunairlugit atuutiqaqtutnnga pijunnautiit, laisansit, uvvaluunniit asingit angiqtausimajut turaangajut piliriap tuksirautinganut, amma upluata isulivvingat(ngit):

imarmut laisansi (qanuittuuninga B) 2BE-HAK0709 maajji 2, 2007 tikiutilugu tisipiri 31, 2009

nunaup atuqtuaqtauninga naasaut 76F/16-1-3 uktuupiri 2, 1976 tikiutilugu uktuupiri 2, 2018

ujarangniarnirmut atuqtuaqtauninga 2958 iniup naasautinga 076F16 sitipiri 19, 1979 tikiutilugu sitipiri 19, 2021

ujarangniarnirmut atuqtuaqtauninga 2789 iniup naasautinga 076F15 vivvuari 10, 1976 to vivvuari 10, 2018

ujarangniarnirmut atuqtuaqtauninga 2895 iniup naasautinga 076F16 jaanuari 4, 1979 to jaanuari 4, 2021

ujarangniarnirmut atuqtuaqtauninga 2964 iniup naasautinga 076F16 jaanuari 15, 1980 tikiutilugu jaanuari 15,

ujarangniarnirmut atuqtuaqtauninga 2893 iniup naasautinga 076F16 julai 12, 1978 tikiutilugu julai 12, 2020

ujarangniarnirmut atuqtuaqtauninga 3018 iniup naasautinga 076F16 vivvuari 24, 1981 tikiutilugu vivvuari 24, 2023

ujarangniarnirmut atuqtuaqtauninga 3000 iniup naasautinga 076F16 juuni 26, 1980 to juuni 26, 2022

nunamut atuqrunnarnirimut pijunnaut N2004C0005 iipuru 7, 2007 tikiutilugu iipuru 7, 2008

inuit nunaqutinganik aturunnarnirmut laisansi KTL303C010 maajji 18, 2007 tikiutilugu maajji 17, 2009

NRI-kut sunatuinnanik qaujisaqattarnirmut amma iliqqusitigut qaujisarunnauti 0400807N-M juuni 1, 2007 tikillugu

NRI-kut nunangit amma imangit qaujisarunnauti 0400607N-M iipuru 1, 2007 tikillugu tisipiri 31, 2010

nunavut gavamakkut uumajulirijingit qaujisarunnauti WL000828 mai 15, 2007 tikillugu tisipiri 31, 2007

nunavut gavamakkut ittarnitalirinirmut pijunnaut 07-022A juuni 11, 2007 tikillugu tisipiri 31, 2007

DFO-kut laisansingat iqalliqijunnarnirmut qaujisarniarlutik S-07/08-1032-NU juni 28, '07 tikillugu uktuupiri 30, '07

DFO-kut nirjutinik aturnirmut maligialiit pijunnaut FW1-ACC-2007-2008-050 juuni 28, '07 tikillugu uktuupiri 30, '07

3. nalunaijarlit <u>utaqqijaujut</u> pijunnautit, laisansit, uvvaluunniit asingit angirutii% turaangajut piliriarmut tuksiraummik:

imalirnirmut laisansi (qanuittuuninga A)-nuvut imalirinirmut katimajingit

iqalliqijunnaut-DFO-kunni

nalunaijauti 2 aaqqigiaqtauluni MMER-avatilirinirmut kanatami

nunami aturunnauti-inulirijituqakkut

inuit nunaqutinganik atuqunnaut-KIA-kunni

qaujisarunnautit:

NRI-kut sunatuinnanik qaujisaqattarnirmut amma iliqqusitigut qaujisarunnauti

NRI-kut nunami amma imarmik qaujisarunnauti

nunavut gavamangat uumajulirinirmut qaujisarunnaut

nunavut gavamangat ittarnitalirinirmut amma uumajuvinirni pijunnauti

DFO-kut laisansingat iqalliqijunnarnirmut qaujisarniarlutik

DFO-kut nirjutinik aturnirmut maligialiit pijunnaut

4. **Taanna piniriaq uvvaluunniit <u>nalimianganik ilulinginnik taapsuma piliriap</u> qaujisaqtausimavaat uvvaluunniit qimirrujausimaavaat NIRB-kunnut?**

X ii **aakka**

Angiqsimaguni, nalunairlugu kingulliulauqtut piliriap taiguusingat amma NIRB-kut titiqqangata naasautiqutaa.

<u>NRI-kut nunami amma imarmik qaujisarunnauti -NIRB# 07YN030</u>

<u>inuit nunaqutinganik laisansi -NIRB #04EN012</u>

BIPR-kut piliriarmut tuksiraut & avatimik aktuiniarnirmik unikkaaq maligialiit- -
NIRB# 03UN114

iqqaumagiaruq: haakit aturniaqtuq BIPR aqqutinganik ujarangniarvingimik tulagvingmut. haakit aturniarmijuq tulagviup piqutinginnik.

Ilangat 3: piliriap tuksirautinganut nalunaijaijjuti

1. **Nalunairli qanuittuuninga piliriap tuksirarutinga (nalunailuktaarlugit atuqtuluktaat) [1,2]: (takulugu Appendix A piliriap qanuittuuningitta tukiliuqtausimaningit)**

1	qanuittutuinnarni silaqarluni aqqut/aturvik All-	X	9	iniup salummaqsaqtauninga/aaqqigiaqsiniq	
2	ukiukkut aqqut/ukiukkut aturvik		10	kiniqtumik amma gaasillarinik qinirasuarniq/qanuiliurniit	
3	ujarangniagaksanut qinirasuarniq		11	imarmiutalirinirmut qanuiliurniit	X
4	pivallianiqsamik ujarangniagaksanut qinirasuarniq	X	12	kisuliriruluujarnirmut/nunarjualimaamit ukiuqtaqtungit arraagunga qaujisarniq*	
5	ujarangniarnirmut pivallianingat/angijukallangni qaujisarutit	X	13	angunasuarnirmut qanuiliurningit*	
6	saggaqsimaniit amma tuapaktaarviit	X	14	pularaqtulirinirmut qanuiliurningit*	
7	sinaaniiqpasingittut makititausimajut (tulaktarvik, ingiuliluaqtailijjutit, tulagvik) makititausimajut (tulagvik, ingiuliluaqtailijjutit, tulagvik)	X	15	asingit([2]:	
8	nunaup najaksallangningata qaujisarniq				

Qaujimaniaqputit:

1. Tamakkiq piliriat qanuittuuningit nalunaiqsimajut qulaani, kisiani taikkua nalunaikkutaqsimajut imaittumik (*), piqariaqarniaqtut ikajurutimik tunisiniarluni **ilangat 2 piliriaq qanuittuullattaarningat tukisigiarutiqariaqarnirmut (PSIR) tatatirummik.** NIRB-kut pinasuarutigivaktangit pijariiqsimaniraqtaunianngittuq pitaqanngikkuni ilangat 2 PSIR tatatirutinganik.
2. Qaujimaniaqpurutit pijariirniarlugu NIRB kamagijauninga, NIRB-kut tuksiratuinnariaqarmata tukisigiarutikkannirnik qangamiattiaq kamagijauvalliatillugu.
3. Kisiani “asingit” niruaqtauguni, qaujigiarvigilugit NIRB-kut qanuq pijariaqarmangaaqpit ilanganik 2-mi PSIR tatatirutinganik.

2. Piliriap qanuittuuninga 3, 4 uvvaluunniit 5 niruaqtausimaguni qulaani, atii nalunairuk ujarangniagaksat pijuminarijanganik piiqtauvviuniaqtillugu. ilaliutiniaqpait naitumik qanuittuunirijanginnik.

X	akikittuksajait savirajaksat (siarnaq, kannujak, guulu, qaqulliq, taimaitturujuit siarnaq, kannujak, aaqiksaq, guulu; marruuk saggaqtausimajuq 1 nunaup ataaniittut piunnginniijaqsimajut
	taiman
	nungujuittut
	asingit: ______

3a. Piliriap qanuittuuninga 13, 14 uvvaluunniit 15 niruaqtausimannirutik qulaani, tatatirlugu saqqitausimajut amma apiqqutiit ataani.

Aturiatunngi

ingirrajjutiup qanuittuuninga	qapsit	aturutiginiaqtangat	akuniutigíningat

3b. nalunaikkit tulaktarviit, mivviit uvvaluunniit makimatitaujut atuqtauniarlutik atauttikkut piliriangujumajumut.
iqqaumaniaqputit: iglurjuat nutaat makititaujut ilaqariaqatuinnarialik ilangat 2 tatatirummik.
aturiatunngi ______

3c. Tangmaarviqalaupillangniarniruni, nalunaijaigit qanuittuuniarmangaata makititauniaqtut amma nalunairlugu qanuittuuniarningat amma nakit uummaqqutiqarniarmangaat tangmaarviuniaqtuq pitaqarniarniruni kisiani.
aturiatunngi ______

4. Pilirijiit (naasautit atuqtaujut tautuglugit tangmarviup iniqarunnarningit)

katillugit qapsiuningit pilirijiit taikani inimik = (A)	300	qatillugit qapsiuningit uplut taikaniinnirijaujunik = (B)	365/arraagutamaat	**Katillugit pilirijiit uplungit (A) × (B) = 109,500/arraagutamaat**

5. ᐊkuniutiginingit

akukiniutiginingat uvanngat	*aulattinirmut:*	**2011 (sanajaugiaqtillugu)**	tikiutilugu	**2027 (ilaliutisimanngittuq nuqqaqpallianirijanginnik)**
angiqtausimajut akuniutiginiarningat: uvanngat		**jaanuari 2010**	tikiutilugu	**tisipiri 2030**

6a. Aviktuqsimaniq (nalunairlugit taikkua aturniqaqtuluktaat):

	qikiqtaaluup uangnangat		kivalliq	X	qitirmiut		sapummijaujut kiglinnguangit:

☐ qikqtaaluup niggingat ☐ mirnnguirsirvik

6b. nalunaijarli iningat piliriangujumajumut qanuiliurniit aviktuqsimaniq maliglugu, nalunairlugu ungasiktiginingat qaninniqpaamut nunalingmut amma sapummijauniqaqtut iniit.

Ujarangniarvik: immaqaa qitigijangat 65°55; uangnanganik sanimut, 108°30' ualinirmi tukimut, immaqaa 75-kilaamitanik nigiqpasingata qingaut. immaqaa 360-kilaamitanik kanangnaqpasingmik qurluqtuup, amma 360-kilaamita ualiniqpasingmik iqaluktuuttiap. ujarangniarvik iniqaqpuq qanigijaqanngiłłuni sapummijauniqaqtunik ininik.

Upagunnarniq ujarangniarvingmut ilaqarniaqtuq qangatanikkut, imakkut, amma nunakkut isumaksaqsiuqtauniaqtut. mivviliurniqarniaqtuq ujarangniarvigijaujuup ininganik amma sirluarijauniaqtuq piunnginniijaqsimajunut ujarangniaqtausimajut amma usigijauniaqtut ininganik sanajauniaqtut qingaup tulagvinganik amma aqqutingat (BIPR) tulaktarvinganik, immaqaa 100-kilaamitanik ungasiktigijuq uangnaqasinganik. haakit rivu niuviqattarniaqtuq BIPR-kunni. nunami isumaksaqsiurutauniaqtut ilaqaqpuq sila qanuikkaluaqpat aqqummik, immaqaa 25-kilaamitanik ungasiktiginilik, turaarutauniarluni ujarangniarvingmut BIPR-kut aqutinganut.

Immaqaa qingaummi.

BIPR piliriangat qimirrujaujuq maanna BIPR-kunnut. kisianittauq, taakkua nalunaijattiaqsimaniuvut inigijarmut tulaktarviup amma aqqutiginiaqtangitta agjaqtuiniaqtillugit.

Tulaktarvik: inilik qingaut nigginganik. tulaktarvik ungasiktiginilik 50-kilaamitanik uilpuvuas qurlurningani amma hiukitak kuungani sapummijausimajurmik inimik.

Agjaqtuivvingata aqqutigijauniaqtut piqutinik tulaktarvikkut qaujisaqtausimaliqtuq amma qimirrujausimaliqłuni ilagijangannik BIPR-kut pilirianganut. iluani ualinirmi qitirmiumi, agjaqtuivvingata aqqutigijauniaqtuq aqqusaaqattarniaqtuq kuin maat imanganik tingmianut pagvisaqtaugiaqanngitungani (Queen Maud Gulf), amma sapummijausimajut iniit tingmianut najugarvingani (Jenny Lind Island) amma nanuit sitigivaktangata ininganik viktuarija imangani amma lausan imangani. silatiani ualinirmi qitirmiut parnagvingata aviktuqsimaniup purins liupu tingmianut pagvisaqtaugiaqanngitungani amma sirmilik mirnnguirsirvinga. ualinirmit qikiqtaalungmut tariukkut aqqutinga isumaksaqsiuqtaujuq pagvisaqtauvviuniangilluni/ittarnitaqarviuluni.

6c. Uqausiriguk atuqtausimalaurniruni ini pilirianut kingunirmi.

Nunalirinirmut qiniruluujarniqalauqtuq qaningani ujarangniarviup 2004-mi maannamut sapiinakkunnut. avatilirinirmut qaujisallattaarniqalauqtuq 2007-mi, kajusiluni 2008-mut.

6d. nalunaiqsigit qaujijausimajuqarmangaat ittarnitaqarvinik/inuqarvivinirniglu ininginnik taikani.

ittarnitalirinirmut ini nalunaiqtausimajut piliriap ininganik 2007-ngutillugu qaujisarnirijangajumik nunami (takugiarlugu pijunnaut 07-022A). immaqaa 30-nik iniujunik nalunaiqsisimajut. taakkua iniit nalunaijattiaqsimaniaqtut pijunnautitaarummik unikkaaliarmik.

7. Nunaup qanuinninga (nalunaikkit taikkua atuqtut):

[x] gavamakkut piqutingit	☐ kamisinaup	☐ nunaliup
[x] inuit nunaqutingit qaangani nunaup	☐ inuit nunaqutingit nunaup ikianganiittunik	

8a. Aktiginingit (kikpaaringninga avataani ujarangniarviup atuqtuarvigijangata):

UL (degree/minute)	108° 39' 40.10" W 65° 59' 11.58" N	UR (degree/minute)	107° 58' 16.39" W 65° 53' 55.46" N
LL (degree/minute)	108° 43' 41.73" W 65° 55' 43.57" N	LR (degree/minute)	108° 4' 48.20" W 65° 48' 33.29" N

NTS nunannguap naasautingat: ᐅᔭᕋᖕᓂᐊᕐᕕᒃ: 76F-16, 76F-15 (1:50,000) apqut: 76G-13 (1:50,000)

(atii qaujigiattiarit nunannguangit piliriarmut atagaluarmangaata (1:50,000 **kisiani atuinnaugutik,** 1:250,000 **piqariaqammariktuq)** atuinnautitaujut taikanngat nunamiutani piviksauvaktut kanatami)

8b. Piliriarmut tuksirat ilaqaruni **tangmaarvimik,** atii atuinnautittigit aktiginirijanginnik tangmaaqviup ininganik

Min Lat (degree/minute)	65° 55' 11.45" N	Min Long (degree/minute)	108° 32' 2.50" W
Max Lat (degree/minute)		Max Long (degree/minute)	

Ajjiginngikkuniuk qulaani tangmaarviup:
NTS nunannguangata naasaut: 76F-16 (1:50,000)

Atuu qaujigiattiarit nunannguat piliriarmut atagaluarmangaata (1:50,000 **kisiani pitaqaruni,** 1:250,000 **pitaqariaqammariktuq)** atuinnaujut nunamiutanik piviksauvaktut kanatami

Qaujimagit ilaliutikkanniqsimajut inimut tukisigiarutit pisimajaujariaqarniaqtuksaungmata kingullirmi pilirirmut tukisigiarutillattaaqariaqarnirmut (PSIR) tunisiniarluni. imaittuujunnaqtuq qaritaujaqtigut nunalirinirmut turaangajunik ilulinginnik.

Ilangat 4: iluliqaluajjuaraalunngittunik piliriarmut tuksiraummik nalunaijaijjuti

Atii ilaliutiqataulugu iluliqaluajjuaraalunngittunik nalunaijaijjutinik piliriarmut tuksirautinganik, ungataanuurujjingillutit 500-nik uqausinik, qaplunaatituurlugit amma inuktitut (ilaqataulugu inuinnaqtun, qitirmiutaniinniruni). piliriaq nalunaijaijjutingat nalunaiqsisimajariaqaqpuq ukuninga:

- piliriarmut qanuiliurniit, aturiaqaqtangit amma akuniutiginiarningat;
- qanuittut ingirrajjutit;
- qanuittutuinnait makititausimajut iglurjuat (makitainnarniaqtut/makimainnajjaangittut);
- asiaguurutiit isumaksaqsiuqtausimajut; amma
- pivallianginnaujarniaqtut, isulijjutigijauniarasugijauningat taikani ininganik amma qanuiliurutiginiaqtapsinnik.

Iluliqaluajjuangittunik piliriarmut tuksiraut nainaaqsimaningit ilaliutisimavut taapsuma unikkaaliap sivuniani. nainaaqsimajut atuinnautitauvut qaplunaatitut, inuktitut, amma inuinnaqtutitut.

<u>PIMMARIUJUQ:</u> QANUILIURNIRIJAUJUMAJUT TUNISIGIAQARUVIT **NIRB** ILANGANIK **2**-MI **PSIR**-MIK TATATIRUMMIK, ATII TATATITUINNARLUGU ILANGANIITTUQ **8**-MI TAINGNATUAQ, TAIMAINNGIKKUNI KAJUSITUINNARIT ILANGANIK **5**-MI..

Ilangat 5: kisut atuqtaujut

Taapsuma ilangat tatatiqtausimanngittuq - NIRB-mik ilanganik 2-mik PSIR-mik tatatiqtausimangmat

1. **Nalunairlit piqutit atuqtauniaqtut (ilaqarlugu ikuutat, puplaksautit, tingmisuut, nunasiutit, taimaitturuluujaq):**

piquti qanuittuuninga naasautingalu	aktiginingat - angitiginingit	aturutauniarningit

2a. Nalunaijaittiaqsimaningit uqsualuk amma ulurianaqtuliit kisut atuqtauningit:

uqsualuk	qapsiuningit uqsualuqautiit amma qanutigi iluliqarunnarmangaata	katillugit qapsiuningit uqsualuup (liitanginniillugit)	qanuq tuqquqsimanirningit
ikumanut uqsualuk			
gasaliiq			
tingmisuunut uqsualuk			
puplanuuqtunut			
asingit			
ulurianaqtut piqutit amma ilaksat		**katillugit qapsiuningit ulurianaqtut piqutit amma ilaksat (liitaunaarlugit)**	

2b. Nalunaijarlit kuvitittittailimanirmut parnauti.

3a. Nalunaijarlit qanutigi imarmik aturniarasugijauniarmangaata uplutamaat

uplutamaat qanutigi (m^3)	qanuq imiqtaqattarniarningit	nani imiqtaqattarniarningit

3b. Pinasuaqsimavit imarmut laisansimik nunavut imalirijikkunginnut?

☐ ii ☐ aakka

Angirniruvit, naliangni laisansiqaqpit?

☐ Class A imarmut laisansi

☐ Class B imarmut laisansi

ilangat 6: aktakuuqattarniq amma salummaqtaujjutit

Taapsuma ilangat tatatiqtausimanngittuq - NIRB-mik ilanganik 2-mik PSIR-mik tatatiqtausimangmat

1. **Nalunaijarlit qanuittuuningitta aktakuuqsinirmut turaangalugu piliriap qanuiliurniriniaqtanginnut:**

qanuittuq aktaku	qanutigi aktakuqarasugijauniaqningit	qanuq piiqtauniaqpat	qanukkanniq salummaqsaqtauniaqpat
kinaaluk (inuup kinaalungit)			
imaq ipiq			
ikisaraittut aktakut			
ikittunnangittut aktakut			
aturniqanngittut ujarangniaqtaujunik (ipju, atuqtauniangittut nunaminngaaqtut, surait)			
ulurianaqtut aktakut			
asingit:			

2. **Nalusaijarlit aktakuuqattarniarnimut aulattiniarluni parnautimik.**

Ilangat 7: nunalik ilauqatauningat amma aviktuqsimanirmut ikajurutauniaqningit

Taapsuma ilangat tatatiqtausimanngittuq - NIRB-mik ilanganik 2-mik PSIR-mik tatatiqtausimangmat

1. **Nalunaijarlit nunalingmut kiggaqtuijiit qaujikkaqtitausimajut amma tunijauplutik katimajjutaulauqtunik pitaqarniruni kisiani:**

nunalik	atiq	timiquti	uplunganik qaujikkaqtitaujuq

Ilangat 8: tukisigiarutit apiqqutiit

1. **iTttarnitaqarvinik qaujimajaujunik aktuqsiniaqpisii?**

ii YES **X aakka NO**

Atii atiliurlugu amma uplunga nalunairlugu pinasuarutigijait:

[signature]	President/ CEO	15/01/09
atiliarusiat	taijaujjusiq	uplunganik

APPENDIX A

Piliriap qanuittuuninga tukiliaqtauningit

Aturiarijauniaqtuq: piliriarmut tuksiraut iluliqarluni nunakkuurutinut aturiarijauniaqtumik taikunga inigijaujumajumut taimaak asijjiluaqtailinasuarlugu nunangat.

Ujarangniaqtauniaqtumik qinirniq: piliriarmut tuksiraut iluliqarluni qanu nalunaiqsiniarmangaata aktiginingat, qanuittuuningat, amma ilitarnarutingit ujarangniagaksanik amma qimirrulugu kiinaujat amma kisuliriruluujarnirmut atuutiqaraluarmangaata saqqittinirmik ujarangniagaksanik pitaqarniraqtaujumik ujarangniarvinnguqtitauniarlutik

Arraagulimaaq atuqtaujunnaqtuq aqqut: piliriarmut tuksiraut iluliqarluni aqqusiurniarnirmut atuqtauniarluni arraagulimaaq.

