



**NORDMIN**  
RESOURCE & INDUSTRIAL  
ENGINEERING

**BENTON**  
RESOURCES INC.

**CAPE RAY GOLD PROJECT  
PORT aux BASQUES & ISLE aux MORTS  
NEWFOUNDLAND**

**Environmental Assessment Registration  
Pursuant to the Environmental Assessment Act 2012  
PROJECT DESCRIPTION SUMMARY of a Designated Project**

Submitted to:

**Canadian Environmental Assessment Agency**  
200 – 1801 Hollis Street  
Halifax, Nova Scotia  
B3J 3N4

Submitted by:

**Nordmin Resource and Industrial Engineering Ltd.**  
**160 Logan Ave**  
Thunder Bay, Ontario  
P7A 6R1

December 2016

**Nordmin Project No.: 14200 - 01**

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December 12, 2016

**Nordmin Project No.: 14200 - 01**

Canadian Environmental Assessment Agency  
200 – 1801 Hollis Street  
Halifax, Nova Scotia  
B3J 3N4

Attention: Mr. Mike Atkinson, Regional Director, Atlantic  
Dear Mr. Atkinson,  
Re: **Cape Ray Gold Project Description Summary  
Port aux Basque, Newfoundland**

Nordmin Engineering Ltd. (Nordmin), in Thunder Bay Ontario, is pleased to submit this Project Description Summary Report for Registration of a designated Project pursuant to the *Canadian Environmental Assessment Act 2012* for the Cape Ray Gold Project near Isle aux Morts and Port aux Basque Newfoundland. Nordmin is currently advancing the Project site as part of a Joint-Venture Agreement with Benton Resources Inc. also in Thunder Bay.

I want to thank you and your staff for the valuable guidance and feedback provided on the earlier drafts of the Project Description. The comments are much appreciated. As you know, it has already been determined that the Project will undergo an environmental assessment and review under the legislation of the Province of Newfoundland and Labrador. Irrespective of a decision by the Agency as to whether a formal environmental assessment of the Project is required, the provincial environmental assessment will benefit from the comprehensive range of federal environmental assessment and planning guidance included in the draft EIS guidelines issued by the province.

I trust that the attached Project Description provides all the key information needed for you to make a determination whether a federal environmental assessment is required for the Project.

Please call should you have any questions regarding the report.

Yours sincerely,

**Nordmin Resource and Industrial Engineering Ltd**

<original signed by>

Giovanni (John) Sferrazza  
Director-Environmental Services  
Encl.

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## Executive Summary

Nordmin Resource and Industrial Engineering Ltd. (Nordmin is the proponent) is currently in a Joint Venture agreement with Benton Resources Inc. for the purposes of developing the Cape Ray Property near Port aux Basques, Newfoundland.

Nordmin proposes to develop, operate, decommission and reclaim a gold and silver mine, mill and processing operation at the Cape Ray site. The Project includes open pit and underground mining methods to extract and process gold and silver bearing ore from the Cape Ray Deposits to produce gold and silver dore bars on site for commercial sale. The Project will take approximately two years to construct and permit and then have a mine life of five to eight years.

A Preliminary Economic Assessment (PEA) was prepared for this Project in April 2016, which indicated a potential minable resource estimated at 1,701,487 t averaging a combined grade of 4.6 g/t gold and 4.8 g/t silver. Open pit potential minable resource made up 836,014 t with anticipated dilution of 10% and mine losses of 5%. The remaining 865,473 potential minable resource tonnes from underground methods include dilution of 20% in longhole stoping and 10% in cut and fill with mine losses of 5% applied.

Mill recovery rates based on preliminary test are estimated to be 97% resulting in 250,000 ounces recoverable gold and 45% resulting in 260,000 ounces recoverable silver.

The Project will bring much needed economic benefits to the region. The recent downturn in the economy reinforces the need for resource development projects of this nature and economic development in Port aux Basque area. Based on preliminary community discussions and past history, there is a strong community support for the Project. The proposed Project would directly create approximately 100 - 150 jobs (at peak) during construction and approximately 30 full-time jobs during operations. The proposed Project presents an opportunity for substantive economic benefits to the region, local communities, and the province.

The Project area is located on the southern slopes of the Long Range Mountains, and generally in the Maritime Barrens ecoregion. It is characterized by broad wooded valleys (tuckamoor), gently sloping organic deposits and rugged bedrock dominated uplands. The dominant surficial characteristics are bedrock concealed by vegetation, barren outcrops or lichen covered rock, thin bog cover; minor thin till deposits and the occasional drumlinoid feature. The deeply incised river valleys contain glaciofluvial deposits and alluvial deposits derived from postglacial erosional and sedimentary processes.

The rugged and often strongly sloping topography varies in elevation from approximately 140 m along the valley bottom of the Isle aux Morts River to nearly 480 m along the eastern boundary of the project area. The Isle aux Morts River is a Scheduled Salmon River and as such is subject to special management procedures and protection by the Newfoundland and Labrador Department of Natural Resources.

The Project is also subject to environmental assessment legislation in Newfoundland and Labrador. Draft Guidelines for the Environmental Impact Statement for the Project have been



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issued (November 2016). There has been involvement with respect to federal agencies and interests with input into the provincial EIS guidelines through the involvement of federal agencies such as Environment and Climate Change Canada and Fisheries and Oceans Canada. As such, there is a high degree of certainty associated with the environmental assessment expectations with respect to the Project.



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## TABLE OF CONTENTS

<b>Executive Summary</b> .....	<b>iii</b>
<b>List of Units and Abbreviations</b> .....	<b>ix</b>
<b>1. Introduction</b> .....	<b>1</b>
1.1 Project Name.....	1
1.2 Proponent Information .....	2
1.3 Consultation Overview .....	3
1.4 Rationale for the Project .....	4
1.5 Environmental Assessment Processes and Requirements.....	5
1.6 Purpose of the Registration.....	6
<b>2. Project Description</b> .....	<b>7</b>
2.1 Property Description and Location.....	7
2.1.1 Proximity to Municipalities .....	9
2.1.2 Proximity to any Permanent, Seasonal or Temporary Residences .....	9
2.1.3 Proximity to any Aboriginal Traditional Lands, Sites or Communities .....	10
2.1.4 Proximity to Federal Lands.....	10
2.1.5 Proximity to Surface Waters .....	11
2.2 Alternatives to the Project .....	12
2.3 Land Tenure.....	13
2.4 Overall Project Development and Production Schedule.....	14
2.4.1 Pit Conceptual Plans.....	15
2.4.2 Mine Production Schedule .....	18
<b>3. Project Phases</b> .....	<b>19</b>
3.1 Construction and Development .....	19
3.1.1 Mine Infrastructure .....	20
3.1.2 Processing Plant (Mill).....	21
3.1.3 Tailings Management Facility (TMF) .....	22
3.1.4 Site Access Road and Haulage Road Network.....	22
3.1.5 Administrative and Dry Buildings .....	25
3.1.6 Power Generation and Communications .....	25
3.1.7 Rock Storage Facilities (RSF) and Overburden Stockpiles .....	25
3.1.8 Collection Ponds.....	25
3.1.9 Associated Project Infrastructure.....	25
3.2 Production, Operation and Maintenance .....	26
3.2.1 Open Pit.....	26
3.2.2 Underground Mine Design .....	28
3.2.3 Tailings Management .....	31
3.2.4 Mine Water Management.....	32
3.3 Closure and Reclamation.....	37
<b>4. Overall Project Schedule</b> .....	<b>39</b>
4.1 Life of Mine Development Plan and Schedules.....	39



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4.1.1	Life of Mine Production Plan and Schedule .....	39
4.2	Labour Force and Occupations.....	40
4.2.1	Underground Labour .....	40
4.2.1	Open Pit Labour.....	43
4.3	Mill Labour.....	43
4.4	Capital and Operating Costs .....	44
<b>5.</b>	<b>Environmental Effects .....</b>	<b>48</b>
5.1	Existing Environment.....	48
5.1.1	Regional Climate.....	48
5.1.2	Air Quality and Noise.....	49
5.1.3	Geology and Topography .....	50
5.1.4	Vegetation and Soils.....	50
5.1.5	Wetlands .....	51
5.1.6	Hydrology .....	51
5.1.7	Hydrogeology .....	56
5.1.8	Fish and Fish Habitat .....	56
5.1.9	Wildlife .....	58
5.1.10	Avifauna.....	59
5.2	Human Environment .....	59
5.2.1	Historic and Heritage Resources .....	59
5.3	Potential Environmental Effects to the Biophysical Environment .....	60
5.3.1	Additional Federal Environmental Effect Considerations .....	60
5.4	Financial Support.....	67
5.5	Potential Effects of Changes to the Environment on Aboriginal Peoples .....	67
5.6	Environmental Management and Protection .....	68
5.7	Nordmin Project Documents.....	68
5.8	Other Required Environmental Approvals and Permits.....	68
<b>6.</b>	<b>Consultation .....</b>	<b>71</b>
6.1	Aboriginal, Community and Social Requirements.....	71
6.2	Governmental Consultation .....	71
<b>7.</b>	<b>Closure .....</b>	<b>72</b>
<b>8.</b>	<b>References .....</b>	<b>73</b>

---

## LIST OF FIGURES

Figure 2.1 Cape Ray Project Location .....	7
Figure 2.2 Deposit Locations within Claim Boundary .....	8
Figure 2.3 Nearest Municipalities .....	9
Figure 2.4 Site Access.....	11
Figure 2.5 Deposits Location within Isles Aux Morts River Watershed .....	12
Figure 2.6 Nordmin-Benton JV Zone within Cape Ray Claims .....	13
Figure 2.7 04, 41, 51 and WGH Conceptual Site Layouts .....	17
Figure 3.1 Cape Ray Access Road off Route 470 to the proposed Mine Site. ....	24
Figure 3.2 Representation of the 04 SLS stopes and Cut & Fill Drifts.....	29
Figure 3.3 Representation of the 51 underground LH Stopes.....	30
Figure 3.4 Representation of the 41 Underground Stopes below the 41 Pit. ....	30
Figure 3.5 Tailings Management Facility .....	32
Figure 5.1 Temperature and Precipitation Averages for Isle aux Morts, NL, (Environment Canada) .....	49
Figure 5.2 Mean Monthly Flows for Isle aux Morts River for 2003- 2013. ....	52
Figure 5.3 Mean, Max and Min Monthly flows for Isle aux Morts River 2003 – 2013 .....	52
Figure 5.4 Isla aux Morts River Hydrograph for 2013.....	53

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## LIST OF TABLES

Table 2.1 Cape Ray Claims held by Benton Resources Inc. as of December 11, 2015.....	14
Table 2.2 Production schedule (Potential Mineable Resources, in thousands) .....	15
Table 2.3 Expected Production Rates .....	18
Table 3.1 Approximate Average Overburden Thickness by Deposit .....	27
Table 4.1 Mine Development Schedule.....	39
Table 4.2 Production Schedule Underground and Open Pit by Deposit (in thousands) .....	40
Table 4.3 Summary Company - Contractor Labour .....	41
Table 4.4 Life of Project Labour .....	42
Table 4.5 Open Pit Labour .....	43
Table 4.6 Labour Requirements for Mill Operation.....	44
Table 4.7 Pre Production Capital Expenditures (in thousands) .....	46
Table 4.8 Sustaining Capital Expenditures by Deposit (in thousands).....	46
Table 4.9 Underground Operating Costs .....	47
Table 4.10 Open pit Operating Costs.....	47
Table 5.1 Climate Data for Isle aux Morts, NL [Source: Environment Canada 1981-2010 Data] .....	49
Table 5.2 Monthly Mean Discharge Volumes of the Isle aux Morts River (m <sup>3</sup> /s), 2003-2013 .....	51
Table 5.3 2014 Water Quality Summary.....	55
Table 5.4 Biophysical Environmental Effects of the Project related to Sections 16-18 of the Prescribed Information for the Description of Designated Project Regulations.....	61
Table 5.5 Summary of Anticipated Applicable Acts and Regulations.....	70



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## List of Units and Abbreviations

<b>Abbreviation</b>	<b>Meaning</b>
°C	Degrees Celsius
\$ and CAD\$	currency of Canada
AA	atomic absorption (assay method to measure metal content)
Ag	silver
Au	gold
BP	Big Pond
BRI	Benton Resources Inc.
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
CRFZ	Cape Ray Fault Zone
CRGD	Cape Ray Gold Deposit
CRIC	Cape Ray Igneous Complex
Cu	copper
CPUE	Catch-per-unit-effort
DDH or ddh	diamond drill hole
DFO	Department of Fisheries and Oceans
DMS	Dense Media Separation
EA	Environmental Assessment
EIS	Environmental Impact Statement
el	elevation
EM	electromagnetic
EPR	Environmental Permitting Regulations
g	gram
g/t	grams per tonne
GBC	Grand Bay Complex
GRG	Gravity Recoverable Gold
ha	hectare
HMY	High Mass Yield
IaM	Isle aux Morts
ICP	Inductively coupled plasma (geochemical test method)
IK	Indicator Kriging (block model type)
IP	induced polarization (geological survey method)
JV	joint venture
km	kilometre
kg	kilogram
kg/t	Kilograms per tonne
L	Litre
LCS	Local Coordinate System
LOI	Letter of Intent
LCM	Loose Cubic Metre



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<b>Abbreviation</b>	<b>Meaning</b>
m	metre
mm	millimetre
µm	micrometre
Ma	millions of years
Mt	millions of tonnes
N	north
NN	Nearest neighbour (block model type)
NLL	Newfoundland and Labrador
NPAG	Non Potentially Acid Generating
NSR	net smelter return
NTS	national topographic system
NW	northwest
oz.	Troy Ounces (1 troy oz. = 31.1034 g)
P. Eng.	professional engineer
P. Geo.	professional geoscientist
PABG	Port aux Basques Gneiss
PAG	Potentially Acid Generating
PEA	Preliminary Economic Assessment
Pb	lead
PMA	Particle Mineral Analysis
PMR	Potential Minable Resource
Ppm	parts per million
RSF	Rock Storage Facilities
QP	Qualified Person
S	south
S	sulphur
SE	southeast
SG	Specific Gravity
SMU	Smallest mining unit
SW	southwest
t	tonne (metric)
t/d	Tonnes per day
t/yr	Tonnes per year
TMF	Tailings Management Facility
UTM	Universal Transverse Mercator
VLF-EM	very low frequency electromagnetic survey
W	west
WCS	World Coordinate System
WDH	Windowglass Hill
WGHD	Windowglass Hill Deposit
WGHG	Windowglass Hill Granite



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<b>Abbreviation</b>	<b>Meaning</b>
WPG	Windsor Point Group
Zn	zinc



**Table of Concordance with CEEA 2012 Regulation SOR/2012-148 and  
 Project Description Guidance Document**

Regulation Clause	Guideline Section	Regulation SOR/2012-148 Requirement	Guidance to Support Regulation Requirement	PD Section(s)
<b>General Information</b>				
1	1.2 (a)	Name of the Project	Name of the designated project.	1.1
1	1.1	Nature of the Project	Nature of designated project.	1.4
1	1.1	Proposed location of the Project	Proposed location of project.	2.1
2	1.2	Name of the Proponent and contact information, and the name and contact information of their primary representative for the purpose to the project description	Provide proponent contact information: b) name of the proponent c) Address of the proponent d) Chief Executive Officer or equivalent (include name, official title, email address and telephone number) e) principal contact person for the purposes of the project description (include name, official title, email address and	1.2
3	1.3	A description of and the results of any consultations undertaken with any jurisdiction and other parties including Aboriginal peoples and the public	Provide a list of any jurisdictions and other parties including Aboriginal groups and the public that were consulted during the preparation of the project description. (A description of the result of any consultations is to be provided in Sections 6 and 7).	1.3
4	1.4	The environmental assessment and regulatory requirements of other jurisdictions	Provide other relevant information: a) Provide information on whether the designated project is subject to the environmental assessment and/or regulatory requirements of another jurisdiction(s).	1.5, 1.6
4.1	1.5	A description of any environmental study that is being or has been conducted of the region where the project is to be carried out	Provide information on whether the designated project will be taking place in a region that has been the subject of a regional environmental study.	5.0
<b>Project Information</b>				
5	2.1	A description of the project's context and objectives	Provide the following information to the extent that it is available or applicable: 1. Provide a general description of the project, including the context and objectives of the project.	1.4
6	2.2	The provisions in the schedule to the <i>Regulations Designating Physical Activities</i> describing the project in whole or in part.	2. Indicate the provisions in the <i>Regulations Designating Physical Activities</i> setting out the designated activities that describe the project in whole or in part.	1.6



Regulation Clause	Guideline Section	Regulation SOR/2012-148 Requirement	Guidance to Support Regulation Requirement	PD Section(s)
7	2.3(a)	A description of the physical works that are related to the project including their purpose, size and capacity	Provide a description of the components associated with the proposed project, including: a) Physical works with the designated project (e.g., large buildings, other structures, such as bridges, culverts, dams, marine transport facilities, mines, pipelines, power plants, railways, roads, and transmission lines) including their purpose, approximate dimensions, and capacity. Include existing structures or related activities that will form part of or are required to accommodate or support the designated project.	2.4,3.0
8	2.3(b)	The anticipated production capacity of the project and a description of the production processes to be used, the associated infrastructure and any permanent or temporary structures	Anticipated size or production capacity of the designated project, with reference to thresholds set out in the Regulations Designating Physical Activities, including a description of the production processes to be used, the associated infrastructure and any permanent or temporary structures.	3.0
	2.3(c)		If the designated project, or one of its components, is an expansion, describe the size and nature of the expansion.	N/A
9	2.3(d)	A description of all activities to be performed in relation to the project	A description of physical activities that are incidental to the designated project.	3.0
10	2.4	A description of any waste that is likely to be generated during any phase of the project and of a plan to manage that waste	Provide a description of any solid, liquid, gaseous, or hazardous wastes likely to be generated during any phase of the designated project and of plans to manage those wastes, including the following: a) Sources of atmospheric contaminant emissions during the designated project phases (focusing on criteria air contaminants and greenhouse gases, or other non- criterial contaminants that are of potential concern) and location of emissions; b) Sources and location of liquid discharges; and, c) Types of wastes and plans for their disposal (e.g., landfill, licensed waste management facility, marine waters, or tailing containment facility).	3.1,3.2



Regulation Clause	Guideline Section	Regulation SOR/2012-148 Requirement	Guidance to Support Regulation Requirement	PD Section(s)
11	2.5	A description of the anticipated phases of and the schedule for the project's construction, operation, decommissioning and abandonment	<p>Provide a description of the timeframe in which the development is to occur and the key project phases, including the following:</p> <ul style="list-style-type: none"> <li>a) Anticipated scheduling, duration and staging of key project phases, including preparation of the site construction, operation and decommissioning and abandonment,</li> <li>b) Main activities in each phase of the designated projected that are expected to be required to carry out the proposed development (e.g., activities during site preparation or construction might include, but are not limited to, land clearing, excavating, grading, de-watering, directional drilling, dredging and disposal of dredge sediments, infilling and installing structures).</li> </ul>	3.0, 3.1,3.2
12	3.0	A description of the Project's location, including	Provide a description of the designated project's location, including:	2.1
(a)	3.1	Its geographic coordinates	1. Coordinates (i.e., longitude/latitude using international standard representation in degrees, minutes, seconds) for the centre of the facility, or for a linear project, provide the beginning and end points.	2.1
(b)	3.1	Site maps produced at an appropriate scale in order to determine the project's overall location and the spatial relationship of project components	<p>2. Site map/plan(s) depicting location of the designated project components and activities. The map/plan(s) should be at an appropriate scale to help determine the relative size of the proposed components and activities.</p> <p>3. Map(s) at an appropriate scale showing the location of the designated project components and activities relative to existing features, including but not limited to:</p> <ul style="list-style-type: none"> <li>a) watercourses and waterbodies with names where they are known</li> <li>b) linear and other transportation components (e.g., airports, ports, railways, roads, electrical power transmission lines and pipelines)</li> <li>c) other features of existing or past land use (e.g., archaeological sites, commercial development, houses, industrial facilities, residential areas and any waterborne structures);</li> <li>d) location of Aboriginal groups, settlement land (under a land claim agreement) and, if available, traditional territory</li> </ul>	2.1, 2.3



Regulation Clause	Guideline Section	Regulation SOR/2012-148 Requirement	Guidance to Support Regulation Requirement	PD Section(s)
(b)	3.1	Site maps produced at an appropriate scale in order to determine the project's overall location and the spatial relationship of project components	<ul style="list-style-type: none"> <li>e) federal lands (as defined in CEEA 2012) including, but not limited to national Parks, national Historic sites, and reserve lands</li> <li>f) nearby communities</li> <li>g) permanent seasonal or temporary residences</li> <li>h) fisheries and fishing areas (i.e., Aboriginal, commercial and recreational)</li> <li>i) environmentally sensitive areas (e.g., wetlands and protected areas, including migratory bird sanctuary reserves, marine protected areas, National Wildlife areas)</li> <li>j) provincial and international boundaries.</li> </ul>	2.1, 2.3
(c)	3.2	The legal description of land to be used for the project, including the title, deed or document and any authorization relating to a water lot	Legal Description of land to be used for the designated project, including the title, deed or document and any authorization relating to a water lot.	2.3
(d)	3.1	The project's proximity to any permanent, seasonal or temporary residences	5. Proximity of the designated project to: <ul style="list-style-type: none"> <li>a) any permanent, seasonal or temporary residences.</li> </ul>	2.1.2
(e)	3.1	The project's proximity to reserves, traditional territories as well as lands and resources currently used for traditional purposes by Aboriginal peoples	<ul style="list-style-type: none"> <li>b) traditional territories, settlement land (under a land claim agreement) as well as lands and resources currently used for traditional purposes by Aboriginal peoples.</li> </ul>	2.1.3
(f)	3.1	The project's proximity to federal lands	<ul style="list-style-type: none"> <li>c) any federal lands.</li> </ul>	2.1.4
	3.2		Land and Water Use To the extent that is known at this time, describe the ownership and zoning of land and water that may be affected by the project, including the following: <ul style="list-style-type: none"> <li>a) Zoning designations</li> <li>b) current land ownership, including sub-surface rights</li> <li>c) Any applicable land use, water use (including ground water), resource management or conservation plans within and near the project site.</li> </ul>	2.1.5, 2.3
	3.2		<ul style="list-style-type: none"> <li>d) Describe whether the designated project is going to require access to, use or occupation of, or the exploration, development or production of lands and resources currently used for traditional purposes by Aboriginal peoples.</li> </ul>	N/A



Regulation Clause	Guideline Section	Regulation SOR/2012-148 Requirement	Guidance to Support Regulation Requirement	PD Section(s)
<b>Federal Involvement</b>				
13	4.0	A description of any financial support that federal authorities are, or may be, providing to the project	1. Describe if there is any proposed or anticipated federal financial support that federal authorities are, or may be, providing to the designated project.	N/A
14		A description of any federal land that may be used for the purpose of carrying out the project	2. Describe any federal lands (as defined per CEAA 2012) that may be used for the purpose of carrying out the designated project. This is to include any information on any granting of interest in federal land (i.e., easement, right of way or transfer of ownership).	N/A
15		A list of permits, licences or other authorizations that may be required under any Act of Parliament to carry out the project	Detail any federal legislative or regulatory requirements that may be applicable, including a list of permits, licences or other authorizations that may be required to carry out the designated project.	5.8
<b>Environmental Effects</b>				
16	5.1	A description of the physical setting	Using existing knowledge and available information provide an overview of the following:  1. A description of the physical setting, including the physical components in the area that may be adversely affected by the project (e.g., air, terrain, water).	5.0
16	5.1	A description of the biological setting	2 A description of the biological setting, including the biological components in the area that may be adversely affected by the project (e.g., fish, vegetation, wildlife, including migratory birds, and known habitat use).	5.0
17	5.2	A description of any changes that may be caused, as a result of carrying out the project, to	A description of any changes that may be caused as a result of carrying out the designated project to:	Table 5.4
(a)	(a)	Fish and fish habitat as defined in subsection 2(1) of the Fisheries Act	Fish and fish habitat, as defined in the Fisheries Act.	5.1.8.1; Table 5.4
(b)	(b)	Aquatic species, as defined in subsection 2(1) of the Species at Risk Act	Marine plants as defined in the Fisheries Act.	Table 5.4
(c)	(c)	Migratory birds, as defined in subsection 2(1) of the Migratory Birds Convention Act, 1994	Migratory Birds as defined in the MBCA, 1994.	Table 5.4





Regulation Clause	Guideline Section	Regulation SOR/2012-148 Requirement	Guidance to Support Regulation Requirement	PD Section(s)
18	5.3	A description of any changes to the environment that may occur, as a result of carrying out the project, on federal lands, in a province other than the province in which the project is proposed to be carried out or outside of Canada	A description of any changes to the environment that may occur, as a result of carrying out the project, on federal lands, in a province other than the province in which the project is proposed to be carried out or outside of Canada.	5.3.1: Table 5.4 (greenhouse gases)
19	5.4	Information on the effects on Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the project, including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance	A description of the effects on Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the designated project, including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is historical, archaeological, paleontological or architectural significance.	5.5
<b>Proponent Engagement and Consultation with Aboriginal Groups</b>				
	6.0		Provide the following information to the extent that it is available or applicable.	
	6.1		A list of Aboriginal groups that may be interested in, or potentially affected by, the designated project.	1.3
	6.2		A description of the engagement or consultation activities carried out to date with Aboriginal groups including:  a) names of Aboriginal groups engaged or consulted to date with regard to the project; b) date(s) each Aboriginal group was engaged or consulted; and, c) means of engagement or consultation (e.g., community meetings, mail or telephone).	1.3
	6.3		An overview of key comments and concerns expressed by Aboriginal groups identified or engaged to date, including any responses provided to these groups.	N/A
	6.4		A consultation and information gathering plan that outlines the ongoing and proposed Aboriginal engagement or consultation activities, the general schedule for these activities and the type of information to be collected (or, alternatively, an indication of why such engagement or consultation is not required).	N/A



Regulation Clause	Guideline Section	Regulation SOR/2012-148 Requirement	Guidance to Support Regulation Requirement	PD Section(s)
	6		The proponent is encouraged to provide background information on Aboriginal groups potential or established Aboriginal or treaty rights. The proponent is also encouraged to provide information on the impact area of the designated project and how it overlaps with uses by Aboriginal groups that have potential or established Aboriginal or treaty rights.	1.3
<b>Consultation with the Public and Other Parties (other than Aboriginal consultation included above)</b>				
	7.0		Provide the following information to the extent that it is available or applicable.	
	2		An overview of key comments and concerns expressed to date by stakeholders and any responses that have been provided.	1.3
	3		An overview of any ongoing or proposed stakeholder consultation activities.	1.3
	4		A description of any consultations that have occurred with other jurisdictions that have environmental assessment or regulatory decisions to make with respect to the project.	1.3
<b>Summary</b>				
20	8.0	A summary of the information required under Sections 1 to 19	...include an executive summary that summarizes the information identified in Sections 1 to 7 of this Guide. The executive summary is to be prepared and submitted to the Agency in both English and French.	Project Description Summary Document
N/A – Not Applicable				

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## 1. Introduction

Nordmin Engineering Ltd., (Nordmin) in a joint venture agreement with Benton Resources Inc. (Benton) is proposing to develop a gold and silver mine and milling complex – the Cape Ray Gold Partnership Project (Project) at the Cape Ray exploration site in southwestern Newfoundland. The site is located southeast of the Isle aux Morts River and approximately 20 kilometres north of the village of Isle aux Morts and 30 km north of the town of Port aux Basques.

