Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

Comprehensive Study Report

Renard Diamond Mine Project

Canadian Environmental Assessment Agency

May 2013

Canada

Photo is credited to Stornoway Diamond Corporation

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Executive Summary

Stornoway Diamond Corporation (the proponent) proposes to develop the diamond deposit on the "Foxtrot property" located in the Municipality of James Bay in north-central Quebec. The project involves the development of the mine and local infrastructure such as open pits, a vertical shaft, inclined adits, a processing plant, processed kimberlite containment areas, an explosives storage facility, a pumping plant, a housing complex, an airstrip and related facilities. The estimated mine life is approximately 20 years, at an ore production rate of approximately 7,000 tonnes per day.

Fisheries and Oceans Canada and Natural Resources Canada will have to issue authorizations and approvals under the *Fisheries Act* and the *Explosives Act*, respectively. Under the *Canadian Environmental Assessment Act* (*the former Act*),[1] a comprehensive study of the project is required before these authorizations and approvals can be issued. The project also underwent a provincial environmental and social impact assessment under section 22 of the *James Bay and Northern Quebec Agreement*.

The Canadian Environmental Assessment Agency conducted the comprehensive study in collaboration with the Federal Environmental Assessment Committee, which consists of representatives of Fisheries and Oceans Canada, Natural Resources Canada, Environment Canada and the Cree Regional Authority.

In the comprehensive study report, the Agency presented the results of the analysis of the project's effects on the following valued ecosystem components (VECs): air quality, water resources, fish and fish habitat, terrestrial wildlife and wildlife habitat, birds and bird habitat, current use of lands and resources for traditional and tourism purposes as well as any structure, site or thing that is of archaeological, heritage or historical significance.

The Federal Environmental Assessment Committee assessed the significance of the effects of the project on the basis of the information provided by the proponent in its environmental and social impact assessment and supplementary documents, opinions provided by federal experts, as well as comments received from the Council of the Cree Nation of Mistissini and the public during consultations.

The Cree and the public expressed concerns about the following:

- surface water quality, in particular in Lac Lagopède;
- groundwater contamination;
- woodland caribou;
- the need to establish an independent environmental follow-up committee;
- the opening up of the area and increased pressure on wildlife resources.

The proponent agreed to implement mitigation measures in order to reduce the project's potential environmental effects. These measures include the adoption of design criteria and construction practices intended to concentrate the activities with the goal of minimizing the project's environmental footprint, a water management plan, and work restrictions during sensitive periods for wildlife. The proponent also proposes to maintain the environmental working group that was established to contribute

[1] The *Canadian Environmental Assessment Act, 2012* (CEAA 2012) came into force on July 6, 2012, replacing the *Canadian Environmental Assessment Act* (S.C. 1992, c. 37) (the former Act). The CEAA 2012 includes specific provisions concerning comprehensive studies commenced under the former Act, such as the Renard Diamond Mine Project, for which the federal environmental assessment was initiated under the former Act. All references to the provisions of federal environmental assessment legislation in this report reflect the requirements of the *Canadian Environmental Assessment Act* (S.C. 1992, c. 37).

to the development of the project and the preparation of the environmental impact statement. This group, which includes regional stakeholders in the forestry, recreation, tourism and mining sectors, land use managers and representatives of the Council of the Cree Nation of Mistissini, will be involved during all phases of the project to monitor and follow up on the implementation of the environmental measures. The proponent also proposes to implement an environmental management program which incorporates monitoring and follow-up of all the human and biophysical valued ecosystem components (VECs) and an emergency response plan in the event of accidents or spills.

A follow-up program is required under the *Canadian Environmental Assessment Act* (S.C. 1992, c. 37) in order to verify the accuracy of the environmental assessment and determine the effectiveness of some of the proposed mitigation measures. Fisheries and Oceans Canada and Natural Resources Canada will assume responsibility for the follow-up program, which will focus on water quality, fish and fish habitat, and birds and bird habitat.

Given the implementation of the proposed mitigation measures and follow-up program, the Canadian Environmental Assessment Agency concludes that the project is not likely to cause significant adverse environmental effects.

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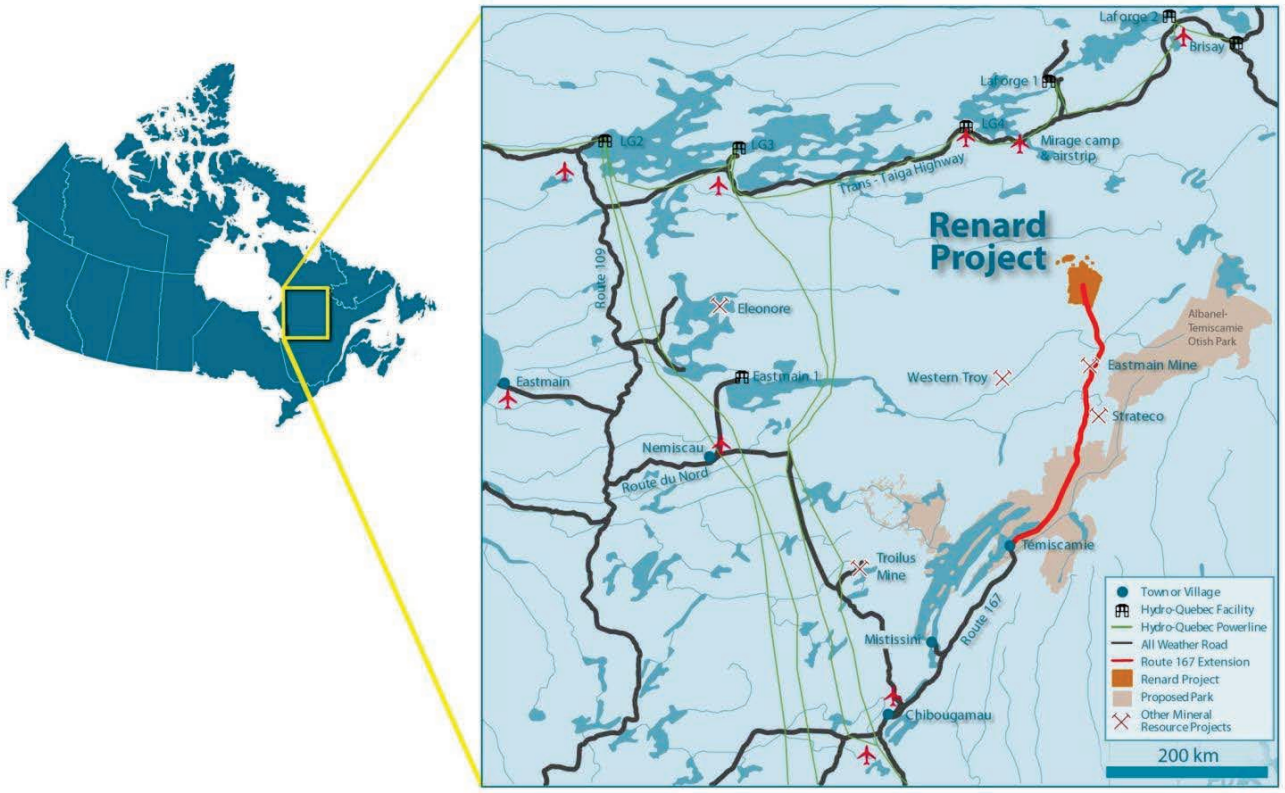
1. Introduction

1.1 Overview

Stornoway Diamond Corporation (the proponent) proposes to develop the diamond deposit on the "Foxtrot property" located approximately 70 km north of the Otish Mountains region (Figure 1-1), in the Municipality of James Bay in north-central Quebec. This region is subject to the *James Bay and Northern Quebec Agreement* (JBNQA). The Renard Diamond Mine Project involves the development of the mine and local infrastructure such as open pits, a vertical shaft, inclined adits, a processing plant, processed kimberlite containment areas, an explosives storage facility, a pumping plant, a housing complex, an airstrip and other related facilities. The estimated mine life is 20 years, at an ore production rate of approximately 7,000 tonnes per day.

Figure 1-1: Project Location



Source: Stornoway Diamond Corporation, 2012.

1.2 Environmental Assessment Context and Process

1.2.1 Federal environmental assessment process

On July 6, 2012, the *Canadian Environmental Assessment Act* (S.C. 1992, c. 37) (the former Act) was repealed and replaced by the new *Canadian Environmental Assessment Act, 2012* (CEAA 2012). Projects, such as the Renard Diamond Mine Project, that were undergoing assessment before this date in accordance with the comprehensive study process are being completed under the requirements of the former Act.

A federal environmental assessment under the former Act is necessary since, pursuant to the *Fisheries Act* and the *Explosives Act*, Fisheries and Oceans Canada and Natural Resources

Canada will likely have to issue authorizations and approvals in order to allow the Renard Diamond Mine Project to proceed.

The project is subject to a comprehensive study environmental assessment, in accordance with subsection 10 of the *Comprehensive Study List Regulations* under the former Act which reads as follows:

> The proposed construction, decommissioning or abandonment of a facility for the extraction of 200,000 m3/a or more of ground water or an expansion of such a facility that would result in an increase in production capacity of more than 35 per cent.

1.2.2 Other environmental assessment process

The project was also subject to an environmental and social assessment by the province of Quebec under section 22 of the JBNQA which is also entrenched in Chapter II of the Quebec *Environment Quality Act*. Following the recommendations of the Provincial Review Committee (COMEX), the Provincial Administrator issued a certificate of authorization for the Renard mine on December 4, 2012, including various conditions of implementation.

The Minister of the Environment will review this report and the comments received from the public and Aboriginal groups …

1.2.3 Purpose of the comprehensive study report

This report presents the analysis conducted by the Canadian Environmental Assessment Agency (the Agency) on the basis of documentation provided by the proponent, the opinions of federal experts, and the knowledge provided by the Aboriginal community of Mistissini and other local communities. This information was taken into account to determine whether the project is likely to cause significant adverse environmental effects.

The Agency prepared this comprehensive study report in collaboration with the Federal Environmental Assessment Committee, composed of representatives of Fisheries and Oceans Canada, Environment Canada, Natural Resources Canada and the Cree Regional Authority, which provided advice in their respective areas of expertise. The conclusions of this report are based on the results of the review of the proponent's environmental and social impact assessment and on an assessment of the project's environmental effects.

The Minister of the Environment will review this report and the comments received from the public and Aboriginal groups before issuing the environmental assessment decision statement. Before making his decision public, the Minister may request additional information or require that additional measures be taken to address the concerns of the public. Following the announcement of the environmental assessment decision, Fisheries and Oceans Canada and Natural Resources Canada will have to make their respective decisions concerning the issuance of their authorizations under section 37 of the former Act.

2. Project Scope

The scope of the project for the purposes of the comprehensive study includes the work and activities associated with the construction of the mining infrastructure and related facilities, the mining of the deposit and the operation and maintenance of the infrastructure, the closure and decommissioning of the mine, as well as the final site restoration.

2.1 Project Components

The general layout plan for the main project facilities is shown in Table 2-1. The proposed project includes the following components:

- A mine including:
  - Open extraction pits to mine three kimberlite pipes (R-2, R-3 and R-65);
  - A 740-m shaft and adits for underground extraction of kimberlite pipes (R-2, R-3 R-4, R-9 and R-65);
  - An access ramp to the underground mine;
  - An ore processing plant;
  - A processed kimberlite containment area;
  - A waste rock stockpile and a temporary ore stockpile;
  - An overburden stockpile;
  - A drinking water supply and treatment system;
  - A mine water management system with sedimentation ponds;
  - A power supply system (generator sets);
  - Access roads and secondary roads;
  - An airstrip;
  - A quarry and borrow pits.
- Related facilities:
  - A housing and services complex;
  - A drinking water supply and treatment system;
  - A domestic and mine wastewater management and treatment system;
  - A hazardous materials management system;
  - A fuel storage area with fuelling station;
  - An explosives storage building.

2.2 Activities

The activities required for the construction and operation of the project are described in Table 2-1.

Table 2-1: Project Activities

Construction	Operation	Closure and restoration
• Site preparation and development • Construction of the containment and storage areas (ore, waste rock, tailings) • Site clearing and levelling • Construction of access and other roads • Operation of quarry and borrow pits • Drainage of lakes, rivers and streams, and water and sediment management • Installation of surface water and groundwater management system (ditches, culverts, domestic and mine wastewater treatment systems, etc.) • Fuel and hazardous materials storage and management • Extraction of overburden, waste rock and ore at pits R-65 and R2-R3 • Use of explosives	• Ore extraction, handling and storage • Ore processing • Water supply • Management of runoff, mine drainage water, drinking water, process water, wastewater, etc. • Pit development • Machinery and generator set use and maintenance • Hazardous materials storage and management • Explosives storage, manufacturing and handling • Use of explosives • Airstrip operation and maintenance • Phased site remediation	• Water management: runoff, • Machinery and generator set use and maintenance • Dismantling and recycling of facilities • Final site restoration and revegetation (overburden, waste rock, and processed kimberlite containment areas) • Flooding of the pits

2.3 Schedule

The construction phase on the site will begin with construction of the infrastructure (permanent camps, services building, generator sets, etc.), the kimberlite processing plant, the shaft and ramp for underground activities, as well as the development of the mine site. The proponent anticipates that the airstrip will be fully operational by December 2013.

The proponent plans to adopt the following schedule:

Phase	Projected period
Construction	2013 to 2016
Mining of the deposit	2014 to 2033
Mine closure and restoration	2033 to 2035

3. Scope of the Environmental Assessment

The scope of the environmental assessment establishes the framework and limits of the analysis conducted by the Agency.

3.1 Factors Considered

Pursuant to subsections 16(1) and 16(2) of the former Act, the Agency has taken into consideration the following factors:

- the purpose of the project;
- alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;
- the environmental effects of the project, including the environmental effects of malfunctions or accidents, and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- the capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future;
- significance of the effects;
- comments received from the public about these effects in accordance with the former Act and the regulations;
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project;
- the need for, and the requirements of, a follow-up program in respect of the project.

As subsection 16(1)(*e*)[1] of the former Act allows, the Agency also asked the proponent to describe the need for and the project and alternatives to the project.

An environmental effect, as defined in the former Act, is any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act*, any effect of any such changes on health and socio-economic conditions, the current use of lands and resources for traditional purposes by Aboriginal persons, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, as well as any change to the project that may be caused by the environment. This definition includes indirect economic and social changes that are caused by biophysical modifications of the environment. It does not include the direct economic and social effects of the project. For example, the Agency may examine the economic effects of a decline in commercial fishing success that is related to a loss of fish habitat, but it will not examine economic effects related to the construction of a mine.

[2] 16(1)(*e*): Any other matter relevant to the screening, comprehensive study, mediation or assessment by a review panel, such as the need for the project and alternatives to the project, that the responsible authority or, except in the case of a screening, the Minister after consulting with the responsible authority, may require to be considered.

3.2 Scope of the Factors to be Considered and Spatial and Temporal Boundaries

As stipulated in the updated Scope of the Federal Environmental Assessment document (2011) issued by the Agency, the proponent was directed to extend its analysis to the sectors and to the components of the environment with which the project might interact. The study area established by the proponent in order to meet the Agency's requirements is composed of two sectors. The mine sector covers approximately 100 km^2 and includes all of the mining infrastructure, the related facilities and the surrounding area. The airstrip sector covers an area of approximately 27 km^2. An extended study area was defined for the assessment of the project's effects on the Cree and Jamesian communities in the area. This area includes the Cree Nation of Mistissini, the towns of Chibougamau and Chapais, and the region of Eeyou Istchee, which includes the traditional family territory M11.

The temporal boundaries include the total project lifespan, including the periods of site preparation, construction, infrastructure development and mining of the deposit, as well as the mine closure and post-closure periods. Most of the closure and restoration work should be completed within a period of two years after the end of operations. However, in its analysis, the proponent extended the follow-up period to more than 25 years following closure of the mine in order to study the long-term impacts of the mine.

The following environmental factors were examined by the proponent:

- surface water and groundwater quality;
- air quality;
- soil quality;
- water regime (hydrology and hydrogeology);
- geology of the environment;
- terrestrial and aquatic vegetation;
- wetlands;
- fish and fish habitat;
- birds and bird habitat;
- terrestrial wildlife and wildlife habitat;
- plant and animal species at risk within the meaning of subsection 2(1) of the *Species at Risk Act* and their habitats, including woodland caribou;
- current use of lands and resources for traditional purposes by Aboriginal peoples;
- health of users of the territory, particularly the impacts of the accumulation of metals in plants and animals as well as on human health;
- boating and boater safety;
- socio-economic activities and heritage, historical, cultural and archaeological resources;
- safety concerns regarding explosives manufacturing and magazines.

3.3 Determination of Valued Ecosystem Components (VECs)

The Agency organized its analysis according to six categories of valued ecosystem components (VECs) which were examined in the comprehensive study:

- **air quality:** dust, nitrogen oxide (NO_x), sulphur dioxide (SO_2) and carbon monoxide (CO);
- **water quality:** groundwater, surface water and the hydrological regime;
- **fish and fish habitat**: the aquatic environment, including aquatic and riparian vegetation as well as fish species;
- **terrestrial wildlife and its habitat:** amphibians and reptiles, fur-bearing animals, micromammals and large mammals as well as their habitats;
- **birds and bird habitat:** waterfowl, waterbirds, forest birds and birds of prey as well as the their critical habitats including terrestrial vegetation, wetlands and water bodies;
- **current use of lands and resources** of archaeological, heritage and historical significance for traditional purposes.

3.4 Purpose of and Need for the Project

The proponent indicated that the Foxtrot deposit represents a significant source of diamonds and that the estimated mine life is approximately 20 years. According to the update on resources published in February 2011, the indicated mineral resources of the deposit are estimated at 24 million carats, which represents a value of more than US$7 billion.

According to the proponent's data, at the current rate of consumption, world diamond mine reserves could be exhausted within 14 years. The proponent therefore believes that the Renard mine would provide a new source of high-value gem-quality diamonds in a market that seems to be running short of supply. The mine would also offer the potential for extraction of very large diamonds (known as "Specials").

The proponent believes that diamond mine projects represent a substantial potential contribution to the Canadian economy and society, and particularly for the regions of the North. In the proponent's view, there is good reason to believe that the opening of the Renard mine, the first diamond mine in Quebec, will also have positive socio-economic impacts for Quebec and the region's communities.

4. Project Alternatives

The following sections present the alternatives to the project analyzed as well as the options selected by the proponent.

4.1 Alternatives

In terms of alternatives, the proponent examined the status quo, i.e. that the Renard Diamond Mine Project does not go forward. In the proponent's view, the status quo would have negative impacts on government revenues and, consequently, on the population. The proponent points out that the loss of tax revenues from a mining operation over a 20-year period (income and sales taxes, royalties, etc.) would place greater pressure on current resources, thereby limiting the prospects for providing or improving social services and funding community infrastructure. Since other alternatives are not feasible, the proponent placed the emphasis on the analysis of alternatives in its approach to carrying out the project.

4.1.1 Description of alternatives

The proponent examined several alternatives for the main components of the project. In addition to the location of the deposit, which is a decisive factor for the choice of the mine site, the proponent examined alternatives for the various project components. For each of these alternatives, as stipulated in the updated Scope of the Federal Environmental Assessment document (2011), the proponent determined the best options from the technical, economic and environmental standpoints.

Road access

The proponent presented two scenarios for permanent road access to the site: access from the north and access from the south. The North alignment, which has been examined by several optimization studies over the years, would link the mine site to the Trans-Taiga Road. This would be a forest road, 154 to 165 km long, depending on where it connects to the Trans-Taiga Road. The South alignment would involve the construction of 240 km of new road planned as part of the northern extension of Route 167 between Albanel Lake and the Renard Diamond Mine Project site. Considering that the extension of Route 167 project has already been started by Transports Québec, this is the proponent's preferred option. Stornoway Diamond Corporation also signed a funding agreement with Finances et Économie Québec in December 2012 for the completion of construction of the last 100 km of road to the Renard project site.