Angijuuti5t qaujisagaksat: piliriarmut tuksiraut iluliqarluni piiqsiniarluni angijumik qaujisaqtaujuksanik ujarangniagaksani hannalanik tausantinigluunniit uqumainniqaurlutik. qaujisagaksat niruaqtauvaktut nakinngaarningit ujarangniarviksaunajaqtumik qaujisaqtaujunik, ilaqatuinnariaqarivuq siqallirinirmik/siqalliqtuinirmik (mikijunik)

Katiqsuinirmut qanuiliurniit: piliriarmut tuksiraut iluliqarluni katiqsuinirmut: piliriarmut tuksiraut iluliqarluni katiqsuinirmut nirjutinik, puijinik amma/uvvaluunniit iqalungni najugarvinginnik angunasuglutik uvvaluunniit mikigiarniarlutik piqqusitiguurlutik uvvaluunniit niurrutiginiarlugit.

Tariurmuungajunut qanuiliurtauningit: qanuiliurniujut tariup miksaani, suurlu umiaq atuqtauluni turaangajunut nunaminngaaqtunuungajunut uvvaluunniit igittiniarluni tariurmut.

* qaujimagit nunalingningaaqpaktut tikisaikkannirnirmut uvvaluunniit atausiq umiarjuaq ingirraningat turaanganngittunut nunaminngaaqtunik piliriarmut tuksirautini qaujisaqtaujjaangimmata NIRB-kunnut (ilanginniittut 12.12.2 NLCA-mi).

Ujarangnianirmik saqqitittiniq: piliriarmut tuksiraut iluliqarluni piijainiarluni siquptiqtausimajunik ujarangni ujarangniagaksattiavauniarluni piujunik amma uqumaitigijunik taimaak niurrutigijaqarunnarniarlutik ujarangnianirijaujunik (savirajaksaq). ujarangniarniq savirajaksani pijaujunnaqput saggailutik amma/uvvaliinniit nunaup ikianganik. ujarangniarniq ilaqatainnariaqaqpuq siqallirinirmik. siqalliriniq ilaqaqpuq salummaqsarlugit piiqtauvalliajut savirajaksait atauttikkut uajutigut amma ilaksaliqtuqtauplutik taimaak saqqittijjutauniarlutik akituniqaqtumik ujarangniagaksanik.

Ujarangniaksani qinirniq: piliriarmut tuksiraut iluliqarluni qinirnirmik inimik nanisinasuarlutik nunalirinirmut naammaumanngninninginnik. ilaqaqpuq qaujisarnirmik inigijarmik (nunakkuurlutik/qangatalutigluunniit) taimaak nanisinasuarlutik angijjuumijunik kiinaujaliarutaujunnarlutik ujarangniarutiksanik.

Sinaaniiqpasingittut makititausimajut: piliriarmut tuksiraut iluliqarluni makititausimajut niuraivviuqattarniaqtumik sinaaniiqpasingittumik amma aktuaniqarluni nunaarmi taqiup uvvaliinniit tasiup avatinganik. uuktuutit ilaqaqpuq tulaktarvik, tulagvik, uvvaliinniit umiarjuanut tulaktarviup.

Kiniqtuq uqsualuk amma gaasini qinirniq/qanuiliurningit: piliriarmut tuksiraut ilaqaruni 1) qinirnirmik, suurlu sajukpillanik uvvaliiniit nunalirinirmik nunannguanginnik, 2) ikuutarniq kiniqtunik uqsualungmik amma gaasinik, 3) sanajauniq amma aulatauningit suplualungni, gaasitaarvikliurniq uvvaliinniit nalimianganik kiniqtunik uqsualuqarvinik nunavut iluani.

Saggaqtauniit amma tuapataarviit: piliriarmut tuksiraut iluliqarluni saggarnirmik, ilaqaqtuq piijailuni siurarujungni (uuktuutit siuraq amma tuapait) amma tuapaktaarvini, ilaqaqłutik piijainirmik sitigligiaqtausimajut ujarait (uuktuutigilugit qaiqtuit, ipjuillu quaqsimajut).

Kisutuinnanik qaujisarniq: piliriarmut tuksiraut iluliqarluni pigiaqtittilutik qanuiliuruluujautinik ilaqarlutik qaujisarnirmik ajjiunngittuujunik, uukturarnirmik amma katiqsuinirmik katiqsuqtauruluujaqtunik suliniujunik taimaak kisutuinnanik qaujisarniarlutik tikkuaqtausimajunik ininik akuniutiginiqaqlutik kiglilingmik.

Najaksallangnirmut qaujisarniq: piliriarmut tuksiraut iluliqarluni qaujisaqattarnirmik nunanngualiurlutik itiningata amma qanuilinganirijangitta ujarait nunaup ikianginniittut qaujisarlutik utirningat nipiup sakkutauluni taikanngat qaangani. qaujisarviujut iniit sinaaniqpasiungittumik (iluaniunngittuq 12-mailinik sigjamik), sigjaup qaninganik, amma ungatikkanninganut sinaap.

Inimik salummaqsainiq: piliriarmut tuksiraut iluliqarluni inimik salummaqsainirmik (ilaqarlugu tiulainnik salummaqsaqtauningit), ujjiqtuqłutik aaqqiigutinik ilaksaqaqtunik ipjunik, aaqqigiaqtaulutik sauvvingit amma aktakungit, ituptiriniq/igittiniq makititausimajunik amma aktakungit qaujisaqattarlutiglu salummaqsairaaniksimaliqtillugit.

Pularaqattarniujut: piliriarmut tuksiraut iluliqarluni ingirrajaqattarnirmut mirnguiqsirlutik, quviasugutituinnanut uvvaliinniit qikariatuinnaqtunut tikkuaqtausimajumut inimut amma akuniutiginingit kigliqarlugit.

Ukiukkut apqut: piliriarmut tuksiraut iluliqarluni aqqusiurnirmik ukiukkut atuqtauqattarniaqtumik nalimutigianiq amma ajaktuqtausimajut aput amma siku. ukiukkut apqut piiqtauvagluni ukiuq nungukkaangami.

Ukiukkut atugaujunnaqtumik apkut: piliriarmut tuksiraut iluliqarluni atuqtauvangniaqtuq ukiukkut atausituinnarmik nunasiutimut atuqtaujunnarluni atausilingmik pirraalingmik, aturiaqaqtitauguni.

A4 – NON-TECHNICAL DESCRIPTION (ENGLISH)

Non-Technical Project Proposal Description

Sabina Silver Corporation (Sabina) has prepared a Project Proposal and permit applications for the development of the Hackett River Project (the "Project"). The Project is located in the West Kitikmeot Region of Nunavut about 75 km south of the southern portion of Bathurst Inlet. The mineral potential of the Project has been explored since the 1960's and recent work by Sabina has found three economical deposits of zinc, silver, copper, lead and gold.

The proposed Project includes the development of two open pits (Main Zone deposit, and East Cleaver deposit) and one underground mine (Boot Lake deposit). Ore would be mined and trucked to a conventional grinding and flotation plant on site to produce zinc, copper, and lead concentrates. Waste material from the mine would be placed on the land in certain areas and tailings would be deposited under water in a nearby impoundment. The mine and mineral processing plant would operate for about 14 years and employ a total of 250 to 325 people. Only about half of the employees would be on site at any one time because of the fly in/fly out rotational schedule.

The concentrate produced at the Project would be trucked to a port located at Bathurst Inlet using the proposed Bathurst Inlet Port and Road (BIPR). A 23 km all-weather access road would be constructed to connect the mine with the proposed BIPR road, and approximately 80 km of the northern portion of the BIPR road would be used to haul concentrate to the port and consumables back to the mine site. From the port, the concentrate would be shipped to overseas markets by using the shipping route to the east, although some limited concentrate production may be shipped to the west.

The Project would also include a camp, mineral processing plant, storage areas, maintenance and mechanical repair warehouses, fuel tanks, tailings impoundment, waste rock piles, airstrip, and local site roads. Sabina would also construct a concentrate storage and loading facility at the port site. Most of these facilities would be removed at the end of the mine life. Roads, the airstrip, the tailings impoundment, and waste rock piles cannot be removed and would be returned to the land use agreed to at that time. This is determined with regulators and relevant communities.

Sabina is developing a mine plan that uses scientific information, public input and traditional knowledge. Location of the access road, the tailings impoundment, waste rock piles, mineral processing plant and camp will be finalized based on this input. Sabina is committed to construct, operate, close and reclaim the mine site in such a way that meets regulatory requirements, minimizes environmental and social impacts and provides opportunities for economic and social development in Nunavut.

A5 – NON-TECHNICAL DESCRIPTION (INUKTITUT)

ᐱᓕᕆᐊᒃᓴᒧᑦ (ᐅᔭᕋᓐᓂᐊᕐᕕᒃᓴᒧᑦ) ᑐᒃᓯᕋᐅᑎᐅᑉ ᐅᓂᒃᑳᖅᑎᑦ

ᓴᐲᓇ ᓯᐅᓪᕗ ᑯᐊᐳᕇᓴᓐ (Sabina Silver Corporation) (ᓴᐱᓇ) ᑎᑎᕋᓚᐅᕐᒪᑕ ᐱᓕᕆᐊᒃᓴᒧᑦ ᑐᒃᓯᕋᐅᒻᒥᑦ ᐊᒻᒪ ᐱᔭᓐᓇᐅᒻᒥᑦ ᑐᒃᓯᕋᕐᑐᑎᒃ ᕿᓂᕈᒪᓂᕐᒧᑦ Hᐋᑭᑦ ᑰᖓᓂ ("ᐱᓕᕆᐊᖅ"). ᕿᓂᕈᒪᒻᒪᑦ ᕿᑎᕐᒥᐅᓂ ᓄᓇᕗᑦ ᐅᐊᓚᓂᕐᐸᓯᐊᓂ ᐃᒪᖅ 75 ᑭᓚᖁᑕᓂᒃ ᐅᖓᓯᓐᓂᓕᒃ ᕿᖓᐅᑦ ᓂᒋᕐᐸᓯᐊᓂ. ᐅᔭᕋᕐᑕᒃᕐᓂᖓ ᕿᓂᕐᕕᐅᔪᒪᔫᑉ ᑕᐃᒪᓐᖓᑦ 1960ᖏᓐᓂᒃ ᕿᓂᕐᕕᐅᕐᑲᑦᑕᕐᓂᑰᒻᒪᑦ ᐊᒻᒪ ᒫᓐᓇᕋᑖᖅ ᓴᐱᓇᒥ ᖃᐅᔮᓴᕐᑎᓪᓗᒋᑦ ᓇᓂᓯᕕᐅᓚᐅᕐᖓᑦ ᑮᓇᐅᔭᓕᐅᕈᑕᐅᕗᓐᓇᕐᑐᓂᒃ ᐅᑯᓂᖓ ᓯᐊᕐᓇᖅ, ᖃᑯᕐᓕᖅ, ᑲᓐᓗᔭᖅ, ᓴᕕᕋᔭᒃᓴᑦ (ᓴᒃᑯᑦᓴᑦ) ᐊᒻᒪ ᒎᓗᑦ.

ᐱᓕᕆᐊᖑᒍᒪᔪᒧᑦ ᑐᒃᓯᕋᐅᑦ ᐱᕐᑲᓯᐅᔾᔨᓂᐅᔭᕐᒪᑦ ᒪᕿᓐᓂᒃ ᓄᓇᐅᑉ ᖄᖓᓂᒃ ᐅᔭᕋᓐᓂᐊᕐᕕᐅᔪᒪᔫᓐᓂᒃ (ᐅᔭᕋᓐᓂᐊᕐᕕᑦᑐᐊᑕᐅᓂᐊᕐᑐᖅ, ᐊᒻᒪ ᑭᓛᕗ ᑲᓇᓐᓇᖓᓂ ᐅᔭᕋᓐᓂᐊᕐᕕᒃᓴᖅ) ᐊᒻᒪ ᐊᑕᐅᓯᖅ ᓄᓇᐅᑉ ᐃᑭᐊᖓᓂ ᐅᔭᕋᓐᓂᐊᕐᕕᒃᓴᖅ (ᐆᑦ ᑕᓯᖓᓂ ᐅᔭᕋᓐᓂᐊᕐᕕᒃᓴᖅ). ᓴᕕᕋᔭᒃᓴᖅ ᐅᔭᕋᓐᓂᐊᕐᑕᐅᓚᐅᕐᓗᓂ ᓄᓇᓯᐅᑎᒃᑯᑦ ᐅᓯᑲᕐᑕᖅᑕᐅᕐᑲᑦᑕᕋᔭᕐᑐᖅ ᖃᖅᑯᐊᕈᑎᕐᑲᕐᕕᒻᒧᑦ ᑲᓐᖢᕐᑎᓇᔾᔪᑎᓄᑦᑐ ᕿᓂᕐᕕᐅᓯᓐᓈᕐᓗᑎᒃ ᓯᐊᕐᓇᒥᒃ, ᑲᓐᓗᔭᖅᒥᒃ, ᓴᕕᕋᔭᒃᓴᒥᑦ (ᓴᒃᑯᑦᓴᒥᑦ) ᐅᔭᕋᕐᓯᐅᕐᕕᒻᒥ. ᐊᒥᐊᒃᑯᕐᓗᑯᑦ ᐅᔭᕋᓐᓂᐊᕐᑕᒥᑦ ᓄᓇᐅᑉ ᖄᖓᓂ ᐃᓂᒃᓴᓕᐅᕐᑕᐅᒐᔭᕐᑐᑦ ᐊᒥᐊᒃᑯᕐᓗᑯᑦ ᑰᒐᓛᓕᐅᕐᑕᐅᓯᒪᔪᒃᑯᑦ ᐃᒥᕐᒧᑦ ᓄᓇᓕᐊᕆᓯᒪᔪᒧᑦ ᑭᕕᑎᑕᐅᕐᑲᑦᑕᕋᔭᕐᑐᑦ. ᐅᔭᕋᓐᓂᐊᕐᕕᒃ ᐅᔭᕋᓕᕈᕝᕕᑦᑐ ᒪᑐᐃᖓᒐᔭᕐᑑᑉ ᐃᒪᖅ ᐊᕐᕌᒍᓐᓂᒃ 14ᓂᒃ ᐊᒻᒪ ᐃᖅᑲᓇᐃᔭᕐᑎᕐᑲᕋᔭᕐᑐᑎᒃ ᑲᑎᑦᑐᒋᑦ 225ᓂᒃ 350ᓄᑦ. ᓇᑉᐸᐃᓐᓇᖏᑦ ᐃᖅᑲᓇᐃᔭᕐᑎᑦ ᐅᔭᕋᓐᓂᐊᕐᕕᒻᒦᕐᑲᑦᑕᕐᑐᑎᒃ ᓇᑦᑎᑭᑕᕐᓂᐊᕐᖓᑕ ᑎᑭᑉᐸᑦᑐᑎᒃ/ᐊᐅᓪᓚᐸᕐᑐᑦᑐ ᐃᖅᑲᓇᐃᔭᕐᑎᑦ ᐅᑦᑐᕐᓯᐅᑎᒋᓂᐊᕐᑕᖏᑦ ᒪᓕᑦᑐᒋᑦ.

ᐅᔭᕋᓐᓂᐊᕐᑕᐅᔪᖅ ᐱᓕᕆᐊᖑᔪᒥ ᓄᓇᓯᐅᑎᒃᑯᑦ ᐅᓯᑲᕐᑕᕐᑕᐅᒐᔭᕐᑐᑦ ᕿᖓᐅᑦ ᑐᓚᒃᑕᕐᕕᖓᓄᑦ ᐊᖅᑯᑎᐅᑐᓂ ᕿᖓᐅᒥ ᑐᓚᒃᑕᕐᕕᒃᓴᓕᐊᖑᔪᒪᔪᖅ ᐊᑐᕆᐊᓕᐊᖑᒍᒪᔪᕐᑐ (BIPR). ᐊᑐᕆᐊᓕᐅᕋᔭᕐᑐᑦ 23km ᑭᓚᖁᑕᒥᒃ ᑕᑭᓂᓕᒻᒥᑦ ᐊᕐᕌᒍᓕᒫᖅ ᐊᑐᖅᑕᐅᔪᓐᓇᕐᑐᓂ ᐅᔭᕋᓐᓂᐊᕐᕕᒻᒥᒃ ᐊᑐᕆᐊᓕᐊᖑᒍᒪᔪᒧᑦ ᑲᓱᖅᓯᒪᓂᐊᕐᑐᓂ ᕿᖓᐅᒥ ᑐᓚᒃᑕᕐᕕᒃᓴᓕᐊᖑᔪᒪᔪᒧᑦ ᐊᑐᕆᐊᓕᐊᖑᒍᒪᔪᒧᑦᑐ, ᐊᒻᒪ ᐃᒪᖅ 80km ᑭᓚᖁᑕᓂᒃ ᐅᔭᕋᓐᓂᐊᕐᑕᐅᔪᑦ ᐅᓯᑲᕐᑕᕐᑕᐅᕙᑦᑐᑎᒃ ᑐᓚᒃᑕᕐᕕᒻᒧᑦ ᐊᒻᒪ ᐅᑎᒧᑦ ᐅᔭᕋᓐᓂᐊᕐᕕᒻᒧᑦ ᐊᑐᖅᑕᐅᓂᐊᕐᑐᑦ ᑭᓱᐃᓐᓇᑦ ᐅᓯᔪᐅᕙᑦᑐᑎᒃ. ᑐᓚᒃᑕᕐᕕᒻᒥᑦ, ᐅᔭᕋᓐᓂᐊᕐᑕᑦ ᐃᒪᐅᑉ ᐊᑭᐊᓄᑦ ᐅᓯᔭᐅᕐᑲᑦᑕᕋᔭᕐᑐᑦ ᓂᐅᕐᕈᑎᕐᑲᕐᕕᐅᕙᒃᑐᓄᑦ ᐅᒥᐊᕐᔪᐊᒃᑯᑦ ᐅᓯᑲᕐᑕᕐᑕᐅᕙᑦᑐᑎᒃ ᓯᓚᕐᔪᐊᑉ ᑲᓇᓐᓇᕐᒥᐅᕐᑯᑎᖏᓐᓄᑦ, ᐃᒪᖅᑲᓗ ᖃᑦᓯᓐᓇᐅᓗᑐᐊᒥᒃ ᐅᔭᕐᒃᑲᒥᒃ ᓯᓚᕐᔪᐊᑉ ᐅᐊᓚᓂᕐᒥᐅᖏᓐᓄᑦ ᐅᓯᑲᕐᑉᐸᑦᑐᑎᒃ.

ᐅᔭᕋᓐᓂᐊᕐᕕᒃ ᑕᒻᒫᕐᕕᕐᑲᕐᓂᐊᕐᑐᖅ, ᐅᔭᕋᓐᓂᐊᕐᑕᐅᕙᓕᐊᔪᓂᑦ ᓯᕐᑲᑦᓕᑎᓇᕕᒻᒥᑦ, ᑐᖅᑯᐃᕕᒻᒥᑦ, ᓴᓇᔭᓇᐊᓖᑦ ᐊᐅᓚᐅᑎᕈᔪᓂᑦᑐ ᓴᓇᕕᒃᓴᓂᒃ ᓯᕐᑐᐊᓂᒃ, ᐅᖅᓯᐊᓗᕐᑲᐅᑎᕐᑲᕐᕕᓂᒃ, ᑰᓚᖀᕐᕕᒃᓴᒥᒃ ᐊᒥᐊᒃᑯᕐᓗᑯᓄᑦ, ᐊᑐᔾᔫᖏᑦᑐᓂᒃ ᐅᔭᖅᑲᑦ ᓴᓂᕐᕙᐃᕕᒃᓴᖏᓐᓂᒃ, ᒥᑦᑕᕐᕕᒻᒥᑦ, ᐊᒻᒪ ᓄᓇᖓᓂ ᐊᑐᕆᐊᓕᐅᕐᓯᒪᓗᑎᒃ. ᓴᐱᓇᒥ ᓴᓇᖁᔭᕐᑐᑦ ᑐᖅᑯᐃᕕᒃᓴᒥᒃ ᐊᒻᒪ ᐅᓯᓕᕐᓯᐃᕕᒻᒥᑦ

ᐃᓪᓗᒥᒃ ᑐᓚᒃᑕᕝᕕᐊᑕ ᐃᓚᖓᓂ. ᑖᒃᑯᐊ ᐃᓪᓗᓕᐊᒥᓃᑦ ᑕᒪᒃᑭᐸᓪᓗᓪᓗᑭᑦ ᐲᔭᕐᑕᐅᒐᔭᕐᑐᑦ ᐅᔭᕋᓐᓂᐊᕐᕕᒃ ᒪᑐᔭᐅᓂᐊᓕᕐᐸᑦ. ᐊᑐᕆᐊᑦ, ᒥᑦᑕᕝᕕᒃ, ᑰᒐᓖᕝᕕᒃ ᐊᒥᐊᒃᑯᕐᓗᑯᓂᒃ, ᐊᒻᒪ ᐅᔭᖅᑲᒥᓃᑦ ᐊᑐᔾᔮᖏᑦᑐᑦ ᓅᑕᐅᔪᓐᓇᔾᔮᖏᒻᒪᑕ ᐊᒻᒪ ᐅᑎᖅᑎᑕᐅᑐᐃᓐᓇᕐᓂᐊᕐᑐᑦ ᓄᓇᒨᑦ ᐊᖏᕈᑎᐅᓯᒪᔪᑦ ᐃᓗᐊᓃᒃᑐᑦ ᒪᓕᓪᓗᑭᑦ ᑕᒪᑐᒪᓂᐅᑎᓪᓗᒍ ᐊᖏᕈᑎᐅᓯᒪᔪᑦ. ᑖᒃᑯᐊ ᓇᓗᓇᐃᕐᑕᐅᓯᒪᓂᐊᕐᒥᔪᑦ ᐱᕐᑯᔭᕋᖠᑦ ᐊᒻᒪ ᓄᓇᓕᓐᓄᑦ ᐊᑐᖅᑕᐅᕐᑯᔭᐅᔪᑦ.