The Cape Ray Project represents the construction and operation of a proposed gold/silver mine and mill along with the construction/upgrading of an existing 22 km access road to the site from highway 470. The proposed ore production capacity will be approximately 600 t/d from underground operations and 1500 t/d from open pit mining. The mill processing rate will be approximately 850 t/day with a capacity of 950 t/d.

This Project Description/Registration report serves to register the Project under the Government of Newfoundland and Labrador (NLL) *Environmental Protection Act* (2002) and *Environmental Assessment Regulations* (2003). It provides the required Project details to the Newfoundland Department of Environment and Conservation in order that a decision and guidance can be given on this undertaking with respect to the Environmental Assessment (EA) processes necessary to allow the project to proceed subject to terms and conditions and applicable permits or if further EA obligations must be met.

It is also understood that this Project Description document will be forwarded to the Canadian Environmental Assessment Agency (CEAA) for review and comment so that harmonization can be achieved early in the EA process should the Project be subject to *the Canadian Environmental Assessment Act* (CEAA 2012) and the *Regulations Designating Physical Activities* (2014).

This Report is based, in part, on site visits by Nordmin and Benton personnel, internal company technical reports and maps, published government reports, company letters and memoranda, public information, documented results concerning the project and discussions held with technical personnel from the company regarding all pertinent aspects of the project as listed in Section 8.0 References of this report. Several sections from reports authored by other consultants have been directly quoted in this report, and are so indicated in the appropriate sections.

### 1.1 Project Name

Cape Ray Gold Project

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## 1.2 Proponent Information

Nordmin Resource and Industrial Engineering Ltd. is the sole proponent of this project and is the sole entity that will be carrying out the project. Founded in 2005 with a corporate office at:

160 Logan Ave.  
Thunder Bay, ON, Canada  
P7A 6R1  
Tel: (807) 683 – 1730 Fax: (807) 683 – 1744  
[www.nordmin.com](http://www.nordmin.com)

The company has grown from a single office to three. Thunder Bay ON is the main office with branch offices in Sudbury ON and Kamloops BC included in the business unit. Nordmin employs more than 120 personnel and continues to expand.

The mining sector has been the main focus of the company, but we hold expertise in Pulp and Paper, Energy, Electrical Power Distribution, and other Industrial Sectors. The company is multi-disciplinary and includes experts practicing in all the major disciplines including Mining, Metallurgy, Civil/Structural, Mechanical/Piping, Chemical, Electrical/Power, Electrical/Controls and Automation, Environmental Management and Geology.

Most recently, Nordmin undertook a merger with NordPro, its former subsidiary Company that is focused on Construction and Operational Management. This has allowed us to offer a full EPCM package to Clients worldwide.

Benton and Nordmin have formed a joint venture pursuant to which Nordmin will have the right to earn up to a 50% interest in the Project through a series of expenditures and services to be provided.

Nordmin will provide the procurement, project and construction management for the Project, including commissioning and start-up. The costs and fees associated with this effort will be part of the Project financing.

Nordmin must spend a minimum of \$4.5 million of expenditures and equivalent services, with any excess going towards Project development.

The intent is that the work proposed within the agreement will be completed in a minimum of three (3) years and a maximum of five (5) years, dependent upon market conditions or other outside and uncontrollable situations.

### Proponent contact information:

Chris Dougherty  
President and CEO  
Email: [chris.dougherty@nordmin.com](mailto:chris.dougherty@nordmin.com)  
807 683 1731

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Principal contact person for the purposes of the EA:

Giovanni (John) Sferrazza  
Director, Environmental Services  
Email: [john.sferrazza@nordmin.com](mailto:john.sferrazza@nordmin.com)  
705 688 0404  
289 213 3306 (mobile)

### 1.3 Consultation Overview

Nordmin has identified the following government agencies, Aboriginal groups and other public stakeholders with whom Project consultation or notification would likely be required. They are listed below. In addition, staff at the Canadian Environmental Assessment Agency in Halifax, the Newfoundland and Labrador Environmental Assessment Agency and previous consultants involved in past studies of the Project site were consulted in the preparation of this Project Description report and their feedback was taken into consideration in the completion of this document. No other consultation has taken place to date with respect to the EA for this Project.

A final list of government agencies, aboriginal communities and stakeholders to be notified or consulted will be issued by CEAA and the Government of Newfoundland and Labrador.

Federal Government:

- Canadian Environmental Assessment Agency;
- Fisheries and Oceans Canada;
- Environment Canada;
- Natural Resources Canada; and,
- Transport Canada – Navigable Waters Protection Act

Provincial Government:

- Government of Newfoundland and Labrador – Environmental Assessment Division;
- Government of Newfoundland and Labrador – Department of Natural Resources;
- Service Newfoundland; and,
- Labrador and Aboriginal Affairs Office

Local Governments:

- Town of Isle aux Morts;
- Town of Port aux Basques; and,
- Town of Rose Blanche

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Aboriginal Communities:

- The Mi'kmaq Community;
- The Qalipu First Nation; and,
- The Miawpukek First Nation

With respect to consultation with Aboriginal organizations, Nordmin will work closely with the Labrador and Aboriginal Affairs Office (LAAO) to establish consultation guidelines and a list of communities that will be consulted with. Further, we will also follow the Government of Newfoundland and Labrador's Aboriginal Consultation Policy on Land and Resource Development Decisions (April 2013).

Other Stakeholders or Interested Parties:

- Local outfitters and other interested persons or groups

## 1.4 Rationale for the Project

The Cape Ray Fault Zone north of Port aux Basque is a small undeveloped mineralized zone containing gold, silver, lead, zinc and copper.

The proposed mineable area includes the deposits of 04, 41, 51 and Windowglass Hill (WGH) more details are given in Section 2. The Isles aux Morts River flows through the property and separates WGH deposit from the others. The Isles aux Morts River flows south from the Cape Ray Fault Zone into the ocean. The footprint of the possible mineable area claims is approximately 18 km<sup>2</sup> and would include infrastructure such as mine stockpiles, processing facilities, tailings facilities, mining areas and office facilities.

A PEA was prepared for this project in April of 2016, which indicated a potential minable resource estimated at 1,701,487 tonnes averaging a combined grade of 4.6 g/t gold and 4.8 g/t silver. Open pit potential minable resource made up 836,014 tonnes with anticipated dilution of 10% and mine losses of 5%. The remaining 865,473 potential minable resource tonnes from underground methods include dilution of 20% in longhole stoping and 10% in cut and fill with mine losses of 5% applied.

Mill recovery rates based on preliminary test are estimated to be 97% resulting in 250,000 ounces recoverable gold and 45% resulting in 260,000 ounces recoverable silver.

Nordmin and Benton in a Joint Venture Agreement propose to develop, operate, decommission and reclaim a gold and silver mine, mill and processing operation at the Cape Ray site. The project includes the extraction and processing of gold and silver bearing ore from the Cape Ray Deposits to produce gold and silver dore bars for commercial sale. Dore bars will be transported off the project site by armoured vehicles and brought to Port aux Basques for shipment to market.

The project would bring much needed economic benefits to the region. The recent downturn in



the economy reinforces the need for resource development projects of this nature and economic development in Port aux Basque area. Based on preliminary community discussions and past history, there is a strong community support for the Project. The proposed Project would directly create approximately 100-150 jobs (at peak) during construction and approximately 30 full-time jobs during operations. The Project presents an opportunity for significant economic benefits to the region, local communities, and the province.

The alternatives to the Project are the no-go scenario and termination of the project. The no-go scenario is an alternative that would be evaluated upon completion of the prefeasibility and feasibility studies in 2017. Project viability would be assessed based on a number of factors, including economic and technical feasibility, and predicted environmental and socio-economic effects. A no-go decision would therefore mean that potential environmental impacts cannot be mitigated, or that the economic benefits to the community, region, and province, may not be realized.

## 1.5 Environmental Assessment Processes and Requirements

In the province of Newfoundland and Labrador, proposed resource development projects may be subject to provincial and/or environmental assessment legislation.

Under the provincial *Environmental Protection Act (EPA, 2002)*, the proponent of a project that could have significant effects on the natural, social or economic environment is required to register this project or undertaking for examination under the provincial EA process. Under the *EPA* the project or undertaking is subject to Part 10 of the *EPA* and pursuant to Section 33(2) of the associated *Environmental Assessment Regulations (EAR, 2013)* which states:

*33(2) "An undertaking that will be engaged in the mining, beneficiating and preparing of a mineral as defined in the Mineral Act whether or not these operations are to be performed in conjunction with a mine or at mills that will be operated separately shall be registered."*

Following a 45 day public and governmental review of this EA Registration, the Minister of Environment and Conservation will make a determination whether the project may proceed, subject to terms and conditions or if further EA review and obligations are warranted.

The Cape Ray Gold Project has already undergone the 45 day public and ministerial review and it was concluded that an EIS will be required under the provincial *Environmental Protection Act* and Draft EIS Guidelines have been issued.

Under *CEAA 2012*, if the project or undertaking is captured by the Regulations Designating Physical Activities, a project description must be submitted which then undergoes a 45 day screening process to determine if a federal EA is required.

This Project Description has been developed to satisfy *Canadian Environmental Assessment Act* requirements, as the Cape Ray Gold Project meets the definition of a designated project that may

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require a federal EA, pursuant to the *Regulations Designating Physical Activities*. This regulation identifies that gold mines with ore production capacity of 600 t/d or more, as stated in Section 16(c) of the Act : *The construction, operation, decommissioning and abandonment of a new rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 t/day or more.*

As the Cape Ray Gold Project exceeds the ore production capacity thresholds described in the *Regulations Designating Physical Activities*, a Project Description is being submitted to the CEA Agency for determination of whether a federal EA is required. The proposed mine is not a component of a larger project or the expansion of an existing project.

## **1.6 Purpose of the Registration**

This project description document serves to satisfy both the provincial and federal requirements for the registration of resource development projects and is intended to formally initiate the review process for both levels of government.

It has been prepared and submitted by Nordmin pursuant to the requirements of the Newfoundland and Labrador *EPA*, CEEA 2012 and the *Prescribed Information for the Description of a Designated Project Regulations (SOR/2012 – 148)*.

In addition to EA approvals, the project may also require other federal, provincial or municipal authorizations and permits. These are outlined in subsequent sections of this document.



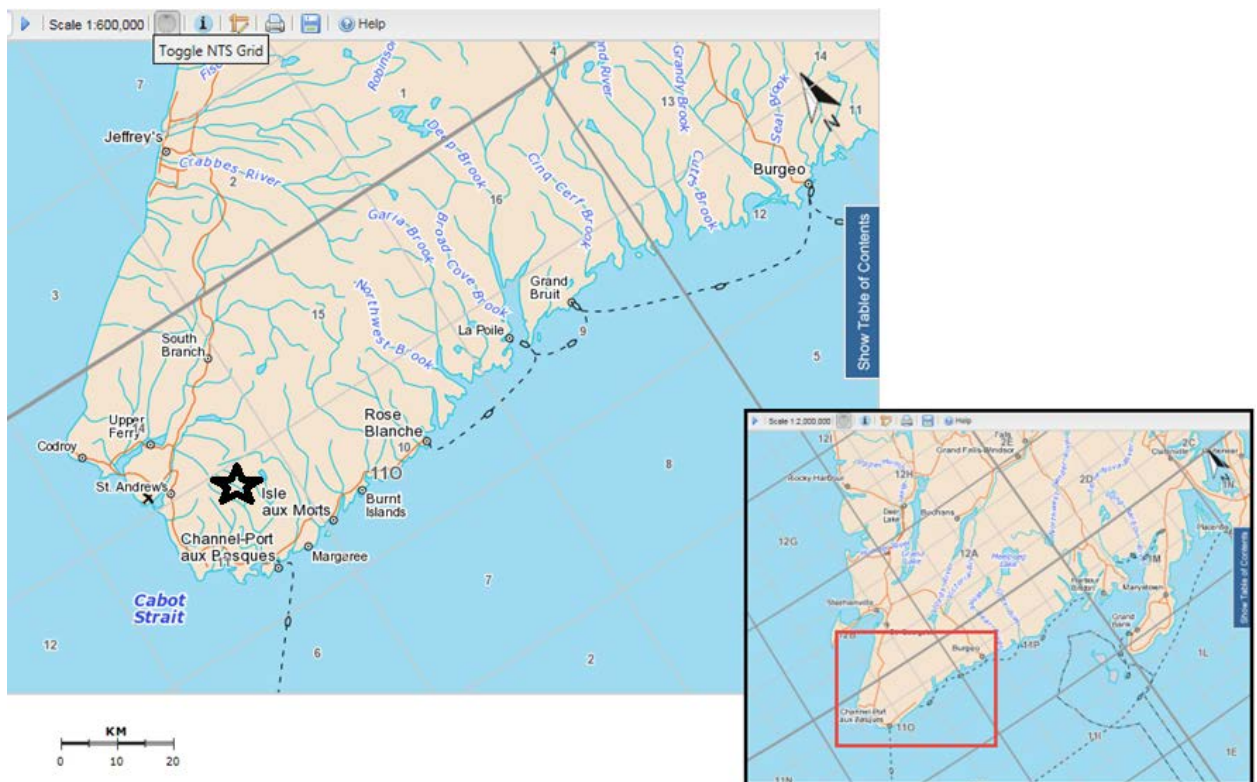
## 2. Project Description

The following sections briefly describe the project location, geographic setting and land tenure status.

### 2.1 Property Description and Location

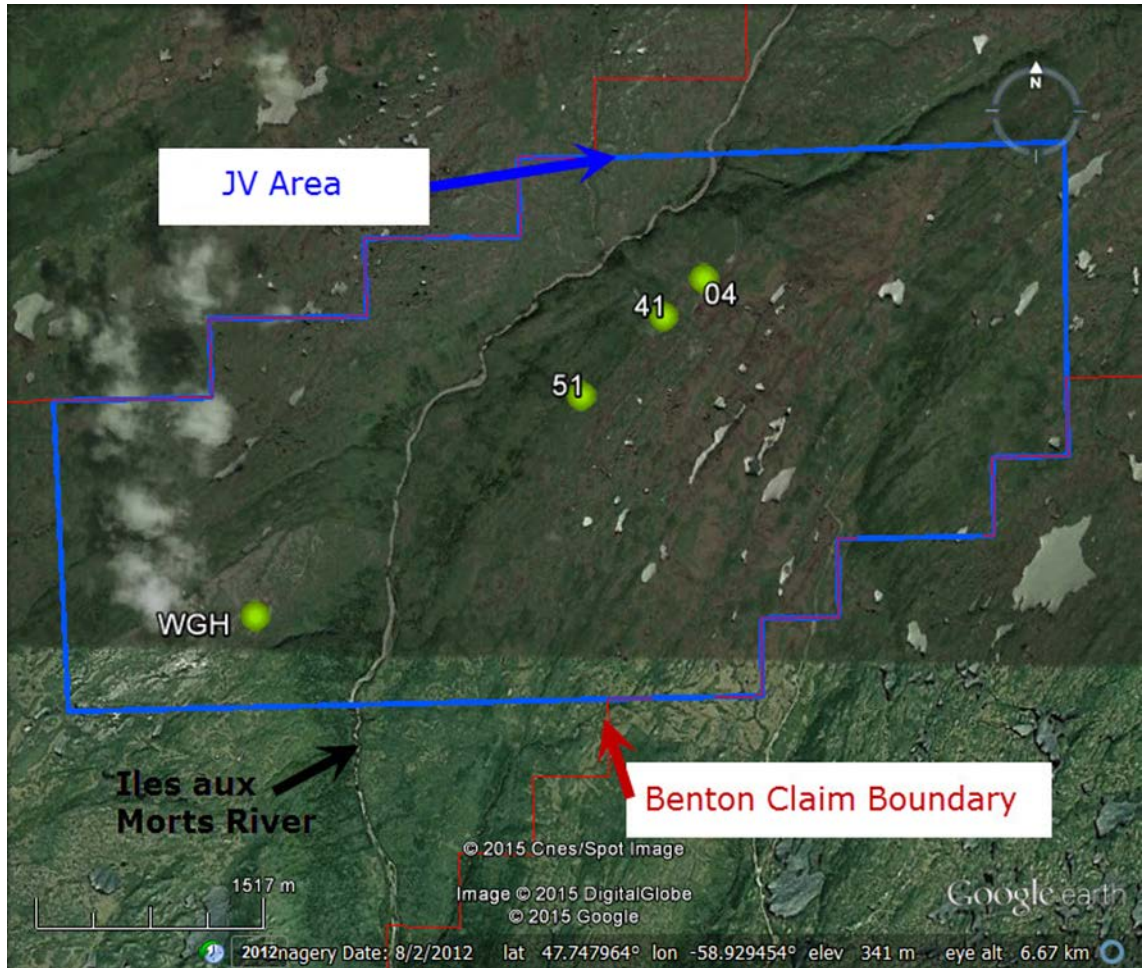
The Cape Ray Property is located approximately 25 km northeast of the town of Channel-Port aux Basques Newfoundland, as shown in Figure 2.1 below. Coordinates for the centre of the Project site are:  $47^{\circ} 45'23.82''N$  and  $58^{\circ} 55'16.92''W$  at an elevation of 332 m.

The property covers portions of 1:50,000 NTS map sheets 110/10, 110/11, and 110/15.



**Figure 2.1 Cape Ray Project Location**

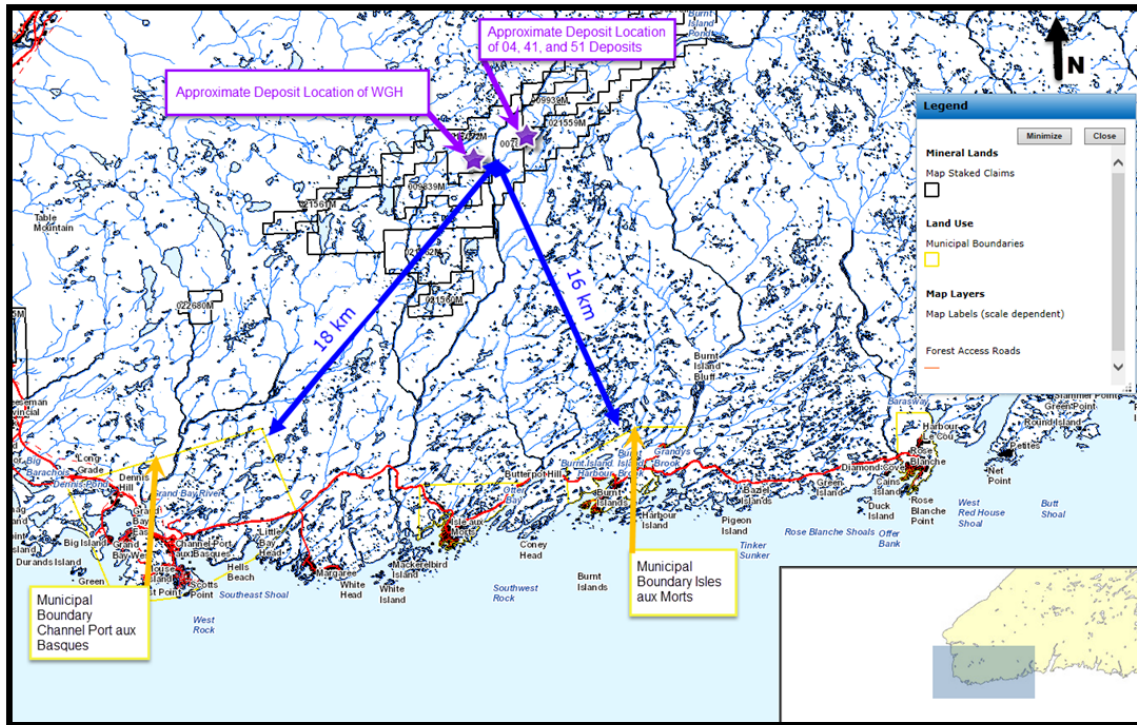
The proposed mineable area includes the deposits of 04, 41, 51 and Windowglass Hill (WGH) shown in Figure 2.2 has the centroid of -58.9° Longitude and 47.8° Latitude. The Isles aux Morts River flows through the property and separates WGH deposit from the others. The Isles aux Morts River flows south from the deposits into the ocean and is a Scheduled Salmon River. The footprint of the possible mineable area claims as shown in Figure 2.2 would be the area potentially affected by mining operations. Mine stockpiles, processing facilities, tailings facilities, mining areas, and office facilities would be contained within this area of approximately 18 km<sup>2</sup>.



**Figure 2.2 Deposit Locations within Claim Boundary**

### 2.1.1 Proximity to Municipalities

The closest municipality to the Cape Ray deposits is Isles aux Morts, which is approximately 16 km away as shown in Figure 2.3.



**Figure 2.3 Nearest Municipalities**

Access to the Cape Ray site is by gravel road, which is off highway 470 just outside of the town of Isle aux Morts and is around 22 km long as shown in Figure 2.4

### 2.1.2 Proximity to any Permanent, Seasonal or Temporary Residences

The Project is currently within approximately two kilometers of the nearest Seasonal or Temporary Residence as illustrated in photo below. There are also approximately 20 seasonal dwellings such as this along the mine access road and they are primarily used only during the hunting season. The location of these seasonal dwellings will be mapped and the owners of the dwellings will be notified of all project activities as part of the Public Consultation Process.





