DIRECT-SHIPPING ORE PROJECT

PROJECT REGISTRATION

Assessment Group 2b / Project 2b

Submitted to the Government of Newfoundland and Labrador in accordance with the

***Environmental Protection Act* (SNL 2002, c. E-14.2)**

Presented by :

New Millennium Capital Corp.
1303, avenue Greene, 2e étage
Montréal (Québec) H3Z 2A7
T: (514) 935-3204; F: (514) 935-9650

Prepared by :

Paul F. Wilkinson & Associés inc.
5800, avenue Monkland, 2e étage
Montréal (Québec) H4A 1G1
T: (514) 448-9595 ; F: (514) 482-0036

December 2009

Table of Contents

List of Tables

List of Figures

List of Acronyms

±	approximately
º	degree
ºC	degree Celsius
%	percentage
µg/m^3	microgramme per cubic metre
µm	micron
µmho/cm	micro mho per centimetre
µS/cm	micro siemens per centimetre
asl	above sea level
ARD	acid rock drainage
Ca	calcium
CEAA	*Canadian Environmental Assessment Act*
cm	centimetres
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
dBA	A-weighted decibel
DFO	Department of Fisheries and Oceans Canada
DNA	deoxyribonucleic acid
DSO	direct shipping ore
DSOP	Direct-Shipping Ore Project
E	East
EIS	environmental impact statement
ELAIOM	Elross Lake Area Iron Ore Mine
EPA	*Environmental Protection Act*
EPR	environmental preview report
FAPAQ	Société de la faune et des parcs du Québec
GNL	Government of Newfoundland and Labrador
GoC	Government of Canada
GoQ	Government of Québec
ha	hectare
HST	High Subarctic Tundra
INAC	Indian and Northern Affairs Canada
IOCC	Iron Ore Company of Canada
K	potassium
km	kilometre
km^2	square kilometre
km/h	kilometre per hour
LIM	Labrador Iron Mines Ltd.
LIOP	LabMag Iron Ore Project
m	metre
m^3	cubic metre
mg	milligram
Mg	manganese
mg/L	milligram per litre
mm	millimetre
MN	Nuttli magnitude
MRNF	ministère des Ressources naturelles et de la Faune
MSF	Mid Subarctic Forest
Mt	million tonnes
Mt/y	million tonnes per year
N	North
Na	sodium
NIMLJ	Nation Innu Matimekush-Lac-John
NLBP	Newfoundland and Labrador Benefits Plan

NML	New Millennium Capital Corp.
NOC	National Occupational Classification
pH	hydrogen potential
PM	particulate matter
PNL	Province of Newfoundland and Labrador
PQ	Province of Québec
ROM	run-of-mine (ore)
S	South
SARA	*Species at Risk Act*
SF	sinter fines
SPF	super fines
Tata Steel	Tata Steel Global Minerals Holdings Pte Limited
TEK	traditional ecological knowledge
W	West

Note on Nomenclature

The terms "Project" and "DSOP" refer to all of the assessment groups forming the Direct-Shipping Ore Project (Figure 1.1).

The term "Project 1a" refers to the Elross Lake Area Iron Ore Mine.

The terms "Project 1b", "Project 2a" and "Project 2b" refer to the exploitation of the deposits that are part of Assessment Groups 1b, 2a and 2b respectively.

Scoping of the Project Registration

For purposes of mining, the Direct-Shipping Ore Project is divided into Phase 1 and Phase 2, the deposits of Phase 1 being located in areas already disturbed by previous mining activities.

For purposes of EIA, the Project is divided into five “Assessment Groups”, which reflect principally the applicable environmental impact assessment regimes.

Table 1.1 illustrates the relationship between the mining phases and the Assessment Groups. Figure 1.1 illustrates the location of the deposits forming the five Assessment Groups.

Table 1.1: Subdivision for Purposes of Environmental Impact Assessment

Mining Designation	Assessment Designation	Deposits	Province
Phase 1	Assessment Group 1a	Timmins 3N, 4, 7, Fleming 7N	Labrador
Phase 1	Assessment Group 1b	Ferriman 4	Québec
Phase 2	Assessment Group 2a	Goodwood, Sunny 1, Kivivic 3S, Leroy 1	Québec (N of 55^{o} N)
Phase 2	Assessment Group 2b	Kivivic 1C, 2, 3N, 4, 5, Timmins 8	Labrador
Phase 2	Assessment Group 2c	Barney 1, 2, Sawmill 1, Fleming 6, Star Creek 2, Timmins 3S, Fleming 7 Ext	Québec (S of 55^{o} N)

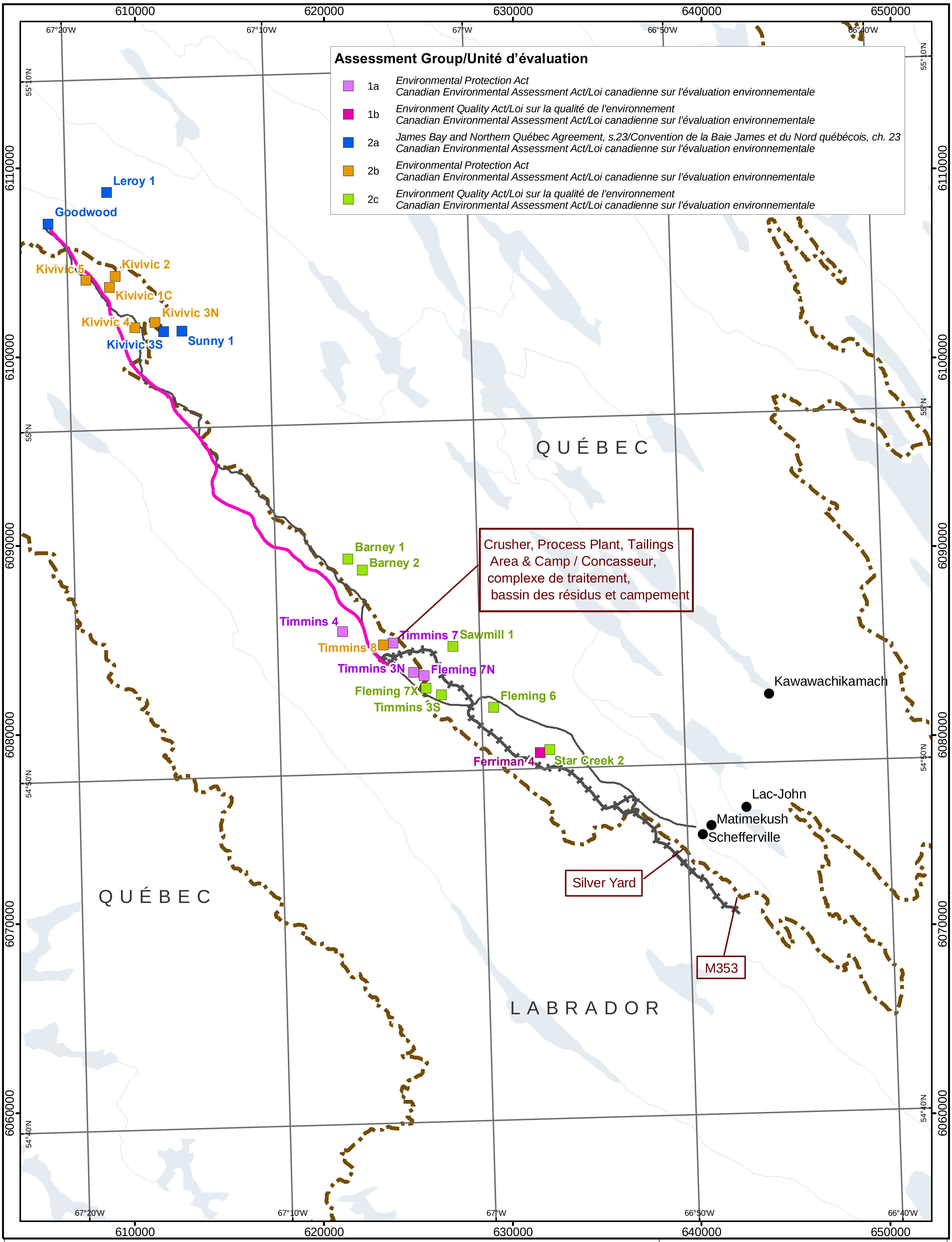
The present registration document is submitted pursuant to section 49 of the EPA in order to permit the minister of the Department of Environment and Conservation to discharge the responsibilities contemplated at section 50 and 51 of the EPA.

Project 2b cannot proceed if the ELAIOM (Project 1a) is not brought into operation, since the ore that would be mined at the Project 2b deposits would be processed at the treatment complex that forms part of Project 1a, and the processed ore (SF and SPF) would be transported from that complex to the main rail line linking Schefferville to Sept-Îles along the rail spur from Timmins 1 to Mile Post 353 that will be re-built as part of Project 1a.

An EIS for Project 1a has been submitted to the GNL, and an EIS for the explosives factory and magazines and the above rail spur has been submitted to the GoC. If the authorizations required for Project 1a, including the explosives factory and magazines and the reconstructed rail spur, are not granted, the present registration document will be withdrawn or amended.

Figure 1.2 shows that the ore from the Project 2b deposits will be trucked to the processing complex via a new haul road connecting DSO3 and DSO4. That same road will be used to haul the ore from the Project 2a deposits, which are located in the PQ north of the 55th parallel. That road is situated partly in the PQ and partly in the PNL.

As agreed in a telephone conference held on November 25, 2009, the parts of the road located in the PQ will be assessed as part of Project 2a, while those located in the PNL will be assessed as part of Project 2b. If Project 2a is not approved, an alternative to the section of the road located in the PQ between the ruisseau La Potardière and Kivivic Brook will be proposed, since that portion of the road is required for Project 2b.

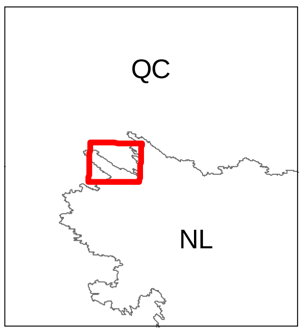


Assessment Groups of the DSOP / Unités d'évaluation du DSOP

Figure 1.1

LEGEND/LÉGENDE

- Proposed haul road/Voie de halage proposée
- Railway to be reconstructed/Chemin de fer à reconstruire
- Main access road/Chemin d'accès principal
- Border/Frontière: Québec-Labrador



0 2 4 8

KILOMETRES/KILOMÈTRES

SCALE/ÉCHELLE: 1:200,000

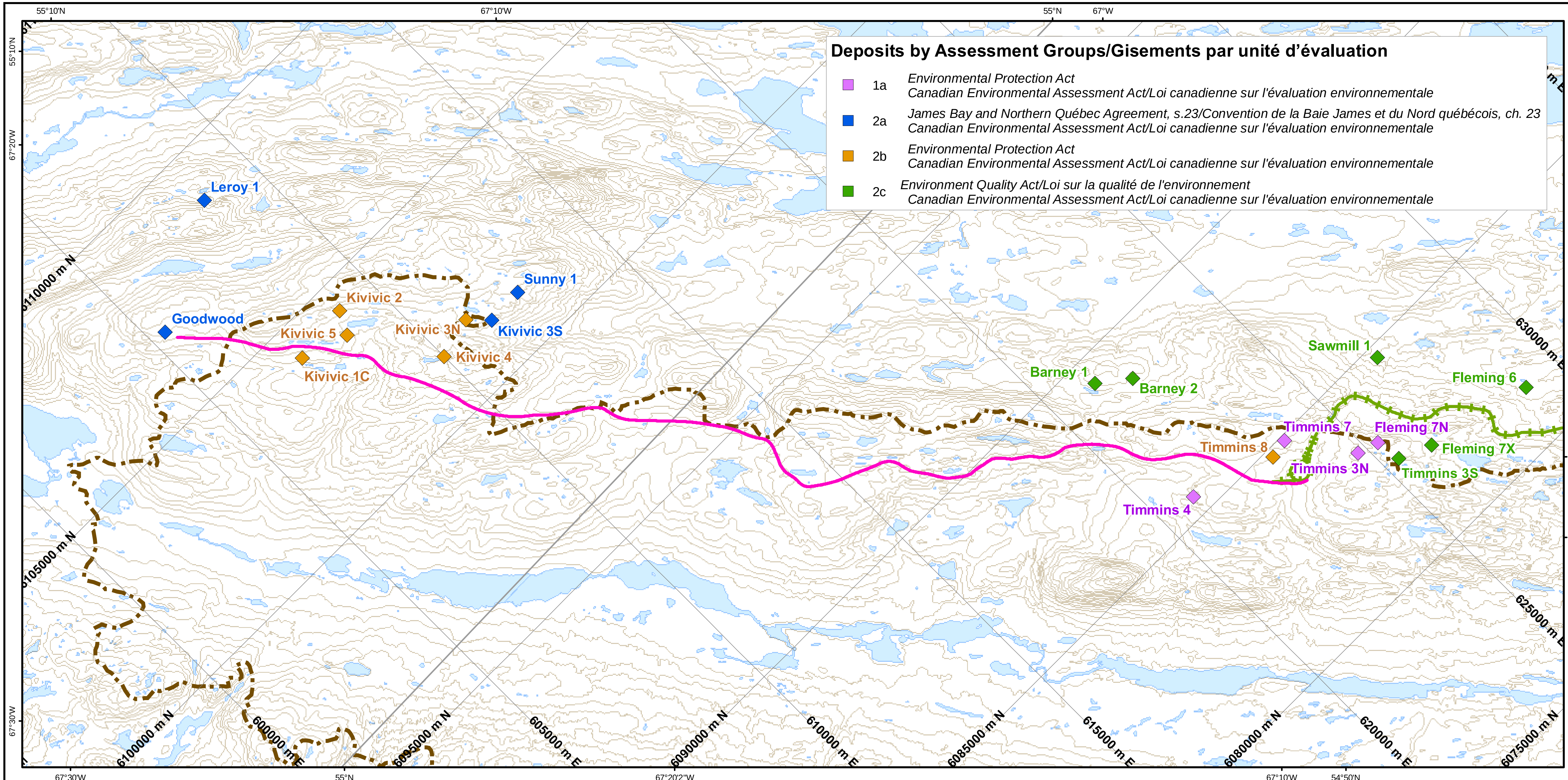
UTM 19N NAD 83

FILE, VERSION, DATE, AUTHOR/ FICHIER, VERSION, DATE, AUTEUR: GIS-0127-00 , 2009-11-25 , L.C.

SOURCES: New Millennium Capital Corp.

CONFIDENTIAL & COMERICALLY PROTECTED
CONFIDENTIEL & PROTÉGÉ COMMERCIALEMENT

NEW MILLENNIUM CAPITAL CORP.



DSO3-DSO4 Proposed Haul Road / Voie de halage reliant DSO3 et DSO4

0 1 2 4
KILOMETRES/KILOMÈTRES

SCALE/ÉCHELLE:
1:100,000

UTM 19N NAD 83

LEGEND/LÉGENDE

- Proposed haul road/Voie de halage proposée
- Railway to be reconstructed/Voie ferrée à reconstruire
- Border/Frontière: Québec-Labrador

Figure 1.2

FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR:
GIS-0110-04 , 2009-11-26 , L.C.

SOURCES:
New Millennium Capital Corp.

CONFIDENTIAL & COMERICALLY PROTECTED
CONFIDENTIEL & PROTÉGÉ COMMERCIALEMENT
NEW MILLENNIUM CAPITAL CORP.

1.0 NAME OF UNDERTAKING

Direct-Shipping Ore Project. Assessment Group 2b / Project 2b.

2.0 PROPONENT

Name:	New Millennium Capital Corp.
Address:	1303 Greene avenue, 2nd floor
	Westmount, Qc, H3Z 2A7
Telephone:	(514) 935-3204
Fax:	(514) 935-9650
Email:	journeauxh@aol.com
Project Manager:	Dean Journeaux

Consultant Mandated by the Proponent

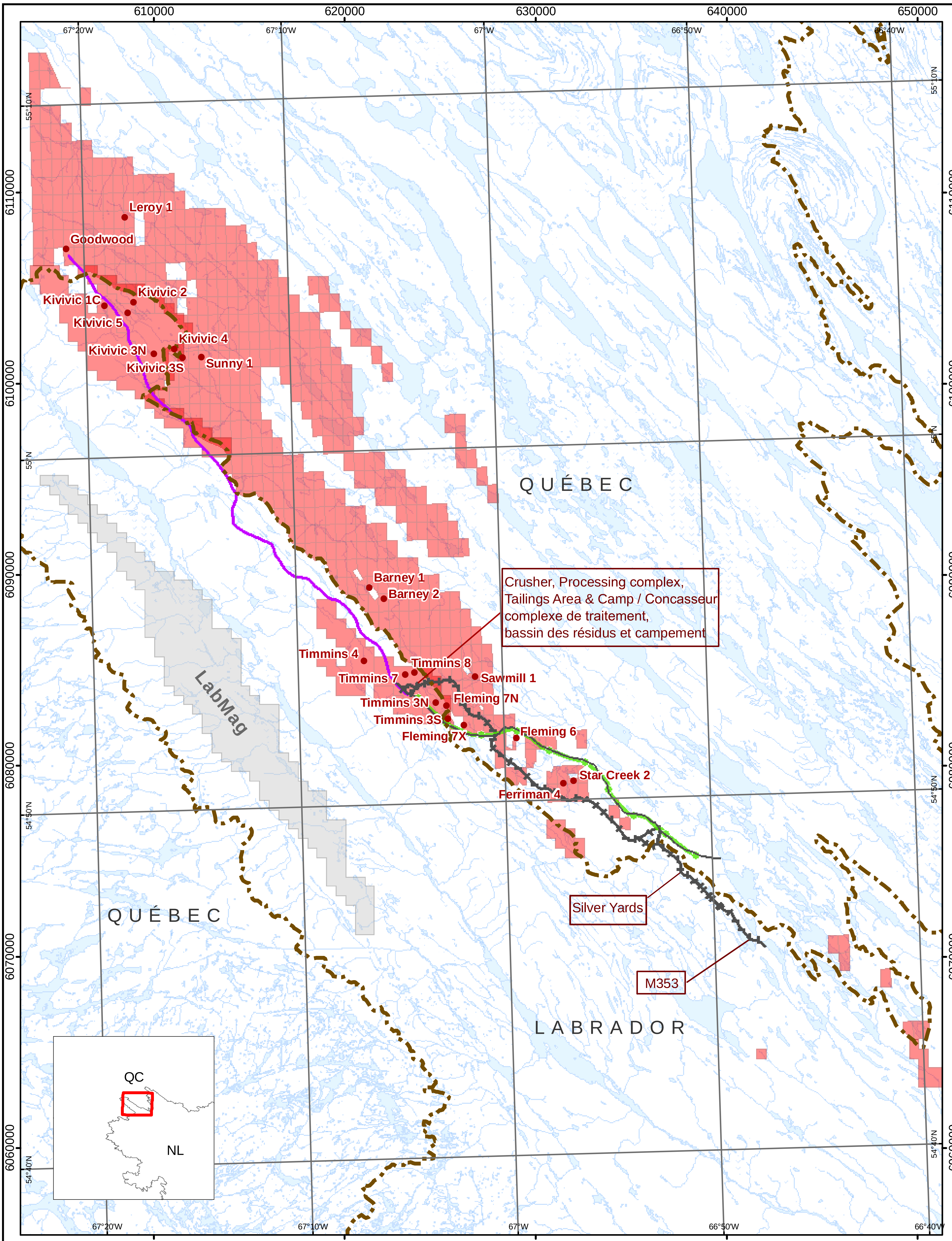
Name:	Paul F. Wilkinson & Associates Inc.
Address:	5800 Monkland avenue, 2nd floor
	Montréal, Qc, H4A 1G1
Telephone:	(514) 448-9595
Fax:	(514) 482-0036
Email:	pfw@wilkinson.ca / masella@wilkinson.ca
Project Manager:	Paul F. Wilkinson / Brigitte Masella

3.0 THE UNDERTAKING

3.1 Nature of the Undertaking

3.1.1 Proposed Undertaking

The proposed undertaking involves mining iron ore at the Kivivic 1C, 2, 3N, 4 and 5 and the Timmins 8 deposits (Figure 3.1) and transporting it to the processing complex at Timmins 1. It does not involve processing the ore or transporting it to Sept-Îles. Table 3.1 provides data on the area and the coordinates of the relevant deposits.



DSOP Project Location
Localisation du DSOP

0 2.5 5 10
KILOMETRES/KILOMÈTRES

SCALE/ÉCHELLE: 1:200,000

UTM 19N NAD 83

FILE, VERSION, DATE, AUTHOR/ FICHIER, VERSION, DATE, AUTEUR:
GIS-0030-17 , 2009-12-07 , L.C.

SOURCES: New Millennium Capital Corp.

LEGEND/LÉGENDE

- DSO Deposit/Gisement DSO
- Border/Frontière: Québec-Labrador
- Main access road/Chemin d'accès principal
- Proposed electrical power line/Ligne de transport d'énergie proposée
- Railway to be reconstructed/Chemin de fer à reconstruire
- Proposed haul road options/Voie de halage proposée
- DSO Claim/Titre minier 'DSO'

Figure 3.1

Table 3.1: Area and Coordinates (Centre Point) of Deposits

Deposit	Area (ha)	Longitude (Decimal Degrees)	Latitude (Decimal Degrees)
Kivivic 1C	6.8	- 67.347749	55.071824
Kivivic 2	14.7	- 67.295409	55.075288
Kivivic 3N	13.4	- 67.261775	55.051313
Kivivic 4	24.0	- 67.279175	55.049564
Kivivic 5	11.8	- 67.298640	55.068744
Timmins 8	2.1	- 67.078795	54.893976

3.1.2 Capital Cost

The capital cost is not expected to exceed $1,517.

3.1.3 Related Projects

The only related project in the PNL is Project 1a (the “ELAIOM”), for which an EIS has already been tabled.

There are three related projects in the PQ, which involve respectively mining the deposits constituting Assessment Groups 1b, 2a and 2c.

An EIS for Project 2a will be submitted in spring 2010, and it is hoped that mining there will start in 2012. There are as yet no dates for the start-up of Projects 1b and 2c.

3.2 Purpose/Rationale/Need for the Undertaking

An important part of the agreement between NML and Tata Steel Global Minerals Holdings Pt Limited (“Tata Steel”) is that the latter will purchase the entire production of the DSOP throughout its entire life.

NML anticipates that Project 1a, the first component of the DSOP, will begin in 2011.

In order to produce the type of product required by Tata Steel in the required amount, NML will need the ore from Kivivic 3N by 2013. Two of the Project 1a deposits, Timmins 7 and Fleming 7N, will be exhausted by 2013, and NML will need the ore from all of the Project 2b deposits to allow it to meet its target of producing 4 Mt of SF and SPF annually.

Objectives

The objective of Project 2b is to mine approximately 10.6 Mt of ore over 10 years from the Kivivic 3N, Kivivic 4 and Kivivic 5 deposits, and an undetermined volume from the Kivivic 1C, Kivivic 2 and Timmins 8 deposits. In order to do so, approximately 18.3 Mt of waste rock would be mined from Kivivic 3N, Kivivic 4 and Kivivic 5, and an undetermined volume would be mined at Kivivic 1C, Kivivic 2 and Timmins 8. The ore would be processed into SF and SPF at the processing complex built as part of Project 1a.