ᓴᐲᓇ ᐋᖅᑭᒃᓱᐃᕙᓪᓕᐊᒻᒪᑕ ᐅᔭᕋᓐᓂᐊᕐᓂᕐᒧᑦ ᐸᕐᖓᐅᑎᒃᓴᓂᒃ ᖃᐅᔾᓴᕐᑎᒻᒪᓅᑦ ᐅᕐᑲᐅᓯᖏᑦ ᐊᑐᖅᑕᐅᓗᑎᒃ, ᑭᒃᑯᐃᓐᓇᕐᓂᑦ ᑲᑎᒪᕝᔾᔪᐊᕐᑎᑦᓯᓂᒃᑯᑦ ᑐᓴᕐᑕᐅᔪᓂᒃ ᐱᐅᓯᑐᕐᑲᒃᑯᓪᓗ ᖃᐅᔾᒪᔭᑐᕐᑲᑦ ᐊᑐᖅᑕᐅᓗᑎᒃ. ᐃᓂᑭᓂᐊᕐᑕᖓ ᐊᑐᓇᐊᕐᑲᕐᕝᕕᒃᓴᑦ, ᑰᒐᓖᕐᑎᑦᓯᕝᕕᒃᓴᖅ ᐊᒥᐊᒃᑯᕐᓗᑯᒥᑦ, ᐅᔭᖅᑲᒥᒃ ᐊᑐᖅᑕᐅᔾᔮᖏᑦᑐᒥᒃ ᓴᓂᕐᕙᐃᕝᕕᒃᓴᖅ ᐊᒻᒪ ᐃᓄᓐᓄᑦ ᑕᓪᓖᕐᕝᕕᒃᓴᖅ ᐱᔭᕇᕐᑕᐅᑐᐃᓐᓇᖃᔭᕐᑐᑦ ᑐᓴᕝᕕᕐᑲᓚᐅᕐᓗᑎᒃ ᑖᒃᑯᓇᓐᖓᑦ. ᓴᐲᓇ ᐅᔭᕋᓐᓂᐊᕐᕕᒃ ᐱᓂᐊᕐᓂᕐᑲᕐᒪᑕ ᓴᓇᔪᒪᓪᓗᑎᒃ, ᐊᐅᓚᑦᓯᓗᑎᒃ, ᒪᑐᓯᓗᑎᒃ ᐊᒻᒪ ᐅᑎᖅᑎᑕᐅᓗᓂ ᓄᓇᖓ ᑕᐃᒪᐃᓐᓂᕆᐸᓗᓚᐅᕐᑕᖓᓄᑦ ᐱᕐᑯᔭᕋᖠᓂ ᒪᓕᑭᐊᖠᑦ ᒪᓕᒃᑕᐅᓗᑎᒃ, ᐊᕙᑎᒃᑎᓐᓂᒃ ᐊᓱᐊᓇᓖᓗᐊᑦᑕᐃᓕᒪᓱᓐᓈᑦ ᐊᒻᒪ ᐃᓅᖅᑲᑎᑏᓂᑦ ᐊᒃᑐᐃᓂᖅᑲᓗᐊᕐᑕᐃᓕᓱᓐᓈᑦ ᐊᒻᒪ ᐱᕝᕐᑲᕐᑎᕐᓯᓱᐊᕐᓗᑎᒃ ᑮᓇᐅᔭᓕᐅᕋᓱᓐᓂᒃᑯᑦ ᐃᓅᖅᑲᑎᑏᓄᓪᓗ ᐱᑦᔫᓕᕈᑕᐅᔪᓐᓇᕐᑐᓂᒃ ᓄᓇᕗᒻᒥᐅᓄᑦ.

A6 – NON-TECHNICAL DESCRIPTION (INUINNAQTUN)

Ayuqnaittukkut Hanayauyughanut Tughirautinit Naunaitkutit

Sabina Silver Kuapurriisakkut (Sabina) iniqhihimayut Hanayauyughanut Tughirautinik aullaqtittiyumaplutik Hackett River Project-mik ("Hanayauyughat"). Taamna hannavighaq Uataaniittuq Qitiqmiuni Nunavunmi 75 km-nik hivuraaniittuq Qingaungmit. Nalvaaqhiuqvighaupluni taapkua Hanayut ihivriuqtauhimayuq 1960's atuqtillugit taapkua Sabina-kut pingahunik manighiurutighanik nalvaaqhimayut zinc-mit, silver-mit, kannuyanik, lead-mit, qipliqtuniklu.

Tughirautini titiraqhimayuq malrungnik angmaumayunik uyaraghiurumayut (Hivulliuyuq nalvaaqhiuqvik, Kivataanillu Cleaver-mik nalvaaqhiuqvik) nunaplu iluani nalvaaqhiuqvik (Boot Lake nalvaaqhiuqvik). Nalvaaqtauyut ungavaqtaulutik agyaqtaulutiklu aghaluutikkut hiqummikvighaanik talvani hanayauvaktumi zinc, kannuyaq, lead-niklu. Kuvviit uyaraghiuqvingmit nunamunngaqtaulutik qurluaqtumillu immap ataanut katitirivaktut talvani haniani. Taamna hannavik angmaumayughaq 14-nik ukiunik havaktiqaqlunilu 225-mit 350-mut inungnik. Aviklugit havaktit hannavingmiinnahuat aullaqtittivakkamik/utiqtittivaghutiklu havaktinik.

Hanayauhimayut talvani nalvaaqhiuqvingmi agyaqtaulutik tullakvingmut Qingaungmi, ihumagiplugu taamna tullakvighaq Qingaungmi (BIPR). Apqutighaq 23 km-nik ungahiktilik hanayauyughaq ataluni uyaraqhiuqvingmut, imaalu 80 km-nik ungahiktigiyumik apqutik agyaqtaqviuluni tullakvingmut talvungalu uyaraqhiuqvingmut. Tullakvingmit, nalvaaqhiuqtauyut agyaqtaulutik ahinut nunangnut umiakkut talvunga kivataanut, kihimi akuttunik uyaraqhiuqhimayut uataanut agyaqtaulutik.

Taamna hannavighaq hinikviqaqniaq, nirrivingnik, nalvaaqtauyunik hannaviqaqluni, tutquumavighanik, ahiqquiqvighanik hanavighaniklu, uqhuqyuaqaqvingnik, kuvviqnik, uyaqqaniklu ahiqqunik naavivighainik, tingmiaqaqvingmik, apqutiniklu. Sabina-kut hanayumayuttauq tutquumavighanik nalvaaqhimayainik talvani tullakvingmi. Hapkua ahivaqtaunahuat uyaraqhiuqvighaat iniqtaukpat. Apqutit, tingmiaqaqvik, kuvviqtaqvik, taapkualu uyaqqat iqqakuuyut ahivaqtaulaittut talvuuna angirutinit nunanut atuqtauyughat hivuatut. Hapkua ihumaliuqtauhimayut atannguyanit nunalingnillu.

Sabina-kut tutqighaiyut atuqtaghanik ayuqnaqtunik naunaitkutiqaqhutik, nunalingnit tuhaqpaghutik inuit qauhimayatuqainiklu. Humiinniaghaat apqutik, kuvvighaqlu, uyaraaluit, hannavighaq nalvaaqtauyunit, hinikvighaqlu iniqtauniaqqut hapkua iniqtauhimaliqqata. Sabina-kut iniqhittiarumayut hanayauyughanik, ingilravighanik, nutqaqtiqlugu nalvaaqhiuqvik maligait ihumagiplugit, avatiptingnut inuuhiptingnullu mihingnautinik ihumagivagait manighiuqhutik Nunavunmi.

A7 – PART 2 FORM: PROJECT SPECIFIC INFORMATION REQUIREMENTS (PSIR)

SCREENING PART 2 FORM
PROJECT SPECIFIC INFORMATION REQUIREMENTS (PSIR)

Submissions

The Proponent must submit all information pertaining to the Project as a whole. The information requirements below are designed for the purpose of environmental assessment and are not limited to the scope of a single permit or license application.

Important: Please be advised of the following:

1	NIRB does not accept references to an ftp site as a submission.	Noted
2	The Proponent must provide NIRB with 1 (one) electronic copy and 1 (one) hardcopy of the required information in English.	Done
3	All maps should be legible, and should include grids, be of appropriate scale, indicate the scale, include latitude and longitude references, title, legend and a north arrow. To the extent possible, avoid hand-drawn demarcations; and,	Done
4	Please complete all required information in each section below. If the required information is not applicable to the project proposal, please indicate this in the response with "n/a". If the request has been provided in a different section or report, please note the section or report where the response can be found.	Done

General Project Information Requirements

	Project Specific Information Requirement	Section in Project Proposal Report
	Project Coordinates and Maps	
1	The preferred method for submitting project coordinates information is through the use of a Geographic Information System (GIS) compatible digital file. Although an ESRI ArcView 3.x shape file (in decimal degrees) is the preferred interchange format, the NIRB has the capacity to receive over 100 GIS and CAD related formats, including MapInfo and AutoCAD, provided proper format and projection metadata is also submitted. The NIRB requires coordinates for the project proposal which reflect the entire project area as defined by: • the area/sites of investigation; • the boundaries of the foreseen land use permit/right-of-way area(s) to be applied for; • the location of any proposed infrastructure or activity(s); and, • the boundaries of the mineral claim block(s) where proposed activities will be undertaken.	Figures 2.1-1, 2.1-2, 2.1-3, 6.2-1 in the report These figures will be sent electronically in a GIS compatible file
2	Map of the project site within a regional context indicating the distance to the closest communities.	Figure 6.3-1, Section 6.3.1
3	Map of any camp site including locations of camp facilities.	Figure 2.1-3, Section 2.1.1 for location of existing exploration camp. See Appendix C for the existing Water Licence (Type B) 2B3-HAK0709 application, which includes information about the exploration camp

	Project Specific Information Requirement	Section in Project Proposal Report
Project Coordinates and Maps		
4	Map of the project site indicating existing and/or proposed infrastructure, proximity to water bodies and proximity to wildlife and wildlife habitat.	Figure 6.1-1, Section 6.1.2
Project General Information		
5	Discuss the need and purpose of the proposed project.	Section 2.1.3
6	Discuss alternatives to the project and alternatives to project components, including the no-go alternative. Provide justification for the chosen option(s).	Section 2.1.3, Section 2.10 The No-Go Alternative will be included in the Draft EIS
7	Provide a schedule for all project activities.	Section 2.3
8	List the acts, regulations and guidelines that apply to project activities.	Section 1.4
9	List the approvals, permits and licenses required to conduct the project.	Section 1.4
DFO Operational Statement (OS) Conformity		
10	Indicate whether any of the following Department of Fisheries and Oceans (DFO) Operational Statement (OS) activities apply to the project proposal: • Bridge Maintenance • Clear Span Bridge • Culvert Maintenance • Ice Bridge • Routine Maintenance Dredging • Installation of Moorings Please see DFO's OS for specific definitions of these activities available from either NIRB's ftp site at http://ftp.nunavut.ca/nirb/NIRB_ADMINISTRATION/ or DFO's web-site at http://www.dfo-mpo.gc.ca/canwaters-eauxcan/index_e.asp	Section 1.5
11	If any of the DFO's OS apply to the project proposal, does the Proponent agree to meet the conditions and incorporate the measures to protect fish and fish habitat as outlined in the applicable OS? If yes, provide a signed statement of confirmation.	Section 1.5 A signed letter is included
Transportation		
12	Describe how the project site will be accessed and how supplies will be brought to site. Provide a map showing access route(s).	Figure 2.1-1, Section 2.1.1, Section 2.8
13	If a previous airstrip is being used, provide a description of the type of airstrip (ice-strip/all-weather), including its location. Describe dust management procedures and provide a map showing location of airstrip.	A previous airstrip will not be used for the proposed Project
14	If an airstrip is being constructed, provide the following information: a. Discuss design considerations for permafrost b. Discuss construction techniques c. Describe the construction materials, type and sources, and the acid rock drainage (ARD) and metal leaching (ML) characteristics (if rock material is required for airstrip bed). d. Describe dust management procedures. e. Provide a map showing location of proposed airstrip.	Section 2.6.3 Figure 2.8-1 a Dust Management Plan will be included in the draft EIS
15	Describe expected flight altitudes, frequency of flights and anticipated flight routes.	Section 2.6.3, Section 2.8.4
Camp Site		
16	Describe all existing and proposed camp structures and infrastructure	Figure 2.1-3, Section 2.1.1 for location of existing exploration camp. See Appendix C for the existing Water Licence (Type B) 2B3-HAK0709 and application, which includes information about the exploration camp.

	Project Specific Information Requirement	Section in Project Proposal Report
Camp Site		
16	Describe all existing and proposed camp structures and infrastructure (continued)	The existing camp will not be a part of the proposed camp for this Project. The exact proposed camp and infrastructure locations are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.
17	Describe the type of camp: a. Mobile b. Temporary c. Seasonal d. Permanent e. Other	The proposed camp will be Permanent, but will be removed upon closure.
18	Describe the maximum number of personnel expected on site, including the timing for those personnel.	Executive Summary, Section 2.6.2, Section 2.8.5
Equipment		
19	Provide a list of equipment required for the project and discuss the uses for the equipment.	Section 2.6.7
20	If possible, provide digital photos of equipment.	Not included
Water		
21	Describe the location of water source(s), the water intake methods, and all methods employed to prevent fish entrapment. Provide a map showing the water intake locations.	Section 2.7.5 Potential water source lakes are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008. Fish entrapment will be prevented by following DFO's "Freshwater Intake End-of-Pipe Fish Screen Guideline"
22	Describe the estimated rate of water consumption (m^3/day).	The water balance and withdrawal volumes are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008. For the Type A water license application, the following estimates are provided: Process water=4,000 m3/d Domestic water=90 m3/d Dust control=100 m3/d Underground drill=100 m3/d
23	Describe how waste water will be managed. If relevant, provide detail regarding location of sumps, including capacity of sumps and monitoring.	Section 2.7.3, Section 2.7.6
24	If applicable, discuss how surface water and underground water will be managed and monitored.	Section 2.7, Chapter 9

	Project Specific Information Requirement	Section in Project Proposal Report
Waste Water (Grey water, Sewage, Other)		
25	Describe the quantities, treatment, storage, transportation, and disposal methods for the following (where relevant): • Sewage • Camp grey water • Combustible solid waste • Non-combustible solid waste • Bulky items/scrap metal • Waste oil/hazardous waste • Contaminated soils/snow • Empty barrels/ fuel drums • Any other waste produced	Section 2.7, Section 2.6.6
26	If the project proposal includes a landfill or landfarm, indicate the locations on a map, provide the conceptual design parameters, and discuss waste management and contact-water management procedures.	Section 2.6.6, Section 2.7 for waste management and contact-water management. See Chapter 9 for general management plans. The location for a landfill is currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.
Fuel		
27	Describe the types of fuel, quantities (number of containers, type of containers and capacity of containers), method of storage and containment. Indicate the location on a map where fuel is to be stored, and method of transportation of fuel to project site.	Section 2.6.4 The locations for fuel storage are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.
28	Describe any secondary containment measures to be employed, including the type of material or system used. If no secondary containment is to be employed, please provide justification.	Section 2.6.4, Section 2.6.6, Section 2.6.1.7
29	Describe the method of fuel transfer and the method of refuelling.	Section 2.9.3, Section 2.6.1.7
Chemicals and Hazardous Materials *Includes but not limited to oils, greases, drill mud, antifreeze, calcium or sodium chloride salt, lead acid batteries and cleaners*		
30	Describe the types, quantities (number of containers, the type of container and capacity of containers), method of storage and containment. Indicate the location on a map where material is to be stored, and method of transportation of materials to project site.	Section 2.6.6 The locations for storage are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.
31	Describe any secondary containment measures to be employed, including the type of material or system used.	Section 2.6.6
32	Describe the method of chemical transfer.	Section 2.6.6
Workforce and Human Resources/Socio-Economic Impacts		
33	Discuss opportunities for training and employment of local Inuit beneficiaries.	Chapter 3
34	Discuss workforce mobilization and schedule, including the duration of work and rotation length, and the transportation of workers to site.	Chapter 3
35	Discuss, where relevant, any specific hiring policies for Inuit beneficiaries.	Chapter 3

	Project Specific Information Requirement	Section in Project Proposal Report
Public Involvement/ Traditional Knowledge		
36	Indicate which communities, groups, or organizations would be affected by this project proposal.	Section 4.1
37	Describe any consultation with interested Parties which has occurred regarding the development of the project proposal.	Section 4.2
38	Provide a summary of public involvement measures, a summary of concerns expressed, and strategies employed to address any concerns.	Section 4.3
39	Describe how traditional knowledge was obtained, and how it has been integrated into the project.	Chapter 5
40	Discuss future consultation plans.	Section 4.4

Project Specific Information

The following Project Types were relevant to the proposed Project:

1	All-Weather Road/Access Trail	Section A-1 and Section A-2
4	Advanced Mineral Exploration	Section B-1 through Section B-8
5	Mine Development/Bulk Sampling	Section B-1 through Section B-12
6	Pits and Quarries	Section C
11	Marine Based Activities	Section H

	Project Specific Information Requirement	Section in Project Proposal Report
Section A: Roads/Trails		
A-1 Project Information		
1	Describe any field investigations and the results of field investigations used in selecting the proposed route (e.g. geotechnical, snow pack)	Sections 2.8.1, 2.8.2, 2.8.3
2	Provide a conceptual plan of the road, including example road cross-sections and water crossings.	No example of a cross section or water crossing is available at this time. See Sections 2.8.1 and 2.8.2 for information on road design and construction. See Section 2.8.3 for information on crossing the Hackett River. Smaller stream crossings will be culverted, and culvert design will be approved by DFO prior to road construction.
3	Discuss the type and volume of traffic using the road/trail (i.e. type of vehicles and cargo and number of trips annually).	Section 2.8.4
4	Discuss public access to the road.	There will not be any public access for the Hackett access road. However, this Project Proposal does not address any BIPR public access.
5	Describe maintenance procedures.	A Road Maintenance Plan will be included in the draft EIS
A-2 All-Weather Road/Access Trail		
6	Discuss road design considerations for permafrost.	Sections 2.8.2, 2.8.3
7	Describe the construction materials (type and sources for materials), and the acid rock drainage (ARD) and metal leaching (ML) characteristics of the construction materials.	Sections 2.8.2, 2.8.3
8	Discuss construction techniques, including timing for construction activities.	Sections 2.8.2.5, 2.8.3.6
9	Indicate on a map the locations of designated refuelling areas, water crossings, culverts, and quarries/borrow sources.	Only a proposed alignment is available at this time; see Figure 2.9-1 The locations for refueling areas, water crossings, culverts, and quarries are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.

	Project Specific Information Requirement	Section in Project Proposal Report
A-2 All-Weather Road/Access Trail		
10	Identify the proposed traffic speed and measures employed to ensure public safety.	Road safety and wildlife safety plans will be included in the draft EIS
11	Describe dust management procedures.	A dust management plan will be included in the draft EIS
A-3 Winter Road/Trail		N/A
12	Describe the surface preparation, including the use of snow berms or compaction, and any flooding. If flooding is to be used, provide the location of the water source on a map.	N/A
13	Describe the operating time period.	N/A
14	Identify the proposed traffic speed and measures employed to ensure public safety.	N/A
15	Discuss whether the selected route traverses any fish-bearing water bodies.	N/A
Section B: Mineral Exploration /Advanced Exploration / Development		N/A
B-1 Project Information		N/A
1	Describe the type of mineral resource under exploration.	Section 2.1.2, Section 2.4.1
B-2 Exploration Activity		
2	Indicate the type of exploration activity: • Bulk Sampling (underground or other) • Stripping (mining shallow bedded mineral deposits in which the overlying material is stripped off, the mineral removed and the overburden replaced) • Trenching • Pitting • Delineation drilling • Preliminary Delineation drilling • Exploration drilling • Geophysical work (indicate ground and/or air) • Other	Delineation drilling (</= 7,500 m @ Main Zone) Preliminary delineation drilling (</= 3,000 m) Exploration drilling (</= 1,500 m away from the central core area) Possible geophysics (max-min most likely) around infrastructure and waste/tailings impoundment areas see Appendix C for more details
3	Describe the exploration activities associated with this project: • Satellite remote sensing • Aircraft remote sensing • Soil sampling • Sediment sampling • On land drilling (indicate drill type) • On ice drilling (indicate drill type) • Water based drilling (indicate drill type) • Overburden removal • Explosives transportation and storage • Work within navigable waters • On site sample processing • Off site sample processing • Waste rock storage • Ore storage • Tailings disposal • Portal and underground ramp construction • Landfilling • Landfarming • Other	Possibly satellite and/or remote sensing through GSC Probable soil sampling through mapping project Sediment sampling through baseline work On-land diamond drilling with Boyles 17, 25, 37 On-ice diamond drilling with Boyles 17, 25 see Appendix C for the existing type B water licence and application. The application describes the ongoing exploration activities taking place

	Project Specific Information Requirement	Section in Project Proposal Report
B-3 Geosciences		
4	Indicate the geophysical operation type: a. Seismic (please complete Section E) b. Magnetic c. Gravimetric d. Electromagnetic e. Other (specify)	Most likely electromagnetic (EM) or MaxMin, likely < 50 line km
5	Indicate the geological operation type: a. Geological Mapping b. Aerial Photography c. Geotechnical Survey d. Ground Penetrating Survey e. Other (specify)	Geological mapping around Camp Lake, Boot Lake infrastructure, East Cleaver zone, other areas for potential tailings locations Aerial photography: detailed (1 m contours) of selected infrastructure, mine workings, and road routes Geotechnical survey: geotech drilling for waste impoundment and tailings dams. Also RQD/RMR work, and oriented core on delineation and exploration holes.
6	Indicate on a map the boundary subject to air and/or ground geophysical work.	Geophysical work will remain within the mining lease areas; see Figure 2.1-2 Aerial photography will focus on the mining lease areas with the exception of the access road and possibly a small section of the proposed BIPR route; see Figure 2.1-2
7	Provide flight altitudes and locations where flight altitudes will be below 610m.	Flight altitudes will likely only be below 610 m altitude during take offs and landings (from Camp Lake)
B-4 Drilling		
8	Provide the number of drill holes and depths (provide estimates and maximums where possible).	Appendix C Drilling estimates: 12,000 m. 45 holes. Maximum depths: 50 m to 400 m.
9	Discuss any drill additives to be used.	Appendix C Drill additives are all biodegradable and consist largely of PureVis, Linseed soap, and CaCl (salt). Some biodegradable muds are used.

