Niobec
UNE COMPAGNIE D'IAMGOLD

Expansion project of the Niobec Mine in Saint-Honoré

Environmental and social impact assessment

Revised based on the *Canadian Environmental Assessment Act*

Summary

March 2013

NOTE TO THE READER

The environmental and social impact assessment – Revised based on the Canadian Environmental Assessment Act of the expansion project of the Niobec Mine in Saint-Honoré includes the following volumes:

→ Rapport principal, volume 1

→ Rapport principal, volume 2

→ Annexes, volume 1

→ Annexes, volume 2

→ Résumé

→ Summary

These documents benefit of being read and consulted together.

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Summary

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1 INTRODUCTION

1.1 Presentation of the project proponent and its consultant

1.1.1 Proponent

Niobec Inc. (hereinafter Niobec) is a company duly incorporated in the terms of its charter and the *Canadian Business Corporations Act*. In the late summer of 2011 Niobec became an independant company and its sole shareholder is IAMGOLD Corporation. Since 1976 Niobec has operated an underground niobium mine known as the Niobec Mine. The company's contact information, whose representative is Mr. Thierry Tremblay, is as follows:

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1.1.2 Consultant

The mandate of this environmental and social impact assesment (ESIA) has been entrusted by Niobec to GENIVAR Inc. (hereinafter GENIVAR).

GENIVAR is a Canadian company which was founded in Québec more than 50 years ago. Since its partnership with WSP in 2012, it is one of the largest professional service firms in the world. GENIVAR has completed many projects in the mining sector, including environmental baseline studies, environmental impact studies, environmental monitoring plans and environmental management plans. GENIVAR's headquarters are in Montréal, Québec and has several regional offices, including Saguenay. The office responsibe for the ESIA, whose representative is Mr. Martin Larose, can be contacted at the below information:

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1.2 Project location

Expansion of the Niobec project will be carried out in the Saguenay-Lac-Saint-Jean region, Québec, within the boundaries of the regional county municipality (RCM) of Fjord-du-Saguenay. Specifically, it is located in the municipality of Saint-Honoré (Map 5-1). The expansion project is planned on the currently operating Niobec site (48°32'3.85"N, 71°9'3.62"W) as well as on land nearby. The mine site is located at 3400 Columbium Road.

1.3 Land ownership and exploration rights

The Niobec property in Saint-Honoré covers approximately 403 ha. It covers the location of the underground mine, existing ore processing facilities and tailings. The other properties are located along the Shipshaw River at the location of the water intake installed in 2012. Niobec holds two mining leases (BM 663 and BM 706) spread over 10 plots of land with a total area of approximately 130 ha for the operation of a mine. The lands needed for the proposed expansion are currently partly leased by Niobec. In October 2012, Niobec held 170 claims at the periphery of the existing mine site with a total area of approximately 7639 ha (MRN 2012). It should be noted that a small part of the Niobec property is not leased or under mining claim.

The proposed expansion of the Niobec projet would be carried out in part on the existing mine of Niobec and in part on intramunicipal public lands (IPL) in Saint-Honoré and Saguenay and nearby private lands.

2 REGULATORY FRAMEWORK AND ENVIRONMENTAL ASSESSMENT PROCESS

2.1 Background and project rational

2.1.1 Global market of niobium

Niobium is a soft and rare transition metal used in the production of high-quality steel. It is an alloy that gives outstanding properties to the materials to which it is added. Steel containing Niobium has several desirable qualities that make it attractive for the automotive, shipbuilding and piping industries. Steel containing Niobium is more corrosion resistant, stronger, and lighter than pure steel.

Approximately 90% of the world's supply of Niobium is found in the ferroniobium form. It has a low density compared to other refractory metals and has superconducting properties. Virtually all of the world's supply of Niobium is a derivative of pyrochlore and comes from three major producers: Companhia Brasileira de Metalurgia e Mineração CBMM (84.3%), Niobec (8.6%) and Catalão (Anglo American) (6.1%).

The global demand for ferroniobium has increased at a compound annual growth rate of (CAGR) of 10% between 2000 and 2010. The largest consumers of Niobium are: China (25%), North America (21%) and Europe (24%). Since the demand for high-quality steel products by end users has increased, steel mills are forced to increase the Niobium content of their product in order to produce steel capable of achieving the higher standards. It is anticipated that growth in the Niobium market will continue in both the short and long term, while emerging markets will continue development of applications for higher quality steels are developed.

In early 2000s, the price of Niobium remained relatively stable, ranging between $12.00 USD/kg and $13.50 USD/kg. Given the significant economic growth of emerging markets, the price of Niobium grew rapidly in 2007 to $32.63 USD/kg and has remained above $30.00USD/kg since. It is expected that the price of Niobium will continue to increase in the short term and will reach and remain at $45 USD/kg. Some analysts are more optimistic, prediciting a long-term price of $50 USD/kg.

2.1.2 Regional and local context

Construction of the Niobec Mine, the only mining exploitation within the study area, started in 1974 and in 1976 the mine produced 1 500 tons per day. Since 1994, Niobec has become a truly diverse mining and integrated metallurgical company, which has allowed it to rank among the world producers of ferroniobium. In 2012, Niobium production at the Niobec Mine reached 2.2 metric tonnes (MT).

The recent increase in the price of Niobium combined with increased global demand changes the future perspectives of Niobec. Consequently, in an effort to make the most of the deposit, mineral resource extraction at the site was increased by 691%. The IAMGOLD Corporation has decided to move forward with an expansion project

to increase the production at the Niobec Mine to 10 metric tonnes per year (MTPY). Residual life of the mine would exceed 40 years.

The arrival of the Niobec Mine in Saint-Honoré had major economic benefits for the municipality and region. Overnight, Saint-Honoré became the North American capital of Niobium and with that came an important economic boost with the arrival of the mining industry. The announcement of the expansion project is well received within the municipalities of the study area.

2.1.3 Project integration context

Currently the Niobec Mine, along with its future facilities, is easily accessible by existing, paved roads and will be even easier with the construction of a new acces road proposed by Niobec in collaboration with the Municipality of Saint-Honoré. The latter will be constructed prior to the expansion project and is advantageous as it will divert mine-related traffic from residential roads.

The current expansion project is planned in an area of of the Municipality of Saint-Honoré, which is sparsely populated. Some residences are located near the future industrial facilities, but they will be acquired by Niobec. The surrounding environment is partially forested, which will provide a more aesthetically pleasing view, especially where tailing ponds are located. The surrounding land is used for agricultural purposes (i.e., crops, including potatoes and blueberries), however the best agricultural land in the municipalities will not be directly affected by the expansion project. The expansion proct will however, affect lands dedicated to the development of cranberries, blueberry fields and blueberry forest projects. Several recreational trails (e.g., snowmobile, ATV) will also be affected by the project.

The project does not encroach on any land used by the Innu of Masteuiatsh community, even if the study area is part of the territory claimed (Nitassinan) by this community, like much of the Saguenay-Lac-Saint-Jean Region (see Chapter 4 for details).

With respect to the natural environment, the expansion (mainly tailing ponds) for various technical reasons and necessary spaces close to its current facility, cannot avoid encroaching on existing wetlands.

2.2 Environmental assessment procedures and regulations

2.2.1 Environmental assessment procedures

2.2.1.1 Federal legal framework

Under the Canadian Enviornmental Assessment Act (CEAA (2012)), physical activities listed in the Regulation identify "designated projects" that may require an environmental assessment. The physical activities that describe the project in whole or in part are the following:

8. The construction, operation, decommissioning and abandonment of a facility for the extraction of 200,000 m^3/year or more of groundwater or an expansion of such a facility that would result in an increase in production capacity of more than 35%.

16. The expansion of : (a) an existing metal mine, other than a gold mine, that would result in an increase in its ore production capacity of 50% or more, or 1,500 t/d ore more, if the increase would raise the total ore production capacity to 3,000 t/d or more; AND (b) an existing metal mill that would result in an increase in its ore input capacity of 50% or more, or 2,000 t/d ore more, if the increase would raise the total ore input capacity to 4,000 t/d or more.

2.2.1.2 Provincial

Section IV.1 of the EQA (R.S.Q., c. Q-2) requires any person or group to follow an environmental impact assessment and review procedure before undertaking a project under the environmental impact assessment and review Regulation (R.R.Q., c. Q-2, r. 23). The project is located south of the James Bay and Northern Québec Agreement (JBNQA) terrority and only Chapter 1 of the EQA applies.

The main articles of Chapter 1 relating to environmental permits and authorization certificates are Sections 22 (general case), 31.1 (environmental impact assessments), 32 (drinking water and domestic wastewater), 48 (air emissions) and 55 (solid waste management).

The list of projects subject includes:

n.8) the construction of a metalliferous ore or asbestos ore processing plant with a processing capacity of 7 000 t/d or more AND p) the opening and operation of a metalliferous mine or asbestos mine that has a production capacity of 7 000 t/d or more.

The expansion project will allow a production of approximately 27 400 t/d. It is therefore subject to the environmental impact assessment and review.

2.2.2 Permits and authorizations

Upon completion of the environmental assessment process, ie., after receipt of the environmental MDDEFP approvals (decree issued pursuant to Section 31.5 of the EQA) and the federal government approvals under the CEAA, Niobec may submit plans and specificiations in connection with applications for authorization and permits for construction. In addition to the mitigation measures within the ESIA, the final design must comply with the applicable standards regarding projected equipment and infrastucture. The preparation of the plans and specifications will need to register within the legal framework for the Government of Québec and Canada.

Before construction can begin, Niobec must obtain permits, authorizations, approvals, certificates and leases required from provincial, federal and municipal officials.

3 PROJECT DESCRIPTION

The Niobec Mine expansion project aims to triple the rate of production of ferroniobium from the currently mined deposit. More specifically, it involves changing the extraction method in order to achieve the desired production rate. With the expansion, mining will remain underground; however, the method used for the last 36 years will be replaced by the block caving method, which is capable of producing large volumes of ore at a low cost.

The project also involves the construction of new production facilities, including two mine shafts, concentrator, converter, service buildings, tailings pond and new services (such as water, sewer and electricity). The buildings currently used for Niobec will be dismantled as part of the expansion project. Once the expansion is complete, the ore processing activities will essentially be the same as the current actvities.

3.1 Improvements to the project in the context of sustainable development

The following paragraphs summarize the major sustainable development initiatives that have been or will be included in the expansion project. Several of these initiatives directly or indirectly arise from the consultation process.

Prevention of pollution upstream of the expansion project – Construction of a direct access road

The constultation process identified traffic and heavy vehicles associated with current Niobec activities as the main nuisance to the community. To eliminate the problem at the source, Niobec, in partnership with the Saint-Honoré Municipality, intends to develop a new direct access road to its existing and future expansion project facilities, which will be north of the expansion project. Thus, the new access road will be constructed along 7th Rural Road to the junction of Martel Boulevard.

Responsible land occupancy

As part of the expansion project land, acquisitions by Niobec are essential as the current property is too small to accommodate the new production facilities and tailings ponds. Mindful of the devitalization of the mining sector, Niobec seeks to occupy the territory in a responsible manner by using the land compactly and promoting synergy between the various components of the project. Thus, several social and environmental factors were considered in order to make an informed choice for the location of the major elements of the project.

3.2 Comparison and selection of project variants

3.2.1 Status quo “no expansion” variant

Niobec wants to carry out its expansion, at medium-term, as the profitability of the mine at current operations, which employs 460 people, is threatened. As the global

demand for Niobium is increasing and the rate of production of competitors is also growing steadily it is essential that Niobec increases its production capacity. With the status quo, Niobec will rapidly lose its market share and become a marginal global player, thus weakening the company. In addition, by maintaining the current extraction methods, the Mine's life expectancy is less than 20 years. With the expansion project, the life of the mine would exceed 40 years. The status quo would also eliminate the economic benefits associated with the expansion project. Therefore, the expansion project is absolutely necessary to ensure the sustainability and competitiveness of the mine.

3.2.2 Change in the method of operation variant

In early 2011, GENIVAR conducted a study on the expansion of Niobec Mine which explored a variety of different extraction scenarios in order to guide the work of the prefeasibility study.

Some scenarios have proved unsatisfactory in terms of financial viability. Based on the results obtained during the preliminary study, it was concluded that in order to improve the profitability of the Mine, major changes were needed. There are few extraction methods that allow a high output with a low operating cost. Thus, in the prefeasibility study, the block caving method and open pit were both studied in more detail on the basis of the five pillars of decision-making inspired by the principles of sustainable development which include the following: health and safety of workers, technical feasibility, and environmental, social and economical aspects. Based on the conclusions of the prefeasibility study the block caving method was selected as the most advantageous option.

Description of the chosen variant: block caving method

Block caving is one of the most cost-effective mining methods as the production costs are comparable to those of open pit mining. However, the deposit must meet specific geotechnical criteria. Operating conditions, particularly with regards to the capacity of the mineralized zone to disintegrate under the influence of induced pressure and gravity, often limit the use of the mining method around the world. Several analyses were conducted which confirmed the applicability of this method for the Niobec deposit.

The block caving technique builds on the strengths of nature where blocks of the ore deposit detach and break into smaller fragments that be manipulated and brought to the surface.

3.2.3 Benefits of the extraction method selected

In terms of sustainable development the underground method has major advantages over the open pit and compared with the current method of underground mining.

Reducing the footprint

Although the block caving method will one day cause the formation of surface subsidence, the resulting footprint will be much smaller than that which would have

been associated with an open pit mine. The prefeasibility study was used to estimate the open pit mine with a diameter of approximately 1 700 metres while the area of subsidence resulting from block caving would only reach a diameter of 1 300 metres. The footprint area from block caving will be 40% less than a footprint of an open pit mine that produces the same amount of ore.

In addition, in order to develop an open pit mine, blasting, excavation and the transportation of a large amount of rock called tailings would have been necessary. Indeed, the proposed open pit mine would have a waste rock/ore ratio of 2 to 1. It would be necessary to store this material in waste rock piles occupying a large area. With the block caving method, only the ore extracted from the ground will be generated during the operational phase. As a result, it is estimated that this method can reduce the total ground footprint by a factor of three.

Reducing impacts on the community

The extraction method selected will have less impact on the community because of this reduced footprint. The number of private and public properties to be acquired for the expansion project will be well below what is required for an open pit mine. In addition, the absence of waste rock piles eliminates impacts caused by trucking hundreds of millions of tons of rock and the impact on the landscape from these activities.

Reducing the risk of accidents at work and occupational diseases

The current extraction method of the Niobec Mine results in open stopes. These stopes will be abandoned and the potential construction of an open pit mine could present a risk of collapse and associated occupational accidents. This risk was considered too high for Niobec. This risk is non-existent with the block caving method as work will be located under the open stopes.

Reducing the carbon footprint

The change in extraction methods will be beneficial to the carbon footprint as compared to the current method. The distance traveled by underground loaders is limited to 400 metres per cycle underground. Electric trains and a conveyor system will be employed. The ore will be hoisted by a hydroelectric-powered machine. These elements have a very positive impact of the carbon footprint.