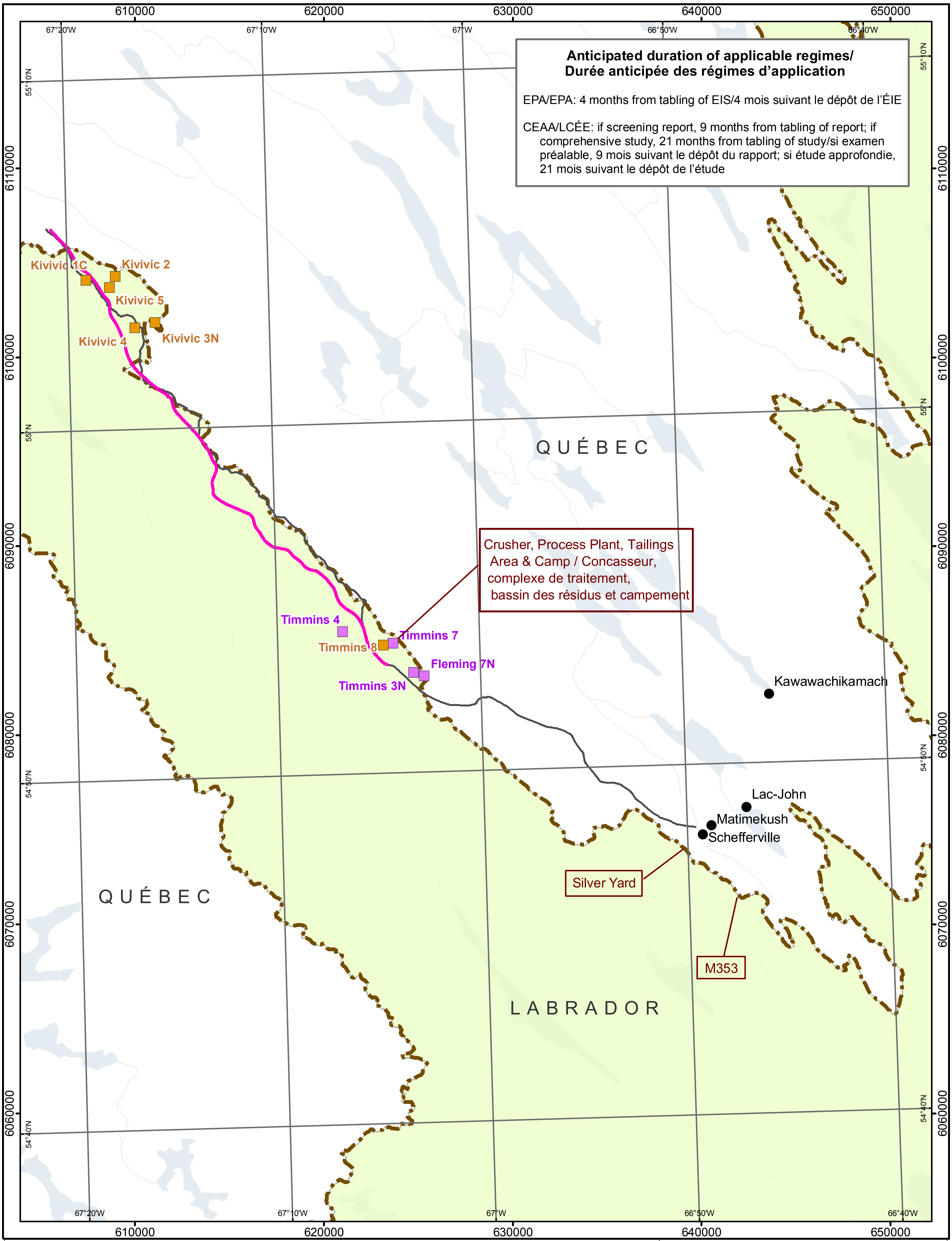
4.0 DESCRIPTION OF THE UNDERTAKING

4.1 Alternatives to the Undertaking

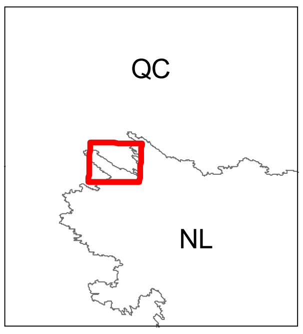
As explained in NML and PFWA (29 April, 2008), the decision to develop Project 1a as part of Phase 1 of the DSOP was motivated by the fact that it was located in an are already affected by mining, where NML could take advantage of some existing infrastructure. There are no alternatives to the undertaking for Phase 2 of the DSOP.

4.2 Geographical Location

Figure 3.1 illustrates the location of the two phases of the DSOP. Figure 4.1 shows the location of Project 2b, the mines of which are located in the PNL some 45 km northwest of Schefferville, with the exception of the Timmins 8 deposit, which is located some 20 km northwest of Schefferville.



Location of Project 2b /
Localisation du Projet 2b
Figure 4.1



0 2 4 8
KILOMETRES/KILOMÈTRES

SCALE/ÉCHELLE:
1:200,000

UTM 19N NAD 83

LEGEND/LÉGENDE

- 1a — *Environmental Protection Act*, *Canadian Environmental Assessment Act/Loi canadienne sur l'évaluation environnementale*
- 2b — *Environmental Protection Act*, *Canadian Environmental Assessment Act/Loi canadienne sur l'évaluation environnementale*
- Proposed haul road/Voie de halage proposée
- Main access road/Chemin d'accès principal
- Border/Frontière: Québec-Labrador
- EPA application area/aire d'application de la EPA

FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR:
GIS-0127-00 , 2009-11-25 , L.C.

SOURCES: New Millennium Capital Corp.

CONFIDENTIAL & COMERICALLY PROTECTED
CONFIDENTIEL & PROTÉGÉ COMMERCIALEMENT

NEW MILLENNIUM
CAPITAL CORP.

4.3 Physical Features

4.3.1 Major Physical Features of the Undertaking

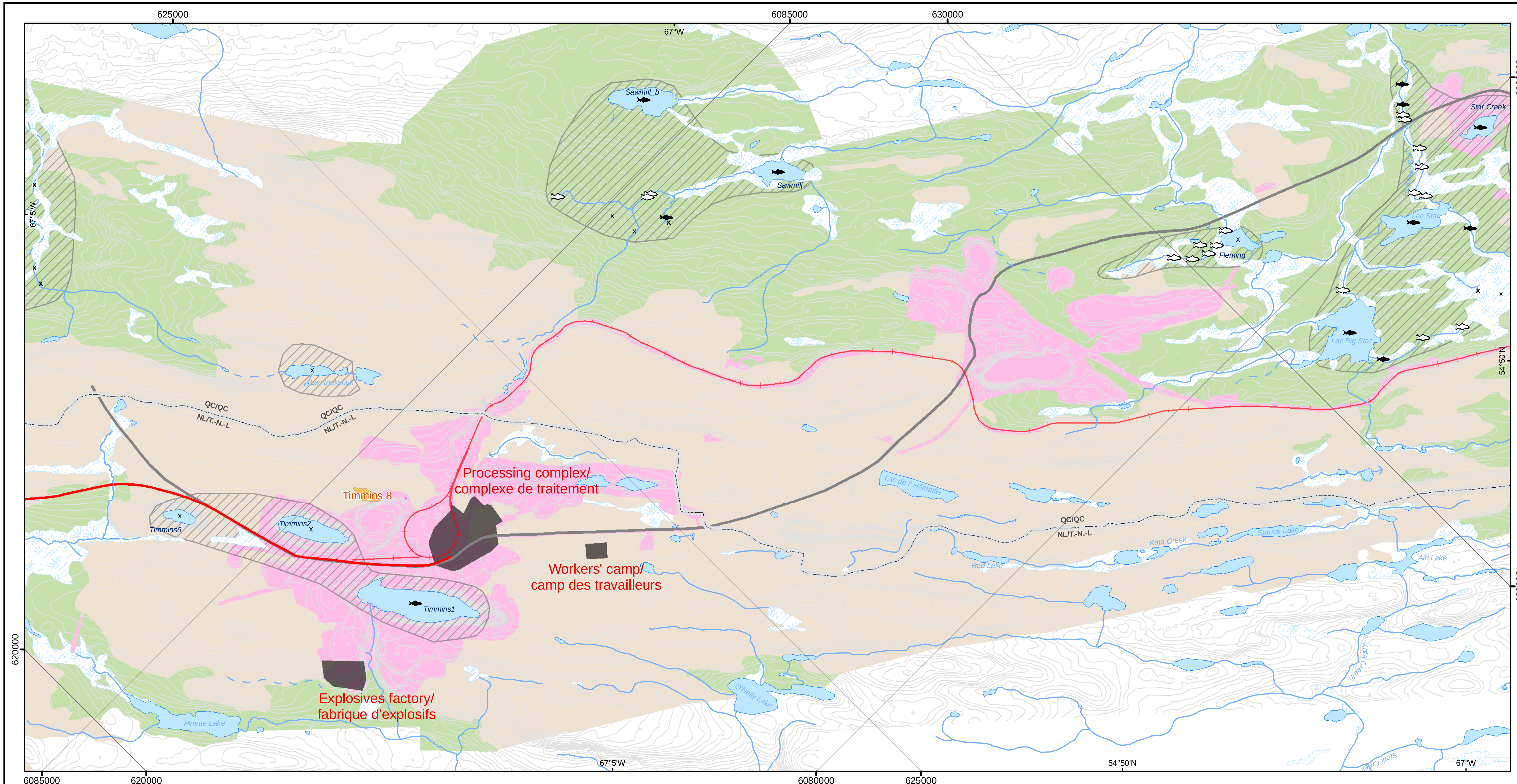
Figure 4.2 (in three parts) shows the major physical features of the undertaking, which can be summarized as follows:

- six pits;
- three or four waste rock dumps;
- roughly four sedimentation ponds for water pumped from the pits;
- roughly 15 km of short haul roads between the pits and the road between DSO3 and DSO4. The driving surface of those roads will be 12 m, and their full width including drainage ditches (where needed) will be 16 m;
- roughly 27 km of the haul road between DSO3 and DSO4, which will have the same dimensions as the short haul roads described above.

4.3.2 Area to be Affected by the Undertaking

The total area that will be affected by the undertaking cannot be calculated precisely since the length of the roads, the area of the pits (as opposed to the area of the deposits) and the area of the waste rock dumps are not yet known.

Based on Table 3.1 and on the information presented in Section 4.3.1, it is likely to be of the order of 100-200 ha distributed over six sites.



LEGEND/LÉGENDE

Fish habitat/habitat du poisson

- x No potential/ aucun potentiel
- Potential/ potentiel
- Confirmed/ confirmé

- Infrastructure footprint/ empreinte de l'infrastructure
- Fishing zone, fish habitat study/ zone pêchée, étude sur l'habitat du poisson
- Disturbed area/aire perturbée
- Mid Subarctic Forest/ forêt subarctique moyenne
- High Subarctic Tundra/ toundra subarctique supérieure

- Watercourse/cours d'eau
- Intermittent watercourse/ cours d'eau intermittent
- Torrential channel/ chenal torrentiel
- Disappearing watercourse/ cours d'eau disparaissant
- Artesian spring/ source jaillissante
- Waterbody/ plan d'eau
- Disappearing pond/ étang disparaissant
- Wetland/milieu humide

- Border/frontière
- Main access road/ route d'accès principale
- Proposed haul road/ voie de halage proposée
- Projected railway/ voie ferrée projetée

Assessment group/ unité d'évaluation

- 2b

*Hydronyms are oriented along the direction of water flow
*Les hydronymes sont orientés selon le sens d'écoulement de l'eau

Infrastructure Concept and Main Biophysical Characteristics

Concept des infrastructures et caractéristiques biophysiques principales

Project / Projet
- 2b -

0 0,5 1 1,5 2
Kilometers/kilomètres

SCALE/ÉCHELLE:
1:35 000

UTM 19N NAD 83

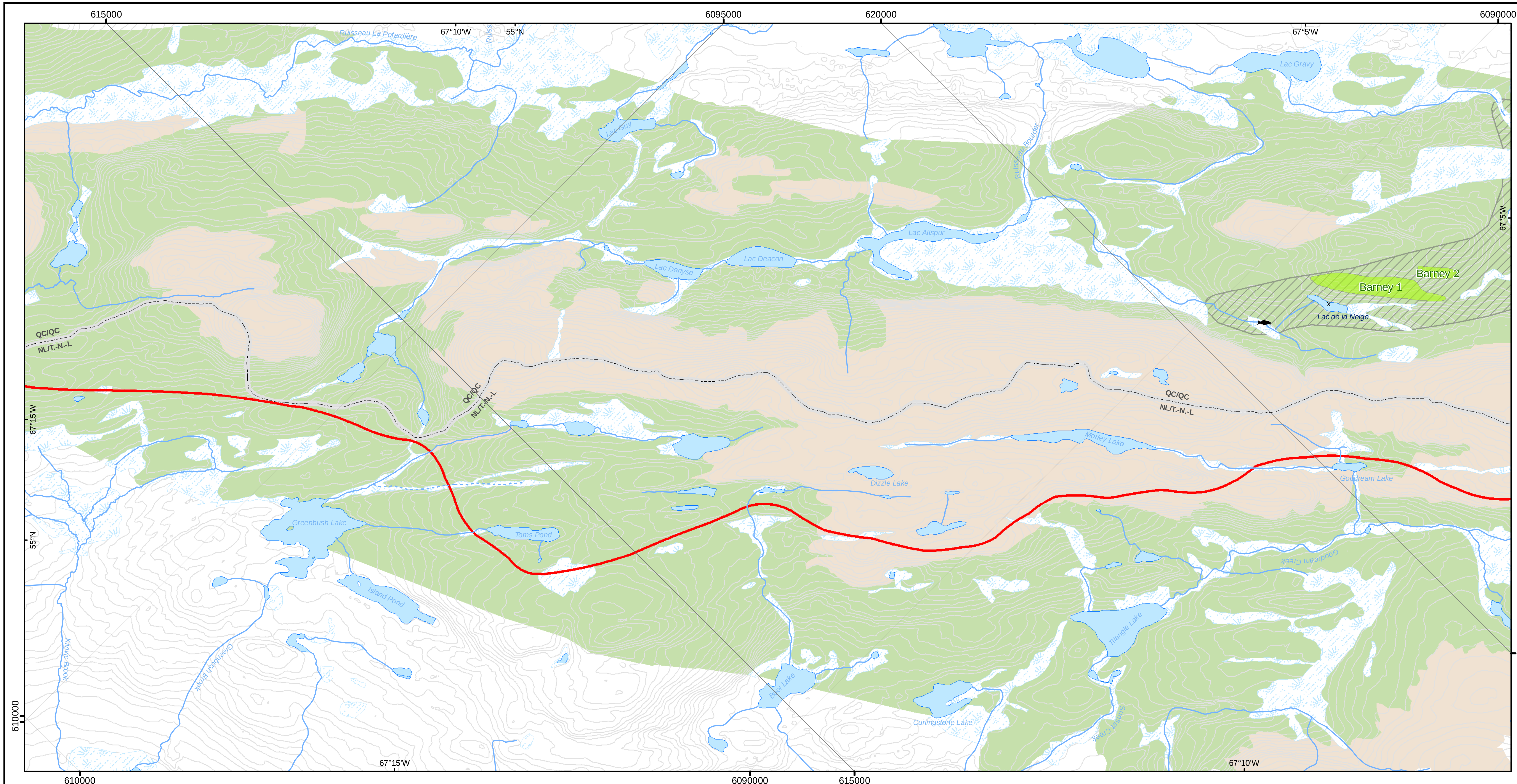
FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR: GH-0130-02, 2009-12-04, A.A.

HEMISPHERES le groupe

SOURCES:
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec, Boundary used for claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology update, 2009

Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de T-N-L et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie, 2009

Figure 4.2



LEGEND/LÉGENDE

Fish habitat/habitat du poisson
- × No potential/ aucun potentiel
- Potential/ potentiel
- Confirmed/ confirmé

- Fishing zone, fish habitat study/ zone pêchée, étude sur l'habitat du poisson
- Mid Subarctic Forest/ forêt subarctique moyenne
- High Subarctic Tundra/ toundra subarctique supérieure

- Watercourse/cours d'eau
- Intermittent watercourse/ cours d'eau intermittent
- Torrential channel/ chenal torrentiel
- Disappearing watercourse/ cours d'eau disparaissant
- Artesian spring/ source jaillissante
- Waterbody/ plan d'eau
- Disappearing pond/ étang disparaissant
- Wetland/milieu humide

- Border/frontière
- Proposed haul road/ voie de halage proposée

Assessment group/ unité d'évaluation
- AG 2c

*Hydronyms are oriented along the direction of water flow
*Les hydronymes sont orientés selon le sens d'écoulement de l'eau

Infrastructure Concept and Main Biophysical Characteristics

Concept des infrastructures et caractéristiques biophysiques principales

Project / Projet
- 2b -

0 0,5 1 1,5 2
Kilometers/kilomètres

SCALE/ÉCHELLE:
1:35 000

UTM 19N NAD 83

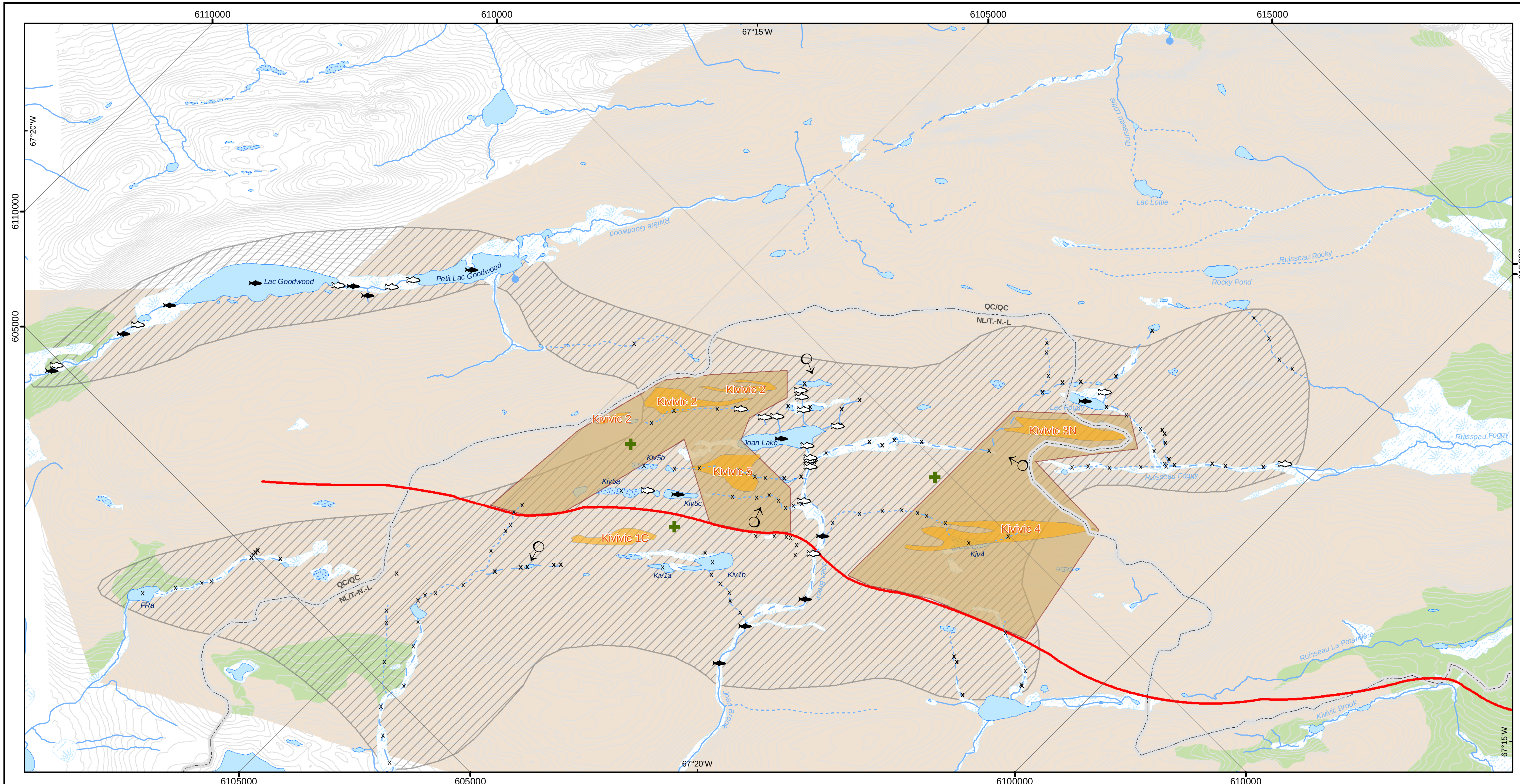
FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR: GH-0130-02, 2009-12-04, A.A.

HEMISPHERES le groupe

SOURCES:
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec, Boundary used for claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology update, 2009

Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de T-N-L et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie, 2009

Figure 4.2



LEGEND/LÉGENDE

Fish habitat/habitat du poisson

- x No potential/ aucun potentiel
- Potential/ potentiel
- Confirmed/ confirmé

Projected sedimentation pond/ bassin de décantation ou d'infiltration à construire

- Proposed dump/ halde proposée
- Proposed road corridor/ corridor routier proposé
- Fishing zone, fish habitat study/ zone pêchée, étude sur l'habitat du poisson
- Mid Subarctic Forest/ forêt subarctique moyenne
- High Subarctic Tundra/ toundra subarctique supérieure
- Watercourse/cours d'eau
- Intermittent watercourse/ cours d'eau intermittent
- Torrential channel/ chenal torrentiel
- Disappearing watercourse/ cours d'eau disparaissant
- Artesian spring/ source jaillissante
- Waterbody/ plan d'eau
- Disappearing pond/ étang disparaissant
- Wetland/milieu humide
- Border/frontière
- Proposed haul road/ voie de halage proposée

Assessment group/ unité d'évaluation

- 2b

*Hydronyms are oriented along the direction of water flow
*Les hydronymes sont orientés selon le sens d'écoulement de l'eau

Infrastructure Concept and Main Biophysical Characteristics

Concept des infrastructures et caractéristiques biophysiques principales

Project / Projet
- 2b -

0 0,5 1 1,5 2
Kilometers/kilomètres

SCALE/ÉCHELLE:
1:35 000

UTM 19N NAD 83

FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR: GH-0130-02, 2009-12-14, A.A.

HEMISPHERES
le groupe

SOURCES:
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec, Boundary used for claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology update, 2009

Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de T-N-L et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie, 2009

Figure 4.2

4.3.3 Description of the Physical Environment

4.3.3.1 Climate

The climate of central Ungava has been classified as humid micro-thermal under the Koppen-Gieger system (Pollard 2005). The growing season is very short, and precipitation moderate.

Long-term records indicate a mean annual air temperature of -5.3°C for the Schefferville town site at 522 m asl, but tundra ridge areas have been documented to have mean annual air temperatures as low as -7°C (Pollard 2005). The seasonal pattern of air temperature is typically continental and is characterized by dramatic extremes, with minima as low as -50.6°C and maxima above 34.3°C. On average, the first day of frost is September 11, and the last is June 13, which yields 92 frost-free days (Cournoyer *et al.* 2007).

Based on long-term data, the annual precipitation is 823 mm. Its monthly distribution is roughly skewed, with a peak in July. This zone, like others along the western boundary, is among the driest in Labrador. A little over one-half of precipitation falls as snow, the average thickness of which is 71 cm in March. There are 216 days with precipitation in one form or another.

Wind speed, with a mean value of 16.5 km/h, varies little from month to month. The most frequent direction of the wind is north-west. Maximum gusts have attained 153 km/h in December, while a sustained wind speed of 97 km/h was recorded for one hour in June (Environnement Canada 2004).

The results from the second version of the Canadian Center for Climate Modelling and Analysis Coupled Global Climate Model, or CGCM2, show that the region of Schefferville should experience a 1 to 2°C rise in temperature between 1975-1995 and 2040-2060. For precipitation, the tendency indicates a yearly increase of 90 mm over the same period.

Climate changes are affecting all the Inuit communities in Northern Québec, but not the Naskapis of Kawawachikamach (Tremblay *et al*. 2006).

4.3.3.2 Geology, geomorphology and hydrogeology

Project 2b is located within the Labrador Trough formed in the Churchill Province of the Canadian Shield where it meets the Superior Province. It is a northwest-southeast trending syncline that extends more than 800 km from western Labrador to the tip of the Ungava peninsula. It separates the Archaean rocks of the Superior Province to the west from the rocks comprising the North Atlantic Craton to the east (Gartner Lee Limited and Groupe Hemisphères December 2007).

Most of the significant iron formations have been found in the Churchill Province. Differential erosion of the iron formations is responsible for the distinctive terrace-like bedrock surface expression observed in parts of the area (Groupe Hémisphères March 2009).

The rocks of the Labrador Trough are distributed in three belts representing at least three cycles of tectonic activity and sedimentation, which are reflected in its ridge-and-valley topography (Gartner Lee Limited and Groupe Hemisphères December 2007).

The Schefferville area was not ice-free until 5,000 to 6,000 years ago (Nicholson and Moore 1977).

The drainage divide bordering the Howells River catchment was formed at the end of the Wisconsin glaciation at the time of the melting of the ice cap that covered the Québec-Labrador region. Glacial masses and melt waters flowed towards the north-west and the south-east along the axis of the Labrador Trough and, in the process, scoured depressions within pre-existing valleys to form the present basins of such systems as the Howells (Derbyshire 1962).

The landscape around Schefferville displays widespread evidence of erosion by glacial meltwater: there are numerous subglacial meltwater channels perched and nested high on the upland surfaces and vast areas of boulder-filled channels that are more characteristic of proglacial meltwater (Gartner Lee Limited and Groupe Hemisphères December 2007).

Landforms are the result of a particular set of erosional and/or depositional processes. They can be classified according to their origins. During fieldwork in 2008, Groupe Hémisphères (March 2009) identified six types of landforms in the DSOP study area, all of which were observed on both sides of the boundary dividing Québec and Labrador. Table 4.1 presents these landform types and their main characteristics.