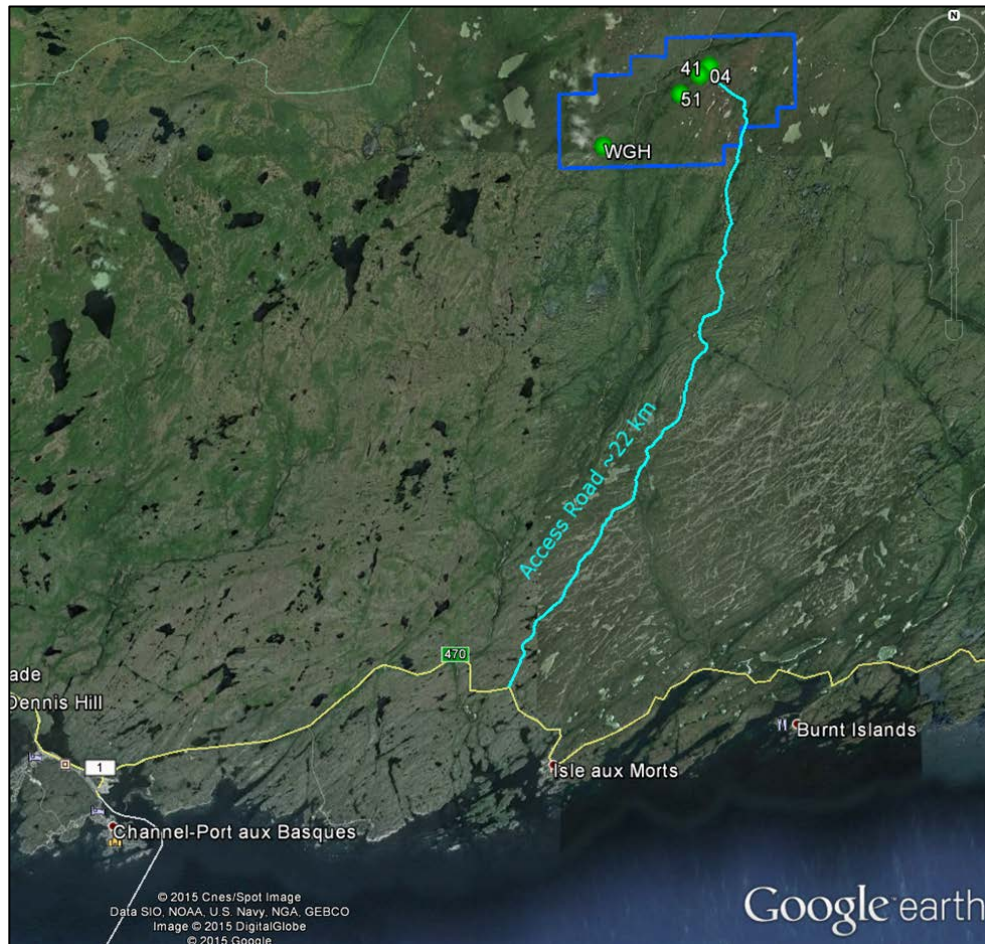
**Photo 2.1** Seasonal Dwelling shown in the background proximate to Project area

### **2.1.3 Proximity to any Aboriginal Traditional Lands, Sites or Communities.**

The most proximate Aboriginal community to the Project site is the Miawpukek community in Bay d’Espoir, formerly known as the “Conne River”. It is approximately 230 kilometres to the east of the Project site. It is not known at this time if the Project site is proximate to any traditional territories, archaeological sites, lands or resources currently being used for traditional purposes by Indigenous Peoples. This information will be acquired as part of the baseline studies proposed to support the EA.

### **2.1.4 Proximity to Federal Lands**

The closest federal land holdings to the Project site is the sea port of Port aux Basques which is approximately 25 kilometres to the southwest.

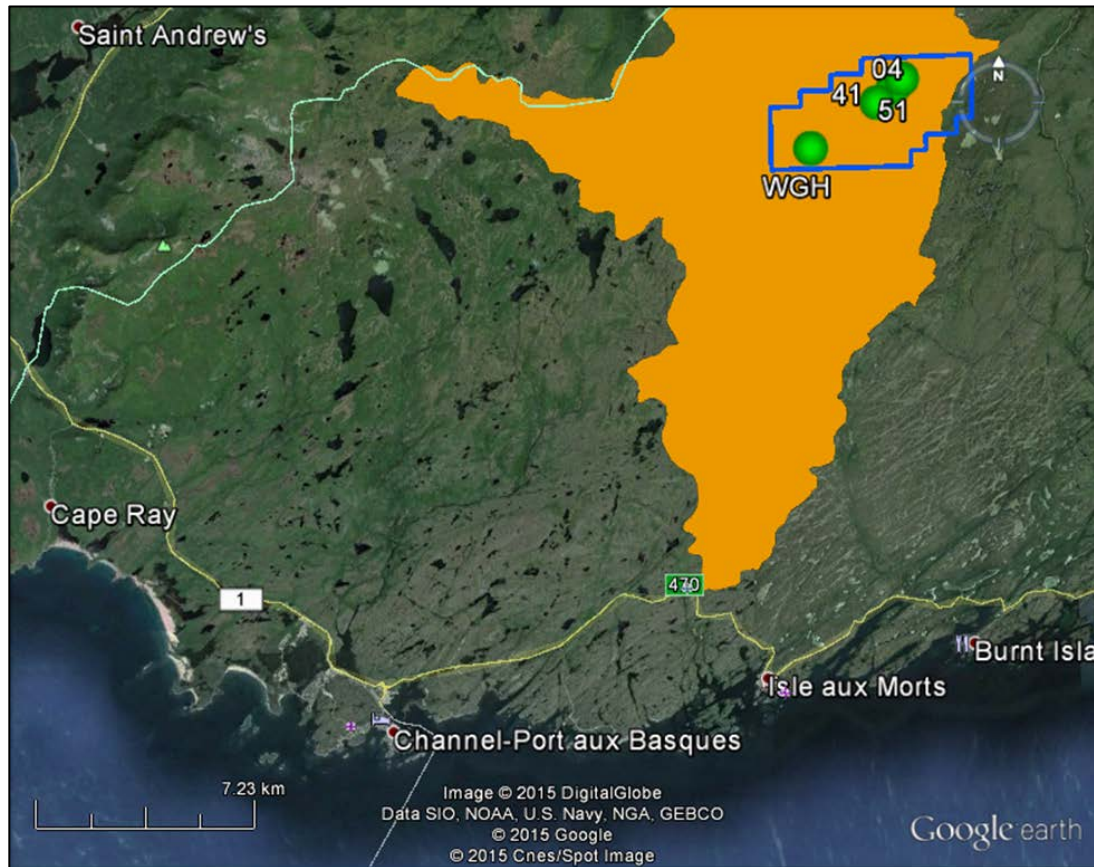


**Figure 2.4 Site Access**

### 2.1.5 Proximity to Surface Waters

The main watershed of the site area is the Isles aux Morts River watershed, which has provincial monitoring stations recording watershed data. All of the deposits, which are being considered for mining, fall in this watershed shown in Figure 2.5.

The Isle aux Morts River is a Scheduled Salmon River and as such is subject to special management procedures and protection by the Newfoundland and Labrador Department of Natural Resources.



**Figure 2.5 Deposits Location within Isles Aux Morts River Watershed**

## 2.2 Alternatives to the Project

Benton Resources is actively exploring and evaluating other mineral deposit targets in the immediate area surrounding the Cape Ray deposits.

Should the PEA show that the project is not economically viable to mine, extract and process the minerals, particularly gold, the alternative is to do nothing until such time as market conditions change.

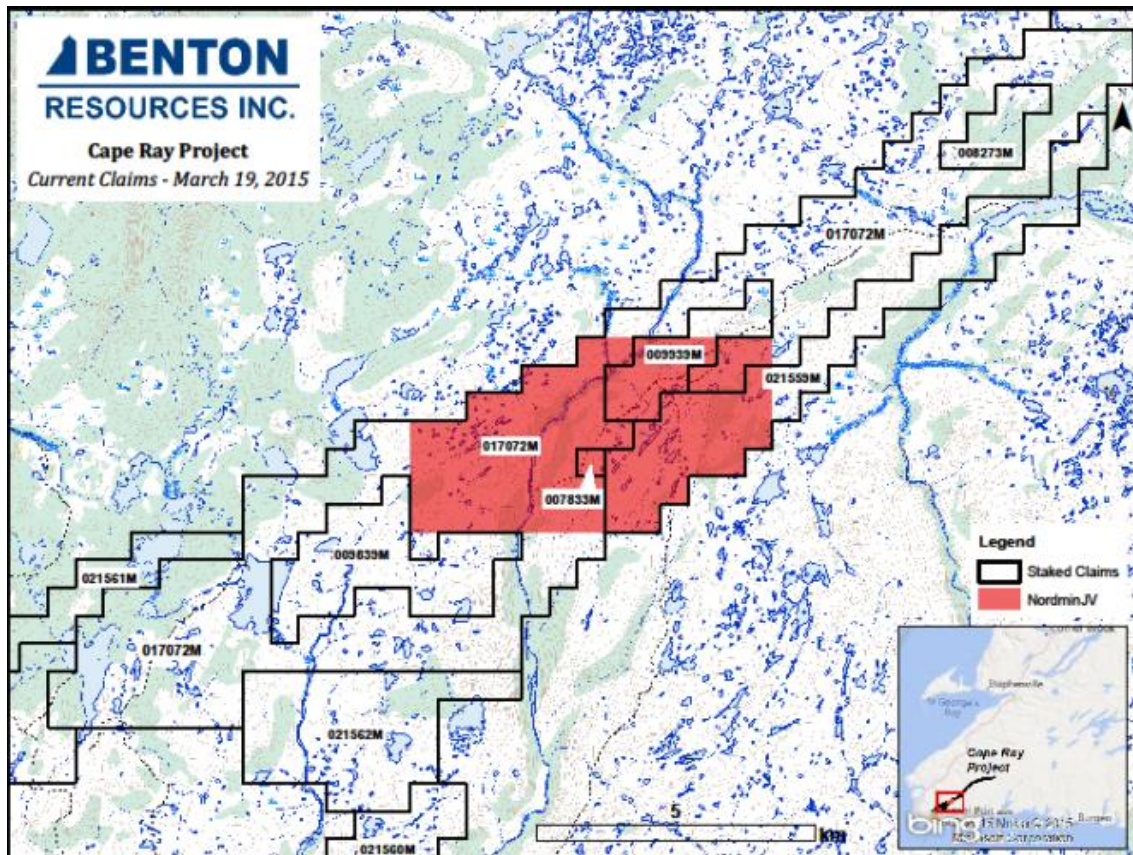
Other alternatives include continued exploration activities to further solidify resource, reserve estimates and continue with the PEA and feasibility studies.



### 2.3 Land Tenure

As of December 11, 2015, Benton is the holder of 1169 claims in Newfoundland and Labrador. In the Cape Ray area, Benton holds approximately 355 claims.

Benton acquired 100% interest in the Cape Ray Property on October 3, 2014 and entered into a joint venture agreement covering a portion of the property with Nordmin Engineering on January 20, 2015. The claims in the Cape Ray area cover the deposits which are a part of the Nordmin joint venture (JV) as shown in Figure 2.6 below.



**Figure 2.6 Nordmin-Benton JV Zone within Cape Ray Claims**

A listing of the Cape Ray claims and their associated royalties are below in Table 2.1.

**Table 2.1 Cape Ray Claims held by Benton Resources Inc. as of December 11, 2015**

Licence #	Known Deposit	# of Claims	Area (km <sup>2</sup> )	Royalty
017072M	Windowglass Hill (WGH) and 51	183	45.70	(a) & (b)
021560M	-	14	3.50	none
020641M	-	10	2.50	none
021561M	-	16	4.00	none
021559M	-	44	10.99	none
007833M	-	1	0.25	none
021562M	-	34	8.49	none
008273M	Isle aux Morts (IaM)	7	1.75	(c)
009839M	Big Pond (BP)	26	6.49	(c)
009939M	04 and 41	12	3.00	(c)
022680M	-	8	2.00	none

The Crown holds all surface rights in the Project area. None of the property or adjacent areas are encumbered in any way. The area is not in an environmentally or archeologically sensitive zone and there are no aboriginal land claims or entitlements in this region of the province.

There has been no commercial production from the property as of the time of this report.

## 2.4 Overall Project Development and Production Schedule

The proposed Project schedule would begin with the open pit mining of the 41 deposit. The 41 open pit would take approximately 2 years to complete and generate approximately 500,000 tonnes of mill feed and 6.4 Mt of waste that would be made available for underground backfill. The 41 pit would supply initial feed to the mill and surface stockpile. The 04 underground deposit ramp would start shortly after mill feed from the 41 open pit is established. The 04 underground capital development would take one year to complete with production from the 04 SLS and cut & fill beginning in year 2. Production from the 04 underground would take 2.5 years producing approximately 480,000 tonnes of mill feed.

Once the 41 open pit is complete, towards the end of year 2, the 41 pit crew and equipment would move to the WGH deposit. The WGH open pit would take approximately 3 years to mine producing approximately 325,000 tonnes of mill feed and generating 1.9 MT of waste rock. The WGH open pit mining would be complete early in year 6 and the contractor pit crews and equipment would demobilize at this time.

With the 04 underground deposit mined out in year 4, the underground crews and equipment would move to the small area under the 41 open pit. Once the 41 underground development is completed, the crews and equipment would move to the 51 deposit. The 41 underground would start production and generate mill feed in year 5. The 51 underground deposit would be complete in year 6. The 51 and 41 underground deposit would generate approximately 350,000 tonnes and 45,000 tonnes of mill feed respectively over a 2 year period. A 6 year life of mine is envisaged.



The proposed plan is to operate the open pits for 6 months of the year, from May to November with a maximum production rate of approximately 1,500 t/d of ore for mill feed with the surplus stockpiled by the mill. The annual open pit production is anticipated to be 285,000 tonnes per year.

The underground deposits would be mined year round with an anticipated maximum production rate of 600 t/d or ore for mill feed for an annual production rate of 174,000 tonnes.

The total feed to the mill over the 6 year mine life would be 1.7 Mt and would be processed by the mill at a rate of approximately 850 t/d or 285,000 tonnes per year (see Table 2.2).

**Table 2.2 Production schedule (Potential Mineable Resources, in thousands)**

Production Schedule	Yr. -2	Yr. -1	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6	Recovered Diluted Tonnes Total	Au Avg (g/t)	Ag Avg (g/t)
Pit 41	-	-	288	215	-	-	-	-	503	3.12	10.31
U.G 04	-	-	-	33	227	219	-	-	479	5.99	14.07
Windowglass	-	-	-	10	59	90	134	35	328	2.24	2.68
U.G. 51	-	-	-	-	-	-	128	219	347	7.29	14.21
Other (41 U.G. / 51 Trench)	-	-	-	-	-	-	44	-	44	6.89	5.24
<b>Total</b>	-	-	<b>288</b>	<b>258</b>	<b>286</b>	<b>309</b>	<b>306</b>	<b>254</b>	<b>1,701</b>		

### 2.4.1 Pit Conceptual Plans

The 41, WGH and 51 trenches would be mined by open pit. Based on the limited geotechnical data available the pit walls would be at a maximum of 48 degrees. The 41 deposit is less than 1km from the proposed mill site and would be mined first for mill feed. The 51 trench and the WGH pit would follow the 41 pit. Approximately 3.5km of haul road would be constructed to access the pits. A free span steel bridge would also be required to cross the Isle Aux Morts River to access the WGH pit.

Figure 2.7 shows the conceptual mine and mill site layout and pit locations. The proposed open pits are conventional operations that use demonstrated technology and equipment for drilling, blasting, loading and haulage. A mine contractor would supply the needed labour and equipment for the open pit operation. The pit contractor would also manage and supply all explosives and blasting accessories. The pit contract crews and equipment would also construct the haul road.

Due to the extreme snowfall, in this area it is envisaged that open pit mining operations would be limited to 6 months of the year. The anticipated open pit production rate would be in the 1,500 t/d range with mineralized ore transported to the mill and surface stockpile. During the winter months, mill feed would come from underground and the surface stockpile of pit ore.

Conceptual pit and Rock Storage Facility (RSF) layouts were created for each deposit. It should be noted that these layouts are based on high-level design studies and are subject to change when

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more data becomes available.



## 2.4.2 Mine Production Schedule

Before production can begin, site preparation must be completed. This includes improving the current access road, building mill and power generation facilities and expanding on administrative amenities. During this time, pre stripping for the first deposit will take place, as well as construction of the Tailings Management Facility (TMF). It is estimated that preproduction construction would take approximately 1.6 years.

Pre-production mine development and construction for underground requires approximately 1.6 years that would be performed by a mining contractor. Initially, one crew would drive the main ramp for the 04 deposit from surface with the second crew starting as soon as the first access level is reached. The two development crews would drive the ramp system, SLS haulage and the cut and fill drifts. The 51 underground would follow in sequence as labour and equipment could be released from the 04 deposit. The anticipated life of mine for underground mining is 4 years operating 350 days per year at the following mining rates.

**Table 2.3 Expected Production Rates**

Single Headings	Rate
Ramp and lateral development	5.2m/d
Multiple Headings	
Cut and Fill development (2 crews D/S, 2 crews N/S)	14.4m/d (Production)
Cut and Fill backfilling	600t/d

The 41 underground potential mineable resources would be mined once the 41 open pit is complete. The 41 deposit would be mined in conjunction with the 51 underground deposit. The 41 underground is only 39,000 tonnes of resource.

It is anticipated that each deposit would be developed and mined individually with a maximum of two pits being mined at once. However, to accommodate the processing requirements blending of feed from different pits may be required. Stockpiling of feed materials would be minimal.

Due to the proximity to the suggested mill site, the main deposits (04, 41, & 51) will be developed first as they are all less than 1 km from the mill site. It should be noted that haul road construction for WGH would need a longer time frame, due to the distance from the milling facilities.



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### 3. Project Phases

Development of the Project falls into three major phases,

1. Construction and Development
2. Production, Operation and Maintenance
3. Closure and Reclamation

Construction consists of pre- production development of the Project. The first target will be to improve the current access road from Highway 470 to site, to allow for increased traffic. In addition, mill and power generation facilities will have to be constructed and administration buildings will require expansion. During this time site clearing of vegetation and overburden will take place for the initial pit.

Production activities include extracting ore from the pit and hauling it to the mill to be processed. Waste rock will also be hauled from the pits, and placed in the pit side RSF. As each pit nears completion, prestripping and road construction for the next scheduled pit will take place.

It is anticipated that traffic by normal vehicles and heavy transport trucks along Hwy 470 and the mine access road during the construction phase will peak at approximately 10-15 vehicles per hour or an increase of approximately 15%. During production phase this will decrease to approximately 8-10 vehicles per hour (heavy trucks, ore haulers) along the mine access road and haul roads. Normal vehicular traffic along Hwy 470 will be approximately 5-8 vehicles per hour on average over a 24 hr period during the production phase.

Reclamation activities will follow the mining sequence. Once environmental studies are completed, exact requirements and methods required for reclamation will be determined, but in general, each RSF will either be reclaimed by sloping and seeding, or by rehandling waste rock back into the pit.

Before closure, the mill, administration and power generation site will have to be reclaimed and the TMF prepared for care and maintenance.

#### 3.1 Construction and Development

As outlined in Section 3, the first project phase would be construction development to prepare the site for production. This phase would begin immediately upon the release of the Project from EA obligations, the issuance of the appropriate permits for start of construction and the completion of the upgrades to the site access road. This phase of the Project is expected to take approximately 24 months to complete with a completion date of June 2019

The 22 km access road from Highway 470 to site will be upgraded to facilitate transport passage. The road will be widened, leveled where grades exceed 10% and capped. Improved access will allow staff, goods and materials to be transported efficiently and safely. Road improvements will be the first priority. The road, in its current state, would be a costly bottleneck for other



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construction activities.

Temporary mobile trailers would be used for the office, shop, warehouse and dry facilities. The trailers will be brought to site by truck and assembled in place. There will be no camp facilities on site as the work force would commute from local towns.

Other site services include a power generation plant, with its associate fuel farm and a sanitation system. The power generation facility will require a coverall building with concrete foundation.

The milling complex will consist of a steel frame building with a concrete foundation and it will house the assay lab.

It is estimated that the entire project footprint including the mine and mill complex, TMF and administrative buildings will occupy approximately 1 km<sup>2</sup>.

A TMF will be required to impound rejects from the process stream. As described in Section 3.2.3, previous studies for design are being reviewed and will be updated for final process design and production rate. The impoundment will be a rock fill dam, with Non Potentially Acid Generating (NPAG) construction material coming from the pits.

As mentioned previously, overburden clearing would be performed as each pit is developed. To the extent possible overburden amounts will be stockpiled for use during reclamation to restore disturbed areas. Details on overburden handling can be found in Section 3.2.1.2

The site complex would have one week of provisions for workers in the event of a road closure.

### **3.1.1 Mine Infrastructure**

Various infrastructure would be required to bring the Project into production as part of the Construction and Development phase.

Currently there is no permanent infrastructure at the Cape Ray Property. There is evidence of previous exploration work including drilling, trenching, and bulk sampling via a portal and drift at the 41 Deposit. Electrical and telephone lines do not extend to the Cape Ray Property and the nearest high voltage electrical substation is located about 25 km to the southwest in the community of Channel-Port aux Basques.

Presently mobile portable camp trailers on the Cape Ray Property require the use of gas generators and propane for heat and cooking. Fuel is brought in portable tanks via the access road since the quantities used are small. To support activity on the property a sewage system and water supply system is required along with the appropriate certificate of approvals.

All areas covered by the PEA occur on crown lands owned by the Province of NLL. The development of any future mining operations in this area must follow provincial permitting requirements.

The project area is surrounded by an abundance of barren land that is not populated except for a few seasonal cottages within the claim boundary. Considering the local economy, and the ideal



location, it is anticipated that the NLL government would be favorable to the development of a new mining project, provided all of the environmental, socio-economic, and permitting issues were addressed properly.

The abundance of surface water resources from lakes on the Cape Ray Property is a positive factor for future development, as is the presence of deep water wharf facilities and commercial shipping infrastructure at nearby Channel - Port aux Basques (<50 km driving distance) (Ténière & Hilchey, 2012).

The main infrastructure required for the Cape Ray project includes:

- Admin buildings and dry
- Processing Plant (Mill)
- Tailing Management Facility (TMF) with Treatment plant and CN Destruction plant.
- Road and culvert upgrades
- Free span bridge, C200 bridge x 5.25m width, c/w epoxy aggregate steel decks.
- Electrical and Communications systems
- Support Services
- Waste and Ore pad

### **3.1.2 Processing Plant (Mill)**

The Mill would process ore at a rate of 850 tonne per day (t/d) with an anticipated annual capacity of 285,000 tonnes. During the winter months underground would supply feed to the mill with supplemental feed drawn from the stockpile, outside the mill. The mill would house the assay lab, dry, office, first aid station and a lunch room.

Run of mine PMR would be delivered to the mill feed stockpile at a rate of 1000 t/d for six to seven months of the year from the open pit while underground production would continue throughout the year. The proposed processing rate is 36 t/h or 850 t/d with the mill operating at 92 % availability 365 days per year. ROM (Run of Mine), at 203.2 mm, is first reduced to – 25.4mm in a single jaw crusher. Further size reduction to 12.7mm is achieved in a series of two gyratory cone crushers operating in closed circuit with a double deck screen. The crushed product is stockpiled ahead of the grinding circuit and is then fed to grinding via a primary grinding mill feed conveyor.

Size reduction from – 10 mm to 80 % passing 100 microns is achieved in the grinding circuit. Crushed product is fed to two parallel primary ball mills at 36 t/h. Primary mill discharge is directed by a screen and the screen underflow reports to a pair of gravity concentrators for recovery of any coarse free gold. The screen oversize reports back to the primary mill feed. The gravity concentrator tailing reports to the secondary grinding circuit for further size reduction before reporting to the CIL circuit thickener.

Prior to cyanide leaching of the contained gold in the PMR, the pulp is thickened to 45 % solids by weight using the CIL pre-leach thickener. The thickened pulp is advanced in the CIL circuit at the full process flow rate of 36 t/h solids. In the CIL circuit, gold is recovered from the solids using whole cyanidation and the gold is transferred to the surface of the activated carbon. The activated



carbon is separated from the main pulp flow by a combination of pumping and screening. The loaded carbon is washed with hydrochloric acid solution to remove the carbonates. Gold is then removed from the loaded carbon using pressure stripping. The gold is transferred from the surface of the loaded carbon to solution and from there is recovered to marketable form using the electro winning process.

The stripped carbon is regenerated in a reactivation kiln before being reintroduced to the process. Fine carbon is constantly eliminated (and recovered) from the process to avoid gold loss, with fresh carbon being continuously added to the process.

The cyanide contained in the tailings from the CIL circuit is eliminated in a cyanide destruction tank with SO<sub>2</sub>-air process. Once the cyanide is destroyed, the tailings are transported to the tailings pond for disposal.