3.3 General description of the deposit

The Niobec deposit is located in the southeastern part of the alkaline complex of Saint-Honoré and has an oval shape of 6 km by 8 km. The intrusion covers an approximate area of 15 km^2. The deposit is almost entirely covered by a layer of Ordovician Trenton limestone with a thickness up to 70 metres.

The main minerals in the Niobec deposit are carbonates (65%), oxides (magnetite, hematite) (12%), silicates (biotite, chlorite) (11%), apatite (10%), sulfides (1%) and fluorite, barite and zircon (1% collectively). Halite, commonly known as sodium chloride, is also present in the deposit with concentrations up to 3%.

The two niobium bearing minerals present in the deposit are pyrochlore ($(Ca,Na)_2(Nb,Ta)_2O_6(OH,F)$) and columbite ($(Fe,Mn)(Nb,Ta)_2O_6$). Representing approximately 1.1% of the Niobec deposite, these minerals have a bipyramidal shape and are scattered throughout the carbonatite. They have a fine grain size (0.2 mm to 0.8 mm) and are hardly visible to the naked eye. They are generally associated with geological units with the highest content in accessory minerals such as magnetite, biotite and apatite. Geological contacts between units are gradual and diamond drilling is the only method used to determine the content of the mineralized zones.

The average levels of large mineralized envelopes range from 0.44% to 0.51% of niobium pentoxide (Nb_2O_5). With the new extraction method, it will no longer be necessary to delineate higher grade envelopes because all of the carbonatite will be exploitable.

Declaration of mineral resources

Mineral resources reported as of December 31, 2011 were confined within the development as well as the caving area planned by the block caving method, in which a 70 degree open cone was added all around the vertical zone of of the mined area. Only the indicated and presumed measured resources will be recorded as the mineral resource, using a cutoff grade of 0.2% Nb_2O_5. Probable reserves to be extracted by block caving are 419.2 million tonnes at an average grade of 0.42% Nb_2O_5, which is equivalent to 1.75 billion kilograms of niobium pentoxide content.

3.4 Extraction methods of ore

3.4.1 Current extraction method

Since its opening in 1976, the Niobec Mine has extracted ore via an open stope method. Currently, Niobec produces approximately 2.2 Mt of ore per year.

The existing shaft, rectangular in shape, includes three compartments and is 850 m deep. It is used to haul the ore to the surface as well as transport personnel and equipment. In addition to the shaft, a ramp provides access to underground facilities to a depth of 750 m.

This method is characterized by relatively low operating costs. It requires a significant mineralized zone and a relatively adapted massif. The main disadvantage is the fact that some mineralized pillars must always be left in place to ensure stability which leaves a significant portion of niobium ore in place.

3.4.2 Block caving method of extraction

3.4.2.1 General description

The block caving method is characterized by the controlled subsidence of the mineralized zone without resorting to continual drilling-blasting works. Rather, it takes advantage of the natural fracturing of the rocky massif, cracking induced by the redistribution of constraints, limited resistance of the rock and gravitional force.

Excavation is completed via drilling-blasting work. When the excavtion is large enough, caving of the mineralized zone may begin. When caving is initiated, the overlying ore will continue to collapse and fill the voids created by the extraction and thus eliminate the need for additional drilling-blasting work.

The transition to the block caving method involves an intense development of galleries and underground infrastructure, including wells, ventilation and ore shafts, new garage and a new gallery for train transportation.

3.4.2.2 Area of subsidence and influence

Using the block caving extraction method, a depression in the natural terrain is induced on the surface. Over the course of years of production this depression increases in size and eventually causes surface collapse of the terrain. Niobec delimited the area of subsidence in the prefeasibility study. The analyses showed that the subsidence of the land should have an angle of collapse of 67 degrees. A subsidence zone is established based on this angle and the block caving footprint. A protected area, within which tension cracks will be visible on the surface, was established approximately 100 m from the periphery, which will encompass an area of approximately 1.7km^2, centred around the underground deposit. The depth of the subsidence should be of the order of a few hundred meters.

The collapse of the natural terrain should occur in the first five years following the beginning of the block caving extraction method. Mature vegetation in the collapsing zone will be removed. Existing infrastructure will be relocated to allow the extraction of ore by this method.

Water diversion structures will be planned around the edge of the area of subsidence in order to reduce the water infiltration into the collapsed and exposed ore. These drainage ditches will be maintained throughout the operational life of the mine.

3.5 Metallurgy and ore processing

3.5.1 Design criteria and material balance

Process design criteria were developed for all sectors of the new concentrator and converter based on the current process. However, new approaches are being development for ore processing considering the design tonnage and dimensions of the equipment. The conventional crusher, rod and ball mill system used in the present concentrator will be replaced by a semi-autogenic crusher and two ball crushers. Ore will be crushed underground before bringing it to the surface. A new cyclone stage will be added in the grinding circuit in order to reduce the amount of seiving required for classification, thus reducing the building's footprint. These cyclones will be chosen with a special attention to minimize the production of fine particles.

3.5.2 Description of the process

Expertise development in the existing ore processing operations and conversion of the concentrated ferroniobium was an important factor in the selectrion process for the future plant. Some important points will be carefully designed because of much larger equipment and lower voltage supply. The start-up of a new concentrator will require a well-prepared plan. Sufficient startup time will be required in order to ensure a smooth transition and ensure the continued production of ferroniobium. The experience gathered over the last 35 years will help to minimize the risks associated with the startup. The simplified process diagram is presented in Figure 3-1.

3.6 Characteristics of discharges into the environment

The primary emissions associated with the future Niobec Mine operations are the following: various types of air emissions, residual materials, hazardous waste, and slag from melting ferroniobium.

With respect to waste material, Noibec's environmental management system is certified to ISO 14001:2004. This means that waste management practices are regularly subject to both internal and external audits and regulatory compliance audits.

Hazardous waste will be collected by a company that specifializes in the management of hazardous waste materials. This waste will be disposed of at an approved site by the MDDEFP.

The Niobec deposit contains trace amounts of uranium and thorium. The slag will be stored underground in accordance with the procedures currently enforced at the Niobec Mine.

3.7 Water management

Given the large distances that separate the production facility, tailings and Shipshaw River, special attention was given to the location of the future water supply, effluent and tailings pond conduits. The chosen location takes advantage of the presence existing roads and trails, of previously developed land and previously negociated easements. This attention will minimize the invonvenience to the community and environment associated with the construction of new pipelines.

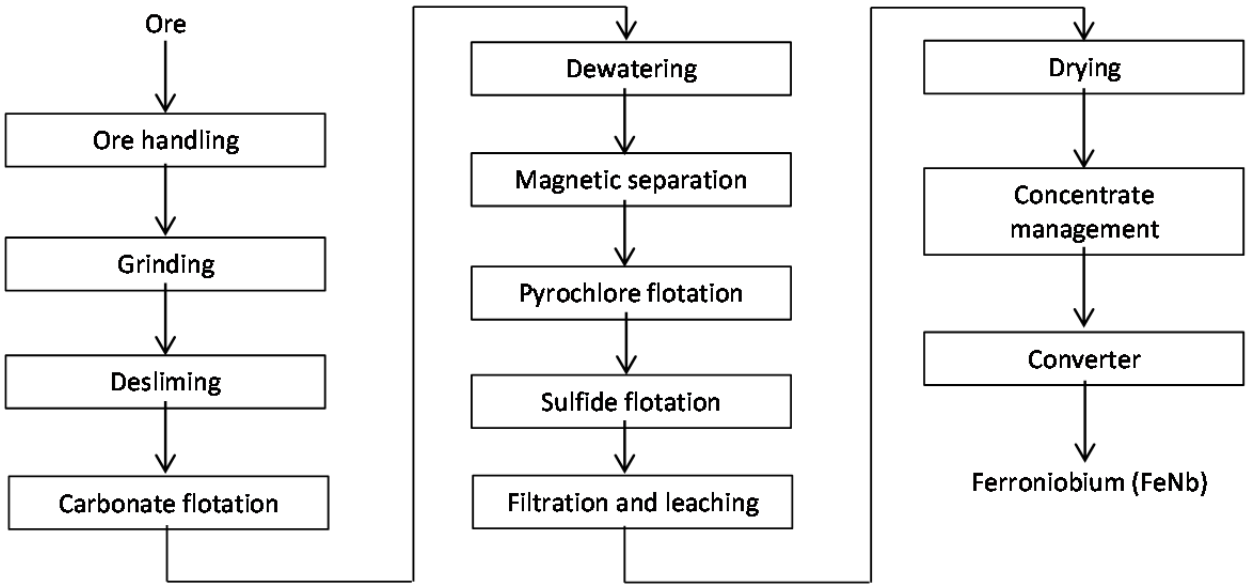


Figure 3-1: Simplified process diagram

3.7.1 Drinking water

Drinking water at the future Niobec facilities will be supplied by the Saint-Honoré Municipality from an aquifer located 8 km east of the Mine site. A pumping station and a supply line are already in place.

3.7.2 Fresh water for processing

Due to the complexity of the ore mined at Niobec and despite constant optimization, research and development work, the concentration process of Nb_2O_5 requires a large amount of water.

The water required for the concentration process will consist of fresh water from the Shipshaw River (2 083 m^3/h) and recycled water from a fine tailings thickener that is stored in a basin on site. The amount of recycled water used will be approximately 8 712 m^3/h, which represents 80% of the water required for the concentrator. It should be noted that this is a significant improvement over the current recycled water use rate (67%).

The development of a new power distribution system will be required. The hydraulic balance resulting from this new system in the Shipshaw River will be neutral, or even positive, as is the case with the current Niobec operations. The new system will consist of a new intake located close to the existing water intake on the Shipshaw River.

Recycled water basin

The basin of water recycled from the current mine will be expanded to increase its storage capacity to 1.6 Mm^3. It has an estimated area of 400 000 m^2. It is important

to note that the basin is located near the production facilities, particularly the concentrator and the fine tailings thickener.

3.7.3 Mine drainage water

Water accumulating at the bottom of the underground mine must be removed to ensure worker safety. The current flow of mine drainage water is 62 m^3/h at the Mine. The estimated flow for the block caving extraction method at the mine is 204 m^3/h.

To monitor the underground water a storage and pumping system will be located in the lower portion of the Mine. Once brought to the surface, the mine drainage water will be stored in a basin with area volume of 14 000 m^3, which is located near the shafts. This water will be treated using a dose of barium chloride to control the concentrations of radium 226, an element present from the natural decay of the radioisotopes in the deposit. The mine drainage water will subsequently mixed into the tailings thickener pipeline underflow. Therefore, it will be routed to the tailings pond.

3.7.4 Wastewater

With regards to the treatment of domestic wastewater for the Niobec expansion project, the plan is to connect to the Saint-Honoré's existing municipal sewer facilities. The proposed option would be to extend the existing municipal system a distance of 3 km to the new facilities. The final partnership in this project remains to be established as well as the identity of the promoter (Saint-Honoré Municipality or Niobec).

3.7.5 Process wastewater – final effluent

The final effluent will be discharged to the environment from the tailing ponds. Prior to its discharge to the Shipshaw River, water will be pretreated using an appropriate processing unit to ensure continued compliance with applicable discharge standards.

The final effluent will be discharged into the Shipshaw River downstream of the fresh water intake. To do this, a buried pipe, approximately 4.5 km, will be installed along the power lines route in a westerly direction before joining the Shipshaw River.

3.8 Tailings management

Typically, two types of waste are generated by the mining process: tailings from the ore processing and waste rock, which has no economic value. Given the selection of extraction method (block caving) the future Niobec activities should not generate a significant amount of waste rock.

3.8.1 Chemical characterization of tailings – 2001 Campaign

A characertization campaign of the Mine's tailings was conducted in 2001 for a Certificate of Authorization application for the construction of tailings pond no. 2.

Characterization, performed according to the criteria of Directive 019 under MDDEFP, showed that the Niobec Mine tailings are not high risk residues. Moreover, they are also not leachable, acid generators or radioactive. The characterization campaign determined that no sealing measures were necessary for tailing pond no. 2.

3.8.2 Environmental characteristics of ore, waste rock and associated water – 2011 Campaign

In 2011 Niobec conducted preliminary characterization tests of two composite samples – one from a pile of ore and the other from a pile of waste rock from the current operations.

Overall, the analyses showed that the ore, waste rock and associated waters are not considered high risk residues because they not leachable, acid generators or radioactive. In this sense, the results are consistent with those obtained from the 2001 tailings characterization campaign.

3.8.3 Environemntal characteristics of tailings and associated water – 2012 Campaign

In 2012, a study was completed in order to characterize the geochemistry of the tailings from the current method of operation as well as those that will be produced in the future. The objective of this study was to define the type of tailings to be stored and determine the sealing criteria required for future tailings ponds.

According to the knowledge acquired by Niobec about its deposit, it is anticapted that the change in extraction method will have no impact on the nature of the tailings that will be generated.

At the time of submitting the impact assessment, only static test results from the 2012 study were available. Kinetic tests are underway on fresh tailing samples taken from the concentrator. The results will be available in early 2013.

3.8.4 Tailings management

3.8.4.1 Assessment of alternatives for the diposal of mine tailings

Methodology

Various locations were studied in order to determine the location of new storage sites for mine tailings required by the expansion of the Niobec Mine.

For this analysis, assuming the maximum height of tailing ponds shall not exceed 35 m, variants studied estimated an area of approximately 9 km² in order to contain the total volume of tailings produced until the closure of the Niobec Mine. In addition, a distance of 10 km from the new plant to the new tailing pond was set as the limit based on the technical and economical point of view.

The methodology used for the evaluation of alternatives for the disposal of tailings was proposed by Environment Canada (2011).

Results and conclusion following the methodology used

For the selection of a new tailings pond, eight variants were considered; following, based on screening criteria, only four variants were selected for detailed analysis. Following this detailed analysis, one variant in particular proved to be more favorable. This variant represents the best alternative for the location of the new tailings storage infrastructure for the Niobec expansion project.

This variant includes the development of a single tailings pond, approximately 5 km west of the existing facilities. The site would be built south of the Hôtel-de-Ville Road and on public land (Territoires non organises (TNO)). It would be located in an agricultural area, mostly within the administrative boundaries of the Saint-Honoré Municipality; however, part of the the site is found on the City of Saguenay's territory.

Although the location selected for the tailings pond is deficient with respect to the environmental criteria as it encroaches on wetlands, it is still considered the best choice if one takes into account all of the factors (environmental, technical, socio-economic and economic). However, according to the characterization study of the receiving environment, the wetlands that will be affected by the tailings are not the richest in the area and are already impacted by anthropogenic activities. In addition, the small unnamed streams that will be affected, although considered fish habitat, have very low halieutic potential

3.8.4.2 Design basis

The design concept proposes the development of a tailings pond similar to that of the existing tailing pond no. 2 at the Niobec Mine. It was designed and built with a peripherial dam constructed of compacted coarse residue and is built up with the upstream tailings dam method.