Table 4.1: Landforms Identified in DSOP Study Area

Landforms	Distribution	Material Composition	Drainage	Soil Types	Topographic Surface Expression	Variability	Special Considerations
Bedrock	Scattered through the study area, most commonly exposed on ridge and hill crests	Bedrock, locally weathered into angular fragments	Well to rapidly drained	Folisol	Knobby, ridged, planar	Intact bedrock commonly overlain by weathered (frost-shattered) fragments on high ridge and hill crests; patchy till veneers too small to be mapped (<1m); wetlands present in depressions	Unpredictable groundwater flow, rugged topography, frost shattering of bluffs
Morainal	Widespread throughout the study area	Silty sand till, locally bouldery	Moderately well to well drained	Orthic Humo-Ferric Podzol or Orthic Gleysol	Planar to undulating, locally hummocky	Washed/reworked till; boulder fields; cryoturbation features (frost boils, sorted stone polygons, contorted soil horizons)	Density and thus permeability varies, interstitial lenses of granular material may be present, cryoturbation locally disturbs soil profile on some high, windswept ridges and hills
Glaciofluvial	Isolated, associated with meltwater-incised valley features	Sand, gravel, cobbles	Well to rapidly drained, except moderately to imperfectly drained in low-lying slope positions	Orthic Humo-ferric Podzol	Variable: planar, ridged, hummocky, dissected	Stratified to massive; may be locally interbedded with till where deposited in contact with glacial ice; some silt in matrix in kames	Efficient contaminant transport paths due to relatively high permeability
Alluvial	Valleys throughout the study area	Silt, sand, gravel, cobbles, boulders, bedrock, peat	Poorly to imperfectly drained	Regosol and Gleysol	Planar, channelled	Cobble and boulder pavements armouring stream bed; silt and peat floodplain deposits; bedrock-controlled longitudinal profiles	Prone to flooding and sedimentation, groundwater table near surface, susceptible to frost heave, commonly associated with organic veneer
Colluvial	Small deposits throughout the study area not mappable at 1:20 000 scale, most significant deposits in the vicinity of DSO 4	Depends on source material: angular bouldery rubble to sand, silt and clay	Moderately to rapidly drained	Orthic Humo-ferric Podzol and Dystric Brunisol	Sloping, undulating	Surface typically coarse rubble and boulders, but finer gravels and sand may exist beneath the surface	Talus piles generally have repose angle slopes of about 35^{o} and may be locally unstable
Organic Terrain	Scattered throughout the study area, especially in valley bottoms	Peat, muck	Very poorly to poorly drained	Fibrisol and Mesisol (Organic Order)	Planar	Marsh, swamp, bog, fen; seasonally fluctuating groundwater table; areas of open water; boulder-paved wetlands	Groundwater table is at or near surface and flooding is common

Source: Groupe Hémisphères (March 2009)

Hydrogeology

Drilling was carried out in 2008 at Kivivic 3, 4 and 5 and in 2009 at Kivivic 4. The 2009 hydrogeological study included the installation of piezometers at Kivivic 4 only, but all of the holes drilled in 2008 and 2009 were visited to identify those that were still open and those that contained underground water (Groupe Hémisphères 17 novembre 2009).

Preliminary results for Kivivic 4 indicate that the level of water observed in the drill holes at the eastern tip of the deposit could be explained by the presence of superficial aquifers (Groupe Hémisphères 17 novembre 2009). The drill holes on the remaining area of the deposit were dry, even those located near the pond overlapping the deposit (see Figure 4.2). According to Groupe Hémisphères (17 novembre 2009), it may be that the pond does not correspond to the roof of the aquifer, but that it exists because the underlying soil is impermeable and captures precipitation, snow melt and surface runoff.

All the holes drilled at Kivivic 5 in 2008 were closed up when visited in 2009 (Groupe Hémisphères 17 novembre 2009). Being near the height of land, Kivivic 5 has a very small recharge area. According to field observations indicating a constant flow in the stream that flows across the deposit and into Joan Brook, it is probable that the head lake uphill from Kivivic 5 is fed by ground water (see Figure 4.2) (Groupe Hémisphères 17 novembre 2009).

According to Groupe Hémisphères (17 novembre 2009), ground water would not have a direct relation to the waterbodies in the immediate vicinity of Kivivic 4 and Kivivic 5. Rather, those waterbodies exist because the impermeable soils allow surface water to accumulate in depressions.

Details on and analysis of hydrogeological studies conducted in 2009 will be available in the final report scheduled for March 2010.

No pumping tests were conducted.

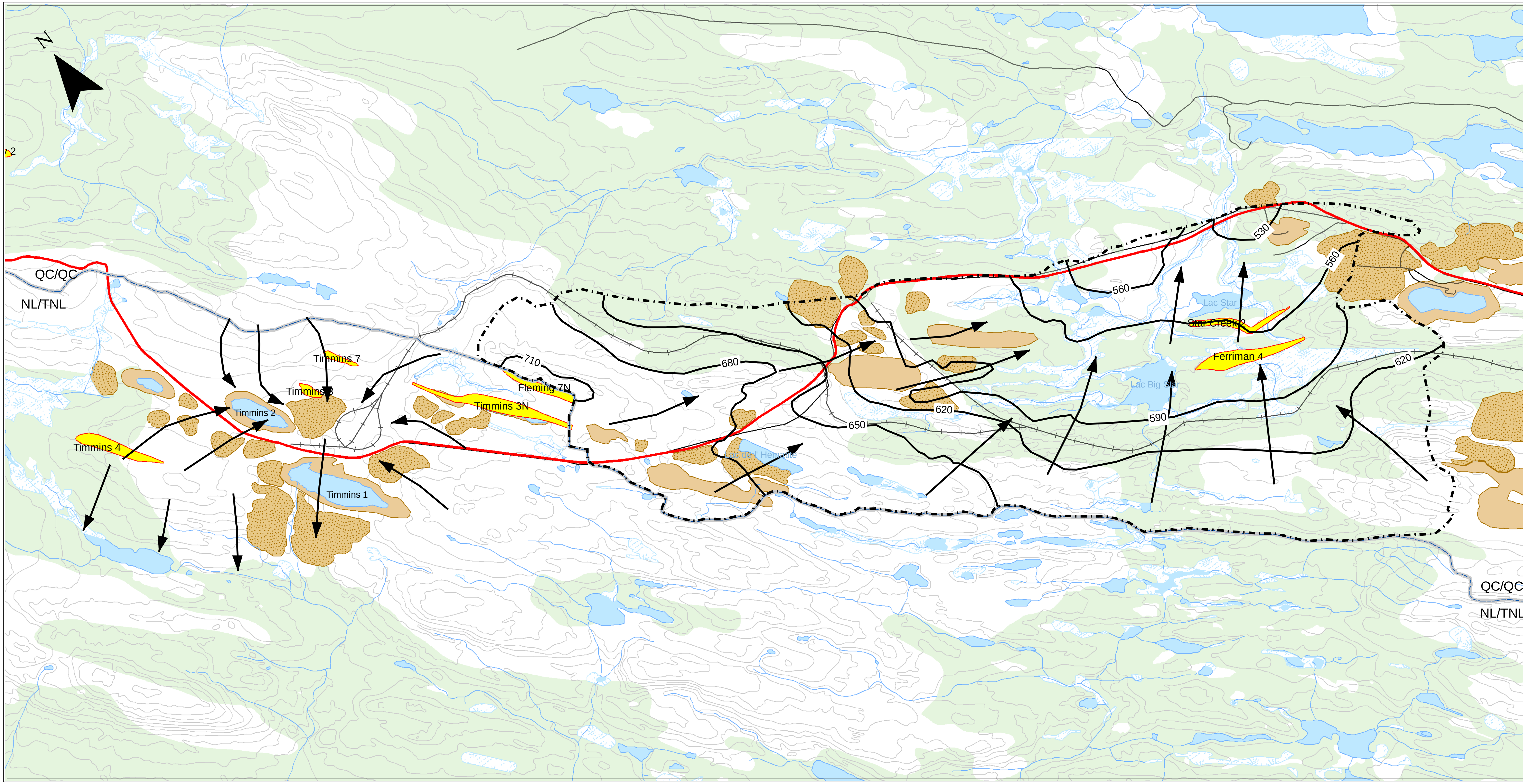
Timmins 8

Timmins 8 is also located a short distance from the height of land and has a limited recharge area. The regional groundwater flow in DSO3 roughly parallels the surface flow (Figure 4.3).

The level of water in Timmins 2, the nearest waterbody to Timmins 8, corresponds to the surface of the water table. It is 50 metres below the surface (Envir-Eau March 2009).

Two holes were drilled in the vicinity of Timmins 3 in 2009. The water table was encountered at 60 m below the surface in one and at 79 m below the surface in the other (Fortin 2009, *personal communication*).

It appears that the level of the water table is determined by the presence of 60-80 m of the impermeable shale of the Ruth Formation (Fortin 2009, *personal communication*). The proposed bottom of the pit at Timmins 8 is 50 m below the surface. If the water table there is at a similar depth to the water table at Timmins 2 and Timmins 3, there might be no need to dewater Timmins 8 other than to remove the relatively small volumes of water accumulating in the sump, which would be piped by means of flexible hoses on the surface of the ground to Timmins 2.



Limit of Fleming Hydrogeological Basin/
Limite du bassin hydrogéologique Fleming

Piezometric Isocontour (m)/
Isocontour piézométrique (m)

Border/
Frontière

Railway to be reconstructed/
Voie ferrée à reconstruire

Main Access Road/
Route d'accès principale

Road/route

Deposit/gisement

Watercourse/
Cours d'eau

Wetland/
Milieu humide

Waterbody/
Plan d'eau

Existing mined-out Pit/
Fosse existante épuisée

Existing Waste Dump/
Halde de stériles existante

Contour Interval/
courbe de niveau

Source and direction of Groundwater Flow/
Sens d'écoulement de l'eau souterraine

Regional Groundwater Flow

in DSO2 and DSO3

Fleming and Timmins Area

0 1 2 3

KILOMETERS/KILOMÈTRES

Écoulement souterrain régional

DSO2 et DSO3

Fleming et secteur Timmins

SCALE/ÉCHELLE:
1:40 000

UTM NAD 83 Zone 19

SOURCES: Government of Canada, NTDB, 1:50 000, 1979
Government of Newfoundland and Labrador and Governement of Quebec, Boundary used for claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology update, 2008
Hydrogeological Basin "Fleming", adapted from *L. Nichols*, 1966

Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de Terre-Neuve-et-Labrador et Gouvernement du Québec, frontière utilisée pour les titres
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise-à-jour de l'hydrologie, 2008
Bassin hydrogéologique "Fleming", adapté de *L. Nichols*, 1966

FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR: GH-0010-02 , 2009-04-02, J.T.
Groupe Hémisphères Inc.

Figure 4.3

4.3.3.3 Hydrography, Hydrology and Water Quality

Hydrography/Hydrology

The flow pattern of the watercourses in DSO3 shows a system of parallel rivers characterized by sharp, often 90º, changes of course in a hydrographic network oriented north-south, as described by Hamelin (1968) for the Labrador geosyncline. Natural lakes and ponds are scarce, because DSO3 is located on the summit of a ridge of hills on the drainage divide between the Labrador and the Ungava Bay basins.

The largest waterbodies in the vicinity of Timmins 8 are Timmins 1 and 2, two pits that were excavated during former mining operations. There is only one watercourse in the DSO3 sector, Elross Creek, which originates in Timmins 1.

The largest waterbody in the Project 2b area is Joan Lake, near Kivivic 5. The area supports a few small lakes and ponds, many of which disappear underground in summer, a few watercourses, often bordered by wetlands, a few intermittent watercourses and several torrential channels. Torrential channels flow only in spring, at snow melt, for about two weeks or during extreme storm events, whereas intermittent watercourses flow every time that there is a significant rainfall.

There are no watercourses in the vicinity of Timmins 8.

In 2009, Groupe Hémisphères visited all of the deposits constituting Assessment Group 2b in order to identify potential fish habitats. The preliminary report (Groupe Hémisphères 2 septembre 2009) indicates that the majority of the watercourses visited were dry, except in some cases for a few pools of stagnant water. Most of the lakes are shallow (< 5 metres), and several are less than 2 metres deep. A high proportion of the lakes in DSO4 seem to be fed by melt water, since they do not have any inflowing or outflowing streams. Moreover, the large difference between the high water mark and the surface of the water at the time the lakes were visited, in July 2009, indicates that the level of the water was dropping at that time (Groupe Hémisphères 2 septembre 2009).

The final report from Groupe Hémisphères is scheduled to be delivered early in 2010. It will permit a better understanding of the hydrogeology and the hydrology of DSO4. That is particularly important since the National Topographic Database of 1979 seems to be based on the interpretation of photographs taken in the 1950s for this region.

Water Quality – Surface Water

September 2003

Water-sampling conducted for the LabMag Iron Ore Project in the Howells River basin in September, 2003, including Chimo, Rosemary, Fleming, Ione and Contact lakes. One sampling station was installed in each of those lakes.

As shown in Table 4.2, concentrations of Ca, Mg, K and Na ions were similar in each of the waterbodies sampled. They are consistent with what would be anticipated for lakes with drainage basins associated with the mineral-rich rocks of the Labrador Trough (see Penn 1971). The slightly alkaline pH values recorded are consistent with this observation, in that the lakes are well-buffered, as indicated by higher Ca ion concentrations than would be found in waterbodies of the Canadian Shield.

Table 4.2: Lake-water Concentrations of Ca, Mg, K and Na Ions, Howells River System, September 2003

Lake Sampling Station	Calcium Ion Concentration (Ca mg/L)	Magnesium Ion Concentration (Mg mg/L)	Potassium Ion Concentration (K mg/L)	Sodium Ion Concentration (Na mg/L)
Chimo	14.8	4.50	0.12	0.44
Fleming	8.34	2.89	0.12	0.54
Ione	3.65	2.20	0.17	0.48
Rosemary	8.37	3.00	0.14	0.55
Contact	9.03	3.06	0.14	0.51

Source: Curtis (February 2004)

Temperature, conductivity and dissolved oxygen measurements demonstrated that the conditions found in the Howells River system are largely typical of what would be expected for waterbodies associated with the Labrador Trough. The conductivity measurements, however, showed somewhat greater variability, ranging from 38.1 µmho/cm in Ione Lake to 102.0 µmho/cm in Chimo Lake. An unusual finding for subarctic lakes was a de-oxygenated layer of bottom water in Fleming Lake, from a depth of 5 m to bottom. The most likely cause, according to Curtis (February 2004), was a period of density stratification, during which time the oxygen demand of organics from an intense plankton bloom may have locally depleted oxygen from the bottom waters.

September 2008

An analysis of the water samples collected by AMEC in September 2008 in DSO3 yields the following conclusions: conductivity was exceptionally low (0-25 µS/cm) and the virtual absence of nutrients, salts or impurities in the water showed no correlation to the location of sampling sites downstream from former mining activities (AMEC January 2009). Such low conductivity is generally not found in natural systems and is similar to pure or distilled water (Hade 2002).

Oxygen was near saturation level in every sample collected in DSO3.

July 2009

In July 2009, Groupe Hémisphères conducted a detailed survey of fish habitat in DSO4 area as well as a reconnaissance along the proposed haul road between DSO3 and DSO4, during which water quality measurements were collected where possible (Groupe Hémisphères 2 septembre 2009 and 18 septembre 2009).

Water samples were collected in one watercourse (Jb1) and in two lakes (Kiv4 and Kiv5a) (Figure 4.10). They will be analyzed in the coming weeks, and the conclusions will be presented in a final report scheduled for December 2009.

Water Quality – Ground Water

Table 4.3 presents the results of analyses of the quality of ground water pumped from Timmins 3 in November 2009.

Table 4.3: Chemical Composition of Ground Water from Timmins 3, November 2009

Parameter	Unit	Result
Total cyanides	mg/L	< 0,01
Bicarbonates	mg/L $CaCO_3$	44
Chlorides	mg/L	0,87
Sulphates	mg/L	0,9
Suspended matters	mg/L	6
Arsenic	mg/L	< 0,002
Copper	mg/L	0,005
Lead	mg/L	< 0,001
Nickel	mg/L	< 0,01
Sodium	mg/L	0,92
Zinc	mg/L	0,035
Iron	mg/L	< 0,1
Magnesium	mg/L	6,6
Potassium	mg/L	0,5
Calcium	mg/L	9,9
Calculated hardness	$CaCO_3$ mg/L	58

Source: Fortin (2009, *personal communication*)

The quality of the water is exceptional, to the point that it could be used as drinking water without any treatment.

If the ground water at Timmins 8 is comparable, which seems likely because ground water collected near Ferriman 4, in DSO2, is similar to that from Timmins 3 (Fortin 2009, *personal communication*), there would be no adverse consequences on water quality if it were discharged into Timmmins 2 or into an existing watercourse or water body.

4.3.3.4 Soil and Permafrost

<u>Soil</u>

Due to the recent deglaciation, soils in the Schefferville region are relatively young. They generally developed on thin layers of drift which "although variable in composition often shows similarities with the underlying bedrock" (Nicholson and Moore 1977). In those areas where bedrock outcrops, soil development has not occurred at all (Nicholson and Thom 1973).

The soils can be classified as Alpine Dystric Brunisol, Rego Humic Gleysol and Lithic Regosol (Nicholson and Thom 1973). With the exception of soils underlain by dolomite, which are rich in calcium and magnesium, soils are acid and contain few nutrients (Waterway *et al*. 1984).

Groupe Hémisphères (March 2009) conducted intensive fieldwork in summer 2008, during which more than 100 soil pits were dug. They confirmed the presence of Dystric Brunisol, Regosolic Humic Gleysol and Lithic Regosol. Several Humo-ferric Podzols were also found in acidic coniferous forest stands, and Humic Regosols were found along streams. Evidence of cryoturbation was observed within Dystric Brunisol in several locations at elevations higher than 650 m asl.

Permafrost

The first casual observations of frozen ground conditions in Labrador-Ungava, which covers Northern Québec and Labrador, parts of the Côte-Nord and of Abitibi-Témiscamingue, were reported by Jenness (1949), who mapped what is now Schefferville as the “tentative southern limit of continuous permafrost”. Thomas (1953) later described the same boundary as the “approximate southern limit of permafrost”, noting that permafrost-free areas of limited extent occurred north of the boundary. Based on the same field data, Black (1951) concluded that there was no continuous permafrost in Labrador-Ungava and indicated boundaries of discontinuous and sporadic zones. The southern limit of discontinuous permafrost was put at some 160 km north of Schefferville, while the sporadic zone extended to within 80 km of the Gulf of St Lawrence (Pryer no date).

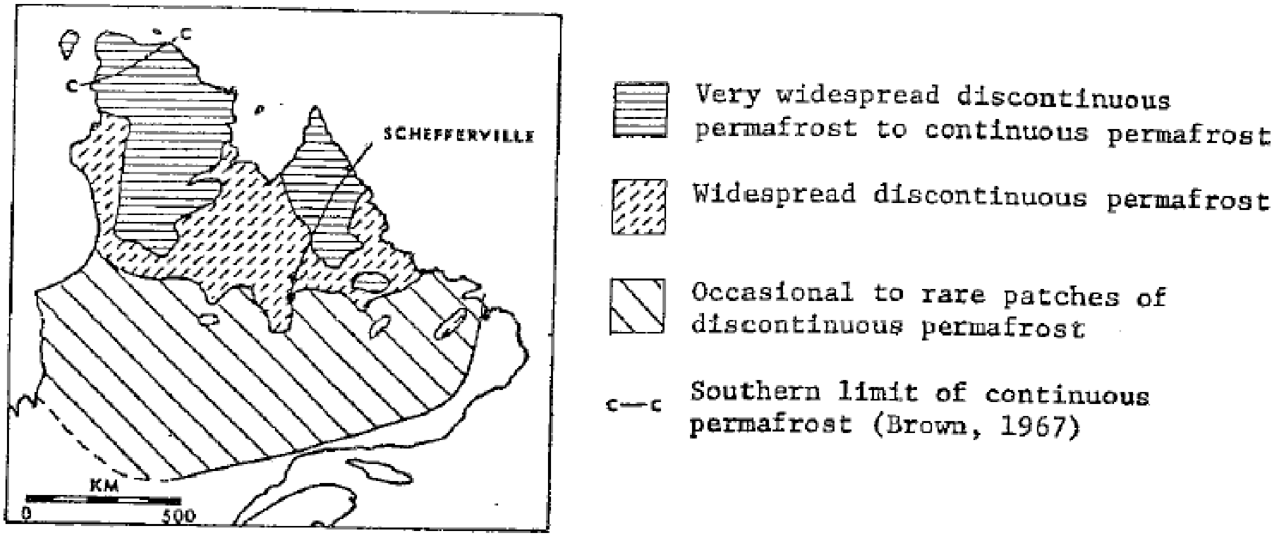
Mining near Schefferville after 1954, however, revealed evidence that permafrost was more widespread than had been estimated. Measurements by IOCC showed that permafrost extended over 60 m in depth (Pryer no date). A permafrost distribution map based on field observations (Brown 1960) showed a narrow coastal area of continuous permafrost along the shores of Hudson Strait and Ungava Bay, while the southern limit of discontinuous permafrost was drawn close to the 55th parallel of latitude, slightly to the north of Schefferville. On the basis of both field observations and ground temperature investigations near Schefferville, Ives (May 1962) predicted the occurrence of contemporary permafrost based on vegetative cover and topography.

Although the ground temperature investigations were inconclusive, the results suggested that, under the subarctic conditions of Labrador-Ungava, relief, snow cover and vegetation influence the development and preservation of permafrost (Ives 1961). Ives (1961) found that the spread of vegetation after deglaciation played a critical role in the degeneration of widespread permafrost into scattered areas of frozen ground in an unstable equilibrium with the contemporary climate.

Nicholson (February 1978) conducted research on permafrost distribution at various sites in the Schefferville area, including Timmins 4 and Fleming 7 (DSO3), at an elevation of 700 m, between 1973 and 1975. He concluded that extensive, deep permafrost underlies those areas that are higher in elevation, exposed and where tundra vegetation covers the ground. Permafrost at those sites ranges from 60 to 100 m in depth, though completely unfrozen areas occur in valleys on the margins of these sites. On less exposed and lower-lying ground, which is covered by woodland, no permafrost is present (Nicholson and Lewis 1976). Beneath those water bodies in the Schefferville area that are deep enough not to freeze solid during winter, due to their capacity to produce higher ground temperatures, permafrost is expected to be absent; nor is it expected to occur within 100 feet from permanently covered shoreline (Nicholson February 1978).

Nicholson and Lewis (1976) also found that deep active layers to 10 m and more, and talik zones, typically 15 to 30 m deep, are found in association with wet lines, in which there is substantial groundwater movement. Due to the heat transport by moving ground water, possibly aided by the frozen ground being permeable along larger voids, the frost table retreats rapidly at times on deep active layer sites.

Figure 4.4: Distribution of Permafrost, Labrador-Ungava



Source: Nicholson and Lewis (1976)

Anecdotal reports from drillers at the summer 2008 camp near DSO4 corroborate the observation of Nicholson and Lewis (1976). Visible (ice-rich) permafrost was encountered until at least nine meters below the surface (Groupe Hémisphères March 2009).

During fieldwork, Groupe Hémisphères (March 2009) observed on high, windswept uplands and ridges the widespread presence of cryoturbation, which is the mixing of soil horizons due to freezing and thawing, commonly in association with underlying permafrost. The presence of cryoturbation “may indicate permafrost at considerable depth, consistent with Nicholson and Lewis (1976), or simply the disruption and churning of shallow soil as a result of freeze-thaw unrelated to permafrost”.

Groupe Hémisphères (March 2009) concludes that “it is assumed that permafrost may be present in certain exposed sites, but not at depths that directly influence soil rooting conditions [...] Soils in these sites are best described as cryoturbated phases of a Burnisol or Regosol”.

Table 4.4 summarizes the state of knowledge of permafrost in DSO3. The only deposit in DSO3 belonging to Project 2b is Timmins 8, where permafrost does not appear to be present.

Table 4.4: Permafrost in Deposits in DSO3

Deposit	Assessment Group	Proposed Final Pit Depth (m)	Pemafrost (NML)	Thickness (m) (literature)
Ferriman 4	1b	110	absent	n/a
Timmins 3	1a	80	discontinuous	unknown
Timmins 4	1a	100	present	60 to 100
Timmins 7	1a	50	present	3 to 20
Timmins 8	2b	50	absent	n/a
Fleming 7N	1a	110	discontinuous	60 to 100

Source: Groupe Hémisphères (March 2009); Fortin (2009, *personal communication*)

There are no published reports on the presence of permafrost in DSO4. Balakrishnan (2009, *personal communication*) provided the following information:

- backhoes collecting bulk samples in Kivivic 4 and 5 in summer 2009 encountered frozen ground just below the overburden;
- ice lenses were observed in trenches in Kivivic 4;
- during drilling in 2008 and 2009, the drillers noted the sudden thawing of the ground while they were drilling, which indicates the presence of permafrost;
- frost heave mounds cover most of DSO4.