Location of the airstrip

The airstrip meets a short-term need of the proponent to ensure the safe transport of personnel and pieces of equipment. When selecting the site for an airstrip in a northern environment, there are a number of requirements that must be met, not only in relation to civil aviation standards, but also in view of the characteristics of the environment, including the topography, the geotechnical characteristics of the soil, and orientation relative to the prevailing winds. Of the 15 site alternatives initially identified during project planning, only two (14 and 15) were subjected to a detailed analysis. The other sites did not meet the criteria either for topographic or environmental reasons or non-compliance with civil aviation standards. Alternatives 14 and 15 were analyzed using a decision matrix (called Pugh matrix), which permitted a comparison of the two sites according to technical, environmental and economic criteria. Alternative 14 was chosen since it had the most advantages from an environmental and economic perspective, particularly because of its location close to Route 167 and its distance from water bodies.

Alternative of the operating mode and layout of mining facilities and infrastructures

The topography, hydrography, sensitive ecosystems, geotechnical boundaries of the receiving environment, the parts of the territory used by the Cree and safety considerations were taken into account by the proponent in drawing up the site layout plan. Owing to the location of the deposit (northeast of Lac Lagopède), the proponent determined that the mine facilities will be built in this sector. This approach was intended to reduce the project's environmental footprint and optimize mining operations. The proponent concludes that the proposed location meets all of its objectives in terms of efficiency and takes into account the evolution of the technical needs of the project while reducing the impacts on the natural and human environment. The final layout plan is shown in Appendix 2.

Based on the proposed layout, the proponent undertook an analysis of the various alternatives for certain components, including the secondary access roads to the mine, the ore extraction methods, the ore processing method as well as the various water management methods. The proponent compared the alternatives by assigning a weighted score to the environmental, economic and technical criteria established for each component.

Secondary roads

The planned network of secondary roads represented approximately 2.2 km. The routes chosen are intended to facilitate traffic movement and ensure worker safety while minimizing the project's environmental footprint. The road network would run alongside the mine facilities to reduce the footprint on land and, insofar as possible, would be kept away from wetlands, water bodies and sensitive wildlife habitats. Locating the various facilities in proximity to one another would also serve to minimize the length of the road network.

Drilling method

Following geotechnical studies and optimization exercises, the proponent selected the blasthole shrinkage (BHS) drilling method, which would be more cost-effective and simpler for workers. This method also makes it possible to begin underground extraction before surface mining operations have been completed.

Ore processing

No alternative analysis was conducted for the ore processing method since only one method is applicable, namely the crushing and gravity separation process used to extract diamonds.

Location of the waste rock and kimberlite storage sites

The mining activities will produce different types of materials which must be managed, including overburden, waste rock, ore (kimberlite) and processed kimberlite. All of the

overburden will be sent to a storage site located to the east of pits R-2/R-3. Part of the overburden will be used for the phased and final revegetation of the site. The proponent eventually plans to return the waste rock to the underground workings via surface openings from pits R2/R3 (Appendix 2) and also to use it to stabilize the slope of the processed kimberlite storage area. In addition, the results concerning the determination of acid generation potential and the leachate analyses demonstrated that the waste rock can be used as construction or road repair materials. In the interim, the waste rock will be temporarily stored in a storage site located north of pits R-2/R-3.

To determine the optimal site for the processed kimberlite containment area, the proponent conducted a comparative analysis of five sites (Appendix 3). The proponent analyzed the alternatives using weighted environmental, social, economic and technical indicators which were evaluated on a qualitative or quantitative scale. The decisive factor was its location in proximity to pits R2/R3, in order to reduce the project's environmental footprint. In addition, the chosen site is the option that received the highest overall score, and was preferred by the M11 tallymen, since it would not interfere with moose hunting and is located at a considerable distance from the snowmobile trail.

Water management methods

The proponent conducted an analysis of the components of the available methods for management of the project's water (domestic and mine) requirements. Two wastewater collection systems (domestic and mine) will be installed and will operate independently. Comparative analyses were conducted for the various alternatives (Appendices 4.1 and 4.2) concerning the methods for treating domestic wastewater and mining effluent as well as the location for the domestic and industrial wastewater treatment plant.

For domestic wastewater treatment, the aerated lagoon system was chosen, since it offers more technical, economic and environmental advantages than the biodisk system. Owing to its simplicity and the minimal equipment required, this system can reduce operating and maintenance costs. In addition, aerated lagoons have a greater capacity to handle organic and hydraulic loads in peak periods owing to the longer retention time. The choice of the site for the domestic wastewater final discharge point was determined based on four criteria (technical, physical, biological and human). On the basis of the five variants analyzed, discharge point #3 (Appendix 4.3) was chosen since it offered the greatest advantages in terms of the biological and physical criteria, in particular deeper water, which will result in greater dilution of the effluent.

The main mine wastewater management infrastructure for the operation phase will be located in the sector of pit R-65 (Appendix 2). The process for selecting the location of the site for the mine effluent final discharge point into Lac Lagopède was governed by the same four categories of criteria as those used for selecting the domestic effluent final discharge point. Site No. 4 is considered the best site for the treated mine effluent outfall, since it offers the greatest advantages of the four alternatives studied (Appendix 4.4). This site is characterized by higher current velocities and is located less than 500 m downstream of the main tributary (F3294) of Lac Lagopède, which makes it possible to maximize dispersion and dilution of the effluent in the lake. In addition, site No. 4 is the deepest of the four alternatives studied and is located more than 1 km downstream from the drinking water intake.

The options chosen represent the solutions which entail the lowest environmental and social impact …

Power supply alternatives
The mining activities will require a supply of electricity ranging from 9,500 kW to 13,560 kW annually. In calculating the power supply requirement assumptions, five options were compared based on technical feasibility and environmental and socio-economic aspects using a set of sub-criteria to which weighted values were assigned. The five options studied are diesel generator sets, a power transmission line, the combination of generator sets and a power transmission line, a small-scale hydroelectric plant, wind energy and solar energy. Only two options would provide a reliable and continuous source of energy to meet the mine's significant electricity needs: diesel generator sets and a power transmission line. According to the proponent, the comparative analysis of the power supply options demonstrates that construction of a power transmission line would be the most advantageous option from an environmental, socio-economic and technical perspective. However, owing to the initial construction costs for the power transmission line (estimated capital cost of $173.6 million for a 159-km line), the solution chosen by the proponent at this stage is the use of diesel generator sets.

4.2 Agency's Conclusions

The Agency is satisfied with the proponent's analysis. The options chosen represent the solutions which entail the lowest environmental and social impact taking into account the technical and economic criteria for this type of mine project.

5. Public and Aboriginal Consultations

Public and Aboriginal consultations improve the quality and credibility of environmental assessments. Comments and concerns expressed in consultations help identify the potential impacts of a project starting at the planning stage. In the context of the Renard Diamond Mine Project, the Agency, with the collaboration of the Federal Environmental Assessment Committee, held several public and Aboriginal consultation sessions.

The Agency administers a Participant Funding Program, the purpose of which is to help interested individuals, non-profit organizations and Aboriginal groups to participate in federal environmental assessments. In the context of this comprehensive study, the Agency allocated close to $25,000.

5.1 Public Consultations Conducted by the Federal Government in the Context of the Comprehensive Study

The former Act provides three official public participation opportunities. The first consultation gives participants an opportunity to comment on the project and the conduct of the comprehensive study. The second consultation provides interested persons an opportunity to comment on the results of the environmental assessment of the project, and the third consultation gives participants an opportunity to comment on the comprehensive study report.

To announce the first two consultation periods and the Participant Funding Program, the Agency posted notices on the Canadian Environmental Assessment Registry website and in two local newspapers: *La Sentinelle* and *La Nation*. The Agency also broadcast these notices on Planète FM 93.5 and CINI-FM 95.3. The relevant documents for the consultations were placed on the Registry website and deposited at the Chibougamau municipal library. The Agency also sent copies of these documents to the organizations to which it had provided funding.

From June 15 to August 8, 2011, the Agency held the first consultation, which focused on a background document including the description of the project, the scope of the environmental assessment and the environmental assessment

schedule. The Agency did not receive any comments during this consultation.

The second consultation took place from May 22 to June 22, 2012. During this period, the Agency held an evening consultation session in Chibougamau, on June 5, 2012, where the public was invited to learn about the project and the proponent's environmental impact statement and to express any comments or concerns. Representatives of the Agency, Fisheries and Oceans Canada, Natural Resources Canada and Environment Canada were present to explain their role and to answer any questions. Representatives of the proponent were also attending to present the project and answer any questions and respond to any concerns directly linked to the project.

In the third consultation opportunity, the Agency will invite the public to comment on this comprehensive study report. The Agency will present the comments received to the Minister of the Environment for consideration in his environmental assessment decision.

5.2 Aboriginal Consultations Conducted by the Federal Government in the Context of the Comprehensive Study

The Crown has a duty to consult and, where appropriate, accommodate Aboriginal groups when it contemplates conduct that is likely to have an adverse impact on established or potential Aboriginal and treaty rights. The former Act required that federal environmental assessments take into consideration the effects of any change that the project may cause in the environment as well as the effect of this change on current use of lands and resources for traditional purposes by Aboriginal people.

To fulfil the Crown's duty to consult and to facilitate a whole-of-government approach, the Agency conducted consultations with the Cree Nation of Mistissini together with the federal authorities concerned. The Agency, Fisheries and Oceans Canada, Natural Resources Canada, Environment Canada, the Cree Regional Authority and the Cree Nation of Mistissini

Public consultation

agreed on a consultation plan. At the end of the comprehensive study process, the Cree Nation of Mistissini will have had three formal consultation opportunities. In addition, throughout the process, the Agency has been in regular contact with the representatives of the Council of the Cree Nation of Mistissini.

To announce the first two consultation opportunities, the Agency sent news releases to the Band Council of the Cree Nation of Mistissini, posted notices in the community and in *La Nation*, and broadcast notices on CINI-FM 95.3. The Agency held a first consultation, which focused on a background document including the description of the project, the scope of the environmental assessment and the environmental assessment schedule. The Agency did not receive any comments during this consultation.

During the second phase of consultation, the federal government and the Council of the Cree Nation of Mistissini jointly organized two consultation events, which gave the Cree community of Mistissini an opportunity to discuss directly with federal representatives. On June 6 and 7, 2012, community residents as well as any group or representative of organizations interested in the project were invited to participate in "open house" type consultations to learn about the project, its impacts and to express their comments.

On June 7, at the invitation of the community of Mistissini, the Agency and representatives of Fisheries and Oceans Canada, Environment Canada, Natural Resources Canada and the Cree Regional Authority met with the working committee on the Renard project, which includes representatives of the community, Cree social and environmental groups, and the tallymen. It was during this meeting that most of the comments made by the Crees were received.

In the third phase of consultation, the Agency will invite the Cree Nation of Mistissini to comment on the content, conclusions and recommendations of this comprehensive study report. The Agency will present the comments received to the Minister of the Environment for consideration in his environmental assessment decision.

If the decision concerning the environmental assessment is favourable, Fisheries and Oceans Canada (DFO) and Natural Resources Canada will consult the Cree Nation of Mistissini on the authorizations to be issued for the implementation of the project, including the compensation program for fish habitat losses.

5.3 Provincial Consultation Activities and Collaboration

The Provincial Review Committee (COMEX), established under section 22 of the JBNQA and composed of representatives appointed by the province and by the Cree Regional Authority, was mandated to review the project. On August 28 and 29, 2012, COMEX held public consultations in Chibougamau and Mistissini.

5.4 Participation Activities Conducted by the Proponent

The proponent reports that it informed the public about its project in the early 2000s. According to the proponent, the various communication and consultation activities that it organized have given the population and the community of Mistissini the opportunity to learn about the project and to express their concerns on an ongoing basis. For example, the proponent held pre-consultation meetings in Chibougamau and Mistissini to gather comments and concerns for the preparation of its environmental and social impact study report.

The proponent documented its meetings with the community members and tallymen concerned to enable them to be informed about the general outlines of the project. The

proponent established a working group on the environment (environmental committee) which, according to the proponent, resulted in various improvements to the project over the course of its development by taking the concerns of the Cree community into account. The proponent also reports that it established an office in Mistissini in 2011 to facilitate ongoing dialogue with the local population. It also organized "open house" type consultation sessions to directly answer the public's questions. The proponent reported that it took into account the comments and concerns raised by the public and the community of Mistissini in the development of its project.

In the winter of 2012, the proponent signed an Impacts and Benefits Agreement (IBA) (Mechshoo Agreement) with the Band Council of Mistissini. One of the provisions of the Mechshoo Agreement is to maintain the "environmental committee" in order to enable the parties to collaborate on environmental issues, create training opportunities concerning environmental issues and organize visits to the mine site for the committee members and the Mistissini M11 tallymen.

5.5 Issues Raised

The Agency considered the concerns and comments received from the public and the Cree of Mistissini in its analysis (chapter 7) and forwarded them to the proponent. The following are the main issues raised by the participants:

- *Risk associated with the impacts of the effluents on water quality, particularly in Lac Lagopède*: The Société pour vaincre la pollution, Nature Québec and the Cree of Mistissini are concerned about water quality at the outfall of the wastewater treatment plant and about the potential impacts on Lac Lagopède, and called for long term monitoring and follow-up.
- *Groundwater contamination*: Some stakeholders requested that the proponent present a detailed analysis of the risks of groundwater contamination, including contamination caused by mine tailings water seepage, given the fact that the groundwater reportedly already contains relatively high concentrations of certain elements (or "natural contaminants").
- *Loss of fish habitat*: The group Nature Québec requested that the proponent present different scenarios to compensate for the loss of fish habitat that would be caused by the drainage of two lakes and one stream during the construction work. Questions were also raised regarding the mitigation measures proposed to compensate for fish habitat losses.
- *Woodland caribou*: Nature Québec is concerned about the status of the woodland caribou and requested that the proponent conduct a much more exhaustive study to characterize the potential effects of the Renard project on woodland caribou in the region, in the short, medium and long term.
- *Need for an independent environmental follow-up committee*: The Société pour vaincre la pollution and the community of Mistissini consider that environmental follow-up should be the responsibility of a committee not associated with the proponent.
- *Opening up of the area*: A number of stakeholders are concerned about potential adverse effects associated with the mine and with Route 167 on hunting, fishing and trapping activities in the region.

In the winter of 2012, the proponent signed an Impacts and Benefits Agreement (Mechshoo Agreement) with the Band Council of Mistissini.

- *Economic aspects*: The group Nature Québec recommended that the proponent conduct a cost-benefit analysis illustrating the project's real economic spinoffs for Quebec from the

start of exploration. It also recommended presenting a preliminary study on the possibility of diamond ore processing in Quebec.

6. Profile of the Environment

6.1 Biophysical Context

The Canadian Shield forms the geologic foundation of James Bay, where the Renard Diamond Mine Project is located. The site of the Renard project is located at an altitude of 450 m to 550 m. The bedrock geology is part of the Superior Province (+/-2.9 to 2.65 billion years ago) and includes diamondiferous kimberlite. In addition to diamond deposits, this region contains large uranium, gold, copper and zinc deposits. The landscape of the area is the result of North America's most recent glaciation, which ended approximately 7,000 years ago.

The study area has a subpolar continental climate characterized by a short growing season. The winters are very cold and long and the temperature can fall to -50^{o}C. The area receives approximately 500 mm of rain and 300 cm of snow annually. The project area is located in the black spruce-lichen domain. Fire is the main driver of forest dynamics. Some 94% of the land in the study area is covered with low-density black spruce forests, while wetlands, mainly peatlands, occupy 2%.

According to the hydrogeological studies conducted by the proponent, the bedrock aquifer is confined or semi-confined, which suggests a naturally low permeability of the subsoil layer. The Renard project lies within the watershed of the Misask River, which flows into the Eastmain River. At the local level, all the rivers and streams that drain the project site flow into Lac Lagopède. Groundwater flows toward various surface water bodies, including Lac Lagopède. The Renard project study area is characterized by the presence of small, low-flow streams and shallow lakes, with the exception of Lac Lagopède . Most of these lakes and streams provide fish habitat. Of the 15 species of fish caught, five are of interest for sport fishing (northern pike, lake whitefish, brook trout, lake trout and burbot). Whitefish and burbot are two species reserved for the exclusive use of the Cree. Of the fish species present in the study area, brook trout is the species most likely to be affected by the project.

The results of surface water and sediment characterization in the study area indicate that water and sediment quality is good. The water generally has very low turbidity and the pH ranges from acidic to neutral. Lac Lagopède has the characteristics of an oligotrophic lake.

Amphibian and reptile species richness and diversity tend to decline from south to north. In total, five species were surveyed in the study area, including four anuran species and one salamander species. The bird surveys confirmed the presence of 49 bird species. Twenty-three species of mammals were surveyed, seven of which are micromammals. The large mammal population of the study area includes three species: woodland caribou, moose and black bear.

6.2 Human Context

The Municipality of Baie-James is occupied by Cree and Jamesian communities. The territorial organization and administrative structures of the region are numerous and were created under a number of acts and agreements. There is currently no road access to the area where the Renard project is located. However, this should change soon, since the extension of Route 167, which is currently under way, is expected to reach as far as the Renard mine project site.

On the Jamesian side, the Municipality of James Bay and the Conférence régionale des élus de la Baie-James are the two organizations responsible for the management and development of the region. The Municipality of

James Bay is made up of the mayors of the towns of Chapais, Chibougamau, Lebel-sur-Quévillon and Matagami, the chairpersons of the communities of Radisson, Valcanton and Villebois, and one person from a non-urbanized territory.

Under the *Cree Villages and the Naskapi Village Act*, the Cree Nation of Mistissini is administered by a band council. Its role is simultaneously political and administrative and also includes the provision of services to the community. The Grand Council of the Crees (Eeyou Istchee) and the Cree Regional Authority are the two regional entities that represent the Crees. They have the power and authority to promote, coordinate and administer programs to protect the traditional Cree lifestyle and culture and develop Cree communities.

The administrative structures shaping the Cree territory stem primarily from the following four agreements: the *James Bay and Northern Quebec Agreement* (JBNQA, 1975), the *Agreement Concerning a New Relationship Between the Gouvernement du Québec and the Crees of Québec* (Paix des Braves, 2002), the *Agreement Concerning a New Relationship Between the Government of Canada and the Cree of Eeyou Istchee* (2008) and, more recently, the *Agreement on Governance in the Eeyou Istchee James Bay Territory Between the Crees of Eeyou Istchee and the Gouvernement du Québec* (2012).

Use of the territory in the proposed mine project area consists essentially of traditional resource harvesting by the Cree community of Mistissini which is under the responsibility of a tallyman. Some 25 individuals use, to a varying extent, the M11 trapline for waterfowl hunting, big game hunting, trapping of fur-bearing animals, gathering and fishing. This trapline extends over an area of approximately 3,800 km^2 and includes two main Aboriginal camps and is crossed by numerous snowmobile trails.

The Lac Lagopède area is a frequently used part of the trapline. A certain number of valued sites are also present in the trapline area including birthplaces and burial sites.

7. Environmental Effects Assessment

7.1 Approach

In this section, the Agency provides a summary to help readers understand its analysis process. Readers who would like more detailed information can consult the series of documents relating to the environmental assessment of the project available on the Canadian Environmental Assessment Registry (CEAR Ref. No. 55169).

The Agency, in collaboration with the Federal Environmental Assessment Committee, identified and assessed potential adverse environmental impacts of the project on the basis of:

- the proponent's impact assessment, including the proponent's responses to a series of questions and comments from the Federal Environmental Assessment Committee;
- the proponent's sectoral studies, such as the analysis of alternatives and survey results;
- the information obtained during public consultations;
- the expert opinions obtained from federal government departments with expertise relevant to the project or the environment.

The method used by the proponent to assess the significance of the effects considers three criteria, defined as follows:

- *Magnitude of the effect*: This refers to the relative significance of the project's effects on a component of the environment. Assessment of magnitude takes into account the natural

and social environment of which the component is a part. The magnitude may be low, moderate or high.
- *Geographical extent*: This is defined as the spatial extent of the effect considered and/or the number of people affected by the impact. The geographical extent may be site-specific, local or regional.
- *Duration*: The duration of the effect indicates its temporal aspects. It expresses the period of time over which a change affects a component, as well as its frequency—continuous or discontinuous. The duration of the effect may be short, moderate or long.