Several boundaries and buffer zones have previously been established and are as follows: 500 m from the Shipshaw River to the west; 60 m from l'Hôtel de Ville Road to the north; 60 m from Bouchard Creek and 100 m from the high voltage power lines to the east; 100 m from high voltage power lines to the south.

Storage of large amounts of tailings requires a very large surface area. Pond capacity should reach approximately 445 Mt in order to store an annual production of 9 950 000 tonnes plus some tailings from ponds no. 1 and 2.

Once its life expectancy is reached, it is anticipated that the average elevation of the pond will be in the order of 30 to 35 m, similar to the final height of pond no. 2, which is currently in operation.

Future tailing ponds will be constructed with a similar concept to the existing pond no. 2. The construction of a perhiperal dam will be composed of compacted, permeable, coarse tailings for each cell. The base of the dam will consist of a drainage system capable of reducing the water level in the peripheral dam.

During the initial land work, the overburden will be retained and stored adjacent to the pond for subsequent restoration work.

To limit land use, the tailings pond will be built in four phases with a life expectancy of ten years each. A fifth phase could be added without increasing the footprint of the pond.

3.8.4.3 General layout of the pond and associated works

Pond sealing

Level A sealing measures (Directive 019 of MDDEFP) may be required during the construction of the tailings pond if the kinetic tests currently underway indicate that the tailings are leachable in normal and realistic environmental conditions. It should be recalled that the tailings characterization campaigns of 2001 and 2011 indicated that that is not necessary to take sealing measures with the Niobec tailings.

Given the sandy foundation in the area, special measures will be required to achieve the level of seal required for phase 1, if it is required.

Following discussion with contractors who specialize in foundation improvement and the opinion of an expert in this field, the solution which is both the most effective and most economical way to meet this criteria would be the construction of a waterproof membranedownstream of the pond which will be defined by current hydrogeological modelling. This membrane would cross the horizontal permeable sand layer to anchor itself into the clayey horizon underlying the sand.

Tailings pond water management

The accumulated water in the tailings pond will be pumped, via barges, to a collection basin with an approximate area of 300 000 m^2. The collection basin will be located east of the pond and will be used to collect water from the centre of the tailing pond as well as runoff and seepage. From the collection basin the water will either be routed to the Shipshaw River after treatment or returned to the water recycling basin for reutilization.

Collection ditches will be located at the periphery of most of the infrastructure to collect runoff and seepage from operating ponds. Water from these ditches will be redirected to the collection basin constructed for this purpose.

Diversion ditches are planned in some areas in order to limit the amount of water from sources outside of the site that could be integrated into the system.

3.8.4.4 Tailings deposition method

Tailings will be pumped the pond as a pulp. Two separate pipes will be required to carry both the tickened residues from the underflow of the thickener and unthickened, coarse residues.

The peripheral dam will be composed of coarse residue and construction by cellular process during the summer season and according to the proposed geometric design.

The coarse tailings deposited in the cells will be well-drained to prevent the excessive rise in the water level in the peripheral dam. During the winter, from December to April, effective tailings compaction is not possible. As such, the deposition of tailings in the winter is performed by pouring tailings upstream of the compacted tailings (cells). In winter, the coarse and fine tailings will be combined at the plant and transported to the pond.

Progressive restoration of the peripherial dam slope will help minimize wind erosion and erosion by runoff.

A deposition plan will be developed during feasibility study to refine and optimize the first phase of operation of the pond (±10 years) and the plans detailed above regarding the deposition of coarse and fine tailings.

3.8.4.5 Relocation of tailings from ponds no. 1 and 2

Existing tailings ponds are located partially within the area of expected subsidence and thus approximately 15 Mm^3 of tailings will need to moved from the ponds before changes in the area of subsidence occur.

Repulping is the recommended mode of transport for the movement of the tailings from existing ponds. Repulping will recover suspended tailings, in the form of pulp, and pump it to the new pond via pipes.

3.8.4.6 Construction and development plan for the new tailings pond

Costruction and operational stages

The construction and operational stages for the first four phases are as follows:

- Completion of the preparatory work (deforestation, stripping, etc.).
- Construction of the tailings pond's peripheral dam by the cellular process. Deposition of tailings will occur over a 10 year period until the maximum capacity of the cell is met. Gradual restoration and enhancement of the dam slopes will also occur during the course of the pond life.
- Pumping tailings from tailing pond no. 1 and 2 to the new pond.
- Completion of the preparatory work for the next operation phase of the pond (i.e., deforestation, stripping and construction of the breakwater, etc.).
- Complete restoration of the previous phase of the pond by planting herbaceous plants and tree varieties (at the end of the phase).

In order to store all of the tailings generated throughout the life of the mine, it is proposed to develop a fifth and final phase after the completion of tailing phases 1-4. Phase 5 would include the construction of a peripheral dam with a maximum height of approximately 5 to 10 m either upstream or downstream of the tailings in place.

Since the technical details and feasibility of phase 5 are not known, the assessment of the impacts on the environment and social environment will be carried out at a later date.

3.8.4.7 Restoration program of the tailings pond

As discussed above, the tailings pond will be built in four or five distinct phases. This approach allows the deposition zone to be small in size and financially beneficial for the first decade of operation. It also allows for rapid actions that will return each deposition phase to a productive state for the community and environment. Thus, it is planned to initiate progressive revegetation of the exterior slopes of the tailings pond as early as year 1 of the deposition of tailings. Subsequently, once a phase is completed, the upper part of the area of deposition may be revegetated or converted to forestry or agricultural use.

3.9 Required infrastructure and facilities

3.9.1 Buildings

All of the necessary mining services and ore processing will be located in two adjoining buildings, namely the service and processing buildings. The service building will host the dryer, mill, storage area, labratory, core library as well as the administrative offices. This building will be directly connected to the processing building by a buffer corridor in order to separate the two buildings. The processing building will include the niobium pentoxide concentrator and FeNb converter. All of the ore processing stages will be carried out in this building.

3.9.2 Energy

Energy sources used by various equipment, buildings and vehicles will be hydro-electric, propane and diesl fuel. Hydroelectrcity is the primary energy supply used for supplying production equipment for the concentrator, converter, mine hoists and needs of the building. Propane will be used to heat the air supplied to the underground mine and to dry the Nb_2O_5 concentrate. Vehicles driven underground will be powered by diesel fuel.

3.9.3 Electric network

A 161 kV power line supplied by Hydro-Québec will supply the entire Niobec site. The new power line will pass east of the existing tailings ponds and within the limits of the area that will be acquired. It will connect with the existing high voltage power line to the south in the the current right-of-way that supplies the Mine.

3.9.4 Production and service shafts

The prefeasibility study determined that the use of driven shafts was the best option available. Two 7.5 m diameter shafts will be drilled. The planned depths of the service and production shafts are 950 m and 900 m respecitively.

The quantity of rock material that will be generated by shaft driving is estimated to be 325 000 t. Following the characterization of the material, it could be used as building materials for infrastructure on the surface, including tailings ponds, the water basin and the drainage ditches. It is also possible that this material can be used as aggregrate for shotcrete that will be applied underground. Finally, it might be possible to store the waste rock in the area of subsidence, possibly above the blasted ore.

3.9.5 Ventilation of the underground mine

A ventilation system will be installed to provide fresh air to the underground complex. The main ventilation system in the mine will be installed underground. It will consist of three parallel arrangements with two fans installed in series. The positive pressure system will allow better management of contaminants emitted during the extraction process by restricting their dispersion in the production area. The ventilation system will be designed and managed to maintain, at all times, the contaminant concentrations at thresholds that comply with the regulatory standards, including those set forth in the “Règlement sur la santé et la sécurité dans les mines”, when workers are present.

3.9.6 Petroleum products stockyard

A petroleum products stockyard will be constructed on the surface for the expansion project. It includes a covered area for the storage of barrels (205 L) and cubes (1 250 L) of lubrication oils, an automotive gas storage tank with a capacity of 10 000 L as well as two diesel storage tanks with a capcity of 40 000 L each.

3.9.7 Workforce

In 2012, a total of 460 people were employed at the Niobec Mine for normal production and operations. With the block caving extraction method of operation Niobec will employ 660 workers.

3.10 Construction plan

Niobec wishes to initiate the shaft driving and services necessary for production over a period of approximately 4 years. The headframes will also be constructed quickly to limit the impact of the shaft driving.

Implementation of the tailings pond and related facilities (i.e., collection basins, pipes, etc.) will start quickly so that they can be used immediately in order to increase production. This will be followed by the contruction of the service building, concentrator and converter.

3.11 Schedule and duration of the project

The construction schedule begins with the feasibility study, which is expected to be filed in late summer 2013. In addition, before construction of surface infrastructure, approximately 18 months should be allocated to complete the authorization process

and permit (after filing the impact assessment), which typically includes public hearings.

General construction could begin as early as 2014. The new processing infrastructure is required for mid-2016.

Excavation of certain galleries may start as early as 2013. The construction of the shafts should begin towards mid-2014 in order to meet the operational requirements present in the pre-feasibility study.

3.12 Cost estimates for the project

Total capital expenditure is estimated at $2 033 118 000 and is broken down as follows: $857 155 000 for surface assests (new infrastructure, plant and converter), $315 702 000 for mine assests (mining equipment, development and infrastructure) and $860 261 000 for replacement assests (investments to achieve the annual production of 10 Mtpa).

3.13 Progressive rehabilitation and closure plan

The Niobec Mine has been exploiting the niobium deposit since 1976. A plan to ensure the restoration of the land affected by mining was introduced in 1994 to comply with the new provisions under the Ministère de l'Énergie et des Ressources. The closure and site restoration plan included the elements of the underground mine, surface facilities and tailings ponds. The main objectives were to ensure workplace safety, protection of the environment, especially by ensuring proper management of soil and hazardous waste, enhance the economic and visual value of the land as well as estimating the the necessary restoration measures. Given the amount of reserves at the time and potential mineralization operation of the Mine, it was expected to continue operations over several years. As such, some aspects of the plan were presented in concept form while some restorations were planned during the operation phase, particularly with regards to the tailings pond.

The next revision of the restoration and closure plan must be submitted to the Ministry in 2013. The existing plan will be updated based on the current expansion project plans.

4 COMMUNICATION AND CONSULTATION

This chapter highlights the participatory and collaborative appoach implemented by Niobec with citizens, organizations and communities involved in its activities following the announcement of the expansion project. This approach, known as pre-consultation, is divided into two phases that overlap and complement each other. The approach is based on best practice principles for public participation developed by the International Association for Impact Assessment (IAIA).

4.1 Pre-consultation on the definition and design of the project

Niobec set-up a community relations team that uses a variety of methods to communicate and interact with the public in order to record the concerns of the interested parties. The pre-consultation strategy included holding multiple open-houses (media and neighbours), the publication of fact sheets and informative newsletters, a website and regular attendace at council meetings.

In parallel with these activities, several meetings were conducted with interest groups and discussion boards were set up. These meetings highlighted some concerns with the current activities of the Niobec Mine as well as those specific to the expansion project. Social issues related to nuisances (including road traffic, noise, dust and blasting) represented the majority of concerns (85%) followed by governmental, environmental and economical issues as well as the location of the Mine.

With respect to the expansion project, the concerns related to open pit mining were considerably larger with 262 comments compared to 19 for the block caving extraction method. However, the level of information provided on the two methods was only partial. Economical issues related to open pit minig, including the impacts to properties affected by the project, were the greatest concern at 60%, followed by social (21%), environmental, governmental issues and those related to the location of the Mine. For the block caving extraction method, environmental issues were the most prevalent reported issue (58%) followed by governmental and social issues.

4.1.1 Municipal and supramunicipal

Fjord-du-Saguenay MRC

The Fjord-du-Saguenay MRC representatives expressed the following concerns: the distance of the tailings pond(s) in relation to the urban area, the environmental impacts of the expansion project, the implementation of the mitigation measures and the social acceptability. The expectations expressed included job creation and maximization of regional benefits.

Saint-Honoré Municipality

Saint-Honoré representatives are in favour of the block caving extraction method which was presented in the Niobec Mine expansion project prefeasibility study. The establishment of an information office and relationship with the environment, in the heart of the municipality, was well received by municipal officials. In addition, the

creation of a ‘Comité du milieu’ and a ‘Table municipalité – entreprise’ was also well received.

The Municipality’s representatives expressed concerns regarding the Mine’s effluent, increased anticipated traffic, the noise generated by the new tailings pond(s), social acceptability, general quality of life, impact on the Chicoutimi-Saint-Honoré Airport activities as well as the potential devaluation of neighbouring properties.

Expectations expressed included the construction of a new access road to the Mine directly linking the Mine and Martel Boulevard or Route 172 in order to free the municipal roads of trucks as well as the expectation that Niobec will continue to act as a good corporate citizen.

Saint-David-de-Falardeau Municipality

The representatives of Saint-David-de-Falardeau did not raise any concerns regarding the expansion of the Niobec Mine. The representatives viewed the project positively as it will result in economic benefits for this area.

City of Saguenay

Generally, the City of Saguenay representatives believe that Niobec presents a postivie image in the community and acts as a good corporate citizen. Representatives expressed concerns over the potential heavy traffic on Route 172. Expections expressed included the use of municipal roads by quarry vehicles, the idea that Niobec could pay a fee based on its use of the road network and more information on the project was requested by the representatives, particularly with regard to the new access road and anticipated increased traffic. Representatives of the City of Saguenay referred to a request sent to Niobec regarding the use of the drinking water wells located south of the Chicoutimi-Saint-Honoré Airport, and that the mine now pumps its process water into the Shipshaw River which is on Saguenay’s territory.

4.1.2 Table municipalité - entreprise

The ‘’Table municipalité – entreprise’’ was established in October 2011 and brings together representatives from the Fjord-du-Saguenay MRC, Saint-Honoré Municipality and Niobec. The Table is an internal working mechanism. It is a structure of information and interaction between the municipal representatives regarding the interests, responsibilities and needs of the expansion project. The group meets on average once every three months and aims to provide municipal representatives with concrete ways to be informed and be consulted on the development of the Niobec Mine expansion project. In addition, this Table offers the possibility to Niobec to adjust to its expansion project with respect to the needs and projects of the municipality.

4.1.3 Comité du milieu

The ‘’Comité du milieu’’, established in November 2011, is composed of neighbouring representatives from the Municipality of Saint-Honoré, environmental

and socio-economic groups and community organizations. The ‘’Comité du milieu’’ meets on average every six weeks. It aims to give neighbourhood representatives and agencies practical ways to stay informed and be consulted on the development of the expansion project.