### **3.1.3 Tailings Management Facility (TMF)**

The TMF and effluent treatment plant will be designed to withstand a 100 year rain or snow event. The TMF would cover an area of approximately 3.8 ha and provides adequate storage capacity for the approximately 1.2M m<sup>3</sup> of tailings anticipated to be produced over the projected mine life. The average rate of deposition of tails is 285k t/yr. at a density of 1.5 t/m<sup>3</sup>. The TMF construction of the dams and buttresses will utilize mine waste rock or quarried rock from a nearby location. Tailings would be deposited from spigots located along the ridge of the TMF. Process water would be draw from the TMF area. If required to control water levels in the TMF, effluent water would be treated and discharged to the polishing pond, refer Figure 2.7 for the TMF location. There is currently a small ephemeral bog where there TMF will be constructed but based on historical data it is not a fish bearing water body and would not be considered fish habitat. In addition, physical barriers, intermittent flow and elevation difference between this bog and the Isle aux Morts River would prevent any upstream migration of fish.

### **3.1.4 Site Access Road and Haulage Road Network**

The existing 22km mine access road to the Project site would require upgrades to enable site construction and year round mill access. This includes widening some of the road, replacement of some of the existing culverts, and cutting and filling in some of the steeper sections of road. There are a total of 18 water crossings along the current access road, all of which have culverts of varying sizes. There are no bridges.

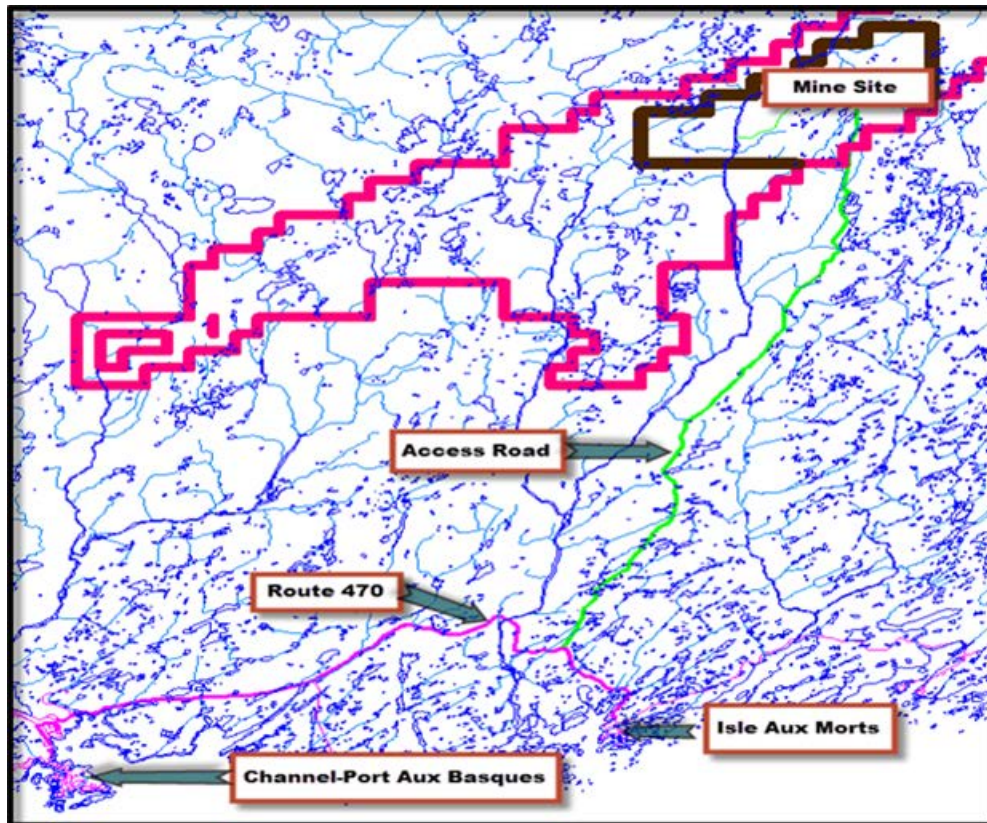
The upgraded 22km mine access road would be a single lane gravel road of approximately 4m in width with pullovers and an additional 2m corridor for powerline requirements. Culverts requiring replacement will be installed according to all provincial regulatory requirements. The road would be maintained to supply year round access to the mine and mill site. Based on the heavy snowfall in this area open pit mining would only occur from Mid-May to Early November. The haul trucks would transport ore from the open pit to the mill site pad at an approximate rate of 1,500 t/d or 285,000 tonnes per year. Figure 3.1 shows the location of the existing road into the Cape Ray site.

Additional haulage roads will need to be established between deposits, their associated RSF and



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the mill. The 04, 41 and 51 deposits are approximately 1 km away from the proposed mill site and the WGH deposit is approximately 3.5 km away, located across the Isle Aux Morts River



**Figure 3.1 Cape Ray Access Road off Route 470 to the proposed Mine Site.**

Haul roads are used by the mine haul trucks to move excavated rock from one place to another. Usually the roads are used to move feed material from pits to the mill. Haul roads will be made with mine waste rock and capped with crushed waste rock to provide a smooth driving surface. Haul roads will be large enough to accommodate haul traffic in both directions with sufficient berm heights as required by the *Mineral Act*. The exact road width is dependent on the size of haul truck working in the mine.

For the main deposit (04, 41, & 51), no water crossings are required for the haul roads. For the WGH deposit, a haul road water crossing is required across Isle aux Morts River. A free span bridge will be constructed for this crossing in accordance with all regulatory requirements both provincially and federally.

Haul roads around the mine will need to be maintained to ensure safe operation of the equipment driving on them. A grader, or similar machine, could be used to resurface the driving surface as required. Dust suppression on dry windy days would be done using water as required. Conceptual haul roads for the site are shown in Figure 2.7 (Section 2.5.1) and amount to approximately 5.1 km of haul road.

### **3.1.5 Administrative and Dry Buildings**

The mine site would have an office, first aid station, security, mine rescue room, mine dry and process plant. A parking area for employee vehicles and service vehicles would be located near the office.

A warehouse and cold storage would be attached to the process plant. A 20m x 30m dome style shop would service the open pit and underground mine equipment.

An explosive and detonator storage would be located a safe distance from buildings and mine operations.

### **3.1.6 Power Generation and Communications**

Access to the Newfoundland Power electrical transmission grid is available along Route 470 near Isle aux Morts, and the installation of a three-phase 66kV electrical transformer station at a transmission line tap would need to be installed. A medium voltage 13.8 kV overhead power line to the proposed 5MW substation at the mine site would supply the needed power for the milling and mining operations. A 1MW generator will supply emergency power to the site during a power outage.

Communication lines would be run in conjunction with the electrical pole line to the mine site and will run parallel to the mine access road. A radio system would be installed to establish mine site surface and underground communication.

### **3.1.7 Rock Storage Facilities (RSF) and Overburden Stockpiles**

Each deposit location will have a near pit RSF, where waste rock is placed after it's extraction. There will also be an overburden stockpile located west of the mill and in the same location as the waste rock pile (Figures 2.7, 3.5)

### **3.1.8 Collection Ponds**

Hydrology and Hydrogeological studies will need to be done to determine the size and if collection ponds are required for the pits. If required, these ponds will be located near the pit to reduce pumping efforts.

### **3.1.9 Associated Project Infrastructure**

#### **3.1.9.1 Fuel Supply and Storage**

Propane storage tanks of a suitable size would be located close to the area it serves. Propane units would be used for mine and building heat and hot water.



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A 20,000 L double wall above ground fuel tanks would store and dispense fuel as required. The pit haul trucks would fuel at the fuel storage site along with underground haul trucks. A service fuel truck would also deliver fuel to underground and open pit drill equipment.

### **3.1.9.2 Domestic Sewage**

Grey water will generally be segregated and directed to the TMF. Black water will be treated in a certified turn-key sewage treatment system (i.e. Waterloo Biofilter, Ecoflo system, Septic tank and field bed) and then this treated system will be directed to the TMF if necessary.

### **3.1.9.3 Process and Potable Water**

Process water in the mill and water accumulating in the TMF would be recirculated back into the mill process water supply system, thereby minimizing the amount of fresh water pumped from surface water sources.

An insulated pump house would draw fresh water from a groundwater source at a volume of 1,150 m<sup>3</sup> per day (800 L/min) to distribute as process make up water to the mill and to supply raw water for treatment to serve as potable water.

## **3.2 Production, Operation and Maintenance**

This phase of the Project is anticipated to begin in July 2019 and will continue for approximately 8 years until cessation of mine and mill/concentrator activity. This may be extended if additional ore reserves are identified. The associated activities with this phase of the project are described in detail below.

### **3.2.1 Open Pit**

Typical open pit drilling and blasting techniques will be used to break the rock mass and allow movement of the rock materials. The loading and hauling equipment will be diesel hydraulic loaders, excavators or shovels with trucks. Equipment will be maintained as required in the sprung building on site.

Waste and feed material will be separated at the dig face by the loader. Waste material will be moved to pit side RSFs, and feed will be hauled to the mill for process

Small sized feed stockpiles may be required for blending purposes. If required, the stockpile would be located near the primary crusher (mill building).

There is currently a 3,000 tonne feed stockpile on surface near the 41 deposit. During operation, this stockpile will be processed.

#### **3.2.1.1 Waste Rock Storage**

Waste rock will be stockpiled near the pit it was extracted from. If there is potentially acid

generating material, it will be handled appropriately to reduce the chance for acid to form. This includes engineered NPAG pads for stockpiles, collection and treatment of run-off water and rehandling material back into the pit or other long-term solutions.

### 3.2.1.2 Overburden Handling

Before overburden removal takes place, the site must be cleared of any brush, shrubs, trees or foliage. Any trees will be cut, skidded and piled and, if salvageable, sold. Non-saleable items may be disposed of by chipping, piling or burning. Trees are expected to be minimal in the tundra environment of this project. Any large stumps or roots will be removed with a bulldozer or other machinery. When possible, stumps and roots will be stockpiled and used as biomass to restore disturbed areas.

To avoid contamination of the rock products, overburden must be removed before rock excavation. Where it is required, overburden will be removed by larger machinery such as a dozer or excavator and will be stored at an overburden stockpile to be used later for reclamation work. Some gravel products which lie above the bedrock surface may be used in road or pad construction. Whenever possible, overburden materials will be stockpiled to reclaim disturbed areas. Depending on the final size of the pits, the overburden could amount to approximately 1.0 Mm<sup>3</sup>, the majority of which is overlying the 04 deposit. The approximate overburden thickness by deposit is listed below in Table 3.1.

**Table 3.1 Approximate Average Overburden Thickness by Deposit**

Within Conceptual Pit Shell Limit with 10 m Offset	Average Overburden Thickness (m)
04	12.0
41	2.4
51	1.9
WGH	5.5
<b>TOTAL</b>	<b>5.9</b>

### 3.2.1.3 Waste Rock Management

The volume of waste rock produced is highly dependent upon the final pit design, project economics, and deposit geology. Waste rock material will be stockpiled near the pit it was excavated from. The potential for acid generation for waste rock materials is currently being assessed and a geochemistry testing program currently underway so that a waste rock management plan can be developed for the Project. The RSF for any potentially acid generating (PAG) materials will require an engineered pad where run off water can be collected and sent to the TMF for treatment and discharge. Any non-potentially acid generating material (NPAG) would either be relocated back to the pit once it is complete, or used as a construction material for the site such as to build roads, pads for buildings, and laydown areas.

### 3.2.2 Underground Mine Design

The 04 deposit would be developed from the ramp at approximately 20 m vertical intervals. In the steep dipping area ( $60^{\circ}$ ) a sub levels shrink (SLS) technique is envisaged. The SLS method applies to only 7% of the 04 deposit's resources. This sub level shrink (SLS) method developed at Mt. Wright in Queensland is still being used today. The SLS method eliminates the need for cemented rock fill.

The majority (93%) of the 04 zone is shallow dipping ( $45^{\circ}$ ). It is envisioned that a cut and fill drift mine method would be used in that area. Development in the mineralized zone would incorporate shotcrete with swellex bolts and screen over the shotcrete for support. The developed sill cut would be backfilled tight to the drift back with unconsolidated waste rock prior to taking the sill cut above. With the zone dipping at  $45^{\circ}$  the cut and fill mining could commence on multiple horizons. All ore would be loaded on to underground 30 tonne haul trucks and hauled-up the ramp, to surface. With the SLS stopes mined out waste rock fill would be drawn from the SLS stopes for fill in the cut and fill drifts. Pit waste rock would be introduced from surface to the fill raise to keep the SLS stopes full. Figure 3.2 represents the 04 underground SLS stopes and the cut & fill drifts.

The 51 deposit would have levels developed from the ramp at approximately 18 m vertical intervals. This small sub level interval will reduce the stopes hydraulic radius (HR) to control hanging wall failure. Each level could be developed from the ramp to the mineralized zone. All ore would be loaded on to underground haul trucks and hauled-up the ramp to surface.

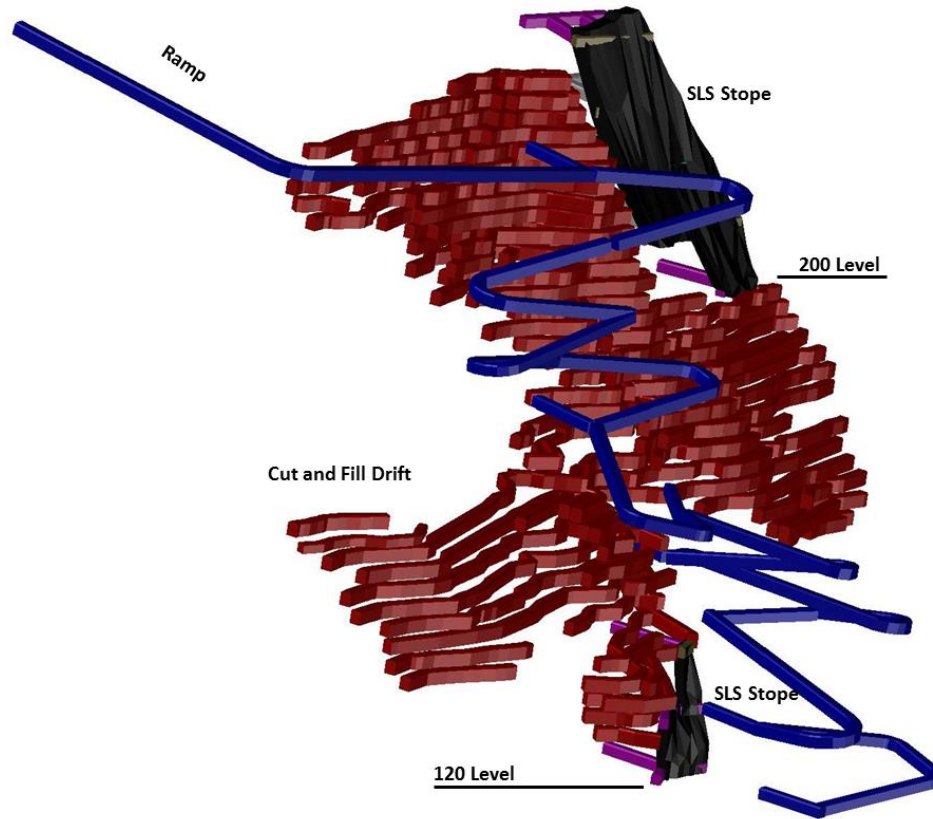
The mining method proposed would be longhole open stoping with placement of consolidated rock fill (CRF) in the primary stopes and unconsolidated waste fill in the secondary stopes. Figure 3.3 represents the proposed 51 underground development and longhole stopes.

The 41 open pit would be mined first to generate early resource tonnes to the mill and supply waste rock for underground fill. On completion of the 41 open pit, the 41 underground mining would commence. The 41 underground deposit could be mined using longhole stopes with cemented and un-cemented rock fill. Figure 3.4 represents the proposed 41 underground mine.

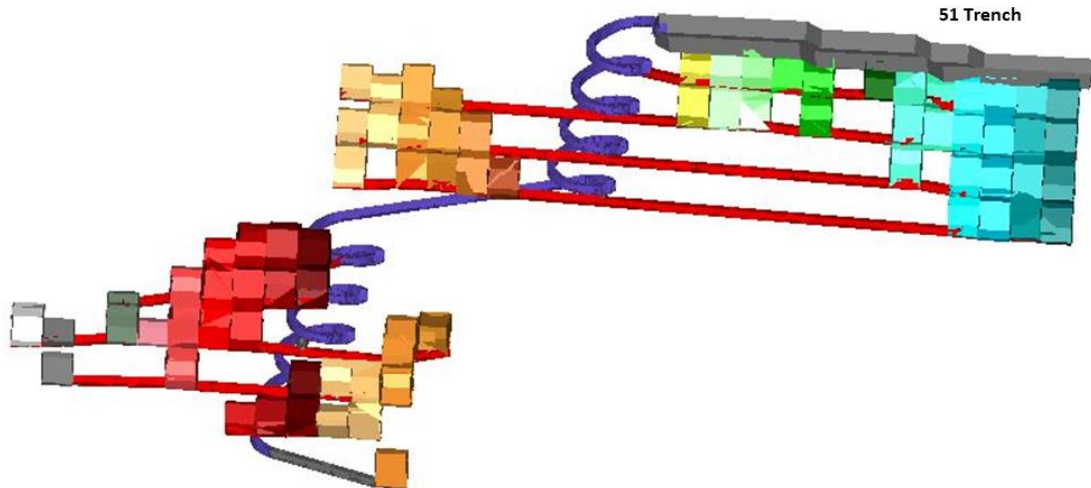
The mine access ramps for each deposit would facilitate movement of equipment, rock, labour and materials to and from the underground mine.

Most underground support facilities would be located on surface including the maintenance shop, main washrooms and the fuel farm. A push-pull ventilation arrangement would utilize raises at each extremity of the mineralized zones for fresh or return air. The ramp system would also be used to ventilate the mine.

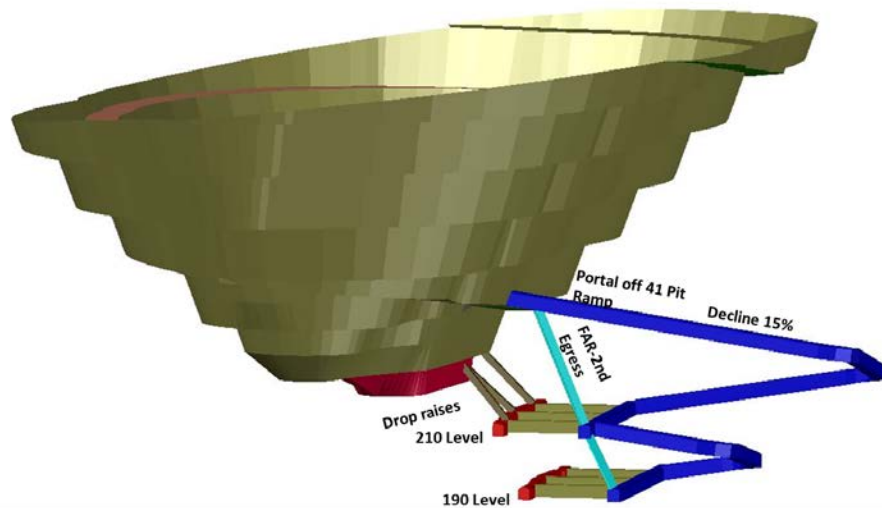




**Figure 3.2 Representation of the 04 SLS stopes and Cut & Fill Drifts.**



**Figure 3.3 Representation of the 51 underground LH Stopes.**



**Figure 3.4 Representation of the 41 Underground Stopes below the 41 Pit.**

### 3.2.3 Tailings Management

Tailings from mill operations (after CN destruction process) will be handled by conventional methods and disposed of in an engineered Tailings Management Facility (TMF). The tailings and wastewater will be pumped to the TMF via a slurry pipeline.

Tailings will normally be thickened to around 35-40 % solids via the thickener and disc filter prior to discharge within the TMF. This practice will reduce the size of the TMF supernatant pond, reduce seepage, minimize or eliminate liquid-solids separation, improve the physical stability of the TMF and reduce both the risk and consequences associated with a potential failure. During thickened tailings deposition, discharge points will be frequently re-located to maximize the size of the wetted surface, thereby minimizing fugitive dust. In addition, tackifier and/or binder may be added to discharge tailings to bind particles together and minimize entrainment by wind and a flocculent will be added to the tailings stream to promote settling of solids.

Late in the life of the mine, tailings solids may be dewatered in the mill to <15 % moisture content and mechanically placed within the TMF footprint using conventional heavy equipment.

The TMF supernatant pond and wastewater treatment plant will be designed to withstand a 30 day duration, 1 in 100 year rain on snow event. The TMF will be equipped with an engineered spillway to prevent a potential dam failure due to overtopping during a Probable Maximum Precipitation (“PMP”) event.

The preliminary TMF design has storage capacity of 1.2M m<sup>3</sup> of tailings solids, with the possibility to increase in the future by raising the height, concurrent with any requirements for amendments to necessary approvals. The TMF surface footprint is not anticipated to be materially changed as a result of any future raises. The TMF will be constructed, operated, maintained and monitored in accordance with Guide to the Management of Tailings Facilities (MAC, 2011) and Environment Canada (2009).

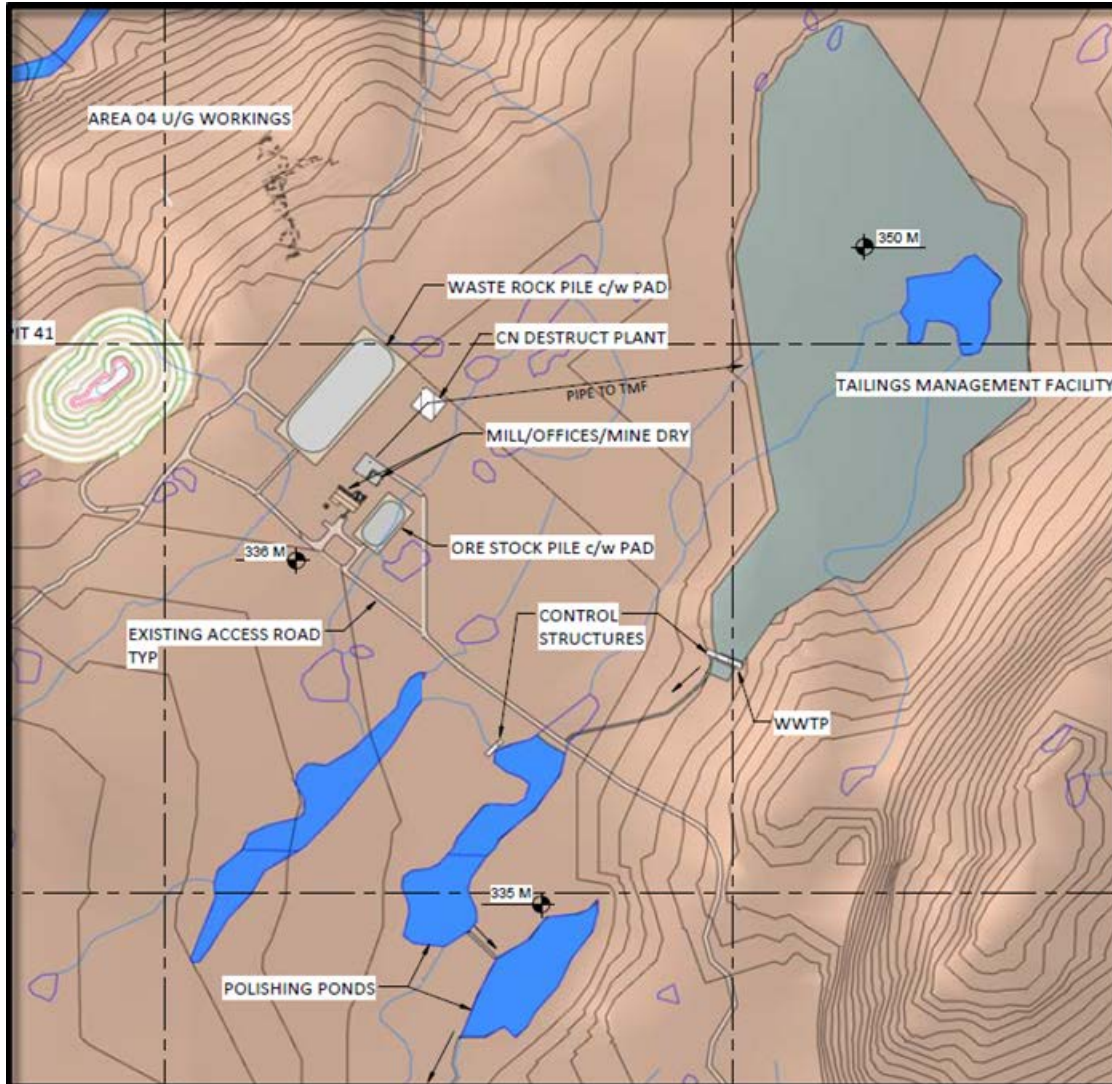
Decanted water from the TMF will then pass through the Wastewater Treatment Plant (WWTP), which will treat to provincial and federal effluent criteria (process described in Section 20.8). Treated effluent will then report to a series of small bogs before discharging to the environment via a natural flow path that eventually discharges to the Isle aux Morts River. Based on historical data these bogs would not be considered fish bearing waters and there is no potential for upstream migration of fish from the river due to physical barriers, intermittent flow and elevation differences. The approximate linear distance of stream between the TMF discharge point to the river is four kilometres. Water quality monitoring stations will be established at fixed points along this stream and sampled on a monthly basis.