The proponent has identified mitigation measures intended to reduce the impact of the project's potential adverse environmental effects for the construction, operation and closure phases. The proponent has incorporated or will incorporate these measures in the project design and in the project plans and specifications. Once the mitigation measures were established, the proponent was able to assess the significance of the residual effects.

7.2 Air Quality

Current air quality at the project site is characterized by pollutant concentrations well below applicable standards. Only forest fires temporarily degrade air quality by increasing fine particulate matter concentrations in the air.

This section covers the main air quality issues. Since mechanical mining methods will be used, such as crushing and grinding, the analysis focused on the dispersion of fine particulates in the air and greenhouse gas emissions.

7.2.1 Potential environmental effects

During the construction, operation and closure phases, combustion gas emissions will be generated by the use and maintenance of machinery, generator sets and traffic.

During the construction phase, air quality will be affected mainly by the site preparation and development work. During the operation phase, the sources of atmospheric contaminant emissions will be the processed kimberlite containment area, the open pits (R-2/R-3 and R-65), the ore processing plant, the conveyor transfer points, ore hauling truck movements, the mine machinery, and the trucks supplying the mine with fuel, food and other supplies required for operation of the mine. During the closure phase, the decommissioning and site reclamation work will be the main sources of atmospheric emissions.

According to the proponent, because of the remote location and general characteristics of the work areas, the concentrations of dust generated and exhaust gases emitted during the construction, operation and closure phases will be concentrated at the work site and will disperse quickly. According to the modelling simulations carried out by the proponent, dustfall from the various mine sources will not exceed 2.5 tonnes/km^2/30 months, which is below the standard of 7.5 tonnes/km^2/month set out in the Quebec *Clean Air Regulation.* The proponent points out that since the geographical extent of the work is limited to the mine site, atmospheric pollutants will have only a limited impact outside the project footprint.

7.2.2 Mitigation measures and residual environmental effects

The proponent indicated that the main mitigation measure that could be applied to improve air quality on the Renard mine site would be to connect a power supply line to the Hydro-Québec grid instead of using generator sets to supply electricity to the mine. According to the proponent's analysis, this measure would improve air quality for the workers in the ore processing facilities area and also in the workers housing and services complex, in addition to reducing the mine's greenhouse gas emissions. However, the proponent decided against the

power line option because of the high construction costs (159-km line).

According to the proponent, using a dust control agent on the mine roads will minimize dust generated by ore hauling vehicles and trucks transporting supplies to the mine.

Blasting activities generate little fine particulate matter and the proponent anticipates that the maximum concentration in the ambient air will be limited to a 250 m radius of the work areas. In addition, blankets will be used to minimize the dispersion of dust generated from surface blasting since the vast majority of the particles released during blasting are over 100 microns.

Watering of the kimberlite storage areas during dry weather will reduce dust emissions due to wind erosion. This measure will have to be maintained during the closure period in the event that revegetation proves ineffective.

Following implementation of the mitigation measures designed to comply with regulatory standards for ambient air quality, the proponent considers that the reduction in air quality will be limited to the project area and will not extend very far into the surrounding natural environment. The proponent therefore concludes that the intensity of the impact on the environmental components can be considered low. The geographical extent of the impact is considered site-specific, since it will affect only the mine site and airstrip. The duration of the impact is considered short for the construction and closure phases, i.e., an estimated period of two years in both cases. The duration of the impact is considered moderate for the operation phase. Once these phases have been completed, air quality will return to current levels, since the impacts are reversible. Consequently, the significance of the residual impact is considered low. In order to validate its analysis and ensure compliance with applicable standards, the proponent proposed a weather and climate monitoring program which includes the installation of weather stations on the mine site and at the airstrip. The proponent will also implement an air quality and atmospheric emissions monitoring program (fine particulate matter concentrations, dustfall, and SO_2 and NO_2 concentrations).

7.2.3 Government, public and Aboriginal comments and proponent's response

Nature Québec requested that the proponent present a detailed plan for reducing the greenhouse gases emitted during the construction, operation and closure phases of the project. In addition, authorization of the project by the Quebec government is conditional on the proponent using the most efficient technologies and least polluting fuels in terms of greenhouse gas (GHG) emissions. The proponent is required to submit to the Quebec government annual monitoring reports on estimated GHG emissions. In addition, a re-assessment of the feasibility of a connection to the electrical power grid must be conducted after five years of operation. If this option proves economically feasible, GHG emissions would be reduced by nearly half.

Environment Canada noted certain deficiencies in the information provided by the proponent to permit verification of the input data as well as assessment of the results of the modelling of atmospheric contaminant dispersion (AERMOD). Considering the lack of representativeness of the meteorological data used and the lack of data on ambient air quality for the study area, some degree of uncertainty remains concerning the results of the modelling of atmospheric contaminant dispersion on the mine site and in the surrounding area.

To this end, the proponent has undertaken to implement a monitoring program to verify dust emissions from non-point sources in particular, from the processed kimberlite containment area, and their potential deposition in water bodies, particularly Lac Lagopède and lake F3298. This verification will make it possible to assess the impact of these dust emissions and take any necessary corrective measures (Appendix 10).

This monitoring program will have to be submitted to the federal authorities for approval before commencement of project operations.

In addition, the conditions for authorization of the project by the Quebec Department of Sustainable Development, Environment, Wildlife and Parks (MDDEFP) require that the proponent submit new atmospheric emission modelling data demonstrating compliance with provincial regulations before commencement of project operations. This modelling data will also have to be submitted to the federal authorities.

7.2.4 Agency's conclusions on the significance of the residual environmental effects

Taking into account the implementation of the proposed mitigation measures and the monitoring of air quality and atmospheric emissions planned by the proponent, the Agency concludes that the project is not likely to cause significant adverse environmental effects on air quality.

7.3 Water Quality

The water quality VEC includes groundwater and surface water, from the perspective of both quantity (hydrologic regime) and quality (sediment, nutrient and contaminant loading).

The mine-related infrastructure such as the open pits and underground adits will be located near Lac Lagopède and six other lakes and streams that connect to Lac Lagopède.

In terms of groundwater, the bedrock aquifer is confined or semi-confined, which suggests low natural permeability of the layer overlying the bedrock. Groundwater vulnerability is considered low to moderate for the till on rock and basal till and bedrock units. Groundwater flow occurs primarily in the direction of the various surface water bodies, suggesting the presence of groundwater seepage in the various water bodies.

Surface water quality is good and the surface water characteristics are similar those of other water bodies in this area. The water generally has low turbidity and a low concentration of suspended sediment. Ion and nutrient (nitrogen and phosphorus) concentrations are low or below detection limits, which is characteristic of an oligotrophic or ultra-oligotrophic environment. The pH varies from acidic to neutral (generally acidic). Because of its low alkalinity and low buffering capacity, surface water in the study area is very sensitive to acidification.

… the proponent has undertaken to implement a monitoring program to verify dust emissions …

7.3.1 Potential environmental effects

The changes to the hydrologic regime (groundwater and surface water) caused by the implementation of this project represent a major issue, considering the diversion and drainage of several rivers, streams and lakes and considering the potential nutrient and fine sediment loading associated with the work. The main anticipated impacts are related to the drainage of lakes F 3302 and F 3303 and their tributaries during construction and operation of the pit, the lowering of water levels in Lac Lagopède and lakes F 3300, F 2607, F 3301, F 3295, F 3296 and F 3298, and the potential for contamination of groundwater and surface water. The contamination of groundwater and surface water through the discharge of domestic and mine wastewater effluent and accidental spills of petroleum products and chemicals are another major issue.

The project components most likely to qualitatively and quantitatively affect groundwater and surface water are:

- the work associated with site preparation and

development as well as borrow pit operation, which could impact water quality and modify surface water and water table recharge patterns;
- the drainage of lakes during operation of the mine as well as the operation and flooding of the pits are likely to lower the water table and impact water levels of other neighbouring lakes, rivers and streams;
- the diversion of lakes, rivers and streams by the network of ditches around the mine, which could have effects on water quantity and quality;
- the discharge of domestic and mine wastewater effluent into Lac Lagopède, which could have impacts on water quality and quantity in Lac Lagopède; and
- the use and maintenance of machinery and generator sets, which could result in accidental spills during operations.

Lake turnover time influences lake water quality and aging process. The Lac Lagopède turnover time is low, making it sensitive to the input and accumulation of additional suspended sediment, nutrient (e.g. phosphorus) and organic matter loading. This additional loading could affect the quality of the environment (transport of contaminants), increase sedimentation (e.g. silting of spawning grounds), increase biological productivity in the water body (eutrophication) and disturb the most sensitive fish species.

7.3.2 Mitigation measures and residual environmental effects

Considering the activities carried out during all the project phases, there are many potential environmental effects on water quantity and quality. It is therefore important that the proponent have a water management plan and apply appropriate mitigation measures to minimize the impacts on the environment.

In its environmental impact statement, the proponent presents a series of mitigation measures (Appendix 7) that it plans to implement in order to reduce the risks of impacts on groundwater and surface water. These measures include:

- maintaining a 30-metre riparian buffer strip to protect aquatic habitats;
- minimizing runoff and flow from the work areas which are potential sources of contamination;
- measures governing the use and storage of hydrocarbons and explosives, such as reducing the use of hazardous materials and installing runoff containment and treatment structures in fuel storage and handling areas;
- installation of devices at source to control soil erosion and sediment transport to lakes, rivers and streams using strategies adapted to the site and the environmental conditions (e.g. sediment barriers, riprap, geotextile, hay bales and sedimentation ponds).

The proponent also presented a comprehensive water management plan for the entire site. The proponent plans to implement a system for collecting wastewater from the mine, including runoff from the processed kimberlite containment areas and ore, waste rock and overburden stockpiles, and mine drainage water. All the water from the site, including water from ore processing, will thus be collected by a peripheral network of collecting ditches and directed toward a sedimentation pond constructed in pit R-65. This water will be pumped to a treatment plant before being discharged into Lac Lagopède. In addition, a closed-circuit water collection system will promote water reuse for ore processing.

The proponent will be required to implement an environmental monitoring program for the entire mine life. This monitoring program will provide more detailed data about the quantity and quality of wastewater from the project and make it possible to quickly detect any changes in these components that may be attributable to the project or to natural factors and enable any necessary corrective action to be taken.

On the basis of the planned measures to avoid any adverse impact on the management of water

quantity and quality, the proponent considers that the project will have a moderate adverse impact during the operation phase, and that this impact will be eventually eliminated in the closure phase.

7.3.3 Government, public and Aboriginal comments and proponent's response

The main concerns expressed by the public and the community of Mistissini pertained to the impact on the water quality of Lac Lagopède. More specifically, the group "Société pour vaincre la pollution" (SVP) questioned the proponent's calculations relating to the suspended sediment and phosphorus loading in Lac Lagopède. The Federal Environmental Assessment Committee also raised this aspect with the proponent, particularly in connection with the anticipated adverse effects on aquatic life (silting of spawning grounds and eutrophication). The proponent confirmed that the treated mine water will only be released into Lac Lagopède when the final effluent meets the effluent discharge objectives (EDO) established by the MDDEFP.

Environment Canada recommends that the proponent use the best available technologies for the treatment of mine and domestic wastewater as well as all available management tools, including the monitoring program for treated effluents, with reference specifically to phosphorus and other substances (suspended sediments, nutrients, metals, organic compounds, etc.) in mine and domestic discharge water (Appendix 10). To this end, the proponent must ensure that its facilities meet the applicable federal legislative and regulatory requirements (e.g. *Fisheries Act, Wastewater Systems Effluent Regulations).* Depending on

Small lake near Lac Lagopède

the results obtained during the monitoring program, adjustments may have to be made to the wastewater treatment system.

7.3.4 Agency's conclusions on the significance of the residual environmental effects
Taking into account the implementation of the proposed mitigation measures as well as the monitoring of the quality of the effluents and surface water of Lac Lagopède planned by the proponent, the Agency concludes that the project is not likely to cause significant adverse environmental effects on water quality.

The proponent will be required to implement an environmental monitoring program for the entire mine life.

7.4 Fish and Fish Habitat

"Fish and fish habitat" includes not only fish per se, but also spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly to carry out their life processes.

The mine site's hydrographic network is located at the head of a watershed and is generally characterized by small streams that have low (or intermittent) flow and run through wetlands or boulder fields, where their flow is diffuse. The area's lakes are fairly shallow, with the exception of Lac Lagopède, which is the largest lake in the study area and the only one with a thermocline and deep pools.

Fish surveys indicate that fish are present in most of the hydrographic network of the study area. During these surveys, a total 1,314 fish of 14 different species were captured: slimy sculpin, northern pike, lake whitefish, burbot, lake chub, round whitefish, white sucker, longnose sucker, creek chub, pearl dace, longnose dace, brook trout, fallfish and lake trout. Captures were dominated by four species: pearl dace (44.9%), white sucker (23.7%), brook trout (13.2%) and lake chub (9.1%).

No fish species at risk were observed in the area of influence of the proposed mine or related infrastructure.

7.4.1 Potential environmental effects
The potential environmental effects of the Renard Project on fish and fish habitat concern essentially:

- dewatering of fish habitat;
- changes to water inflow into fish habitat; and
- fine sediment loading in fish habitat.

Dewatering of fish habitat
Implementation of the project will require prior drainage of lakes, rivers and streams as well as the diversion of rivers and streams, causing destruction of fish habitats and possible fish mortality (Appendix 5).

The operation of pits R2-R3 and R-65 will require prior drainage of F 3302 and F 3303 and their outlets. In addition, stream F 3298V will be diverted to develop pit R-65. The upstream section of the stream will diverted northwest of its current course, thus dewatering the downstream portion of the stream (Appendix 5).

Changes to water inflow into fish habitat
Implementation of the Renard Project will include the application of a water management plan for the entire mine site. This plan includes the dewatering of the pits and adits of the mine and the construction of a network of drainage ditches ringing the mine site. The water collected will be treated before being discharged into Lac Lagopède.

Application of the water management plan may reduce the water levels of the lakes, rivers and streams bordering the mine, through a combined reduction in their surface water and groundwater inflows.

The reduction in the water levels of the lakes, rivers and streams may thus lead to direct losses of fish habitat (Appendix 5), as well as indirect effects. The decrease in flows transiting through the lakes may reduce water turnover time, result in changes in water quality (temperature, dissolved oxygen, contaminants, etc.), reduce or eliminate groundwater springs conducive to spawning grounds and egg incubation, reduce thermal refuges for fish, change the hydraulic conditions on spawning grounds and, finally, restrict free passage of fish (e.g. at the outlets of the lakes in which the water levels have decreased).

The proponent studied seven lakes most likely to be affected by drawdown of the water table, namely lakes F 3300, F 2607, F 3301, F 3295, F 3296 and F 3298 and Lac Lagopède (Appendix 2).

According to the proponent, the reduction in water inflows associated with the mine water management plan would result in lower water levels and habitat losses in the littoral zone of five lakes (Appendix 5). The largest losses are indicated for lakes F 3298 and F 2607 because of their low slope and shallow depth of their shores.

On the basis of modelling data, the proponent concludes that the drop in water level of the lakes would have only a minor impact on the flow (water level, flow, velocity) at their outlets. Nevertheless, DFO will require appropriate monitoring and follow-up (see section 8.1) in order to ensure free movement of fish and maintenance of the hydraulic conditions on natural spawning grounds or on those developed to compensate for habitat losses in some of these outlets following implementation of the project.

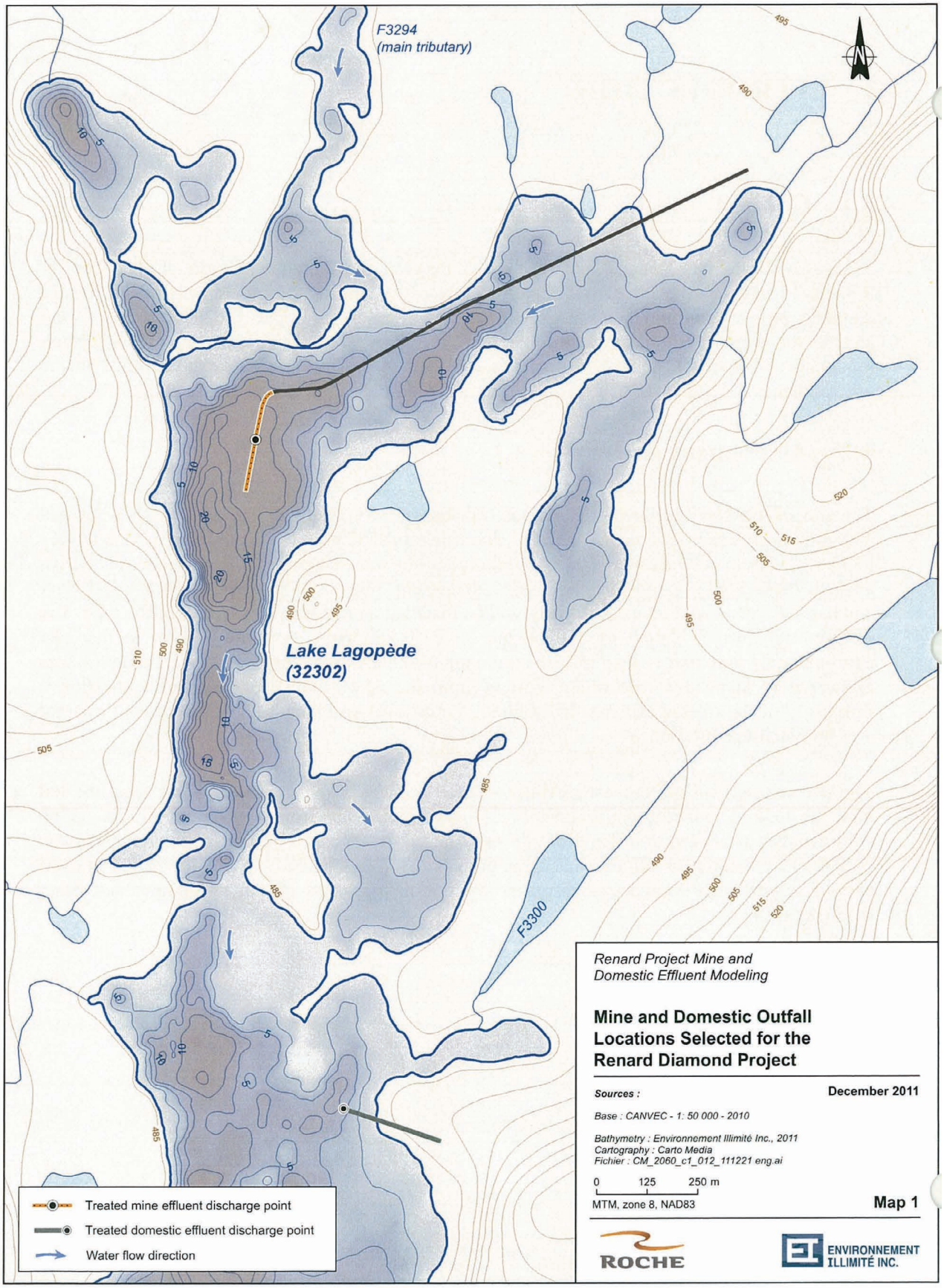
The proponent anticipates that there could be a significant decrease in water turnover time in three lakes, especially lake F 3298. DFO estimated that the turnover time of this lake will increase from 22 days to 170 days and considers that the water quality of the lake could become unsuitable for the fish currently present in this lake, including brook trout, a species sensitive to changes in its habitat. DFO will require monitoring and follow-up of the lake and, if necessary, the implementation of measures to ensure that suitable habitat conditions are maintained in this water body.

Fine sediment loading in fish habitat

During mine construction, before the network of drainage ditches is installed, there is a risk that fine sediment will be transported into the aquatic environment from excavation areas, areas where machinery is being operated and cleared areas. There is also a risk of fine sediment loading when lakes F 3302 and F 3303 are drained and the water is discharged into Lac Lagopède. In order to mitigate this effect, the proponent has proposed a series of measures to control erosion and fine sediment transport. The monitoring program includes provisions to take additional actions if these measures prove to be insufficient.