One of the main tools used by the ‘’Comité du milieu’’ is the “evolving list of concerns”, where all concerns gathered by Niobec’s ‘équipe de Relations avec la communauté’ gathered from 134 individual meetings with immediate neighbours of the expansion project. The list is continusouly evolving as to idendity and address new concerns throughout the development of the expansion project. Concerns will be addressed in the “Programme de gestion et d’atténuation des nuisances et d’autres interventions” implemented by Niobec.

Following a prioritization of concerns by the ‘’Comité du milieu’’, to which Niobec should respond to in the short term, concerns were prioritized by two thematic groupings, namely the traffic caused by the operation of the Mine and the impact on the real estate and quality of life of the neighbours as well as the process of acquisition and compensation.

4.1.4 Groupe de travail sur le trafic

The ‘’Comité du milieu made’’ the decision to establish a ‘’Groupe de travail sur le trafic (GTT)’’ in order to specifically address the issues of road safety and the noise generated by traffic. Its mandate is to implement urgent measures in the very short term and submit recommendations to the ‘’Comité du milieu’’ at the end of September 2012. The GTT’s main objective was to increase the sense of security on the main access road to the Mine as well as to improve the quality of life of the residents in these areas, pending the construction of the proposed access road, which will permenantly resolve this problem.

Based on the reflections of the GTT, driven by the current state of affairs, several measures have been deployed in the short term to reduce this problem. Subsequently, the GTT report which includes a series of 11 recommendations was submitted to the ‘’Comité du milieu’’. Selected recommendations were assessed on the basis of their potential effectiveness. The feasibility of each of these is currently being analyzed.

4.1.5 Groupe de travail sur le processus d'acquisition et d'indemnisation

With the same logic, the ‘’Comité du milieu’’ made the decision to establish a ‘’Groupe de travail sur le processus d'acquisition et d'indemnisation (GTAI)’’. The mandate of the GTAI is to propose to the ‘’Comité du milieu’’ a guide of good practices for a harmonious acquisition and compensation process and to spread the results of its work to concerned citizens. The report was tabled in December 2012.

4.2 Pre-consultation of the environmental impact assessment

Niobec intends to continue its approach to participation and collaboration with citizens, organizations and communities affected by its activities by directing them to the information contained in the draft impact assessment. Niobec wishes to improve

its project and the impact assessment so that they, as much as possible, are in tune with the expectations of the community and stakeholders. At the end of the pre-consultation process, Niobec will submit a full report of the activites to the MDDEFP.

The pre-consultation process, specific to the environmental impact assessment, will take place from January to June 2013. It will consist of a sequence of activities and meetings to engage interested stakeholders in the Niobec expansion project. The target audience for this process are the ‘’Comité du milieu’’, Niobec employees, neighbours and community members from Saint-Honoré as well as regional and national interest groups.

4.3 Exchange activities and consultation with First Nation of Pekuakamiulnuatsh

4.3.1 The First Nation of the Pekuakamiulnuatsh and their territory

The Innu of Québec refer to their territory by the term Nitassinan, meaning ‘‘our land’’. The Nitassinan extends over the provinces of Québec and Labrador, between the 48th and 56th parallel. Nitassinan is currently the subject of comprehensive land claim negotiations between the First Nations of Mamuitun (Mashteuiatsh, Essipit and Pessamit) and Nutashkuan and the governments of Québec and Canada. The traditional territory of the First Nation of Pekuakamiulnuatsh covers a good part of the Saguenay-Lac-Saint-Jean region. The community of Mashteuiatsh is located approximately 80 km as the crow flies from the Niobec Mine and in 2006 had a population of 4 791.

Pekuakamiulnuatsh Takuhikan, the political and administrative organization of the First Nation of Pekuakamiulnuatsh, unveiled, in May 2012, eight guidelines and guiding principles to serve as a guide to mining development in the area. The guidelines and principles include the following: protection of aboriginal rights, including aboriginal title, the Pekuakamiulnuatsh on Tshitassinu, continuity of Innu aitun (traditional activities), recognition of collective aboriginal and treaty rights, recognition of families who are subject to direct impacts, sustainable development, socio-economic needs and local impact, project analysis as well as definition of prerequisite rules affecting the distribution of benefits related to mining.

The ‘‘Plan régional de développement intégré des ressources et du territoire’’ (PRDIRT) raises a specific issue related to the economic benefits for the Pekuakamiulnuatsh. In this regard, the PRDIRT highlights that Pekuakamiulnuatsh businesses operate in a very different economic environment as compared to non-native regional businesses. It also identifies the need for new and effective partnerships to ensure that the measures deployed by the local stakeholders result in significant and permanent results for the Pekuakamiulnuatsh

The three directions of the PRDIRT to meet the challenge of both land and resource development are as follows: integrating job creation, the development of entrepreneurship and development of partnerships.

4.3.2 Description of the activites of exchange and consultation thus far

Despite the fact that the Saint-Honoré Mine has been in operation for more than 36 years, few relationships have been established with the community of Mashteuiatsh, or more generally with the Pekuakamiulnuatsh.

During the design of the expansion project, Niobec identified the need to build bridges with stakeholders of the project, including the First Nation of Pekuakamiulnuatsh. In this regard, a process of exchange with the Pekuakamiulnuatsh Takuhikan was initiated. To date, two meetings were held with representatives of the Pekuakamiulnuatsh Takuhikan.

According to the findings which emergered from the preliminary discsussions between Niobec and First Nation of Pekuakamiulnuatsh representatives, Niobec understands that the project area is not considered Innu Assi territory (freehold), is not considered a heritage site and is not targetted for the establishment of an Innu park or territory targetted for traditional management. No specific aboriginal use is known in the project area.

Despite these findings, the Niobec Mine is committed to continual exchanges and cooperation with the Firstion Nation of Pekuakamiulnuatsh in order to validate the potential impact of the project on the area and current use of land and resources for traditional purposes.

In the same logic, even if it is determined that the expansion does not affect the interests of the First Nation of Pekuakamiulnuatsh, Niobec is committed to working with the Pekuakamiulnuatsh Takuhikan to maximize anticipated benefits of the expansion project on the community to address the issues identified as priorities by the community. The first meeting allowed Niobec to present information regarding the expansion project to the Pekuakamiulnuatsh Takuhikan representatives. At the second meeting, they expressed interest in the project, including the opportunity for socio-economic development.

The Pekuakamiulnuatsh Takuhikan representatives recalled on this occasion that the area was part of their claimed territory, but also that they were not involved in mining at this time. They indicated that the expansion project could offer opportunities for its businesses as well as the possibility of job creation. In this regard, the the department of ‘Éducation et main-d’œuvre’ of Pekuakamiulnuatsh Takuhikan, initiated a program aimed at procuring a workforce development plan for the organization. It is expected that Pekuakamiulnuatsh Takuhikan representatives will provide Niobec with more information on the subject.

4.3.3 Mechanisms of cooperation between Niobec and Pekuakamiulnuatsh Takuhikan

The Niobec Mine, together with Pekuakamiulnuatsh Takuhikan, intends to idenfity a consultation mechanism that meets the guidelines and principles for development of the mining project.

In the same perspective, and subject to the needs and expectations expressed by the Pekuakamiulnuatsh Takuhikan, Niobec intends to propose various exchange activities whose terms will be defined jointly with Pekuakamiulnuatsh Takuhikan.

4.3.4 Métis communication

There are no known Métis uses of the project area. During a meeting with the representatives from the Clan Métis Centre-Nord du Saguenay, concerns about the use of water and the state of Bras-Cimon Creek were raised. Since then, Niobec initiated a pilot project to re-stock native Trout in the Bras-Cimon Creek.

4.4 Public participation (clarification)

4.4.1 Pre-consultation for the environmental impact assessment (update)

The six pre-consultation sessions which were presented and proposed to the Comité du milieu are as follows:

Themed workshop 1

- Evaluation method
- Context and reason for the project
- Variants (development, restoration, etc.)

Themed workshop 2

- Portrait and impact on the human environment

Themed workshop 3

- Portrait and impact on the quality of life

Themed workshop 4

- Portrait and impact on the natural environment

Themed workshop 5

- Technological risks and emergency measures plan
- Surveillance and monitoring

Summary session

As of march 2013, the first three pre-consultation sessions with the Comité du milieu led to many exchanges as to the content of the impact assessment and many new improvement options were found for both the assessment and the expansion project.

4.4.2 Consultation with First Nation of Pekuakamiulnuatsh (clarification)

To ensure that the First Nation of Pekuakamiulnuatsh is the only community potentially interested or affected by the project and its impacts (or that has associated larger stakes), the ministère des Affaires autochtones et Développement du Nord Canada, as well as the Secrétariat aux affaires autochtones du Québec will

be contacted. The proximity criteria, be it near or far, is not always representative of their interests for a territory or a project based on rights to land or land usage.

However, it is known that the project is located on the traditional territory of the First Nation of Pekuakamiulnuatsh.

4.4.3 ''Guide et bonne pratiques pour un processus harmonieux d'acquisition et d'indemnisation''

The ''Guide et bonnes pratiques pour un processus harmonieux d'acquisition et d'indemnisation'' was submitted to the ''Comité du milieu'' in December 2012 by the ''Groupe de travail sur le processus d'acquisition et d'indemnisation''. The ''Comité du milieu'' confirmed the validity of this guide. This guide is a work tool designed to help residents concerned by the acquisitions.

For each resident met with the goal of an acquisition, the Guide is first presented by a Niobec representative and the approved evaluator responsible for the acquisition initiative. This ensures that the acquisition initiative is equitable for all affected residents.

Once all affected residents were met, the Guide was presented to the 'Table municipalité-entreprise'. It will be made public on Niobec's website during the month of April 2013 to ensure maximum transparency for the acquisition process.

Four values are shared by Niobec and the 'Comité du milieu' in this procedure, they being equality, mutual respect, trust and transparency.

Many important actions were established in this guide :

- Evaluation guidelines were established to ensure the equality of the agreements between owners to offer just compensation which represents at least the equivalent of the sold good and that will permit, if desired, the acquisition of a similar good.
- Niobec has hired an approved evaluator, paid by hourly wage, to lead the acquisition and compensation process in a respectful, equal and transparent manner.
- Niobec is committing itself to consider all reasonable requests to cover fees associated with the hiring of professionals that each party will judge necessary for the progress of the agreement.
- Niobec is committed to disposing of acquired buildings in a respectful, responsible and safe manner.
- In this guide, Niobec clears up and answers resident's questions and preoccupations involved in the process.

5 IDENTIFICATION AND EVALUATION OF IMPACTS METHODOLOGY

5.1 Study area

Two areas have been defined for the description of the receiving environment: a restricted area and an extended area (Map 5-1).

The extended study area covers approximately 24 686 ha (246.86 km^2). This area was selected for the project based on the regional geography and socio-economic context. It overlaps with territory of Fjord-du-Saguenay MRC and City of Saguenay.

The restricted study area includes the elements in the receiving environment that are most likely to be affected by the impacts associated with the expansion project of the Niobec Mine.

5.2 General approach

The general approach can be summarized as follows:

- The description of the project identifies the sources of impact from technical characteristics of the work to be completed as well as the activities, methods and timing of construction.
- The general description of the environment allows us to understand the environmental and social contexts in which the project fits; to identify the most sensitive environmental components relative to the project; and to identify, where appropriate, certain issues to consider. The map 5-2 presents a synthesis of sensitive elements.
- Public consultation helps identify concerns about the project within the context of the social environment.

Consideration of these elements gives way to a list of environmental components that will be later detailed in an assessment of impacts. The evaluation process for each targeted environmental component includes the following steps:

- A description of the reference state. This is completed so that the characteristics of the sensitive components of the physical, biological and human environment prior to development may be recalled.
- A description of the impact on the environment. It describes the anticipated changes from the various sources of impact of the project.
- Development of mitigation measures to reduce, or even eliminate, the importance of the impacts identified, as appropriate. The integration of these measures at this stage consititutes a commitment by the proponent to execute during the implementation phase.
- An evaluation of the importance of the residual impact, i.e., after the application of mitigation measures.

- A description of the applicable compensation measures, where appropriate, to reduce some of the residual impacts.

5.3 Impact assessment methodology

The overall objective of the impact assessment is to determine, as objectively and precisely as possible, the significance of residual impacts generated by the project on the components of the physical, biological and human environments following the application of both general and specific mitigation measures. This assessment focuses on the impacts of any nature, either negative or indeterminate as well as profits or benefits. The importance of an impact is evaluated qualitatively based on the following elements:

Ecosystem value: the value of an ecosystem's component is determined only for those in the natural environment. This value expresses the relative importance of this component, taking into account its features (sensitivity, integrity, resilience), and its role and function in the ecosystem. The ecosystem value can be high, medium or low.

Socio-economic value: the socio-economic value of a given component of the environment reflects its importance for the local or regional interest groups, managers and specialists. It indicates their desire or the will of the people or policy to maintain the integrity of the original characteristics of a component of the environment. The social value can be high, medium or low.

Degree of disturbance: the degree of disturbance of a component corresponds to the magnitude of the structural and functional changes that could result. Depending on the nature of the changes, they can induce a positive (bonus) or negative effect, direct or indirect. The degree of disturbance can be high, medium, low or undertermined.

Intensity: the intensity of the environmental impact is the relative importance of the consequences due to the alteration induced by an activity of the project on a component. The method used to determine the intensity of the impact refers to the degree of disturbance of an environmental component and the overall environmental value of this component. The intensity of the impact can be high, medium or low.