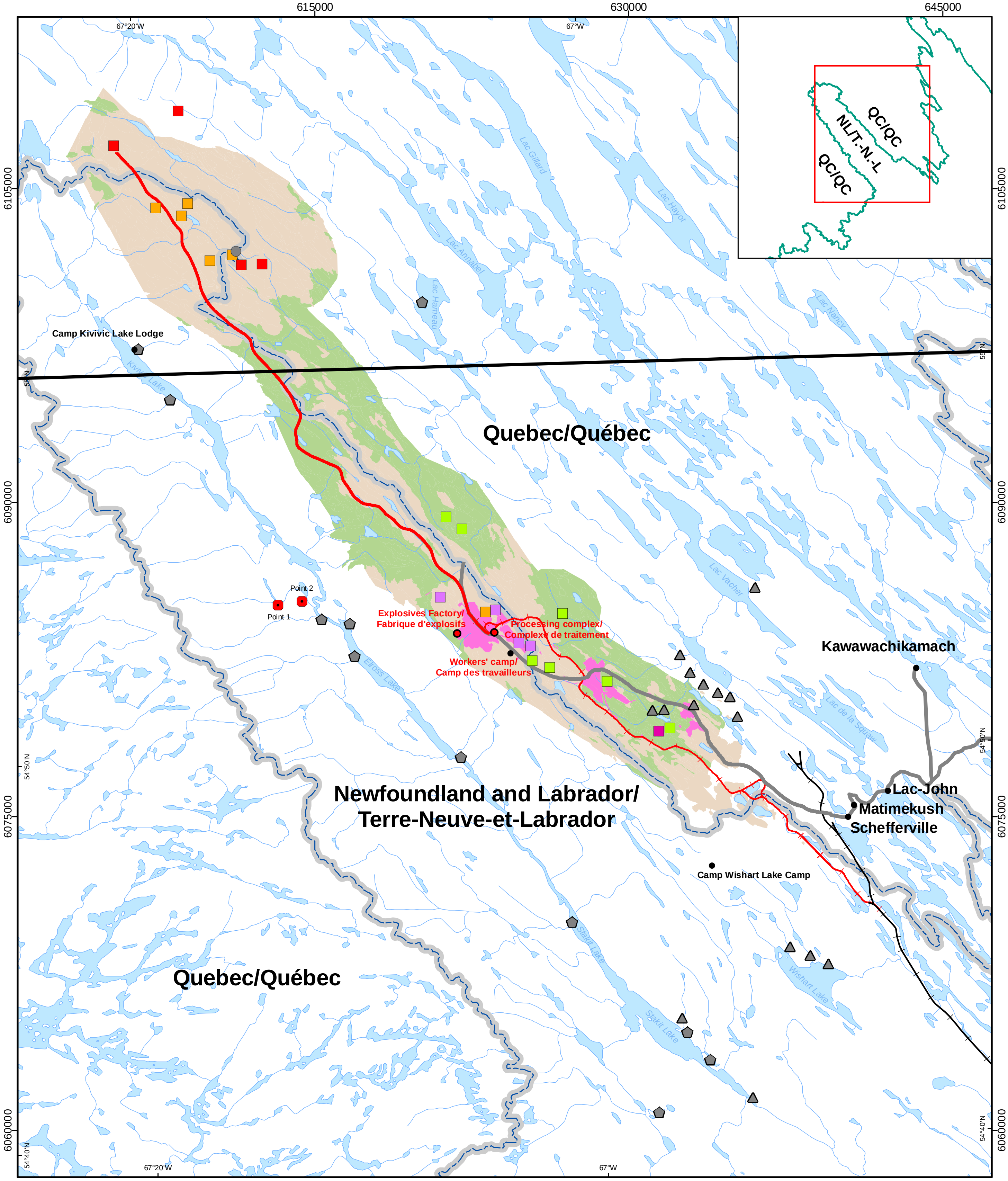
Given that DSO4 is barren and is exposed to strong northwesterly winds in winter, Balakrishnan (2009, *personal communication*) thinks that it would be safe to assume that permafrost is present in all of the deposits.

Groupe Hémisphères (Décembre 2009) noted that drillers in DSO4 did not observe visible permafrost (*i.e.*, permafrost containing much ice) above 9 m from the surface, but it reported permafrost at approximately 0.4 m below the surface in several small fens in a valley at a high elevation in the eastern part of DSO4.

4.3.3.5 Air Quality

Noise

Ambient noise level measurements were taken by Tecsult in October 2006 within the framework of the LabMag Iron Ore Project at three sites near the Howells River. The measurements taken from two of those sites can be considered as representative of the general vicinity of Project 2b, since they are within the Mid Subarctic Forest and the High Subarctic Tundra ecoregions. The location of these two stations is shown on Figure 4.5. The third station was located near a river and the noise level measurements obtained there are not considered to be representative of the background noise level of Project 2b, where there are no similar rivers.



LEGEND/LÉGENDE

- Camp or city/ camp ou ville
- Innu camp/ camp des Innus
- Naskapi camp/ camp des Naskapis
- Innu or Naskapi Camp/ camp Innu ou Naskapi
- Proposed infrastructure/ infrastructure proposée
- Border/ frontière
- Main access road/ route d'accès principale
- Existing railway/ voie ferrée existante
- Proposed railway/ voie ferrée proposée
- Watercourse/ cours d'eau
- Waterbody/ étendue d'eau
- Proposed haul road/ voie de halage proposée
- Noise measurement point/ point de mesure de bruit

Ecoregion/écorégion

- Disturbed area/ aire perturbée
- Mid Subarctic Forest/ forêt subarctique moyenne
- High Subarctic Tundra/ toundra subarctique supérieure

Assessment group/unité d'évaluation

- AG 1a
- AG 1b
- AG 2a
- AG 2b
- AG 2c

General Location, Ecoregions and Land Use

Localisation générale, écorégions et occupation du territoire

0 2 4 6 8 10

Kilometers/kilomètres

N

SCALE/ÉCHELLE: 1:250 000

UTM 19N Nad 83

FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR:
GH-0131, 2009-12-08 , A.A.

HEMISPHERES le groupe

SOURCES:
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec, Boundary used for claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology update, 2009

Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de T-N-L et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie, 2009

Figure 4.5

Table 4.5 shows the results of the ambient noise level measurements obtained at the two representative measurement stations, during two periods (day time and night time). It also shows the noise levels that were equaled or exceeded 1%, 95% and 99% of the time, as well as the equivalent values over the measuring period of one hour. The L95 values represent the background noise.

Table 4.5: Results of Ambient Noise Measurements

Location		Period	Ambient Noise (dBA)				Observations at Time of Noise Measurements
Description	**UTM (X,Y)(1)**		**L99**	**L95**	**L1**	**Leq (period)**	
Station 1	(614 403; 6 085 037)	**Day** (October 2, 2006 10:26 to 11:26)	32.9	33.0	52.5	39.3	Light wind Presence of birds Passage of an airplane Passage of two trucks
		Night (October 3, 2006 0:38 to 1:36)	35.3	35.5	37.3	36.3	Light wind Passage of a truck
Station 2	(613 220; 6 084 884)	**Day** (October 2, 2006 14:12 to 15:12)	33.3	33.5	52.9	39.7	Light wind Presence of birds Passage of a helicopter
		Night (October 3, 2006 4:17 to 4:59)	34.6	34.9	46.3	36.7	Light wind Presence of birds Passage of an airplane Passage of one truck

(1) UTM coordinates, Zone 19.

The measured noise levels varied from 36.3 dBA (night time) to 39.7 dBA (day time). Those sound intensities reflect local activities, such as the passage of an airplane, a helicopter and a few trucks in the vicinity, as well as the presence of birds. Background noises (L95) measured between 33.0 and 36 dBA, indicating a very quiet environment. Since there are no access roads used regularly in the vicinity of Project 2b (except perhaps for Timmins 8 on occasion), we can assume that the background noise level would probably be lower than 33.0 dBA.

Particulates

Considering that the only atmospheric pollutant that will be generated by Project 2b will be particulates produced during blasting, truck loading and ore transportation by truck to Timmins 1, data on total particulate matter and fine particulates smaller than 2.5 µm in diameter (PM 2.5) are presented in this section. Data on the heavy metal concentrations (lead, arsenic, cadmium, beryllium, mercury, nickel, vanadium, chromium and zinc) found in the total particulate matter are also presented.

Baseline data on the ambient air quality were collected by Consulair in 2006 (Janvier 2008) when ambient levels were assessed near the Howells River prior to the implementation of the LIOP. The sampling site is located at 54°53'N and 67°11'W (UTM coordinates 19N NAD83, 616 500mE, 6 083 400mN). It is approximately 7 km west of Timmins 8 and 20 km south of the other Project 2b deposits.

Given the short distance between the sites, the similarity of their characteristics and the low level of human activity at the Howells River site when the measurements were taken, the measurements in question can be considered as generally representative of pre-development conditions at the Project 2b deposits.

The sampling and analysis methodologies used at the Howells River site in 2006 as well as the duration and frequency of sampling are shown in Table 4.6. The equipment was calibrated prior to sampling according to standard methodologies.

Table 4.6: Total Particulate Matter and Metal Sampling Methodology

Source	Sampling and Analysis Methodology	Duration and Frequency
Metals and total particulate matter	Environment Canada EPS 1-AP-73-2 method with a high-volume air sampler Model TISCH TE-5000 with quartz filters and dust gravimetric weighing. Atomic absorption for metals.	10 samples taken over 24-hour periods between August 29 and October 20, 2006
PM 2.5	TEOM 1400A Monitor (*Tapered Element Oscillation Microbalance*)	29 samples taken over 24-hour periods between September 1 and October 20, 2006

Table 4.7 shows the maximum and average daily concentrations calculated from the sampling parameters.

The results show that relatively low particulate concentrations are found in the natural environment. Indeed, average daily concentrations of 7 µg/m^3 and 36 µg/m^3 were measured in the ambient air for PM 2.5 and total particulates respectively. These values are 30% of the ambient air standards for PM 2.5 and total particulates in the PNL. Insignificant concentrations of metals were measured, except for nickel, for which one concentration equal to 16% of the standard was measured. That value is close to 100 times higher than the average concentration calculated for nickel. That result is inexplicable.

Table 4.7: Results of Sampling – Ambient Air

Measured Parameter	Sample Size	Daily Maximum			Daily Average		
		Max. Conc. Measured (µg/m³) (2)	Standard(1) (µg/m³)	% of Standard	Av. Concen. (µg/m³)(2)	Standard(1) (µg/m³)	% of Standard
Total particulates	10	35.9	*120*	30%	7.9	*60*	13%
Arsenic	10	0.00083	*0.3*	0.3%	0.00023	-	-
Beryllium	10	0.000023	-	-	0.000017	-	-
Cadmium	10	0.00014	*2*	0.007%	0.000082	-	-
Chromium	10	0.0053	-	-	0.0027	-	-
Mercury	10	0.00016	*20*	0.0008%	0.000093	-	-
Nickel	10	0.32	*2*	16%	0.035	-	-
Lead	10	0.0034	*2*	0.2%	0.0017	-	-
Vanadium	10	0.0012	*2*	0.1%	0.00074	-	-
Zinc	10	0.057	*120*	0.05%	0.020	-	-
PM2.5	29	7	*25*	28%	4	-	-

Source: Consulair (Janvier 2008)
(1) *Air Pollution Control Regulations*, Newfoundland and Labrador Regulation 39/04.
(2) When a given contaminant was not detected in the analysis, a concentration equal to half the value of the threshold of detection value was used.

4.3.3.6 Seismicity

The Schefferville station of the Federation of Digital Seismograph Networks is located within the Eastern Background seismic zone, in which low-level but occasionally significant seismicity may occur. The region is seismically quiet in all directions from the station for more than 300 km (FDSN no date, Internet site). Blasts from the mines near Labrador City are recorded several times weekly. They normally range from 2<MN<3.

4.3.4 Description of the Biological Environment

4.3.4.1 Anthropogenically Altered Landscapes

A substantial portion (± 7%) of the area studied by Groupe Hémisphères (Décembre 2009) has been disturbed by previous mining activity, which ended in 1982, in some cases to such an extent that the original condition of the landscape is no longer recognizable. Mining-related alterations to the landscape include: large open pits; extensive piles of unprocessed, ore-rich rock, waste rock and tailings; numerous test pits and trenches; survey cut-lines; access roads; and abandoned camps, infrastructure and equipment.

Timmins 8 is located in such a landscape. Pioneer species of vegetation have begun to colonize the surface. The rate of colonization has been slow, though, most likely due to the harsh climate, rocky soils and concentrated mineralization. The following pioneer plant species were usually found on disturbed sites: rough alder (*Alnus rugosa*), bearberry willow (*Salix uva-ursi*), flatleaf willow (*Salix planifolia*), dwarf birch (*Betula glandulosa*) as well as several grass species.

The absence of frost boils or other signs of cryoturbation in the rock piles in DSO3 suggests that permafrost has not permeated them, as one might expect farther north. This observation also corroborates the hypothesis that isolated areas of permafrost on high, windswept ridges are relic features from a cooler, early post-glacial climate.

Although the vicinity of the other Project 2b deposits has undergone some mining exploration, it is relatively undisturbed.

4.3.4.2 Terrestrial Ecosystems and Vegetation

The Schefferville area lies in the broad transitional zone between the boreal forest and the tundra, with a vegetation cover ranging from closed spruce forest at lower elevations and in sheltered areas to tundra at higher elevations and in more exposed locations (Nicholson and Thom 1973; Jones 1976). The distribution of cover types is diverse and closely linked with drainage and microclimatic factors, such as snow accumulation and exposure (Jones 1976).

The Project 2b deposits are located in the Taiga Shield Ecozone, which extends from coastal Labrador to central Northwest Territories (Gartner Lee Limited and Groupe Hemisphères December 2007). It falls into two distinct ecoregions: areas below about 680 m form part of the Mid Subarctic Forest (MSF) ecoregion, while areas above 680 m are classed as High Subarctic Tundra (HST) ecoregion (Groupe Hémisphères March 2009).

Acterre (August 2006) summarized the regional terrestrial ecosystems in the Howells River catchment as

> "Below 680 m the landscape is largely forested, with forested and non-forested wetlands in depressions. Below 680 m […] but above the lowest elevations along the river there are extensive areas of the xeric and submesic rock dominated communities, where tills have been scoured during glacial wasting. Submesic reindeer lichen woodlands are also common. Richer subhygric communities enriched by seepage occur in linear drainage channels between rapidly to well drained sites. At the lowest elevations along the river there are extensive wetlands formed by complexes of forested and non-forested fens. Wetland areas are interspersed with well drained sites composed primarily of mesic and submesic black spruce communities.
>
> Above 680 m a suite of largely treeless terrestrial ecosystems occurs that more closely resemble arctic tundra ecosystems of northern Labrador and Quebec. Treeless, mesic communities on deep till blankets dominate the landscape and are characterized by scattered dwarf birch, blackberry, bog blueberry, partridgeberry, reindeer lichens and feathermoss. Moister sites occur on protected areas on bouldery lag deposits where bog birch is much more productive and dominant, and may form a continuous cover that protects a richer herb flora. Feathermosses form a continuous cover in the moss layer. Wetlands occur in linear landscape depressions and are mostly medium rich fens on thin peats and are dominated by cotton grasses (*Eriophorum spissum*, *E. vaginatum*, *E. angustifolium*) and sedges (*Carex aquatilis*, *C. vaginatum*)."

Groupe Hémisphères (March 2009) further notes that the MSF ecoregion is a transition zone between the productive and closed boreal forest and the subarctic tundra. At the northern sector of the ecoregion, balsam fir (*Abies balsamea*) disappears, while black spruce (*Picea mariana*), white spruce (*Picea glauca*) and tamarack (*Larix laricina*) become the only tree species of the forested ecotypes. Forest fires are frequent and usually cover large sectors dominated by spruce and lichen stands. Many of these forests are at the first stages of succession (Groupe Hémisphères March 2009).

The HST ecoregion lies on discontinuous permafrost.

Groupe Hémisphères (March 2009) conducted terrestrial ecosystem mapping of the study area of the DSOP using over 20 ecotypes and describing the vegetation diversity within each of them. Seventeen ecotypes were observed, 10 of which are within the MSF and eight of which are within the HST. Table 4.8 lists the 18 ecotypes. Elevation, wind and slope are important factors in the distribution and composition of the ecosystems.

Table 4.8: Ecotypes Present in MSF and HST Ecoregions, DSOP Study Area

Ecotype	Code in Québec	Complete name	Description
MSF01	RE12	Black Spruce/White Spruce-Labrador Tea-Feathermoss (Forested Ecosystem)	Black spruce stand with white spruce subdominant; thin-thick moraine or colluvial deposits; medium soil texture; well drained.
MSF05	RE11	Black Spruce – Lichen – Open Forest (Forested Ecosystem)	Black spruce lichen stand with some tamarack; thin-thick moraine or glaciofluvial surficial deposits; coarse soil texture; well to rapidly drained.
MSF06	RE25	White Spruce/Black Spruce – Feathermoss Seepage (Forested Ecosystem)	White spruce stand, with black spruce; moss-covered forest floor; medium-thick moraine or colluvial deposits; fine to medium soil texture; imperfect drainage with seepage.
MSF07	RE25f	White Spruce- Willow-Sedges - Riparian (Forested Riparian Ecosystem)	White spruce stand with moss-covered forest floor; thin-thick fluvial deposits; fine soil texture; riparian ecosystem; periodically flooded sites; imperfect to poor drainage.
MSF08	BS1	Black Spruce/Tamarack-Glandular Birch-Sphagnum Swamp (Forested Wetland Ecosystem)	Forested bog with black spruce and tamarack stand; organic deposits dominated by peatmoss; poor drainage.
MSF10	Bbu	Black Spruce Forested Fen (Forested Wetland Ecosystem)	Black spruce forested fen; organic deposits; ground cover dominated by sedge and grass; poorly drained.
MSF11	Fns	Structured Herb Fen (Non-Forested Wetland Ecosystem)	Structured herb fen; organic deposits; ground cover dominated by sedge and grass; very poor drainage.
MSF12	Fnu	Uniform Herb Fen (Non-Forested Wetland Ecosystem)	Uniform herb fen; organic deposits; ground cover dominated by sedge and grass; poor to very poor drainage.
MSF14	Fau	Uniform Shrub Fen (Non-Forested Wetland Ecosystem)	Uniform shrub fen; dominated by various shrub species of the Ericaceae family; ground cover dominated by sedge and grass; poor drainage.
MSF15	Fauf	Uniform Riparian Shrub Fen (Non-Forested Riparian Ecosystem)	Non-forested riparian shrub fen; fluvial or organic deposits; ground cover dominated by sedge and grass; soil richer and plant community more diverse than Ecotype MSF14; imperfect to poor drainage.
HST01		Alpine Shrub – Glandular Birch - Mesic	Mesic ecosystem dominated by herbs and shrubs; thick till; silty texture; well to moderately well drained.
HST02		Rock Outcrop - Crowberry - Xeric	Dry ecosystem dominated by lichen-covered rock outcrops; very thin or no soil; medium texture; very rapid drainage.
HST03		Low Alpine Herb/Lichens – Subxeric	Subxeric ecosystem dominated by Ericaceae and lichen species; thin till on bedrock; medium to coarse texture; good to rapid drainage.
HST04		Large-leaved Goldenrod Alpine Shrub – Seepage	Ecosystem with soils enriched by seepage and dominated by tall shrubs and a dense and diverse ground cover; thick till deposits; medium to fine texture; moderate to imperfect drainage.
HST05		Uniform Riparian Shrub Fen	Riparian fen; fluvial or organic deposits; ground cover dominated by sedge and grass; imperfect to poor drainage.
HST06		Uniform Herb Fen	Uniform herb fen; organic deposits; ground cover dominated by sedge and grass; poor to very poor drainage.
HST07		Uniform Shrub Fen	Uniform shrub fen; dominated by diverse shrub species of the

Ecotype	Code in Québec	Complete name	Description
			Ericaceae family; ground cover dominated by sedge and grass; poor drainage.

Source: Groupe Hémisphères (March 2009)

All of the above ecotypes may be found in the Project 2b area. In addition, an alpine prairie ecosystem was identified in a moderately drained valley east of the Kivivic deposits that is sheltered from the desiccating winds (Groupe Hémisphères 27 août 2009a, Décembre 2009).

Data collection on terrestrial ecosystems present in the area of Project 2b was completed in summer 2009 (Groupe Hémisphères 27 août 2009a). Results and analysis will be compiled in a final report that will include data collected in 2008 and 2009, which shall be integrated to the EIS. The report is expected for December 2009.

Figure 4.2 shows that the Kivivic sites are located in the HST, while Timmins 8 is located in a disturbed area within the HST. In Labrador, approximately 35 % of the DSO3-DSO4 haul road is located in the MSF Ecoregion, 44% in the HST and 10% in disturbed areas. The remaining percentages concern the Québec portion of the haul road (1% in the MSF and 10% in the HST).

No threatened or endangered species of plant was identified during the 2008 and 2009 surveys (Groupe Hémisphères March 2009 and 27 août 2009a). However, four species likely to be designated as threatened or vulnerable in Québec may occur in the vicinity of the Project 2b sites:

- the Large-leaved avens (*Geum macrophyllum* var. *perincisum*) was collected in the region of Schefferville (formerly Knob Lake) and at Burnt Creek in 1963 and in the vicinity of Schefferville in 1999 (Blondeau 2000);
- a colony of Chamisso arnica (*Arnica chamissonis*) was recently observed northeast of Schefferville in an area were old houses have been demolished (Groupe Hémisphères Décembre 2009);
- the Norwegian arctic cudweed (*Omalotheca norvegica*) was observed more than 25 years ago in the vicinity of Schefferville, on the shore of a creek (Groupe Hémisphères Décembre 2009);
- a population of Northern hollyfern (*Polystichum lonchitis*) was observed on the northeast side of mont Geren (Groupe Hémisphères Décembre 2009).

4.3.4.3 Fauna

Micromammals, Chiroptera, Herpetofauna and Insects

<u>Micromammals</u>

The term “micromammals” refers to very small terrestrial mammals. Micromammals play an important ecological role, being one of the first links in the food chain of carnivorous mammals and birds of prey. Micromammals include several taxonomic groups, such as rodents (mice and voles) and insectivores (shrews and moles) (Desrosiers *et al.* 2002). In general, they are active night and day and all year long. In winter, they rarely come out in the open, moving in tunnels that they dig under the snow to protect themselves from predators.

A summary of observations by Brunet *et al.* (Juin 2008) in the Schefferville area is presented in Table 4.9.

Table 4.9: Species of Micromammals Recorded in Schefferville Region and Habitat Description

Common English Name	Common French Name	Scientific Name	Habitat Description
Cinereus shrew	Musaraigne cendrée	*Sorex cinereus*	Mature deciduous or coniferous forests, bogs, fens and brush. Corresponding terrestrial ecosystems: MSF01, MSF06, MSF07, MSF08, MSF11, MSF12.
Pygmy shrew	Musaraigne pygmée	*Microsorex hoyi*	Various habitats close to watercourses (forests, groves, fens, *etc*.). Corresponding terrestrial ecosystems: MSF07, MSF11, MSF12, MSF13, MSF15.
Star-nosed mole	Condylure à nez étoilé	*Condylura cristata*	Forests and fields, but prefers riparian and wetland environments. Corresponding terrestrial ecosystems: MSF07, MSF15.
Meadow jumping mouse	Souris sauteuse des champs	*Zapus hudsonius*	Wet meadows, brush, grassy banks of watercourses as well as alder and willow groves. Fringes of coniferous and deciduous forests (where vegetation is dense). Corresponding terrestrial ecosystems: MSF07, MSF11, MSF12, MSF15.
Woodland jumping mouse	Souris sauteuse des bois	*Napaeozapus insignis*	Deciduous and coniferous forests close to watercourses. Corresponding terrestrial ecosystems: MSF06, MSF07.
Meadow vole	Campagnol des champs	*Microtus pennsylvanicus*	Wet and brush areas close to ponds, lakes and watercourses. Corresponding terrestrial ecosystems: MSF11, MSF12, MSF15.
Northern bog lemming	Campagnol-lemming boréal	*Synaptomys borealis*	Sphagnum fens, wet coniferous forests, wet subalpine grasslands and tundra. Corresponding terrestrial ecosystems: MSF06, MSF08 MSF11, MSF12, HST01, HST03, HST04, HST05, HST06.
Rock vole	Campagnol des rochers	*Microtus chrotorrhinus*	Wet taluses, between moss-covered rocks, at the base of cliffs, on rocky outcrops in mixed or coniferous forests. Corresponding terrestrial ecosystems: HST02, HST03, HST05.
Southern red-backed vole	Campagnol à dos roux de Gapper	*Clethrionomys gapperi*	Mature forests (coniferous, mixed or deciduous) and brush close to a source of water. Corresponding terrestrial ecosystems: MSF06, MSF07, MSF08, MSF15.
Ungava collared lemming*	Lemming d'Ungava	*Dicrostonyx hudsonius*	Dry and lichen-covered tundra areas. Corresponding terrestrial ecosystems: HST01, HST02, HST03.
Western heather vole	Phénacomys	*Phenacomys intermedius*	Various habitats close to water. Bushes near wooded areas, wet meadows with moss. Summits of mountains. Corresponding terrestrial ecosystems: MSF06, MSF07 MSF13, MSF15 HST01, HST02, HST03.

* Not recorded by Brunet *et al.* (Juin 2008), but identified by Girard (November 2003)

During the 2005 micromammal survey, the Southern red-backed vole was the most abundant and the most widespread micromammal. The Western heather vole was the next most abundant micromammal.

Brunet *et al.* (Juin 2008) indicated that they measured relatively low population densities, and they noted that inter-annual variations in the size of populations of micromammals are particularly great in northern latitudes. They speculated that such fluctuations might explain the absence of Ungava lemmings in 2005.

According to Girard (November 2003), Ungava lemmings and Meadow voles occur in the Howells River valley.

The Innu of Matimekush-Lac John are familiar with the Star-nosed mole (which they call *nanashpatinishtsheshu*) and confirmed its presence around DSO2 and DSO3 (Clément Mai 2009). They also know the Brown rat (*Rattus norvegicus*) and an aquatic shrew (*Sorex* sp.)

No species of micromammal is designated as being at risk in the PNL.

Chiroptera

According to Brunet et Duhamel's (Juillet 2005) literature review, the Silver-haired bat (*Myotis lucifugus*) may be present in the Howells River catchment.