Run off from the watershed surrounding the TMF will be collected in a perimeter intercept ditch, which will be constructed around the base of the TMF. The interception ditches will be excavated in bedrock or glacial till lined with rock to mitigate erosion. All runoff water from these intercept ditches will report to the polishing ponds (Figure 3.5).

At closure, the TMF and plant sites will be covered with an engineered, low-permeability dry cover



that will minimize infiltration of water. Seepage collection around the TMF will continue post closure until the seepage decreases and no longer poses a risk to the environment.



**Figure 3.5 Tailings Management Facility**

### 3.2.4 Mine Water Management

The thin (<2m) layers of overburden that have been observed at the Project site are interpreted to be permeable compared to the underlying competent bedrock and the hydrogeology of the Project site is predominantly bedrock controlled. Groundwater flow is currently assumed to be primarily through the overburden units and similar to surface drainage within the Project area; primarily originating at the heights of land and flowing radially downslope.

The proponent will gather additional field data (i.e. slug testing and/or packer testing to determine



bulk conductivity of bedrock mass; similar testing to determine bulk conductivity, sustained yield and drawdown from any potentially affected overburden units) to develop a hydrogeological model to predict the zone of influence that is created by the mine dewatering and estimate dewatering volumes. It is not anticipated that there will be any significant effects to the water table of the Property and therefore no effects to existing groundwater users. There are no users of groundwater in the vicinity of the Property and the primary function of groundwater is to provide base flow in surrounding watercourse features. The baseline work completed to date does not indicate the presence of upwellings or other groundwater discharges that support significant fish habitat, but additional work is planned in this regard, so that any potential impacts can be identified and mitigated. Due to the tight bedrock conditions observed to date and the absence of deep, continuous overburden deposits to connect the pit shell with surrounding watercourses, the potential for mine dewatering to affect potential groundwater upwellings in surface watercourses is interpreted to be low.

#### **3.2.4.1.1 Open Pit Dewatering**

During the life of the open pit, a sump (that is founded in bedrock) will be carried in the floor of the pit to contain runoff, direct precipitation and the groundwater seepage that will enter the pit because much of the excavation will be done below the water table. The sump will serve as a primary treatment pond to achieve the treatment listed below, if required.

- i. Settling of suspended solids and potential chemical conditioning (coagulant and/or flocculant addition). Metals will not be precipitated in the sump.
- ii. Potential addition of commercially available ammonia oxidizing bacteria to reduce the concentration of ammonia that would be present due to the use of explosives.
- iii. Potential attenuation of hydrocarbons using sorbent materials and/or the use of hydrocarbon degrading enzymes.

The sump will also serve as a surge pond to equalize the flows of water being pumped from the pit to the treatment system and/or process water tanks (for recycling) and/or release to the environment.

The potential for the pit shell to have a strong hydraulic connection (i.e. through overburden) to proximal surface watercourses or aquifers is interpreted as low. However, additional field investigations will be conducted to determine the potential for seepage from these features to enter the pit so that adaptive management plans can be developed and implemented as may be required during the life of the Project. The adaptive management plan may include, but not necessarily be limited to the measures listed in the bullets listed below.

- i. Low-permeability cut-off walls installed in overburden to reduce the hydraulic connectivity between the pit and the water feature.
- ii. Targeted grouting program to install a grout curtain in bedrock to reduce groundwater seepage entering the pit.
- iii. Groundwater interception wells to intercept overburden and/or bedrock groundwater before it enters the pit.
- iv. Groundwater and/or surface water interception trenches to intercept overburden





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groundwater and surface water before it enters the pit.

As the development of open pit(s) is not anticipated to create a strong hydraulic connection with any surface water features or aquifers, no dewatering wells surrounding the pit are planned. Sometimes this strategy is employed at “wet pits” to create a drawdown cone surrounding open pit developments to intercept groundwater before it enters the pit and typically allow direct discharge of this water to the environment.

A hydrogeological model will be developed to predict the volume of groundwater that will enter the workings as part of the environmental assessment and permitting process.

#### **3.2.4.1.2 Underground Mine Dewatering**

Sump(s) will be carried with the underground workings to collect process water and groundwater seepage so it can be efficiently pumped to surface.

The potential for the underground workings to have a strong hydraulic connection (i.e. through overburden) to proximal surface watercourses or aquifers is low. However, additional field investigations will be conducted to determine the potential for seepage from these features to enter the underground workings so that adaptive management plans can be developed and implemented as may be required during the life of the Project. The adaptive management plan may include, but not necessarily be limited to the measures listed in the bullets listed below.

- i. Installation of a grout curtain in bedrock to reduce groundwater seepage entering the underground workings (i.e. grouting over a stope or in the crown pillar; grouting around a shaft collar or a raise collar).
- ii. Collars for mine openings that are watertight and sealed to bedrock to prevent inflows of overburden groundwater.
- iii. Equipment, consumables and trained staff to perform grouting in the mine workings on an as-needed basis based on regular observations during the life of the mine.

A hydrogeological model will be developed to predict the volume of groundwater that will enter the workings as part of the environmental assessment and permitting process. Based on a benchmarking of similar projects carried out in bedrock environments that are interpreted to be similar (i.e. Canadian Shield, competent bedrock), it is reasonable to expect groundwater inflows that are on the order of  $\sim 250\text{m}^3/\text{day}$ .

#### **3.2.4.1.3 Other Groundwater Extraction**

A groundwater well(s) may be established to provide potable water to the office, dry and service building. Wells would be established in accordance with provincial requirements. Groundwater would provide a superior raw water source for drinking water purposes compared to surface water. The volume of any water well withdrawals would likely be less than  $\sim 50,000\text{ L/day}$ .



#### **3.2.4.1.4 Water Treatment**

Wastewater (i.e. mine water, grey water, treated sewage from domestic sewage systems, backwash water from potable water treatment plants, collected runoff that has contacted process materials, wash water, etc.) will be consolidated in the TMF. This water will be recycled for use in the mine and the mill. Surplus water in the TMF will be treated to meet provincial effluent criteria as well as federal requirements pursuant to the *Metal Mining Effluent Regulations* and either recycled to the mill or discharged to the environment. Treatment steps and water treatment strategies that are currently anticipated are summarized in the bullets below.

- i. Control of contaminants at the source through good housekeeping practices that minimize hydrocarbon.
- ii. Implementation of an ammonia control program to reduce ammonia in mine water. Components of the ammonia control program would include, but not necessarily be limited to, low solubility product selection, minimization of spillage, promote efficient blasting practices.
- iii. Deployment of hydrocarbon degrading enzymes in sumps and in the TMF as needed.
- iv. Use of ammonia oxidizing bacteria in sumps and in the TMF as needed.
- v. Use of coagulants and/or flocculants (i.e. chemical conditioning) to remove total suspended solids either in a pond or in a clarifier. Sludge from this treatment step would be placed in the TMF.
- vi. Additional chemical conditioning (i.e. metal precipitants that work at neutral pH) and/or pH adjustment to precipitate metals as low solubility hydroxides. Sludge from this treatment step would be consolidated and managed to minimize any environmental risk from potential metal leaching.
- vii. Filtration, following the chemical conditioning step, to remove suspended solids and metal precipitates.
- viii. Final pH adjustment through the addition of carbon dioxide or acid (i.e. citric, hydrochloric or sulphuric) to within regulatory limits.
- ix. Aeration and biological treatment of residual ammonia to oxidize any nitrites or other contaminants that could be present.
- x. Any treatment steps that are deemed unnecessary, based on operating experience and empirical evidence, would be by-passed.

Cyanide would be destroyed in tailings slurry before it leaves the mill building envelope. Although additional engineering is required, this would likely be achieved using the well-established SO<sub>2</sub>-air process. The by-product of this process of most concern would be ammonia, which would be produced through the hydrolysis of cyanate.

#### **3.2.4.1.5 Site Run off Water**

Water collecting on the site in the form of precipitation or seepages will be collected by perimeter intercept ditches that will be installed around the site including waste rock and over burden piles. Water collected in the ditches will be pumped to the TMF for treatment and discharge.

### 3.2.4.1.6 Discharge Point to Surface Water

Treated mine water from the TMF will pass through two polishing ponds which discharge to a small brook that eventually reports to the Isle aux Morts River approximately 4kms downstream. At the time of the preparation of this report a site wide water balance had not yet been completed, however, it is anticipated that this would be a seasonal discharge, releasing effluent only during the ice-free periods of the year (May to November).

An assimilative capacity assessment of the receiver will be undertaken during the permitting phase of the project to determine effluent limits that will not impact the ambient water quality in the Isle aux Morts River.

### 3.2.4.1.7 Atmospheric Emissions

The Project will utilize conventional open pit and underground mining methods and milling processes. The Project will maximize the use of grid power for power demands thereby reducing the potential for greenhouse gas emissions from the site. Diesel and electric powered pit production equipment, blasting, and crushing will generate the majority of air emissions from the mine site area.

The criteria air contaminants (CAC's) expected from the mine site are from diesel use, blasting (explosives), other energy sources such as gasoline, propane and natural gas and fugitive dust from mine components. Greenhouse gases from these fuel sources may include nitrogen oxides (NOx), sulphur oxide (SOx), particulate matter (PM), volatile organic compounds (VOC), carbon monoxide (CO) and Ammonia (NH3). The sources of air contaminants for the Project are typical of an open pit mine, with the major air emissions resulting from fugitive dust (which may affect ambient particulate matter concentrations - PM2.5 and PM10), and fuel consumption during construction and operations. The mine site is not in close proximity to human settlements, with the closest community to the Project (Town of Isle aux Morts) approximately 35 km southeast of the Project. Table 3.2 below shows expected Greenhouse Gas emissions from the Project for construction and operation phases.

**Table 3.2 Expected Greenhouse Gas Emissions for Cape Ray Gold Project**

Project Phase	Newfoundland Targets <sup>1</sup>		Canada Targets <sup>2</sup>		Global Targets <sup>3</sup>
	2020	2030	2020	2030	2030
	8.8 Mt <sup>4</sup>	5.4 Mt	622 Mt	524 Mt	34 Gt
Construction	0.052	0.052	0.052	0.052	0.000052
	0.59%	0.96%	0.008%	0.01%	0.0002%
Operations	0.060	0.060	0.060	0.060	0.000060
	0.68%	1.11%	0.01%	0.01%	0.0002%
Notes:					
(1) Environment and Climate Change Canada. Newfoundland and Labrador: Environment Profile. November 2015.					
(2) Environment and Climate Change Canada. Canadian Environmental Sustainability Indicators: Progress Toward Canada's Greenhouse Gas Emissions Reduction Target. 2016.					
(3) United Nations Framework Convention on Climate Change. Aggregate effect of the intended nationally determined contributions: an update, FCCC/CP/2016/2. May 2016.					
(4) Projections are in tonnes (million tonnes; Mt or billion tonnes; Gt) of CO <sub>2</sub> equivalent units per year.					



Fugitive dust emissions from the mine site are not expected to affect any communities due to the distance from the Project to regional populations and low dustfall levels.

#### **3.2.4.1.8 Domestic Waste**

Domestic waste (garbage, recyclables and other domestic waste) from all project phases and activities will be trucked off-site to a municipal landfill. Waste oils and construction materials will also be hauled off site and brought to an appropriate recycling facility or landfill. There are no hazardous wastes anticipated to be generated by the Project.

### **3.3 Closure and Reclamation**

The rehabilitation measures that are being developed are intended for walk-away closure. Rehabilitation activities will begin upon completion of all mine and mill/concentrator activities and will last approximately 3yrs with completion within approximately 36 months from the commencement of closure and the major activities are summarized below in general chronological order.

- i. Buildings, trailers, intermodal shipping containers, storage tanks, equipment and any chemicals/consumables will be removed and salvaged, recycled or disposed of in accordance with applicable legislation. Concrete foundations will be demolished to grade as is necessary and used to backfill local depressions.
- ii. Hydrocarbon contaminated soil will be identified and remediated in accordance with applicable legislation.
- iii. Equipment in the underground workings will be purged of all operating fluids and salvaged to the maximum extent practical. Consumables will be removed from the underground workings and salvaged.
- iv. The ramp portal will be filled and barricaded to prevent access. Based on the observed static water level in the underground workings from 2002 to 2009, there is the potential for overflow from the ramp so the barricade will be designed and constructed as a concrete bulkhead to prevent water outflow.
- v. The shaft and ventilation raise will be partially backfilled and sealed with an engineered concrete cap to prevent access.
- vi. Pipelines (water, compressed air) on the site will be flushed with fresh water or air, plugged and left in place. Fuel pipelines (propane, diesel) will be decommissioned with legislative requirements and good engineering standards as applicable.
- vii. The domestic sewage disposal system components will be salvaged. The septic tank will be purged of its contents by a licensed hauler and backfilled with locally available soil and/or rock.
- viii. Remaining liquid and solid waste at the Project site will be removed for recycling or disposal with licensed contractors in accordance legislative requirements.
- ix. Rock, sludge and tailings that pose a risk of acid generation and/or metal leaching will be consolidated during the life of the mine and managed in accordance with best industry practice.

- 
- x. Areas of the Project site that are overlain with (clean) development rock will be scarified and any modest embankments will be sloped to a minimum of 3H:1V for long-term physical stability. Accumulations of soil sized particles in the crevasses of rock embankments will be planted with native tree seedlings in accordance with established silvicultural practices. Native soil from the established stockpiles on the site will be placed over these prepared areas and the area will be re-vegetated.
  - xi. The power line, electrical distribution infrastructure and substation will be removed and re-used to the extent practical.
  - xii. Site roads will be rehabilitated in general accordance with standard road abandonment practices as removed from use. This will include, but not necessarily be limited to removing and replacing culverts with erosion proof channels, and scarifying road surfaces to encourage re-vegetation.
  - xiii. The long-term chemical and physical stability monitoring program will be continued to completion, in accordance with the regulatory requirements.

The access road beyond the first stream crossing is owned by the Crown and is outside the scope of the Project site closure.

## 4. Overall Project Schedule

### 4.1 Life of Mine Development Plan and Schedules

The 41 underground potential mineable resources would be mined once the 41 open pit is complete. The 41 deposit would be mined in conjunction with the 51 underground deposit. The 41 underground is only 39,000 tonnes of resource. The underground development schedule is shown in Table 4.1.

**Table 4.1 Mine Development Schedule**

Development Schedule	Yr. -2	Yr. -1	Yr. 1	Yr. 2	Y3	Yr. 4	Yr. 5	Yr. 6	Total
04 Underground									
Ramp Development (m)	-	-	1,582	-	-	-	-	-	1,582
Level Development Waste and SLS sill (m)	-	-	238	134	-	-	-	-	372
Raise Development (m)	-	-	65	200	-	-	-	-	265
C&F Access Development waste (m)	-	-	-	1,686	569	-	-	-	2,255
Deposit Development with Shotcrete (m)		-	-	-	5,040	2,328	-	-	7,368
<b>Total (m)</b>									<b>11,842</b>
41 Underground (m)									
Ramp Development (m)	-	-	-	-	-	446	-	-	446
Level Development waste (m)	-	-	-	-	-	201	-	-	201
Level Development Sill (m)	-	-	-	-	-	160	-	-	160
Raise Development	-	-	-	-	-	143	-	-	143
Total (m)									950
51 Underground (m)									
Ramp Development (m)	-	-	-	-	-	800	319	-	1,119
Level Development waste (m)	-	-	-	-	-	-	-	-	
Level Development Sill (m)	-	-	-	-	-	-	-	-	
Raise Development(m)	-	-	-	-	-	-	-	-	
<b>Total</b>									<b>1,119</b>
<b>Grand Total</b>									<b>13,911</b>

#### 4.1.1 Life of Mine Production Plan and Schedule

The mill production schedule is based on an ore processing rate of 850 t/d for 335 days per year, or 285,000 t/yr. The mill would have a processing capacity of 950 t/d based on 85% availability providing some flexibility to the operation.

The open pit mine would operate 183 d/yr. or 6 months of the year at a production capacity of approximately 1,500 t/d of ore. This mineralized ore would feed the mill and surface stockpile.

The underground mine would operate 350 d/yr. at a production capacity of approximately 600 t/d of ore.

The production schedule by deposit for the underground and open pits is presented in Table 4.2. A total production of 1,7Mt of resource material would be mined over the 6 years.

**Table 4.2 Production Schedule Underground and Open Pit by Deposit (in thousands)**

Production Schedule	Yr. -2	Yr. -1	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6	Recovered Diluted Tonnes
<b>Resources</b>									
Pit 41	-	-	288	215	-	-	-	-	503
U.G 04	-	-	-	33	227	219	-	-	479
Windowglass	-	-	-	10	59	90	134	35	328
U.G. 51	-	-	-	-	-	-	128	219	347
Others (41 U.G. / 51 Trench)	-	-	-	-	-	-	44	-	44
<b>Potential mineable resource</b>									
Start of Period	-	-	1,701	1,413	1,155	869	560	254	-
Mined	-	-	288	258	286	309	306	254	1,701
End of Period	-	-	1,413	1,155	869	560	254	-	-
<b>Production Potential mineable resource</b>									
Mined	-	-	288	258	286	309	306	254	1,701
Processed (850 t/d) for 335 days	-	-	285	261	286	309	306	254	1,701
Stockpile	-	-	3	-	-	-	-	-	-

## 4.2 Labour Force and Occupations

It is expected that a local contractor will provide the necessary equipment and labour to mine the open pits. Open pit labour will consist of supervisors, equipment operators, and blasters. It is envisioned the administration of the mine will consist of personnel recruited as much as possible from the surrounding area and from Newfoundland. Should there be a need to recruit personnel with specific skills and experience not available in Newfoundland, it is expected that we would relocate personnel to Newfoundland.

### 4.2.1 Underground Labour

Labour estimates for the underground mining operation total approximately 110 mine contractors and up to 16 company staff. These figures include mine supervision, management, engineering and geology staff. Table 4.3 shows proposed labour and rotation schedule.

Table 4.4 shows the total underground labour by year over the project life.





**Table 4.3 Summary Company - Contractor Labour**

<b>Underground labour</b>	<b>#/day</b>	<b>#/night</b>	<b>Total</b>	<b>Schedule</b>
800 Mt/day				
Administration				
Project manager	1	0	2	dayshift 14/14
Engineering - Geology	4	2	12	dayshift 14/14
Clerk/buyer	1	0	2	dayshift 14/14
HR				
Safety & Training Coordinator - contractor	1	0	2	dayshift 14/14
U/G Supervision				
Captain - contractor	1	0	2	dayshift 14/14
Supervisor - contractor	2	2	6	day/night shift 28/14
<b>Sub Total</b>			<b>26</b>	
<b>Service - General</b>				
Construction - Timber man - contractor	2	2	8	dayshift 14/14
Service man contractor	1	1	3	day/night shift 28/14
<b>Subtotal</b>			<b>11</b>	
U/G mechanical services and fixed equipment				
Master mechanic - contractor	1	0	2	dayshift 14/14
Mechanical - contractor	2	2	6	day/night shift 28/14
U/G and surface electrical services				
Master electrician - contractor	1	0	2	dayshift 14/14
Electrician - contractor	1	1	3	day/night shift 28/14
Surface mechanical services				
Surface Labourer				day/night shift 28/14
Machine doctor - contractor	1	0	2	dayshift 14/14
<b>Subtotal</b>			<b>15</b>	
U/G Crews				
Dev Crew A - contractor				
Jumbo man	1	1	3	day/night shift 28/14
Miner	2	2	6	day/night shift 28/14
Shotcrete	4	4	12	day/night shift 28/14
Mucker	1	1	3	day/night shift 28/14
Dev Crew B Production Cut and Fill - contractor				
Jumbo man	1	1	3	day/night shift 28/14
Miner	2	2	12	day/night shift 28/14
Shotcrete	4	4	12	day/night shift 28/14
Mucker	1	1	3	day/night shift 28/14
<b>Subtotal</b>			<b>54</b>	
Production Crew - contractor				
Longhole Driller	1	1	3	day/night shift 28/14
Longhole C/B Driller	1	0	2	dayshift 14/14
Blasters	2	0	4	dayshift 14/14
Cable Bolters	2	0	4	dayshift 14/14
Muckers	1	1	3	day/night shift 28/14



Underground labour	#/day	#/night	Total	Schedule
Sub Total			16	
Alimak Raise Crew - contractor				
Raise miners	2	0	4	day/night shift 14/14
<b>Subtotal</b>			<b>4</b>	
<b>Total</b>			<b>126</b>	

**Table 4.4 Life of Project Labour**

Position	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Management	10	14	14	14	14	14
Engineering, Geology	8	12	12	12	8	8
Underground Services	11	11	11	11	11	3
Underground Mechanical -Electrical	6	15	15	15	6	6
Development	12	12	0	12	12	0
Production Included C&F Dev	0	36	59	29	16	16
Alimak Raising	4	0	0	4	4	0
<b>Total</b>	<b>51</b>	<b>100</b>	<b>111</b>	<b>97</b>	<b>71</b>	<b>47</b>

#### 4.2.1 Open Pit Labour

**Table 4.5 Open Pit Labour**

Description	Position	Staff/ Day
Superintendent	Surface G&A	1
Blasting Foreman	Surface G&A	1
Maintenance Superintendent	Surface Maintenance	1
<b>Total Mine Salaried</b>		<b>3</b>
Drillers	Drilling	2
Blaster	Blasting	1
Blaster Helper	Blasting	1
<b>Total Drilling and Blasting</b>		<b>4</b>
Excavator Operator	Loading	2
<b>Total Loading</b>		<b>2</b>
Truck Driver	Haulage	6
<b>Total Hauling</b>		<b>6</b>
Dozer Operator	Roads & Dumps	2
Grader Operator	Roads & Dumps	1
Utility Driver	Roads & Dumps	2
<b>Total Support</b>		<b>5</b>
Lead Mechanic	Surface Maintenance	1
Heavy Equipment Mech.	Surface Maintenance	4
Light Vehicle Mech.	Surface Maintenance	2
<b>Total Mine Maintenance</b>		<b>7</b>
<b>Grand Total Mine Operations</b>		<b>27</b>

#### 4.3 Mill Labour

The concentrator will be set up for operating 24 hours per day; requiring four shifts of operators. The functionality of the crews will include three operators, a millwright and an electrician and an assayer for each crew. There will be a metallurgist, seven days a week on day shifts only. Administration would work 40 hours per week on a Monday – Thursday schedule and would consist of a superintendent, maintenance and electrical foreman as well as a clerk.

**Table 4.6 Labour Requirements for Mill Operation**

	Number	Hr/Shift	Shift/Mo	Base \$/yr.	Base \$/hr	Burden %	Burden \$	TOTAL \$/yr.	Total \$/mo.
<b>Mill Administration</b>									
Mill Superintendent	1		21	140,000		20	28,000	168,000	14,000
Maintenance Foreman	1		21	105,000		20	21,000	126,000	10,500
Electrical Foreman	1		21	105,000		20	21,000	126,000	10,500
Metallurgist / Supervisor	1	12	15	75,000		20	15,000	90,000	7,500
Assayer	1		15	55,000		20	11,000	66,000	5,500
Clerk	1		21	48,000		20	9,600	57,600	4,800
<b>Operations</b>									
Lead Hand / Concentrator Operators	4	12	15		32	20	55,296	331,776	27,648
Crusher Operators / Loader	8	12	15		28	20	96,768	580,608	48,384
Leach/CIP Operator	4	12	15		28	20	48,384	290,304	24,192
<b>Maintenance</b>									
Millwrights	2	12	15		34	20	29,376	176,256	14,688
Electricians	2	12	15		34	20	29,376	176,256	14,688
<b>Total</b>	<b>26</b>							<b>2,188,800</b>	<b>182,400</b>
Cost per tonne	285,000	tons						7.68	\$/tonne

Labour adds an additional \$7.68/t on top of consumable operating cost of \$18.74/t provides a total of \$26.42/t.