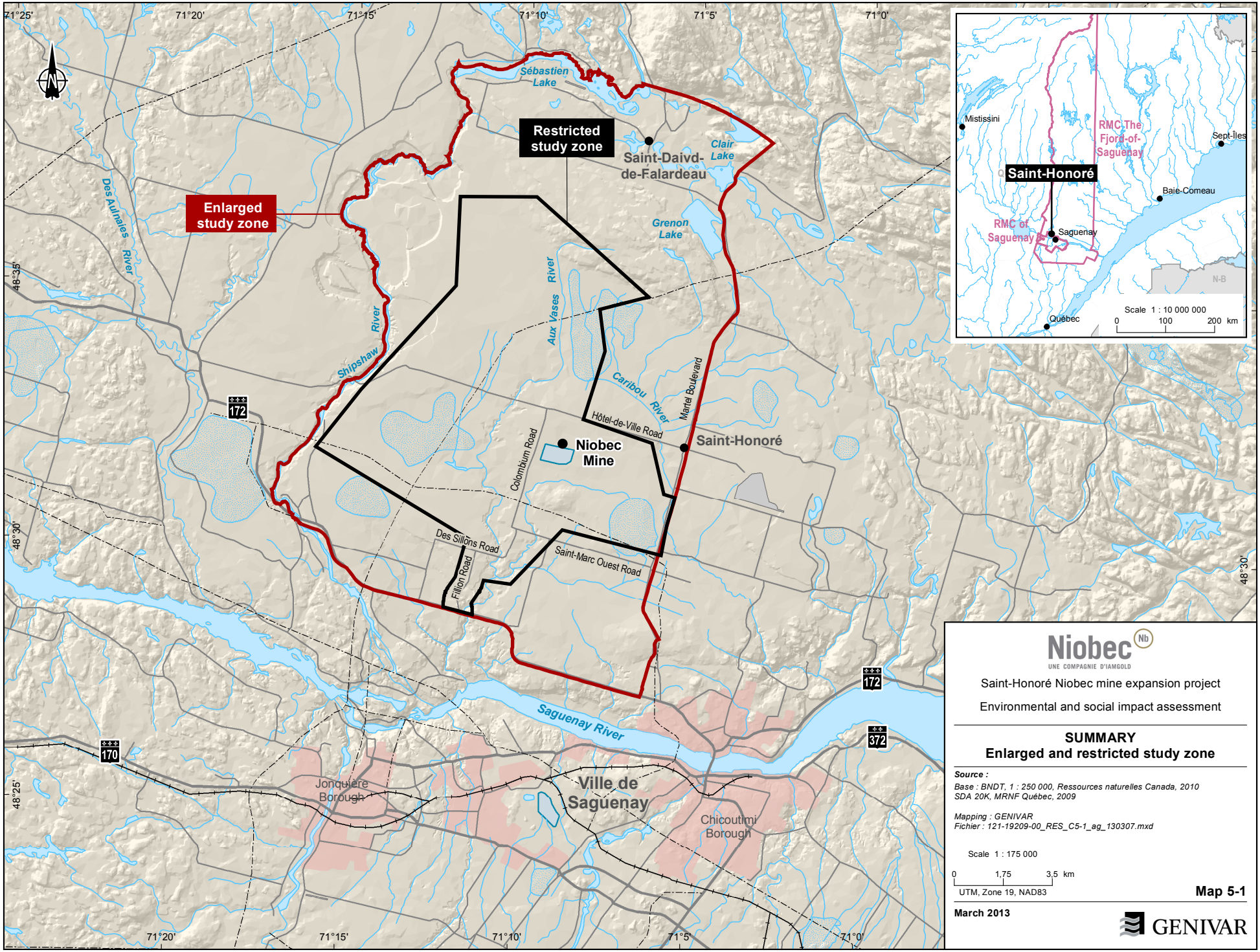
Spatial extent: the spatial extent of the impacts on the component corresponds to spatial span and influence of effects on it, as well as proportion of an affected population. The spatial extent of impacts may be regional, local or point source.

Duration: the duraction of the impact on a component corresponds to the temporal dimension, that is to say, the period of time during which the impacts affect a component. This criterion takes into account the character of intermittence or one or more impacts. The duration of an impact may be long, medium or short.

Probability of occurrence: the probability of occurrence corresponds to the actual probability that an impact could affect a component. The probability of occurrence of impacts may be high, medium or low.

Importance of impact: the importance of impact incorporates the criterias of intensity, extent, duration and probability of occurrence. The combinations used to determine the level of importance of the impact are predetermined. The relationship between each of these criteria to carry an overall judgement on the importance of the impact is based on the following five classes: very high, high, medium, low and very low (Table 5-1).

The assessment of the impacts on a component of the environment is the result of the effects of all of the sources of impacts that have previously been identified.



Niobec
UNE COMPAGNIE D'IAMGOLD

Saint-Honoré Niobec mine expansion project

Environmental and social impact assessment

SUMMARY
Enlarged and restricted study zone

Source :
Base : BNDT, 1 : 250 000, Ressources naturelles Canada, 2010
SDA 20K, MRNF Québec, 2009

Mapping : GENIVAR
Fichier : 121-19209-00_RES_C5-1_ag_130307.mxd

Scale 1 : 175 000
0 1,75 3,5 km
UTM, Zone 19, NAD83

Map 5-1

March 2013

GENIVAR

Niobec
UNE COMPAGNIE D'IAMGOLD

Saint-Honoré Niobec mine expansion project

Environmental and social impact assessment

SUMMARY
Synthesis of sensitive elements

Sources :

Cartes écoforestières (SIEF), 1 : 20 000, MRNF Québec
BDTQ, 1 : 20 000, MRN, 2002
Orthophotographie, 56 cm, 2007

Mapping : GENIVAR
Fichier : 121-19209-00_RES_C5-2_ag_130307.mxd

Scale 1 : 70 000

0 700 1 400 m

MTM, Zone 7, NAD83

Map 5-2

March 2013

GENIVAR

71°15'
71°10'
48°40'
48°35'
48°30'
Sébastien Lake
Asian oak
SECOND ROAD
Calypso
FIRST ROAD
Saint-David-de-Falardeau
Grenon Lake
Robinson's hawkweed
White fringed orchid
Dragon's mouth orchid
White fringed orchid
Dragon's mouth orchid
Gagnon-Flamand Creek
Shipshaw River
Rusty Blackbird
Des Vases Lake
Barn Swallow
Bouchard Creek
Aux Vases River
SIMARD ROAD
Yellow Rail
MARTEL BOULEVARD
Short Eared Owl
Short Eared Owl
Canada Warbler
Southern Twayblade
Austrich fern
HÔTEL-DE-VILLE ROAD
Bobolink
Saint-Honoré
Niobec Mine
Common Nighthawk
Canada Warbler
Brûlé Lake
Striped coral-root
Canada Warbler
Canada Warbler
Austrich fern
Rusty Blackbird
Chicoutimi–Saint-Honoré Airport
Canada Warbler
Southern bog lemming
COLOMBIUM ROAD
Bras-Cimon Creek
DES SILLONS ROAD
BRASSARD ROAD
HARVEY ROAD
SAINT-MARC OUEST ROAD
Caribou River
DES VISONS ROAD
172
NIL-JEAN ROAD
Striped coral-root
Striped coral-root
Queen lady's slipper
Short Eared Owl
(SAINTE-GENEVIÈVE BOULEVARD) 172
Saguenay
Saguenay River

Biological environment

Wetlands
- Swamp
- Waterside marsh
- Tree-filled marsh
- Drained bog
- Forested Bog
- Fen
- Bog
- Water
- Iron-rich Fen
- Cedar grove

Plant species at risk
- GENIVAR Data
- CDPNQ Data

Mammals species at risk
- GENIVAR Data

Bird species at risk
- GENIVAR Data
- Other Data

Characterized waterways
- Adjoining ditch
- Fish habitat
- Non-characterised waterway

Human environment

Archeology
- Potential archeological zone

Recreation and tourism
- Regional or local snowmobile trail
- Recreation trail (ATV or other)

Infrastructure
- New acces road
- Electrical transmission line

Limit
- Enlarged study zone
- Restricted study zone

Project component
- New industrial complex
- Subsidence zone
- Tailling pond
- Recycled water pond
- Seepage collection system
- Effluent pipeline
- Tailings pipelines
- Freshwater pipeline

Table 5-1: Criteria combinations in order to determine the significance of an impact on an environmental component

Intensity	Scope	Duration	Probability of occurrence	Importance	Intensity	Scope	Duration	Probability of occurrence	Importance	Intensity	Scope	Duration	Probability of occurrence	Importance
Strong	Regional	Long	High	Very strong	Medium	Regional	Long	High	Strong	Low	Regional	Long	High	Medium
			Medium	Very strong				Medium	Medium				Medium	Low
			Low	Strong				Low	Medium				Low	Low
		Medium	High	Very strong			Medium	High	Strong			Medium	High	Medium
			Medium	Very strong				Medium	Medium				Medium	Low
			Low	Strong				Low	Medium				Low	Low
		Short	High	Strong			Short	High	Medium			Short	High	Medium
			Medium	Strong				Medium	Medium				Medium	Low
			Low	Strong				Low	Medium				Low	Low
	Local	Long	High	Strong		Local	Long	High	Medium		Local	Long	High	Low
			Medium	Strong				Medium	Medium				Medium	Low
			Low	Strong				Low	Medium				Low	Low
		Medium	High	Strong			Medium	High	Medium			Medium	High	Low
			Medium	Strong				Medium	Medium				Medium	Low
			Low	Medium				Low	Medium				Low	Very low
		Short	High	Strong			Short	High	Medium			Short	High	Low
			Medium	Strong				Medium	Medium				Medium	Very low
			Low	Medium				Low	Low				Low	Very low
	Point source	Long	High	Strong		Point source	Long	High	Medium		Point source	Long	High	Low
			Medium	Strong				Medium	Medium				Medium	Low
			Low	Medium				Low	Low				Low	Very low
		Medium	High	Strong			Medium	High	Medium			Medium	High	Low
			Medium	Medium				Medium	Medium				Medium	Very low
			Low	Medium				Low	Low				Low	Very low
		Short	High	Strong			Short	High	Medium			Short	High	Low
			Medium	Medium				Medium	Low				Medium	Very low
			Low	Medium				Low	Low				Low	Very low

* Only the residual impacts with an importance of strong or very strong demonstrate a significant effect within the framework of the *Canadian Environmental Assessment Act*.

6 EXISTING CONDITIONS AND THE IMPACTS OF THE PROJECT ON THE PHYSICAL ENVIRONMENT

This chapter describes the various components of the physical environment that may be affected by the project by one or more sources. Existing conditions of each component are described as well as a summary of impacts and mitigation measures that will be implemented.

6.1 Existing conditions

6.1.1 Wind

Within the study area, the wind tends to blow west (approximately 35% of the time) and east (approximately 25% of the time) in both summer and winter. The average wind speed is 14.3 km/hr (4.0 m/s). On average, it varies monthly between 10.9 km/hr and 16.5 km/hr. Extreme winds reach mean speeds of 69.5 km/hr and gust speeds of nearly 100 km/hr. On average, wind gusts over 52 km/hr occur 14.9 days per year.

6.1.2 Ambient air quality

Air quality in the local study area can be considered as very good as it is located in a rural area where there are few existing industrial activities. Indeed, according to the National Pollutant Release Inventory, the closest factories are located more than 10 km from Niobec, with the exception of d'Inter-Cité Construction Ltée, which is located approximately 5 km to the east and produces very low emissions.

There is no air quality station near the study area; however, a one-time air quality campaign showed that air particle concentrations were consistent with standard air quality. In addition, it was determined that concentrations of copper and other metals met the 24-hour standards. Finally, the respirable silica concentrations sampled were all below the analytical detection limit.

Greenhouse Gases

The main sources of greenhouse gases (GHGs) from the current Niobec mining operation (2011 data) are associated with the mine's electrical consumption (123 942 920 kWh indirect emissions), propane for ambient heating and drying of concentrate (2 670 721 L), use of diesel fuel (1 394 192 L) and gas (17 563 L) for mobile equipment and use of explosives (1 328 t). The above energy consumption represents 8 308 t CO_2 equivalent per year of direct emissions and 923 t CO_2 equivalent per year of indirect emissions.

6.1.3 Substrate and stability

Geology

The study area is located in the Central Gneiss Belt of the geological province of Grenville from the middle Precambrian age. It is largely composed of metamorphic rocks. The niobium deposit is located southeast of the massif.

Geomorphology

The relief of the extended study area is relatively flat, located between Monts-Valin to the north and the Saguenay River valley to the south. The location of this plain was favourable to sedimentation of several distinct facies of unconsolidated depositional units.

The bedrock, or Trenton limestone and Utica shale, is exposed (outcrops) in the northern section of the study area. To the east, a rocky ridge is covered with a thin layer of till, which is located north of the study area and completely isolates the valley. Surface deposits of this valley are glaciofluvial, meaning that they were directly deposited by glacial meltwater. In addition, an esker is identified in this region. The formation of several kettles (depressions resulting from blocks of ice melting under the sand) promoted the presence of lakes in this area.

To the south, rocky outcrops form two small buttons, one of which is covered with till. These rocky buttons pierce the clay plain, which occupies the entire southeastern portion of the study area.

Existing landslide scars suggest that the region is subject to significant erosion dynamics. Indeed the presence of scars from major clay flows to the south indicates that the whole region is particularly vulnerable to this type of mass movement, and has been for a long time.

Earthquakes

The study area is part of the Charlevoix seismic zone, which remains the most active in Eastern Canada. According to the Seismic Zoning Map of Canada produced by Natural Resources Canada (NRCan), Saint-Honoré is in Zone 3, which has a high probability of seismic activity.

According to the National Earthquake Databse (NEDB) 85 earthquakes or other events (blasting) have been recorded since 1985 within a 50 km radius of the study area with magnitudes between 0.1 and 5.9. The most powerful earthquake occurred on November 25, 1988 in the Laterrière region. Forty aftershocks were recorded over the following days and months. Within 5 km of the Niobec Mine, in the Saint-Honoré region, six earthquakes were recorded between 1991 and 1995 with magnitudes ranging from 0.0 to 2.4.

Soil stability

The region is characterized by several landslide scars which are visible within the study area. In the southern section of the extended study area, deposits were reworked by mass movements that are on the edge of an area where some large

landslides were triggered. The best known was the Saint-Jean-Vianney slide which occurred May 4, 1971 and covered an area of approximately 30 ha. This slide left a scar; however, it is almost completely hollowed out and there is only a thin layer of debris on the bottom. It should be noted that this slide was formed within the limits (20.6 km^2) of a 1 663 landslide, which is believed to have triggered a 7.0 magnitude earthquake.

Geotechnical surveys in the study area have revealed that some of the clay deposits are potentially sensitive and may experience liquefaction due to seismic events or various disturbances.

6.1.4 Soil quality

Soil quality analysis in the study area shows no abnormal concentrations of parameters. For metals, the natural background levels for some parameters are high. Barium and cadmium concentrations in several samples were in the generic criteria range ''A-B'' of the Policy. In addition, one sample also had a manganese concentration in the generic criteria range ''C-D'' of the Policy. On the other hand, there were no exceedances of the generic criteria range ''A'' of the Policy for the metals analyzed.

The pH of the sampled soils ranged from slightly acidic to slightly alkaline. Total cyanide concentrations are generally below the detection limit, except for a few samples where the values are in the generic criteria range ''A-B'' of the Policy.

Finally, among the samples analyzed for sulphur, one has a concentration in the generic criteria range ''A-B'' of the Policy and another has a concentration in the generic criteria range ''B-C'' of the Policy.

6.1.5 Hydrological regime

The study area is located within the Saguenay River basin. Within the restricted study area the Aux Vases River is the main streams. It has two main tributaries, namely the Bras-Cimon Creek and the Bouchard Creek. Streams flowing through the study area are characterized by extensive forestry and agricultural environments.

The Aux Vases River has an estimated annual average flow of 2.1 m^3/s downstream of its confluence with the Bras-Cimon Creek, which has an annual average flow of 0.7 m^3/s. The Aux Vases River downstream to Brûlé Lake has an annual average flow of 0.5 m^3/s and the Bouchard Creek upstream of Brûlé Lake has a flow of 0.4 m^3/s. Low flows ($Q_{2,7}$) for these streams at the same locations are estimated at 0.41, 0.13, 0.1 and 0.07 m^3/s respectively. Flow during flooding events (2 year recurrence interval) are estimated at 22.5, 9.0, 6.8 and 4.5 m^3/s respectively.