The environmental impact statement also shows that during operation of the mine, mine and domestic effluents from the Renard mine (see Figure 7-1) will be discharged into Lac Lagopède after treatment. The discharge of mine effluent could eventually lead to non-negligible solid particle loading in Lac Lagopède. The compensation program provides for the development of a lake trout spawning ground that would be located in the mine effluent dispersion plume. This new spawning ground will be monitored in order to make any necessary adjustments to prevent potential disturbances.

Figure 7-1: Mine and Domestic Outfall Locations Selected for the Renard Diamond Project



7.4.2 Mitigation measures and residual environmental effects

The proponent plans to take various measures to control fine sediment loading in the aquatic environment (water management plan, drainage ditches, system for permanent treatment of mine effluent, compliance with effluent discharge objectives, monitoring of final effluent) (Appendix 7).

These measures include:

- performing all work in the aquatic environment during the low-water period in accordance with the fish timing windows;
- maintaining a 30-metre riparian buffer to protect aquatic habitats;
- controlling erosion and runoff to rivers and streams;
- lowering the water level of the small lakes F3302 and F3303 slowly in order to concentrate the fish in the deepest section of lake so that they can be captured and moved to other water bodies.

In addition to these measures, the proponent undertakes to implement the additional measures prescribed by DFO (Appendix 8).

> The proponent plans to take various measures to control fine sediment loading in the aquatic environment …

According to available information, the Renard Mine Project will result in the destruction of approximately 45,800 m² of fish habitat caused primarily by the drainage of some 40,800 m² of water bodies and 5,000 m² of rivers and streams due to the mine infrastructure and facilities (e.g. pits and drainage ditches) and mining activities (e.g. dewatering of the pits and drawdown of the water table). The habitats destroyed include feeding, spawning and nursery areas of various species of fish, including brook trout, northern pike, white sucker and pearl dace.

The compensation program proposed by the proponent would involve the creation of approximately 18,000 m^2 of feeding, spawning and nursery areas for the fish species of interest to Aboriginal peoples and for sport fishing. This program includes development projects for brook trout and lake trout in the Renard mine area as well as projects intended to enhance various habitat functions (particularly spawning) of several species, including walleye and brook trout in the Mistassini Lake area (Roche, November 2012). In addition, long-term monitoring of the lake trout spawning ground site will be carried out as part of the habitat compensation program.

7.4.3 Government, public and Aboriginal comments and proponent's response

The group Nature Québec recommended that the proponent present various scenarios to compensate for the fish habitat losses caused by the draining of the two water bodies. The compensation program initially submitted by the proponent was not accepted by DFO because the proposal to flood the pits following mine closure would not make it possible to maintain conditions likely to generate an acceptable gain for compensation purposes because of the time required (more than 30 years) to reach equilibrium. The proponent has proposed new compensation scenarios (see section 7.4.2), which DFO has found to be satisfactory. This new compensation program, which will involve the restoration of a former mine channel, was also presented to and approved by the Cree community of Mistissini.

7.4.4 Agency's conclusions on the significance of the residual environmental effects

Considering the application of the proposed mitigation measures and the compensation of habitat losses, the Agency is of the opinion that the project is not likely to cause significant adverse environmental effects on fish and fish habitat.

The compensation program proposed by the proponent would involve the creation of approximately 18,000 m^2 of feeding, spawning and nursery areas for the fish species of interest to Aboriginal peoples and for sport fishing.

7.5 Terrestrial Wildlife and Its Habitat

For the purposes of this report, terrestrial wildlife includes amphibians and reptiles, fur-bearing animals, micromammals and large mammals as well as their habitats. A brief description of the various wildlife species present in the project study area is first presented, followed by an analysis of the anticipated impacts and the proposed mitigation measures.

Amphibians and reptiles

The study area of the Renard Project is located at a latitude subjected to northern climatic conditions, which limit the number of amphibian and reptile species in the area. While the James Bay territory has numerous wetlands that provide quality habitat for several species, the Renard Project would be located in the part of James Bay that has the smallest area of wetlands, and amphibian and reptile populations would be smaller in this area.

A single snake species could potentially be found in the study area (the common garter snake), as well as five anuran species (American toad, spring peeper, wood frog and mink frog) and three salamanders (northern two-lined salamander, blue-spotted salamander and yellow salamander).

Fur-bearing animals

Quebec is home to 22 species of fur-bearing animals and there are 15 species that may potentially be found in the Renard Project study area, including grey wolf, beaver, marten and lynx. The proponent also considered the presence of other small wildlife species which are not listed in Schedule 1 of the Quebec *Regulation respecting trapping activities and the fur trade* such as snowshoe hare, woodchuck, striped skunk, northern flying squirrel and American porcupine. The information concerning fur-bearing animals includes knowledge obtained from surveys and harvest statistics as well as traditional knowledge.

The proponent's report indicates that there are only two species of fur-bearing animals with special status potentially found in the area, i.e., the least weasel and the wolverine. The wolverine is protected by the Quebec *Act respecting threatened or vulnerable species* and the federal *Species at Risk Act,* while the least weasel is likely to be designated threatened or vulnerable under provincial regulation. However, although some studies claim that the distribution of these two species overlaps the study area, there is no recent scientific information to confirm this. Mentions of wolverines in traditional knowledge generally refer to observations of signs of the animal's presence dating back 50 years or more, a period when the wolverine was still present in Quebec. Current information indicates that there are no longer any wolverine populations in Quebec. There have been no official reports of the least weasel in the study area.

Micromammals

The proponent pointed out the paucity of data on micromammals in the Renard Project study area. To support its analysis, the proponent conducted surveys in the project study area. The surveys confirmed the presence of seven

micromammal species, out of the thirteen likely to be found in the study area. Of this number, one species likely to be designated threatened or vulnerable by the Quebec government, the southern bog lemming, was observed.

Large mammals

The large mammal population of the study area includes three species: caribou, moose and black bear. The information sources that the proponent used to provide a general overview of the large mammals include harvest statistics, traditional knowledge collection, the results of previous studies carried out in the study area, and the woodland caribou and moose winter aerial surveys conducted in collaboration with the regional office of the Quebec Department of Natural Resources, located in Chibougamau.

The Renard Project area is located in a potential wintering ground of the woodland caribou ecotype. Historically, the woodland caribou ecotype used the Lac Lagopède area. However, recent studies and traditional knowledge indicate that the woodland caribou ecotype is not present in the study area. In fact, according to the tallyman, it has not been seen since the 1990s. The closest herd of woodland caribou is reportedly the Témiscamie herd, in the Albanel-Mistassini-and-Waconichi Lakes Wildlife Reserve (approximately 300 km to the southeast).

During a survey conducted in 2011, three groups of caribou of the migratory ecotype were observed between kilometres 34 and 43 of Camp Lagopède (the current study site).

According to traditional knowledge and survey data, moose are present in the entire study area. However, the habitats in the study area do not appear to be suitable for maintaining a large moose population because of the small proportion of deciduous species.

No specific black bear survey was conducted. However, the tallyman in this area reported that observations of this species in the Lac Lagopède area confirm its abundance.

7.5.1 Potential environmental effects

The main anticipated impacts are associated with habitat loss and territorial fragmentation caused by construction of the mine infrastructure and facilities. Disturbance and mortality due to the construction work, mine operations and the potential increase in hunting pressure are also potential environmental effects on terrestrial wildlife.

Habitat loss and territorial fragmentation

Implementation of the Renard Project will cause a total loss of approximately 3 km^2 of habitat, consisting primarily of softwood-dominant stands (97%). The remaining habitat consists of dry barrens (1%) and wetlands (2%).

This loss of forest habitat and the vehicle noise generated during the construction, operation and closure of the mine infrastructure and facilities will to some extent limit the use of adjacent habitats by certain species and will restrict exchanges between populations.

Temporary or permanent habitat losses are considered marginal for local wildlife because the availability of habitat is not a limiting factor for most of the terrestrial wildlife species in the area.

In addition to habitat losses, the roads in the project footprint also constitute physical barriers that may restrict wildlife movement to varying degrees depending on the species. Roads fragment the terrestrial habitat and can result in the isolation of small wetlands and a decline in local anuran populations.

Disturbance and mortality

Risks of wildlife mortality could be caused by the use of machinery during clearing and other construction activities as well as vehicle traffic on the work site and on the access roads. In addition, these activities, combined with the

new road access (Route 167) under construction, could lead to issues such as increased predation by wolves, collisions with vehicles and poaching, and could therefore contribute to an increase in wildlife mortality. In addition, movements by affected wildlife to peripheral environments may require increased expenditure of energy, increase their vulnerability to predation or lead to some degree of competition in the area surrounding the project.

7.5.2 Mitigation measures and residual environmental effects

During implementation of the project, the proponent undertakes to apply mitigation measures that will help minimize habitat losses, the barrier effect as well as mortality in order to minimize the project's effects on terrestrial wildlife and its habitat (see Appendices 7 and 8).

Measures that will be taken to reduce the adverse impacts on terrestrial wildlife include:

- maintaining a 30-m buffer strip to protect riparian habitats;
- restricting movements of machinery and workers to the work areas;
- implementing a wildlife protection plan to reduce poaching opportunities;
- installing signs to indicate and protect moose yards;
- using sand and gravel as abrasives for winter maintenance instead of calcium;
- using silvicultural practices that promote the return of the woodland caribou ecotype;
- raising worker awareness about the potential presence of caribou and the importance of protecting them;
- documenting, if applicable, the movements of the woodland caribou ecotype in the mine project area.

7.5.3 Government, public and Aboriginal comments and proponent's response

The public raised concerns about the woodland caribou ecotype and requested that the proponent to conduct a more exhaustive study concerning the characterization of the potential effects of the Renard Project on woodland caribou in the region, in the short, medium and long term. Since the woodland caribou ecotype does not appear to be present in the study area, the proponent's proposal to raise user awareness about the effects of poaching on the caribou and document its presence in the mine areas should be sufficient to minimize any impact should any caribou be present.

7.5.4 Agency's conclusions on the significance of the residual environmental effects

Taking into account the implementation of the mitigation measures proposed by the proponent, the Agency concludes that the project is not likely to cause significant adverse environmental effects on wildlife and wildlife habitat.

7.6 Birds and Bird Habitat

This component includes forest birds, waterfowl, members of the family Anatidae, colonial birds, raptors and water birds. It also includes their habitat: forests, open wetlands and water bodies.

Due to the inaccessibility of the area, there is relatively little information on the bird fauna of the Otish Mountains. Therefore, in addition to producing a regional profile, based on the studies conducted for the Route 167 project and other projects, the proponent carried out surveys to establish a list of bird species found in the study area during the breeding season, in order to determine their abundance and locate their habitat.

The proponent surveyed 33 species of forest birds. This group includes woodpeckers, passerine birds, and members of the family Tetraonidae. Despite a high probability that these species are breeders in the study area, the proponent was only able to confirm this information for 11 species. Of the species

known to be present in the project area, the olive-sided flycatcher (threatened species) and the rusty blackbird (species of special concern) are two forest bird species at risk under the *Species at Risk Act*. The surveys revealed nesting of the bohemian waxwing, which merits special attention. Finally, the presence of two species of forest birds hunted by the Cree was confirmed in the study area, i.e., spruce grouse and willow ptarmigan (in winter).

Only three species of raptors of were observed during the breeding season in the 2010 and 2011 surveys. These species are the osprey, bald eagle and red-tailed hawk. It is possible that other species of raptors, such as peregrine falcon and golden eagle, frequent the study area. The bald eagle and golden eagle are protected under the Quebec *Act respecting threatened or vulnerable species*. The peregrine falcon is designated threatened under the federal *Species at Risk Act*.

In the group of waterbirds, which includes waterfowl, the proponent identified 11 species in the surveys. Although all these species may breed in the study area, three species are confirmed breeders through observation of clutches: Canada goose, American black duck and herring gull. For this group of birds, the surveys show that the most heavily used habitats are small lakes and ponds.

7.6.1 Potential environmental effects

The Federal Environmental Assessment Committee examined the project's potential effects in terms of habitat loss and alteration caused by construction of the project infrastructure and facilities, mortality caused by clearing machinery and vehicle traffic on the access roads and increased hunting pressure.

The drainage of water bodies, the preparation and development of sites near water bodies and the use of watercraft that will be necessary during the construction and maintenance of the wastewater (domestic and mine) outfalls could also disturb aquatic species and species that use riparian areas as their home range.

Activities that could have adverse effects on forest birds include clearing and grubbing that will be required in both the mine area and the airstrip sector. These activities will cause the loss of terrestrial and wetland environments that forest birds use during the breeding season. Ground-nesting waterfowl and tree-nesting species could also be affected. In addition, the movement of workers, transport of supplies, and increased accessibility of Lac Lagopède could also cause disturbances to birds.

Although the direct impact on the bohemian waxwing, olive-sided flycatcher and rusty blackbird is difficult to demonstrate, the project will cause the loss of habitats potentially used by these species. These birds use different critical habitats, many of which are located in the study area and will be largely lost.

… the proponent will have to include a component on birds in the planned environmental monitoring program …

In addition to habitat losses, many forest bird nests could be destroyed during the construction phase. The particularly critical period for this region is from May 1 to August 15; these dates are provided to guide the proponent in assessing the risk of destroying migratory bird nests and contravening the *Migratory Birds Convention Act*. These dates are a general guide and in no way relieves the proponent of the obligation to comply with the *Migratory Birds Convention Act* and avoid the destruction of migratory bird nests. Appendix 6 provides some additional information on this subject.

Willow ptarmigan

7.6.2 Mitigation measures and residual environmental effects

The proponent undertakes to implement all the mitigation measures described in Appendix 7 in order to minimize the project's effects on birds and bird habitat.

The measures proposed to reduce the adverse impacts on birds include:

- beginning the pumping of water to drain lake F3302 after mid-August, after the breeding season;
- installing nesting boxes for waterfowl around Lac du Lagopède and neighbouring small lakes to maintain the number of breeding pairs in the mine area;
- avoiding disturbing and stripping the soil in areas where only trees need to be cut so that they remain attractive hunting areas for red-tailed hawk and other species in this group;
- carrying out most of the deforestation and clearing work for the project site in the fall and winter, outside the peak breeding season for forest birds, which extends from May 1 to August 15 in this area, as recommended by the Canadian Wildlife Service (CWS);
- during closure, giving preference to planting species that are preferred by the Canada goose.

Despite these mitigation measures, the proponent indicated that there will be a low-intensity residual impact on birds directly related to the habitat loss of approximately 3 km^2 required for implementation of the project.

However, not all of these losses will have significant impacts on birds (including olive-sided flycatcher and rusty blackbird) given the wide availability of similar habitats in the project area. It is probable that rusty blackbird and olive-sided flycatcher pairs affected by the project will successfully become established elsewhere, since most of the population decline of these species does not appear to be associated with the loss of breeding habitat (COSEWIC,

2006). The bohemian waxwing is also likely to successfully become established elsewhere, since it does not defend a specific territory and shows no tendency to return to the same nesting site.

In order to complete the proposed mitigation measures, the proponent will have to include a component on birds in the planned environmental monitoring program to avoid any impact on migratory birds and species at risk during the construction work. This program should also include provision to take any necessary actions such as establishing a buffer zone if a migratory bird nest is found, so as not to harm or disturb the bird or its nest or eggs during the breeding season.

7.6.3 Government, public and Aboriginal comments and proponent's response

The Federal Environmental Assessment Committee and more specifically Environment Canada reviewed the information provided by the proponent. Environment Canada noted that the survey methods used are not sufficient to provide a complete profile of the birds in the areas directly affected by the work. However, the mitigation measures planned by the proponent, including the introduction of an environmental monitoring program (Appendix 10) during the work to protect the nests of migratory birds and species at risk, should minimize the adverse impacts on birds. On the basis of the information collected and the proponent's commitment to implement the mitigation measures that will meet the requirements of section 6 of the *Migratory Birds Regulations* (Appendix 6), Environment Canada is of the view that the adverse impacts on birds will be minor.

7.6.4 Agency's conclusions on the significance of the residual environmental effects

Taking into account the implementation of the mitigation measures and the monitoring program during the construction work, the Agency concludes that the project is not likely to cause significant adverse environmental effects on birds and bird habitat.

7.7 Current Use of Lands and Resources for Traditional Purposes and Structures, Sites or Things of Archaeological, Heritage, Historical or Burial Significance

This section deals with the project's effects on the use of the territory by the Cree of Mistissini, in particular the effects on the M11 traditional family territory (Appendix 9) for hunting, fishing, trapping and gathering activities as well as its archaeological, heritage, historical and burial significance.

The Renard Project is located on Category III lands[3], where the Cree have specific hunting, fishing and trapping rights set out in the JBNQA. All other users also have certain hunting and fishing rights for recreational purposes. The use of the territory in which the Renard Project is located is dominated by traditional Cree hunting, fishing and trapping activities.

The activities that take place in this area as well as past, current and future camps were identified through the many discussions and contacts between the proponent and the tallyman. According to the information collected by the proponent, the area is currently accessible only by sea plane and snowmobile, but will become accessible by motor vehicle once the Route 167-N extension project being carried out by the Quebec Department of Transportation is completed.

It should be noted that the environment in which the project is located is undisturbed and that there are very few human activities that generate pollutant emissions (no industrial activity). Air

[3] Category III lands are defined by the land regime set out in Section 5 of the JBNQA.

and water quality are generally very good.

To date, no archaeological surveys have been conducted within a 50-km radius of the study area and there are no known archaeological sites in the study area. To document this aspect, an assessment of the archaeological potential was therefore carried out as part of the environmental and social impact assessment. A total of 51 areas of archaeological potential were delineated, nine of which refer to the presence of portages. The interviews conducted with current users of the M11 trapline also provided relevant information, including the location of former camps, burial grounds, trails and portages.

The tallymen identified a lake located north of Lac de Bray as being an area valued by the family because it is associated with a time when the Cree depended on hunting and fishing for their survival, a time when fish was their main food source. The Cree consulted also identified a large number of camp sites that they or other members of their family have used in the past. Some of these sites are of historic value and are part of the family heritage.

The Cree consulted also identified an area that they consider to be of archaeological interest in the southeast part of the trapline where arrowheads can be found. The area was also used in the past to build canoes. Some known birthplaces were identified by the tallymen.

7.7.1 Potential environmental effects

Site construction, preparation and development, the use and maintenance of machinery and generator sets, road and air traffic, the drainage of lakes as well as the construction and operation of the mine facilities are the activities most likely to have impacts on use of the territory and natural resources.

Site preparation and development as well as the drainage of lakes F3302 and F3303 and the establishment of a security perimeter around the mine facilities will remove 307 ha (3 km^2) of land that could be used for natural resource exploitation by M11 trapline users.

The main sources of impact during construction and operation will be road traffic, the use and maintenance of machinery and generator sets, air transport, ore extraction, handling and storage, the management of materials generated by mining operations, the presence of facilities and workers, and the phased site remediation work. These project components will generally disrupt hunting, fishing and trapping activities in the project footprint and surrounding areas and will cause various nuisances that will likely prompt a certain number of animals to move away from the construction site, while at the same time causing inconvenience to land users (noise, dust, etc.).

It should be noted that, according to information provided by Cree land users, the project site does not interfere directly with any snowmobile trails. However, the mine project and the trail network developed by M11 trapline users will simultaneously evolve. Thus it is possible that the snowmobile trails will eventually intersect with mine access roads and facilities.

However, the proponent has undertaken to implement a mechanism of continuous communication with land users, in particular through the environmental committee established under the *Mecheshoo Agreement*.

It is always possible that archaeological remains will be uncovered incidentally during the various excavations to be made on site. In such circumstances, the archaeological sites uncovered will be treated in compliance with the requirements of the Quebec *Cultural Property Act* (R.S.Q., c. B-4, s. 41 and s. 42), by temporary protective measures, by assessment of findings and, where appropriate, by archaeological excavations. The domestic wastewater treatment plant is located near area of archaeological potential No. 6 and the proponent undertakes to have an archaeologist conduct a preliminary survey of this area prior

to construction, as soon as the necessary authorizations have been obtained.