Project Specific Information Requirement		Section in Project Proposal Report
B-4 Drilling		
10	Describe method for dealing with drill cuttings.	Appendix C Drill cutting are collected in either a natural sump proximal to the drill set up or in settling tanks at the drill, which are decanted to a secondary tank, and the cuttings transferred to a mega bag, and taken to a natural sump. All cutting disposal areas are over 35 m from the high water mark of any water body, and are large enough to contain the cuttings deposited there. Sumps are then monitored, and marked and photographed.
11	Describe method for dealing with drill water.	Appendix C Drill water is obtained from the closest lake, and recirculated where possible. Excess water, which has not entered the drill (or come in contact with any additives, cuttings, etc) is diverted away from the drill. Any water which has come in contact with the drill or drilling additives/cuttings is captured at the drill and sent with the cuttings to the natural sump deposition area.
12	Describe how drill equipment will be mobilized.	Appendix C Drill equipment is already on site, ready to be mobilized to Camp Lake to start the 2008 drill program. The drills (Boyles 17 and Boyles 25) are either moved via helicopter (A-Star, BA) or dragged over the ice using a Nodwell “swamp buggy”.
13	Describe how drill holes will be abandoned.	Appendix C Drill holes, when completed, are cleaned up by Major Drilling personnel, and the drill and ancillary equipment moved to the next hole. The casing is then surveyed with a Trimble RTK Differential GPS and the casing cut off at ground level, using a Husqavarna power saw, with a cut off wheel. The cut casing is sent back to camp, to be flown in to Yellowknife for recycling.

	Project Specific Information Requirement	Section in Project Proposal Report
B-4 Drilling		
13	Describe how drill holes will be abandoned (continued).	The ground is allowed to dry, and any drill cuttings are then removed to a natural sump in the area. The ground is re-contoured and the hole number is marked on a wooden picket, left to mark the site. Photographs are then taken. Holes are monitored each year, and any follow-up work that is done is photographed and noted.
14	If project proposal involves uranium exploration drilling, discuss the potential for radiation exposure and radiation protection measures. Please refer to the *Canadian Guidelines for Naturally Occurring Radioactive Materials* for more information.	The project does not involve uranium
B-5 Stripping/ Trenching/ Pit Excavation		
15	Discuss methods employed. (i.e. mechanical, manual, hydraulic, blasting, other)	Section 2.4.4
16	Describe expected dimensions of excavation(s) including depth(s).	Section 2.4.4
17	Indicate the locations on a map.	Figure 2.1-3
18	Discuss the expected volume material to be removed.	Section 2.4.4
19	Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.	Section 2.4.4, Section 2.4.6
B-6 Underground Activities		
20	Describe underground access.	Section 2.4
21	Describe underground workings and provide a conceptual plan.	Section 2.4
22	Show location of underground workings on a map.	Figure 2.1-3
23	Describe ventilation system.	Section 2.4.5
24	Describe the method for dealing with ground ice, groundwater and mine water when encountered.	Section 2.4.5
25	Provide a Mine Rescue Plan.	A Mine Rescue Plan will be provided in the draft EIS
B-7 Waste Rock Storage and Tailings Disposal		
26	Indicate on a map the location and conceptual design of waste rock storage piles and tailings disposal facility.	Section 2.4.4, Section 2.7.1, Section 2.7.2 The locations for a tailings management facility and waste rock piles are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.
27	Discuss the anticipated volumes of waste rock and tailings.	Section 2.7
28	Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.	Section 2.7, Section 2.4.6
B-8 Stockpiles		
29	Indicate on a map the location and conceptual design of all stockpiles.	The location of a stockpile is currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.

	Project Specific Information Requirement	Section in Project Proposal Report
B-8 Stockpiles		
30	Describe the types of material to be stockpiled. (i.e. ore, overburden)	Section 2.4.4.4, Section 2.7.2
31	Describe the anticipated volumes of each type of material to be stockpiled.	Section 2.4.4.4, Section 2.7.2
32	Describe any containment measures for stockpiled materials as well as treatment measures for runoff from the stockpile.	Section 2.7.6, Section 2.7.2
33	Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.	Section 2.7, Section 2.4.6
B-9 Mine Development Activities		
34	Indicate the type(s) of mine development activity(s): • Underground • Open Pit • Strip Mining • Other	Section 2.4
35	Describe mine activities. • Mining development plan and methods • Site access • Site infrastructure (e.g. airstrip, accommodations, offshore infrastructures, mill facilities, fuel storage facilities, site service roads) • Milling process • Water source(s) for domestic and industrial uses, required volumes, distribution and management. • Solid waste, wastewater and sewage management • Water treatment systems • Hazardous waste management • Ore stockpile management • Tailings containment and management • Waste rock management • Site surface water management • Mine water management • Pitting and quarrying activities (please complete Section C)	Sections 2.4, 2.5, 2.6, 2.7, 2.8, 2.9
35	• Explosive use, supply and storage (including on site manufacturing if required) • Power generation, fuel requirements and storage • Continuing exploration • Other	
36	Describe the explosive type(s), hazard class, volumes, uses, location of storage (show on map), and method of storage.	Sections 2.4.4.6, 2.4.5.6, 2.6.5 The locations of storage areas are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.
B-10 Geology and Mineralogy		
37	Describe the physical nature of the ore body, including known dimensions and approximate shape.	Section 2.4.1
38	Describe the geology/ mineralogy of the ore deposit	Section 2.4.1
39	Describe the host rock in the general vicinity of the ore body.	Section 2.4.1
40	Discuss the predicted rate of production.	Section 2.4
41	Describe mine rock geochemical test programs which have been or will be performed on the ore, host rock, waste rock and tailings to determine acid generation and contaminant leaching potential. Outline methods and provide results if possible.	Section 2.4.6

	Project Specific Information Requirement	Section in Project Proposal Report
B-11 Mine		
42	Discuss the expected life of the mine.	Executive Summary, Section 2.3, Section 2.4
43	Describe mine equipment to be used.	Section 2.6.7
44	Does the project proposal involve lake and/or pit dewatering? If so, describe the activity as well as the construction of water retention facilities if necessary.	Yes. Sections 2.7.7, 2.7, 2.4.4.5, 2.4.5.5
45	Discuss the possibility of operational changes occurring during the mine life with consideration for timing. (e.g. open pit to underground)	Yes, there may be operational changes. The optimal mining methods are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.
46	If project proposal involves uranium mining, consider the potential for radiation exposure and radiation protection measures. Particular attention should be paid to *The Nuclear Safety and Control Act*.	Project does not involve uranium mining
B-12 Mill		
47	If a mill will be operating on the property in conjunction with mining, indicate whether mine-water may be directed to the mill for reuse.	Section 2.5
48	Describe the proposed capacity of the mill.	Section 2.5
49	Describe the physical and chemical characteristics of mill waste as best as possible.	Section 2.5
50	Will or does the mill handle custom lots of ore from other properties or mine sites?	Not considered for this Project
Section C: Pits and Quarries		
1	Describe all activities included in this project. • Pitting • Quarrying • Overburden removal • Road use and/or construction (please complete Section A) • Explosives transportation and storage • Work within navigable waters • Blasting • Stockpiling • Crushing • Washing • Other	Section 2.8.3.6 Section 2.8.2.5 Section A of this form is completed Section 2.6.5 Section 2.4.4
2	Describe any field investigations and the results of field investigations used in determining new extraction sites.	Section 2.4.4, Section 2.8.3.6
3	Identify any carving stone deposits.	None have been identified so far, but carving stone deposits will be identified if encountered in the future
4	Provide a conceptual design including footprint.	Figure 2.1-3 (location of open pits) The potential locations of borrow material for road construction are currently being evaluated as part of the pre-feasibility work, which is expected to be completed by summer 2008.
5	Describe the type and volume of material to be extracted.	Section 2.4.4
6	Describe the depth of overburden.	Section 2.4.4, Section 2.7.2

Project Specific Information Requirement		Section in Project Proposal Report
Section C: Pits and Quarries		
7	Describe any existing and potential for thermokarst development and any thermokarst prevention measures.	Section 2.4.4
8	Describe any existing or potential for flooding and any flood control measures.	Section 2.4.4, Section 2.4.5
9	Describe any existing or potential for erosion and any erosion control measures.	Section 2.7.6
10	Describe any existing or potential for sedimentation and any sedimentation control measures.	Section 2.7.6
11	Describe any existing or potential for slumping and any slump control measures.	Section 2.7.6, Section 2.4.4
12	Describe the moisture content of the ground.	Sections 6.1.5, 6.1.8
13	Describe any evidence of ice lenses.	Section 6.1.7
14	If blasting, describe methods employed.	Sections 2.4.4, 2.4.5
15	Describe the explosive type(s), hazard class, volumes, uses, location of storage (show on map), and method of storage.	Sections 2.4.4.6, 2.4.5.6, 2.6.5
16	Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.	Section 2.4.6
17	Discuss safety measures for the workforce and the public.	Safety Plans will be included in the draft EIS; see Chapter 9 for general information
Section D: Offshore Infrastructure		N/A
D-1 Facility		N/A
1	Describe any field investigations and the results of field investigations used in selecting the site (i.e. aerial surveys, bathymetric surveys, tidal processes, shoreline erosion processes, geotechnical foundation conditions)	N/A
2	Provide a conceptual plan, profile description and drawing(s) indicating shoreline, facility footprint, tidal variations, required vessel draft, keel offset, deck height freeboard	N/A
3	Discuss how anticipated loads on the seabed foundation and on the offloading platform will be incorporated into the design.	N/A
4	Describe how vessels will manoeuvre around the facility. (e.g. pull alongside or in front)	N/A
5	Discuss the anticipated life of the facility.	N/A
D-2 Facility Construction		N/A
6	Describe the types of material used for construction (i.e. granular or rock, steel piling or sheet piling, concrete). If material is granular, consider acid rock drainage potential, metal leaching potential, percentage of fines, size.	N/A
7	Describe dredging activities.	N/A
8	Indicate source of granular or rock material used in construction.	N/A
9	List quantities of the various types of material used in construction.	N/A
10	Describe construction method(s).	N/A
11	Indicate whether a site engineer will be on-site to inspect construction.	N/A
12	If proposed construction method involves dumping of fill into water, discuss measures for mitigating the release of suspended solids.	N/A
D-3 Facility Operation		N/A
13	Describe maintenance activities associated with the facility (e.g. dredging, maintenance to account for potential settlement of facility,)	N/A
14	Discuss whether the public will have access to the facility(s) and describe public safety measures.	N/A
15	Describe cargo and container handling, transfer and storage facilities.	N/A
16	Indicate whether fuel will be transferred from barges at this site and describe the method of that fuel transfer.	N/A
17	Discuss frequency of use.	N/A

Project Specific Information Requirement		Section in Project Proposal Report
D-4 Vessel Use in Offshore Infrastructure		N/A
18	Please complete Section H	N/A
Section E: Seismic Survey		N/A
E-1 Offshore Seismic Survey		N/A
1	Indicate whether the survey is 2D or 3D at each site	N/A
2	Describe the type of equipment used, including: • Type and number of vessels including length, beam, draft, motors, accommodation capacity, operational speeds when towing and when not towing • Sound source (type and number of airguns) • Type and number of hydrophones • Number, length, and spacing of cables/ streamers	N/A
3	On a map, indicate the grid, number of lines and total distance covered at each site.	N/A
4	Indicate the discharge volume of the airguns, the depth of airgun discharge, and the frequency and duration of airgun operation at each site.	N/A
5	Discuss the potential for dielectric oil to be released from the streamer array, and describe proposed mitigation measures.	N/A
E-1 Offshore Seismic Survey		N/A
6	Indicate whether additional seismic operations are required for start-up of operations, equipment testing, repeat coverage of areas.	N/A
7	Indicate whether air gun procedures will include a “ramping up” period and, if so, the proposed rate of ramping up.	N/A
8	Indicate whether the measures described in the *Statement of Canadian Practice for Mitigation of Noise in the Marine Environment* will be adhered to for this project.	N/A
E-2 Nearshore/ Onshore Seismic Survey		N/A
9	For each site, indicate whether nearshore and onshore surveys will be conducted during the ice season or once the ice has melted	N/A
10	Describe how nearshore and onshore areas will be accessed.	N/A
11	Describe the survey methods to be used (e.g. explosive charge, vibration, air or water gun, other)	N/A
12	Describe equipment to be used	N/A
13	If applicable, indicate number, depth and spacing of shot holes	N/A
14	Describe explosive wastes including characteristics, quantities, treatment, storage, handling, transportation and disposal methods.	N/A
E-3 Vessel Use in Seismic Survey		N/A
15	Please complete Section H	N/A
Section F: Site Cleanup/Remediation		N/A
1	Describe the location, content, and condition of any existing landfills and dumps (indicate locations on a map).	N/A
2	Identify salvageable equipment, infrastructure and/or supplies.	N/A
3	Provide a list of all contaminants to be cleaned up, anticipated volumes and a map delineating contaminated areas. This includes buildings, equipment, scrap metal and debris, and barrels as well as soil, water (surface and groundwater) and sediment.	N/A
4	Describe the degree of pollution/contamination, and list the contaminants and toxicity.	N/A
5	Describe technologies used for clean-up and/or disposal of contaminated materials. Include a list of all the physical, chemical and biological cleanup/ remediation methods, operational procedures, and the dosage/frequency of reagents and bacterial medium.	N/A
6	Identify and describe all materials to be disposed of off site, including the proposed off site facilities, method of transport and containment measures.	N/A

Project Specific Information Requirement		Section in Project Proposal Report
Section F: Site Cleanup/Remediation		N/A
7	Discuss the viability of landfarming, given site specific climate and geographic conditions.	N/A
8	Describe the explosive types, hazard classes, volumes, uses, location of storage (indicate on a map), and method of storage (if applicable).	N/A
9	If blasting, describe the methods employed.	N/A
10	Describe all methods of erosion control, dust suppression, and contouring and re-vegetation of lands.	N/A
11	Describe **all** activities included in this project. • Excavation (please complete Section B-5) • Road use and/or construction (please complete Section A) • Airstrip use and/or construction • Camp use and/or construction • Stockpiling of contaminated material • Pit and/or quarry (please complete Section C) • Work within navigable waters (please complete Section H) • Barrel crushing • Building Demolition • Other	N/A
Section G: Oil and Natural Gas Exploration/Activities		N/A
G-1 Well Authorization		N/A
1	Identify the location(s) of the well centre(s) by latitude and longitude. Attach a map drawn to scale showing locations of existing and proposed wells.	N/A
2	Indicate if the site contains any known former well sites.	N/A
3	Include the following information for each well: a. Well name b. Surface location c. Proposed bottomhole location d. Ground elevation (in metres) e. Spacing area (in units) f. Identify the well type: • Production • Injection • Disposal • Observation • Storage • Experimental • Other (specify) g. Identify the well classification: • Exploratory wildcat • Exploratory outpost • Development h. Drilling operation (deviation): • Vertical • Directional • Horizontal • Slant	

Project Specific Information Requirement	Section in Project Proposal Report
G-1 Well Authorization	N/A
3 i. Objective Zones (copy chart style below)	

Objective Formation	Fluid (oil/gas/water)	Depth (mTVD)	Core (Y/N)

j. Proposed Total Depth in mTDV and mMD.
k. Formation of Total Depth
l. Sour well? (yes or no)
- If Yes: Maximum H2S concentration in mol/kmol
  Emergency planning zone radius in km

m. Blowout Prevention (Well Class I – VI)
n. Deviation Surveys
- Will be run at intervals less than 150m? (yes or no)

o. Wireline logs
- Will run logs in hole for surface casing? (yes or no)
- Will run a minimum of 2 porosity measuring logs? (yes or no) — N/A

Project Specific Information Requirement	Section in Project Proposal Report
G-2 On-Land Exploration	
4 Indicate if the site contains any known: a. Waste Dumps b. Fuel and Chemical Storage Areas c. Sump Areas d. Waste Water Discharge Locations	N/A
5 Attach maps drawn to scale showing locations of existing and proposed items identified in (2) above, as well as all proposed: a. Sumps b. Water sources c. Fuel and chemical storage facilities d. Drilling mud storage areas e. Transportation routes	N/A
6 If utilizing fresh water, estimate maximum drawdown and recharge capability of the river or lake from which water will be drawn.	N/A
7 Indicate if permafrost is expected to be encountered under: a. Camp Facilities b. Well Site c. Access Routes d. Sumps e. Other: __________________	N/A
8 Indicate any potential for encountering artesian aquifers or lost circulation within the surface hole (to casing depth).	N/A
9 Will drilling wastes contain detrimental substances (including, but not limited to, oil-based or invert mud and high salinity fluids)? If yes, indicate the substances and estimated volumes.	N/A
10 Indicate methods for disposal of drilling wastes: a. Sump b. Down Hole (requires NEB approval) c. On-Site Treatment (provide plan) d. Off-Site (give location and method of disposal)	N/A

	Project Specific Information Requirement	Section in Project Proposal Report
G-2 On-Land Exploration		
11	If a sump is being used, attach the following information: a. scale drawings and design of sumps b. capacity in cubic metres c. berm erosion protection d. soil permeability and type e. recycling/reclaiming waters f. surface drainage controls g. abandonment procedures	N/A
12	Attach the proposed or existing contingency plan which describes the course of action, mitigative measures and equipment available for use in the event of system failures and spills of hazardous materials.	N/A
13	Attach an outline of planned abandonment and restoration procedures.	N/A
G-3 Off-Shore Exploration		N/A
14	Will drilling wastes contain detrimental substances (including, but not limited to, oil-based or invert mud and high salinity fluids)? If yes, indicate the substances and estimated volumes.	N/A
15	Attach the proposed or existing contingency plan which describes the course of action, mitigative measures and equipment available for use in the event of system failures and spills of hazardous materials.	N/A
16	Attach an outline of planned abandonment and restoration procedures.	N/A
17	Please complete Section H	N/A
G-4 Rig		N/A
18	Type of Rig. Draw works, make and model	N/A
19	Derrick/Mast make and model	N/A
20	H.P. available to draw-works	N/A
Section H: Marine Based Activities		
H-1 Vessel Use		
1	Describe the purpose of vessel operations.	Section 2.9, Section 2.8.6
2	List classes and sizes of vessels to be used.	Section 2.9, Section 2.8.6
3	Indicate crew size.	Unknown, but probably between 15 and 25 people for a 50,000 dwt carrier
4	Indicate operating schedule.	Section 2.9, Section 2.8.6
5	Provide a description of route to be traveled (include map).	Figure 2.1-1
6	Indicate whether the vessel will call at any ports. If so, where and why?	Section 2.9, Section 2.8.6
7	Describe wastes produced or carried onboard including the quantities, storage, treatment, handling and disposal methods for the following: a. Ballast water b. Bilge water c. Deck drainage d. Grey and black water e. Solid waste f. Waste oil g. Hazardous or toxic waste	Section 2.9, Section 2.8.6, Section 2.9.5.2 Management plans will be included in the draft EIS
8	List all applicable regulations concerning management of wastes and discharges of materials into the marine environment	The Canadian Shipping Act (CSA), and the Arctic Waters Pollution Prevention Act (AWPPA) and Regulations
9	Provide detailed Waste Management, Emergency Response and Spill Contingency Plans	These plans will be included in the draft EIS

	Project Specific Information Requirement	Section in Project Proposal Report
H-1 Vessel Use		
10	Does the vessel(s) possess an Arctic Pollution Prevention Certificate? If yes, indicate the date of issue and the name of the classification society.	Unknown at this time. Marine shipping would be contracted out by Sabina, and the company has not yet been identified
11	Describe the source of fresh water and potable water	Details will be obtained from the shipping company once identified; however, while at the Bathurst Inlet port, it is assumed that the same sources will be used as is being used for BIPR
12	Indicate whether ice-breaking will be required, and if so, approximately where and when? Discuss any possible impacts to caribou migration, Inuit harvesting or travel routes, and outline proposed mitigation measures.	Section 2.8.6, Section 2.9 Section 7.3.2.2, Section 7.3.3.6
13	Indicate whether the operation will be conducted within the Outer Land Fast Ice Zone of the East Baffin Coast. For more information on the Outer Land Fast Ice Zone, please see the Nunavut Land Claims Agreement (NLCA), Articles 1 and 16.	The proposed Project is not within the Outer Land Fast Ice Zone.
14	Indicate whether Fisheries or Environmental Observers will be onboard during the proposed project activities. If yes, describe their function and responsibilities.	Environmental Observers may be on board to help mitigate the potential effects on wildlife. Section 7.3.3.6.
15	Describe all proposed measures for reducing impacts to marine habitat and marine wildlife (including mammals, birds, reptiles, fish, and invertebrates).	Section 7.3.3
H-2 Disposal at Sea		N/A
1	Provide confirmation you have applied for a Disposal at Sea permit with Environment Canada	N/A
2	Provide a justification for the disposal at sea	N/A
3	Describe the substance to be disposed of, including chemical and physical properties	N/A
4	Indicate the location where the disposal is to take place	N/A
5	Describe the frequency of disposals (disposals per day/week or month)	N/A
6	Describe the route to be followed during disposal and indicate on a map.	N/A
7	Indicate any previous disposal methods and locations	N/A
8	Provide an assessment of the potential effects of the disposal substance on living marine resources	N/A
9	Provide an assessment of the potential of the disposal substance, once disposed of at sea, to cause long-term physical effects.	N/A
10	Describe all mitigation measures to be employed to minimize the environmental, health, navigational and aesthetic impacts during loading, transport and disposal.	N/A
Section I: Municipal and Industrial Development		N/A
1	Describe the business type, including public, private, limited, unlimited or other.	N/A
2	Describe the activity (e.g. development of quarry, development of hydroelectric facility, bulk fuel storage, power generation with nuclear fuels or hydro, tannery operations, meat processing and packing, etc.).	N/A
3	Describe the production process or service provision procedures.	N/A
4	Describe the raw materials used in this activity, the storage and transportation methods. If hazardous materials are included in raw materials, products or by-products; include safety regulations methodology.	N/A
5	Provide detailed information about the structure and/or building in which the activity will be conducted.	N/A
6	List the PPE (personal protective equipment) and tools to be used to protect personal health and safety.	N/A