6.1.6 Groundwater flow regime

Aquifers

In the Saint-Honoré sector there are two main types of aquifers. Granular aquifers consist of deposits of deltaic sand and gravel or littoral sand which are shaped as

plateaus and are located east of the Caribou River, approximately 6 km from the Mine. These aquifers are the main source of drinking water in the Municipality of Saint-Honoré and are operated by the City of Saguenay and Niobec. Granular aquifers are sporadically distributed within the restricted study area and found west of the Mine and to the south of the Shipshaw River. Sandy aquifers in the same region do not provide hydraulic linkages between the two types of aquifers. According to the information received, granular aquifers (west and south) are characterized as Class II as they have acceptable quality and the extraction potential is good. Within the restricted study area, this aquifer is not considered a source of irreplaceable water supply unlike the Saint-Honoré aquifer (Class I). According the DRASTIC index the hydrogeological properties of the site the groundwater from the granular aquifers has a high index of vulnerability (MDDEP 2005).

The rock aquifer, probably less exploited because of the poor quality of extracted water, still has some remaining potential depending on the type of rock encountered (limestone or igneous rock). The rock aquifer vulnerability index has been evaluated to be very low to medium. This aquifer is considered Class III or II according to the hydrogeological context and physico-chemical properties. The permeability data indicated that the water in the rock aquifer is exploitable but the results of the sampling indicate that the water quality is generally poor because it is highly mineralized (high concentrations of chloride, sodium, calcium, etc.). On the other hand, groundwater removed within a few piezometers in the rock has an acceptable quality and thus the groundwater must be considered Class II.

Piezometry and groundwater flow

Groundwater at the Mine, in the rock aquifer, flows from north to south. It is assumed that the water flows in the same direction where the construction of the tailing ponds will occur. More boardly, the regional flow in the rock aquifer is from northeast to southwest and from north to south at the east and west ends of the site.

6.1.7 Groundwater quality

Groundwater analysis in the study area shows that the natural background concentrations of several parameters are high and often exceed the RESIE or drinking water criteria. Groundwater is generally highly mineralized.

The following parameters exceeded the RESIE criteria for the groundwater samples collected: copper, chloride, total phosphorus, zinc, sulphates, barium and silver. The following parameters exceeded the drinking water criteria: sodium, chloride, iron, lead, molybdenum, arsenic, nickel, selenium and fluoride.

The clay cover in the area acts as a protective barrier to infiltration of surface water to deep aquifers. The most vulnerable aquifers are those located above the clay layer (granular sandy aquifers) or those located in areas where the clay layer is thin or absent.

6.1.8 Surface water quality

The quality of surface water from two waterbodies within the study area (Brûlé and Des Vases Lakes) indicates that the water is neutral, soft and well mineralized based on the physico-chemical characteristics and has a low sensitivity to acidification. The water was not very clear and had high concentrations of suspended material and chlorophyll which are associated with agricultural activities that promote soil erosion, particularly arable crops. High levels of organic and inorganic carbon, as well as tannins and lignins, are explained by the presence of bogs in the area.

With regards to major ions and nutrients the surface water showed a marked presence of total nitrogen in Des Vases Lake. The ammonia nitrogen concentration exceeded the criteria for the protection of aquatic life from chronic toxicity under the MDDEFP. The concentration of total phosphorus exceeded the criteria for the protection of aquatic life from chronic toxicity under the MDDEFP for both lakes. These nutrients explain the marked presence of phytoplankton, demonstrating the process of eutrophication of these lakes, which is often associated with agricultural activities.

The concentration of total cyanide, an index often associated with industrial effluents, also exceeded the criteria for the protection of aquatic life from chronic toxicity under the MDDEFP. It should be noted that there are no industrial emissions in this section of the study area. Cyanide in the environment may also originate from the runoff resulting from the application of salts containing cyanide compounds on the soil and in water (including pesticides and rodenticides).

In addition to major ions, some metals had high concentrations in the surface water, including aluminum, iron and lead (only in Brûlé Lake). Aluminum concentrations exceeded the Canadian guidelines for the protection of aquatic life under the CCME; while the concentrations of iron and lead (only in one lake) exceeded the criteria for the protection of aquatic life under MDDEFP (acute or chronic toxicity). These elements are normally present in soils in varying concentrations.

The results of the Environmental Effects Monitoring (EEM) studies (2004 to 2009) showed, in general, that the surface water quality from Bouchard Creek and Aux Vases River meet the criteria for the protection of aquatic life. However, several exceedances were observed for a number of metals and major ions.

6.1.9 Sediment quality

Sediment quality in both bodies of water within the study area (Brûlé and Des Vases Lake) indicates that the following metals were detected (in order of importance): iron, aluminum, calucium and magnesium. Only chromium concentrations in the Brûlé Lake sediments exceeded the criteria for the quality of freshwater sediments under the CCME with a concentrations capable of producing a threshold effect (CSE). With regards to other substances, oil and grease were also detected.

The results of the EEM study (2004 to 2009) show that the sediment quality from Bouchard Creek and Aux Vases River meets the CCME criteria for Sediment Quality Guidelines for the Protection of Aquatic Life (freshwater).

6.1.10 Background noise

Noise surveys near residences situated in the sensitive zone 1 have shown that the general noise measured at receptor points is relatively high due to heavy road traffic, even at night, and mostly continuous air traffic during the day. This noise potentially contains the sounds generated by the Niobec Mine activities. During the day, with the exception of ventilation fans perceived weakly at the measurement point located near the mining facilities, there were no audible manifestations from the Mine. However, at night, the noise generated by fans, the movement of a drill or bulldozer were easily perceived at the measurement points closest to the Mine (located immediately north). For the vast majority of the measurement points, the level of ambient noise is sometimes less than the MDDEFP criteria.

6.1.11 Vibration perception

Vibration measurements in the field and analysis of data stored by Niobec (vibrations produced by blasting) were used to measure the effect of vibrations from current Mine operations at the property boundary and nearby neighbours. Measurements and simulations (vibration propagation model) showed that current blasting operations meet Directive 019 of the mining industry. Vibration levels are also safe for all structures located outside the Niobec site.

6.2 Assessment of impacts on the physical environment and mitigation measures

Table 9-1 of the chapter 9 presents the overall balance of the impacts on the physical environment.

In the next few sections, anticipated impacts to the most sensitive components (medium residual impact) during the different phases of the project are presented. Both general and specific mitigation measures that will be implemented are also summarized below.

6.2.1 Construction phase

Impacts likely to affect the various components of the physical environment in the construction phase are anticipated to originate from the following sources: construction activities for the various planned infrastructure, including the construction of a new plant, dismantling of the existing plant, shaft sinking, installation of pipes and the construction of a new tailings pond.

The anticipated impacts of medium residual significance relate to increased level of noise, which may cause nuisance to nearby residences.

The following general mitigation measures will be implemented to enable compliance with the noise criteria:

- Implementation of the acquisition and mitigation area intended by Niobec.

- All mobile equipment residing on the mine site (excluding trucks on public roads) will be equipped with a white noise alarm to help neutralize the tonal character sounds.
- Bumping of back panels on trucks will be prohibited.

6.2.2 Operational phase

Impacts likely to affect the various components of the physical environment in the operating phase are anticipated to come from the following sources: the collection and recycled water basins, dams and tailings ponds, installation of materials for dams and residual material in the tailings ponds, block caving activities, creation of an area of subsidence on the surface, presence, operation and maintenance of buildings, permanent installations, permanent installations associated to production equipment, machinery, management of hazardous materials, use and management of water as well as the general operations at the plant.

The anticipated impacts of medium residual significance relate to the following: slope erosion, landslides and deformation of the tailings pond dams which can affect soil stability / change to local flow regime which could affect the groundwater flow regime / risk of contamination from spills as well as deterioration of general surface water quality / increased noise levels which may cause nuisance to the nearest residences from activities such as watering the tailings ponds, movement of piping on top of tailing ponds, movement of deposits, material and excavated fill, cell method for dam construction, raising of central tailings dams and future plant activities.

General mitigation measures that will be implemented are as follows:

- Limit the impacts of excavation and earthworks near wetlands and streams in order to protect riparian zones.
- Reduce erosion due to runoff and prevent sediment from reaching a lake or streams.
- Ensure machinery is kept in good condition and spill kits are located adjacent to the work.
- Compliance with the management of the fueling station and handling of petroleum products.
- Management of waste and hazardous materials to prevent contamination of surface water.
- Avoid unloading or storing snow in streams and their riparian zones.
- Avoid releasing dust emissions into the atmosphere.
- The discharge and monitoring of final effluent water will comply with current standards.

In addition, the following specific mitigation measures will also be applied:

- Implementation of the acquisition and mitigation area intended by Niobec.

- Stabilization of slopes in tailings ponds using techniques that harmonize well with the natural environment, such as revegetation and restoration of plant cover.
- Conduct a risk analysis of the project, including geotechnical aspects.
- Compact tailings from the dam, at the periphery of the tailings pond, to form a non-liquefiable tailings area. The requirement to compact waste is particularly important for residues located at the base of the dam (i.e., those deposited during the first years of operation).
- Regular, visual inspection of dams to detect any anomalies.
- No bulldozing activities at night in Phase 4 of the tailings ponds.
- A single bulldozer will be active during the day operation of the dam northeast of Phase 4 tailings ponds. The other two bulldozers will be in simultaneous operation in the southern section of the Phase 4 or on the cell inside the dams.
- All mobile equipment on the mine site (excluding trucks on public roads) will be equipped with a white noise alarm to help neutralize tonal character sounds.
- Bumping of back panels on trucks will be prohibited.
- Well fans will be configured for a maximum noise level of 80 dBA at 1 m.

7 EXISTING CONDITIONS AND IMPACTS OF THE PROJET ON THE BIOLOGICAL ENVIRONMENT

This chapter describes the various components of the biological environment that are likely to be affected by one or more sources of project-related impacts. The existing conditions of each component are described as well as a summary of impacts and mitigation measures that will be implemented.

7.1 Existing conditions

7.1.1 Benthic fauna

Within the study area the benthic fauna is found in two lakes (Brûlé Lake and Des Vases Lake) and is characterized as low density. On average the Brûlé Lake sampling produced 204 organisms per square meter distributed across 4 families. The dominant phylum was composed of Annelida of the Tubificidae family. The sample from Des Vases Lake was less densely populated and had an average of 18 organisms per square meter distributed across only 2 families (Tubificidae and Chaoboridae) with similar proportions. This result was much lower than that of Brûlé Lake. Both low diversity and quantity of organisms, as well as the absence of taxa sensitive to pollution (such as Mayflies, Stoneflies and Caddisflies) confirms the presence of low-quality ecosystems.

Monitoring results of the EEM (2004 to 2009) from Bouchard Creek and Aux Vases River showed that benthic communities were diverse. Insects dominated the samples followed by Chironomids and bivalve molluscs.

7.1.2 Ichthyofauna and habitats

Water bodies

Brûlé Lake and Des Vases Lake are small, shallow lakes whose parameters are representative of eutrophic and productive lakes. They had thermal stratification in the summer with oxygen levels below the minimum requirements of salmonids in the deeper areas.

Brûlé Lake has little potential for the reproduction of Brook Trout. It contains several impassable obstacles, particularly in the upstream portion of the watershed. Two species of fish were captured: Small Brook Trout (63% of catches) and Pearl Dace. The halieutic potential for Brook Trout is limited.

In Des Vases Lake the free movement of fish was compromised at both ends of the lake (tributary and outlet) by impassable beaver dams. The following two species of fish were captured in small quantities: Pearl Dace and Five-spined Stickleback. The halieutic potential is very low or almost non-existent for Brook Trout.

D Lake is a small, productive, eutrophic basin with a population of Pearl Dace. The halieutic potential is very low or nul for Brook Trout.

The polishing pond is also a very small body of water located on the grounds of the Niobec Mine and no fish species were caught when sampling. The basin is artificial and has been development to collect effluent from the Mine before it is treated and discharged into the Shipshaw River.

Streams

The main streams in the study area is the Aux Vases River, located in the western part of the study area and flows 25 km before reaching the Saguenay River and several secondary branches. In general, these rivers are small with a width of less than 4 m and depth of less than 1 m just until the parts situated completely upstream. There are several beaver dams restricting the free movement of fish. A few Brook Trout spawning habitats were identified upstream of Brûlé Lake in an area with multiple fish migration barriers. Brook Trout were observed in the fall.

The Bras-Cimon Creek, located south of the Mine, flows for about 7 km before reaching the Aux Vases River. This streams is small with a width of 2 m or less and until 2011 received the Mine effluent downstream of the polishing pond.

A portion of the Gagnon-Flamand Creek, a tributary of the Caribou River, is located in the northeastern part of the study area. This creek is small with a width of 2 m or less and contains several obstacles, some of which are impassable by fish.

A series of adjoining ditches are located in the eastern part of the study area. No fish were captured within these ditches during sampling events.

The following seven species of fish were captured in the streams surveyed: Longnose Dace, Five-spined Stickleback, Three-spined Stickleback, Fallfish, Pearl Dace, Lake Chub and Brook Trout. These streams have few suitable habitats for Brook Trout. The Aux Vases River watershed could also provide habitat for the following species: American Eel, Yellow Walleye and Longnose Sucker. The American Eel and Yellow Walleye are most likely located in the downstream of the identified streams.

Shipshaw River

The water intake and outlet area of the Shipshaw River can be characterized by a lentic type flow upstream followed by a channel. Species of fish caught in this area are as follows: Fallfish, White Sucker, Lake Chub, Longnose Dace. This segment of the River is also home to Northern Pike, Longnose Sucker, Brook Trout, Whitefish, Lake Trout and Brown bullhead.

7.1.3 Vegetation and wetlands

In total, 370 species of vascular plants were present or likely to be present in the study area. Various surveys were conducted, with efforts focused primarily on wetlands, and confirmed the presence of 303 species. The study area is transitional as it is located between the northern temperate and boreal zones. Different substrates and the presence of a large number of anthropogenic habitats contribute significantly to the floristic diversity of the study area.

Terrestrial environments

The study area covers an area of 24 686 ha. Terrestrial environments cover 80% of the area.

Environments altered by anthropogenic activities (mine and quarry) occupy 6% (1 374 ha) of the land and are concentrated in the south and north of the study area. The current Niobec Mine is located in the center of the study area and represents approximately 104 ha of the total area.

Agricultural areas are concentrated mainly in the southwest portion of the study area and occupy 2 957 ha or 12% of the total area.

Softwood forest stands occupy 19% (4 809 ha) of the study area. For the most, these stands have been established from forest fires. They are uniformly distributed over the study area with large contiguous land sections in the western portion which have undergone partial cuts.