No species were recorded in the surveys carried out in 2005 and 2006 (Brunet *et al.* Juin 2008). Cries were recorded but their low intensity did not make it possible to attribute them to a particular species.

There is only a slight potential for the Little brown bat (*Myotis lucifugus*) and the Silver-haired bat (*Lasionycteris noctivagans*) to be found around DSO4.

Herpetofauna

Table 4.10 shows the species of herpetofauna that are present or are likely to occur in the area based on a review of the literature and on two surveys.

Table 4.10: Herpetofauna Potentially Present and Recorded in Schefferville Region

Common English Name	Common French Name	Scientific Name	Literature Review	2005 Survey	2006 Survey
American toad	Crapaud d'Amérique	*Bufo americanus americanus*	X	X	X
Blue-spotted salamander	Salamandre à points bleus	*Ambystoma laterale*	X		
Mink frog	Grenouille du Nord	*Rana septentrionalis*	X		X
Northern green frog	Grenouille verte	*Rana clamitans melanota*			X
Northern spring peeper	Rainette crucifère	*Pseudacris crucifer crucifer*		X	
Northern two-lined salamander	Salamandre à deux lignes	*Eurycea bislineata*	X		
Wood frog	Grenouille des bois	*Rana sylvatica*	X	X	X

Source: Brunet et Duhamel (Juillet 2005); Brunet *et al.* (Juin 2008).

The Wood frog (*Rana sylvatica*) and the Northern spring peeper (*Pseudacris crucifer crucifer*) were recorded in all of the areas studied, whereas the American toad (*Bufo americanus americanus*) was found only in one area. The Northern spring peeper outnumbered the Wood frog.

Brown (June 2005) also recorded the American toad in the Howells River valley. He was advised that it belonged to the *copei* subspecies.

No salamanders or snakes were recorded during the 2005 and 2006 surveys.

Brunet et Duhamel (Juillet 2005) noted that few inventories of herpetofauna have been conducted in northern regions and that knowledge of the northern limits of the distribution of herpetofauna is consequently limited. Table 4.11 lists the species whose confirmed geographic distribution is limited to the south of DSO2, but that may nevertheless occur in DSO2, DSO3 and DSO4.

Table 4.11: Herpetofauna Recorded South of DSO2 but Potentially Present in Schefferville Region

Common English Name	Common French Name	Scientific Name
Boreal chorus frog	Rainette faux-grillon boréale	*Pseudacris maculata*
Four-toed salamander	Salamandre à quatre doigts	*Hemidactylium scutatum*
Northern dusky salamander	Salamandre sombre du Nord	*Desmognathus fuscus*
Northern spring salamander	Couleuvre à ventre rouge	*Gyrinophilus porphyriticus*
Redbelly snake	Couleuvre à ventre rouge	*Storeria occipitomaculata*

Source: Brunet et Duhamel (Juillet 2005)

Fortin (no date) recorded the Northern two-lined salamander (*Eurycea bislineata*) close to the 54th parallel of latitude some distance west of Schefferville, and he cited other records south and south-east of Schefferville.

The American toad and the Mink frog are the only species of amphibians and reptiles apparently known to the Innu of Matimekush-Lac John (Clément Mai 2009). Since they are not an important part of their subsistence and are considered to be pests, there is little traditional knowledge of amphibians and reptiles among them.

Insects

In a survey of insects in the Schefferville region from 10-11 August, 1974, Minot (no date) identified insects belonging to the following Orders: Coleoptera, Hemiptera, Hymenoptera, Lepidoptera, Plecoptera, Psocoptera, Trichoptera and Odonata.

In a literature review, Brunet et Duhamel (Juillet 2005) identified 67 species of insects of the Orders Lepidoptera and Odonata that may be present in the region of the LIOP encompassing Sept-Îles, Schefferville and Churchill Falls. The field surveys that followed in 2006 recorded four species of insects in the Schefferville area of the PQ (Brunet *et al.* Juin 2008). The findings of the field surveys are presented in Table I-1 (Appendix I).

Appendix I also includes the results of a 6-week survey and of a 10-day survey of butterflies in the Schefferville region in summer, 1948, and in July, 1967, respectively (Munroe 1951; Anthony March 1969).

Anthony (March 1969) noted that "Most of the species we took were extremely limited in their altitudinal and environmental preferences…"

In a conversation on 14 February, 2008, Mr Brian Skinner, MRNF, confirmed that knowledge about insects that may be present in northern Québec is very incomplete. MRNF cannot at this time provide a list of insects for northern Québec in general or for the Schefferville region in particular. The same appears to be true for the relevant portion of the PNL.

The Innu of Matimekush-Lac John consider insects to be pests, except for certain diptera used as fishing bait. Clément (Mai 2009) reported that all genera and species of diptera, butterflies, ants, flies, bees and spiders are observed everywhere.

Avifauna

Table II-1 (Appendix II) summarizes observations of birds in the Howells River valley between 1983 and 2006, while Table II-2 (Appendix II) presents observations of birds at the DSO2, DSO3 and DSO4 in 2008 by Groupe Hémisphères (October 2008). Table II-2 (Appendix II) presents a list of species observed by Innu informants from Matimekush-Lac John that do not appear on the preceding two lists, as reported by Clément (Mai 2009).

Groupe Hémisphères' (October 2008) survey of breeding birds was conducted between 11 and 16 July, 2008. It permitted the detection of 43 avian species through listening points, visits to wetlands and the examination of cliffs, as well as during movements of the survey team between those sites. Of those species, 14 are possible, probable or confirmed breeders according to the terminology established by Gauthier and Aubry (1995). Those 14 species, detected within 50-m radius listening points, and the biotopes in which they were recorded are presented in Table 4.12.

Table 4.12: Breeding Birds Detected at Listening Points in DSO2, DSO3 and DSO4, July 2008

Species	Barren		Tundra		Coniferous Forest	
	# of observations	% of observations	# of observations	% of observations	# of observations	% of observations
White-crowned sparrow	**12**	100,00	**72**	64,29	2	12,5
Fox sparrow					2	12,5
American tree sparrow			23	20,54		
Pine grosbeak					1	6,25
Gray-cheeked thrush					2	12,5
Dark-eyed junco					2	12,5
American robin			2	1,79	1	6,25
Yellow-bellied flycatcher					1	6,25
Yellow-rumped warbler					1	6,25
Blackpoll warbler					2	12,5
American pipit			10	8,93		
Golden-crowned kinglet					1	6,25
Ruby-crowned kinglet					1	6,25
Common redpoll			5	4,46		

In bold: Species most often observed in the biotope.
Source: Groupe Hémisphères (October 2008)

Seven of the 43 species detected by Groupe Hémisphères (October 2008) are species of interest according to David's (1996) list (Table 4.13).

Table 4.13: Species of Interest Observed in the Study Area According to the Status Classification in David (1996)

Latin Name	English Name	French Name	Status
Perisoreus canadensis	Gray jay	Mésangeai du Canada	Breeding resident; uncommon
Pinicola enucleator	Pine grosbeak	Durbec des sapins	Breeding resident; uncommon
Loxia leucoptera	White-winged crossbill	Bec-croisé bifascié	Breeding resident; uncommon
Anthus rubescens	American pipit	Pipit d'Amérique	Breeding resident; uncommon; rare wintering habitat
Passerella iliaca	Fox sparrow	Bruant fauve	Migratory breeding; uncommon; rare wintering habitat
Catharus minimus	Gray-cheeked thrush	Grive à joues grises	Migratory breeding; uncommon
Melanitta fusca	White-winged scoter	Macreuse brune	Rare migrator

Source: Groupe Hémisphères (October 2008)

The numbers of breeding waterfowl and shorebirds observed during the two-week survey conducted by Global Environnement/Golder Associates (November 2005) in mid-June to early July, 2005 were low, but that is probably attributable to the fact that waterfowl and shorebird nesting surveys in that area are best conducted in May (CQ-WBPS 2001) and that the major waterfowl flyways do not pass over or through the Schefferville and Howells River regions (Thomasson-Grant 1988).

According to Naskapi informants, the Howells River valley is used by geese and ducks from spring to fall. Girard (November 2003) reported sighting Canada geese (*Branta canadensis*) on the banks of Ione Lake. The wetlands around Kivivic Lake, as well as Boundary and Harris lakes, represent a refuge for waterfowl by serving as staging and nesting areas during spring/early summer. During the fall migration, geese are said to rest and feed on berries on the hills bordering the valley on the east (Weiler November 2006). According to Innu informants, the Snow goose overflies the area, but it barely stops there except to drink (Clément Mai 2009).

Three Innu informants have observed the Harlequin duck (*Histrionicus histrionicus*) in the vicinity of DSO2 and DSO3 (Clément Mai 2009). The Harlequin duck (eastern population) is a species at risk under provincial and federal legislations.

Brown (June 2005) reports sighting many ospreys (*Pandion haliaetus*) within the Howells River catchment. Innu informants from Matimekush-Lac John are also of the opinion that the osprey is very common (Clément Mai 2009).

According to Brown (June 2005) the number of Bald eagles (*Haliaeetus leucocephalus*) that he observed south and east of the Howells River increased after 1989. The regular presence of Bald eagles in the catchment has been confirmed by Naskapi and Innu informants (Girard November 2003; Clément Mai 2009). The species is classified as vulnerable in Québec.

Brown (June 2005) reports sighting one Golden eagle (*Aquila chrysaetos*) in the Howells River valley in 1991. Groupe Hémisphères (Octobre 2009) reports two sightings of the same Golden eagle in 2009 during a fisheries study. Innu informants have also observed it along the Howells River, south of Kivivic Lake and at Stakit Lake (Clément Mai 2009). It is claimed that nests have been observed at lac John and 150 metres notheast of Stakit Lake.

Rusty blackbirds (*Euphagus carolinus*) were sighted in a swamp bordering Ione Lake (Girard November 2003). A Rusty blackbird was observed on 18 July, 2008, near Inukshuk Lake (DSO3) during a fisheries survey (Groupe Hémisphères October 2008). One male, one female and one juvenile were observed near lac Big Star (DSO2 area) during a fisheries survey in 2009, which confirms that the species nests in the area (Groupe Hémisphères Octobre 2009). A rusty blackbird was also recorded near Goodwood in 2009 (Groupe Hémisphères Octobre 2009). The species is of special concern under federal legislation.

Minaskuat Limited Partnership (January 2008) reports sighting a Northern goshawk (*Accipiter gentilis*) in the Howells River valley in March, 2006. The presence of that species has also been reported by several members of the NIMLJ, according to whom it is present year-round (Clément Mai 2009).

The various surveys conducted did not reveal any owls, but Innu informants from the NIMLJ have reported sightings the Great horned owl (*Bubo virginianus*), the Snowy owl (*Nyctea scandiaca*), the Hawk owl (*Surnia ulula*) and *papanashtshish* (possibly the Boreal owl (*Aegolius funereus*)).

Clément (Mai 2009) also reported that Spruce grouse (*Dendragapus canadensis*), Willow ptarmigan (*Lagopus lagopus*) and Rock ptarmigan (*Lagopus mutus*) use the region. The Ruffed grouse (*Bonasa umbellus*) was also observed by one of the Innu informants.

Surveys of birds were continued in summer 2009 along the Québec routing of the DSO3-DSO4 haul road. Preliminary results indicated that a total of 28 species were identified, three of which had not been observed during the 2008 surveys (Groupe Hémisphères 27 août 2009b). The merlin (*Falco columbarius*) was among them. The merlin was, however, known by one Innu informant (Clément Mai 2009).

In the open forest, the most abundant species were the Gray jay (*Perisoreus canadensis*), the White-throated sparrow (*Zonotrichia albicollis*), the American tree sparrow (*Spizella arborea*), the Yellow-rumped warbler (*Dendroica coronata*), the Fox sparrow (*Passerella iliaca*), the Yellow-bellied flycatcher (*Empidonax flaviventris*), the White-winged crossbill (*Loxia leucoptera*) and the American robin (*Turdus migratorius*) (Groupe Hémisphères 27 août 2009b).

In the High Subarctic Tundra ecoregion, areas of low vegetation support the Horned lark (*Eremophila alpestris*) and the American pipit (*Anthus rubescens*). The White-crowned sparrow, the Common redpoll (*Carduelis flammea*) and the American tree sparrow are found in the Alpine Shrub-Glandular Birch ecotype. Finally, the Savannah sparrow occupied predominantly stands of sedges at the extremities of ponds.

No species with status were observed in 2009, but White-winged scoters (*Melanitta fusca*), which is of particular interest because of its limited breeding range in Québec, were observed on several water bodies. Birds of prey were very rare, observations being limited to two sightings of a male Pigeon hawk (*Falco columbarius*) near Goodwood. There were also two sightings of Willow ptarmigan (*Lagopus lagopus*) in DSO4.

Big and Small Game

The species of big and small game observed by Brown (June 2005) along the Howells River between May and October over the 1983-2002 period include: caribou *(Rangifer tarandus)*; Black bear (*Ursus americanus*); Grey wolf (*Canis lupus*); beaver (*Castor canadensis*); otter (*Lutra canadensis*); mink (*Mustela vison*); ermine (*Mustela erminea*); Red fox (*Vulpes vulpes*); Red squirrel (*Tamiasciurus hudsonicus*); muskrat (*Ondatra zibethicus*); and Snowshoe hare (*Lepus americanus*).

According to Girard (November 2003), who conducted fieldwork in the area located north-west of Irony Mountain and DSO3 in September, 2003, Naskapis frequently observe wolves, ermines and porcupines (*Erethizon dorsatum*) in that area, while moose (*Alces alces*) and Canada lynx (*Lynx canadensis*) are seen more rarely.

<u>Moose</u>

Although rare, moose are known to travel as far north as the Schefferville region in spring and summer (Brown June 2005). A DNA analysis of a sample of hairs collected in the Howells River Basin revealed the presence of moose there at some time between May and October, 2006 (Brunet *et al.* 2008).

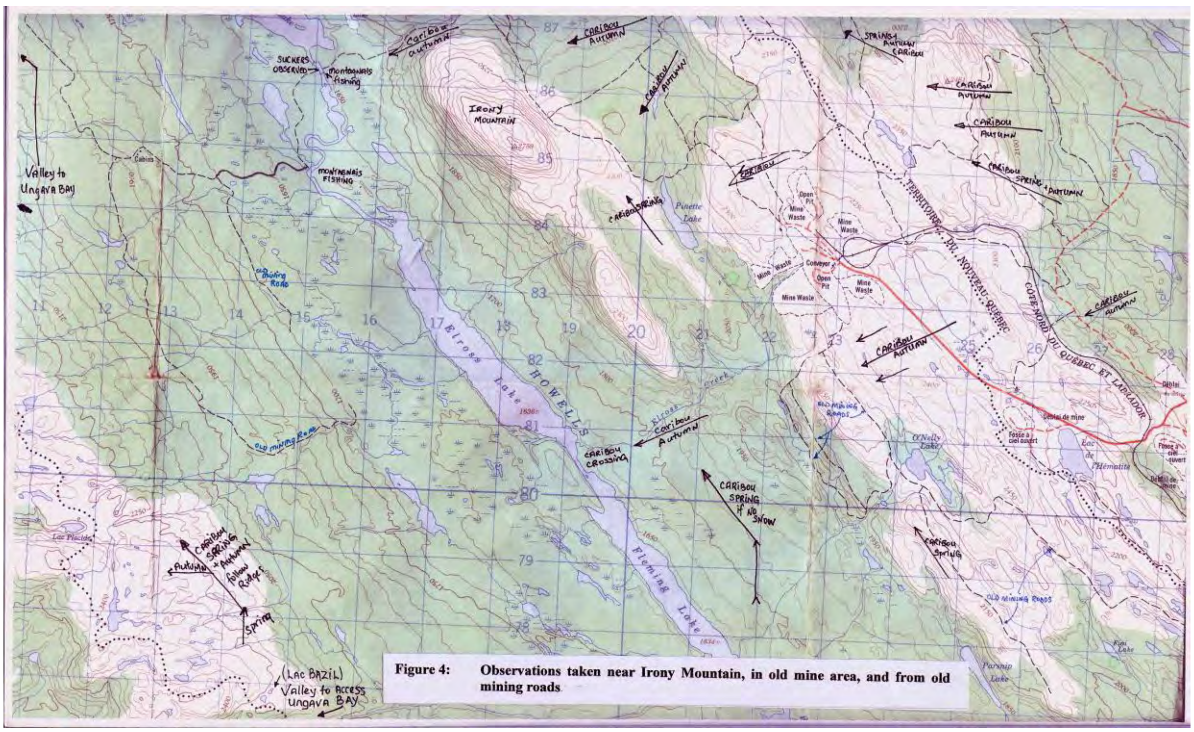
Moose tracks were observed south-east of Schefferville during the aerial survey of caribou conducted by NML and LIM in spring 2009, but no wintering areas were found (D'Astous and Trimper November 2009).

According to the Matimekush-Lac John Innu, moose (*mush*) are found only rarely in and around DSO2 and DSO3 (Clément Mai 2009). The construction of the railway in the 1950s is said to have facilitated the northward spread of moose. Paradoxically, however, the noise of trains is said to make them flee (Clément Mai 2009).

Caribou

Brown (June 2005) notes that the most commonly observed mammal in the Howells River catchment is the caribou. According to his observations, the precise direction in which caribou migrate in the Howells River catchment both in fall and in spring is influenced first by the topography and second by old mine sites east of the catchment, the location of which coincides with DSO3. The preferred migration routes of the caribou are high ridges and open black spruce-lichen forest. They have adapted to the formerly mined area by using old mining roads should they happen to be leading in the same direction as that in which they are migrating. The direction of caribou movements in the area of the old mine sites as observed by Brown and as evidenced by recently used trails is presented on Figure 4.6.

Figure 4.6: Observed Caribou Movements in and around Old Mine Sites



Source: Brown (June 2005)

Based on information from a representative of FAPAQ, Girard (November 2003) concluded that the caribou using the area belong to the George River Herd and are at the southern limit of their usual range. The area is not used as a calving ground, and no protective measures for caribou are in force there.

Minaskuat Limited Partnership (January 2008) reports sighting a caribou during a field survey completed in the Howells River valley in March, 2006, but it is uncertain whether it belonged to the sedentary or the migratory ecotype. The sedentary ecotype is considered to be threatened by the GNL and the GoC.

Brown (2008, *personal communication*) specified that he observed two types of caribou along the Howells River: solo animals that could be present at any time of year; and small groups of migrating animals that would travel down or across the valley principally in August-

September during the pre-rut period. In the light of the foregoing, combined with his recollection that there were no recent migratory paths in the lower portion of the valley, he concluded that the solo animals were of the sedentary ecotype, while the migrants belonged to the migratory ecotype.

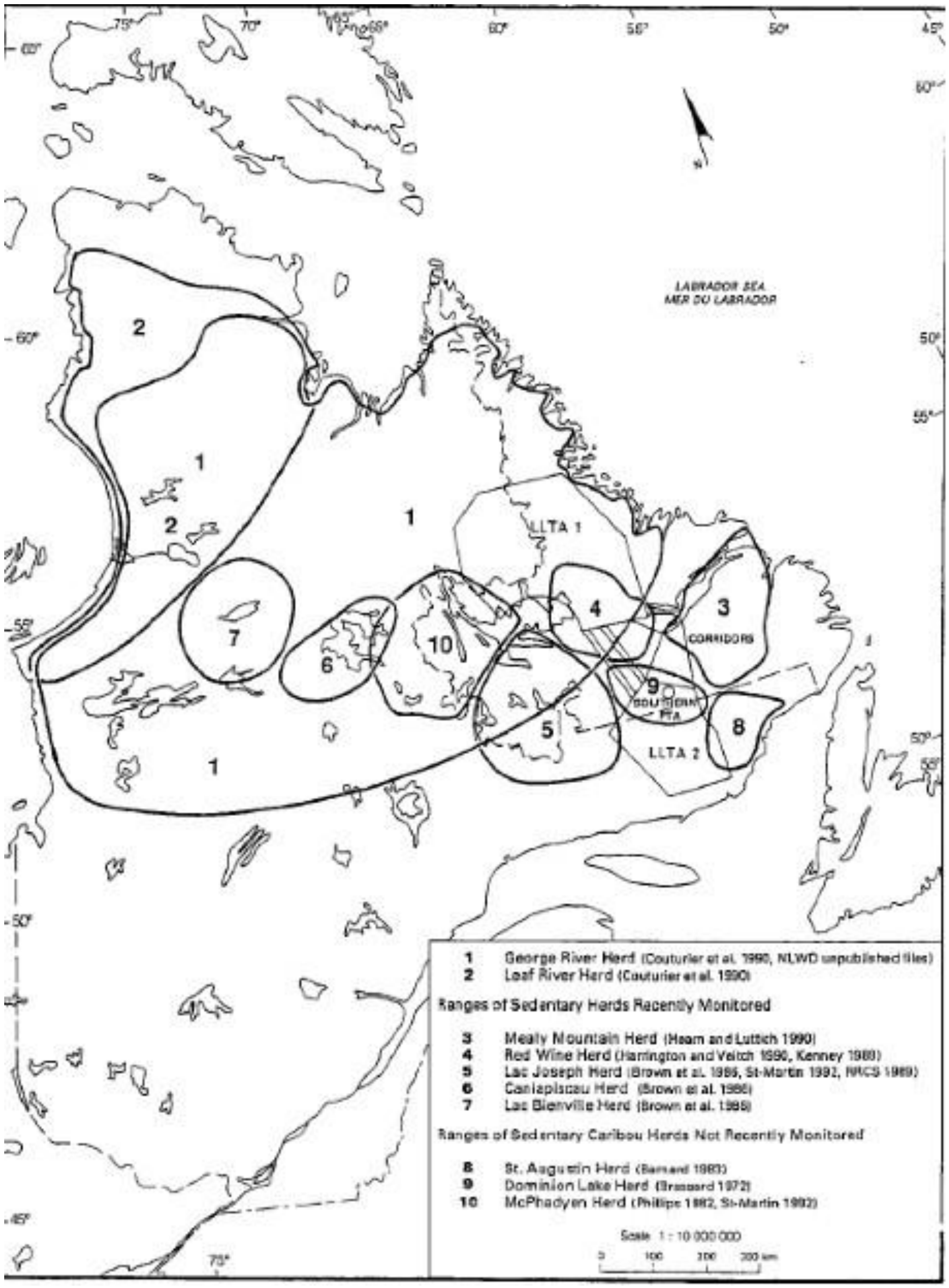
The GNL is concerned that some of the caribou seen near the site of Project 1a might belong to the McPhadyen Herd of sedentary ecotype caribou, which has until recently been thought to be extinct (Doucet 2008, *personal communication*).

Figure 4.7 shows that the range of the McPhadyen Herd encompasses the area of the DSOP. There is, however, no direct evidence suggesting that the caribou associated with the McPhadyen River form a distinct population, and some have suggested that they belong to the larger Caniapiscau Herd (Pilgrim 1979).

A survey consisting of two days of flying time between January and April 1978 counted 281 caribou in the McPhadyen River area (Pilgrim 1979).

A late-winter aerial survey in 1981 covering an area of ± 15,000 km^2 centered around the McPhadyen River counted 214 caribou in 10 groups composed of from one to 50 animals (Phillips March 12, 1982). Phillips (March 12, 1982) concluded that a large number of caribou seems to occupy the McPhadyen area in late winter. He noted that several important factors, including herd affinity with neighbouring caribou populations, such as the Caniapiscau and Lac Joseph herds, herd range and spatial and temporal characteristics of migrations, remain unknown.

Figure 4.7: Range of McPhadyen Herd according to RRCSL (January 1994)



Of the four female caribou from the McPhadyen area that were radio-collared in 1984, three remained in the area when a large group of George River caribou that had moved there in February-March 1984 migrated north in April, which supports the resident status of the caribou in the McPhadyen area (Brown *et al*. 1986; RRCSL January 1994).

A study of the McPhadyen and Lac Joseph herds was conducted between May, 1984, and October, 1986 (Saint-Martin 1987). Seven female caribou from the McPhadyen herd were radio-collared in April, 1984. The approximate range of the McPhadyen herd was defined by a polygon surrounding the outermost locations of the radio-collared caribou. The data suggested that the range at that time extended north of Schefferville.

The small sample size of collared caribou did not permit an adequate description of population dynamics (Saint-Martin 1987). The following inferences were made about the McPhadyen herd: the animals were present at very low density; some animals travelled towards the area north of the McPhadyen River in winter, followed by a return movement in late winter and spring; travel rates increased as fall and spring approached; groups of up to 33 and 46 animals were observed in fall and late winter respectively; groups of up to four animals were widely dispersed during the calving period; individual females did not show marked fidelity toward specific calving grounds.

Bergerud *et al*. (2008) further commented on Saint-Martin's (1987) study by pointing out that the seven radio-collared animals did not use the same calving area in each of the three years of the study, which suggested to them that the group in question should not be designated as a herd and managed as a unit.

Thirty-three caribou were sighted in the lac Harris area during a monitoring programme conducted by NML for caribou movements that took the form of a weekly helicopter overflight between 28 July and 19 October, 2007 (NML 29 January 2008). No caribou were sighted during three overflights of the vicinity of Project 2b organized by NML in August and September 2008 (O'Quinn 5 January, 2009). No caribou were sighted during two overflights conducted by NML in September 2009 (O'Quinn 2009, *personal communication*).