> … the inclusion of a provision in the *Mecheshoo Agreement* to maintain [the] environmental committee should enable the Cree stakeholders to closely monitor the project's social and environmental issues …

7.7.2 Mitigation measures and residual environmental effects

The first mitigation measure that will be taken concerning the project's overall impact on the cultural heritage of land users will be to recognize and respect the role of M11 trapline holders in the traditional and contemporary management of the area's natural resources. In this way, Stornoway Diamond Corporation will keep local land users informed of the anticipated progress and location of construction work and will be sure to discuss any accommodation deemed necessary with these locals. In addition, an awareness program about Cree culture, their presence and the M11 trapline uses will be developed for all workers.

The mitigation measures that the proponent has undertaken to implement are presented in Appendix 7.

The measures proposed to reduce the adverse impacts on the use of lands and resources for traditional purposes include:

- reducing noisy activities (e.g. helicopter and all-terrain vehicle travel) on certain parts of the land during the waterfowl and moose hunting seasons;
- ensuring that the mine facilities do not interfere with any boat or snowmobile transportation;
- posting adequate signage in areas where snowmobile and ATV trails might intersect with mine access and secondary roads;
- prohibiting fishing, hunting and trapping on the site through clauses in worker and contractor contracts;
- compensating for the anticipated disturbances to the tallyman, in particular relocating the base camp located to the east of the airstrip (discussions between the two parties on this subject are currently under way).

From a general perspective, the proponent considers that the project will not have any residual effects on the use of lands and resources for traditional purposes.

7.7.3 Government, public and Aboriginal comments and proponent's response

Throughout the development of the project, the community was consulted and had an opportunity to voice its concerns and receive answers from the proponent. During the consultations that took place in Mistissini, the Federal Environmental Assessment Committee had an opportunity to observe that the proponent provided satisfactory answers to questions from community members.

The Federal Environmental Assessment Committee believes that the proponent's initiative to establish an environmental committee, whose members include regional stakeholders, land use managers and representatives of the Council of the Cree Nation of Mistissini, has made it possible to consider the problems concerning the environmental and social issues related to the Renard Mine Project.

In addition, the inclusion of a provision in the *Mecheshoo Agreement* to maintain this environmental committee should enable the Cree stakeholders to closely monitor the project's social and environmental issues and collaborate on environmental issues and creating opportunities for training on environmental issues.

7.7.4 Agency's conclusions on the significance of the residual environmental effects

Taking into account the implementation of the mitigation measures and the efforts made by the proponent to address all the concerns of the community of Mistissini, the Agency concludes that the project is not likely to cause significant adverse effects on the current use of lands and resources for traditional purposes and on structures, sites or things of archaeological, heritage, historical and burial significance in the Renard mine project study area.

7.8 Cumulative Environmental Effects

Cumulative environmental effects are defined as the effects on the environment that are likely to result from a project when a residual effect combines with the effects of other projects or human activities that have been or will be carried out. This assessment of cumulative effects is based on the Canadian Environmental Assessment Agency's *Operational Policy Statement - Addressing Cumulative Environmental Effects under the* Canadian Environmental Assessment Act, the *Cumulative Effects Assessment Practitioners Guide* (1999) and the proponent's analyses. The assessment of cumulative effects aims to identify to what extent the project being assessed contributes to overall human impacts on valued ecosystem components.

Potential residual effects are anticipated for wildlife habitats (terrestrial, wetland and aquatic environments), air quality and the use of the lands by the Cree. Wildlife habitats and more specifically the aquatic environment are the valued components most likely to be subject to cumulative effects.

7.8.1 Scope

For the cumulative effects assessment, the proponent determined several spatial boundaries in order to consider the various valued environmental components.

The immediate study area encompasses the study area defined in the environmental and social impact assessment of the Renard Project (127 km^2) and a 1 km wide strip on either side of the extension of Route 167 as well as a 250 m wide strip (right-of-way) along the preliminary alignment of the electric power line linking Camp Lagopède to the Nikamo station near LG4.

The local study area represents the spatial limits of the potential impacts of the project as well as of other industrial and commercial activities (mining, forestry, outfitting, etc.) and recreation and tourism activities (future parks and wildlife reserves), both existing and likely to be developed close to the site. This area, which incorporates the immediate study area, also includes activities that may be undertaken within the territory of the Eastmain River watershed, where the project is located, and concern primarily biophysical cumulative effects. The local study area encompasses an area of just under 95,000 km^2.

The regional study area includes the area where the potential cumulative socio-economic impacts of the project and of other activities could arise. This area includes the James Bay region as well as the urban communities of Mistissini, Chibougamau and Chapais.

The temporal boundaries for the cumulative effects assessment encompass the main projects completed or planned between 1920 and 2050.

The past, current and future projects and activities identified by the proponent are as follows:

- the former Troilus mine;
- the former Chibougamau mining camp with the former Copper Rand and Principale gold and copper mines, and the Joe Mann, Portage and Cook mines;
- the Springer and Perry (Opimiska) mines;
- the former Eastman gold mine;

- the Éléonore gold project;
- the Blackrock iron, titanium and vanadium project;
- the Macleod Lake copper/molybdenum project;
- the Eastmain Mine and Ruby Hill gold project;
- the Matoush uranium project;
- the Whabouchi mining project;
- the Lavoie uranium project;
- the Chantiers Chibougamau logging and forest development work, Forest Management Unit (UAF) 026-61 and UAF 026-62;
- the extension of Route 167 and other road links;
- the power transmission lines (between Laforge-1 and the Renard mine site and the Macleod Lake project facilities);
- recreation, tourism and conservation activities, including the Assinica and Albanel-Mistassini-and-Waconichi Lakes Wildlife Reserves, the proposed Albanel-Téminscamie-Otish Biodiversity Reserve and the proposed Hirondelle Biodiversity Reserve.

7.8.2 Potential cumulative environment effects

Terrestrial, wetland and aquatic environments

In the local study area, past and current projects and projects in the advanced stage of development (Matoush, Macleod Lake, Eastmain Mine and Ruby Hill, Lavoie), if they are carried out, will cause the destruction of natural terrestrial, wetland and aquatic environments related to the surface area of the facilities (pits, tailing sites, plants, other infrastructure, etc.). Although it is difficult to quantify these losses, the proponent estimates that the cumulative areas would be approximately 1,700 ha per project, which corresponds approximately to the surface area occupied by the Osisko project. The disturbed area of all the potential mining sites would represent 0.08% of the local study area. In terms of the other infrastructure projects, the construction of Route 167 would result in the loss of approximately 3,450 ha of terrestrial habitat and nearly 38 ha of wetlands (mainly peatlands). Logging activities represent approximately 2% of the local study area. Considering that the anticipated habitat losses for the Renard Project are approximately 307 ha of terrestrial and wetland environments and 4 ha of aquatic environment, this represents less than 0.003% of the local study area.

The aquatic environment will be affected by all the mining projects, to varying degrees. Although mine effluents must be controlled and treated before being discharged into waterways, routine site operations will result in a certain quantity of suspended sediment, nutrient and contaminant loading. Past activities have probably impacted the terrestrial, wetland and aquatic environments. In the case of the Renard Project, studies conducted by the proponent suggest that the discharges of effluents into Lac Lagopède will disperse quickly from the discharge points. From the perspective of cumulative effects, the spatial extent of the plumes in Lac Lagopède should be limited to the northern (mining effluent) and southern (domestic effluent) sections of the lake and should not have a cumulative effect with other projects. No other effluents from other mining projects are discharged into this lake.

7.8.3 Mitigation measures and residual cumulative environmental effects

Throughout the planning of the project, the proponent has endeavoured to concentrate the infrastructure and facilities in order to minimize the project's footprint, thereby also reducing this project's contribution to cumulative habitat losses. The applicable mitigation measures described in section 7.3 on water quality will minimize the project's cumulative effects on the aquatic environment.

In addition, the water management plan established by the proponent and the regulatory requirements (e.g. *Fisheries Act, Wastewater Systems Effluent Regulations*) that the proponent will have to meet concerning criteria at the mining and domestic effluent outfalls will minimize the direct effects of the project and,

consequently, their cumulative potential with the effects of other projects and activities, particularly on the aquatic environment.

7.8.4 Government, public and Aboriginal comments and proponent's response

The Federal Environmental Assessment Committee assessed the cumulative environmental effects of the project. In general, the cumulative effects of other projects and activities with the Renard Diamond Mine Project were considered of low magnitude. This low cumulative impact is primarily the result of the distance separating the projects (on average 100 km) and the small overall footprint of these projects in the receiving environments given the vast size of the geographic area concerned.

To counter the effects of extreme rainfall, the proponent plans to construct a network of ditches and culverts to collect and, if necessary, treat runoff from the site …

7.8.5 Agency's conclusions on the significance of the residual cumulative environmental effects

Taking into account the mitigation measures and the follow-up program that the proponent will implement for all the valued components, the Agency concludes that the project is not likely to cause significant adverse cumulative environmental effects on the terrestrial, wetland or aquatic environment.

7.9 Effects of the Environment on the Project

7.9.1 Approach

The definition of "environmental effect" provided in the former Act includes any change to the project that may be caused by the environment. The proponent examined the effects of the environment on the project and proposed various measures intended to reduce these effects, taking into consideration the mine construction, operation and closure phases.

7.9.2 Potential effects

The potential effects of the environment on the project are associated with natural events, such as violent storms, forest fires and earthquakes.

To assess the probability of extreme rainfall at the project site, and because of the lack of a weather station in the study area, the proponent used data from the Nitchequon weather station, which is the station located closest to the project site and at the same latitude. According to the data measured at Nitchequon based on Canadian precipitation maps, the highest recorded rainfall occurring in one day was 59.7 mm. This extreme precipitation value corresponds to a return period of 25 to 50 years.

Forest dynamics in the Renard Project area are influenced by various disturbances, the most significant of which is forest fires. According to available data, three fires disturbed the Renard Project area between 1935 and 1970.

In terms of earthquakes, the Renard Project is located in the Precambrian Shield, far from any seismic activity.

7.9.3 Mitigation measures and residual effects

The proponent has proposed various measures intended to reduce the environmental effects associated with extreme climatic conditions and forest fires.

The proponent has submitted an emergency response plan which considers the effects of the environment on the project, associated with extreme climatic conditions and forest fires, and outlines the measures planned to ensure the safety of mine personnel. This plan specifies the applicable procedures and specific equipment to be used during forest fires, as well as the roles, responsibilities and organization of the various

parties concerned as well as the resources available to respond in the event of major environmental incidents.

To counter the effects of extreme rainfall, the proponent plans to construct a network of ditches and culverts to collect and, if necessary, treat runoff from the site, as well as to control the quality of this runoff before it is discharged into Lac Lagopède.

7.9.4 Government, public and Aboriginal comments and proponent's response
According to the Atlas of Canada, the assessment of the forest fire risk, based on climatic conditions and type of vegetation, indicates that the area affected by the project is located in a low to moderate risk zone.

The Natural Resources Canada analysis confirms that the probability of a major earthquake in this region is very low, indeed essentially nil.

7.9.5 Agency's conclusions on the significance of the residual environmental effects
Taking into account the implementation of the proponent's environmental monitoring and emergency measures program, the Agency concludes that environmental conditions are not likely to have significant adverse effects on the project.

7.10 Effects of Possible Accidents or Malfunctions

7.10.1 Approach
The environmental effects caused by accidents or malfunctions are among the factors to be examined pursuant to the former Act. The proponent identified the activities most likely to cause accidents or malfunctions during the mine construction, operation and closure phases, their potential adverse environmental effects, as well as the planned emergency response measures.

7.10.2 Potential effects
In the context of this project, the accidents and malfunctions that could result in accidental spills of contaminants are associated with the use and maintenance of equipment, generator sets and vehicles, the use of hazardous materials, including explosives, and the transfer of petroleum products from tanker truck to a tank. Depending on the type, extent and location of the spill, the magnitude of the effects on the environment could be significant. Explosions and fires could also occur, the potential sources being the explosives magazines, the propane and fuel storage areas as well as electric transformers.

7.10.3 Mitigation measures and residual effects
The proponent has committed to implement its environmental emergency response program and operating procedures for situations that pose a high potential risk. This program will detail the preventive and response measures in the event of accidental spills and leaks, fire and explosions at the mine site as well as the procedures for handling and storing petroleum products and chemicals. The emergency response plan will describe the roles, responsibilities and organization of the parties involved, the availability of resources and the coordination and response mechanisms as well as the training requirements. For storage sites, the proponent will implement a management plan that will comply with applicable regulations, including the *Regulation respecting hazardous materials*, *Transportation of Dangerous Substances Regulation* and *Regulation under the Act respecting explosives*. The principles that will be applied to reduce the risk of accidents are: minimizing the transfer of hazardous materials, reducing the use of hazardous materials at the source and establishing a tracking mechanism for hazardous materials.

A key component of the proponents' emergency management program is prevention through an employee training and awareness approach,

which is intended to ensure a fast, effective response in the event of a disaster or spill that could have impacts on the environment. Considering the isolation of the project site, the proponent plans to provide all the necessary resources to respond in the event of emergency situations. This approach is particularly important in view of the fact that the project is located 360 km from the nearest town.

The purpose of a follow-up program is to verify the accuracy of the environmental assessment of a project and to determine the effectiveness of [mitigation] measures …

Taking into account the implementation of the mitigation measures and the communication and emergency management mechanisms, the proponent believes that it can minimize the risks, losses and damage caused by accidents or malfunctions.

7.10.4 Government, public and Aboriginal comments and proponent's response

The Federal Environmental Assessment Committee notes that the preventive measures proposed by the proponent, such as secure tank storage, should reduce the probability of the occurrence of accidents or malfunctions. In addition, in the event of an accidental spill, the emergency measures and responses will reduce the effects on the environment.

7.10.5 Agency's conclusions on the significance of the residual environmental effects

The Agency concludes that potential accidents and malfunctions associated with the project are not likely to have significant adverse environmental effects if the proponent applies its environmental emergency response program and operating procedures.

7.11 Effects on the Capacity of Renewable Resources

In accordance with the requirements of subsection 16(2) of the former Act, the Agency must consider the capacity of renewable resources likely to be significantly affected by the project to meet the needs of the present without compromising the possibility for future generations to meet their needs. In order to assess whether the capacity of a renewable resource would be adversely affected, the Agency determined that the residual adverse effects on the resources would have to be significant enough to threaten the integrity of the ecosystem or resources in question. In the case of this project, the Agency concluded, after assessment, that none of the residual adverse effects of the project had these characteristics.

8. Follow-up Program

The purpose of a follow-up program is to verify the accuracy of the environmental assessment of a project and to determine the effectiveness of any measures taken to mitigate the adverse environmental effects of the project. In addition, the results of a follow-up program will support the implementation of adaptive management measures to react to unforeseen adverse effects or change existing measures if necessary. The anticipated adverse effects for this project as well as the measures that will be implemented to mitigate those effects are described in section 7 of this report.

Fisheries and Oceans Canada and Natural Resources Canada will be responsible for the follow-up program and, with the support of the relevant federal authorities, will ensure that the proponent designs and implements a detailed program.

The table in Appendix 10 outlines the approach and the objectives the proponent will use to develop the follow-up program required by the federal authorities pertaining to water quality,

fish and fish habitat, and birds and bird habitat. The program will take into account the conditions of the federal and provincial authorizations and approvals required for the implementation of the project, as well as changes in environmental conditions and the observation of environmental effects that may arise while the project is being carried out.

As part of the follow-up program, the proponent must produce reports presenting and interpreting the results and describing any necessary corrective measures. The proponent will submit the reports to Fisheries and Oceans Canada and Natural Resources Canada, as well as to the relevant monitoring committees. The results of the follow-up program will be made publicly available on the Canadian Environmental Assessment Registry.

The comprehensive study process gave the public and the Crees opportunities to participate in the improvement of the project.

Follow-up of the fish habit compensation program

The proponent will carry out a follow-up program designed to assess the effectiveness of all the components of the compensation program and to ensure that the stated objectives have been achieved. The purpose of the compensation program is to comply with the principle of no net loss of fish habitat pursuant to the *Fisheries Act*. The compensation program, which was modified following discussions with the Federal Environmental Assessment Committee as well as with the Cree community of Mistissini, will be finalized with Fisheries and Oceans Canada when DFO issues its authorizations.

9. Benefits of Environmental Assessment

The comprehensive study process gave the public and the Crees opportunities to participate in the improvement of the project. In collaboration with the Federal Environmental Assessment Committee, the Agency reviewed and assessed the information gathered during the environmental assessment process. This environmental assessment process helped to improve the design of the project and to reduce the environmental effects of its construction and operation. As a result, the design, construction, operation and decommissioning of the project are not based only on technical or economic criteria, but also incorporate environmental criteria that promote a balanced approach that is in keeping with the principles of sustainable development.

Early on, the proponent designed its project taking into account the comments received from the public, which helped to reduce the project's ecological footprint. The proponent selected the alternative with a lesser impact that better meets its technical and economic criteria.

During the federal review, changes were made to the project in response to comments received from experts, the public and Aboriginal groups. For example, Fisheries and Oceans Canada helped the proponent ensure that undertakings were designed so as to reduce fish habitat loss and disturbance and to protect and reduce encroachment on the aquatic environment. Moreover, at the request of Fisheries and Oceans Canada, a compensation program was prepared by the proponent for loss of fish habitat; this program, which is supported by several stakeholders of the Cree community of Mistissini, will create fish habitats.

In compliance with environmental assessment requirements, the proponent has developed monitoring and follow-up plans aimed at

protecting the environment. Consequently, throughout the various phases of the project, these programs will enable the proponent to make changes and adjustments to its facilities and its operations in order to minimize the impacts on the environment.

10. The Agency's Conclusion and Recommendations

… the Agency concludes that the Project is not likely to cause significant adverse environmental effects.

To reach a conclusion on the significance of the environmental effects of the project, the Agency took into account the following elements in its analysis:

- The documentation submitted by the proponent;
- The analyses and findings of the Federal Environmental Assessment Panel;
- Opinions and advice received from the public and the Mistissini Aboriginal community;
- The proponent's obligations, as described in the certificate of authorization issued in accordance with the *Loi sur la qualité de l'environnement du Québec*;
- The obligation to obtain authorizations under subsection 35(2) of the *Fisheries Act* for any work resulting in the loss and disruption of fish and their habitat;
- The approval required under the *Explosives Act*.

Taking into account the implementation of mitigation measures described in this comprehensive study report and the commitments made by the proponent (see appendix 7), the Agency concludes that the Project is not likely to cause significant adverse environmental effects. The proponent will also need to implement a follow-up program and share the results with federal authorities.