Environments of regeneration (ecological succession) are common in the study area and occupy 16% of the territory. This area is primarily due to anthropogenic disturbances such as recent logging (3 262 ha), plantations (430 ha), and right-of-way for transmission lines (173 ha).

Fallow land occupies 1 475 ha (6%) of the total study area. This land is a result of abandoned cultivated farmland which is located at the periphery of existing cropland.

Mixed forest stands are abundant and occupy 16% (3 966 ha) of the total study area. The majority of these stands are a result of logging and are evenly distributed over the whole area.

Intolerant hardwood stands colonize sites with a finer texture and are evenly spread over the study area. These stands are primarily a result of logging. Hardwood stands occupy 3% of the study area and are confined to the northern section. There are more young stands, at a ratio of 3:1, over mature stands. Trembling Aspen and Paper Birch are the dominant species in this region.

Small stands of tolerant hardwoods, including Sugar Maple, are found in the northeastern section of the study area. A small sugar bush was inventoried in the wooded area north of tailings pond no. 2. Approximately forty mature Sugar Maple trees were observed. The largest specimens were notched to harvest sap in the past but this practice appears to have been abandoned recently.

Blueberry fields occupy 400 ha or 2% of the total study area. They are located in the southwest and northwest sections.

Wetlands

Wetlands account for 3 933 ha or 16% of the total study area. Aquatic environments occupy 1 042 ha or 4%, including natural water courses, ponds and reservoirs.

Within the study area, bogs represent 1 521 ha (6%), forested bogs represent 1 418 ha (6%), and fens represent 135 ha (less than 1%). Drainage channels were

made into two bogs located east and west of the Mine and have a total area of 149 ha.

Marshes (tree-filled and waterside) comprise a small area, with a total of 375 ha, and are closely linked to the presence of water. Treed marshes are very uncommon in the study area and only occupy 39 ha.

Swamps occupy a small portion, 126 ha, within the study area and are mainly located in beaver ponds or associated with ponds and marshes.

Cedars grove occupy a small portion, 113 ha, of the study area. They are mostly concentrated west of the Mine, in the southeastern section on lime deposits, as well as in three areas in the northern section of the study area.

Vascular plans with special status

The presence of five species that are provincially protected were confirmed by the fields inventories within the study area and are as follow: Striped Coralroot, Southern Twayblade, Arethusa Bulbosa (commonly called Dragon's Mouth Orchid), White-fringed Orchid, and Ostrich Fern.

7.1.4 Herpetofauna and habitats

In total, 16 herpetofauna species are present or likely to be present in the study area. Various surveys confirmed the presence of the Green Frog, Mink Frog, Wood Frog, Bullfrog and Spring Peeper.

7.1.5 Birds and habitats

Diversity

In total, 188 species of birds are present or likely to be present in the study area. Field surveys identified 92 species during the nesting period. Thirty species were confirmed to be nesting, 25 species are considered likely to be nesting and 37 are possibly nesting. These surveys also identified the presence of the Gadwall and the Lesser Scaup in the study area.

The population of breeding landbirds in the extended study area is estimated to be between 50 000 and 118 000 breeding pairs. The richest habitats in terms of species are regenerating stands and mixed hardwood and mature forests.

For landbirds, the most common species are the Gray-cheeked Warbler, White-throated Sparrow, Ovenbird and Bay-breasted Warbler.

Naturally aquatic environments are scarce in the study area as there are very few ponds in the bogs and the rivers are small. Only one Black Duck, a female Common Goldeneye, six Sandhill Cranes (young and adult) and a Great Blue Heron were observed. It should be noted that disturbed environments, such as the Mine's ponds, hosted an abundance of waterfowl species. Ponds and their periphery are used for nesting and rearing ducklings for several species of ducks. The most abundant species observed were the Black Duck, Mallard, Northern Shoveler, Common Teal and the American Wigeon.

During a variety of surveys, six species of birds of prey were recorded within the study area. The most abundant species observed was the American Kestrel with three pairs and a nest within proximity of the tailings pond. The Northern Harrier frequented the bog in the northwestern portion of the study area. A Broad-winged Hawk was observed in the cedar grove area near the Mine as well as west of Bouchard Creek. Finally, a Short-eared Owl was observed once over a field north of the Mine.

Species at Risk

The presence of six species that are provincially protected were confirmed by the fields inventories within the study area and are as follows: Short-eared Owl, Common Nighthawk, Barn Swallow, Canada Warbler, Bobolink and Rusty Blackbird.

7.1.6 Mammals and habitats

Diversity

In total, 50 species of mammals are present or likely to be present in the study area. More specifically, there are three species of large fauna, 22 species of small fauna, seven bat species and 18 species of small mammals.

Various surveys confirmed the presence of the Black Bear, Beaver, Red Fox, Red Squirrel, Snowshoe Hare, Muskrat and 12 species of small mammals. The most abundant species of small mammals was the Masked Shrew followed by Meadow-jumping Mouse, Northern Short-tailed Shrew and Deer Mouse.

Species at Risk

The Southern Bog Lemming, a species likely to be designated as threatened or vulnerable in Québec, was captured in a bog within the study area.

7.2 Assessment of impacts on the biological environment and mitigation measures

Table 9-2 of the chapter 9 presents the overall balance of the impacts on the biological environment.

In the next few sections, anticipated impacts to the most sensitive components (medium residual impact) during the different phases of the project are presented. Both general and specific mitigation measures that will be implemented are also summarized below.

7.2.1 Construction phase

During the construction phase, between start-up and closure of the construction site, the following sources are likely to have an impact on the biological environment: deforestation, stripping and removal of woody debris, excavation, backfilling, drilling, blasting, equipment set-up, development of site access, movement of machinery and waste and hazardous materials.

The anticipated impacts of medium residual significance are the loss of area currently colonized by plants, including wetlands / habitat loss and disturbance of birds due to the disruption of existing background noise / temporary and permanent habitat loss, mortality of low mobility individuals and disturbance of mammals due to the disruption of background noise.

General mitigation measures that will be implemented:

- The movement of machinery and trucks will be limited to the right-of-way access roads, work areas and the protective perimeter will be fenced in.
- No vehicle or construction equipment will travel, without cause, within 20 m of a permanent streams or within 5 m of an intermittent streams.
- During the excavation and earthwork, the areas around ditches will be graded and cleared of topsoil, which will be reused in the same sector.
- Machinery will be kept in good condition and spill kit equipment will be present. Parking, washing and maintenance of machinery areas will be located at least 60 m from a streams.
- Upon completion of the work, some areas will be redeveloped and restored. Areas that will be not used during the operational phase will be revegetated. Altered banks will be restored, including slope stabilization and revegetation of surfaces.
- Excavation and earthworks adjacent to wetlands and rivers will be limited in order to protect riparian zones.
- Reduction of erosion due to runoff and preventing sediments from reaching streams.
- Waste and hazardous materials will be managed accordingly to prevent the contamination of soil and surface water.
- A site supervisor will be present at all times to ensure compliance with all environmental requirements and the application of mitigation measures.
- All waste material and debris shall not be deposited into streams.

In addition to the above, the following specific mitigation measures will also be applied:

- In order to prevent the destruction of nests, deforestation will not occur during the main nesting period for species at this latitude, which is a period from May 1st to August 15th.
- Progressive deforestation and filing of tailings ponds during the operational phase of the mine will reduce impact on mammals.
- A compensation plan will be elaborated in a later stage and additional details are given in the monitoring program.

8 EXISTING CONDITIONS AND IMPACT OF THE PROJECT ON THE HUMAN ENVIRONMENT

This chapter introduces the different components of the human environment likely to be affected by one or more sources of impact from the project. Existing conditions of each component are described and a summary of impacts and mitigation measure that will be implemented.

8.1 Existing conditions

8.1.1 Administrative framework and land tenure

The extended study area of the human environment is part of the administrative Saguenay-Lac-Saint-Jean region (02) and the Fjord-du-Saguenay MRC. It encompasses the entire Saint-Honoré Municipality and Saint-David-de-Falardeau Municipality to the north and intersects with the City of Saguenay (Districts of Jonquière and Chitcoutimi) in the sourthern portion.

The study area is mainly composed of private land; however, there is a relatively large area of public lands. They are intramunicipal public land (IPL) under the management of Fjord-du-Saguenay MRC and City of Saguenay or of public lands under under the management of MRN (Government of Québec).

8.1.2 Land planning and development

Ministère des Ressources naturelles (MRNF)

The “Plan d'affectation du territoire public” (PATP) of the MRNF offers two main assignments for the territory with the study area, which are the prioritary occupation/activity uses (blueberry farms to the northwest on the Saint-David-de-Falardeau territory) and multiple modular uses for the remainder of the territory priority.

Fjord-du-Saguenay MRC

In addition to the three urban perimters, all other assignments for the territory of Fjord-du-Saguenay MRC are as follows: agricultural, agroforestry, industial, forestry, urban and recreational. The largest territory assessment with respect to area is agricultural.

Saint-Honoré (intramunicipal public land)

According to the “Plan intégré de développement et d’utilisation des terres publiques intramunicipales” IPL in the Saint-Honoré Municipality has a total area of 1 667 ha, for which the following six types of assignments haven attributed: agriculture (63.6%), conservation (28.2%), forestry (6.1%), recreational tourism (1%), industry and transport (0.7%) and protection (0.4%).

Saguenay MRC

The City of Saguenay is municipality which has the skills of an MRC. In the City of Saguenay, the study area includes the urban fringe and the rest of the territory is allocated for agriculture and forestry.

Saint-Honoré Municipality

The Saint-Honoré Municipality zoning at the Niobec Mine site is designated as industrial; and in the vicinity of the Mine, it is designated as agricultural.

8.1.3 Regional population and economy

Population

Since early 2000, the populations of Saint-Honoré and Saint-David-de-Falardeau have both been increasing. The City of Saguenay, as well as the whole region, experienced a population decline between 2001 and 2006 but a slight increase thereafter.

Saguenay-Lac-Saint-Jean has experienced an increase in the number of jobs in both 2006 and 2007. Afterwards, this number continued to decrease until 2010 due to the global economic downturn, which affected industries at the base of the regional economy, namely logging and primary processing for metals and agri-food. In 2006 the unemployment rate of Saint-Honoré, Saint-David-de-Falardeau and Saguenay was higher than anywhere else in Québec, as well as having lower employment rates. The total median revenues in 2005 in the City of Saguenay, as well as in the Municipalities of Saint-Honoré and Saint-David-de-Falardeau, were slightly lower than data from across Québec.

Economic activities

In the Saguenay-Lac-Saint-Jean region logging, wood processing and aluminum production industries account for almost 40% of employment related to the primary and secondary sectors.

The City of Saguenay has a diverse workforce and has become the commercial centre of Northern Québec. Nearly 83% of some 4 200 companies operate in the tertiary sector with more than 57 000 jobs (78.9%). The secondary sector provides 19.2% of jobs whereas the primary sector provides 1.9%.

The Saint-Honoré Municipality benefits, economically, from the presence of Niobec on its territory and is the largest employer on the territory with 460 employees.

The economic activity of the Saint-David-de-Falardeau Municipality is primarily based in the transformation and enhancement of forest products as well as recreational activities.

8.1.4 Social structure

According to the results from a Statistics Canada study carried out in 2007-2008, which was based on the sense of belonging to the local community by region, the

commitment of the people in the region proves to be strong. According to these results, it is understood that the same can be assumed for the majority of Saint-Honoré population.

Voter turnout is a measure of social cohesion which is commonly used. In 2009, the turnout in municipal elections was just over 50% in the region. In the 2007 provincial election, this rate was 75% for the entire region (compared to 71% in Québec). In the 2008 federal election, the regional voter turnout was 62%, a proportion similar to the Québec rate.

8.1.5 Land use and resources

8.1.5.1 Developped environment

The study area includes the villages of Saint-Honoré and Saint-David-de-Falardeau as well as the residential sectors of City of Saguenay (north shore). There are houses scattered along the roads in these three municipalities.

The main businesses are distributed along Route 172, Martel Boulevard and within the village centres of Saint-Honoré and Saint-David-de-Falardeau.

The institutional structures are concentrated in the village centres of Saint-Honoré and Saint-David-de-Falardeau.

In the Saint-Honoré Municipality, the industrial structures are primarily located at the Niobec Mine site, the quarries on Boulevard Martel and at the Chicoutimi-Saint-Honoré Airport.

8.1.5.2 Agriculture

A large part of the study area is agricultural land that is protected under the “Loi sur la protection du territoire et des activités agricoles”. The protected agricultural land has a greater surface area in the Saint-Honoré Municipality compared to the Saint-David-de-Falardeau Municipality.

Mapping of the agricultural potential of soil, according to the ARDA classification, shows that the study area has soil classes of varying potential. There are many lots with a good potential along Route 172, east of the Aux Vases River and Martel Boulevard and at the height of the Saint-Honoré village. The agricultural sector in the Saint-David-de-Falardeau Municipality is more exploited than that of Saint-Honoré. The land allocated to agricultural purposes in the Shipshaw River basin, Saint-Honoré and Saint-David-de-Falardeau, has a development potential for blueberry or potato crops. This agricultural potential is recognized by agronomists as one of the best potential blueberry field developments in the area.

Many plots of land in the study area are dedicated to the cultivation of blueberries. Three blueberry farms are identifed in the territory of Saint-Honoré. Within the territory of Saint-David-de-Falardeau, blueberry cultivation is particularly prevalent west of the Shipshaw River on IPL.

Land for potato cultivation is primarily concentrated west of the Shipshaw River.

There are eight sugar bush licenses on IPL in Saint-David-de-Falardeau, north of the study area. In addition, Saint-Honoré has two sugar bushes located on private land within its territory.

The Fjord-du-Saguenay MRC has defined two parcels of land for the potential cultivation of cranberries, west of Saint-Honoré, near the City of Saguenay boundary.

8.1.5.3 Logging

Forests in the study area are either under the management of the Fjord-du-Saguenay MRC or under the City of Saguenay when they are IPL.

In Saint-Honoré the land allocated for forestry is only 102 ha (6.1%), while the IPL land in Saint-David-de-Falardeau allocated for forestry covers 1 769 ha (45.4% of the IPL of the Municipality).

8.1.5.4 Mining

It is important to note that nearly one kilometre north of the Niobec Mine, IAMGOLD focused on the exploration of what appears to be one of the most important rare earth metals deposit of the world. Extraction for rare earth metals is akin to the niobium extraction process. IAMGOLD could adapt some of its current facilities for the prodction of these new minerals. IAMGOLD is currently conducting a preliminary economic assessment of this potential exploitation.

8.1.5.5 Extraction and waste disposal areas

Extraction areas

The study area includes two quarries in the Saint-Honoré Municipality. They are located on either side of Martel Boulevard, south of the village centre.

The study area also includes seven sand pits on IPL, including four in Saint-David-de-Falardeau, one in Saint-Honoré and two in Sagenay. The City of Sagueny also has five extraction sites on private land.