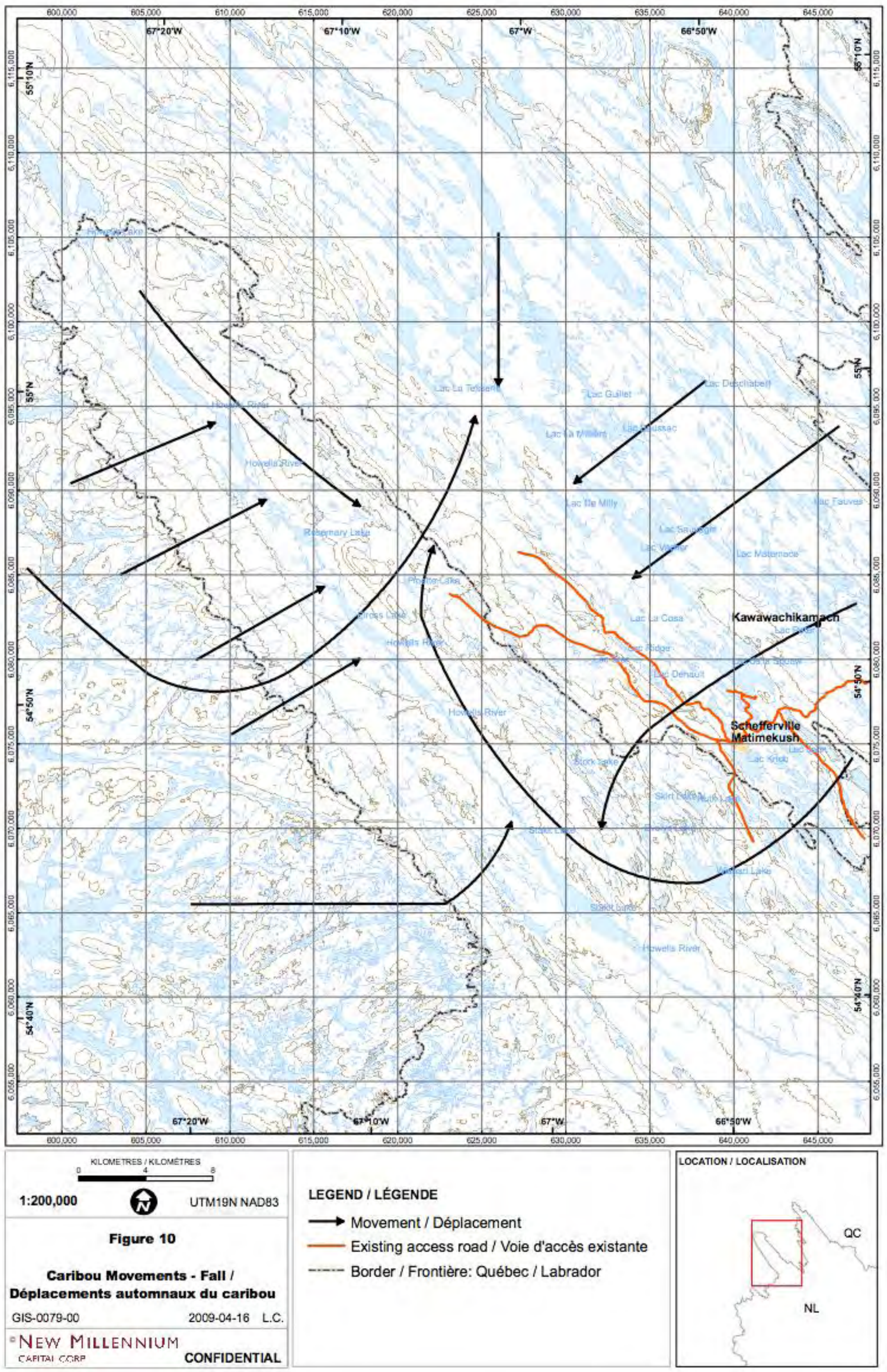
NML and LIM, in collaboration with wildlife biologists from the GNL, conducted a helicopter-based survey of caribou within a 50-km radius of DSO3 and of the claims of LIM between May 4-8, 2009 (D'Astous and Trimper November 2009). There were three sightings of caribou and one sighting of tracks that were not associated with the preceding sightings. Two adult female caribou were measured, and tissue samples for genetic analysis were taken from them. The measurements did not permit a determination as to whether the caribou belonged to the sedentary or to the migratory ecotype. The results of the genetic analyses will not be available before early 2010. One of the female caribou was fitted with a satellite collar, but no signals were ever received from it.

According to Clément (Mai 2009), migratory caribou (*mushuau-atik* in innu aimun) are found in the DSO2 and DSO3, but they are thought to have been avoiding the region of Schefferville in recent years for several reasons, such as drilling for mining exploration, fear of airplanes and global warming. In a general way, migratory caribou use mountains in the summer and woods and lakes in the winter (Clément Mai 2009). According to the Innu, their feeding habits also vary seasonally. In general, their main winter and summer food is reindeer lichen. They also eat broad-leaved and shrubby plants, mosses (sphagnum) and even, at times, rocks or sand (Clément Mai 2009).

The fall movement patterns of caribou identified by Naskapi and Innu interviewees predominantly follow a north-east to south-west direction (Weiler January 2009; Clément Mai 2009). Caribou are reported to cross the Howells River valley in winter at Rosemary and Stakit lakes (Weiler January 2009).

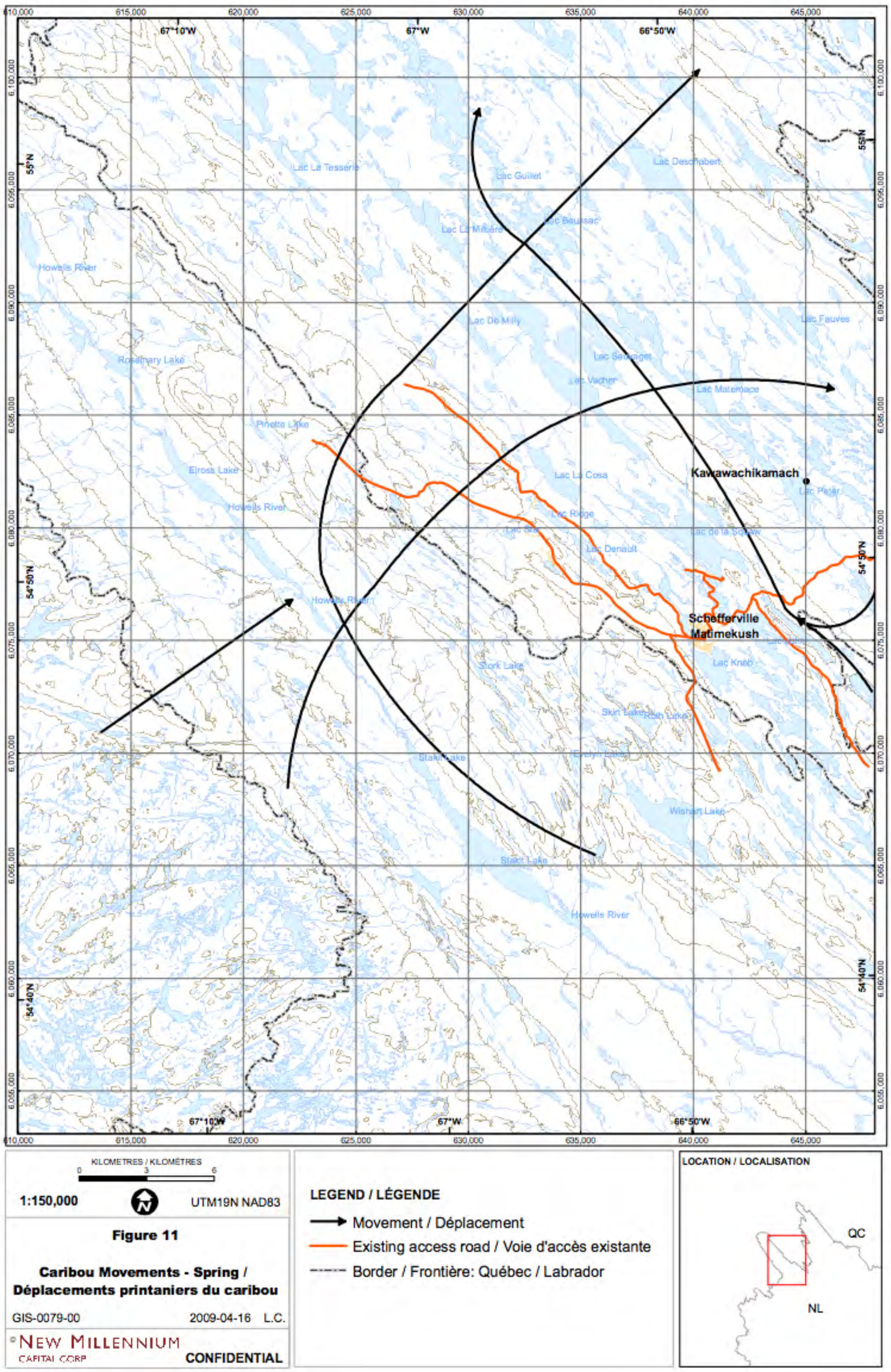
Innu interviewees confirmed the fall movement patterns reported by the Naskapis. Some of the caribou arriving from the rivière George in the north-east turn south towards the Smallwood Reservoir, while others overwinter in the Fermont area and return to the Schefferville region in spring (Clément Mai 2009). Some of the interviewees identified caribou movements in the opposite direction, *i.e.*, from the south-west to the north-east, in which the caribou cross the Howells River and spend approximately one month in the Schefferville region. Other fall movements were reported (Figure 4.8). Spring movements can originate from the Fermont/Esker areas or from the rivière George (Figure 4.9).

Figure 4.8: Pattern of Caribou Fall Movements Reported by Matimekush-Lac John Innu



Source: Clément (Mai 2009)

Figure 4.9: Pattern of Caribou Spring Movements Reported by Matimekush-Lac John Innu



Source: Clément (Mai 2009)

Black Bear

Brown (June 2005) observed on numerous occasions the presence of Black bears both in the old burns located adjacent to the lower portion of the Howells River and in the former mined area. According to him, individuals enter the area to gain access to the Schefferville landfill site. He observed no Black bear denning sites or cubs in the Howells River valley, but he did observe a female and two cubs near Greenbush Lake in the adjacent catchment area in 1995.

Most of the Innu consulted by Clément (Mai 2009) had seen Black bears (*mashk*) in 2008 in the vicinity of DSO2 and DSO3. According to one Innu, there is a den in the Schefferville cemetery; another Innu made a similar observation in the mountains west of the Howells River. The Innu of Matimekush-Lac John said that, although Black bear abounds near the Schefferville landfill, it is not harvested because of its eating habits (Clément Mai 2009).

During the caribou survey conducted by D'Astous and Trimper (November 2009), Black bears and tracks were observed in a 50-km radius from DSO3. Four Black bears and at least 10 different tracks were noted.

Wolf

The only sightings of wolves by Brown (June 2005) coincided with the presence of caribou, and he observed no denning sites. Innu from Matimekush-Lac John have observed wolves in the vicinity of DSO2 and DSO3 (Clément Mai 2009). Two different tracks were observed during the caribou survey in May 2009: one near a caribou carcass about 50 kilometres south of DSO3, the second 50 kilometres south-east of DSO3 (D'Astous and Trimper November 2009).

Wolverine

Wolverines, listed both federally and provincially as endangered, are typically found wherever prey is availability and are not linked to specific habitats. No observations of wolverine have been made in the Project area recently (Clément Mai 2009). A study in the Howells River basin endeavoured to identify the presence of wolverines by means of baited posts. No wolverines were recorded (Brunet *et al.* 2008).

In 1978, an Innu gave to an INAC representative a wolverine reportedly harvested north of Schefferville (Moisan Octobre 1996). The site of the capture was not confirmed. Nonetheless, based on knowledge of the territory used by the Matimekush-Lac John Innu, it seems unlikely that the harvest would have occurred further than ± 150 km north of Schefferville.

Prior to 1978, the most recent sightings of wolverines (*kuekuatsheu* in innu aimun) in the Schefferville region were those made by the Innu of Matimekush-Lac John in the 1950s (Clément Mai 2009).

Fish and Fish Habitat

Regional Data

Table 4.14 presents the species of fish that have been recorded in the Schefferville region and in the Howells River basin.

Table 4.14: Fish Species Present in the Schefferville Region and in Howells River Basin

Common English Name	Common French Name	Scientific Name
Brook trout	Omble de fontaine	*Salvelinus fontinalis*
Burbot	Lotte	*Lota lota*
Lake chub	Méné de lac	*Couesius plumbeus*
Lake trout	Touladi	*Salvelinus namaycush*
Lake whitefish	Grand corégone	*Coregonus clupeaformis*
Landlocked Atlantic salmon (ouananiche)	Saumon atlantique (ouananiche)	*Salmo salar*
Longnose sucker	Meunier rouge	*Catostomus catostomus*
Northern pike	Grand brochet	*Esox lucius*
Round whitefish	Ménomini rond	*Prosopium cylindraceum*
Slimy sculpin	Chabot visqueux	*Cottus cognatus*
White sucker	Meunier noir	*Catostomus commersoni*

Source: Scruton (1984); Brown (June 2005); Weiler (November 2006); Lee (July 2006)

White and Longnose suckers usually comprise the most important component of fish biomass in the larger lakes of the region, where more than 50% of biomass may be composed of suckers and Lake trout (Scruton 1984). Brook trout is the dominant species in the smaller lakes. Individuals of that species were observed in all the aquatic habitat types encountered by Lee (July 2006) during visual surveys in the Howells River valley in September 2005. According to his visual estimates, Brook trout ranged in age from young of the year (0+) to five-year-old (5+) individuals. Young of the year and 1+ were usually encountered in upwelling areas, on stream margins and in small side channels. Older Brook trout (5+) were generally present in pools, deeper sections and on pond margins (Lee July 2006). According to the Innu of Matimekush-Lac John, Brook trout is abundant everywhere in rivers, streams and lakes. They are known to be found in lac John, the Howells river, Elross Lake, Island Pond, Boot Lake and lac Squaw. According to several informants, the population of Brook trout has increased in a number of the waterbodies commonly fished (Clément Mai 2009).

A DFO gill-net survey of western Labrador lakes in 1982 indicated that Lake trout accounted for 37% of the biomass of the salmonid catch (Scruton 1984).

Innu informants have reported the presence of Arctic char further north and in the vicinity of George River (Clément Mai 2009)..

Site-specific Data to the Project and Project 2b

Timmins 8

There are two ponds in the vicinity of Timmins 8, both of which are pits excavated during former mining operations.

- Timmins 1 is located in DSO3. It is a former pit now filled with water from the spring freshet, sub-surface flow, runoff and precipitation in unknown proportions. Timmins 1 contains Brook trout. It has an area of 23.78 ha, with the deepest point measuring 75 m. The substrate is composed of rubble, gravel, sand and silt. Total Habitat Equivalent Units have been calculated for Brook trout at 2.2 ha (AMEC January 2009). Timmins 1 is connected, at least seasonally, to a stream named DSO3-15 (Elross Creek), which flow ultimately into the Howells River.
- Timmins 2 is a former pit now filled with water, a result of rain, runoff and the spring freshet in unknown proportions. It is located in DSO3. No surface inflow or outflow was observed. Gillnets and minnow traps were set but did not yield any fish; therefore no other surveys were conducted or samples collected. Timmins 2 is not considered to be fish habitat (AMEC January 2009).

There are no water bodies in the immediate vicinity of Timmins 8.

DSO4 Area and Proposed Haul Road

In 2009, Groupe Hémisphères conducted a fish habitat survey of the streams and bodies of water in the DSO4 sector and along the proposed haul road linking DSO3 to DSO4 (Groupe Hémisphères 2 septembre 2009 et 18 septembre 2009). Table 4.15 shows the preliminary results for Project 2b. Figure 4.10 shows the location of sampling sites in the DSO4 sector and figures 4.11 and 4.12 show the location of sampling sites along the proposed haul road. Figure 4.2 shows the results

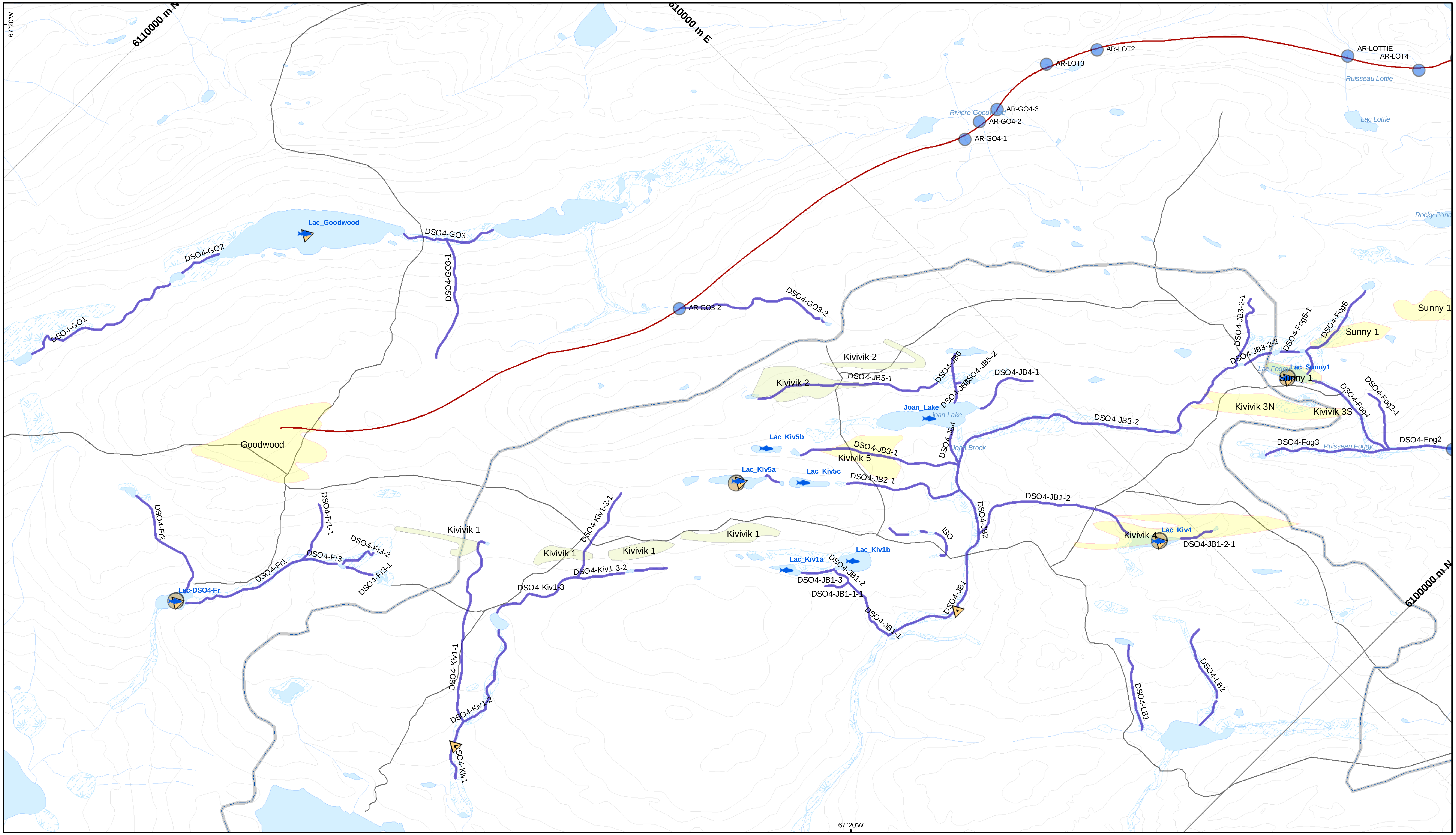
The majority of streams in the DSO4 sector (Project 2b) show no flow, other than a few stagnant puddles.

Table 4.15: Summary of Field Observations on Fish Habitat, 2009

Site	Présence of Fish	Observations
Watercourses		
JB3-2	No fish	Good potential habitat before junction with Jb4, no flow beyond this point
Jb3-2-1	No fishing possible	No flow
Jb2-1	No fish in puddles	No flow
Jb1-2	No fishing possible	No flow
Jb4	No fish	Potential habitat
Jb3-1	No fish	Small section with potential habitat, followed by a basin with organic substrate and end of flow
ISO	No fishing possible	No flow
Jb4-1	No fish	Very little flow
Jb5-2	No fish	Observation of a coleopteran larva
Jb5	No fish	Potential habitat
Jb6	No fish	Potential habitat
Jb5-1-1	No fish	Low habitat potential, low flow, highly organic substrate
Jb5-1	No fish	Flow ends a short distance downstream
Jb2-1-2	No fishing possible	No flow
Kiv1-3	No fishing possible	No flow, follows the road ditch
Kiv1-1	No fishing possible	No flow, flows in the road for 30 m
Kiv1-3-2	No fishing possible	No flow
Kiv1-3-1	No fishing possible	No flow, construction of an elbow in bed
Kiv1	No fishing possible	No flow
Kiv1-2	No fishing possible	No flow
Jb1-3	No fishing possible	No flow, stagnant puddles
Jb1-2	No fishing possible	No flow
Jb1-1	No fishing possible	No flow
Jb1	3 *Salvelinus fontinalis*	Confirmed habitat
Lb1	No fishing possible	No flow, stagnant puddles
Lb2	No fishing possible	No flow, observation of an Arctic fox
Jb3-2-2	No fishing possible	No flow, stagnant puddles
Lakes		
Joan	5 *Salvelinus fontinalis*	Confirmed habitat
Kiv1A	No fish	
Kiv1B	No fish	
Kiv 5A	No fish	
Kiv 5B	No fish	
Kiv 5C	4 *Couesius plumbeus*	Confirmed habitat

Site	Présence of Fish	Observations
Kiv 4	No fish	
Proposed haul road (Labrador variant)		
AR-Bo1		No flow, bed covered with terrestrial vegetation
AR-Bo2		No flow, bed covered with terrestrial vegetation
AR-Bo3		No flow, bed covered with terrestrial vegetation
AR-Tri		No flow, bed covered with terrestrial vegetation
AR-Rea1		Water course, substrate made up mainly of organic matter
AR-Rea2		Water course, 90% of substrate covered with moss
AR-Rea-3		No channel, seepage through wetland
AR-Rea4		No channel, seepage through wetland
AR-Rea5a		Low flow, substrate suitable for fish
AR-Kiv1a		No flow, substrate suitable for fish
AR-Jo1		No flow, substrate suitable for fish
AR-Jo2		Fish presence confirmed by electric fishing in July 2009
AR-Jo3		No flow, substrate suitable for fish
AR-Ba1		No flow, substrate suitable for fish
AR-Ba2		No flow, slope steep for fish (11%)
AR-Ba3		No channel, shallow depression in shrub layer
AR-Gr1-1		Observation of one Brook trout (25 cm)
AR-Gr2-1		No flow
AR-Gr3-1		Water course, substrate made up mainly of organic matter

Source : Groupe Hémisphères (2 septembre 2009 ; 18 septembre 2009)



LEGEND/LÉGENDE

- gps_090804_MED_point
- *Stream survey/ Inventaire de cours d'eau*
- Fishing and water quality/ Pêche et qualité de l'eau
- Échantillonage d'eau
- Sediment sample/ Échantillonage de sédiments
- Fish habitat survey/ Inventaire de l'habitat du poisson
- Deposit/gisement
- Border/frontière
- Railway/voie ferrée
- Road/route
- Watercourse/cours d'eau
- Wetland/milieu humide
- Waterbody/plan d'eau
- Existing mined-out pit/ fosse existante épuisée
- Existing waste dump/ halde de stériles existante