Project Specific Information Requirement		Section in Project Proposal Report
Section I: Municipal and Industrial Development		N/A
7	Describe the firefighting equipment that are or will be installed.	N/A
8	Describe the noise sources, noise level in work area, technical measurements that will be adopted to abate the noise levels and regulatory requirements for noise abatement and noise levels.	N/A
9	Describe the type of gaseous emission that will be produced during this activity. Include the allowable thresholds and mitigation measures.	N/A
10	Describe odours that the activity might release and include corresponding allowable threshold. Describe mitigation measures if thresholds are exceeded.	N/A
11	Describe radiation sources that might be emitted during the activity. Include type and source and include mitigation measures. Also describe preventative measures for human exposure (i.e. PPE).	N/A
12	Discuss the employee safety and environment protection training program.	N/A
13	If the activity involves a bulk fuel storage facility, include drawings showing the bulk fuel storage facility location in proximity to natural water courses, high water marks, etc.	N/A
14	If the activity involves the development of a new quarry or expansion of an existing quarry, complete Section C.	N/A

Description of the Existing Environment

Project Specific Information Requirement	Section in Project Proposal Report
Physical Environment	
Please note that a description of the physical environment is intended to cover all components of a project, including roads/trails, marine routes, etc.	
• Proximity to designated environmental areas, including parks; heritage sites; sensitive areas, including sensitive marine habitat areas (recreational areas; sport and commercial fishing areas; breeding, spawning and nursery areas; known migration routes of living ;marine resources; and areas of natural beauty, cultural or historical history and; other) and protected wildlife areas; and other protected areas.	Section 6.1.2 Figure 6.1-1
• Eskers and other unique landscapes (e.g. sand hills, marshes, wetlands, floodplains).	Section 6.1.6
• Evidence of ground, slope or rock instability, seismicity.	Sections 6.1.5, 6.1.6, 6.1.7 The Hackett area is very old and an inactive geological province that has been very stable with no seismic activities to the best of our knowledge.
• Evidence of thermokarsts	Section 6.1.7
• Evidence of ice lenses	Section 6.1.7
• Surface and bedrock geology.	Section 6.1.4
• Topography.	Section 6.1.5
• Permafrost (e.g. stability, depth, thickness, continuity, taliks).	Section 6.1.7
• Sediment and soil quality.	Sections 6.1.8, 6.1.10.5, 6.1.10.6, 6.1.11.4
• Hydrology/ limnology (e.g. watershed boundaries, lakes, streams, sediment geochemistry, surface water flow, groundwater flow, flood zones).	Section 6.1.10.1
• Tidal processes and bathymetry in the project area.	Sections 6.1.11.1, 6.1.11.2
• Water quality and quantity.	Sections 6.1.10.1, 6.1.10.3, 6.1.10.4, 6.1.11.3
• Air quality.	Section 6.1.12
• Climate conditions and predicted future climate trends.	Section 6.1.13
• Noise levels.	Section 6.1.14
• Other physical Valued Ecosystem Components (VEC) as determined through community consultation and/or literature review.	Section 6.1.15
Biological Environment	
• Vegetation.	Section 6.2.2
• Wildlife, including habitat and migration patterns.	Sections 6.2.3, 6.2.9, 6.2.10.1, 6.2.10.3
• Birds, including habitat and migration patterns.	Sections 6.2.4, 6.2.9, 6.2.10.2, 6.2.10.3
• Species of concern as identified by federal or territorial agencies, including any wildlife species listed under the Species at Risk Act (SARA), its critical habitat or the residences of individuals of the species.	Section 6.2.10
• Aquatic (freshwater and marine) species, including habitat and migration/spawning patterns.	Sections 6.2.5, 6.2.6, 6.2.7, 6.2.8, 6.2.10.4
• Other biological Valued Ecosystem Components (VEC) as determined through community consultation and/or literature review.	Section 6.2.11
Socioeconomic Environment	
• Proximity to communities.	Section 6.3.1
• Archaeological and culturally significant sites (e.g. pingos, soap stone quarries) in the project and adjacent areas.	Section 6.3.2

Project Specific Information Requirement		Section in Project Proposal Report
Socioeconomic Environment		
•	Palaeontological component of surface and bedrock geology.	Section 6.3.3
•	Land and resource use in the area, including subsistence harvesting, tourism, trapping and guiding operations.	Section 6.3.4
•	Local and regional traffic patterns.	Section 6.3.5
•	Human Health, broadly defined as a complete state of wellbeing (including physical, social, psychological, and spiritual aspects).	Section 6.3.7
•	Other Valued Socioeconomic Components (VSEC) as determined through community consultation and/or literature review.	Section 6.3.8
Identification of Impacts and Proposed Mitigation Measures		
1	Please complete the attached Table 1 – Identification of Environmental Impacts, taking into consideration the components in Appendix A. Identify impacts in Table 1 as either positive (P), negative and mitigable (M), negative and non- mitigable (N), or unknown (U).	Completed and included in Section 7.2
2	Discuss the impacts identified in the above table.	Sections 7.3.1, 7.3.2, 7.3.3
3	Discuss potential socioeconomic impacts, including human health.	Section 7.3.4
4	Discuss potential for transboundary effects related to the project.	Section 7.3.5
5	Identify any potentially adverse effects of the project proposal on species listed under the Species at Risk Act (SARA) and their critical habitats or residences, what measures will be taken to avoid or lessen those effects and how the effects will be monitored.	Sections 6.2.10, 7.3.2, 7.3.3
6	Discuss proposed measures to mitigate all identified negative impacts.	Sections 7.3.1, 7.3.2, 7.3.3, 7.3.4
Cumulative Effects		
Discuss how the effects of this project interact with the effects of relevant past, present and reasonably foreseeable projects in a regional context.		Chapter 8
Supporting Documents		
•	Abandonment and Decommissioning Plan	Addressed in Chapter 9; draft plan will be included in draft EIS
•	Existing site photos with descriptions	Appendix B
•	Emergency Response Plan	Addressed in Chapter 9; draft plan will be included in draft EIS
•	Comprehensive Spill Prevention/Plan (must consider hazardous waste and fuel handling, storage, disposal, spill prevention measures, staff training and emergency contacts)	Addressed in Chapter 9; draft plan will be included in draft EIS
•	Waste Management Plan/Program	Addressed in Chapter 9; draft plan will be included in draft EIS
•	Monitoring and Management Plans (e.g. water quality, air pollution, noise control and wildlife protection etc.)	Addressed in Chapter 9; draft plan will be included in draft EIS
•	If project activities are located within Caribou Protection Areas or Schedule 1 Species at Risk known locations, please provide a Wildlife Mitigation and Monitoring Plan	Addressed in Chapter 9; draft plan will be included in draft EIS
•	Remediation Plan including cleanup criteria and how the criteria were derived.	Addressed in Chapter 9; draft plan will be included in draft EIS
•	Human Health Risk Assessment of the contaminants at the site.	will be included in draft EIS

APPENDIX B
SITE PHOTOS

Representative Photos of the Hackett River Study Area

Aerial view of Hackett River Camp on the shore of Camp Lake.

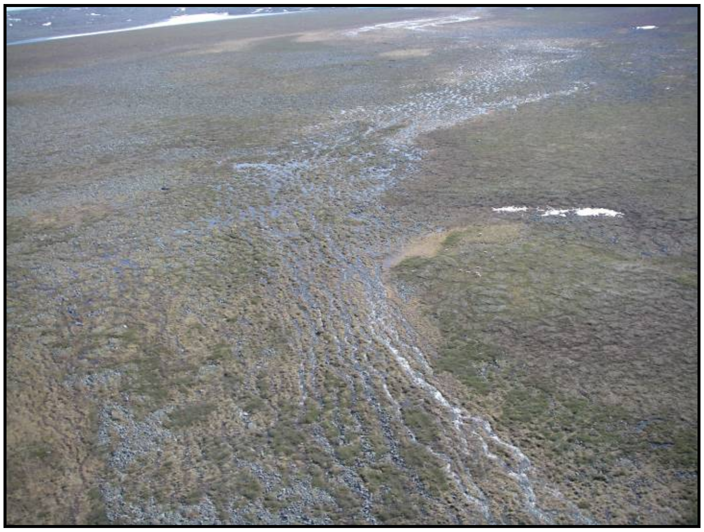
Hackett River Camp as seen from the shore of Camp Lake.

The Hackett River.

The Mara River.

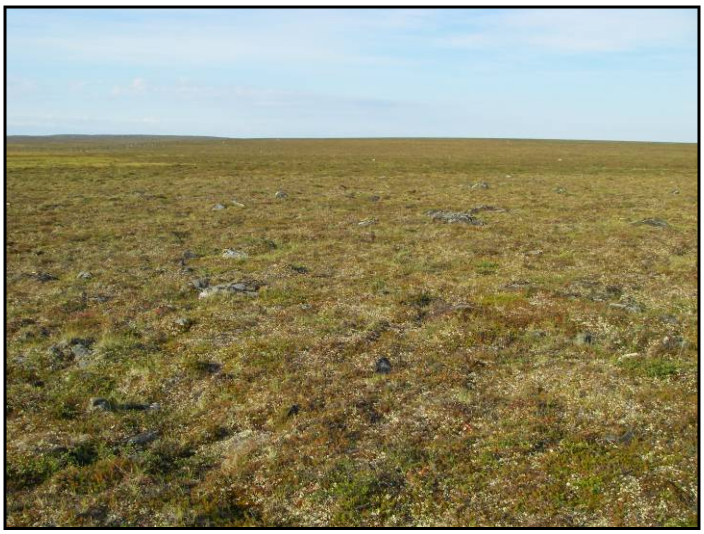
Boot Lake looking north, the Boot Lake exploration drill lies directly to the left of the photographer.

Dog Lake outflow, such boulder laden outflows are common in the Cleaver and Boot Lake Basins.



Braided outflow of Cleaver Basin during high flow periods (June, 2007). The River in the upper left is the Mara.

Boulder-dominated terrain common in the Hackett River area.



The low-lying topography of the Hackett River area vegetated by flora typical of tundra habitats.

Kathy Lake shoreline, a mixture of heath tundra and exposed bedrock.

Esker running between Upper and Lower Sunken Lakes, SE of Camp Lake.

Esker habitat South of Camp Lake with fewer boulders.

Aerial view of the Bathurst Port Site peninsula.

Bathurst Port Site looking east.

Bathurst Port Site looking SE.

Near the tip of Bathurst Port Site peninsula looking NE up Bathurst Inlet.

Bathurst Port Site shoreline looking North.

Near shore habitat of Anne Lake. This habitat is typical of many Cleaver and Boot Basin lakes.

Boot Basin Outflow, an example of a finer substrate outflow.

APPENDIX C
EXISTING TYPE B WATER LICENSE AND APPLICATION

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

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NUNAVUT IMALIRIYIN KATIMAYINGI
NUNAVUT WATER BOARD
OFFICE DES EAUX DU NUNAVUT

File No: 2BE-HAK

3/2/2007 5:02 PM

Attention: Abraham Drost
Sabina Silver Corporation
401-1113 Jade Court
Thunder Bay ON P7B 6M7
Email: adrost@sabinasilver.com

RE: NWB Licence No. 2BE-HAK0709

Dear Mr. Drost:

Please find attached Licence No. 2BE-HAK0709 issued to Sabina Silver Corporation by the Chief Administrative Officer of the Nunavut Water Board pursuant to Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*. The terms and conditions of the attached Licence related to water use and waste disposal are an integral part of this approval.

Sincerely,

Original signed by:

Philippe di Pizzo
Executive Director

PDP/rqd
Enclosure: Licence No. **2BE-HAK0709**

cc: Jim Rogers, DIAND Iqaluit
Peter Kusugak DIAND Inspector
Geoff Clark, Kitikmeot Inuit Association
Erin Calder, Nunavut Wildlife Management Board
Colette Spagnuolo, Environment Canada
Earle Baddaloo, GN-DOE
Tania Gordanier, Department of Fisheries and Oceans
Carson Gillis, NTI
Doug Sitland, CGS

DECISION

LICENCE NUMBER: 2BE-HAK0709

This is the decision of the Nunavut Water Board (NWB) with respect to an application for a renewal of a Water Licence dated December 5, 2006 made by:

SABINA SILVER CORPORATION

to allow for the use of water and disposal of waste during camp activities and exploration drilling operations at the Hackett River Project located within the Kitikmeot Region, Nunavut contained within the geographical coordinates **Latitude: 65º55'; Longitude: 108º22'**.

DECISION

After having been satisfied that the application was in conformity with the applicable Land Use Plan and exempt from the requirement for screening by the Nunavut Impact Review Board in accordance with Schedule 12.1, Paragraph 5 of the *Nunavut Land Claim Agreement* (NLCA), the NWB decided that the application could proceed through the regulatory process. In accordance with S.55.1 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act (NWNSRTA)* and Article 13 of the *NLCA*, public notice of the application was given and interested persons were invited to make representations to the NWB.

After reviewing the submission of the Applicant and considering the representations made by interested persons, the NWB, having given due regard to the facts and circumstances, the merits of the submissions made to it and to the purpose, scope and intent of the *NLCA* and of the *NWNSRTA*, waived the requirement to hold a public hearing and furthermore delegated its authority to approve the application to the Chief Administrative Officer pursuant to S. 13.7.5 of the *NLCA* and S. 49(a) of the *NWNSRTA*, and determined that:

Licence Number 2BE-HAK0709 be issued subject to the terms and conditions contained therein. (Motion #: 2006-66)

SIGNED this 2nd day of March 2007 at Gjoa Haven, NU.

Original signed by :

Philippe di Pizzo
Chief Administrative Officer

LICENCE 2BE-HAK

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

SABINA SILVER CORPORATION
(Licensee)

of

401-1113 JADE COURT, THUNDER BAY ON P7B 6M7
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water for a period subject to restrictions and conditions contained within this Licence:

Licence Number: **2BE-HAK0709**

Water Management Area: **NUNAVUT 07**

Location: **HACKETT RIVER, KITIKMEOT REGION (Camp - 65˚ 55' N, 108˚ 22' W)**

Purpose: **WATER USE AND WASTE DISPOSAL**

Classification of Undertaking: **MINING AND MILLING – TYPE "B"**

Quantity of Water Not to Exceed: **198.7 CUBIC METRES PER DAY**

Date of Licence: **MARCH 02, 2007**

Expiry Date of Licence: **DECEMBER 31, 2009**

Dated this 2nd day of March 2007 at Gjoa Haven, NU.

Original Signed By:

Philippe di Pizzo, Chief Administrative Officer

Table 1.1
Supplemental information to be submitted by Licensee

Licence Condition	Report Title	Timeline for Submission
Part B, Item 1	Water Use Fee	The water use fees of $30, payable to the Receiver General for Canada, shall be sent to the Board annually in advance of any use in accordance with Section 9 of the *Regulations.*
Part B, Item 2	Annual Report	To be submitted March 31st of the year following the calendar year.
Part B, Item 3	Changes to Operations/Conditions	The Licensee shall notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.
Part B, Item 5	Expiry of Licence	The NWB recommends that an application for the renewal of this Licence be filed at least four months before the Licence expiry date.
Part G, Item 1	Spill Contingency Plan	To be kept on site thirty (30) days following the issuance of licence.
Part H, Item 1	Abandonment and Reclamation Plan	The Licensee shall complete all restoration work prior to the expiry of this Licence.

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. Scope

This Licence allows for the use of water and the disposal of waste for an undertaking classified as Mining and Milling as per the geographical coordinates indicated in the application.

i. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the Nunavut Waters and Nunavut Surface Rights Tribunal Act, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and;

ii. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

"Act" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"Amendment" means a change to original terms and conditions of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

''Appurtenant Undertaking'' means an undertaking in relation to which a use of water or a deposit of waste is permitted by a licence issued by the Board;

"Board" means the Nunavut Water Board established under the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"Engineer" means a professional engineer registered to practice in Nunavut in accordance with the Engineering, Geological and Geophysical Act (Nunavut) S.N.W.T. 1998, c.38, s.5;

"Greywater" means all liquid wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet wastes;

"Infrastructure" means all construction necessary for mining, such as watercourse crossings, piping, sewage and water systems, reservoirs, and roads.

"<u>Inspector</u>" means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

"<u>Licensee</u>" means the holder of this Licence;

"<u>Modification</u>" means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"<u>Nunavut Land Claims Agreement</u>" (NLCA) means the *"Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*", including its preamble and schedules, and any amendments to that agreement made pursuant to it;

"<u>Regulations</u>" means the *Northwest Territories Water Regulations sor/93-303 8th June, 1993,* omitting Section 5, Water Use or Waste Deposit Without a Licence;

"<u>Sewage</u>" means all toilet wastes and greywater;

"<u>Spill Contingency Plan</u>" means a Plan developed to deal with unforeseen petroleum and chemical events that may occur during the operations conducted under the Licence;

"<u>Sump</u>" means an excavation in impermeable soil for the purpose of catching or storing water or waste;

"<u>Toilet Wastes</u>" means all human excreta and associated products, but does not include greywater;

"<u>Waste</u>" means, as defined in S.4 of the *Act*, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means.

3. Enforcement

i. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

ii. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and

iii. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the licensee, Inspectors appointed under the *Act,* hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

PART B: GENERAL CONDITIONS

1. The fee payable on the submission of an application for a licence or for the amendment, renewal, cancellation or assignment of a licence or of an application under section 31 of the Act is $30. The water use fees of $30, payable to the Receiver General for Canada, shall be sent to the Board annually in advance of any use in accordance with Section 9 of the *Regulations.*

2. The Licensee shall file an Annual Report on the appurtenant undertaking with the Board no later than March 31st of the year following the calendar year being reported which shall contain the following information:

   i. A summary report of water use and waste disposal activities:

      a. including the GPS coordinates and photographic records of any camp, water supply and waste disposal facilities, drill sites, and all sumps used for the disposal of camp greywater and drill cuttings, and watercrossings; and
      b. summary of volumes of water used on a daily, monthly and annual basis, detailing the location of all water sources.

   ii. A list of unauthorized discharges and a summary of follow-up actions taken;

   iii. A summary report of construction activities, including photographic records of all Infrastructure before, during and after construction;

   iv. Detailed discussion on the performance, installation, and evaluation, including the use of photographic record, of the primary and secondary containment functions used in fuel storage to safeguard impacts to freshwaters;

   v. An up-to-date copy of the Spill Contingency Plan, including contact information;

   vi. A description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of operations;

   vii. All of the results as outlined in the Monitoring Program (Part I); and

   viii. Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

3. The Licensee shall notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.

4. The Licensee shall install flow meters or other such devices, or implement suitable methods required for the measuring of water volumes, to be operated and maintained to the satisfaction of an Inspector.

5. If the Licensee contemplates the renewal of this Licence, the Licensee is responsible to apply to the NWB for its renewal. The past performance of the Licensee, new documentation and information, and issues raised during a public hearing, if the NWB is required to hold one, will be used to determine the terms and conditions of the Licence renewal. Note that if the Licence expires before the NWB issues a new one, then water use and waste disposal must cease, or the Licensee will be in contravention of the Nunavut Land Claims Agreement. However, the expiry or cancellation of a licence does not relieve the holder from any obligations imposed by the licence. The NWB recommends that an application for the renewal of this Licence be filed at least four months before the Licence expiry date.

6. If the Licencee contemplates or requires an amendment to this licence, the NWB may decide, in the public interest, to hold a public hearing. The Licensee should submit applications for amendment as soon as possible to give the NWB sufficient time to go through the amendment process. The process and timing may vary depending on the scope of the amendment requested but 30 days from time of acceptance of the request by the NWB is the minimum time required.

7. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

(i) Manager of Licensing:
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369

(ii) Inspector Contact:
Water Resources Officer, INAC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

8. The Licensee shall submit one paper copy and one electronic copy of all reports, studies,

and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.

9. The Licensee is responsible to ensure that any documents or correspondence submitted by the Licensee to the Board have been received and acknowledged by the Manager of Licensing.

10. This Licence is not assignable except as provided in Section 44 of the *Act*.

PART C: CONDITIONS APPLYING TO WATER USE

1. The volume of water for the purposes of this Licence shall not exceed **198.7** cubic metres per day.

2. Streams cannot be used as a water source unless authorized and approved by the Board.

3. If the Licensee requires water in sufficient volume that the source water body may be drawn down the Licensee shall, at least 30 days prior to commencement of use of water, submit to the Board for approval the following: volume required, hydrological overview of the water body, details of impacts, and proposed mitigation measures.

4. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen.

5. The Licensee shall not remove any material from below the ordinary high water mark of any water body unless authorized.