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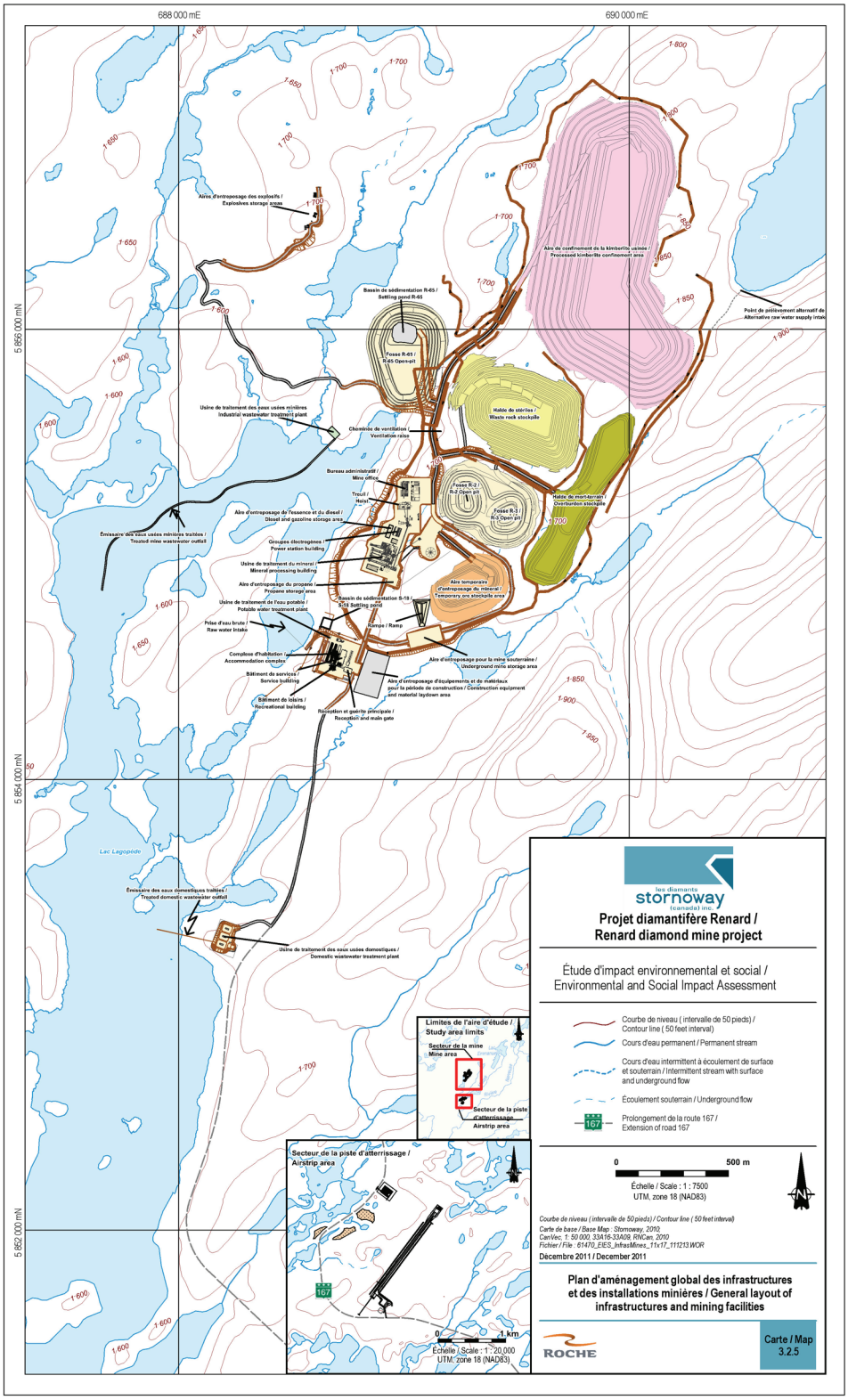
Appendix 1: Pugh Decision Matrix Used to Analyze Airstrip Alternatives #14 and #15

		CAPEX (+/- 50%)	**0**		**0**	
		OPEX (+/- 50%)	**0**		**0**	
		Total Cost - NPV (+/- 50%)	**0**		**0**	
	Evaluation Criteria		Base Case Concept 1		Concept 2	
Selection Criteria	Priority	Rank	Alternative #14		Alternative #15	
CAPEX (Including Closure Cost)	High	9	Same	0	Worse	-9
OPEX	High	9	Same	0	Same	0
NPV	High	9	Same	0	Worse	-9
Average for Category				0		-18
Weighted Subtotal	**50%**			0		-9
Environmental - Impact on the Environment	High	9	Same	0	Worse	-9
Environmental – Long-term Risks	Moderate	6	Same	0	Same	0
Environmental - Biodiversity Restoration	Moderate	6	Same	0	Same	0
Average for Category				0		-9
Weighted Subtotal	**20%**			0		-1.8
Acceptance by Interest Groups	Low	3	Same	0	Same	0
Acceptance by the Crees	High	9	Same	0	Same	0
Average for Category				0		0
Weighted Subtotal	**10%**			0		0
Regulations and Policies - Compliance With	High	9	Same	0	Same	0
Regulations and Policies - Degree of Difficulty in Obtaining Approvals	High	9	Same	0	Better	9
Average for Category				0		9
Weighted Subtotal	**10%**			0		0.9
Safety Risk - During Construction	High	9	Same	0	Same	0
Safety Risk - During Operation	High	9	Same	0	Better	9
Operability	Moderate	6	Same	0	Better	6
Constructability / Logistic - Difficulty	Moderate	6	Same	0	Worse	-6
Long-term Opportunity for Future Development	Moderate	6	Same	0	Same	0
Average for Category				0		9
Weighted Subtotal	**10%**			0		0.9
Raw Total				**0**		**-9**
Weighted Total	**100%**			**0**		**-9**

Matrix: Better = Better option than Base Case/ Same= Same evaluation as Base Case/ Worse = Poorer option than Base Case

Source: Roche Ltd, Consulting Group. 2011. *Environmental and Social Impact Assessment of the Renard Diamond Project*: *Volume 1 – Main Report V.0* presented to Stornoway Diamond Corporation.

Appendix 2: General Layout of Infrastructures and Mining Facilities



Source: Roche Ltd, Consulting Group. December 2011. *Environmental and Social Impact Assessment of the Renard Diamond Project*: *Volume 1 – Main Report V.0* presented to Stornoway Diamond Corporation.

Appendix 3: Evaluation Results for the Processed Kimberlite Confinement Area Site Alternatives

Indicator Description	Explanation	Site A	Site B	Site C	Site D	Site E
Environmental Aspect						
Proportion of watersheds affected	A=43 %, B=22 %, C=40%, D=40%, E=27%	0	100	14	14	76
Number of watersheds affected	A=1, B=2, C=3, D=3, E=2	100	20	0	0	20
Position in the watershed	All in the upstream portion of the watershed	0	0	0	0	0
Actual distance from body of water (river or lake) in m	A=0, B=98, C=27, D=22, E=0 The distances are calculated as straight line distances (as the bird flies). The site E groundwater thalwegs were considered since the latter will also be affected by the layout.	0	100	28	22	0
Watercourse diversion	A=Yes, B=No, C=No, D=Yes, E=Yes	100	100	100	100	100
Stream crossing by road/pipeline	A=2, B=2, C=5, D=6, E=2	100	100	25	0	100
Presence of fish habitat on the site	A= Yes, B= No, C= No, D= Yes, E= No	0	100	100	0	100
Presence of fish downstream Distance in m	A=160, B=100, C=27, D=22, E=66. Where data is unavailable for certain sites, the distances are calculated as straight line distances towards the closest lake.	100	57	4	0	32
Distance from a spawning ground	A=less than one km, B= unknown, C= less than one km, D= unknown, E=unknown. B, D, and E are unknown because the bodies of water had not been inventoried when Golder Associated ltd, (Feb. 2011) did the study.	0	50	0	50	0
Area of wetland on the site in m^2	A=5,590 B=2,223 C=11,475 D=95, E=2,400	52	81	0	100	80
Distance from a downstream wetland in m	A=0, B=25, C=0, D=0, E=77. The distances are calculated as straight line distances towards the closest wetland.	0	32	0	0	100
Deforestation required (in m^2)	A=711,187, B=674,540, C=728,178, D=719,977, E=729,791;	34	100	3	18	0
Plant population or presence of a habitat of interest on the site	Information was unavailable when Golder did the study (Feb. 2011).	50	50	50	50	50
Distance from a park, a protected habitat, or a high value habitat	No protected area or regulated wildlife habitat in proximity. These sites are more than 50 km away, such as the planned Albanel-Temiscamie-Otish National Park. However, a swallow biodiversity reserve project exists about 30 km east of Lagopede Camp.	50	50	50	50	50
Presence of special status flower species within the confinement area footprint	Up to the present, no special status species were discovered in the Renard Project study area.	100	100	100	100	100

Appendix 3: Evaluation Results for the Processed Kimberlite Confinement Area Site Alternatives (cont'd)

Indicator Description	Explanation	Site A	Site B	Site C	Site D	Site E
Presence of special status wildlife species	A=Yes, B=Potential habitat, C= Potential habitat, D=Yes, E= Potential habitat. Brook trout, a species of interest and subsistence according to the ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) at sites A and D, and the Cooper Lemming Campagnol (*Synaptomus coopen*), a species likely to be designated threatened or vulnerable according to the Quebec Threatened and Vulnerable Species Law at site D. "Potential habitat" for the other sites because these sites have not been inventoried.	0	25	25	0	25
Waterfowl presence	Information unavailable at the time of the Golder study (Feb., 2011) or no lake likely to house the waterfowl nesting sites on the project site.	100	100	100	100	100
Length of road or pipeline (footprint) in m	A=2,306 B=2,503 C=4,832 D= 5,658 E=2,986.	94	88	23	0	100
	Environmental aspect score (%)	**45**	**68**	**35**	**35**	**58**
Social Aspect						
Visual impact	The sites will always be partially visible from the ski-doo trails	40	40	40	40	40
Traditional activity area (Cree)	A=In proximity, B=On the site, C=On the site, D=On the site, E=In proximity. Sites B, C, and D are in a moose hunting ground and/or a trapline.	50	0	0	0	50
Recreational tourist activities and infrastructures and vacation area nearby	A=Activity not impacted, B= Activity not impacted, C= Activity not impacted, D=Activity slightly impacted, E=Activity not impacted. It is considered that the ski-doo trial in the site D area will be slightly impacted because the trail goes around the site. The trail can be easily moved without disrupting the activity to a significant degree. The other sites do not interfere with the ski-doo trails or other types of activities.	100	100	100	75	100
Land tenure	All on crown land	100	100	100	100	100
Archeological site, cultural or patrimonial asset	No archeological site within the limits of the sites	100	100	100	100	100
	Social aspect score (%)	**77**	**60**	**60**	**57**	**77**
Economic Aspect						
Volume of dykes	A=13.8 Mm^3 B=14.5 Mm^3 C=15.9 Mm^3 D=15.0 Mm^3 E= 16.6 Mm^3	100	77	27	59	0
Stockpile height	A=88 m, B=136 m, C=89 m, D=77m, E=91 m	81	0	80	100	76
Stockpile area (cover, liner)	A=0.815 Mm^3 B=0.855 Mm^3 C=0.808 Mm^3 D=0.677 Mm^3 E= 0.65 Mm^3	22	0	26	100	50
Possibility of expansion	A=No possibility – significant lakes to the north and south, and topographical limits to the east and west; B=Possibility of minor expansion to the west; C=Possibility to the north and south despite few rivers/streams; D=Possibility to the southwest, limited by lakes; E=Major possibility to the northeast.	0	25	50	25	75

Appendix 3: Evaluation Results for the Processed Kimberlite Confinement Area Site Alternatives (cont'd)

Indicator Description	Explanation	Site A	Site B	Site C	Site D	Site E
Deviation/Compensation	A=One or two simple deviations, moderate compensation required; B=No deviation or compensation required; C=No deviation possible but major compensation; D=No deviation possible but minor compensation required; E=No deviation possible but moderate compensation required.	75	100	25	75	25
Maximum elevation change between the concentrator and the output point	A=-44 m B=-64 m C=-36.5 m D=-46.6 m E=-46.5 m	73	0	100	64	64
Length of main or trucking distance	A=2.37 km B=2.48 km C=4.99 km D=5.75 km E=2.09 km	92	89	21	0	100
Site accessibility	A=2.37 km B=2.48 km C=1.0 km D=1.6 km E=1.12 km	8	0	100	59	92
Consequence of a dyke/containment failure	In all cases, no population is at risk and there will be no loss of infrastructure. For the environment A=Loss or deterioration of a major part of the fish or wildlife habitat; B=No significant loss or deterioration of the fish or wildlife habitat; C=Loss or deterioration of a major part of the fish or wildlife habitat; D=No significant loss or deterioration of the fish or wildlife habitat; E: No long-term loss.	50	75	50	75	100
	Economic aspect score (%)	**58**	**44**	**48**	**65**	**61**

Source: Roche Ltd, Consulting Group. December 2011. *Environmental and Social Impact Assessment of the Renard Diamond Project*: *Volume 1 – Main Report V.0* presented to Stornoway Diamond Corporation.

Appendix 4.1: Domestic Wastewater Treatment System Alternative Analysis

Evaluation Criteria for Alternatives	Criteria Weighting	Criteria Value Based on Class		Result for Each Alternative	
		Class	Weighting (pts)	Facultative Aerated Lagoons	RBC (bio-discs)
Technical Feasibility					
Treatment system operation and maintenance	2.5	Complex	1	Easy	Complex
		Easy	2	**5**	**2.5**
Overload efficiency during peak periods	2.5	Low	1	High	Low
		High	2	**5**	**2.5**
Sludge management	2.5	Complex	1	Complex	Easy
		Easy	2	**5**	**2.5**
Treatment efficiency during winter	2.5	Low/Average	1	Low/Average	High
		High	2	**2.5**	**5**
Environmental Aspects					
Respect of effluent standards	5	No	1	Yes	Yes
		Yes	2	**10**	**10**
Encroachment on the territory	5	Moderate	1	Moderate	Weak
		Weak	2	**5**	**10**
Socio-economic Aspects					
Construction and operation costs	10	Moderate	1	Low	Moderate
		Low	2	**20**	**10**
			Total	**52.5**	**42.5**

Appendix 4.2: Characteristics of the Site Alternatives for the Domestic Wastewater Treatment Plant

Evaluation Criteria for Alternatives	Treated Effluent Discharge Point Alternative	Domestic Wastewater Treatment Plant Alternative		
		A	B	C
Length of effluent pipeline from the water treatment plant to the discharge point (m)	1	630	**490**	760
	2	1,240	450	**160**
	3	1,050	300	**240**
	4	**132**	890	1,260
	5	840	**360**	530
Length of domestic wastewater pipeline from the accommodation complex to the water treatment plant (m)		700	1,100	1,300
Altitude of the treatment plant (m)		484	488	476
Method to distribute the wastewater to the domestic wastewater treatment plant	Maximum change in altitude over the route (m)	488	490	498
	Pump/Gravity	Pump	Pump	Pump

Appendix 4.3: Assessment Results of the Site Alternatives for the Final Effluent Discharge Point of Treated Domestic Wastewater

Evaluation Criteria for Alternatives	Criteria Weighting[1]	Position of the Discharge Point with respect to the Criteria		Value of Criterion Parameter		
		Direction	Score (pts)	Class	Score (pts)	
Technical Criteria						
Distance between the discharge point and the shore	0.11			>300 m	1	
				150 ≥ 300 m	2	
				< 150 m	3	
Length of the wastewater pipeline between the accommodation complex and the treatment plant	0.47			>1,000 m	1	
				500 ≥ 1,000 m	2	
				< 500 m	3	
Length of the pipeline between the treatment plant and the final treated effluent discharge point	0.11			>300 m	1	
				150 ≥ 300 m	2	
				< 150 m	3	
Method to distribute the wastewater to the treatment plant	0.31			Pump	1	
				Gravity	2	
					Sub-total	

[1] Weighting was done using the multi-criteria hierarchy method (MHM) (CCI software): http://www.cci-icc.gc.ca/tools/ahp/index_e.aspx.

(Appendix 4.3)

	Results for each evaluation criterion for the various plant site alternatives and treated wastewater discharge points				
	B	C		A	B
	1	2	3	4	5
	245 m	41 m	275 m	29 m	37 m
	0.21	**0.32**	**0.21**	**0.32**	**0.32**
	1,100 m	1,300 m	1,300 m	900 m	1,100 m
	0.47	**0.47**	**0.47**	**0.94**	**0.47**
	490 m	160 m	240 m	132 m	360 m
	0.11	**0.22**	**0.22**	**0.33**	**0.11**
	Gravity	Pump	Pump	Gravity	Gravity
	0.6192	**0.3096**	**0.3096**	**0.6192**	**0.6192**
	1.42	**1.33**	**1.22**	**2.22**	**1.52**

Appendix 4.3: Assessment Results of the Site Alternatives for the Final Effluent Discharge Point of Treated Domestic Wastewater (cont'd)

Evaluation Criteria for Alternatives	Criteria Weighting[1]	Position of the Discharge Point with respect to the Criteria		Value for a Criterion Parameter		
		Direction	Score (pts)	Class	Score (pts)	
Physical Criteria						
Maximum water depth near the discharge point	0.20			<3 m	1	
				3 ≥ 6 m	2	
				> 6 m	3	
Thermocline presence (summer)	0.11			No	1	
				Yes	2	
Distance of a tributary that can favour the dispersion and diliution of the treated effluent	0.06			< 500 m	1	
				500 ≥ 1,000 m	2	
				> 1,000 m	3	
Environmental characteristics: dissolved oxygen on the surface (% O_2)	0.17			< 90%	1	
				> 90%	2	
Type of substrate	0.13			Unconsolidated sediment (Om)	1	
				Rocks (potential fraying substrate for whitefish)	2	
				Sand (potential fraying substrate for whitefish)	2	
				Gravel (potential fraying substrate for brook trout and whitefish)	3	
				Blocks and large blocks (potential fraying substrate for lake trout and whitefish)	3	
Distance from an aquatic grass bed	0.05			< 0.5 km	1	
				0.5 ≥ 1 km	2	
				>1 km	3	
Current in the area	0.18			Weak (+ to ++)	1	
				Moderate (+++ to ++++)	2	
				Strong (+++++)	3	
Exposure to prevailing winds (west)	0.10			Downwash	1	
				Dispersion	2	
					Sub-total	

(Appendix 4.3)

	Results for each evaluation criterion for the various plant site alternatives and treated wastewater discharge points				
	B	C		A	B
	1	2	3	4	5
	5 m	1 m	7.5 m	7.5 m	5 m
	0.40	**0.20**	**0.60**	**0.60**	**0.40**
	Yes	No	Yes	Yes	Yes
	0.2256	**0.1128**	**0.2256**	**0.2256**	**0.2256**
	400 m	600 m	600 m	300 m	400 m
	0.06	**0.11**	**0.11**	**0.06**	**0.06**
	88.6%	95.7%	97.5%	90.3%	86.8%
	0.1703	**0.3406**	**0.3406**	**0.3406**	**0.1703**
	Om	Om	Om	Om	Om
	0.1338	**0.1338**	**0.1338**	**0.1338**	**0.1338**
	0.5 ≥ 1km	< 0.5km	< 0.5km	0.5 ≥ 1km	0.5 ≥ 1km
	0.0988	**0**	**0**	**0.0988**	**0.0988**
	+++++	+	+++	++++	++
	0.5451	**0.1817**	**0.3634**	**0.3634**	**0.1817**
	2	1	1	1	1
	0.19	**0.10**	**0.10**	**0.10**	**0.10**
	1.82	**1.18**	**1.87**	**1.91**	**1.36**

Appendix 4.3: Assessment Results of the Site Alternatives for the Final Effluent Discharge Point of Treated Domestic Wastewater (cont'd)

Alternatives Evaluation Criteria	Criteria Weighting[1]	Position of the Discharge Point with respect to the Criteria		Value for a Criterion Parameter		
		Direction	Score (pts)	Class	Score (pts)	
Biological Criteria						
Distance from a known spawning ground	0.54	Upstream	1	< 500 m	1	
				500 m ≥ 1,000 m	2	
		Downstream	2	>1,000 m	3	
Distance from a known rearing area	0.30	Upstream	1	< 500 m	1	
				500 ≥ 1,000 m	2	
		Downstream	2	>1000 m	3	
Distance from a narrowing in the lake that could consititute a fish migration route	0.10			< 500 m	1	
				500 ≥ 1,000 m	2	
				>1000 m	3	
Presence of structural elements that could serve as fish shelters	0.06			Yes	1	
				No	2	
					Sub-total	
Human Criteria						
Distance from a fishing site mapped by the Cree	0.5	Upstream	1	< 500 m	1	
		Downstream	2	500 ≥ 1,000 m	2	
				>1000 m	3	
Distance from the planned drinking water intake	0.5	Upstream	1	< 500 m	1	
		Downstream	2	500 ≥ 1,000 m	2	
				>1,000 m	3	
					Sub-total	
					Total	
					Rank	

(Appendix 4.3)

	Results for each evaluation criterion for the various plant site alternatives and treated wastewater discharge points				
	B	C		A	B
	1	2	3	4	5
	495 m	1,200 m	1,100 m	200 m	700 m
	1.07	**3.22**	**3.22**	**0.54**	**2.14**
	500 ≥ 1,000 m	>1,000 m	>1,000 m	< 500 m	500 ≥ 1,000 m
	1.2036	**1.8054**	**1.8054**	**0.3009**	**1.2036**
	< 500 m	< 500 m	< 500 m	500 ≥ 1,000 m	< 500 m
	0.1007	**0.1007**	**0.1007**	**0.2014**	**0.1007**
	Yes	No	No	No	Yes
	0.0625	**0.125**	**0.125**	**0.125**	**0.0625**
	2.44	**5.25**	**5.25**	**1.16**	**3.51**
	200 m	900 m	700 m	500 m	400 m
	1	**2**	**2**	**1**	**1**
	> 1,000 m	> 1,000 m	> 1,000 m	> 1,000 m	> 1,000 m
	3	**3**	**3**	**3**	**3**
	4	**5**	**5**	**4**	**4**
	9.68	**12.75**	**13.34**	**9.29**	**10.40**
	4	**2**	**1**	**5**	**3**

Appendix 4.4: Assessment Results of the Site Alternatives for the Mine Effluent Final Discharge Point

Evaluation Criteria for Alternatives	Criteria Weighting[1]	Position of the Discharge Point with respect to the Criteria		Value for Criterion Parameters		
		Direction	Score (pts)	Class	Score (pts)	
Technical Criteria						
Length of the pipeline between the R-65 sedimentation pond and the final mine effluent discharge point	1.00	N/A	N/A	>2,000 m	1	
				500 ≥ 2,000 m	2	
				< 500 m	3	
					Sub-total	
Physical Criteria						
Maximum water depth near the discharge point	0.36	N/A	N/A	<1 m	1	
				1 ≥ 10 m	2	
				> 10 m	3	
Distance of a tributary that can favour the dispersion and diliution of the mine effluent	0.20	N/A	N/A	> 1,000 m	1	
				500 ≥ 1,000 m	2	
				< 500 m	3	
Type of substrate[2]	0.11	N/A	N/A	Unconsolidated sediment (Om)	1	
				Rock	2	
				Sand	3	
				Gravel	4	
				Blocks and large blocks	5	
Current in the area	0.23	N/A	N/A	Weakest (+)	1	
				Moderate (++)	2	
				Strongest (+++)	3	
Exposure to prevailing winds (west)	0.10	N/A	N/A	Downwash (DW)	1	
				Dispersion (DP)	2	
					Sub-total	

[1] Weighting was done using the multi-criteria hierarchy method (MHM) (CCI software): http://www.cci-icc.gc.ca/tools/ahp/index_e.aspx.