#### 4.4 Capital and Operating Costs

The estimates were developed by using first principles and applying direct applicable project experience, and by avoiding the use of general industry factors. Virtually all of the estimate inputs are derived from engineers, contractors, and suppliers who have provided similar services to existing operations and have demonstrated success in executing the plans as defined in the PEA. The target accuracy of the capital cost estimate is in the range of +20%/-20%.

The following cost estimates are detailed within this section:

- i. Initial Capital Cost – Major costs incurred in constructing the Mill and Tailing Management Facilities (TMF).
- ii. Sustaining Capital Cost – Expenditures incurred during operations for waste development, underground set-up and underground infrastructure for deposit 04, 51 and 41.
- iii. Closure and Reclamation Cost – Costs incurred to permanently close and reclaim the site

The following capital costs are not discussed in this section:

- i. Sunk Costs – Not considered in the PEA.
- ii. Owners Reserve – Not considered in the PEA.

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Contractors performed preproduction mining; it is assumed that Contractors will be used for all deposits. The specific scope and execution plans described in the PEA. Any deviations from these plans will affect the capital costs.

The following costs are not included in the capital cost estimate:

- i. HST
- ii. Schedule acceleration costs
- iii. Schedule delays and associated costs, such as those caused by:
  - a. Unexpected site conditions
  - b. Latent ground conditions
  - c. Force majeure
  - d. Permit applications
- iv. Development fees and approval costs beyond those specifically identified
- v. Cost of any disruption to normal operations
- vi. Foreign currency changes from project exchange rates
- vii. Commodity specific escalation rates
- viii. Event risk
- ix. Cost associated with third party delays
- x. Sunk costs
- xi. Escalation – all cost data is presented in Canadian 2015 dollars.

Certain items within the operating costs begin during the pre-production phase and continue through the life of the mine. All costs incurred during the pre-production phase have been capitalized and are part of the capital cost estimate under sustaining capital. Operating costs have been compiled in accordance with industry standards.

The pre-production capital expenditures have an internal contingency factor of 10%. The estimates are based on budget pricing from suppliers for critical components, consultants, contractors and a review of other Canadian projects. Smaller equipment and facilities component costs were factored based on industry norms for the type of facility being constructed and, where possible, adjusted to reflect local conditions.

**Table 4.7 Pre Production Capital Expenditures (in thousands)**

Pre-Production Capital	Contingency	Yr-2 (\$)	Yr-1 (\$)	Yr. 1 (\$)	Yr. 2 (\$)	Yr. 3 (\$)	Yr. 4 (\$)	Yr. 5 (\$)	Yr. 6 (\$)	Total (\$)
Permitting	10%	1,359	1,359	-	-	-	-	-	-	2,718
Roadwork-Quote from Adams Construction	10%	506	143	-	-	-	-	-	-	649
Over burden Removal	10%	220	275	-	-	-	-	-	-	495
Surface Infrastructure-Open Pit/Mill	10%	-	2,524	-	-	-	-	-	-	2,524
Material and Waste Pads(3)-Mine & Mill	10%	165	275	-	-	-	-	-	-	440
Dewatering/trench/sumps	10%	-	275	-	-	-	-	-	-	275
Processing Plant	10%	10,481	20,319	-	-	-	-	-	-	30,801
Tailings	10%	-	3,520	-	-	-	-	-	-	3,520
Surface Equipment	10%	-	825	-	-	-	-	-	-	825
Water Treatment Plants/Testing	10%	385	1,650	-	-	-	-	-	-	2,035
Power Distribution to Mill	10%	385	770	-	-	-	-	-	-	1,155
Working Capital	10%	-	550	-	-	-	-	-	-	550
Engineering for Capital	10%	-	802	-	-	-	-	-	-	802
Mine Closure	0%	-	-	-	-	-	-	-	4,400	4,400
<b>Total</b>		<b>13,502</b>	<b>33,287</b>	-	-	-	-	-	<b>4,400</b>	<b>51,189</b>

The sustaining capital expenditures by deposit do not have any contingency. Included in these expenditures are the initial cost to start-up each deposit as well as ramp development for the underground mine. In the open pit the expenditures include initial setup as well as overburden and first pioneer benching (see Table 4.8).

**Table 4.8 Sustaining Capital Expenditures by Deposit (in thousands)**

Deposit	Yr-2 (\$)	Yr-1 (\$)	Yr. 1 (\$)	Yr. 2 (\$)	Yr. 3 (\$)	Yr. 4 (\$)	Yr. 5 (\$)	Yr. 6 (\$)	Total (\$)
Pit41	-	556	-	-	-	-	-	-	556
U.G.04	-	-	13,669	2,857	-	-	-	-	16,526
Windowglass	-	-	-	3,149	-	-	-	-	3,149
U.G.51	-	-	-	-	2,103	7,514	-	-	9,617
Other (41U.G./51Trench)	-	-	-	-	-	3,840	-	-	3,840
<b>Total</b>	-	<b>556</b>	<b>13,669</b>	<b>6,007</b>	<b>2,103</b>	<b>11,355</b>	-	-	<b>33,689</b>

All the operating costs are based on typical Canadian prices from contractors, suppliers and other similar type Canadian projects, for consumables and parts. The cost of power is based on rates charged by Newfoundland and Labrador Hydro for similar sized power consumers and services in the province. Labour costs for the operating period are based on the labour schedules presented for each department and their associated labour costs. The costs include a burden component of 25-30%. All costs are quoted in constant 2015 Canadian Dollars.





**Table 4.9 Underground Operating Costs**

<b>Underground Operating Costs</b>	
Mining Block - Total Tonnes	\$49.72/tonne
Development	\$4,675/metre
PMR Development with Shotcrete	\$94/tonne
Treatment Plants (All inclusive)	\$1.10/tonne
Processing	\$26.42/tonne

**Table 4.10 Open pit Operating Costs**

<b>Open pit Operating Costs</b>	<b>\$/tonne</b>
Mining Block - Total Waste Tonnes	3.66
Mining Block-Total PMR Tonnes	6.81
Transportation of PMR	2.00
Crushing	1.45
Treatment Plants (All inclusive)	1.10
Processing	26.42

Both operating costs include the expenditures for direct mining related labour and supervision. Geology and engineering staff costs are provided as G&A within each mining method. The vision of this PEA is to use contractors for both Open Pit and underground operations. The processing cost is expected to be \$26.42 per tonne of potentially economic mineralization based on preliminary discussions with custom milling operations

## 5. Environmental Effects

The following sections will briefly describe the physical, biological and socio-economic environments within the area that may be adversely affected by Project activities. There have been no regional studies as described in Sections 73 to 77 of CEEA 2012 carried out at the site. The collection of empirical data for all of these environmental aspects is planned for the 2017 and 2018 season as part of the EA process and once final EIS Guidelines have been received.

Some data on regional biophysical baseline conditions was obtained from historical publications submitted to the NL government by the previous owners. This information is summarized below. For those aspects where no baseline data exists, plans for the collection of this data will be prepared before initiation of the EA.

### 5.1 Existing Environment

#### 5.1.1 Regional Climate

The study area has a moderate climate with a maritime influence based on its proximity to the sea. Freeze up usually does not occur until December. There are variable weather conditions and frequent freeze/thaw cycles throughout the winter. The prevailing winds are west to northwesterly in autumn and winter and southwesterly in spring and summer.

Climate data for the periods 1981 to 2010 is shown in Table 5.1 and Figure 5.1. This data was obtained from the Environment Canada Climate Data website from climate monitoring stations located in Isle aux Morts which is the village most proximate to the Project site.

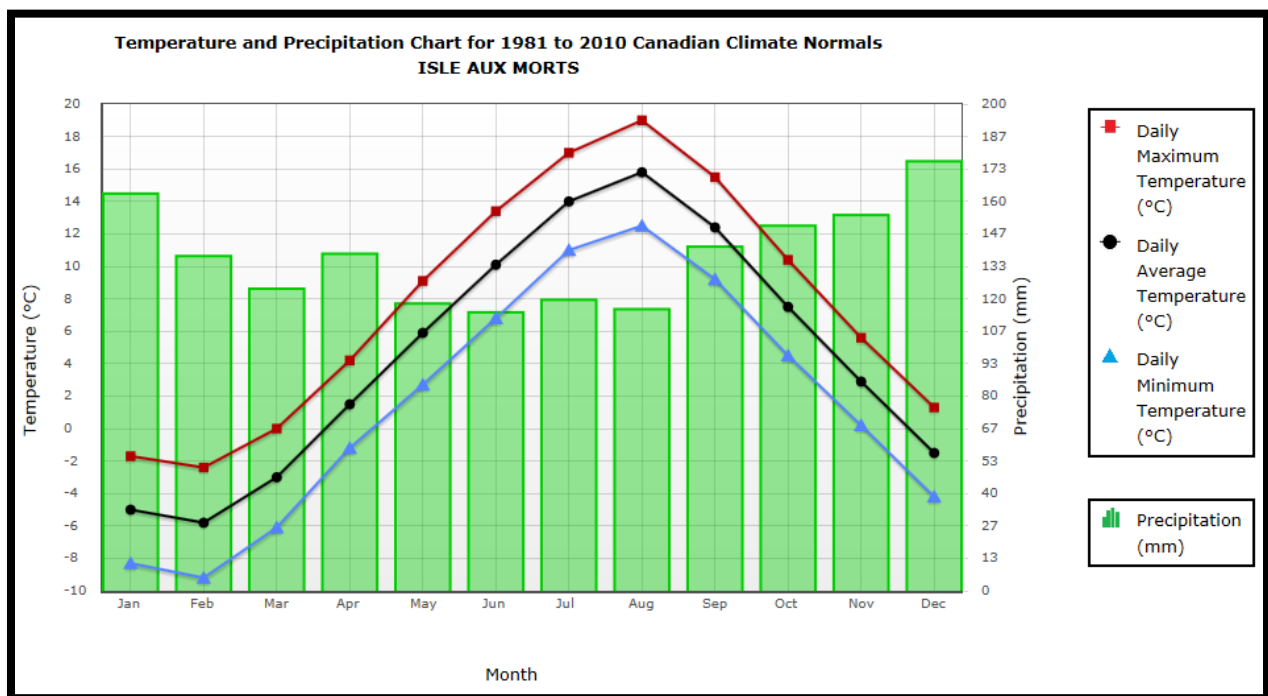
The climate data for the period of record analyzed shows that show daily mean temperatures in August of 15.8 °C and an average maximum August daily temperature of 19.0 °C (see Table 5.1). The average daily winter maximum temperature in February is -2.4°C and the corresponding average minimum is -9.2°C. The extreme winter minimum is -24°C, recorded in February. Average yearly precipitation totals 1,653.1 mm, which includes 325.8 cm of snowfall. Very high winds with gusts >100 km/h can occur, often from southerly and southeasterly directions. Temperature and precipitation averages for Isle aux Morts are shown below in Figure 5.1.

Weather and site conditions during the spring break-up period (typically April to late May) can prevent some exploration activities from being carried out due to high water levels and remnant snow cover. Scheduling of field activities to avoid this period is generally advisable. Winter programs can be carried out with snowmobiles, with consideration given to snowfall and cold temperature conditions, as well as potentially high wind conditions with reduced visibility that generally accompany storm events. Coastal waters south of the Cape Ray Property are free of ice and are navigable all year around.

**Table 5.1 Climate Data for Isle aux Morts, NL [Source: Environment Canada 1981-2010 Data]**

1981 to 2010 Canadian Climate Normals station data

Temperature														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Daily Average (°C)	-5.0	-5.8	-3.0	1.5	5.9	10.1	14.0	15.8	12.4	7.5	2.9	-1.5	4.6	C
Standard Deviation	1.3	2.2	2.1	1.2	1.1	1.1	1.0	0.8	1.1	1.1	1.0	1.5	1.2	C
Daily Maximum (°C)	-1.7	-2.4	0.0	4.2	9.1	13.4	17.0	19.0	15.5	10.4	5.6	1.3	7.6	C
Daily Minimum (°C)	-8.3	-9.2	-6.1	-1.2	2.7	6.8	11.0	12.5	9.2	4.5	0.2	-4.2	1.5	C
Extreme Maximum (°C)	9.0	9.0	11.0	17.0	23.0	24.5	26.0	<b>27.5</b>	25.0	19.0	16.0	9.5		
Date (yyyy/dd)	2000/25	2000/29	1983/14	1998/30	1999/07	1983/21	1991/19	<b>1996/06</b>	2001/10	2003/12	2000/11	1993/14		
Extreme Minimum (°C)	-22.5	<b>-24.0</b>	-23.5	-13.0	-8.0	-4.0	4.0	4.5	2.0	-4.0	-11.0	-18.0		
Date (yyyy/dd)	1991/26	<b>1994/09</b>	1986/10	1994/03	2000/10	1988/03	1991/01	1989/29	1988/30	1993/27	1993/25	1984/27		



**Figure 5.1 Temperature and Precipitation Averages for Isle aux Morts, NL, (Environment Canada)**

### 5.1.2 Air Quality and Noise

There are no historical records for air quality and noise in the regional area surrounding the Project Site. As part of the EA process and Environmental Baseline data collection program, these surveys will be conducted as per previously issued EIS Guidelines for similar mineral development projects in NL. The surveys will take place in 2017 or 2018 and the data included in the EIS or EPR submissions to the government of NL.

### 5.1.3 Geology and Topography

There is little historical data available on the Geology and Topography of the study area other what could be obtained from some of the component studies performed by the previous owners of the Site. In summary, the regional area surrounding the Project site was glaciated during the advance of the Wisconsin ice sheet. The study area is located on the southern slopes of the Long Range Mountains and is characterized by broad wooded valleys, gently sloping organic deposits and rugged bedrock dominated uplands. The dominant surficial characteristics are bedrock concealed by vegetation, barren outcrops or lichen covered rock, thin bog cover; minor thin until deposits and the occasional drumlinoid feature. The deeply incised river valleys contain glaciofluvial deposits and alluvial deposits derived from postglacial erosional and sedimentary processes.

The rugged and often strongly sloping topography varies in elevation from approximately 140 m along the valley bottom of the Isle aux Morts River to nearly 480 m along the eastern boundary of the regional study area.

### 5.1.4 Vegetation and Soils

The following information was gleaned from various component study reports undertaken by the previous owners. Nordmin intends to augment this data with baseline field surveys as part of the EA process. These studies are in the planning stages at present and will be implemented during the 2017 and 2018 field seasons.

Most of the regional study area is occupied by dwarf shrub heath. Species composition varies depending on snow cover and exposure. Sheep laurel (*Kalmia angustifolia*) heath is the most abundant dwarf shrub vegetation in this ecoregion. In areas with deep snow cover, this heath is augmented by rhodora (*Rhododendron canadense*). Exposed knolls and summits are generally occupied by heath, dominated by arctic-alpine species such as diapensia (*Diapensia lapponica*), pink crowberry (*Empetrum eamesii*) and tundra bilberry (*Vaccinium uliginosa*).

Wind pruned stands of black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*) known as tuckamoor are generally found on well-drained sites with moderate wind exposures. These stands are characteristic of the Long Range Barrens ecoregion. Fully developed forests are restricted to sheltered valleys. In the Southern Long Range sub region, these forests are composed mainly of balsam fir, with small quantities of mountain white birch (*Betula cardifolia*) and black spruce. These stands are densely stocked and are often severely affected by moose browsing and damage from exposure to wind and ice.

Peatlands vary in abundance depending on the topography. Peatlands are extensive in the Southern Long Range sub region but are not the dominant feature of the landscape. The most common peatlands are oligotrophic patterned fens.

Ferro-Humic Podzols and Humo –Ferric Podzols are the characteristic soils of the study area. These soils are coarse textured, extremely stony and bouldery. They are usually very shallow, but bedrock outcrops are uncommon. Soils of the study area are unsuitable for agricultural purposes by virtue of their shallowness and wetness, and lack of organic matter and nutrients. Organic soils

in the form of Typic Mesisols are derived from sedge peats and occur throughout the study area. Orthic Regosols occur on the lower terraces along the rivers and streams. These soils are by definition poorly developed and have poor moisture holding capacity because of their coarse textures and are susceptible to inundation because of their location.

### 5.1.5 Wetlands

There are no historical records for the wetlands that occur in the regional area surrounding the Project Site. As part of the EA process and Environmental Baseline data collection program, these surveys will be conducted as per previously issued EIS Guidelines for similar mineral development projects in NL. The surveys will take place in 2017 or 2018 and the data included in the EIS or EPR submissions to the government of NL.

### 5.1.6 Hydrology

Monthly average flow rates for the Isle aux Morts River were obtained from the Water Survey of Canada (WSC) hydrometric database. The WSC maintains a hydrometric gauging station on the Isle aux Morts River just below the Highway 470 bridge (Sta 02ZB001). Hydrometric data is available for this station dating back to 1962, however, only the period from 2000 to 2013 (the last year available) was analyzed for trending purposes for this report. Table 5.2 summarizes the mean monthly flow rates (m<sup>3</sup>/sec) for this period. Figure 5.2 illustrates the flow trends over this same period of record. As illustrated, the maximum flow rates occur in April and May and minimum flow rates generally occur in January and February and again in July/August.

**Table 5.2 Monthly Mean Discharge Volumes of the Isle aux Morts River (m<sup>3</sup>/s), 2003-2013**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean
2003	20.10	15.90	4.51	42.20	29.80	11.70	9.08	3.43	7.30	17.80	14.10	12.80	15.70
2004	2.18	0.92	0.74	29.60	31.40	14.90	7.00	3.46	12.60	10.30	20.30	19.20	12.70
2005	4.19	3.09	2.26	19.20	23.50	4.07	4.46	4.69	18.00	11.30	20.40	12.20	10.60
2006	13.50	3.23	1.17	25.50	11.70	6.38	9.81	10.90	9.14	23.90	29.80	8.49	12.80
2007	9.18	1.76	7.65	12.40	30.40	10.50	13.60	17.90	16.20	10.10	20.80	3.74	12.90
2008	3.13	9.38	4.06	22.50	30.30	7.13	2.70	11.70	14.40	12.20	22.90	20.60	13.40
2009	2.93	1.47	6.16	40.70	27.20	11.20	3.03	10.50	5.85	11.40	19.10	11.30	12.60
2010	4.36	1.98	2.35	22.40	10.10	8.83	11.10	3.38	12.00	21.50	15.60	19.40	11.10
2011	4.26	3.11	12.00	27.70	37.50	17.80	8.42	4.98	4.37	13.30	13.80	14.70	13.50
2012	9.38	9.12	4.74	39.30	17.30	2.01	5.02	5.86	26.60	17.00	11.70	20.90	14.00
2013	3.34	12.00	11.70	27.30	32.00	6.81	8.96	7.80	14.90	8.06	36.10	9.84	14.90
2011	1.73	1.73	2.03	2.20	2.41	1.93	1.83	1.70	1.65	1.97	1.96	1.99	1.93
2012	1.90	1.78	1.79	2.31	1.96	1.48	1.63	1.71	2.12	2.01	1.90	2.05	1.89
2013	1.69	2.29	1.98	2.11	2.24	1.75	1.79	1.74	1.96	1.82	2.19	2.01	1.96
Mean	5.85	4.84	4.51	22.53	20.56	7.61	6.32	6.41	10.51	11.62	16.48	11.37	10.71
Min	1.69	0.92	0.74	2.11	1.96	1.48	1.63	1.70	1.65	1.82	1.90	1.99	1.89
Max	20.10	15.90	12.00	42.20	37.50	17.80	13.60	17.90	26.60	23.90	36.10	20.90	15.70

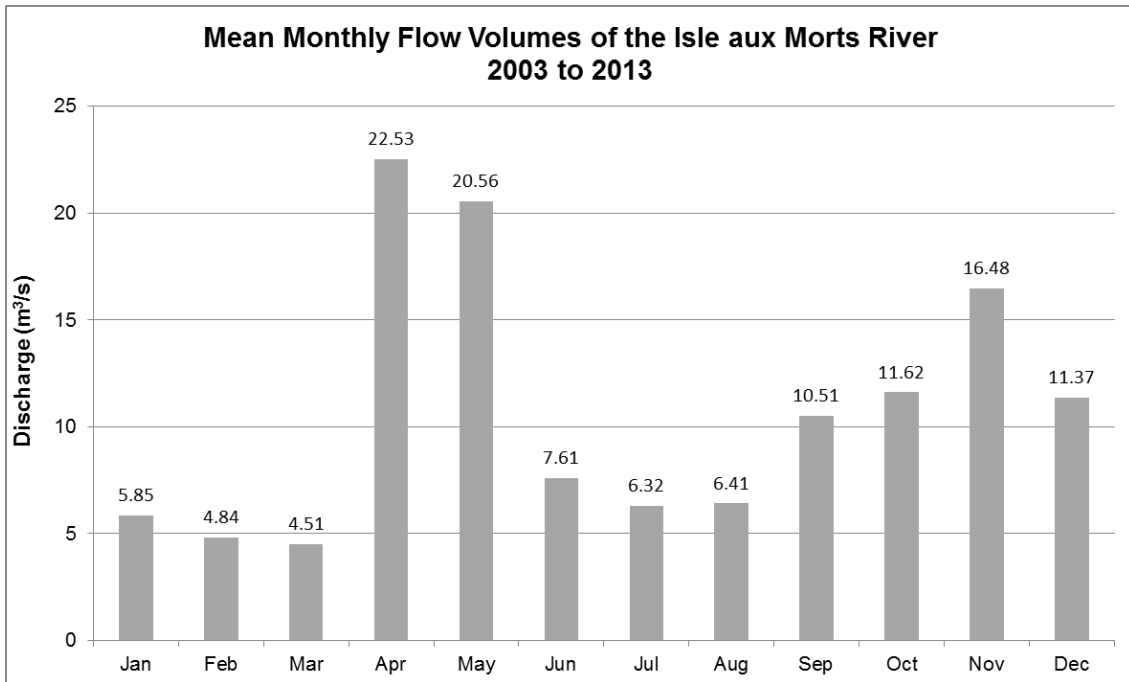


Figure 5.2 Mean Monthly Flows for Isle aux Morts River for 2003- 2013.