6. The Licensee shall not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

7. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall locate areas designated for waste disposal at a minimum distance of thirty (30) metres from the ordinary high water mark of any water body such that the quality, quantity or flow of water is not impaired, unless otherwise authorized by the Board.

2. Unless otherwise approved by the Board, the Licensee shall not practice open burning or on-site land filling of domestic waste.

3. The Licensee may incinerate all food waste, paper waste and wood products in an incinerator capable of meeting the emission limits established under the Canada-wide Standards for Dioxins and Furans the Canada-wide Standards for Mercury Emissions. In such case, the Licensee shall insure that the waste is burned in a device that promotes efficient combustion and reduction of emissions, and shall as much as possible reduce the amount of waste to be incinerated. The use of appropriate waste incineration technology shall be combined with a comprehensive waste management strategy, especially waste segregation, that is designed to reduce and control the volumes of wastes produced, transported, and disposed of.

4. The Licensee shall backhaul and dispose of all hazardous wastes, waste oil and non-combustible waste generated through the course of the operation in an approved waste disposal site.

5. Unless otherwise approved by the Board, the Licensee shall contain all greywater in a sump located at a distance of at least thirty (30) metres above the ordinary high water mark of any water body, at a site where direct flow into a water body is not possible and no additional impacts are created.

6. Unless otherwise approved by the Board, the Licensee shall contain all toilet wastes in latrine pits or use incineration, chemical, portable or composting toilets for any camp with a design population under 300 person days per year and less than 1,000 person days for the life of the camp. Latrine pits shall be located at a distance of at least thirty (30) metres above the ordinary high water mark of any water body, treated with lime and covered with native material to achieve the pre-existing natural contours of the land prior to abandonment.

7. Unless otherwise approved by the Board the Licensee shall dispose of all toilet wastes through incineration, chemical or composting toilets for any camp with a design population over 300 and less than 2,000 person days per year, and less than 5,000 person days per year for the life of the camp. Any remaining residue generated through the course of the operation shall be backhauled and disposed of in an approved waste disposal site.

8. The proponent shall ensure that any hazardous materials, including waste oil, receive proper treatment and disposal at an approved treatment facility.

9. This Licence does not allow for the construction and/or operation of a landfarm facility.

PART E: CONDITIONS FOR CAMPS, ACCESS INFRASTRUCTURES AND OPERATIONS

1. The Licensee shall not erect camps or store material on the surface of frozen streams or lakes including immediate banks except what is for immediate use. Camps shall be located such as to minimize impacts on surface drainage.

2. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake any corrective measures in the event of any impacts on surface drainage.

3. Winter lake and stream crossings, including ice bridges, shall be constructed entirely of water, ice or snow. The Licensee should minimize disturbance by locating ice bridges at an area that requires the minimum approach grading and the shortest crossing route. Stream crossings shall be removed or the ice notched prior to spring break-up.

4. With respect to access road, pad construction or other earthworks, the deposition of debris or sediment into or onto any water body is prohibited. These materials shall be disposed a distance of at least thirty (30) metres from the ordinary high water mark in such a fashion that they do not enter the water.

PART F: CONDITIONS APPLYING TO DRILLING OPERATIONS

1. The Licensee shall not conduct any land based drilling within thirty (30) metres of the ordinary high water mark of any water body, unless otherwise approved by the Board.

2. The Licensee shall delineate through an appropriately scaled site map, include approximate GPS coordinates, and any mitigation measures in place to protect waters if filing a request to the Board to drill within thirty (30) metres of the ordinary high water mark of any water body.

3. The Licensee shall dispose of rock saw sludge collected from the settling container (as indicated in the application) through the process of collection, drying, and placement in plastic sample bags and deposited in an approved disposal facility. **These materials are to not be used as a fill material**.

4. The Licensee shall ensure that all drill waste, including water, chips, muds and salts ($CaCl_2$) in any quantity or concentration, from land-based and on-ice drilling, shall be disposed of in a properly constructed sump or an appropriate natural depression located at a distance of at least thirty (30) metres from the ordinary high water mark of any adjacent water body, where direct flow into a water body is not possible and no additional impacts are created.

5. Drilling additives or mud shall not be used in connection with holes drilled through lake ice unless they are re-circulated or contained such that they do not enter the water, or are demonstrated to be non-toxic.

6. If artesian flow is encountered, drill holes shall be immediately sealed and permanently capped to prevent induced contamination of groundwater or salinization of surface waters. All artesian flows, including location (GPS), should be reported in the annual report to the NWB.

7. If the bottom of the permanently frozen ground, or permafrost, is broken through by the drill, the depth of the bottom of permafrost and location should be reported in the annual report to the Board for data management purposes.

PART G: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. In accordance with section 6(2)(g)(i) and (ii) of the Regulations, the Licensee shall, within thirty (30) days of issuance of this Licence, keep on the site of operations a Spill Contingency Plan that will describe how petroleum products and hazardous materials will be handled, stored and disposed of, as well as how they will be contained and cleaned-up in the event of a spill. This Plan shall include, but not be limited to, the following:

   i. The name, address and contact number for the person in charge, management or control of the contaminant (in this case, fuel oil and any other chemicals associated with the program);
   ii. The name and address and telephone number of the employer;
   iii. The name, job title and 24 hour contact number for the person or persons responsible for activating the spill plan;
   iv. A detailed description of the facility, including size and storage capacity and its geographic location – in UTM coordinates (map sheet number, Eastings and Northings) and in geographic coordinates (Lat/Long) –;
   v. A description of the type and amount of contaminants stored on site;
   vi. A description of the spill prevention measures to be undertaken in the handling, storage and disposal of petroleum products and hazardous materials;
   vii. Steps taken to report, contain, clean up and dispose of a spill on applicable topographic conditions, i.e., land, water, snow, and ice;
   viii. A site map of sufficiently large scale to show the location of buildings, contaminants storage areas, sensitive areas such as water bodies, probable pathways of contaminant flow and general topography;
   ix. A description of the spill response training provided to employees who will respond to a spill;
   x. An inventory and location of the response and clean up equipment available to the spill clean up team;
   xi. The means by which the spill plan is activated; and
   xii. The date that the spill plan was prepared.

2. The Licensee shall annually review the Plan referred to in this Part and if needed, modify it to reflect changes in operation and/or technology. The Plan and any revisions shall be submitted with the Annual Report.

3. The Licensee shall ensure that any chemicals, petroleum products or wastes associated with the project do not enter water. All sumps and fuel caches shall be located at a distance of at least thirty (30) metres from the ordinary high water mark of any adjacent water body and inspected on a regular basis.

4. The Licensee shall ensure that any equipment maintenance and servicing be conducted

only in designated areas and shall implement special procedures (such as the use of drip pans) to manage motor fluids and other waste and contain potential spills.

5. If during the term of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:

   i. Employ the Spill Contingency Plan;

   ii. Report the spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and

   iii. For each spill occurrence, submit to the Inspector, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean up the spill site.

PART H: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall complete all restoration work prior to the expiry of this Licence.

2. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.

3. When possible to do so, the Licensee shall backfill and restore, to the satisfaction of an Inspector, all sumps to the pre-existing natural contours of the land.

4. The Licensee shall remove from the site Infrastructures and site material, including but not limited to, all fuel caches, drums, barrels, buildings and contents, docks, water pumps and lines, all bulky wastes, material and equipment before the expiry of this License.

5. All roads and airstrip, if any, shall be re-graded to match natural contour to reduce erosion.

6. All culverts shall be removed and the drainage opened up to match the natural channel. Measures shall be implemented to minimize erosion and sedimentation.

7. In order to promote growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.

8. Areas that have been contaminated by hydrocarbons from normal fuel transfer procedures shall be reclaimed to the satisfaction of an Inspector. The use of reclaimed soils for the purpose of back fill or general site grading may be carried out only upon approval by an Inspector.

9. Drill holes and disturbed areas will be restored to natural conditions immediately upon completion of the drilling. The reclamation of drill holes must include the removal of any drill casing materials and the capping of holes with a permanent seal.

10. The Licensee may store drill core produced by the appurtenant undertaking in an appropriate manner and location at least thirty (30) metres above the ordinary high water mark of any adjacent water body, where any direct flow into a water body is not possible and no additional impacts are created, or as directed by an Inspector.

11. All disturbed areas shall be contoured and stabilized upon completion of work and restored to a pre-disturbed state.

PART I: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall measure and record, in cubic metres, the daily quantities of water utilized for camp, drilling and other purposes.

2. An Inspector may impose additional monitoring requirements.

3. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board.

4. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

5. The Licensee shall provide the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations where sources of water are utilized for all purposes. The Licensee shall report these co-ordinates to the Inspector prior to utilizing waters.

6. The Licensee shall determine the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations of temporary and permanent storage areas where wastes associated with camp, drilling and Infrastructure operations are deposited. The Licensee shall report these co-ordinates to the Inspector prior to depositing wastes.

7. The Licensee shall measure and record the following:

   i. the quantities, in cubic metres, of domestic waste, sewage, and hazardous waste hauled off-site for disposal;

   ii. the location and name of the disposal facility for each waste type noted above; and

iii. the date that each was hauled off-site for disposal, for each occasion that these are removed from the site.

8. The Licensee shall include in the Annual Report required under Part B, Item 2 all data and information required by this Part.

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

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NUNAVUT IMALIRIYIN KATIMAYINGI
NUNAVUT WATER BOARD
OFFICE DES EAUX DU NUNAVUT

WATER LICENCE
SCHEDULE III - APPLICATION FORM

Application for: (check one)

☐ **New** ☒ **Renewal** ☐ **Amendment**

LICENCE NO:
(for NWB use only)

1. NAME AND MAILING ADDRESS OF APPLICANT/LICENSEE

SABINA SILVER CORPORATION
401-1113 Jade Court
Thunder Bay, ON
P7B-6M7

Phone: (807) 766-1799
Fax: (807) 345-0284
e-mail: hklatt@sabinasilver.com

2. ADDRESS OF CORPORATE OFFICE IN CANADA (if applicable)

SABINA SILVER CORPORATION
646 Clearwater Crescent
London, ON
N5X-4J7

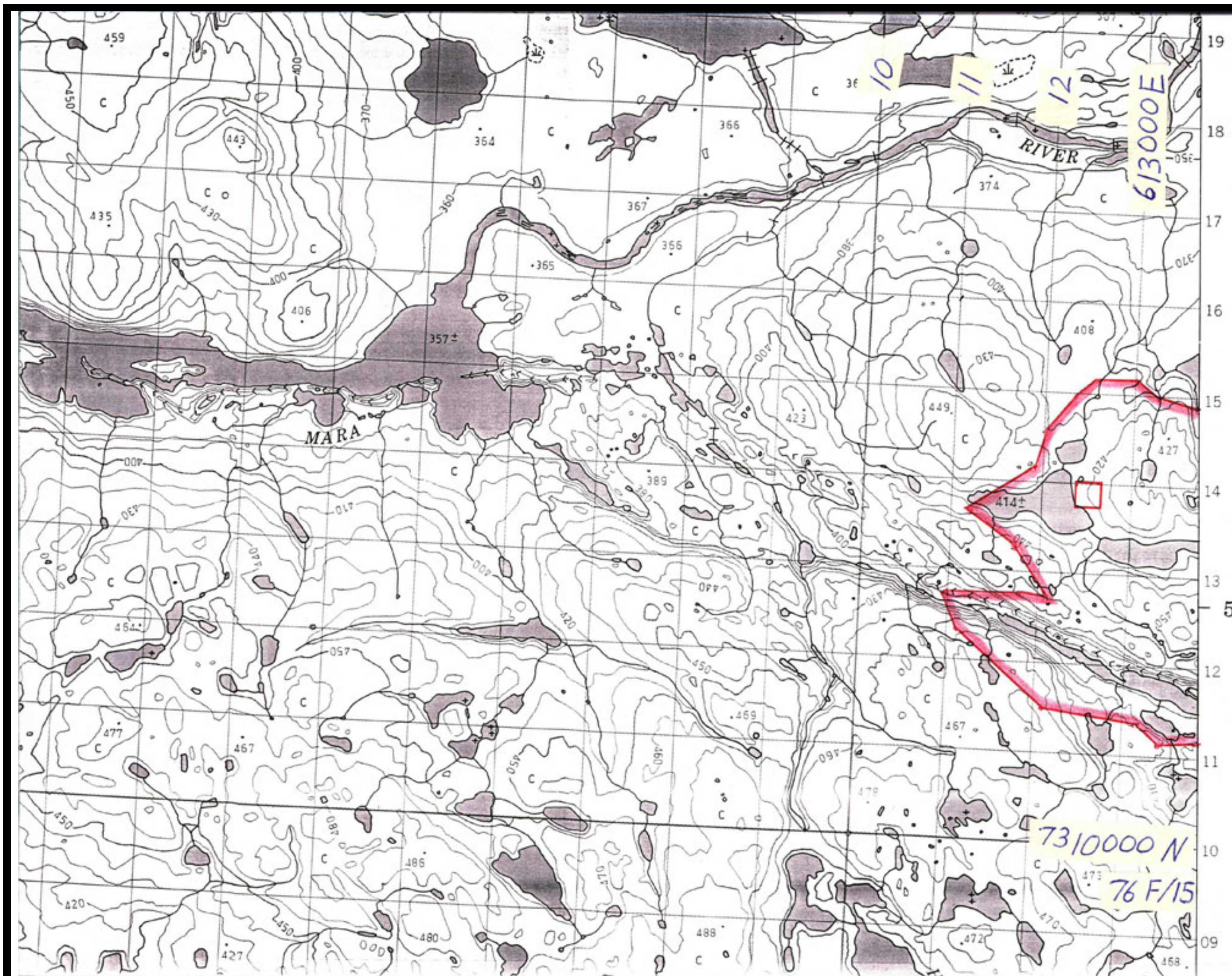
Phone: (519) 348-4555
Fax: (519) 348-9666
e-mail: caldwell@sabinasilver.com

3. LOCATION OF UNDERTAKING (describe and attach a topographical map, indicating the main components of the Undertaking)

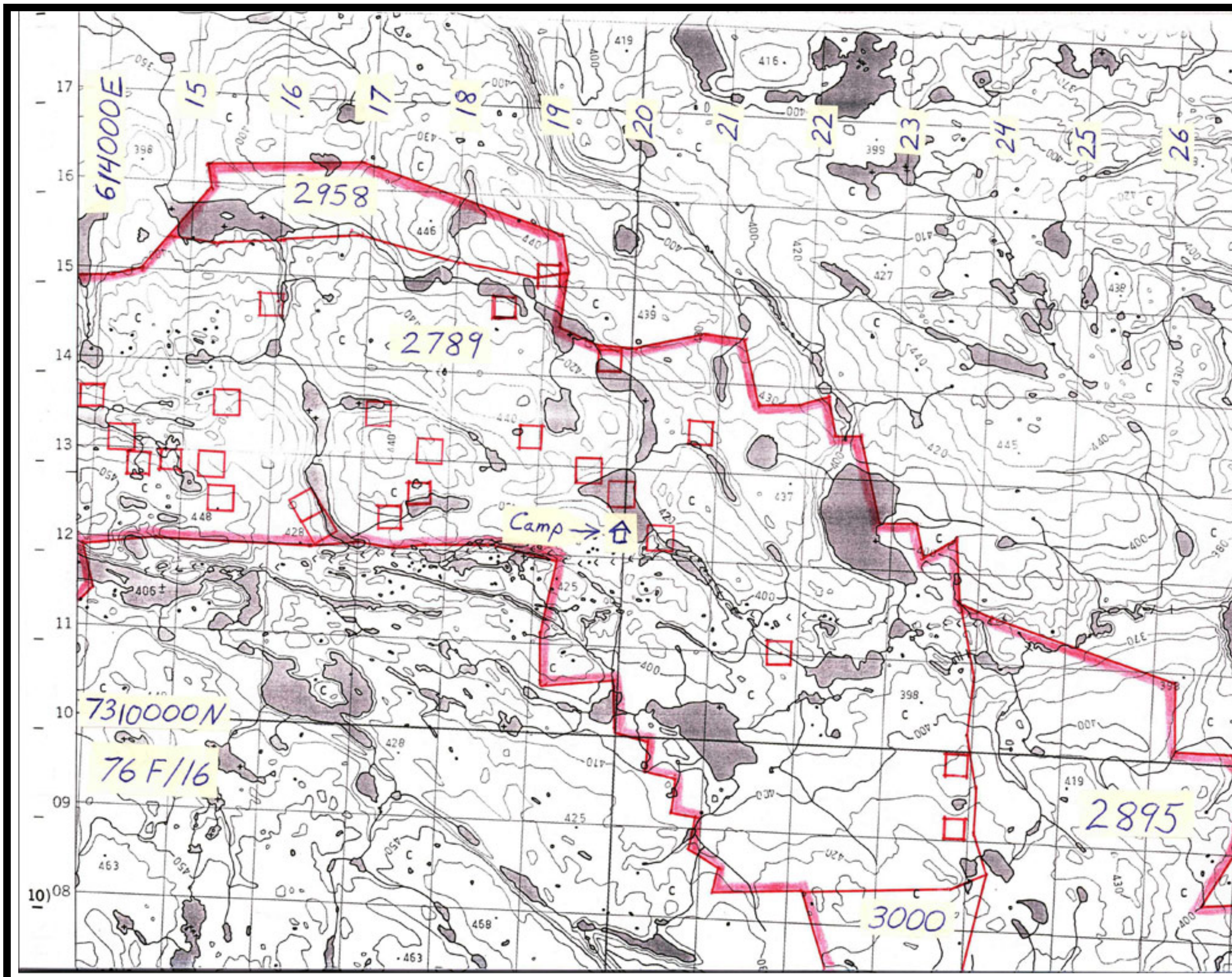
The Hackett River Project area is located approximately 104 km S of the community of Bathurst Inlet, Kitikmeot Region, Nunavut. The proposed exploration and drilling program will be confined to Mineral Leases numbered: 2789, 2893, 2895, 2958, 2964, 3000 and 3018 (See the following 3 maps below). The Mineral Leases lie within the following map coordinates:

MAX Lat Min	57	MIN Lat Deg	65	MIN Lat Min	49	MAX Lat Deg	65
MAX Long Min	34	MIN Long Deg	108	MIN Long Min	01	MAX Long Deg	108

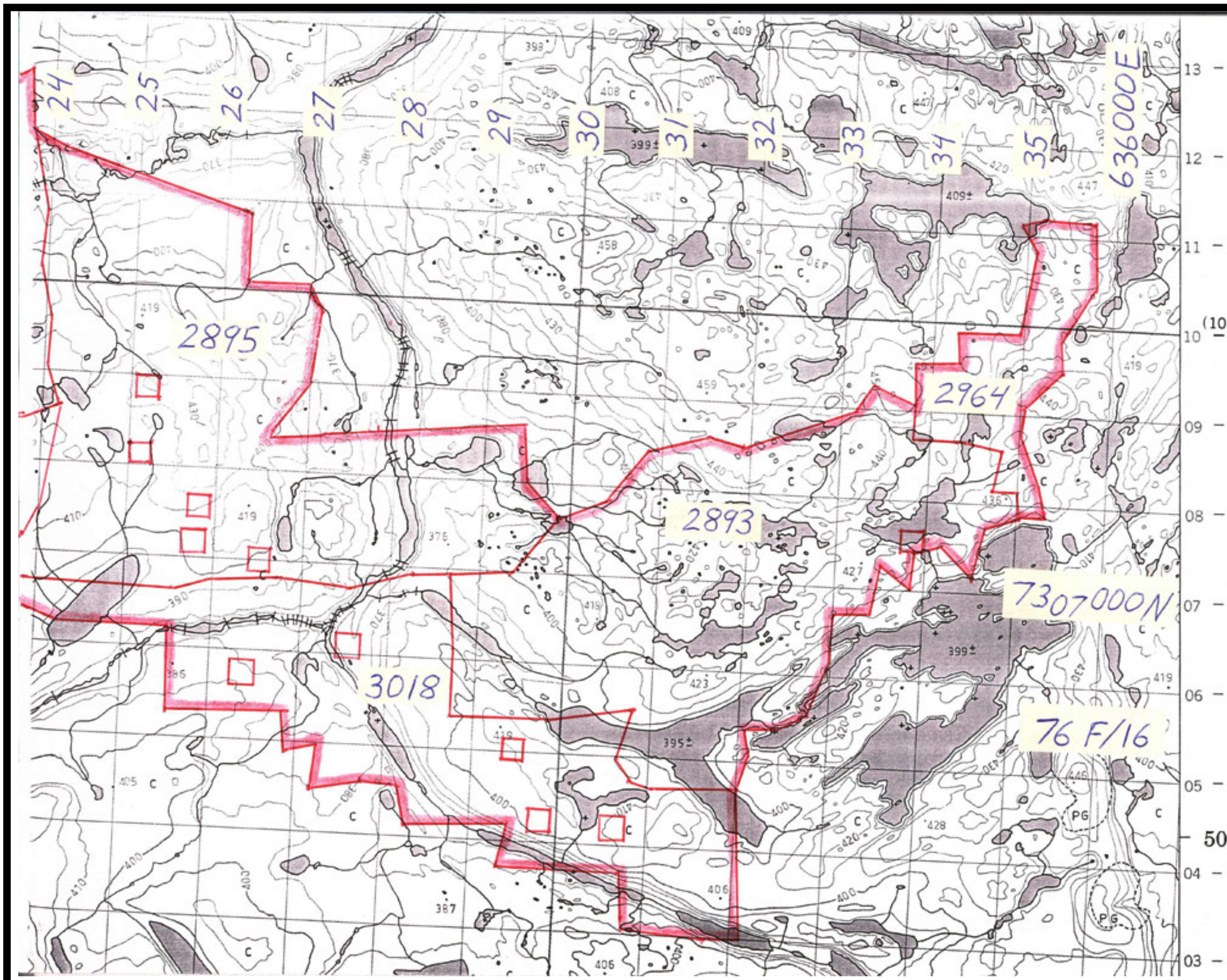
Within the Mineral Leases, proposed drill target locations are outlined in red rectangles or squares. The topographic maps show the location of the camp as well as the approximate location of the proposed drill sites.