[2] Relationship between the type of substrate and the preferred spawning substrate for whitefish, brook trout, and lake trout:

- Rocks (potential fraying substrate for whitefish)
- Sand (potential fraying substrate for whitefish)
- Gravel (potential fraying substrate for brook trout and whitefish)
- Blocks and large blocks (potential fraying substrate for lake trout and whitefish)

(Appendix 4.4)

	Result for Each Evaluation Criterion for the Alternative Mine Effluent Discharge Points			
	1	2	3	4
	160 m	890 m	2,470 m	1,340 m
	3.0	**2.0**	**1.0**	**2.0**
	3.0	**2.0**	**1.0**	**2.0**
	5.5 m	11.2 m	8 m	12.7 m
	0.72	**1.08**	**0.72**	**1.08**
	120 m	520 m	200 m	380 m
	0.59	**0.40**	**0.59**	**0.59**
	Om	Om	Om	Om
	0.11	**0.11**	**0.11**	**0.11**
	+	++	++	+++
	0.23	**0.45**	**0.45**	**0.68**
	DW	DP	DW	DP
	0.10	**0.21**	**0.10**	**0.21**
	1.75	**2.24**	**1.98**	**2.67**

Appendix 4.4: Assessment Results of the Site Alternatives for the Mine Effluent Final Discharge Point (cont'd)

Alternatives Evaluation Criteria	Criteria Weighting [1]	Position of the Discharge Point with respect to the Criteria		Value for Criterion Parameters		
		Direction	Score (pts)	Class	Score (pts)	
Biological Criteria						
Distance from a known spawning ground	0.5	Upstream	1	< 1,000 m	1	
		Downstream	2	≥ 1,000 m	2	
Distance from a known rearing area	0.5	Upstream	1	< 1,000 m	1	
		Downstream	2	≥ 1,000 m	2	
					Sub-total	
Human Criteria						
Distance from an existing fishing site	0.5	Upstream	1	< 500 m	1	
		Downstream	2	500 ≥ 1,000 m	2	
				>1,000 m	3	
Distance from the planned drinking water intake	0.5	Upstream	1	< 500 m	1	
		Downstream	2	500 ≥ 1,000 m	2	
				>1,000 m	3	
					Sub-total	
					Total	
					Rank	

(Appendix 4.4)

	Result for Each Evaluation Criterion for the Alternative Mine Effluent Discharge Points			
	1	2	3	4
	2,160 m	1,280 m	760 m	760 m
	1.0	**1.0**	**0.5**	**0.5**
	>1,000 m	>1,000 m	760 m	760 m
	1.0	**1.0**	**0.5**	**0.5**
	2.0	**2.0**	**1.0**	**1.0**
	690 m	> 1,000 m	750 m	1,170 m
	1.0	**1.5**	**2.0**	**1.5**
	920 m	1,220 m	3,480 m	1,730 m
	1.0	**1.5**	**3.0**	**3.0**
	2.0	**3.0**	**5.0**	**4.5**
	8.75	**9.24**	**8.98**	**10.17**
	4	**2**	**3**	**1**

Appendix 5: Estimated Fish Habitat Losses Associated with the Renard Project

Type of Work or Activity	Area m^2	Nature of the Loss
Subwatershed R_1		
Partial drainage (littoral zone) of lake F 3296 linked to the drainage of the pits and to the reduction of the area of its watershed due to the mine facilities	80	Destruction of feeding, nursery and spawning habitat for species including northern pike, pearl dace and white sucker.
Partial drainage (littoral zone) of lake F 3295 and drainage of its littoral zone linked to the drainage of the pits and to the reduction of the area of its watershed due to the mine facilities	730	Destruction of feeding, nursery and spawning habitat for northern pike.
Subwatershed R_2		
Partial drainage (littoral zone) of lake F 3298 linked to the drainage of the pits and to the reduction of the area of its watershed due to the mine facilities	670	Destruction of feeding, nursery and spawning habitat for species including brook trout.
Drainage of the lake F 3298 outlet, which will be diverted to lake F 3295 to dig pit R-65	3,880	Destruction of feeding, nursery and spawning habitat for species including brook trout.
Drainage of lake F 3303 to dig pit R-65	11,960	Destruction of feeding, nursery and spawning habitat for white sucker, pearl dace and brook trout. Fish mortality associated with drainage of the lake.
Subwatershed R_3		
Drainage of lake F 3302 prior to digging of pit R2-R3	25,000	Destruction of feeding, nursery and spawning habitat for pearl dace. Fish mortality associated with drainage of the lake.
Drainage of the lake F 3302 outlet prior to digging of pit R2-R3	1,100	Destruction of feeding habitat for pearl dace.
Subwatershed R_5		
Lowering of the water level of lake F 2607 and drainage of its littoral zone, linked to the drainage of the pits and to the reduction of the area of its watershed due to the mine facilities	2,160	Destruction of feeding, nursery and spawning habitat for species including brook trout.
Lowering of the water level of lake F 3300 and drainage of its littoral zone, linked to the drainage of the pits and to the reduction of the area of its watershed due to the mine facilities	200	Destruction of feeding, nursery and spawning habitat for northern pike.
TOTAL - Habitat Alteration, Disruption or Destruction		**45,780 m^2**

Appendix 6: *Migratory Birds Convention Act, 1994*

Pursuant to section 6 of the *Migratory Birds Regulations* available here: http://www.ec.gc.ca/nature/default.asp?lang=En&n=496E2702-1, no person shall disturb, destroy or take a nest, egg or nest shelter of a migratory bird or have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird except under authority of a permit thereof. The proponent must therefore be vigilant to comply at all times with these Regulations. Environment Canada points out that the purpose of identifying the key periods, from May 1 to August 15, is to reduce the risk of destruction of the nests of migratory birds during a period when the risk of incidental take is particularly high. The key breeding periods are presented for guidance only, and are intended to help the proponent determine the period when the risk is particularly high. This is not a "restriction period," just as there is no "authorized period." Environment Canada therefore cannot guarantee the proponent protection against any recourse or remedy under the *Migratory Birds Convention Act, 1994*, regardless of the scope of a given activity, the significance of the potential impacts on bird populations, or the nature of the mitigation measures taken.

Otherwise, Environment Canada does not recommend actively seeking nests.This activity can disturb and harm migratory birds, their nests and eggs. More information on incidental take is available at www.ec.gc.ca/paom-itmb/default.asp?=Fr&n=FA4AC736-1.

Appendix 7: Mitigation Measures Proposed by the Proponent

This appendix outlines the mitigation measures that will be implemented to limit the effects of the project. The information is organized under the same subheadings as those in section 7 on the assessment of environmental effects of the project. To avoid repetition some mitigation measures of a section may also be applicable to another section.

Air Quality

- Use of dust control agents on mine roads will reduce dust raised by vehicles transporting ore/processed kimberlite and mine supply vehicles.
- Use of mats to confine to the worksites dust propagation generated by blasting of surfaces;
- Positioning of power generating sets as far as possible from the temporary worker's camp to minimize exhaust gas concentrations within the accommodation and services complex area.
- For the processed kimberlite confinement area, sprinkling during dry weather in the locations where the kimberlite is stockpiled will reduce the probability of emission by wind erosion.

Water Quality

- The overall design of the mine site has been progressively optimized to minimize interference with the waterways and the hydrogeological regime of surface deposits;
- Mitigation measures will be implemented during the construction phase to reduce the quantity of runoff exiting the construction site to minimize contaminant transport.
- Wherever possible, the exploitation of borrow pits will be limited to the portion located above the water table. Therefore, no pumping will be required to drain borrow pits.
- Circulation of machinery and other vehicle will be limited to access roads rights-of-way and to work areas that have been previously identified.
- Hazardous materials will be managed in accordance with Regulation respecting hazardous materials (RSQ, c. Q-2, r. 15.2). Transportation of hazardous materials will be made in accordance with the Transportation of Dangerous Goods Act (RSQ, c. C-24.2, s. 622, para. 1-8), and the Regulation respecting biomedical waste (c. Q-2, r. 12), para. 1 to 8). Petroleum products will be managed in accordance with the Petroleum Products Act (RSQ, chapter P-29.1) (RSQ, chapter P- 29.1) and the Petroleum Products Regulation (RQ c. P-29.1, r.3) for material management and petroleum products;
- Minimize use of and use alternatives to hazardous materials;
- Storage areas for petroleum products will be equipped with a holding tank with a capacity at least 110% of the volume of the largest tank in order to contain leaks and spills;
- Barrel storage areas will be equipped with watertight dikes or other containment facilities, in order to contain the highest of the following volumes: 25% of the total capacity of all storage containers or 125% of the largest capacity;
- Establishment of procedures for spill prevention and response (e.g., containment structures, stormwater treatment in areas of storage and handling of fuel) and a emergency response plan for spills (procedures and methods of intervention);
- Any spillage will be immediately reported to the person responsible for the mine emergency response plan;
- The underground areas designated as permanent sites for routine maintenance activities, lubrication and refuelling will be covered with a concrete slab designed to

prevent the outflow of petroleum products or equipped with an automatic non-leak filling system;
- A permanent and easily accessible emergency kit for recovering petroleum products and hazardous materials will be present on site. Absorbents will be used to hold waste oil;
- Properly sealed and identified containers for receiving the waste contaminated petroleum products will be available;
- Oil contaminated absorbent materials will be disposed appropriately.
- Only processed kimberlite will be stored in the processed kimberlite confinement areas;
- If anthropic contamination of the overburden occurs or is suspected, this material will be characterized and its management method established in keeping with the most recent version of the MDDEP's Soil Protection and Contaminated Sites Rehabilitation Policy (Guideline 019).
- A percolating water catchment system, including drainage ditches around the waste rock stockpiles, will be built to channel the waters collected to the appropriate treatment facilities;
- A groundwater quality monitoring program will be implemented as required by Guideline 019;
- Additional observation wells will be developed in areas where the effect of water table drawdown may be greater;
- Water levels will be monitored in the observation wells during construction to validate modelling results;
- Certain stream flows will be monitored to check for potential flow variations following dewatering activities;
- A contingency plan will be developed once new data are acquired.
- If contaminants are observed in groundwater after mining operations closure, post-rehabilitation monitoring of groundwater quality downstream of the Processed Kimberlite Confinement (PKC) and/or overburden stockpile will have to be undertaken over a five-year period, as recommended in Guideline 019. Such monitoring will make it possible to validate numerical model predictions and prevent a loss of groundwater use following the mine closure.

Hydric regime

- Water from the bottom of the lake that is rich in suspended solids will be treated using Envirobags before being released into Lake Lagopede;
- Bottom sediment of dewatered lakes will be excavated in early winter to minimize sediment transport.
- The water management plan submitted by Golder (2011e) provides a network of ditches and culverts to collect runoff, as well as a water treatment plant to monitor water quality prior to release into Lake Lagopede.
- The waste rock stockpiles impact on the configuration of the site's natural sub-watersheds will be limited by the fact that, throughout the mine's service life, waste rock stockpiles will be returned into the ditches.
- To minimize the mine's impact on the site's hydrological regime during the operation phase, the water management plan provides for the water collected in open pit R-65's sedimentation basin to be pumped to the ore processing plant for reuse. By promoting recirculation of the site's water in a closed loop, water intake and effluent discharge in Lake Lagopede are minimized.

Surface water

- The footprint of the project was reduced to a minimum in order to reduce clearing;
- Do not establish a sandpit within 75 m of a lake or perennial stream or fish habitat, unless conditions comply with the Regulation respecting pits and quarries (Q -2, r. 7);
- Work area limits will be clearly identified

on site in order to strictly limit work to required areas;
- Control erosion and sediment transport toward streams and waterbodies by selecting strategies considering characteristics of the site and environmental conditions (e.g. silt fences, rockfill, geotextiles, straw bales, sedimentation ponds);
- No debris will be disposed of into the aquatic environment and any debris accidentally dumped will be removed promptly;
- Services areas and excavation and fill materials stockpiles will be cleared, and the topsoil layer will be set aside for the rehabilitation phase;
- Clearing, grading, and levelling will be executed, as far as possible, immediately before the beginning of infrastructure installation;
- Slopes will be stabilized as quickly as possible to prevent erosion;
- No levelling or excavation will be carried out near streams during flood periods or during heavy rain;
- Preventive stabilization work will be carried out if work must be suspended during the winter;
- Maintain and retain vegetation cover within a buffer strip of 30 metres from the natural high water mark;
- All drainage ditches that receive runoff from the construction site will be stabilized before construction activities begin and will be maintained until completion of the work;
- Install silt fences wherever soil will be disturbed and add additional barriers where there is a risk of fine sediment transport;
- Protect material storage areas (cement, sand, etc.) with plastic tarp for small areas and silt fences for larger areas;
- Dispose of backfilling soil in order to prevent runoff transport of fine particles toward streams or lakes;
- Within 60 m of a lake or a perennial stream, and within 30 meters of an intermittent stream, preserve the vegetation cover and stumps, except where a road will be developed (including roadway, shoulders and road embankment) and where backfilling is required for the road.
- Control erosion at source and reduce sediment transport to lakes or streams;
- Runoff will be deviated to a vegetated area located at a distance of at least 20 m from a lake or a stream measured from the natural high water mark;
- Slopes of an exploited surface of a sand pit will be of 30 degrees at most (from horizontal), to prevent erosion and land slumping;
- The water released into the environment by quarry or sand pit operation, or by crushing or screening processes will not include a contaminant concentration greater than 15 mg/l of oil, grease, or mineral originating tar , and greater than 25 mg / litre of total suspended solids.
- The pH of water released into the environment by quarry or sand pit operation, or by crushing or screening processes should be between 5.5 and 9.5, unless demonstrated that the pH value of the natural environment is outside of this range, as it is the case for the Renard Project area.
- Water from lake and stream dewatering will be treated by mobile treatment units in order to remove total suspended solids prior to release into Lake Lagopede.
- During work, respect as much as possible the terrain natural drainage and carry out appropriate measures to allow normal water flow;
- Construct a sedimentation basin for drainage ditches at least 20 m from the receiving stream and drain the basin when the height of water above the sediment is less than 30 cm on at least 50% of the area of the basin;
- Machinery streambed fording will be prohibited unless the necessary infrastructure has been installed and required authorizations obtained from the departments concerned. To cross a stream or a fish habitat, a bypass will be installed

and removed at the end of the work;
- After installation of a culvert, other structures required for the work will be removed out of the water; the contractor will ensure streambed inflow and outflow stabilization. The stream bed must then be restored to its natural profile and with similar substrate, and the banks stabilized and, revegetated when necessary;
- Place shallow channels or waterbars across secondary roads to limit erosion;
- When necessary, use the lower-third method for ditch maintenance.
- Waste material will be managed in accordance with current regulations (Regulation respecting the application of the Environment Quality Act(Q-2, r.3), Regulation respecting the landfilling and incineration of residual materials (Q -2, r.19), Regulation respecting the environmental and social impact assessment and review procedure applicable to the territory of James Bay and Northern Québec (Q-2, r.25), Regulation respecting the quality of the atmosphere (c. Q-2, r. 38), and Regulation respecting used tire storage (Q-2, r.20)).
- Containment and runoff treatment facilities will be installed within storage and fuel handling areas;
- Storage areas for new and used petroleum products will be provided with a containment platform of sufficient capacity to contain leaks and accidental spills;
- The underground areas designated as permanent sites for routine maintenance activities, lubrication, and refuelling will be covered with a concrete slab designed to prevent outflow of petroleum products;
- All mobile production equipment will be equipped with a system for express filling with overflow protection;
- Preserve a strip of land on the site perimeter to accumulate stripped organic matter;
- Remove and stockpile organic matter more than 20 m from a lake, stream or fish habitat in order to reuse it.
- Do not clean or wash machinery in a lake, stream or fish habitat or less than 60 m from them, or park machinery or travel in it on the plant cover less than 30 m from streams, measured from the high water mark;
- If possible, limit heavy machinery traffic to firm soil in order to avoid rut formation. Give precedence to machinery with tires or wide tracks;
- At worksite exits, make sure to install gravel zones to reduce sediment input on roads.
- Regularly optimize the blasting pattern and explosives volume to minimize explosives residues;
- Use best practices to handle explosives and fill blasting holes;
- Thoroughly clean accidental explosives spills.
- The mine tailings accumulation area will be located at least 60 m from the high water mark of any stream or body of water;
- Only the materials intended for the waste rock and overburden stockpiles and the processed kimberlite confinement area will be disposed of in these sites;
- At least once a season, visits will be conducted to monitor confinement structures' and related structures' physical stability. A log reporting on these visits will be kept updated and will be accessible at all times;
- In addition to monitoring water quality downstream of the work, a visual lake water quality monitoring program will be carried out during the work so as to be able to react quickly in case of unexpected sediment inputs;
- Minimize runoff areas representing potential sources of contaminants (e.g. by limiting impermeable surfaces);
- Reduce peak flows (e.g. channel waters to retention basins during peak flows) to avoid treatment station overflows;
- Wastewater treatment facilities and septic facilities will be operated in keeping with current regulations.

- Gasoline and oil separators in the mechanical workshops and grease separators in the kitchen will be maintained systematically and regularly.
- To limit propylene glycol dispersion, all de-icing activities will be grouped together in a single location and small quantities estimate at about 1,000 litres per year will be used;
- To ensure that neighbouring lakes and streams are not contaminated or that there is an impact on the dissolved oxygen concentration associated with the use of propylene glycol, analysis of this compound and of the dissolved oxygen and DBO5 levels in surface waters downstream of the airstrip will be included in the surface water quality monitoring program.