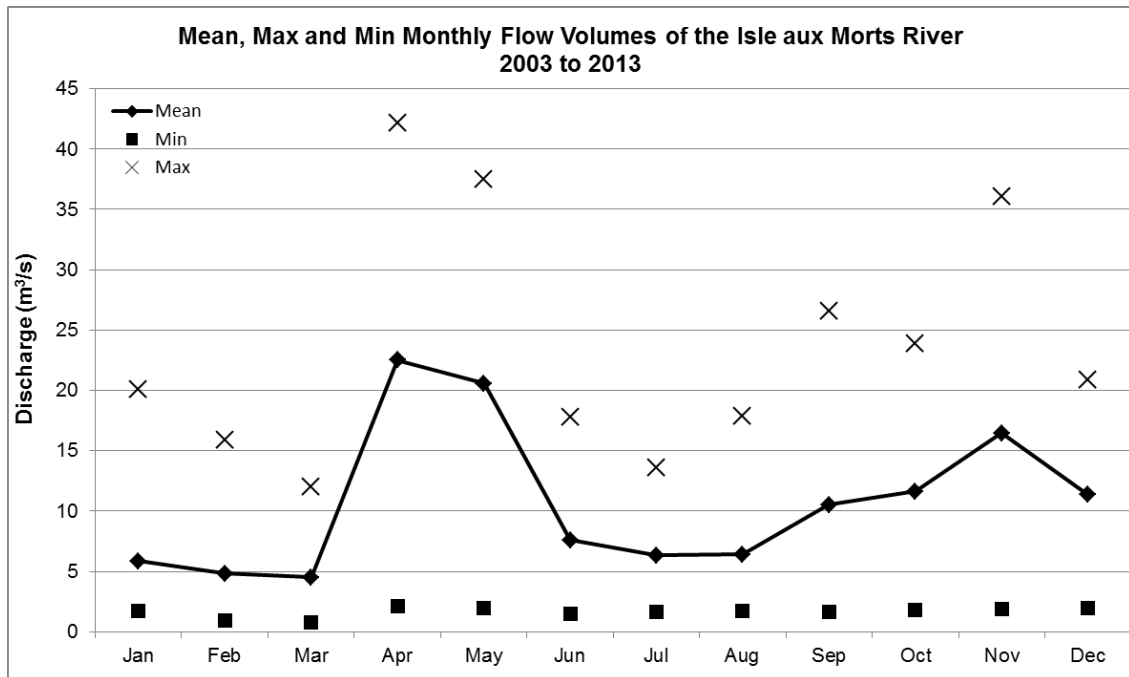
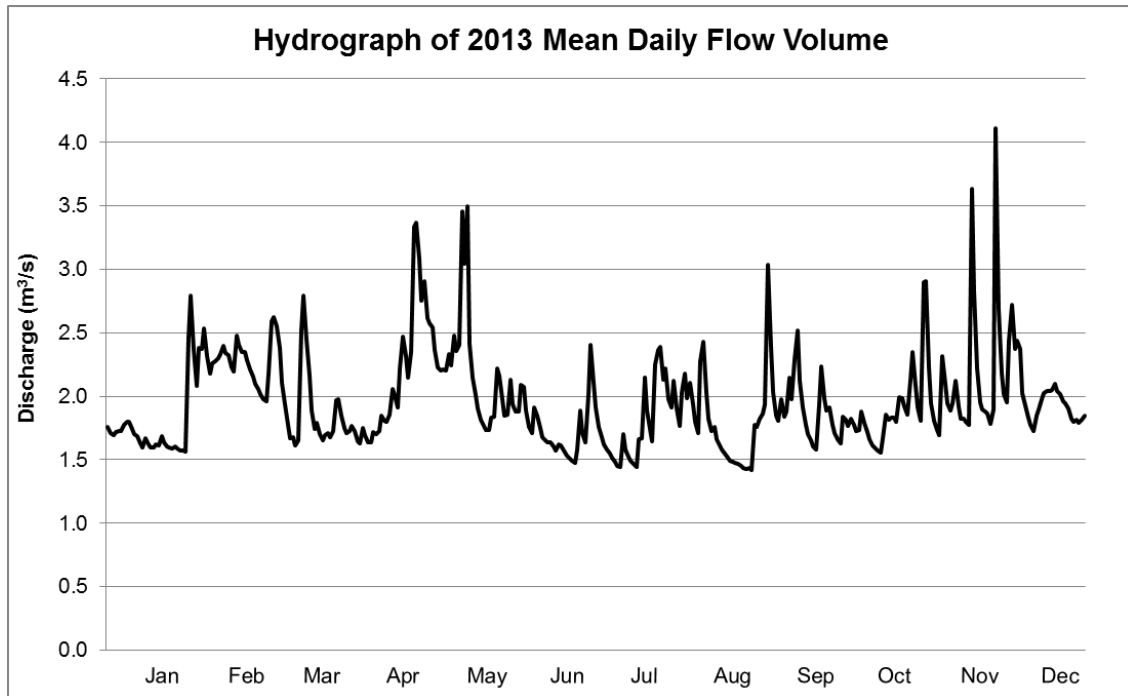


Figure 5.3 Mean, Max and Min Monthly flows for Isle aux Morts River 2003 – 2013





**Figure 5.4 Isla aux Morts River Hydrograph for 2013**

The drainage area for the Isle aux Morts river system is 205 km<sup>2</sup> and as can be seen from the hydrometric data the river tends to be quite “flashy” with mean daily flows, which can increase up to 150% or more from one day to the next. This is due mainly to the very shallow soils in the study area, exposed bedrock and very little moisture retention capability from these materials.

As illustrated, the largest number of peak floods occurs during the months of April and May, then again in November and December.

#### 5.1.6.1 Project Area Hydrology

The Project will utilize existing ponds for water and tailings storage as illustrated in Figure 3.6 The final option for this has yet to be determined pending baseline hydrology studies to be completed in 2017. The preferred option at this stage is utilizing the small pond northeast of the access road for tailings and wastewater storage. This would create the smallest footprint in terms of sub-watershed area utilized out of the entire Isle aux Morts River watershed. This small pond reports to a series of larger ponds that eventually report to the Isle aux Morts River by way of Jack Henry’s Brook 3.8 km downstream. These smaller ponds would be utilized as polishing ponds or emergency ponds in the event of an unplanned discharge. Control structures would be constructed at the outlet of the tailings storage pond and the emergency pond.

Currently, ground water from the existing underground workings (flooded adit), flows into a perimeter collection ditch then into a series of settling ponds which then discharge to a small unnamed brook which flows into the Isle aux Morts River. Water samples were obtained by Nordmin

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staff in September of 2014 from several locations along this collection system for the purposes of assessing water quality. Samples were obtained from the portal entrance, north drainage ditch, south drainage ditch and the polishing pond overflow which reports to the Isle aux Morts River. The results of this sampling campaign are summarized in Table 5.3 Water quality currently discharging from the property is good and there are no exceedances of CCME criteria for the protection of aquatic life or the Newfoundland and Labrador Environmental Control and Sewage Regulation 65/03. A broader baseline surface water monitoring program is scheduled to be implemented at the site and regional study area in 2017 in support of the EA and permitting process.



**Table 5.3 2014 Water Quality Summary**

Physical Tests	MDL <sup>(1)</sup>	UNITS	Reg 65/03 <sup>(2)</sup>	CEQG-PAL <sup>(3)</sup>	PORTAL	NORTH DRAINAGE DITCH WP87	POND OVERFLOW CULVERT WP90	SOUTH DRAINAGE DITCH WP93
					22-SEP-14 @ 16:30	22-SEP-14 @ 16:45	22-SEP-14 @ 17:00	22-SEP-14 @ 17:30
Hardness (as CaCO3)	0.51	mg/L			35.2	121	50.6	23.5
pH	0.1	pH			7.42	7.72	7.54	7.29
Total Suspended Solids	2	mg/L	30 <sup>(4)</sup>		<2.0	<2.0	5.6	<2.0
<b>Anions and Nutrients</b>								
Alkalinity, Total (as CaCO3)	2	mg/L			27	67.3	31.5	13.6
Ammonia, Total (as N)	0.02	mg/L	2		<0.020	<0.020	<0.020	<0.020
Chloride (Cl)	0.1	mg/L		120	4.3	4.17	4.16	4.68
Fluoride (F)	0.03	mg/L		0.120	<0.030	0.032	<0.030	<0.030
Nitrate (as N)	0.03	mg/L	10		0.47	0.249	0.121	<0.030
Nitrite (as N)	0.02	mg/L			<0.020	<0.020	<0.020	<0.020
Total Kjeldahl Nitrogen	0.25	mg/L			0.51	0.38	0.46	0.54
Phosphorus (P)	0.003	mg/L			0.0113	0.008	0.0118	0.0115
Sulfate (SO4)	0.3	mg/L			5.83	54.8	18.3	5.22
<b>Cyanides</b>								
Cyanide, Total	0.002	mg/L	0.025		<0.0020	<0.0020	<0.0020	<0.0020
<b>Organic/Inorganic Carbon</b>								
Total Organic Carbon	1	mg/L			13.3	21.3	16.7	16.1
<b>Total Metals</b>								
Aluminum (Al)	0.005	mg/L			0.112	0.0428	0.0843	0.139
Antimony (Sb)	0.0006	mg/L			<0.00060	<0.00060	<0.00060	<0.00060
Arsenic (As)	0.001	mg/L	0.5	0.005	<0.0010	<0.0010	0.0011	<0.0010
Barium (Ba)	0.01	mg/L	5		0.028	0.026	0.01	<0.010
Beryllium (Be)	0.001	mg/L			<0.0010	<0.0010	<0.0010	<0.0010
Bismuth (Bi)	0.001	mg/L			<0.0010	<0.0010	<0.0010	<0.0010
Boron (B)	0.05	mg/L	5	1.5	<0.050	<0.050	<0.050	<0.050
Cadmium (Cd)	0.000017	mg/L	0.05	0.09	0.000113	0.000201	0.000107	0.000244
Calcium (Ca)	0.2	mg/L			12.7	43.9	16.9	7.81
Chromium (Cr)	0.001	mg/L			<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)	0.0005	mg/L			<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)	0.001	mg/L	0.3	0.002 to 0.00278	<b>0.0109</b>	<b>0.0037</b>	<b>0.006</b>	<b>0.0052</b>
Iron (Fe)	0.02	mg/L	10	0.300	0.138	<b>0.341</b>	0.202	0.124
Lead (Pb)	0.001	mg/L	0.2	0.001 to 0.00406	<0.0010	<0.0010	<b>0.0022</b>	<b>0.0021</b>
Lithium (Li)	0.05	mg/L			<0.050	<0.050	<0.050	<0.050
Magnesium (Mg)	0.02	mg/L			0.819	2.68	2.05	0.979
Manganese (Mn)	0.001	mg/L			0.0239	0.295	0.0513	0.0077
Mercury (Hg)	0.000017	mg/L	0.005	0.000026	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)	0.001	mg/L			<0.0010	0.002	<0.0010	<0.0010
Nickel (Ni)	0.002	mg/L	0.5	0.025 to 0.11048	<0.0020	<0.0020	<0.0020	<0.0020
Potassium (K)	0.5	mg/L			0.73	1.42	0.7	<0.50
Selenium (Se)	0.001	mg/L	0.01	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Silicon (Si)	1	mg/L			1.3	1.3	<1.0	<1.0
Silver (Ag)	0.0001	mg/L	0.05	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)	0.1	mg/L			2.82	2.48	2.53	2.75
Strontium (Sr)	0.001	mg/L			0.0408	0.116	0.0597	0.0273
Tellurium (Te)	0.001	mg/L			<0.0010	<0.0010	<0.0010	<0.0010
Thallium (Tl)	0.0003	mg/L		0.0008	<0.00030	<0.00030	<0.00030	<0.00030
Tin (Sn)	0.001	mg/L			<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)	0.002	mg/L			<0.0020	<0.0020	<0.0020	<0.0020
Tungsten (W)	0.01	mg/L			<0.010	<0.010	<0.010	<0.010
Uranium (U)	0.005	mg/L		0.015	<0.0050	<0.0050	<0.0050	<0.0050
Vanadium (V)	0.001	mg/L			<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)	0.003	mg/L	0.5	0.030	0.0042	0.0136	0.0081	0.0125
Zirconium (Zr)	0.001	mg/L			<0.0010	<0.0010	<0.0010	<0.0010
<b>Radiological Parameters</b>								
Ra-226	0.01	Bq/L			<0.0100	<0.0100	<0.0100	<0.0100

- NOTES:**
- 1) MDL - Laboratory Method Detection Limit, ALS Environmental laboratory, Thunder Bay, Ontario.
  - 2) New foundland and Labrador, Regulation 65/03 under the Environmental Control Water and Sewage Regulations, 2003 under the Water Resources Act (O.C. 2003-231)
  - 3) Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Freshwater Aquatic Life.
  - 4) If water is being abstracted from a water course, used, treated and subsequently returned to the same water course, the total suspended solids data mean that the effluent should not contain more than 30 mg/L more than was in the water originally abstracted.
  - 5) The sample concentrations were not equal to or greater than the Reg.65/03 criteria concentrations.
  - 6) Shaded, bold values indicate concentrations equal to or greater than the CEQG-PAL criteria.

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### 5.1.7 Hydrogeology

There are no historical records for hydrogeology in the regional area surrounding the Project Site. As part of the EA process and Environmental Baseline data collection program, these surveys will be conducted as per previously issued EIS Guidelines for similar mineral development projects in NL. The surveys will take place in 2017 or 2018 and the data included in the EIS or EPR submissions to the government of NL.

### 5.1.8 Fish and Fish Habitat

Information on fish and fish habitat within the surface waters of the regional study area was gleaned from component study reports prepared by the previous owners of the site. Although this data is dated (1989/90) it is still of relevance and will be augmented by further fishery baseline studies to be conducted by Nordmin at the site in 2017 and 2018 as part of the EA and permitting process.

Historical data indicates that species reported to be present in the Isle aux Morts River are; Atlantic salmon (*Salmo salar*), brook trout (*Salvelinus fontinalis*), and American eel (*Anguilla rostrata*). The river was considered to be completely obstructed 3.2 km from the mouth until the two falls were channelized by the Department of Fisheries and Oceans (DFO) in 1961 and is now considered unobstructed clear to the headwaters.

Salmon angling data for 2012 for the Isle aux Morts River, collected by DFO revealed that a total of 177 individual fish were either captured and retained, or released (small and large) over a total of 289 rod/days. This resulted in a catch-per-unit-effort (CPUE) of 0.61. The river is considered to be an important angling river by DFO although fishing effort is restricted to the lower 5 km of river. The removal of the obstructions in 1961 has not dramatically changed the success rate or harvest. The 2012 angling data was compared to historical catch and CPUE data (1952 – 1990) and revealed that individual numbers of fish caught or released has remained fairly constant (mean = 172 vs. 177), while the CPUE has increased (mean = 0.42 vs. 0.61). This may be due to the fact that commercial fishing for salmon was suspended in 1984.

Brook trout are fished in the watershed but mostly in ponds and brooks near the lower reaches of the river.

Fish community data were collected in 1989 by the previous owners as part of the component studies and involved backpack electrofishing of the small brooks and ponds as well as in the river and overnight gill net sets in the deeper ponds. This effort produced 123 Atlantic salmon, 2 brook trout and 1 American eel. These were all captured in the Isle aux Morts River and the lower reaches of Jack Henry's Brook. Most of the salmon captured (52%) were young of the year (age 0+) with the remainder (36%) being either yearlings (age 1+) or 2 year old fish (12%).

The two brook trout that were captured were taken in the lower reaches of Jack Henry's Brook just upstream of the confluence with the Isle aux Morts River. Age of the specimens was estimated to be 0+ and 1+. The single American eel was captured in the river.

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Gill net sets in the deeper ponds to the south of the proposed mine site did not produce any fish. Electroshocking of the interconnecting streams, shoreline areas and shallower sections of these ponds also did not produce any fish.

Level of effort was not recorded so a CPUE could not be calculated for these surveys.

#### **5.1.8.1 Fish Habitat**

Fish habitat mapping was also undertaken as part of the fishery resource component studies conducted in 1989 by the previous owners and is summarized below. Habitat mapping was completed on the entire length of the Isle aux Morts River from the mouth at the Gulf of St. Lawrence to the headwaters upstream of the proposed mine site. The river forks into two branches approximately 6 km upstream from the mouth; the Main Stem branch and the Big Pond branch.

The main stem of the Isle aux Morts comprises 12 sections of river each of which can be categorized into five main habitat types. They are (moving from upstream to downstream):

- i. Section 1 – described as wide well defined channel with steep banks for the first four kilometers of the river. Shoreline is mainly bedrock and heavily wooded with mature spruce and alder that provide some instream cover. Average water depth is one metre or more with some cobble and gravel bars that would be exposed during low flow periods. This section of river has some holding pools and is subject to the highest fishing pressure as the upstream areas are difficult to access on foot. The spawning habitat type could be characterized as Type I and II good for spawning and rearing of salmonid species.
- ii. Section 2 – described as a narrow stretch of rapids and chutes with a substrate of mainly bedrock. The banks are steep and also bedrock with steep vertical cliffs. There are many rapids, riffles and chutes along these sections but they do not pose as an obstacle to upstream migration. The spawning habitat types can be characterized as Type II, good for rearing and III, mostly falls or rapids which are not optimal areas for spawning or rearing.
- iii. Section 3 – described as a wide shallow stretch of river with some slow riffle sections and an average depth of less than one metre. The average width is 20 m with low banks composed of boulders, cobble and sod with a gentle back slope. The substrate in this section of the river is mainly cobble, gravel and boulders with some exposed bars. There is limited shoreline cover and the spawning habitat is Type II and some Type I areas.
- iv. Section 4 – this section is described as having several braided channels with large wooded islands in the middle of the river. The water depth is shallow (< 1m) and is boulder strewn with large banks that would be exposed during low flow periods. The shoreline areas are gently sloping and treed with spruce and alder providing some shade and overhead cover. River substrate here is mainly cobble and gravel which provide good areas for spawning and rearing for salmonid species (Type I and II).

- v. Section 5 – this section is defined as being boulder strewn with an ill-defined streambed. The banks are barren plateau areas indicative of the upper watershed areas of the river with boulders and rock providing the only cover. This section is poor spawning and rearing habitat and is probably not utilized by anadromous salmon or trout. This section is typical of the numerous rivulets and small streams that drain the highland regions of this watershed.

The Big Pond branch of the Isle aux Morts River comprises habitats similar to those described above, with some Type I and II spawning habitats at the section closest to the confluence with the main stem. Upstream of this point is the limit for migrating salmonids due to physical barriers however there are still good rearing areas for trout.

### 5.1.9 Wildlife

Little current information exists on the wildlife common to the Project site and surrounding areas however, some information was obtained from the Environmental Preview Report for the proposed mine access road that was prepared by the previous owners in 1988. Most of this information is anecdotal in nature or based on personal communication with local residents or outfitters. Some information was gathered from game harvesting records as well. This information is summarized below.

#### 5.1.9.1 Large Mammals

Three species of big game are known to inhabit the Project site and surrounding areas. They are: black bear (*Ursus americanus*), woodland caribou (*Rangifer tarandus*), and moose (*Alces alces*). Although no detailed information is available on black bear populations in the area, sightings are common but they are not considered to be abundant in the Project area.

Woodland caribou are by far the most abundant big game in the Project area and surrounding territories however the two major herds ( La Poile, and Long range Barrens) listed in the information available showed that they exist mainly 50 -60 km and 30 -40 km respectively from the proposed mine site. However, some of these caribou migrate south to the Burnt Island Pond area to calve in the spring which is approximately 10 km east of the proposed mine site.

Although some moose habitat does exist in the Project area, it is considered marginal and confined to the river valleys where there is some forest cover. Moose herd numbers are unknown but 1988 harvest records show that the two local outfitters harvested 15 moose each during the season.



### 5.1.9.2 Small and Furbearing mammals

Very little data exists on small game and furbearing mammals in the immediate Project Area but information obtained from historical reports suggest that the area provides habitat for the following species: arctic hare (*Lepus arcticus*), willow ptarmigan (*Lagopus lagopus*), snowshoe hare (*Lepus americanus*), rock ptarmigan (*Lagopus mutus*), red fox (*Vulpes vulpes*), muskrat (*Ondatra gibethicus*), mink (*Mustela vison*), ermine (*Mustela erminea*), beaver (*Castor Canadensis*), and otter (*Lutra Canadensis*).

### 5.1.10 Avifauna

There is some historical information available on raptor resources in the Project area from the component study report prepared by the previous owners and this is summarized below. Information on waterfowl and passerines is not available other than anecdotal references in some reports that the area may be used by migrating waterfowl in the spring and fall and that waterfowl production in the proposed Project area is not considered significant.

Aerial and ground surveys for large raptors were conducted by the previous owners in 1989 as part of the resource component studies. Aerial surveys covering 100 % of the study area and ground surveys covering approximately 30 km of ground within an 8 km radius of the proposed mine site and along the access road were conducted during early June of 1989. Ground surveys involved the use of tape recorded raptor calls to evoke a vocal response if any raptors were present.

The results of the surveys revealed the presence of only one species of raptor. Two ospreys (*Pandion haliaetus*) were sighted during one of the ground surveys. No other raptors were sighted or responded to any of the raptor calls.

Although only one species of raptor was noted during these surveys, the Project area would likely be frequented by other raptor species for hunting, nesting or overwintering such as Bald Eagle (*Haliaeetus leucocephalus*), Northern Harrier (*Circus cyaneus*), American Rough-legged Hawk (*Buteo lagopus*), Northern Goshawk (*Accipiter gentiles*), Sharp-shinned Hawk (*Accipiter striatus*), American Kestrel (*Falco sparverius*), Merlin (*Falco columbarius*), Great Horned Owl (*Bubo virginianus*), Northern Hawk Owl (*Surnia ulula*), Short-eared Owl (*Asio flammeus*), and Boreal Owl (*Aegolius funereus*).

There is currently no data available on migratory birds on or near the Project site. This data will be collected for the EIS.

## 5.2 Human Environment

### 5.2.1 Historic and Heritage Resources

There are no known designated environmentally sensitive or cultural heritage sites within the Project lands. Aboriginal consultation, as well as biological and archaeological assessment work that is planned as part of the EA process will identify environmentally sensitive sites and cultural

heritage sites. An objective of the on-going consultation process with the engaged Aboriginal communities is anticipated to result in the identification of such sites so that they can be considered for preservation during the EA and Project planning process.

A Stage 1 Archaeological Assessment of the Project lands and road corridor will be completed as part of the baseline studies to be undertaken as part of the EA process. This assessment would be conducted by a licensed archaeologist, in accordance with requirements of the Government of NL, with full participation and involvement by the surrounding First Nations to the extent that they are willing to participate.

### **5.3 Potential Environmental Effects to the Biophysical Environment**

Table 5.4 provides a brief overview of the likely adverse environmental effects of the Project on biophysical resources expected in the area, with emphasis on those of key federal interest. Key biophysical attributes identified in Table 5.4 are based only on current information from workers at site and previous environmental baseline studies conducted at the Cape Ray property in the late 1980s when another proponent was preparing an environmental impact statement with respect to potential mine development at the site. Biophysical environmental baseline studies and modeling will commence in 2017 to better characterize the existing environment in the Project area and support the overall issue scoping process for the environmental assessment (federal and provincial). A key element of the planned environmental baseline studies will be to better describe the area in terms of species at risk or any species with special conservation status (provincial or federal).

Table 5.4 also includes key information on the concerns associated with greenhouse gas emissions and potential transboundary issues that need to be considered in the environmental assessment. As stated above, environmental baseline studies and modeling studies will be initiated in 2017 to support the assessment of potential adverse environmental effects on the atmospheric environment which will include greenhouse gas emissions as well as noise and dust emissions.

Table 5.4 also indicates where key federal interests associated with biophysical environmental effects aligns with Environmental Impact Assessment Guidelines for the Project issued by the government of Newfoundland and Labrador.

#### **5.3.1 Additional Federal Environmental Effect Considerations**

Due to the location of the Project, it is not anticipated to result in any changes to the environment on federal lands, on in a province other than Newfoundland and Labrador or outside of Canada. The Project is not located near any provincial, federal, territorial or national borders. The Project is located approximately 170 km from the Nova Scotia border (Cape Breton Island), 300 km from the Quebec border and 450 km from the New Brunswick border. It is also approximately 25 km to the nearest federal lands at Channel – Port aux Basques. The Project does not affect any major waterway with direct connectivity to other jurisdictions.