Map 1 – Westernmost potential drill site.



Map 2 – Central portion of property with Camp site and most likely potential drill sites



Easternmost holdings, and potential drill sites.

A list of proposed drill targets (to be tested with 1 or more holes) is listed in the following table:

Proposed possible drill targets

Area	Northing	Easting	Azimuth	Dip
Boot Lake	7312150	616650	NNE	-60
Finger Lake	7312500	618600	N	-60
Camp Lake	7312800	619500	NNW	-60
Bat Lake	7313200	218700	NNE	-60
Hungrat Lake	7313500	617200	NNE	-60
“	7313100	617700	NNE	-60
Afta U Lake	7308800	625300	NNE	-60
“	7308150	625200	NNE	-60
“	7309950	623900	NNE	-60
Island Lake	7314700	616000	N	-60
Anne Lake	7313450	614100	N	-60
Cleaver Lake	7312800	614500	N	-60
Knob Hill	7312850	615400	NNE	-60
Cleaver Lake	7312850	614900	NNE	-60

Cigar Lake	7305750	626450	NE	-60
"	7307600	625800	NE	-60
"	7307000	626500	NE	-60
"	7306050	627650	NE	-60
Anchor Lake	7304250	630650	?	-60
"	7304300	628850	N	-60
"	7305000	629500	?	-60
Finger Lake	7312600	617700	N	-60
Banana Lake	7314250	619700	NNE	-60
Watson Lake	7307500	633900	N	-60
Terry Lake	7313650	612300	N	-60
High Lake	7313750	615400	N	-60
Banana Lake	7314750	618600	NE	-60
"	7315050	619050	NE	-60
"	7313450	620750	NE	-60
Zone E	7311000	621850	NE	-60
Cigar Lake	7309100	623900	NE	-60
"	7307150	625800	NE	-60

Note: Planned drill collar locations require ground geophysical and visual confirmation before the actual collar location is placed. All lake names are local names.

Latitude: (65° 55' N) Longitude: (108° 22 ' W)
NTS Map Sheet No. 76F / 15, and 76F / 16 Scale: 1:50,000

4. DESCRIPTION OF UNDERTAKING (attach plans and drawings)

The main water using components of the undertaking include the operation of a 25 person camp and the supply of water to 2 or 3 diamond drill units. The attached topographic maps show the location of the camp as well as the approximate location of the proposed drill sites.

Sabina Silver Corporation, through an option agreement with Teck Cominco Limited, has earned a 100% interest in the Hackett River project. The Hackett River project is located approximately 75 km SSW of the community of Bathurst Inlet within the Kitikmeot region of Nunavut. The Hackett River Property contains 5 zinc-silver-copper-lead-gold massive sulfide mineral deposits. Sabina's exploration work in 2004 and 2005 built on earlier work by Cominco to outline a cumulative indicated resource for the 3 Hackett River deposits of 35,695,000 tonnes grading 0.36% Cu, 0.73% Pb, 4.63% Zn, 116.88 g/t Ag and 0.419 g/t Au together with a cumulative inferred resource of 7,953,000 tonnes grading 0.34% Cu, 0.54% Pb, 3.49% Zn, 101.61 g/t Ag and 0.305 g/t Au calculated using a cut-off grade > 5 ounces per ton silver equivalent.

Sabina Silver Corporation sees an opportunity to invest in additional exploration Hackett River in the hope of discovering additional mineralized resources that might make future mine development economically feasible. If Sabina is successful in outlining substantial additional mineral resources mine development may follow. Sabina's planned 2007 exploration program is directed at discovering sufficient additional mineralization to make mine development possible. It is the nature of exploration that success in discovering sufficient additional mineralization is not assured. The planned 2007 exploration work is a continuation of the exploration done work done in 2006 by Sabina Silver Corp. The 2007 drill program is aimed at testing the existing mineral deposits at greater depths, infill drilling on the existing deposits, and at testing previously untested geophysical anomalies in the vicinity of the known deposits.

The planned exploration program for 2007, at Hackett River is expected to involve:

1. Re-opening of the existing camp (on Surface Lease 76F 16-1-4) in late February. The existing camp is located at 65° 55'N, 108° 22'W. (see following photos)
2. Transport of fuel and drilling supplies to the camp and storing it near the camp.
3. Limited ground EM geophysical surveys to accurately locate on the ground the location of previously identified geophysical anomalies.
4. Diamond drill testing of the geophysical targets, infill and step-out drilling on the known deposits.
5. Transport of drilled core to camp for geological logging, sampling and storage.
6. Inspection and reclamation of drill sites upon drill hole completion.
7. Sampled core would be sawn with half of the core sent away for assaying.
8. Camp clean-up and progressive reclamation.
9. Esker airstrip clean-up after each use during spring break-up season.

Other project activities planned for the camp (on Surface Lease 76F 16-1-4) in 2007 would include:

1. Complete the renovation of the kitchen and camp dry facilities in the existing camp to better accommodate approximately 25-30 people.
2. Construction of approximately 5 wooden core storage racks to hold approximately 15,000 m of drill core.
3. Maintenance of the main generator, and maintenance and possible upgrade of the incinerator.
4. Reposition 1 of the 4 secondary containment berms to store fuel drums in a more level orientation.
5. Finish construction of the bear fence.
6. Construct a core logging shed for geotechnical measurements and core photography.

The proposed 2007 work program is planned as follows:

Task	**Start Date**	**Completion Date**
Camp reopening	February 20	February 28
Geophysics mobilization and anomaly confirmation	April 1	September 1
Fuel mobilization	March 15	May 20
Drill crew mobilization and drilling	March 1	September 15
Crew demobilization and camp clean-up	September 15	September 30

The plan is to work though the spring break-up season without a break.

5. **TYPE OF PRIMARY UNDERTAKING** (A supplementary questionnaire **must** be submitted with the application for undertakings listed in **"bold"**)

- ☐ **Industrial**
- ☒ **Mining and Milling**(includes exploration/drilling)
- ☐ **Municipal** (includes camps/lodges)
- ☐ Power
- ☐ Agricultural
- ☐ **Conservation**
- ☐ Recreational
- ☐ **Miscellaneous** (describe below):

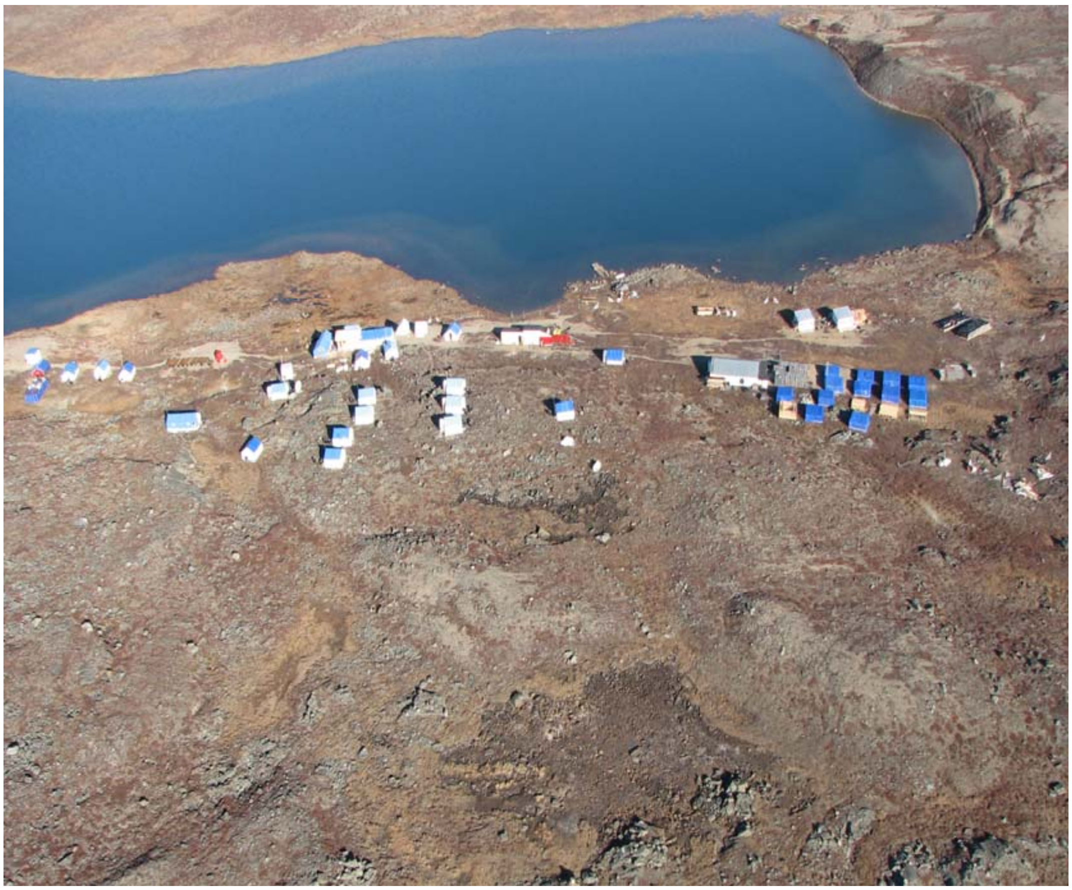
See Schedule II of *Northwest Territories Waters Regulations* for Description of Undertakings

6. WATER USE

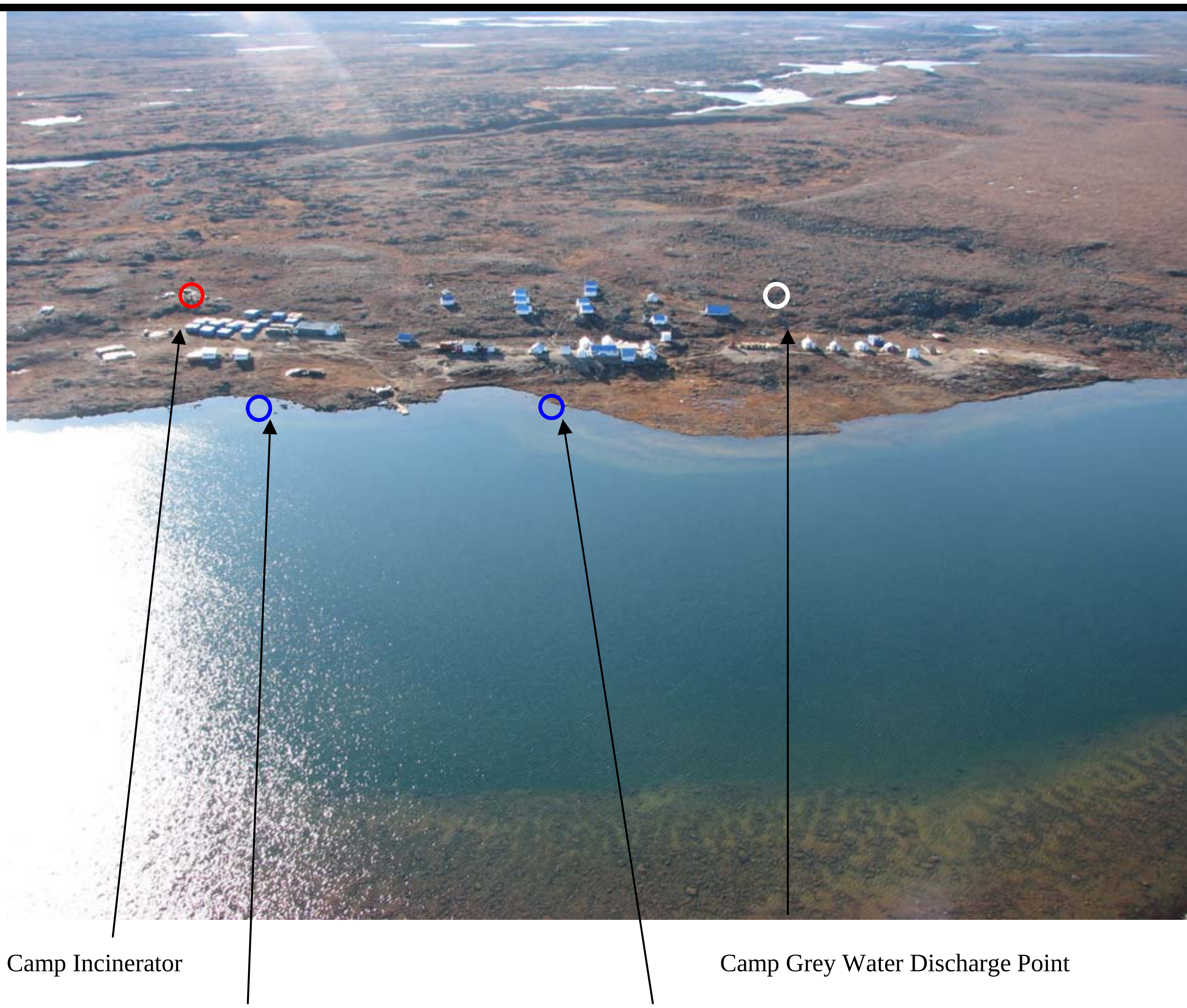
- ☒ To obtain water
- ☐ To cross a watercourse
- ☐ To modify the bed or bank of a watercourse
- ☐ Flood control
- ☐ To divert a watercourse
- ☒ To alter the flow of , or store, water

☐ Other (describe): _________________

Water would be used for 2 (and possibly 3) diamond drills and to supply camp (showers, kitchen, laundry, rock saw) with water. Water stored would be in surge tanks located at each drill and in camp.



Hackett River Camp, photo taken 09/22-2006



SABINA SILVER CORPORATION'S HACKETT RIVER CAMP: September, 2006

7. QUANTITY OF WATER INVOLVED (cubic metres per day including both quantity to be used and quality to be returned to source)

Water use ☐ 100m^3/day or less
✕ Greater than 100m^3/day; if greater, indicate quantities to be used for each purpose (camp, drilling, etc.)

Each supply pump for each drill has a pumping capacity of up to 45.4 litre/min (12 gal/min) or 0.0453 m^3/min. Three drills in operation simultaneously would use up to (0.0453 m^3/min X 1,440 min/day X 3 drills) 195.7 m^3 per day. Of the water pumped to the drill site only a small portion is utilized downhole. On average approximately half of each day is spent not drilling (pulling core, drill moves, crew change, etc.). When the drill is advancing, water is supplied to the bit by a high-pressure water pump at a rate of up to 37.9 litre/min (10 gal/min) or 0.0379 m^3/min. If the return flow of water from the bit is good (as is common) 80 to 90% of the return water is recycled for use back down the hole. The amount of water used downhole by 3 drills is estimated to be (20% X 0.0379 m^3/min X 720 min/day X 3 drills) 16.4 m^3 per day. Overflow from the surge tank would be returned to the environment as surface run-off and percolation through the soil. Return from the drill would be via a settling sump before the decanted water would join surface run-off and percolate through the moss and soil. In both cases the water would in time likely rejoin the same small drainage basin that it was pumped from.

See photo above for reference points for the Hackett River Project camp, on the West shore of “Camp Lake.”

The camp would use an estimated 3 m^3 per day pumped from Camp Lake (local name). Grey-water generated from the kitchen, showers and laundry facilities would be collected in a 500 litre holding tank. On an as-needed basis the grey-water would be pumped to a suitable disposal sump location well back from Camp Lake and would be allowed to percolate though the moss and soil to rejoin groundwater. The ground water would in time most likely return to Camp Lake

Water would be stored at each drill and at the camp. At each drill a metal horse trough type surge tank (approximately 500 litre capacity) would be used. In camp water would be stored in 4 plastic tanks (of approximately 500 litre capacity) for domestic use and a plastic horse trough type tank (approximately 500 litre capacity) would be used to hold water for occasional use with the rock saw. The total amount of water stored at any one time would be approximately 3.0 m^3.

A total of 198.7 m^3 per day water use is requested.

Water returned to source

_______ m^3/day

8. **WASTE** (for each type of waste describe: composition, quantity (cubic metres per day), methods of treatment and disposal, etc.)

- ☐ Sewage
- ☒ Solid Waste
- ☐ Hazardous
- ☒ Bulky Items/Scrap Metal
- ☒ Waste oil
- ☒ Greywater
- ☒ Sludges
- ☐ Other describe):_______________________________

No sewage system will be installed in the camp as no water is needed for the Pacto toilets.

The disposal method for burnable solid waste such as paper, cardboard, plastic, wood, burlap cloth, fuel or oil soaked absorbent material, semi-solid waste from Pacto toilets and food preparation waste would be by burning in an incinerator. It is estimated that on average approximately 5 garbage bags (121 litre capacity) of such burnable waste would be generated each day. Any remaining ashes and unburned residue would be flown out for disposal at the Yellowknife landfill site.

All large metal waste items such as used drill steel, broken or worn out mechanical parts and 45 gallon drums used for fuel transport would be flown back to Yellowknife for recycling or for disposal in the Yellowknife dump. Any bulky waste items would be cut up and burned in the incinerator or would be flown out for disposal at the Yellowknife landfill site. The quantity produced is estimated to be one Twin Otter plane load every week, most of which would be empty fuel drums.

In an ongoing program, instituted in 2006, all aluminum pop cans, and all non-dairy plastic containers are bagged and send out to the recycling facilities in Yellowknife. Approximately 8-10 (121 L) bags were sent to Yellowknife each week, and a similar amount is expected in 2007.

No hazardous materials other than the fuels and acetylene and oxygen for gas welding are expected to be stored or used on the property.

Any waste motor oil, transmission fluid and other petroleum fluids would be transferred to plastic tubs or other sealable containers and either flown back to Yellowknife for recycling or disposal by the drilling contractor or incinerated in camp. It is estimated that in total approximately 150 litres of such waste petroleum fluids would be generated in the course of the exploration program.

Grey-water generated from the kitchen, showers and laundry facilities is collected in a 500 litre, plastic holding tank. All cleaning agents would be biodegradable and phosphate free. On an as-needed basis the grey-water would be pumped to a suitable disposal sump location well back from Camp Lake (local name) and would be allowed to percolate though the moss and soil to rejoin groundwater. It is estimated that approximately 3 m^3 per day of grey-water would be generated by the camp. . In 2006, geotextile fences were constructed to contain any spillage or overflow from the greywater collection tank, the core cutting facitilty, and the camp dry buildings. The fences are approximately 60 – 90 cm high, with the bases buried in the soil, and they are arcuate in construction. Additional containment fences were build at the drills to contain any excess runoff from drilling water, cuttings or return water.

Drilling will result in the distribution of drill mud cuttings being deposited near the drill hole collar and in the sump. All drill hole additives are biodegradable. Where drilling occurs near, or on lakes, the drill return water (containing drill cuttings) will be pumped well back from the shore of the lake. Because drill cuttings are mechanically pulverized rock they are geologically similar to the locally present glacial till. It is expected that drill cuttings will, in time, be colonized by plants and lichen. The occasional use of salt at the drill site is expected to have minimal impact as any brine will be effectively diluted by water pumped to the drill site at a rate of approximately 12 gallons per minute. Salt is needed to prevent permafrost from freezing the hole closed when drilling is halted for a significant length of time. Permafrost is not present under deeper lakes that don't freeze to the bottom. If drilling is successful in intersecting sulfide mineralization the resulting drill cuttings will have high acid rock drainage potential. This is a naturally occurring state within the soils developed above existing zones of sulfide mineralization on the property. The relatively small quantities of sulfide rich drill cuttings left at the surface are expected to be admixed with other rock type drill cuttings hence slowing the rate of reaction and providing possible buffering capacity. The quantity of drill cuttings at each drill site depends on the length of the hole and is estimated to be up to 1 m^3 for the deepest holes. At each drill site (except those drilled from ice) plans are to backfill the drill hole with any accumulated drill cuttings taking care not to disrupt the surrounding topsoil / organic layer. Any excess sludge or cuttings are allowed to dry, then collected and removed for disposal.

The rock saw is expected to produce approximately 1/2 m^3 of sludge cleaned from the bottom of the settling container in the course of the season. The sludge will consist mostly of sulfides. The sludge will be cleaned from the settling container on an as needed basis, dried, placed in plastic sample bags and flown out to the Yellowknife dump for disposal.

9. OTHER PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING (give name, mailing address and location; attach if necessary)

Land Use Permit

DIAND	☐ Yes	✕ No	If no, date expected March 25, 2007
Regional Inuit Association Kitikmeot Inuit Association Lands Division Kugluktuk, Nunavut XOB OEO	☐ Yes	✕ No	If no, date expected April 1, 2007
Commissioner	☐ Yes	✕ No	If no, date expected N/A

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES (direct, indirect, cumulative impacts, etc.)

The proposed exploration program is expected to have minimal impact on the land, water flora and fauna and socio-economic areas.

The reuse of the existing camp and air strip is expected to cause minimal additional environmental impact to the land.

The total area estimated to be affected by the planned drill program is 2 hectares. Drilling will result in some compressed vegetation where wooden beams or supplies are placed on the ground. Drilling will also result in the distribution of some drill mud cuttings being deposited near the drill hole collar. All drill hole additives are biodegradable. Where drilling occurs on or near lakes, the return water containing drill mud will be pumped well back (>30m) from the shore of the lake. Because drill cuttings are mechanically pulverized rock they are geologically similar to the locally present glacial till. It is expected that drill cuttings will, in time, be colonized by plants and lichen. The occasional use of salt at the drill site is expected to have minimal impact as any brine will be effectively diluted by water pumped to the drill site at a rate of approximately 12 gallons per minute. Salt is needed to prevent permafrost from freezing the hole closed when drilling is halted for a significant length of time. Heated water is the preferred method of keeping the water from freezing when drilling in frozen ground.