HEMISPHERES le groupe

Fish Habitat Survey Sites, 2009 - DSO4

0 0.5 1 1.5 2

KILOMETRES/KILOMÈTRES

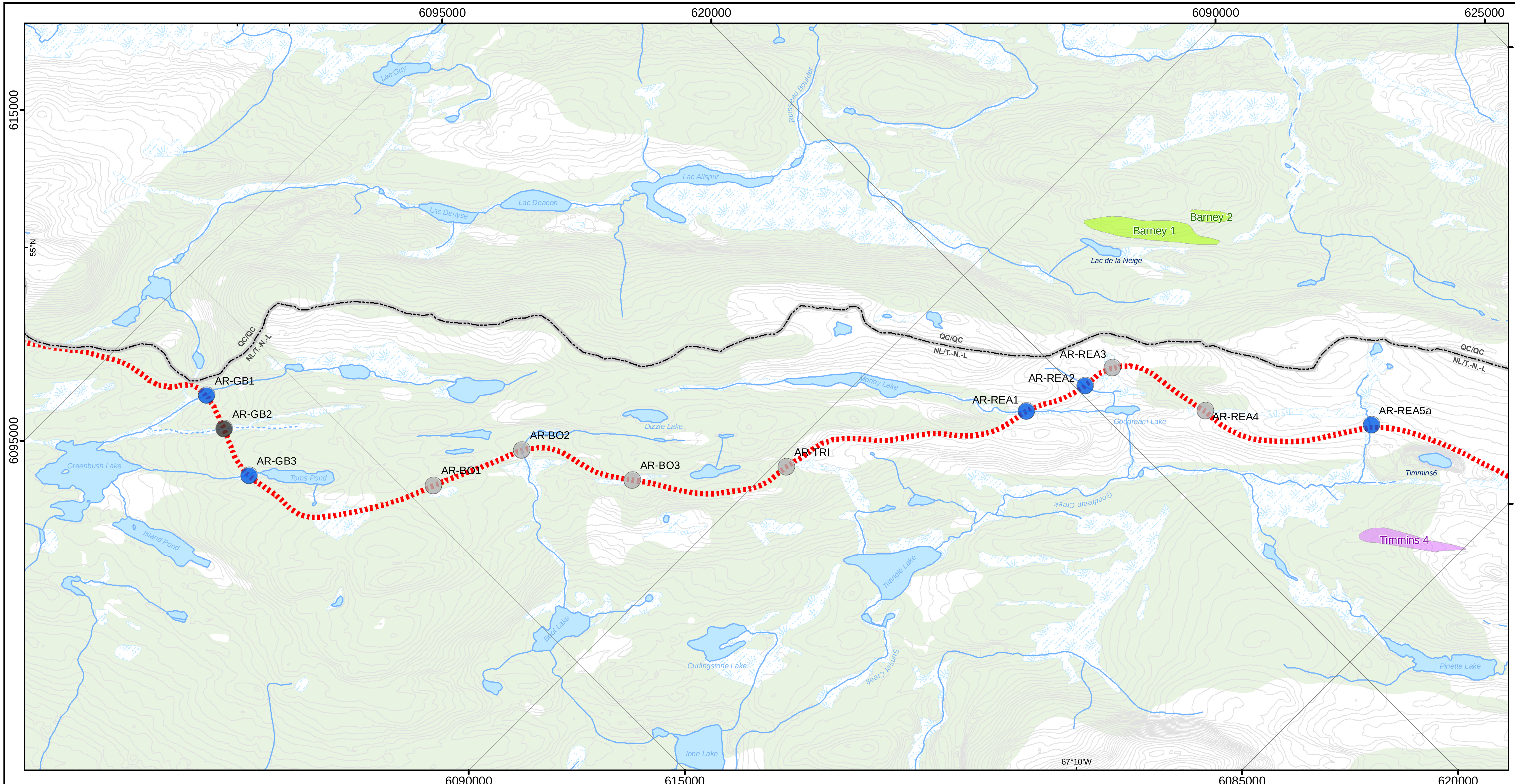
SCALE/ECHELLE:
1:25,000

UTM 19N NAD 83

Figure 4.10

SOURCES:
Gov. of Canada, NTDB, 1:50 000, 1979
Gov. of NL and Gov. of QC, Boundary
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology update, 2008

Gouv. du Canada, BNDT, 1/50 000, 1979
Gouv. de T-N-L et Gouv. du QC, frontière
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise-à-jour de l'hydrologie, 2008



LEGEND/LÉGENDE

Fish habitat survey/ reconnaissance de l'habitat du poisson

- No flow /aucun écoulement
- Torrential flow/ écoulement torrentiel
- Intermittent flow/ écoulement intermittent
- Permanent flow/ écoulement permanent

Assessment groups/unités d'évaluation

- 1a
- 2c

- Watercourse/cours d'eau
- Intermittent watercourse/ cours d'eau intermittent
- Torrential channel/ chenal torrentiel
- Disappearing watercourse/ cours d'eau disparaissant
- Artesian spring/ source jaillissante
- Waterbody/ plan d'eau
- Disappearing pond/ étang disparaissant
- Wetland/milieu humide

- Border/frontière
- Contour interval/ courbe de niveau
- Wooded area/ aire boisée

Proposed road/route proposée

- Newfoundland and Labrador route/ tracé du Terre-Neuve-et-Labrador

Sampling Sites for the Fish Habitat Survey – Haul Road DSO3-DSO4 South

Stations d'échantillonnage de la reconnaissance de l'habitat du poisson – Voie de halage DSO3-DSO4 sud

0 0,5 1 1,5 2 2,5

Kilometers/kilomètres

SCALE/ÉCHELLE:
1:35 000

UTM 19N NAD 83

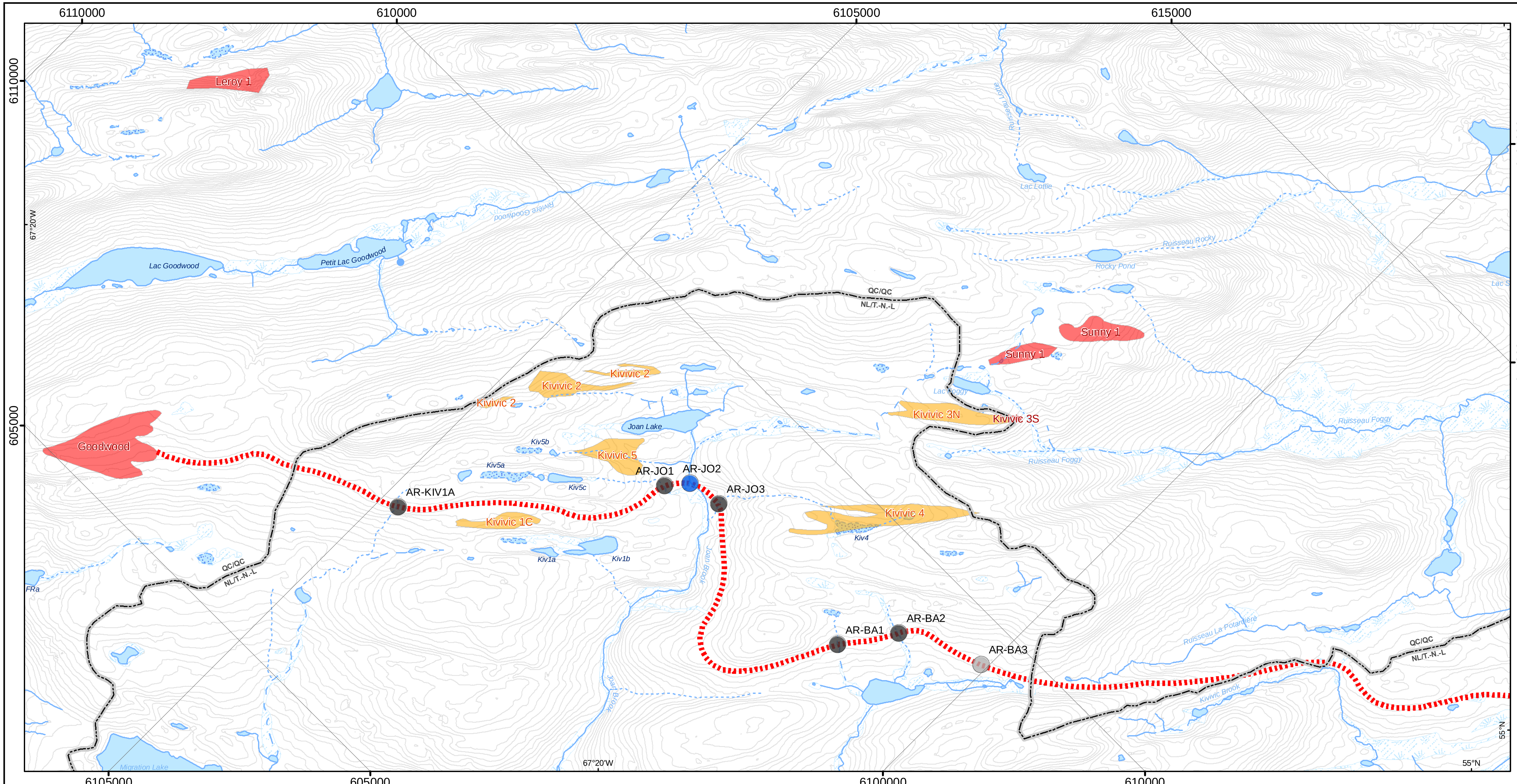
FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR:
GH-0095-01, 2009-12-11, A.A.

HEMISPHERES le groupe

SOURCES:
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec, Boundary used for mining claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology update, 2009

Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de T-N-L et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie, 2009

Figure 4.11



LEGEND/LÉGENDE

Fish habitat survey/ reconnaissance de l'habitat du poisson

- No flow /aucun écoulement
- Torrential flow/ écoulement torrentiel
- Intermittent flow/ écoulement intermittent
- Permanent flow/ écoulement permanent

Assessment groups/unités d'évaluation

- 2a
- 2b

- Watercourse/cours d'eau
- Intermittent watercourse/ cours d'eau intermittent
- Torrential channel/ chenal torrentiel
- Disappearing watercourse/ cours d'eau disparaissant
- Artesian spring/ source jaillissante
- Waterbody/ plan d'eau
- Disappearing pond/ étang disparaissant
- Wetland/milieu humide

- Border/frontière
- Contour interval/ courbe de niveau
- Wooded area/ aire boisée

Proposed road/route proposée

- Newfoundland and Labrador route/ tracé du Terre-Neuve-et-Labrador

Sampling Sites for the Fish Habitat Survey – Haul Road DSO3-DSO4 North

---

Stations d'échantillonnage de la reconnaissance de l'habitat du poisson – voie de halage DSO3-DSO4 nord

0 0,5 1 1,5 2 2,5

Kilometers/kilomètres

SCALE/ÉCHELLE:
1:35 000

UTM 19N NAD 83

FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR:
GH-0095-01, 2009-12-11, A.A.

SOURCES:
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec, Boundary used for mining claims
New Millennium Capital Corp., Mining sites and roads
Groupe Hémisphères, Hydrology update, 2009

Gouvernement du Canada, BNDT, 1/50 000, 1979
Gouvernement de T-N-L et gouvernement du Québec, frontière utilisée pour les titres miniers
New Millennium Capital Corp., gisements et routes
Groupe Hémisphères, mise à jour de l'hydrologie, 2009

HEMISPHERES le groupe

Figure 4.12

Only one of the 27 streams visited in the Project 2b area has fish and is confirmed fish habitat (Table 4.15). It is Jb1, where three Brook trout were fished. Seventeen streams in that area have no flow and are confirmed not to be fish habitat. Six streams contain potential habitat (Table 4.15).

A considerable proportion of the lakes in DSO4 appear to be fed by snow melt, since no inflowing stream was found in many cases (Groupe Hémisphères 2 septembre 2009). In addition, the large difference between the high water mark and the surface of the water at the time of the survey indicated that the water level had dropped.

The lakes in the Project 2b area are generally poor in or totally devoid of fish. Five Brook trout were caught in Joan Lake, and four Lake chub were caught in Kiv 5C, but no fish were caught in the five other lakes sampled (Table 4.15). The shallowness of the lakes combined with the small hydrographic network seems to limit the potential for fish production in this sector (Groupe Hémisphères 2 septembre 2009).

Data collected in September 2009 along the haul road linking DSO3 and DSO4 revealed that there was flow in six of the 19 crossings at the beginning of September, but only three of those streams contained potential habitat (Groupe Hémisphères 18 septembre 2009) (Table 4.15). The other crossings were either dry, or their substrate was either organic or non existent. The presence of fish was confirmed at only two of the crossings (AR-JO2 and AR-Gr1-1) (Table 4.15).

A second campaign to survey fish habitat was conducted in August and September 2009 in order to collect more detailed data on habitats where flow had been observed. The results will be included in any assessment report that is required, but they are illustrated on Figure 4.2.

Macroinvertebrates

A benthos sample was collected in 2009 at Jb 1 to identify benthic macroinvertebrate species. The results will be included in any assessment report that is required.

Species at Risk

Appendix III summarizes knowledge of species at risk or likely to be so designated.

Table 4.16 lists the only such species the presence of which has actually been confirmed in the Howells River valley.

Table 4.16: Species at Risk or Likely to be Designated Present in the Howells River Valley

Common English Name	Common French Name	Scientific Name	SARA Status	COSEWIC Status	Status in Québec	Status in Labrador
Rock vole	Campagnol des rochers	*Microtus chrotorrhinus*	---	---	Likely to be designated	[1]
Bald eagle	Pygargue à tête blanche	*Haliaeetus leucocephalus*	---	---	Vulnerable	---
Golden eagle	Aigle royal	*Aquila chrysaetos*	---	---	Vulnerable	---
Rusty blackbird	Quiscale rouilleux	*Euphagus carolinus*	---	Special concern	---	---
Harlequin duck	Arlequin plongeur	*Histrionicus histrionicus*	Special concern	Special concern	Vulnerable	Vulnerable
Barrow's goldeneye	Garrot d'Islande	*Bucephala islandica*	Special concern	Special concern	Vulnerable	Vulnerable

[1]There are no endangered species of small mammals in Labrador, but the GNL asked to be informed of any occurrences of Rock vole (Rodrigues June 27, 2007).

4.3.5 Traditional Ecological Knowledge

The relevant TEK already collected by NML (Clément Mai 2009; Weiler January 2009) are included in the preceding sections.

Contracts were awarded for the collection of TEK for the vicinity of Project 2b. The resulting data will be included in whatever assessment report is required.

4.4 Construction

The construction phase will involve the following principal activities:

- building approximately 27 km of haul road from the processing complex near Timmins 1 to the border between the PNL and the PQ roughly north of Kivivic 1C (Figure 1.2). The routing shown in Figure 1.2 will likely be adjusted slightly so as to avoid sensitive habitats;
- building approximately 15 km of haul roads between the Kivivic 3N, 4 and 5 deposits and the DSO3-DSO4 haul road. The precise routings of these haul roads have not yet been determined. They are likely to be in the corridors shown on Figure 4.2 and will be selected so as to avoid sensitive habitats. The rolling surface of all roads will be 12 m wide. They will be constructed from mine waste covered by 150 mm of borrowed pit-run material, as they will all be used by 135-tonne trucks. There will be ditches alongside the roads wherever needed. The width of the right-of-way will thus be 16 m. The pit-run material will be produced with a mobile crusher to be located at a borrow pit the exact location of which will be determined after the feasibility stage of Project 2b.

  The geology of the Kivivic 3N, 4 and 5 deposits indicates that there will be no requirement for stripping before mining starts.

  Site preparation will be minimal, although limited vegetation clearing might be required during the construction of the haul roads. As required, equipment will be used to push the resultant debris into piles, the location of which will be determined at that time.

  To prevent the incursion of surface runoff into the pits, ditches will be built at appropriate points on the pit perimeters to channel water into settling ponds before reaching natural drainage features.

  The workers will commute on a daily basis from the workers' camp near Timmins 1.

4.4.1 Appropriate Total Construction Period and Proposed Start Date

Construction of the access road from DSO3 to DSO4 is scheduled to begin in spring 2012. The haul roads between Kivivic 3N Kivivic 4 and Kivivic 5 and the DSO3-DSO4 haul road and between those deposits and the sites of the waste rock piles will be built in fall 2012. The duration of the construction phase will be roughly nine months. The haul roads to the other deposits will be built once a firm decision has been taken to mine those deposits.

4.4.2 Potential Sources of Pollutants

The only potential sources of pollutants during the construction period are noise, dust and exhaust gases from heavy machinery and other vehicles. Chemical toilets will be installed at the work sites, and their contents will be disposed of at the installations planned for DSO3. All repairs and maintenance of vehicles will be carried out at the processing complex near Timmins 1.

4.4.3 Potential Causes of Resource Conflicts

Recent land- and resource-use surveys by Weiler (January 2009) and Clément (Mai 2009) show that the DSO2 and DSO3 areas are used by Naskapis and Innu based in Québec for hunting and for gathering plants, including medicinal plants. Those areas form, however, only a tiny proportion of the total areas used for subsistence purposes by those two groups. Additional studies are being conducted at the moment to include DSO4 area, the results of which will be included in any assessment document that may be required.

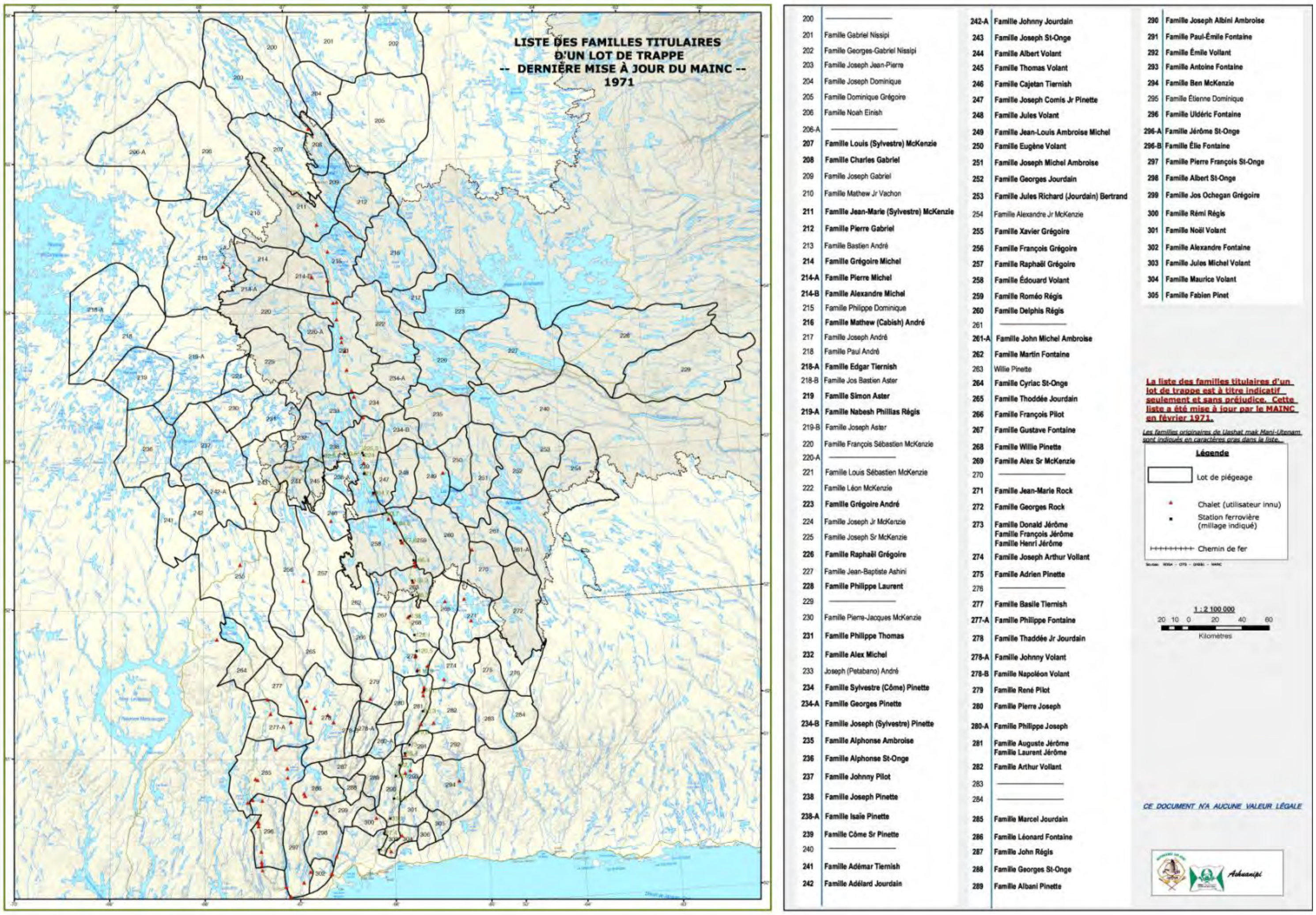
An outfitting camp (Kivivik Lake Lodge owned by Labrador 2 BG Adventure Inc.) is located on the shore of Kivivic Lake, less than 10 kilometres south of the Kivivic deposits (Figure 4.2). Its capacity is 10 persons. Because of the rarity of caribou, it has not been open for caribou hunting since 2007, but it has been used over the past 10 years to offer snowmobile trips to approximately 40 persons each winter (NML and PFWA December 2009).

Based on the foregoing and on the preoccupations voiced during the information and consultation sessions with local communities, the following potential sources of resource conflicts have been identified:

- interference with subsistence activities on traplines 207 and 211, the locations of which are shown on Figure 4.13;
- interference with subsistence hunting of caribou, particularly between mid July and the end of September.

We anticipate that the scale of those conflicts will be very minor.

Figure 4.13: Traplines as of 1971



4.5 Operations

4.5.1 Description of Operations

4.5.1.1 Ore Extraction

Ore will be extracted from five pits in DSO4 (Kivivic 1C, Kivivic 2, Kivivic 3N, Kivivic 4 and Kivivic 5) and from one pit in DSO3 (Timmins 8) (Figure 4.2) using conventional open-pit mining techniques :

- rotary, diesel-driven drills will drill 9⅞" (250 mm) diameter holes on 12 m benches for blasting;
- blasting will use slurry explosives that will be manufactured at a factory to be built near Timmins 1 and waterproof blasting caps;
- 135-tonne trucks, loaded by front-end loaders fitted with 10 to 12 m^3 buckets, will transport ore from the face to the processing complex in DSO3 and to waste rock piles located near each pit;
- three tracked bulldozers will assist each front end loader.

An explosives truck will bring the slurry and other supplies from the batch plant. The slurry will not be explosive during transportation. It becomes explosives only after it has been poured into the blast holes and gassed.

On average, blasting will be performed twice a week in the area.

Ore and waste rock extraction will take place 365 days per year and 24 hours per day.

The DSOP will produce approximately 5.1 Mt of ROM material per year. The production of ore from Project 2b will never exceed 2 Mt/y and will generally be closer to 1 Mt/y (Table 4.17). The balance of the ore needed will come from other deposits.

Mining will begin at Kivivic 3N in 2013 and will continue for four years, followed by Kivivic 4 in 2014 for nine years and Kivivic 5 in the same year for five years (Table 4.17). Geological resources estimations for Kivivic 1C, Kivivic 2 and Timmins 8 need to be completed before the quantity of ROM material that can be extracted from them can be assessed.

Table 4.17: Mine Plan for Project 2b (million tonnes)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Kivivic 3N										
Waste Rock	1.7	0.4	2.2	0.2						
Ore	0.4	0.03	1.0	0.3						
Kivivic 4										
Waste Rock		1.3	0.4	0.5	1.3	2.6	2.8	0.8	0.8	0.8
Ore			0.003	0.02	0.4	1.1	2.0	1.2	1.0	1.0
Kivivic 5										
Waste Rock		0.6	0	0.8	0.8	0.3				
Ore		0.2	0	0.7	0.7	0.5				

The ore will be transported to the processing complex in DSO3 by means of 135-tonne trucks. During the year of peak production (2019), there will be 80 truck movements per day between Kivivic 4 and the processing complex (40 full and 40 empty). In most years, however, the number will be closer to 40 movements (full and empty) per day.

Except for field servicing and emergency repairs, equipment will not be maintained in DSO4. Maintenance activities will take place in DSO3 adjacent to the processing complex.

4.5.1.2 Dewatering

Where required, dewatering will be carried out by means of diesel-powered pumps, since none of the Project 2b pits will be provided with electricity. The water will be pumped through flexible hoses lying on the surface of the ground.

Preliminary indications (see Section 4.3.2.2) are that dewatering the pits will not be problematic and will not generate large volumes of water (Groupe Hémisphères 17 novembre 2009), although no pumping tests have yet been conducted on any of the deposits.

By definition, all of the deposits in DSO4 are greatly altered. They are made up of soft, non-cohesive material. Permeability tests have indicated a very weak hydraulic conductivity similar to that of a clay (Groupe Hémisphères 17 novembre 2009).

All of the drill holes at Goodwood (Project 2a) that were still open in 2009, the deepest of which was 60 m, were dry (Groupe Hémisphères 17 novembre 2009). Some water was encountered there during drilling in 2009, but it appears to have came from a small perched water table (Groupe Hémisphères 17 novembre 2009).

Water was observed in drill holes in Kivivic 4 southeast of the mining road that crosses it, but it appears to come from surface aquifers, and the drill holes northwest of that road were dry (Groupe Hémisphères 17 novembre 2009).

All of the Project 2b deposits in DSO4 are close to the height of land that defines the border between the PNL and the PQ. Consequently, they have a very limited recharge area. Recharge is mainly by infiltration, but the impermeability of the deposits favours runoff rather than infiltration. The lakes near Kivivic 4 and 5 appear to reflect the accumulation of surface runoff in depressions with impermeable beds rather than the presence of the water table near the surface (Groupe Hémisphères 17 novembre 2009).

The formations surrounding the iron ore deposits are very hard and highly cohesive compared with the deposits themselves.

Given the foregoing, it is unlikely that peripheral wells will be required to dewater the pits in DSO4, since their walls should be able to withstand safely the hydrostatic pressure. The possibility that aquifers in the surrounding rock will start to flow into the pits cannot, however, be discarded (Groupe Hémisphères 17 novembre 2009).

We anticipate, therefore, that dewatering the pits in DSO4 would target mainly removing accumulations of surface runoff and precipitation from the low point (sump) of the pits.

The volumes of water would likely be small, but it will contain suspended particles and could be contaminated with the residue of explosives, fuel, lubricants and oil. It would be pumped to a sedimentation basin, where continuous flow would avoid freezing in winter. Hydrocarbons would be removed by means of a flotation device and would be shipped by rail to a treatment plant in Sept-Îles.

Figure 4.2 shows potential locations of the sedimentation basins.

For the reasons explained in Section 4.3.2.2, the approach to dewatering at Timmins 8 will probably be identical to that at the pits in DSO4. In that case, however, the water will be disposed of in Timmins 2.