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**Table 5.4 Biophysical Environmental Effects of the Project related to Sections 16-18 of the Prescribed Information for the Description of Designated Project Regulations**

Table 5.4 Biophysical Environmental Effects of the Project related to Sections 16-18 of the *Prescribed Information for the Description of Designated Project Regulations*

Relevant Section of Regulations Pertaining to Environmental Effects	Context	Key Project Activities	Environmental Planning Studies and Needs (commencing in 2017)	Potential Adverse Environmental Effects	Mitigation	Key EIS Guidelines Cross Reference <sup>1</sup>
Section 16: A description of the physical and biological setting.	Project area largely occurs within the Maritime Barrens Ecoregion of southwest Newfoundland. Brief descriptions of biophysical characteristics are provided in Section 5 of the Project Description.	The Project is mine site infrastructure; access road and haul road upgrading with bridge, and power transmission line erection along road access. There are no marine development or marine shipping aspects of the Project.	Environmental baseline (including biophysical and socio-economic/cultural) conditions will be fully described as part of the environmental assessment requirements (provincial and federal)	Potential adverse environmental effects of the Project are well known as many similar projects have been successfully planned and executed in Newfoundland and Labrador	The Project will be designed to include good management practices and technically proven mitigation measures to protect the environment and prevent pollution. Results for the environmental assessment (provincial and federal) will be used to adjust final design to achieve an acceptable Project.	n/a
	Species at Risk and species with special conservation status:	n/a	Environmental baseline studies and supporting modeling (as appropriate) will be initiated in 2017 to fully investigate the potential occurrence of all provincially and federally protected species (those at risk and those with special conservation status). Consultation will be initiated in 2017 with relevant regulators and resource managers; special interest groups and the public with respect to key concerns and issues associated with natural resources in the area.	n/a	Project will develop a comprehensive environmental, health and safety (EHS) management system to address the EHS needs of the Project based on the results of the Environmental Impact Statement. One aspect of the management system will be an education and awareness program for site workers and visitors that will include any special concerns associated with species at risk and species with special conservation status.	Section 4.21 (pages 50-52): <i>Species at Risk and Species of Conservation Concern</i>
	wildlife (large game, furbearers)	development of Project infrastructure; atmospheric emissions; effluent discharge; traffic; human presence	Likely key species include: caribou, American pine marten and bats (e.g., little brown myotis). Environmental baseline studies will be initiated in 2017 to identify sensitive areas and sensitive periods for key wildlife species that can possibly be avoided in the final general arrangement of facilities or scheduling of key activities. Environmental baseline studies conducted in the area (late 1980s) will also be reviewed.	habitat loss; habitat avoidance; mortality	Project personnel will not be able to hunt and trap at the Project site; vehicles will adhere to speed limits as a safety design feature of site and road operations; sensitive areas and sensitive periods will be avoided; worker and public environmental awareness of key wildlife areas and sensitivities	Section 4.20 (pages 47-49): <i>Avifauna, Caribou, Other Wildlife and Their Habitats</i>

Relevant Section of Regulations Pertaining to Environmental Effects	Context	Key Project Activities	Environmental Planning Studies and Needs (commencing in 2017)	Potential Adverse Environmental Effects	Mitigation	Key EIS Guidelines Cross Reference <sup>1</sup>
Section 16: A description of the physical and biological setting.  (Continued)	migratory birds	development of Project infrastructure; atmospheric emissions; effluent discharge; traffic; human presence	Likely key species include: short-eared owl and rusty blackbird. Environmental baseline studies will be initiated in 2017 to characterized the avifauna occurring in the Project area with particular emphasis on breeding birds and migratory birds. Environmental baseline studies conducted in the area (late 1980s) will also be reviewed.	habitat loss; habitat avoidance; mortality	Project personnel will not be able to hunt at the Project site	Section 4.20 (pages 47-49): <i>Avifauna, Caribou, Other Wildlife and Their Habitats</i>
	fish	Site drainage and erosion from exposed soils; effluent treatment and discharge; containment of accidental spills; water taking; stream/water crossings (access road, power line and haul roads)	Likely the key species is Atlantic salmon that can occur throughout the Isle aux Morts River to the Gulf of St. Lawrence.	Reduced water quality in the Isle aux Morts River; loss or alteration of potential fish spawning habitat (e.g., sedimentation and reduced flows)	Develop a water management plan in consultation with Fisheries and Oceans Canada for the Project that does not impair minimum water flows for Atlantic salmon in the Isle aux Morts River; Project personnel will not be able to fish at the Project site; engineering design of ore and rock placement facilities to prevent acid rock drainage; run-off control and treatment; accidental spill contingency plans to avoid releasing contaminants reaching the Isle aux Morts River; fuel and other hazardous materials storage and handling; buffer zones and erosion control practices	Section 4.19 (pages 45-47): <i>Fish, Fish Habitat and Fisheries</i>

Relevant Section of Regulations Pertaining to Environmental Effects	Context	Key Project Activities	Environmental Planning Studies and Needs (commencing in 2017)	Potential Adverse Environmental Effects	Mitigation	Key EIS Guidelines Cross Reference <sup>1</sup>
Section 16: A description of the physical and biological setting.  (Continued)	aquatic species	development of Project infrastructure; atmospheric emissions; effluent discharge; traffic; human presence	Other fish species occurring in the Isle aux Morts River include: brook trout, American eel (based on late 1980s baseline studies at Cape Ray); the Project has no marine components thus marine plants are not expected to be adversely affected. Environmental baseline studies will be initiated in 2017 to characterize area fisheries and aquatic baseline; previous studies in the late 1980s indicated that area bogs and streams were barren of fish and aquatic species	Reduced water quality in the Isle aux Morts River; loss or alteration of potential fish spawning habitat; reduced flows	Minimize Project footprint; avoid permanent waterbodies to the extent practical; Isle aux Morts River water flow management; accidental spill contingency plans to avoid release of contaminants; run-off control and treatment; erosion prevention; engineering design of ore and rock placement facilities to prevent acid rock drainage	Section 4.19 (pages 45-47): <i>Fish, Fish Habitat and Fisheries</i>
	plants (including mosses and bryophytes; marine plants)	development of Project infrastructure; atmospheric emissions; effluent discharge; traffic; human presence	There are a wide range of possible plant species that may be at risk or have special conservation status in Newfoundland and Labrador and that may occur in the Project area. Environmental baseline studies and modeling (as appropriate) will be initiated in 2017 to characterize the vascular and non-vascular flora of the Project area.	habitat loss; reduced habitat quality	Avoidance of sensitive areas; buffer zones and erosion prevention; accidental spill contingency plans to avoid release of contaminants	Section 4.17 (pages 35-39): <i>Landforms, Soils and Wetlands</i> ; Section 4.20 (pages 47-49): <i>Avifauna, Caribou, Other Wildlife and Their Habitats</i>
	insects	development of Project infrastructure; atmospheric emissions; effluent discharge; traffic; human presence	Environmental baseline studies and supporting models (as appropriate) will be initiated in 2017 and will include the presence and likely occurrence of insects (including butterflies and moths as well as other pollinators) that are considered species at risk or have some special conservation status that may occur in the region	habitat loss; reduced habitat quality	Avoidance of sensitive areas; buffer zones and erosion prevention; accidental spill contingency plans to avoid release of contaminants	Section 4.15: (page 32): <i>Baseline Studies</i> ; Section 4.21 (pages 50-52): <i>Species at Risk and Species of Conservation Concern</i>



Relevant Section of Regulations Pertaining to Environmental Effects	Context	Key Project Activities	Environmental Planning Studies and Needs (commencing in 2017)	Potential Adverse Environmental Effects	Mitigation	Key EIS Guidelines Cross Reference <sup>1</sup>
Wetlands	The Maritimes Barrens Ecoregion is characterized by shallow soils and areas of bedrock controlled topography that has large amount of rainfall and snow pack, with myriad fen and bog complexes, that are typically unnamed. The principle named waterbody in the Project area is the Isle aux Morts River and generally, all project area surface drainage reports there. The Project site access road from Highway 470 requires upgrades with respect to existing culverts and areas of cross drainage, which also reports to the Isle aux Morts River. The power line will be aligned with the road.	development of Project infrastructure; atmospheric emissions; effluent discharge; and run-off from site. Key Project site wetlands are indicated in Figure 2.7 of this Project Description.	Wetlands provide habitat for a wide variety of flora and fauna throughout the year. Included in this is the habitat wetlands provide for waterfowl and other water birds for breeding as well as passage during migration. Environmental baseline studies and modeling (as appropriate) will be initiated in 2017 to better characterize the wetlands within the Project area.	Loss of habitat; avoidance of habitat	General arrangement of Project facilities designed to avoid, to the extent practical, wetlands and low lying area; site personnel will adhere to no hunting provisions; buffer zones; erosion prevention	Section 4.17 (pages 35-39): <i>Landforms, Soils and Wetlands</i>
Section 17: A description of any changes that may be caused, as a result of carrying out the Project, to:	(a) fish and fish habitat as defined by subsection 2(1) of the <i>Fisheries Act</i> .	Reduced flows to the Isle aux Morts River as a result of water demands from Project; sedimentation as a result of site exposed soils and erosion on site;	Likely, the key species is Atlantic salmon that can occur throughout the Isle aux Morts River to the Gulf of St. Lawrence. Other fish species known from the area in the Isle aux Morts River include brook trout and American eel. Previous studies indicate that site area waterbodies such as bogs and wetlands are barren of fish species. Environmental baseline studies will be initiated in 2017 to characterize fish and fish habitat in the Project area.	Loss of habitat; avoidance of habitat; mortality; reduced water quality	Maintain minimum flows for Isle aux Morts River (in consultation with Fisheries and Oceans Canada); erosion prevention; buffer zones; site personnel will adhere to no fishing provisions; accidental spill contingency plans to avoid releasing contaminants to the environment; fuel and other hazardous materials storage and handling procedures; engineering design of ore and rock placement facilities to prevent acid rock drainage; regulatory compliance with Project effluent discharge requirements; adherence to conditions of permits, authorizations and approvals.	Section 4.19 (pages 45-47): <i>Fish, Fish Habitat and Fisheries</i>

Relevant Section of Regulations Pertaining to Environmental Effects	Context	Key Project Activities	Environmental Planning Studies and Needs (commencing in 2017)	Potential Adverse Environmental Effects	Mitigation	Key EIS Guidelines Cross Reference <sup>1</sup>
Section 17: A description of any changes that may be caused, as a result of carrying out the Project, to:	(b) aquatic species, as defined in subsection 2(1) of the <i>Species at Risk Act</i>	Reduced flows to the Isle aux Morts River as a result of water demands from Project; sedimentation as a result of site exposed soils and erosion on site; alteration and loss of wetlands in the project area to support the siting of infrastructure	Other fish species known from the area in the Isle aux Morts River include brook trout and American eel. Previous studies indicate the site area waterbodies such as bogs and wetlands are barren of fish species. Environmental baseline studies will be initiated in 2017 to characterise fish and fish habitat in the Project area. The Project will not likely affect marine habitats and plants.	Loss of habitat; avoidance of habitat; mortality; reduced water quality	Maintain minimum flows for Isle aux Morts River (in consultation with Fisheries and Oceans Canada); erosion prevention; buffer zones; site personnel will adhere to no fishing provisions; accidental spill contingency plans to avoid releasing contaminants to the environment; fuel and other hazardous materials storage and handling procedures; engineering design of ore and rock placement facilities to prevent acid rock drainage; adherence to conditions of permits, authorizations and approvals	Section 4.19 (pages 45-47): <i>Fish, Fish Habitat and Fisheries</i>
Section 18: A description of any changes to the environment that may occur, as a result of carrying out the project, on federal lands, in a province other than the province in which the project is proposed to be carried out or outside Canada.	The Project will likely result in adverse environmental effects restricted to the Province of Newfoundland and Labrador.	The Project will create atmospheric emissions from the combustion of fossil fuels for vehicle and equipment operations as well as dust emissions. Power to the site will be via hydroelectric transmission from the existing grid power available at Highway 470.	n/a	n/a	n/a	n/a
Greenhouse gas emissions		Vehicle and equipment operations; mill operations	Environmental baseline studies and atmospheric dispersion modeling will be initiated in 2017 that will include greenhouse gas emissions as well as noise. Project engineering will mature in 2017 to enable the characterization and quantification of greenhouse gases for environmental assessment purposes as well as reporting.	Reduced air quality; wildlife habitat avoidance (associated with noise emissions); dust deposition on sensitive habitats and plant communities	Operating vehicles and equipment within recommended manufacturer's specifications; regular maintenance; erosion prevention measures for areas of exposed soils; compliance with permits, authorizations and approvals	Section 4.16 (pages 32-34): <i>Atmospheric Environment</i>

**Notes:**

1. Key cross references in Environmental Impact Statement Guidelines for the Cape Ray Gold Partnership Project prepared by the Newfoundland and Labrador Department of Environment and Climate Change (November 2016) - see [http://www.env.gov.nl.ca/env/env\\_assessment/projects/Y2016/1851/index.html](http://www.env.gov.nl.ca/env/env_assessment/projects/Y2016/1851/index.html)

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## 5.4 Financial Support

There is no financial support being provided to the Project by any federal authorities now or in the future.

## 5.5 Potential Effects of Changes to the Environment on Aboriginal Peoples

Section 12(e) of the regulations for *“Prescribed Information for the Description of a Designated Project”* address federal interests in *“the project’s proximity to reserves, traditional territories as well as lands and resources currently used for traditional purposes by Aboriginal peoples”*. Land, water and resource use activities are an important and integral part of the culture and lifestyles of many Aboriginal people and communities, and these be affected by development of the Projects both directly and indirectly.

Nordmin will fully consider in its environmental assessment the concerns and issues associated with potential adverse environmental effects, as appropriate, to Aboriginal Peoples in terms of proximity, historic resources, land and resource use, physical and social effects (including health) on their communities, as well as economy, employment, cultural heritage and business in the Project area. There are two Aboriginal communities currently under consideration. The Qalipu First Nations located near Corner Brook is approximately 150 km away from the Project site and the Miawpukek First Nations community near Bay D’Espoir is approximately 230 km northeast of the Project site.

Nordmin will prepare an aboriginal consultation plan and continue to meet with Aboriginal groups to provide information on the planned Project, to gather appropriate information on the biophysical and social environment, to obtain feedback, and to document their interests and concerns. As appropriate to support the environment assessment, baseline studies will be undertaken to collect information regarding Aboriginal Peoples in terms of socio-economic conditions, land use, and heritage and historic resources. Baseline information will be collected through meetings with Aboriginal groups and governments, information available from published sources (e.g., StatsCanada, Labrador and Aboriginal Affairs Office, federal Aboriginal and Treaty Rights Information System (ATRIS), Provincial Archaeology Office), and field studies.

To provide context to Aboriginal associations in Newfoundland there are two main organizations.

The Mi'kmaq (also Micmac, L'nu and Mi'kmaw) are a First Nations people indigenous to Canada's Maritime Provinces and the Gaspé Peninsula of Quebec. On September 26, 2011 the Government of Canada announced the recognition of Canada's newest Mi'kmaq First Nations Band, the Qalipu First Nations in Newfoundland and Labrador. The new band, which is landless, has accepted 25,000 applications to become part of the band. Its members are recognized as Status Indians, joining other organized Mi'kmaq bands recognized in southeast Canada.

Miawpukek is a Canadian community in Bay d'Espoir on the island of Newfoundland. It was formerly known as "Conne River" until the 1980s. Miawpukek became a permanent community sometime around 1822.

Potential adverse environmental effects on Aboriginal peoples using of the area near the Project, as a result of changes to the environment due to Project activities, could include:

- Possible loss of habitat used by moose which are a traditional food source for aboriginal peoples;
- Potential loss of habitat used by caribou which are a traditional food source for aboriginal peoples;
- Potential loss of access to country foods due to project development and activities; and,
- Potential loss of cultural heritage resources due to direct or indirect project activities.

## 5.6 Environmental Management and Protection

Nordmin will develop a comprehensive environmental, health and safety (EHS) management system to address the EHS needs of the Project based on the results of the Environmental Impact Statement. The range of plans and programs comprising the EHS Management System will likely include:

- Environmental Protection Plan – addressing environmental protection and pollution prevention practices;
- Emergency Response and Contingency Plan – addressing situations of accidents, malfunctions and unplanned events;
- Environmental Awareness and Education Plan – addressing worker and visitor needs with respect to species of concern, sensitive areas and sensitive periods for fisheries, wildlife and cultural resources in the Project area;
- Community Engagement Plan – addressing information sharing, identification of issues and concerns, and optimizing employment and business benefits;
- Monitoring and Follow-up Plan – addressing regulatory compliance monitoring requirements with respect to conditions of permits, authorizations and approvals as well as any identified follow-up needed as a result of the EIS findings
- Auditing and Continuous Improvement Plan – addressing overall EHS performance and striving for continuous improvement in EHS matters.

## 5.7 Nordmin Project Documents

Mineral Resources Estimate Technical Report for the Cape Ray Property; 04, 41, 51 and Windowglass Hill Deposits, NI 43-101 technical report and PEA is filed with SEDAR.

## 5.8 Other Required Environmental Approvals and Permits

A list of potentially applicable Permits and Authorizations that may be required for the Project from Provincial, Federal or Municipal Governments is provided below.

Nordmin will initiate the necessary approvals for the Project following the EA process. Although legislation is continuously evolving, based on the current Project description, approvals are anticipated to be required pursuant to the Acts listed in **Error! Reference source not found..** The specific approvals will be detailed once the EA process has been completed and the project is more clearly defined.



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It is premature to prepare a precisely detailed approvals list until the EA process is completed and each aspect of the Project is better defined. However, this can be provided at a later date if requested.



**Table 5.5 Summary of Anticipated Applicable Acts and Regulations**

Level of Government	Approval Potentially Required	Responsible Agency	Legislation/Act
Federal	Authorization under Section 35 or 36 of the Fisheries Act for potential negative effects to Commercial, Recreational or Aboriginal Fisheries.	Department of Fisheries and Oceans and Environment Canada	Fisheries Act
	Authorization under the Navigation Protection Act	Transport Canada	Navigation Protection Act Transportation of Dangerous Goods Act
	Environmental Assessment, Compliance Standards; Permits that may be required: Metal Mining Effluent Regulation authorizations	Environment and Climate Change Canada, Canadian Environmental Assessment Agency	Migratory Birds Convention Act Canadian Environmental Protection Act 1999 Canadian Environmental Assessment Act 2012 Species at Risk Act Federal Policy on Wetland Conservation
	Explosives User Magazine Licence	Natural Resources Canada	Explosives Act
Provincial	<u>Surface Lease</u> – Areas to be developed for mining should be held under a Surface Lease.	Mineral Development Division, Department of Natural Resources	Mining Act
	<u>Mineral Exploration Approval</u> – An application for approval must contain a detailed plan and description of the exploration activities	Mineral Development Division, Department of Natural Resources	Mineral Act and Mineral Regulations
	Environmental Assessment <u>Water Use Licence</u> – Water withdrawals for use at temporary camps or during construction and operation. Certificate of Approval for Water withdrawal system of > 4,500 L/d. Water supply for construction or operations activities.	Department of Environment and Conservation	Water Resources Act Environmental Protection Act Environmental Assessment Regulations
	Certificate of Approval for Septic System > 4,546 L/d and for drilled wells. Certificate of Approval for Storage and Handling of Gasoline and Associated Products Fuel cache Permit	Engineering Services Division, Service Newfoundland	Environmental Protection Act
	<u>Quarry Permit</u> – to dig, excavate and extract quarry borrow material for construction purposes	Mineral Lands Division, Department of Natural Resources	Quarry Materials Act and Regulations
	Cutting Permit Operating Permit Permit to Burn	Forestry Branch, Department of Natural Resources	Forestry Act and Regulations
	Certificate of Approval for installation of a water supply and Sewage system.	Water Resources Division, Department of Environment and Conservation.	Health and Community Services Act and Regulations
	Permit for Storage, Handling, Use or Sale of Flammable and Combustible Liquids	Engineering Services Division, Service Newfoundland	Fire Protection Act
Municipal	Approval for Waste Disposal – the operation of a waste disposal site may require municipal approval. License to operate a temporary work camp.	Community Council	Municipal Plan and Development Regulations



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## 6. Consultation

### 6.1 Aboriginal, Community and Social Requirements

Aboriginal and community engagement will be an integral part of the Environmental Assessment process should the project move forward. Consultation plans will be developed for Aboriginal groups, local communities and other interested persons including NGO's and implemented to provide feedback on social and community impacts from the project.

In addition to community meetings, Aboriginal organizations and the public will have several opportunities for participation and feedback during the EA process. The project proponent will also provide current information to the communities most likely affected by the project as early as possible and at key points of the project development. This will ensure that all stakeholders have an opportunity to gain an understanding of the proposed Project and may facilitate their continued involvement in the EA process.

A record of all consultation efforts will be kept which will describe key stakeholder groups, summarize comments heard, and identify key issues of concern and responses.

### 6.2 Governmental Consultation

Consultation with government agencies will be scheduled at key points during the EA process and project development.

The following government agencies will be engaged as required by the EA process and for general project updates on an ongoing basis:

**Newfoundland and Labrador Government:**

Department of Environment and Conservation – Environmental Assessment Division

Department of Natural Resources – Mineral Lands Division

**Federal Government:**

Canadian Environmental Assessment Agency (CEAA)

Fisheries and Oceans Canada (DFO)

**Municipal Governments:**

Municipalities of Port aux Basques and Isle aux Morts

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## 7. Closure

In closing we trust that the contents of this EA Registration fulfills the requirements of provincial and/or federal environmental assessment legislation under the provincial Environmental Protection Act (EPA, 2002), and CEEA 2012 and the Prescribed Information for the Description of a Designated Project Regulations (SOR/2012 – 148)

We look forward to your review and assessment of this document.

## 8. References

- I. *Government of Newfoundland and Labrador Department of Environment and Conservation Labrador Environmental Assessment A Guide To the Process.*
- II. *Newfoundland and Labrador Regulation 54/03 Environmental Assessment Regulations, 2003 Under the Environmental Protection Act (O.C. 2003-220) (filed May 23, 2003)*
- III. *Newfoundland And Labrador Regulation 65/03 Environmental Control Water And Sewage Regulations, 2003 Under The Water Resources Act (O.C. 2003-231) Amended By: 23/09 Newfoundland And Labrador Regulation 65/03 Environmental Control Water And Sewage Regulations, 2003 Under The Water Resources Act(O.C. 2003-231) (Filed May 23, 2003)*
- IV. *Consolidated Newfoundland and Labrador Regulation 1143/96. Mineral Regulations Under The Mineral Act(O.C. 96-299) Amended by: 57/97, 85/97, 71/98, 104/98, 107/98, 32/99, 38/99, 81/99, 97/00, 36/01, 2001 c42 s45, 31/04, 16/05, 46/06, 78/06, 100/06, 2006 c40 s12, 8/08, 28/09, 63/09, 20/10, 66/10, 5/13, 79/14, 34/15.*
- V. *Environmental Guidelines For Construction And Mineral Exploration Companies*
- VI. *Raptor Resources Component Study For the Cape Ray Environmental Impact Statement*
- VII. *Prepared for: Dolphin Explorations Limited Suite 1900 Adelaide st. Toronto, Ontario M5H 1T1 Prepared By: Ledrew, Fudge And Associates Limited 607 Torbay Road St. John's, Newfoundland A1A 2Y3 F-213 10 April 1990.*
- VIII. *An Environmental Preview Report For The Proposed Access Road To The Cape Ray Exploration Site S. Fudge And Associated Limited*
- IX. *Wildlife Caribou Component Study For The Cape Ray Environmental Impact Statement Prepared For: Dolphin Explorations Limited Suite 1900 Adelaide St. Toronto, Ontario M5H 1T1 Prepared By: Ledrew, Fudge And Associates Limited 607 TORBAY ROAD ST. JOHN'S, NEWFOUNDLAND A1A 2Y3 F-212 August 20, 1990*
- X. *Ecological Land Classification Component Study For The Cape Ray Environmental Impact Statement Prepared For: Dolphin Explorations Limited Suite 1900 Adelaide st. Toronto, Ontario M5H 1T1 Prepared By: Ledrew, Fudge And Associates Limited 607 Torbay Road St. John's, Newfoundland A1A 2Y3 I-246 10 August 1990*
- XI. *Fisheries Resource Component Study Environmental Impact Statement Prepared For: Dolphin Explorations Limited Suite 1900 Adelaide St. Toronto, Ontario M5H 1T1 Prepared By: Ledrew, Fudge And Associates Limited 607 Torbay Road St John's, Newfoundland 1A1 2Y3 April 25, 1990 I-247*
- XII. *Kilborn Consulting Engineers And Architect Kilborn Limited. 2200 Lake Shore Boulevardwest. Toronto, Canada MAV 1A4. January 12, 1990 file 3714 15. corr/1*
- XIII. *Dolphin Explorations Ltd. 120 Adelaide Street West Suite 1900 Toronto, Ontario. M5H 1T1 Reference: Cape Ray Project Feasibility Study*
- XIV. *Guidelines For The Assessment Of Alternatives For Mine Waste Disposal Cape Ray Waste Management System Feasibility Study Prepared For Dolphin Explorations Limited By D. Comrie Consulting Ltd. 120 Traders Boulevard East Suite 209 Mississauga, Ontario LAZ 2H7 April 24, 1989*
- XV. *Dubé, B. & Lauzière, K. (1997). Gold Metallogeny of the Cape Ray Fault Zone, southwestern Newfoundland; Geological Survey of Canada Bulletin 508. 90 p.*
- XVI. *Arnold, R. (1988). 1988 Surface Diamond Drilling Report on the Cape Ray Project, SW Newfoundland. Fourth year assessment report on diamond drilling exploration for the Cape Ray Project for licence 2875 on claim blocks 3297-3302 and 3843-3846 in the Isle aux Morts River area, southwestern Newfoundland.*



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- Unpublished report for Dolphin Explorations Ltd. and Corona Corporation, Newfoundland and Labrador Geological Survey, Assessment File 110/0325; 1567 pp.*
- XVII. *Wilton, D.H.C. & Strong, D.F. (1986). Granite-related gold mineralization in the Cape Ray Fault Zone of southwestern Newfoundland. Economic Geology, v. 81. p. 281-295.*
- XVIII. *Ford, G. (1985). First year assessment report on underground geological exploration and feasibility study for the Cape Ray project for licence 2443 on property in the Isle aux Morts River area, southwestern Newfoundland, 2 reports. Unpublished reports for New Venture Equities Limited. Newfoundland and Labrador Geological Survey, Assessment File 110/0171, 197 pp.*
- XIX. *Wilton, D.H.C. (1983a) Metallogenic, tectonic and geochemical evolution of the Cape Ray Fault Zone, with emphasis on electrum mineralization; Ph.D. thesis, Memorial University of Newfoundland, St. John's, Newfoundland. 618 p.*
- XX. *Wilton, D.H.C. (1983b) The geology and structural history of the Cape Ray Fault Zone in southwestern Newfoundland. Canadian Journal of Earth Sciences, v. 20. p. 1119-1133.*
- XXI. *Mining Association of Canada (2011) A Guide to the Management of Tailings Facilities, Second Edition, 68 p.*