Water impacts for drilling and camp use are expected to be minimal. Drilling requires the use of water from a lake or stream. Any water pumped from a lake or stream is usually discharged near the drill collar. Water intakes are screened to prevent juvenile fish from entering the pump. The pumped water, after being used for drilling, percolates through the moss and soil to rejoin groundwater present in the area. Grey water from the camp is expected to be pumped away from the camp to a location where is can percolate through the moss and soil before rejoining groundwater in the area (see photo on Page 8 of this document).

Possibly the largest impact on fauna will be due to noise caused by the use of a diesel generator at the camp as well as the periodic use of aircraft. The noise may cause large mammals to avoid the camp area; however, experience from 2004 through 2006 indicates that the steady noise of the generator seemed to have no impact on large mammal behavior. Arctic ground squirrels most likely will be attracted to the camp area due to the presence of numerous sheltered hiding places. All garbage will be flown out of camp or will be burned on site so as not to attract wildlife. Plans are to complete the electric fence around the camp to reduce the chance of human – large mammal interaction.

Socio-economic impacts of the proposed exploration program are expected to be similar to that in the three previous programs, and rather minimal. In 2004 and 2005 exploration related jobs at Hackett produced employment earnings of $106,300.00 and 446 days of employment and $70,435.00 and 302 days of employment respectively (not counting holiday pay) for Inuit workers. In 2006 seven Inuit worked at Hackett, for a total of 639 days, with combined earnings totaling $152,698.00. It is expected that a similar number of seasonal jobs would be generated for the duration of the exploration program planned for 2007. Preference in hiring would be for local Inuit, particularly from the closest communities of Bathurst Inlet, Bay Chimo and Cambridge Bay.

If exploration is successful in outlining a potentially mineable deposit, additional future socio-economic impacts would likely result, most likely increasing the probability that a winter road would be constructed to a proposed deep-water port site located north of the community of Bathurst Inlet.

After each drill hole is completed any trash and litter is gathered up and transported back to camp for either burning or flying out to Yellowknife. Capped casing pipes are expected to be used to mark hole locations where significant mineralization was intersected. In holes where no significant mineralization was intersected, plans are to pull the casing and backfill the hole with drill cuttings and mark the hole with a wooden picket. Natural revegetation is expected to reclaim the drill sites. Any holes drilled through the ice are plugged with a fast-drying cement and a rubber plug, once completed. The casings are then pulled. All ice holes have the casing removed.

Treatment of wastes would be as outlined in section 8 above. At the close of the field season tents and equipment would be stored or winterized for use the following year. All waste is removed from the camp at the end of each field season, and any supplies left on site are stored so as to minimize damage from winter storms, ice damage or damage from snow accumulations.

NIRB Screening ☒ Yes ☐ No If no, date expected ________________________

11. INUIT WATER RIGHTS

Will the project or activity substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands and the rights of Inuit under Article 20 of the Nunavut Land Claims Agreement?

No, except for the unlikely event of a major fuel spill. Major fuel spills are unlikely as all fuel at Hackett is in 45 gallon drums which are stored within secondary containment berms.

If yes, has the applicant entered into an agreement with the Designated Inuit organization to pay compensation for any loss or damage that may be caused by the alteration. If no compensation agreement has been made, how will compensation be determined?

In the unlikely event of a major fuel spill any compensation would be determined by mutual negotiations.

12. CONTRACTORS AND SUB-CONTRACTORS (name, address and functions)

Major Drilling Group International Inc. (provides diamond drilling services)
P.O. Box 1377
337 Old Airport Road
Yellowknife, NT
X1A 2P1
Phone: (867) 873 – 3358
Fax : (867) 873 – 6803

Kitikmeot Helicopters (provides helicopter support services)
Great Slave Helicopters
106 Dickens Street
Yellowknife, NT
X1A 2R3
Phone: (867) 873 – 2081
Fax: (867) 873 – 6087

1984 Enterprises Inc. (provides first aid, camp staffing and WCB compliance support)
1000 – 355 Burrard Street
Vancouver, B.C.
V6C 2G8
Phone: (604) 736 – 8142
Fax: (604) 736 – 8119

Nunavut Expediting Services Ltd. (provides expediting services and logistical support)
Discovery Mining Services
P.O. Box 97
Cambridge Bay, NU
X0E 0C0
Phone: (867) 983 – 2544
Fax: (867) 983 - 2203

13. STUDIES UNDERTAKEN TO DATE (list and attach copies of studies, reports, research, etc.)

Photocopies of the following two reports were submitted in 2004.

Department of Indian and Northern Affairs, Water Management Section, Bathurst Norsemines (Hackett River), Potential Mine Water Quality Survey Network, Report Series, 1974 By: D. Sutherland, J. McLaren

Northwest Territories Water Board, Department of Indian and Northern Development, Bathurst Norsemines Hackett River, Potential Mine Water Quality Survey Network, Report Series, 1975 By D.J. Sutherland

The following photocopied report was submitted in 2005 with the Annual Report.

Geochemical Dispersion over Massive Sulphides within the Zone of Continuous Permafrost, Bathurst Norsemines, District of Mackenzie, N.W.T. by J. K. Millar, The University of British Columbia, December, 1978.

Also submitted in 2005 with the Annual Report was a report entitled:

Baseline Water Quality Monitoring Program at Hackett River Project, prepared by Gartner Lee Limited and dated December 6, 2004 and covering the results of water quality sampling conducted in August 2004.

Submitted with the 2006 license renewal application was a report entitled:

2005 Baseline Water Quality Monitoring Program – Hackett River Project, prepared for Sabina Resources Limited, submitted by Gartner Lee Limited, October 2005 covering the results of water quality sampling conducted in July 2005.

To be submitted at a later date, are the following reports, not yet completed:

2006 Baseline Preliminary Options of the Road Route Options from Hackett River Camp to the BIPAR Road, prepared for Sabina Resources Limited, submitted by Gartner Lee Limited, November, 2006.

2006 Baseline Water Quality Monitoring Program at Hackett River Project, prepared by Gartner Lee Limited, November, 2006.

14. THE FOLLOWING DOCUMENTS MUST BE INCLUDED WITH THE APPLICATION FOR THE REGULATORY PROCESS TO BEGIN

Supplementary Questionnaire (where applicable: see section 5) ☒ Yes ☐ No If no, date expected ____________

Inuktitut and/or Innuinaqtun/English Summary of Project ☐ Yes ☐ No If no, date expected ____________

Application fee of $30.00 (Payee Receiver General for Canada) ☒ Yes ☐ No If no, date expected ____________

Water Use fee of $30.00 (unless otherwise indicated in Section 9 of the *NWT Waters Regulations;* Payee Receiver General for Canada)
☒ Yes ☐ No If no, date expected ____________

15. PROPOSED TIME SCHEDULE (unless otherwise indicated, the NWB will consider the application for a five (5) year term)

☐ one year or less (or) ☒ Multi Year

Start Date: Feruary 15, 2007 Completion Date: October 31, 2009

Name (Print)	Title (Print)	Signature	Date

For Nunavut Water Board office use only

APPLICATION FEE	**Amount: $**__________	**Pay ID No.:** ___________________________
WATER USE DEPOSIT	**Amount: $**__________	**Pay ID No.:** ___________________________

2007 Non Technical Project Summary

Sabina Silver Corporation, through an option agreement with Teck Cominco Limited, has earned a 100% interest in the Hackett River project. The Hackett River project is located approximately 104 km S of the community of Bathurst Inlet within the Kitikmeot region of Nunavut. The Hackett River project contains 5 zinc-silver-copper-lead-gold massive sulfide mineral deposits. Sabina's exploration work in 2004 and 2005 built on earlier work by Cominco to outline a cumulative indicated resource for the 3 largest Hackett River deposits of 35,695,000 tonnes grading 0.36% Cu, 0.73% Pb, 4.63% Zn, 116.88 g/t Ag and 0.419 g/t Au together with a cumulative inferred resource of 7,953,000 tonnes grading 0.34% Cu, 0.54% Pb, 3.49% Zn, 101.61 g/t Ag and 0.305 g/t Au calculated using a cut-off grade > 5 ounces per ton silver equivalent.

Sabina Silver Corporation sees an opportunity to invest additional exploration funds at Hackett River in the hope of discovering additional mineralized resources that might make future mine development economically feasible. If Sabina is successful in outlining substantial additional mineral resources, mine development may follow. It is the nature of exploration that success in discovering sufficient additional mineralization is not assured. The planned 2007 exploration work is a continuation exploration done from 2004 through 2006 by Sabina Resources (Sabina Resources changed its name in late 2005 to Sabina Silver Corporation). The 2007 drill program is aimed at testing the existing mineral deposits at greater depths and at testing several geophysical anomalies in the vicinity of the known deposits.

The planned exploration program at Hackett River is expected to involve:

1. Re-opening of the existing camp (on Surface Lease 76F 16-1-4) in late February. The existing camp is located at 65° 55'N, 108° 22'W.
2. Transport of fuel and drilling supplies to the camp and storing it near the camp.
3. Limited ground EM geophysical surveys to accurately locate on the ground the location of previously identified geophysical anomalies.
4. Diamond drill testing of the geophysical targets and step-out drilling on the known deposits.
5. Transport of drilled core to camp for geological logging, sampling and storage.
6. Inspection and reclamation of drill sites upon drill hole completion.
7. Sampled core would be sawn with half of the core sent away for assaying.
8. Camp clean-up and progressive reclamation.
9. Esker airstrip clean-up after each use during spring break-up season.

Other project activities planned for the camp (on Surface Lease 76F 16-1-4) in 2007 would include:

1. Complete the renovation of the kitchen and camp dry facilities in the existing camp to better accommodate approximately 25-30 people.
2. Construction of approximately 5 wooden core storage racks to hold approximately 15,000 m of drill core.
3. Maintenance of the main generator, and maintenance and possible upgrade of the incinerator.
4. Reposition 1 of the 4 secondary containment berms to store fuel drums in a more level orientation.

5. Finish construction of the bear fence.
6. Construct a core logging shed for geotechnical measurements and core photography.

The proposed 2007 work program is planned as follows:

Task	Start Date	Completion Date
Camp reopening	February 20	February 28
Geophysics mobilization and anomaly confirmation	April 1	September 1
Fuel mobilization	March 15	May 20
Drill crew mobilization and drilling	March 1	September 15
Crew demobilization and camp clean-up	September 15	September 30

The plan is to work though the spring break-up season without a break.

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The Insta-Berm™ is used for spill containment of hazardous materials

INSTA-BERM™

Secondary Containment

Insta-Berm™

The Insta-Berm™, made of industrial-strength fabrics, is a durable and easy-to-use environmental safeguard. Insta-Berm™ is used for the secondary containment of toxic materials in many applications, to help industries meet today's strict guidelines on environmental protection.

Features of the All-New L-Rod Design

> L-shaped rods hold up walls, yet fold down easily for vehicle entry and exit
> Fully collapsible for compact storage and easy transport
> Instant deployment without any tools
> Wide range of sizes available, plus custom-made sizes
> No gate required - fold-down design allows vehicles or mobile equipment to be driven in and out of the berm for storage or washdown
> Can be easily cleaned, folded, and stored for reuse
> Eyelet patches for staking down the berm
> Extremely cost-efficient compared to air-inflated models
> Simple and inexpensive to repair
> Appropriate for waste water, petroleum products, and various chemicals
> Optional Track Belting for driving vehicles into the Insta-Berm helps the liner last longer!

Fabric Options

Chem: Chemical resistant fabric
Arctic: Chemical resistant fabric for temperatures to -50 Degrees F (-45.6 Degrees C)

Applications for Berms

> Chemical transfer
> Tankers and oilers
> Industrial maintenance
> Paint factories
> Refineries
> Spill containment
> Oil spill clean-up
> Fuel oil distribution
> Vehicle & equipment washdown & decontamination
> Chemical treatment plants
> Hazardous waste disposal
> Sanitation
> Fuel drum storage
> Aircraft & equipment fueling
> Manufacturing plants
> Oil pumping sites
> Vehicle maintenance
> Battery recycling & disposal

See Reverse side for Insta-Berm™ Specifications

The Insta-Berm™ helps companies meet stricter government regulations on environmental protection.

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Operate a complete fuel transfer system safely inside an Insta-Berm™

The benefits of the new design of the Insta-Berm™ include a more secure vertical wall.

INSTA-BERM™
SPECIFICATIONS

Model	Maximum Capacity			Inside Dimensions (LxWxH)		Weight (Ship)	
	US Gal.	Imp Gal.	Litres	Feet, In.	Meters	lbs	Kg
IBLR 101015	935	780	3512	10' x 10' x 15"	3.3 x 3.3 x .4	86	39
IBLR 101515	1400	1170	5260	10' x 15 x 15"	3.3 x 5.0 x .4	102	46
IBLR 102015	1870	1560	7025	10' x 20' x 15"	3.3 x 6.6 x .4	140	64
IBLR152015	2800	2340	10,520	15' x 20' x 15"	5.0 x 6.6 x .4	172	78
IBLR 202015	3740	3120	14,050	20' x 20' x 15"	6.6 x 6.6 x .4	188	85
IBLR 153015	4200	3500	15,780	15' x 30' x 15"	5.0 x 10.0 x .4	225	102
IBLR 154015	5600	4675	21,040	15' x 40' x 15"	5.0 x 13.3 x .4	263	119
IBLR 203015	5600	4675	21,040	20' x 30' x 15"	6.6 x 10.0 x .4	260	118
IBLR 204015	7500	6230	28,180	20' x 40' x 15"	6.6 x 13.3 x .4	310	140
IBLR 303015	8400	7000	31,560	30' x 30' x 15"	10.0 x 10.0 x .4	343	156
IBLR 205015	9300	7800	34,940	20' x 50' x 15"	6.6 x 16.6 x .4	382	173
IBLR 206015	11,200	9350	42,080	20' x 60' x 15"	6.6 x 20.0 x .4	435	197
IBLR 304015	11,300	9440	42,450	30' x 40' x 15"	10.0 x 13.3 x .4	450	204
IBLR 305015	14,000	11,700	52,600	30' x 50' x 15"	10.0 x 16.6 x .4	535	243
IBLR 404015	15,000	12,000	56,360	40' x 40' x 15"	13.3 x 13.3 x .4	535	243
IBLR 306015	16,800	14,000	63,120	30' x 60' x 15"	10.0 x 20.0 x .4	610	277
IBLR 405015	19,000	15,000	71,385	40' x 50' x 15"	13.3 x 16.6 x .4	630	286
IBLR 505015	23,500	19,000	88,290	50' x 50' x 15"	16.6 x 16.6 x .4	745	338

NOTE: Capacities do not allow for 10% safety. All dimensions are nominal and specifications subject to change.

Why use an Insta-Berm™

The Insta-Berm™ helps companies avoid stiff penalties from non-compliance of EPA standards.
40CFR112.7
"Any bulk storage container (eg. Tanks, oil-water separators) must have secondary containment for the entire contents of the largest single container, with sufficient freeboard to allow for precipitation."

Options

The Insta-Berm™ is available with an optional low-cost drain fitting installed. This fitting can be opened to let out accumulated rainwater, or connected to a hose to pump out spilled product.

An overfill protection system is also available. This system allows precipitation to be drained from the berm while containing spilled chemicals.

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Mini-Berm™ used under a valve for spill clean-up

MINI-BERM

Secondary Containment

Mini-Berm™

The Mini-Berm™ is an ultra lightweight and convenient spill tray for clean-up operations and spill containment during fuel and chemical transfer. Mini-Berm™ trays are easily placed under valves and fittings, trucks, and machinery. Totally reuseable and compact, the Mini-Berm™ withstands most liquids and is designed to take standard size sorbent pads. Fourteen sizes of Mini-Berm™ trays are available, with custom sizes available upon request.

Features

> Lightweight and compact for easy storage
> Extremely durable
> Inexpensive
> Chemical resistant to fuels, oils and most chemicals including acids. For a complete chemical resistance chart please contact Raymac.

The Mini-Berm™ Model TTM3B243 is an inexpensive safeguard against environmental spills.

Applications for Berms

> Chemical transfer
> Tankers and oilers
> Industrial maintenance
> Paint factories
> Refineries
> Spill containment
> Oil spill clean-up
> Fuel oil distribution
> Vehicle & equipment washdown & decontamination
> Chemical treatment plants
> Hazardous waste disposal
> Sanitation
> Fuel drum storage
> Aircraft & equipment fueling
> Manufacturing plants
> Oil pumping sites
> Vehicle maintenance
> Battery recycling & disposal

Applications include foam storage, fuel transfer and fire pump containment.

Arctic Mini Berm in Nunavut Territory, Canada

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MINI-BERM

Secondary Containment

Why use a Mini-Berm™ ?

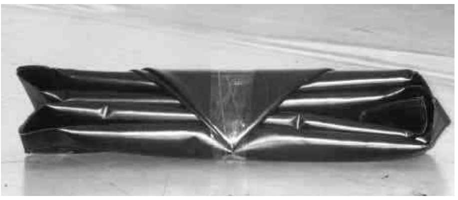
The Mini-Berm™ helps companies avoid stiff penalties from non-compliance of EPA standards.
40CFR112.7
"Any bulk storage container (eg. Tanks, oil-water separators) must have secondary containment for the entire contents of the largest single container, with sufficient freeboard to allow for precipitation"

Options

The Mini-Berm™ is available with an optional low-cost drain fitting installed. Shown below is a 3/4" fitting with cap. This fitting can be opened to let out accumulated rainwater, or connected to a hose to pump out spilled product.

An overfill protection system is also available. This system allows precipitation to be drained from the Mini-berm™ while containing spilled chemicals.

A fitting can be installed in the Mini-Berm™ for easy draining.



The Mini-Berm™ is compact and lightweight for shipping and storage.

Standard Sizes

Dimensions (LxWxH)	
Inches	cm
18 x 18 x 4	46 x 46x 10
18 x 18 x 6	46 x 46 x 15
24 x 24 x 4	60 x 60 x 10
24 x 24 x 6	60 x 60 x 15
36 x 36 x 4	91 x 91 x 10
36 x 36 x 6	91 x 91 x 15
48 x 48 x 4	122 x 122 x 10
48 x 48 x 6	122 x 122 x 15
48 x 60 x 4	122 x 152 x 10
48 x 60 x 6	122 x 152 x 15
48 x 72 x 4	122 x 183 x 10
48 x 72 x 6	122 x 183 x 15
60 x 72 x 4	152 x 183 x 10
60 x 72 x 6	152 x 183 x 15

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The Rain Drain™ will continuously filter out rain water while containing hydrocarbons.

RAIN DRAIN™

Berm Filtration System

Rain Drain™

Enabling your secondary containment berm to contain minor leaks or spills of hazardous materials, the RainDrain will continuously filter out rain water while containing hydrocarbons.

Features

> Filters rainwater down to 10 PPM in compliance with EPA regulation 40CFR112.7
> Go-no-go filtration system will automatically stop the discharge of water when full of hydrocarbons eliminating the need for monitoring
> Easy installation within minutes
> Includes a ball valve with sight glass to examine liquid levels & content
> Rugged anodized aluminum filter casing
> Discharge end - molded cap with 3/8" discharge port
> Feed end - molded cap with 3/4" camlock inlet
> Replacement filter media kits available in packages of 6

Specifications

	Large	Small
Capacity	4.8 USG 16.65 L	2.2 USG 8.32 L
Flow Rate	2.5 - 3.5 USGPM	2 - 3 USGPM

Components

> Filter casing with molded caps and camlock inlet
> 1 Pre-packaged spare filter media kit with used
> cartridge disposal bag
> Ball valve with hose and sightglass
> 8 foot chemical hose
> Bulkhead fitting for the berm

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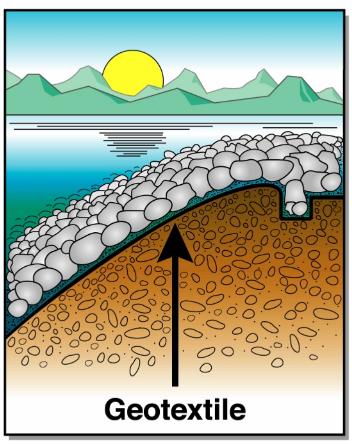
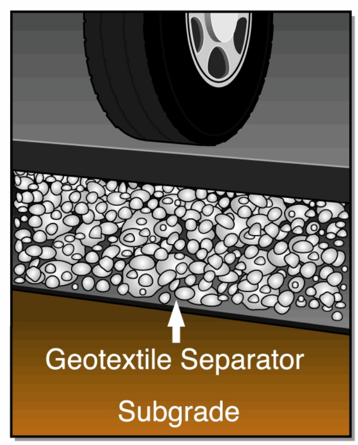
Nonwoven Geotextile

A 16.0 oz/sy nonwoven needlepunched geotextile made of 100% polypropylene staple filaments. This product can be used under riprap for erosion control, for separation in road and railroad applications, and will act as a cushion in geomembrane applications.

Riprap



With a Geotextile Separator



PROPERTY	TEST METHOD	ENGLISH	METRIC
Tensile Strength	**ASTM D-4632**	**380 lbs**	**1690 N**
Elongation @ Break	**ASTM D-4632**	**50 %**	**50 %**
Mullen Burst	**ASTM D-3786**	**750 psi**	**5171 kPa**
Puncture Strength	**ASTM D-4833**	**235 lbs**	**1046 N**
Trapezoidal Tear	**ASTM D-4533**	**140 lbs**	**623 N**
Apparent Opening Size	**ASTM D-4751**	**100 US Sieve**	**0.150 mm**
Permittivity	**ASTM D-4491**	**0.70 Sec^{-1}**	**0.70Sec^{-1}**
UV Resistance, % Retained	**ASTM D-4355**	**70 % @ 500 hours**	**70 % @ 500 hours**
Flow Rate	**ASTM D-4491**	**50 gal/min/sf**	**2037 1/min.m^2**