Fish Habitat

- Reduce traffic speed limits to minimize soil erosion and dust emission toward hydrological network;
- Perform work during low flow periods and in respect to the timing windows for fish. A timing window will be applied for work to be performed in water. Thus, stream diversion and small lake dewatering as well as culvert installation will be done outside the spawning period of brook trout, i.e. between September 1 and November 1. Regarding the installation of the outfalls in Lake Lagopede, work will be done between May 30 and August 31 to protect spawning of northern pike and white sucker during springtime, as well as lake trout and whitefish during fall.
- Permanently dispose of clearing materials or debris (trees, stumps, shrubs, branches, brush, dead wood and other plant debris) at a distance of at least 60 m away from the bank of a lake or a stream or any flood plain, marsh, swamp, or bog;
- If absolutely necessary to clear within 20 meters of a stream, cut trees manually and dispose of woody debris outside of the natural high water mark. This will prevent the tree from falling in streams and water bodies and maintain soil integrity by protecting it from the passage of machinery;
- Runoff will be directed to temporary sedimentation basins until the construction of the sedimentation pond that will be located at pit R-65;
- Always control erosion at the source and slow runoff velocity in order to reduce erosive force;
- Promote soil infiltration of runoff from work areas;
- Limit clearing to a strict minimum in the field, i.e. only to the exact location of the river crossing;
- Install culverts as recommended by the Best Practice Guide for the design and installation of culverts under 25 m (DFO, 2010).
- Ensure the free flow of water at all times to maintain the functions of fish habitat downstream from the construction zone. Take the necessary measures to prevent and limit impacts (e.g. flooding, dewatering, erosion, sediment transport, etc.) upstream and downstream from the work area;
- Design the temporary diversion of streams (if required) to withstand floods that may occur during the construction period; stabilize adequately to prevent erosion and sediment transport downstream and to maintain the free passage of fish.
- Maintenance and cleaning of machinery, its refuelling, and mechanical checkups will be conducted in stable and safe locations that are more than 60 m away from streams, lakes or other water bodies ;
- Storage areas for hazardous materials and petroleum products will be equipped with a containment platform of sufficient capacity to contain leaks and spills;
- Lower the lake level slowly, so that the fish are concentrated in the deepest poolsof the lake;
- Capture all the fish with the help of seine or a trap net;
- Relocate the fish in a lake nearby with similar fish populations;
- If a bypass is necessary, minimize the

length of the diverted section;
- Redevelop the streams by reproducing the original features (natural shorelines with native plant species, size, slope, and identical width);
- Plan the reprofiling of the bank slope (if required) to ensure stability;
- Provide a section of preferential flow ("thalweg") in the substrate of the bed of the stream and ensure the free passage of fish;
- The diversion structures will not obstruct fish passage and will not shrink the width, measured from the high water mark, of the habitat by more than a third;
- Choose the proper stream bed substrate consisting of a natural granular coating to ensure optimal flow;
- Limit rockfill on stream banks to the height of the natural high water line, and create a vegetation buffer from the edge of the rockfill using recognized bioengineering techniques, promoting undercut strata of herbaceous plants, shrubs, and trees.
- Grating openings can be round, square, rectangular, or any combination thereof, but should not have any protrusions that could injure fish; The materials used will be resistant to corrosion and UV rays, including brass, bronze, aluminum, monel, galvanized or stainless steel, and plastics; Guide openings and joints will be smaller than the criteria for structures needed to prevent fish passage; Gratings will be positioned at least 300 mm from the lake bottom to prevent entrainment of sediment and benthic organisms; A support structure will be fitted onto grating panels to prevent them from sagging or collapsing.
- Clauses in the contracts of workers and contractors will prohibit fishing on the site.
- Reduce the footprint of facilities and infrastructure as part of the design phase to minimize the loss of terrestrial habitat and wetlands;
- Limit the number of affected sub-watersheds to prevent impacts on the hydrological regime of wetlands;
- Limit to a strict minimum the stripping, clearing, excavation, backfilling and grading of work areas in order to respect the natural topography and prevent erosion;
- Prohibition to dispose of any debris or any wood waste in floodplains and wetlands such as swamps and bogs, even outside the areas directly affected by the work;
- Limit and control the risks of forest fires during construction;
- The contractor must comply with guidelines governing the use of explosives in or near Canadian fisheries waters;
- It is prohibited to use ammonium nitrate or fuel oil in or near fisheries waters due to the production of toxic by-products (ammonium hydroxide).
- For the closure phase, gradual flooding of pits to avoid resuspension of pariculate matter;
- For the closure phase, create hydraulic connection with the natural environment to ensure free passage of fish.

Birds and Habitat

- Preferably, start pumping water after the breeding season (mid August) to allow reproduction for another year;
- Install nesting boxes for the common goldeneye around Lake Lagopede and other nearby lakes to maintain the number of waterfowl breeding pairs in the mine area.
- Make users aware of the need to avoid circulation of small crafts in sheltered bays, which are potential areas for common loon nesting and brood rearing in the spring and summer.
- Avoid disturbance and stripping of the ground in areas where only trees must be cut in order to maintain attractiveness of these zones as hunting areas for red-tailed hawks and other species of this group.
- Clearing of sites will be done mostly in autumn and winter, or outside of the peak of the forest bird breeding season, which extends from May 1 to August 15 for the sector, as recommended by the Canadian Wildlife Service (CWS);

- Dead, fallen trees and low shrubs will be preserved wherever possible in areas where soil will not be disrupted, particularly in the airstrip area.
- Plant species preferred by the Canada goose will be prioritized for sowing at the closure phase.
- At least one conductive wetland site should be developed to replace at least one of those lost in the construction phase. Wetland development should be included in the drainage restoration plan for the site. Wetlands could be integrated to stream banks restored (for instance, F3298V) in areas where slopes are low.

Mammals and Habitats

- When possible, keep a protective cover by making a partial cut to reduce the impact of land clearing and habitat fragmentation.
- Circulate with machinery only in areas to be cleared. Circulation of machinery is prohibited along banks and riparian areas where clearing, if required, should be done manually.
- Road design and management to limit the risk and frequency of traffic accidents (e.g. cutting vegetation at large curves in order to allow drivers of vehicles to see the animals);
- Ensure that beavers affected by construction activities are trapped by Crees or captured alive during the summer, and then relocated in suitable habitats.
- The abrasives used for winter road maintenance will be limited to sand and gravel unless there are exceptional circumstances.
- Make workers aware that it is important not to feed the animals and leave food out in order to prevent attraction of fur-bearing animals near the work areas. Awareness programs can be done through posters and information sessions;
- Develop a plan to protect wildlife to reduce poaching opportunities.
- Install appropriate fences to exclude large mammals from the camp, the hazardous materials storage areas and the trench landfill;
- Make land users aware of the effects of illegal harvesting, poaching, accidental slaughtering, and overall disturbance of woodland caribou;
- If applicable, document the movements of woodland caribou on the property using opportunistic observations, aerial surveys or GPS collars placed on the woodland caribou.
- As far as possible, avoid tourism-related low-altitude flights in order to limit the impact of this disturbance on wildlife.
- Shut down and rehabilitate sites used temporarily during the construction phase.
- Install an electric fence to keep bears away from the trench landfill site;
- Regularly backfill buried waste;
- Place waste in sites or containers so as not to attract wildlife.
- During progressive rehabilitation of construction sites, apply appropriate sylvicultural practices (maintain habitat's coniferous characteristics) to promote the return of Woodland Caribou habitat.

Use of the Territory and Natural Resources

- Recognize and respect the role of M11 trapline users in the traditional and contemporary management of natural resources in the environment;
- Keep land users informed of the anticipated progress of construction and its location to ensure user safety during more dangerous operations (e.g. blasting) and agree with users about any accommodation deemed necessary;
- Reduction of noisy activities (e.g. travel by helicopter or ATV) on certain portions of the territory during waterfowl and moose hunting periods;
- Ensure that the development of the mine

does not interfere with any navigation or snowmobile trails;
- Establish appropriate signboards at locations where snowmobile trails and all-terrain vehicles paths intersect with the mine roads and access roads;
- For workers, develop an awareness program in relation to Cree culture and land use on M11 trapline;
- Fishing, hunting, and trapping will be prohibited on the site by clauses in the contracts for workers and contractors;
- A safety zone will be established around the project site where the practice of hunting, fishing, and trapping will be suspended;
- Compensate disturbance caused to the tallymen, whose base camp is located east of the airstrip. Discussions between the two parties are underway to relocate the camp in an equally suitable area of the trapline.

Appendix 8: Additional Mitigation Measures relating to Fish and Fish Habitat, Proposed by Fisheries and Oceans Canada

General Measures

- Prohibit all quarries, sand pits and waste or disposal sites within 20 metres of the ordinary high water mark of all rivers and streams. Ensure that their presence does not have adverse effects on fish habitat (suspended sediment loading, changes in drainage, etc.).

Sensitive Periods

- Perform the work during the low-water period and observing the fish timing windows. Work such as diverting rivers and streams, draining lakes and installing culverts will be carried out outside the brook trout spawning period, from September 1 to November 1. The work to install outfalls in Lac Lagopède will have to be carried out between May 30 and August 31 to protect the spawning of northern pike and white sucker in the spring as well as the spawning of lake trout and lake whitefish in the fall.
- Submit in advance justification for each case where application of the mitigation measures associated with the above-mentioned sensitive periods would be impossible or in the opinion of the proponent not warranted. Where applicable, this justification must be accompanied by an action plan outlining the mitigation measures adapted to the time of the year that would be implemented in order to meet the fish habitat protection objectives (free passage of fish and stability of temporary structures).

Drainage of Fish Habitat for the Purpose of Mining the Open Pits

Drainage of lakes F 3302 and F 3303

- Before the beginning of the lake fisheries, take measures to minimize fish mortality, for example by installing fish barriers at the outlets of Lakes F 3302 and F 3303 in order to prevent access of fish to the future dewatered sections.
- Capture the fish present in the outlet of F 3302V and transfer the living individuals to a water body with similar fish communities.
- During draining of the lakes, take all necessary measures to prevent suspended sediment from being released into the receiving aquatic environment (e.g. equip the pumps with a float system and keep the pumps away from friable banks, build sedimentation ponds for the pumped water with sufficient capacity and resistant to high-water events, etc.).

Diversion of stream F 3298V

- Install a fish barrier upstream of the stream in order to prevent fish from lake F 3298 from entering the future dewatered section.
- Install a fish barrier downstream of the future dewatered section of the outlet to prevent fish from Lac Lagopède from migrating there.
- Take all necessary measures (e.g. hydroseeding, stabilization of bank slopes and of the bed of the new stream, etc.) in order to prevent suspended sediment loading during filling of the new channel.
- Select the proper substrate for the stream bed in order to ensure optimal flow above the substrate by minimizing interstitial flow, i.e., minimize water loss through the substrate.
- Ensure free passage of fish by avoiding

excessive slopes and impassable barriers. However, configure the future diversion channel of stream F 3298V to prevent the migration of northern pike from lake F 3295 to lake F 3298 in order to protect the brook trout population.

Changes to Water Inflow into Fish Habitats and Associated Effects

Declines in lake water levels and flows

- Take all appropriate measures to minimize the anticipated changes in water depths and flows in the lakes and their outlets where hydraulic changes are anticipated following application of the water management plan for the mine site.
- Take all necessary measures to maintain the free passage of fish between Lac Lagopède and the tributary of lake F 3301 (free passage of northern pike and brook trout to lake F 3300; free passage of brook trout to stream F 3301M) following application of the water management plan for the mine site.

Fine Sediment Loading and Deposition in Fish Habitat

Discharge of effluents in Lac Lagopède

- Take all appropriate measures and use all appropriate technologies to ensure the long-term protection of fish habitat in Lac Lagopède and in particular minimize the fine sediment deposition on the lake trout spawning ground.

Control of erosion and sediment re-suspension

- Take all necessary precautions to prevent any transport of fine sediment into the aquatic environment beyond the immediate work area.
- Construct ditches along the temporary roads and work areas in order to direct runoff to sediment capture structures.
- Install a sufficient number of berms, sediment barriers, sediment retention ponds or sediment traps in the work areas to prevent the transport of sediments into the water. However, outside the work area, none of these structures must be installed in fish habitat. These structures must be functional at all times.
- Channel drainage ditches toward areas of stable vegetation in order to prevent sediments from being transported into the aquatic environment. If the drainage ditches cannot be diverted or if the vegetation is too sparse, potential sediment loading from structures must be controlled by an appropriate and effective system in order to prevent leaching.
- Avoid leaving reconfigured and denuded areas without erosion control measures, particularly on slopes. If a period of time is required for permanent stabilization, erosion control measures must remain in place in order to prevent erosion and capture any eroded material.
- Do not carry out any earth moving or excavation work near rivers or streams at high water or during heavy rains.
- Plan adequate sediment control measures during temporary closures of the work site (evenings, weekends, holidays) based on weather forecasts.

Temporary Works

- Ensure, at all times, the free circulation of water and a sufficient volume of water to maintain fish habitat functions (feeding, nursery, spawning and migration) downstream of the work area. Take the necessary measures to prevent impacts (e.g. flooding, drainage, suspended matter, erosion, etc.) upstream and downstream of the work area.

- Encourage the use of cofferdam types that minimize encroachment on fish habitat.
- If the use of stone cofferdams is justified, build them with clean granular material, and preferably install a membrane to ensure that the structure is watertight.
- Temporary works must be protected from erosion using stabilizing material, for example a suitable geotextile membrane or riprap. The works must also be designed to withstand any high-water events that may occur during the work period.

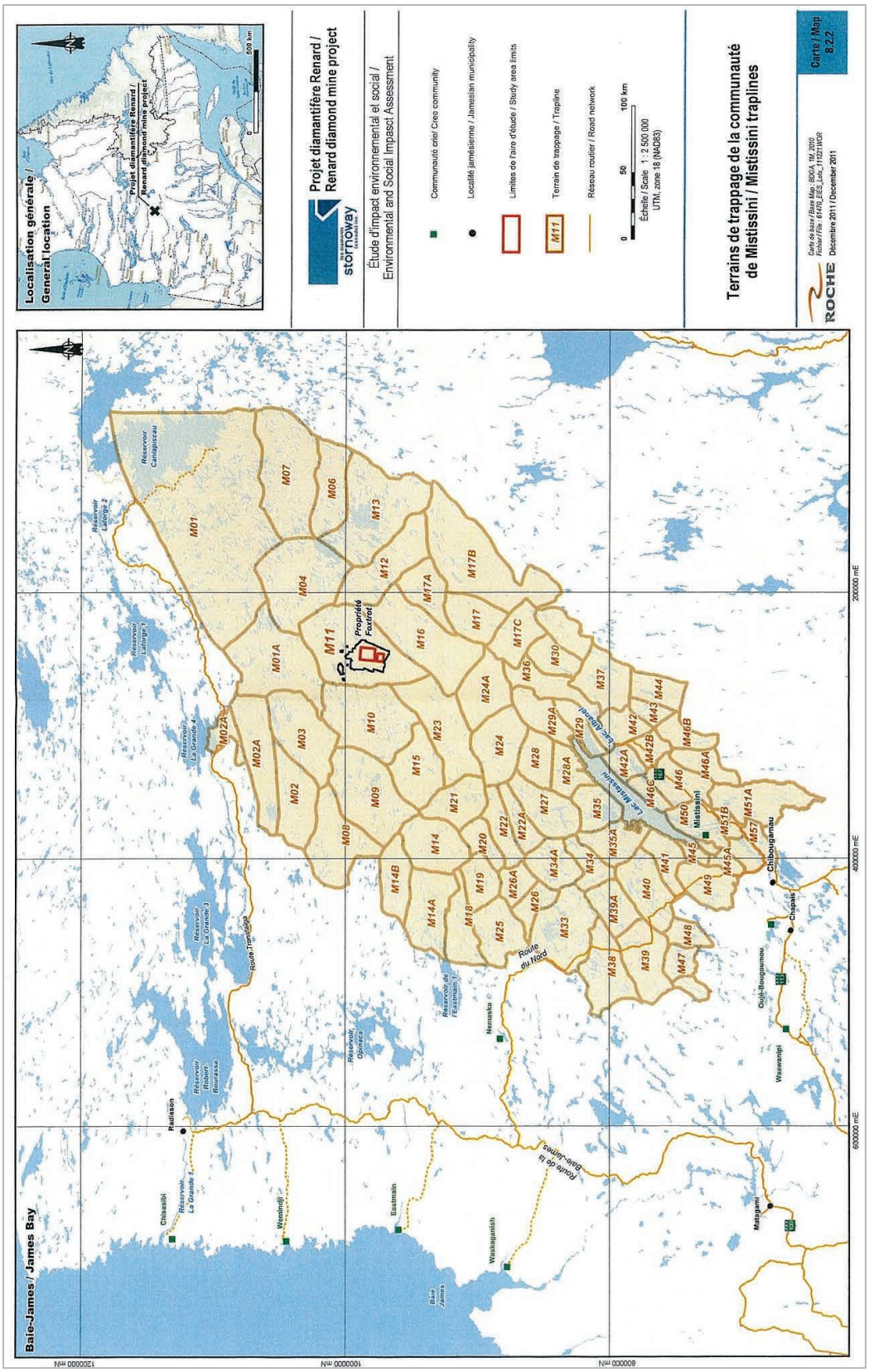
Culvert Construction

- DFO recommends using the criteria and measures set out in the document entitled "*Lignes directrices pour la conception de traversées de cours d'eau au Québec*" (see Chapter 7 for culverts under 25 m) for the design of crossings in rivers and streams where the free passage of fish must be ensured.

Blasting

- Blasting operations must comply with the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Can. Tech. Rep. Fish. Aquat. Sci. 2107, Wright and Hopky, 1998). If unable to comply with these guidelines, the proponent will have to apply for authorization under section 32 of the *Fisheries Act*.

Appendix 9: Mistissini Traplines



Appendix 10: Focus of the Follow-up Program

Valued Ecosystem Components	Objectives and Approach	Timetable and/or Frequency
Air Quality	● Submit new modelling of atmospheric emissions. ● In its air quality and atmospheric emissions monitoring program, the proponent will have to: ○ Verify the potential deposition of dust from non-point sources (e.g. from the processed kimberlite containment area) in the surrounding lakes, particularly Lac Lagopède and lake F 3298, in order to validate the results of the atmospheric dispersion model (AERMOD); ○ Implement corrective measures depending on the results of the follow-up.	Before the start of mine operational activities Entire life of the mine and during site closure and rehabilitation
Surface Water Quality	● Ensure that the mine and domestic effluent treatment systems perform effectively ● Prevent trophic level changes in Lac Lagopède as a result of excessive nutrient loading (minimize phosphorus loading) ● Avoid sediment loading which could affect the quality of the environment ● Implement a program to monitor the quality of treated effluents and surface water based on various references including provincial requirements (Guidelines 019, EDO), the MMER (Metal Mining Effluent Regulations) and the protocol on metal mining environmental effects monitoring (Environment Canada, 2011) ● Implement corrective measures depending on the results of the follow-up	Entire life of the mine and during site closure and rehabilitation
Fish and Fish Habitat (Free Passage)	● Assess the maintenance of conditions for free passage of fish upstream between Lac Lagopède and the tributary of lake F 3301 ● Implement corrective measures depending on the results of the follow-up	Will be specified in the conditions of the permit issued by Fisheries and Oceans
Fish and Fish Habitat (Habitat Conditions under Lowered Lake Water Levels)	● Assess the maintenance of conditions conducive to the species present in lake F 3298 ● Implement corrective measures depending on the results of the follow-up	Will be specified in the conditions of the permit issued by Fisheries and Oceans
Fish and Fish Habitat (Changes to Hydraulic Conditions)	● Assess the maintenance of hydraulic conditions suitable for brook trout spawning and egg incubation on the natural spawning ground in the tributary of lake F 3301 and on the spawning grounds developed at the lake outlet (see follow-up of the compensation program) ● Implement corrective measures depending on the results of the follow-up	Will be specified in the conditions of the permit issued by Fisheries and Oceans
Fish and Fish Habitat (Compensation Works)	● Provide a baseline if required ● Meet the stated compensation objectives ● Confirm the integrity and effectiveness of the compensation works ● Implement corrective measures depending on the results of the follow-up	Will be specified in the conditions of the permit issued by Fisheries and Oceans Canada
Birds and Bird Habitat	● Document, through environmental monitoring reports, the presence of nests of migratory birds and species at risk, particularly the olive-sided flycatcher, and the actions taken to protect these species in accordance with the measures specified in section 7.6.2	During the pre-construction and construction periods