4.5.1.3 Storage of Waste Rock and Tailings

In order to minimize haulage distances, the waste rock dumps will be located as close as possible to the pits, without covering zones of potential mineralization and without impacting sensitive habitats. Where possible, they will be located at least 100 m from watercourses and water bodies. Figure 4.2 shows the potential locations of the waste rock dumps. In the peak year (2019), there will be roughly 115 truck movements per day between Kivivic 4 and its waste rock dump (57 full and 57 empty). The average number of truck movements will be roughly 75 (37 full; 37 empty).

No tailings will be generated in DSO4, since the ore will be processed in DSO3 and the tailings will be disposed of in an abandoned pit there.

4.5.1.4 Schedule

Mining is scheduled to begin in 2013 at Kivivic 3N, while Kivivic 4 and Kivivic 5 are scheduled to be mined starting in 2014. Mining is expected to extend beyond 2022 with the opening of Kivivic 1C, Kivivic 2 and Timmins 8.

4.5.2 Potential Sources of Pollutants

The principal sources of pollutants are noise, dust and exhaust gases from heavy machinery, vehicles, blasting and loading. Dewatering water may also be source of pollutants, although petroleum products will be removed by flotation and suspended particles will be allowed to settle out before the water is discharged to the environment.

4.5.3 Potential Causes of Resource Conflicts

The potential causes of resource conflicts during operations are similar to those that are foreseen during construction, with the principal addition of the effects of noise on caribou.

4.6 Decommissioning

A rehabilitation and closure plan will be prepared in conformity with the regulations of the GNL. It will be submitted before the start of operations, and scheduled updates will be submitted as required.

The plan will address those of the following activities that are applicable, as stipulated in the “Guidelines to the Mining Act” (GNL 2009), namely:

- a rehabilitation plan for all waste rock areas and ore stockpile areas;
- the rehabilitation of all open pits or quarries to the satisfaction of the minister, considering the following factors:
    - the dimensions of the pit;
    - the nature of the rock;
    - the stability of the rock;
    - the surrounding topography;
    - the surrounding land use;
    - proximity to residential or recreational areas;
    - the disposition of waste rock extracted from the open pit;
    - water elevations and groundwater characteristics;
- an assessment of surface excavations and stockpiles to determine their long-term stability;
- a description of all stockpile material, such as overburden, till and topsoil, for use during progressive rehabilitation or final rehabilitation and closure;
- a description of the reclaim method for all roadways to the satisfaction of the minister;
- the removal of all machinery;
- a description of any other work necessary for final rehabilitation and closure.

Wherever practicable, rehabilitation will be carried out on a progressive basis.

The plans will also address monitoring and emergency measures in the event of accidents during or after site rehabilitation.

Planned rehabilitation and closure activities include the revegetation of the tops and berms of the waste rock piles and the revegetation of the topsoil/overburden disposal areas. Whenever possible, diverted streams will be rerouted to their original courses.

Preliminary indications are that the potential of tailings, waste rock and overburden to produce ARD is non-existent.

A financial assurance is also required as part of the rehabilitation and closure plan. A financial assurance proposal will be submitted to the GNL pursuant to the relevant regulatory requirements.

Experience gained with Project 1a in such matters as the choice of plants for revegetation will be applied.

4.7 Occupations

NML/PFWA **[Awaiting numbers from NML.]**

4.7.1 Construction

It is estimated that the Project will employ a total of 20 people in the construction phase. A similar number of indirect and induced jobs will also be created. The duration of the employment will be approximately nine months.

4.7.2 Operations

It is estimated that during the operations phase, 15 new employees will be hired. A similar number of indirect and induced jobs will also be created. The duration of employment will be at least 10 years and probably close to double that.

4.7.3 Enumeration and Breakdown of Occupations According to the National Occupational Classification, 2006

Tables 4.18 and 4.19 categorize the anticipated employment at the construction and operations phases..

Table 4.18: Anticipated Occupation Types and their Major Groups and Associated Codes According to the National Occupational Classification Matrix (2006) – Construction Phase

Occupational Categories	No. of Positions	Major Groups according to NOC	Associated Codes According to NOC
Lead foreman	**1**		**721**
Truck driver	**8**		**7411**
Heavy equipment operators	**6**		**7421**
Surveyor	**1**		**2454**
Labourers	**4**		**7612**

Table 4.19: Anticipated Occupation Types and their Major Groups and Associated Codes According to the National Occupational Classification Matrix (2006) – Operations Phase

Occupational Categories	No. of Positions	Major Groups according to NOC	Associated Codes According to NOC
Foreman	**1**		**8211**
Haul truck driver	**12**		**7411**
Grader operator	**2**		**7421**

4.7.4 Employment Equity in Relation to Age and Gender

NML has already committed to preparing a woman's employment plan as part of Project 1a (NML and PFWA December 2009). That plan will be completed by spring 2010. It will be applied (as adapted in the light of acquired experience) to Project 2b.

4.7.5 Newfoundland and Labrador Benefits Plan

NML and PFWA (December 2009) contains a Newfoundland and Labrador Benefits Plan negotiated between NML and the GNL. The NLBP will apply to the entire DSOP, including Project 2b.

4.8 Project-related Documents

Table 4.20 lists the reports on environmental topics that have been completed. Field reports are not included, since their findings are not definitive.

Table 4.20: Environmental-related Reports

Boland, Bobbie. 5 January, 2009. *Report on Gender Equity Requirements for NML submission to Government of Newfoundland and Labrador EIS submission.* Submitted to New Millennium Capital Corp.
Clément, Daniel. May 2009. *Unofficial Translation. Innu Use of the Territory and Knowledge of its Resources. Final Report.* Submitted to New Millennium Capital Corp.
D'Astous, Natalie and Perry Trimper. November 2009. *Spring Survey of Caribou in the Vicinity of Schefferville. May 2009. Final Report – Without Prejudice.* Submitted on behalf of Groupe Hémisphères and Jacques Whitford Stantec Limited to New Millennium Capital Corp. and Labrador Iron Mines Limited.
Envir-Eau. March 2009. *Hydrogeological Report DSO2 and DSO3 Sectors. Schefferville (Québec) and Elross Lake (Newfoundland and Labrador). Unofficial Translation of Sections Dealing with DSO3.* Submitted to New Millennium Capital Corp.
Groupe Hémisphères. October 2008. *Survey of Breeding Birds at Future DSO Site. Final Technical Report.* Submitted to New Millennium Capital Corp.
Groupe Hémisphères. March 2009. *Mapping of Terrestrial Ecosystems and Surface Deposits: Direct Shipping Ore project. Technical Report.* Submitted to New Millennium Capital Corp.
O'Quinn, Donna. 5 January 2009. *DSO Project 2008. Caribou Information.* Submitted to New Millennium Capital Corp.
Weiler, Michael H. January 2009. *Naskapi Land Use in the Schefferville, QC. Region.* Submitted to New Millennium Capital Corp.

5.0 APPROVAL OF THE UNDERTAKING

Table 5.1 lists the main permits, licences, approvals and other forms of authorization of an environmental nature that may be required from the GNL.

Table 5.1: Permits and Authorizations Potentially Required from Government of Newfoundland and Labrador

Permit/Authorization	Trigger/Condition	Project Component/Activity	Department/ Agency	Required Information	Comments
Environmental Protection Act and Environmental Assessment Regulations	Designated undertakings listed in Environmental Assessment Regulations.	Mine and ancillary facilities, construction of new railway line or railway yard and power transmission line.	Department of Environment and Conservation	EIS	EIS will be prepared to also meet requirements of federal guidelines.
Lease under section 31 of Mineral Act	Requirement to obtain a mining lease.	Operation of mine site.	Department of Natural Resources	Land survey.	Can be applied for before or after EIA.
Licence under section 6 of Lands Act	Requirement to obtain a licence to occupy Crown land.	Facilities.	Department of Environment and Conservation	Land survey, if required.	
Section 5 of Quarry Materials Act	Requirement to obtain a quarry permit.	Construction and, possibly, operation.	Department of Natural Resources	Plans and specifications.	Any quarry will be operated on a one-year permit. Quarry leases will not be requested.

6.0 SCHEDULE

Construction will start in spring 2012 and will last roughly nine months. Mining will begin in 2013 and will last for at least 10 years.

7.0 FUNDING

The Undertaking does not depend on a grant or loan of capital funds from a federal, provincial or other government agency.

The estimated capital cost of the Undertaking is $5.3 million (Canadian), for one additional mining truck and part of the DS3-DSO4 haul road (built by NML's mine workers).

8.0 LITERATURE CITED

Acterre. August 2006. Ecological Overview. Prepared for LabMag Inc.

AMEC. January 2009. Fish and Fish Habitat Investigation for the Direct-Shipping Ore Project. Report No TF 8165902. Submitted to Groupe Hémisphères for New Millennium Capital Corp.

Anthony, G.S. March 1969. Notes on the Butterflies of the Schefferville Region, Northern Québec. McGill Sub-Arctic Research Paper No. 24.

Balakrishnan, Thiagarajan. 2009. Chief Geologist. New Millennium Capital Corp. Montréal, QC. E-mail. December 3, 2009.

Bergerud, A.T., S.N. Luttich and L. Camps. 2008. The Return of Caribou to Ungava. McGill-Queen's University Press.

Black, R.F. 1951. Permafrost. Smithsonian Inst. Rept. 1950. Cited in Pryer (no date).

Blondeau, Marcel. 2000. Statut et répartition au Québec du *Geum macrophyllum* Willd. Var. *perincisum* (Rydb.) Raup (Rosacea). Ludoviciana 29:54-62.

Brown, R.J.E. 1960. The Distribution of Permafrost and Its Relation to Air Temperature in Canada and the USSR. Arctic 13:3. Cited in Pryer (no date).

Brown, W.K., J. Huot, P. Lamothe, S. Luttich, M. Paré, G. St-Martin and J.B. Théberge. 1986. The Distribution and Movement Patterns of Four Woodland Caribou Herds in Québec and Labrador. Rangifer, Special Issue No. 1.

Brown, R. June 2005. Observations in the Howells River Basin, Labrador, 1983-2002. Prepared for LabMag GP Inc.

Brown, Richard. 2008. Biologist. Montréal, QC. Email. September 11, 2008.

Brunet, R. et R. Duhamel. Juillet 2005. Revue de littérature et plan d'échantillonnage : insectes, herpétofaune, micromammifères et chiroptères. Submitted on behalf of Envirotel 3000 inc. to LabMag GP Inc.

Brunet, R., R. Duhamel et J. Léger. Juin 2008. Synthèse des résultats d'inventaires fauniques – 2006 (Herpétofaune, micromammifères, chiroptères, cougars, carcajous et insectes). Submitted on behalf of Envirotel 3000 inc. to LabMag GP Inc.

Brunet, R., R. Duhamel and J. Léger. 2008. Supplement to « Synthèse des résultats d'inventaires fauniques – 2006 (Herpétofaune, micromammifères, chiroptères, cougars, carcajous et insectes) ». Submitted on behalf of Envirotel 3000 inc. to LabMag GP Inc.

Clément, Daniel. Mai 2009. Direct-Shipping Ore Project. Unofficial Translation. Innu Use of the Territory and Knowledge of its Resources. Final Report. Prepared for New Millennium Capital Corp.

Consulair. Janvier 2008. Rapport d'échantillonnage de l'air ambient Site Howells River. Prepared for LabMag GP Inc.

Cournoyer, L., A. Yagouti, Y. Bégin, G. Boulet et L. Vescovi. 2007. Analyse spatio-temporelle des températures pour un meilleur suivi du climat dans le nord du Québec. Report presented to the Consortium Ouranos.

COSEPAC [Comité sur la situation des espèces en péril au Canada]. 4 novembre 2009. Available at http://www.cosewic.gc.ca/eng/sct1/index_e.cfm. Consulted in November 2009.

CQ-WBPS [Central Québec Waterfowl Breeding Population Survey]. 2001. 2001 Waterfowl Breeding Pair Population Survey Central and Northern Québec. United States Fish and Wildlife Survey. Cited in Global Environnement/Golder Associates (November 2005).

Curtis, Mark. February 2004. Fish and Lake Water Quality of the Howells River System, Labrador. Presented to LabMag GP Inc.

D'Astous, Natalie and Perry Trimper. November 2009. Spring Survey of Caribou in the Vicinity of Schefferville, May 2009. Final Report – Without Prejudice. Prepared for New Millennium Capital Corp. and Labrador Iron Mines Limited.

David, N. 1996. Liste commentée des oiseaux du Québec. Montréal. Cited in Groupe Hémisphères (October 2008).

Derbyshire, E. 1962. The Deglaciation of the Howells River Valley and the Adjacent Parts of the Watershed Region, Central Labrador-Ungava. McGill Subarctic Research Papers No. 14. Cited in Curtis (February 2004).

Desrosiers, N., R. Morin et J. Jutras. 2002. Atlas des micromammifères du Québec. Société de la faune et des parcs du Québec, Direction du développement de la faune. Québec, QC.

Doucet, Christine. 2008. Senior Manager of Research. Wildlife Division, Environment and Conservation, Government of Newfoundland and Labrador, Corner Brook, NL. Telephone conversation. August 13, 2008.

Envir-Eau. March 2009. Hydrogeological Report DSO2 and DSO3 Sectors Schefferville (Québec) and Elross Lake (Newfoundland and Labrador). Unofficial Translation of Sections Dealing with DSO3. Prepared for New Millennium Capital Corp. by Paul F. Wilkinson & Associates Inc.

Environment Canada. no date. Species at Risk. Available at http://www.speciesatrisk.gc.ca/search/default_e.cfm. Consulted in November 2009.

Environnement Canada. 2004. Évaluation scientifique 2004 des dépôts acides au Canada. Sommaire des résultats clés. Gouvernement du Canada, Service météorologique du Canada. Downsview, ON.

FDSN [Federation of Digital Seismograph Networks]. no date. FDSN Station Book. SCHQ - Schefferville, Québec, Canada. Available at http://www.fdsn.org/station-book/CN/SCHQ/ schq.html. Accessed September 2006.

Fortin, Christian. no date. Extension de l'aire de répartition nordique de la salamandre à deux lignes. Bulletin de la Société de géographie de Québec.

Fortin, Gilles. 2009. Hydrogeologist. Groupe Hémisphères. Montréal, QC. E-mails (two). December 7, 2009.

Gauthier, J. et Y. Aubry (sous la direction de). 1995. Les oiseaux nicheurs du Québec: Atlas des oiseaux nicheurs du Québec méridional. Association québécoise des groupes d'ornithologues, Société québécoise de protection des oiseaux, Service canadien de la faune, Environnement Canada, région du Québec. Montréal, QC.

Gartner Lee Limited and Groupe Hémisphères. December 2007. Labrador Study Area Terrestrial Ecosystem Mapping. Prepared for LabMag GP Inc.

Girard, N. November 2003. Field Work Report: Avifauna, Terrestrial Wildlife and Flora. Pre-feasibility Study, Howells River (Labrador, Canada). Prepared for LabMag GP Inc.

Global Environnement/Golder Associates. November 2005. Breeding Bird Data Collection in the Howells River Basin of Labrador. Prepared for LabMag GP Inc.

GNL [Gouvernment of Newfoundland and Labrador]. no date. Wildlife at Risk. Available at http://www.env.gov.nl.ca/env/wildlife/wildlife_at_risk.htm. Consulted in November 2009.

GNL. 2009. Guidelines to the Mining Act. Available at http://www.nr.gov.nl.ca/mines&en/legislation/guidelines.pdf. Accessed March 2009.

Groupe Hémisphères. October 2008. Survey of Breeding Birds at Future DSO Site - Schefferville. Technical Report. Prepared for New Millennium Capital Corp.

Groupe Hémisphères. March 2009. Mapping of Terrestrial Ecosystems and Surface Deposits: Direct Shipping Ore project. Technical Report. Prepared for New Millennium Capital Corp.

Groupe Hémisphères. 27 août 2009a. Compte rendu de terrain. Cartographie des dépôts de surface, des écosystèmes terrestres et inventaire de la végétation: corridor DSO3-DSO4. Prepared for New Millennium Capital Corp.

Groupe Hémisphères. 27 août 2009b. Rapport de terrain: Inventaire aviaire pour DSO, année 2009. Prepared for New Millennium Capital Corp.

Groupe Hémisphères. 2 septembre 2009. Compte rendu de terrain. Reconnaissance de l'habitat du poisson dans les cours d'eau potentiellement affectés par les futures activités minières et par la construction de la future route d'accès, projet DSO. Prepared for New Millennium Capital Corp.

Groupe Hémisphères. 18 septembre 2009. Compte rendu de terrain. Reconnaissance de l'habitat du poisson dans les cours d'eau potentiellement affectés par les futures activités minières et par la construction de la future route d'accès, projet DSO. Tracés potentiels de la future route d'accès. Prepared for New Millennium Capital Corp.

Groupe Hémisphères. 17 novembre 2009. Compte rendu de terrain. Étude hydrologique et hydrogéologique de la campagne d'inventaires de 2009, projet DSO. Prepared for New Millennium Capital Corp.

Groupe Hémisphères. Octobre 2009. Inventaire des oiseaux nicheurs du futur site DSO. Rapport technique préliminaire. Presented to New Millennium Capital Corp.

Groupe Hémisphères. Décembre 2009. Cartographie des écosystèmes terrestres et des dépôts de surface: Projet de minerai de fer à enfournement direct. Rapport technique préliminaire 2008-2009. Prepared for New Millennium Capital Corp.

Hade, A. 2002. Nos lacs: les connaître pour mieux les protéger. Québec, QC: Éditions Fides.

Hamelin, L-E. 1968. Aspects originaux du réseau hydrographique canadien. Centre d'études nordiques, Québec, QC.

Ives, J.D. 1961. A Pilot Project for Permafrost Investigations in Central Labrador-Ungava. Geog. Paper No. 18, Department of Mines and Technical Surveys, Ottawa, ON. Cited in Pryer (no date).

Ives, J.D. May 1962. Iron Mining in Permafrost, Central Labrador-Ungava. Geography Bulletin No. 17, Department of Mines and Technical Surveys, Ottawa, ON. Cited in Pryer (no date).

Jenness, J.L. 1949. Permafrost in Canada. Arctic 2. Cited in Pryer (no date).

Jones, I.G. 1976. An Attempt to Quantify Permafrost Distribution near Schefferville, Québec. M.Sc. thesis. Department of Geography, McGill University, Montréal, QC.

Knox, K. 1994. Research into the historical distribution of wolverine (Gulo gulo) in Labrador. Newfoundland and Labrador Wildlife Division, Department of Tourism & Culture, St. John's, Newfoundland. Cited in Minaskuat Limited Partnership (January 2008).

Lee, Eugene M. July 2006. Howells River Tributaries. Fish Habitat Surveys. LabMag Iron Ore Project. Claim Block, Mine, Pit and Concentrator. September 2005. Final Report. Submitted on behalf of AMEC Earth & Environmental to LabMag GP. Inc.

Minaskuat Limited Partnership. January 2008. Winter Land Use Surveys. Prepared for LabMag GP Inc.

Minot, M.C. no date. Malaise trapping in three habitats near Schefferville, Québec.

Moisan, Michèle. Octobre 1996. Rapport sur la situation du carcajou (*Gulo gulo*) au Québec. Ministère de l'Environnement et de la Faune, Direction de la faune et des habitats.

Morin, Mathieu. 2008. Direction de l'aménagement de la faune du Nord-du-Québec, ministère des Ressources naturelles et de la Faune, QC. Personal communication. February 1, 2008.

MRNF [ministère des Ressources naturelles et de la Faune]. Octobre 2009. Espèces fauniques menacées ou vulnérables au Québec. Available at http://www.fapaq.gouv.qc.ca/fr/ etu_rec/esp_mena_vuln/liste.htm. Consulted in October 2009.

Munroe, E. 1951. Field Notes on the Butterflies of Knob Lake, Northern Québec. The Lepidopterists' News. 5. Available at http://research.yale.edu/Peabody/jls. Accessed on 8 September 2006.

Nicholson, F.H. February 1978. N.R.C. Special Project. Prediction of Permafrost Distribution for Subarctic Mining Operations. Final Report. McGill Subarctic Research Station, QC.

Nicholson, F.H. and B.G. Thom. 1973. Studies at the Timmins 4 Permafrost Experimental Site. Reprinted from PERMAFROST: The North American Contribution to the Second International Conference. National Academy of Sciences, Washington D.C.

Nicholson, F.H. and J.S. Lewis. 1976. Active Layer and Suprapermafrost Groundwater Studies, Schefferville, Québec. Reprinted from Proceedings of the 2nd Conference on Soil Water Problems in Cold Regions, September 1-2, 1976. Edmonton, AB.

Nicholson, H.M. and T.R. Moore. 1977. Pedogenesis in an iron-rich subarctic environment: Schefferville, Québec. Cited in Waterway *et al*. (1984).

NML [New Millennium Capital Corp.]. 29 January 2008. Report on Caribou Monitoring Program, Lac Harris Area, July to September 2007.

NML and PFWA [New Millennium Capital Corp. and Paul F. Wilkinson & Associates Inc.]. 29 April, 2008. Project Registration. Direct-Shipping Ore Project. Submitted to the Government of Newfoundland and Labrador.

NML and PFWA. December 2009. Elross Lake Area Iron Ore Mine. Environmental Impact Statement Submitted to Government of Newfoundland and Labrador.

O'Quinn, Donna. 5 January, 2009. DSO Project 2008 Caribou Information. Prepared for New Millennium Capital Corp.

O'Quinn, Donna. 2009. Health, Safety and Environmental Manager. New Millennium Capital Corp. Montréal, QC. E-mails. September 13 and October 19, 2009.

Penn, A.F. 1971. The Composition of Waters in a Sub-Arctic Lake System. M.Sc. thesis, McGill University, Montréal, QC. Cited in Curtis (February 2004).

Pilgrim, W. 1979. An Aerial Survey of the Lac Joseph Calving Range. Newfoundland and Labrador Wildlife Division. Project No. 4202. Cited in Phillips (March 12, 1982).

Phillips, F. March 12, 1982. Late Winter 1981 Distribution of McPhadyen River Caribou. Newfoundland and Labrador Wildlife Division. Project No. 4204.

Pollard, Wayne. 2005. The Elross Lake Automatic Weather Station. Prepared for LabMag GP Inc.

Pryer, R.W.J. no date. Mine Railroads in Labrador-Ungava. Québec North Shore and Labrador Railway Company, Canada.

Rodrigues, Bruce. June 27, 2006. Ecosystem Management Ecologist, Endangered Species and Biodiversity Section, Wildlife Division, Department of Environment and Conservation, Government of Newfoundland and Labrador. Letter to Rémi Duhamel, Biologiste, Envirotel 3000 inc.

Rousseau, C. 1974. Géographie floristique du Québec-Labrador. Travaux et documents du Centre d'études nordiques nº7. QC: Presses de l'Université Laval. Cited in Blondeau (2000).

RRCSL [Renewable Resources Consulting Services Limited]. January 1994. EIS: Military Flight Training. An Environmental Impact Statement on Military Flying Activities in Labrador and Québec. Technical Report 5. The Caribou Herds of Labrador and Northeastern Québec.

Saint-Martin, G. 1987. The Ecology of the East-Central Québec and Western Labrador Caribou Population as it Relates to a Proposed Road Development. MA thesis, University of Waterloo, Waterloo, ON.

Scruton, D.A. 1984. A Survey of Selected Lakes in Labrador, with an Assessment of Lake Status and Sensitivity in relation to Acid Precipitation. Technical Report No 79. DFO Fisheries Research Branch, St. John's, NL. Cited in Curtis (February 2004).

Skinner, Brian. 2007. Centre de données sur le patrimoine naturel du Québec, ministère des Ressources naturelles et de la Faune, Québec, QC. E-mail. December 7, 2007.

Thomasson-Grant. 1988. Magnificent Voyages. Waterfowl of North America. Cited in Global Environnement/Golder Associates (November 2005).

Thomas, M.K. 1953. Climatological Atlas of Canada. Natural Resources Canada, Ottawa, ON. Cited in Pryer (no date).

Tremblay, M., M. Allard, J.-P. Savard, M. Qiisik, E. Angiyou, P. Tookalook, N. Swappie, N. Einish, T. Annanack, C. Larrivée, C. Furgal et M. Barrett. 2006. Changements climatiques au Nunavik: Accès au territoire et aux ressources. Projet A1279 présenté au Programme sur les impacts et l'adaptation liés aux changements climatiques, Ressources Naturelles Canada.

Waterway, M.J., M.J. Lechowicz and T.R. Moore. 1984. Vegetation of the Schefferville Region, Nouveau-Québec. In T.R. Moore (ed.). Future Directions for Research in Nouveau-Québec. McGill Subarctic Research Paper No. 39. Centre for Northern Studies and Research, McGill University, QC.

Weiler, Michael H. November 2006. Naskapi Land Use Survey. Preliminary & Summarized Results. Prepared for LabMag GP Inc.

Weiler, Michael H. January 2009. Naskapi Land Use in the Schefferville, QC Region. Prepared for New Millennium Capital Corp.

I certify that all the information mentioned in this Project Registration is, to the best of my knowledge, correct.

Signed this Day of 16 December, 2009 by

R. A. Martin
President and Chief Executive Officer