Waste disposal areas

It should be noted that Saint-Honoré's waste disposal and the portion of Saguenay in the study area's waste disposal is carried out in the City of Saguenay's territory.

The MDDEFP reported the presence of two waste disposal sites, which are designed for soil and industrial waste, both of which are inherent to Niobec's activities. This allows for underground storage of ferrobium slag and tailings from the tailing ponds.

8.1.5.6 Cottage, recreation and tourism

In the Saint-Honoré Municipality the main vacationing areas border Docteur Lake and Creek as well as the following Lakes: Bon-Repos, Louis Harmel, Caribou, Joly and Larrivée.

The Saint-David-de-Falardeau Municipality has the largest number of cottages leases on IPL (34), including 29 that are located within the study area.

In Saint-Honoré, the Martingale Equestrian Centre offers horseback riding in a 125 km network of trails which lead to the foot of the Valin Mountains. In Saint-David-de-Falardeau the Chiens et Gîtes du Grand Nord company, located east of Durand Lake, offers dogsledding rides. The Centre d'Observation de la Faune et d'Interprétation de l'Agriculture of Saint-David-de-Falardeau is a refuge for injured wild animals.

Saint-David-de-Falardeau is one of the gateways to the northern territory, an area used for recreational purposes. The Sébastien Lake Seaplane Base in Saint-David-de-Falardeau facilitates access to this terrority.

A large network of snowmobile trails criss-cross the study area. The ATV trails follow similar paths and in several places they share the same right-of-way. The Trans-Québec No. 93, a national snowmobile trail, crosses the territory from west to east, passing under the ownership limit of Niobec and then passing north around Docteur Lake and out of the study area in Saint-David-de-Falardeau.

8.1.5.7 Wildlife resources

According to the most recent data from the the MRNF wildlife sector, no sport fishing is practiced in the restricted study area. On the other hand, unorganized fishing is practiced on the Valin and Shipshaw Rivers as well as in some lakes. Brook Trout is the main species fished in these streams.

The study area is located within hunting zone 28, which covers most of the Saguenay-Lac-Saint-Jean area. In 2006, during the last aerial survey covering the area, the density of moose had been assessed at 0.54 inidividuals/10 km^2. Signs of hunting were observed in the large bogs located west of the restricted study area during the biological field inventories conducted by GENIVAR as part of this project.

The density of the region is estimated at 1.4 bears/10 km^2. Evidence of black bear activity in the territory was noted on the ground during the biological field inventories conducted by GENIVAR as part of this project.

A single UGAF is touched by the studied human environment zone, this being UGAF 52. It corresponds to an open trapping area, accessible to all generael permit holders. The most common species harvested are the Beaver, Red Fox, American Marten, Weasel and Mink.

8.1.6 Infrastructure and services

8.1.6.1 Road networks

In the southern part of the study area, Route 172 runs from east to west according to the Transport Québec classification. A network of collector roads oriented north-south in the study area links the municipalities not served by Route 172. In the study area, the main arterial road is Martel Boulevard. It provides the link bewteen Saint-David-de-Falardeau, Saint-Honoré and the City of Saguenay. Martel Boulevard and Route 172 are very busy roads in the study area.

Transportation associated with Niobec operations occurs on both the municipal and regional road networks. The operation of the Mine generates 53% of the traffic on the Hôtel-de-Ville Road and 29% of the traffic on Saint-Marc Ouest Road.

8.1.6.2 Airport

The Chicoutimi-Saint-Honoré Airport (CYRC) is located east of the Saint-Honoré urban centre and mainly south of Airport Road. Although it has the capacity to receive jumbo jets it primarily services small, private aircrafts.

NAV CANADA marker beacons servicing Chicoutimi-Saint-Honoré Airport are located within the study area. One is located west of the existing Niobec facilities and several others on the Saint-Honoré territory.

8.1.6.3 Eletrical power

The study area includes sections of three power transmission lines of 735 kV and two lines of 161 kV. There are two Hydro-Québec substations.

8.1.6.4 Municipal infrastructure

The Saint-Honoré Municipality supplies its region with drinking water from four groundwater wells located in the wooded territory north of the Chicourtimi-Saint-Honoré Airport. The majority of the inhabited Municipality is served by this water distribution system.

The Saint-David-de-Falardeau Municipality supplies drinking water from two groundwater wells located east of Sébastien Lake.

The City of Saguenay supplies drinking water from two groundwater wells. One of the wells is operated by the City of Saguenay and is located outside its municipal boudaries to the south of the Aqueduc Lake in the Saint-Honoré territory.

The Saint-Honoré sewage treatment facilities includes an aerated lagoon system. The sewer system serves the same sectors as the municipal water network. The municipal sewer system does not serve the Niobec site. Separate wastewater treatment facilities are located on the property.

In Saint-David-de-Falardeau, the sewer system (aerate lagoons) are located inside the urban perimeter and main rural roads.

8.1.7 Quality of life

According to Natural Resources Canada, in Saint-Honoré and the District of Jonquière (Saguenay), the quality of life is acceptable and it is considered good in the District of Chicoutimi.

In Saguenay, as in several Québec municipalities, according to the "Institut du Nouveau Monde", citizens are very concerned about the challenges related to health and the quality of life, both individual and collective, in communities affected by mining projects. Citizens insist on the need for local employment to counter the negative impacts of commuting ("fly-in/fly-out").

Water and air emmissions, especially dust, as well as vibrations arising from mining blasts are some of the areas of concerns among the population in connection with the exploitation of mining sites.

Some elements of the current quality of life in Saint-Honoré, specifically around the mine, emerged as part of Niobec's communication and consultation with the community. The operation of the Mine causes nuisances that may affect the quality of life, including road traffic (safety and ridership), dust emissions mainly related to the operation of tailings pond no. 2, machinery noise, vibrations and light pollution.

8.1.8 Heritage and archaeology

The study area does not contain any cultural property, as defined under the *Cultural Property Act*. The limited study area does not contain any classified or recognized, nor any known archaeological sites.

At the regional level, the study area is part of an important network of waterways renowned for its former use dating back to the prehistoric period. The theoretical study of archaeological potential, supported by a visit to the field, demonstrated the archaeological potential in the restricted study area.

Four areas of high archaeological potential identified are in the following sectors: south (downstream of the Aux Vases River), north (upstream of the Aux Vases River), west (connected to the Shipshaw River) and Brûlé Lake.

8.1.9 Landscape

The extended study area lies within an agroforestry landscape with several large bogs present. This natural landscape is charactereized by the presence of rivers (Saguenay, Shipshaw, Aux Vases and Caribou) and an extensive network of streams meandering through the woodland and farmland.

More precisely, the restricted study area has a generally flat terrain with a decreasing altitude from north to south. Analysis highlighted three types of landscapes, which include agricultural, agroforestry and industrial.

8.1.10 Navigation

In the study area, the major river system associated with the Aux Vases River has several secondary navigable streams. In addition, the Shipshaw River, a navigable river, is located in the western portion of the study area.

8.2 Assessment of impacts on the human environment and mitigation measures

Table 9-3 of the chapter 9 presents the overall balance of the impacts on the human environment.

In the next sections, the anticipated impacts or benefits for the most sensitive components (medium residual impact or benefit and more) during different phases of the project are presented. Common and specific mitigation or improvement measures that will be implemented are also summarized.

8.2.1 Construction phase

Impacts

Sources of impacts that are likely to have a negative impact on the various components of the human environment in the construction phase come from the organization and closure of the worksite, deforestation and disposal of wood debris, excavation, backfilling and paving, the establishment of buildings (industrial complex), development of permenantly connected installations, installation of new production equipment, as well as the acquisition of property, services and labour.

The anticipated impacts of medium residual significance are as follows: risk of deterioration of social cohesion that can affect the social structure / modification of the quality of ambient air, noise and vibrations that might affect the phsical and psychological well-being of the population and thus their quality of life / modification of agroforestry, agricultural and industrial land that can affect the landscapes.

The following common mitigation measures will be implemented:

- Equipment and machinery used will be maintained in good working condition.
- Blasting activities will only be executed during the day, between 7 am and 7 pm, barring any exceptional circumstances.
- Vehicles will operate at reduced speeds when near private residences. The movement of machinery and trucks will be limited to the access roads and work areas.
- Necessary measures will be taken to ensure that deforestation activities comply with current laws and consistents.
- In areas with steep slopes, erosion problems will be avoided by continually stabilizing the bottom of ditches.
- A site supervisor will be present at all times to ensure compliance with environmental requirements and mitigation measures.

- Upon completion of work, areas will be refurbished and restored.

In addition, the following specific mitigation measures will be applied:

- Prior to construction, the population will be notified of beginning of the work.
- A Best Practices Gruide will be developed for a harmonious acquisition and compensation process by the ‘’Comité du milieu’’.
- In addition to the ‘’Comité du milieu’’, Niobec is committed to continuing its system for receiving and handling compliants.
- Niobec’s Community Relations Office will remain in place and a communication program will be monitored continuously.
- Niobec will measure, before the beginning of construction, existing background dust levels in the area where modeling shows that the project could have an impact on quality of air.
- Niobec will follow, during construction and operation of the Mine, the results of the modelling of the air quality, ambient noise and vibrations.
- Niobec will retain a wooded strip of at least 60 m around the tailings pond.

Benefits

Sources of impacts that are likely to have a positive impact on various components of the human environment in the construction phase come from the acquisition of goods, services and labour.

The anticipated residual benefits with medium or higher significance, are as follows: creation or preservation of jobs as well as the economic benefits from local and regional suppliers, which will promote the regional population and economy / increase the commitment of the local population to its environment which will promote the social structure / improving economic security of the population and commercial services will enhance the quality of life.

The following improvement measures will be considered:

- Niobec will priorize the use of companies based near the project when the call for tenders occurs and expertise and price are competitive.
- When possible, Niobec shall divide the major mandates to promote the participation of small local and regional businesses.

8.2.2 Operation phase

Impacts

Sources of impacts that are likely to have a negative impact on the various components of the human environment in the operating phase arise from the operation and maintenance of buildings, permenant installations and production equipment, quality of air, ambient noise, water use and management, acquisition of residences and goods, service and labour as well as the public land permits.

The anticipated impacts of medium residual significance are as follows: a decreased attachment of Niobec's neighbouring residents to their environment which may affect the social structure / potential housing pressure in Saint-Honoré and neighbouring municipalities and the amendement of land use for residential purposes on a stretch of Hôtel-de-Ville Road that may affect the use of land and resources / increased request for municipal wastewater and drinking water infrastructure that may affect infrastructure and services / physical modification of households located near the new mining infrastructure and the potential devaluation of properties that may affect the quality of life / modification of the agroforestry, agricultural and industrial landscape that may affect the landscape.

The following common mitigation measures will be implemented:

- Equipment and machinery used will be maintained in good working condition and a construction supervisor will ensure the proper maintenance of noisy equipment.
- Blasting activities will only be executed during the day, between 7 am and 7 pm, barring any exceptional circumstances.
- The noisest work will be scheduled during less sensitive periods.
- Vehicles will operate at reduced speeds when near private residences.

In addition, the following specific mitigation measures will be applied:

- In addition to the ''Comité du milieu'', Niobec is committed to continuing its system for receiving and handling compliants.
- Niobec's Community Relations Office will remain in place and a communication program will be monitored continuously.
- The possibility that Niobec makes a financial contribution, directly or indirectly, to the development of transport infrastructure (pipes) and the Saint-Honoré wastewater treatment infrastructure.
- Signage will be added on Martel Boulevard to indicate the presence of a new access road.
- Niobec will notify its workers and suppliers to access the Mine using the main access on 7th Rural Road.
- Speeds on the new access roads, including 7th Rural Road, will be limited.
- During the construction and operation phases Niobec will monitor the results of modelling.
- Niobec will implement an inspection program for the structure of the foundations of homes located closest to the Mine before operations begin.
- Niobec will measure vibration levels at strategic locations.
- Niobec will retain a wooded strip of at least 60 m around the tailings pond.
- Restoration and rehabilitation will be carried out progressively at the beginning of phase 1 of the tailings pond no. 1.
- Niobec will continue its research project, which is part of the Chaire en éco-conseil de l'UQAC. It involves research on the planting of trees on the outer

slopes of the existing tailings pond no. 2 and proposed tailing ponds if the results are positive.

- Buildings and related equipment will be visually integrated using harmonious colours.
- Lighting at the mining complex will be directed toward the ground, which will ensure worker safety as well as limit the amount of light pollution for nearby residents.

Benefits

Sources of impacts that are likely to have a positive impact on the various components of the human environment in the operating phase stem from the acquisition of goods, services and labour.

The anticipated residual benefits (medium and higher) of significance, are as follows: creation or preservation of jobs as well as the economic benefits from local and regional suppliers, which will promote the regional population and economy / increase in the commitment of the local population to its environment which will promote the social structure / improving the econoimc security of the population, increasing the value of buildings, improvement of business, community and municipal services which will enhance the quality of life.

The following improvement measures will be considered:

- Niobec will priorize the use of companies based near the project when the call for tenders occurs and expertise and price are competative.
- When possible, Niobec shall divide the major mandates to promote the participation of small local and regional businesses.

8.2.3 Closure phase

Impacts

Sources of impacts that are likely to have a negative impact on the various components of the human environment in the closure phase arise from the dismantling of new production infrastructure, equipment and related permanent installations, safety of the premises, the rehabilitation of the site and final restoration.

The anticipated impacts of medium residual significance are as follows: job losses, reduction of purchases in the region and the potential devaluation of buildings that can affect the population and regional economy / the deterioration of social cohesion during the closure period of the mine complex that can affect the social structure / the modification of the physical and psychological well-being of the population as well as jobs loss and reduction of purchases in the region, the posssible deterioration of the economic security of housholds and the reduction in services to the community that may affect the quality of life.

The following common mitigation measure will be implemented:

- Upon completion, equipment from work areas, machinery, materials, temporary facilities, waste and cuttings will be removed.

In addition, the following specific mitigation measures will be applied:

- Niobec is committed to continuing its system for receiving and handling compliants.
- Niobec will notify its workers and suppliers to access the Mine using the main access on 7th Rural Road. Speeds on the new access road, including 7th Rural Road, will be limited.
- Niobec will continue its community relation activities and program of continuous communication.
- Companies based near the project will be favoured when the call for tenders occurs where expertise and price are competitive.
- Niobec will notify the surrounding communities of the cessation of activities at the Mine.
- Niobec will continue exploration work to renew reserves and mineral resources of niobium in order to extend the life of the Mine.
- Work to beneficiate the elements other than the existing niobium in the Niobec deposit as well as promote mine tailings as well as beneficiate the tailings will be pursed, as to extend the life of the Mine.

Benefits

Sources of impacts that are likely to have a positive impact on the various components of the human environment in the closure phase stems from the rehabilitation of the site and decreased load on the municipal water and sewage services.

The anticipated residual benefits (medium and higher) of significance are as follows: the restoration of the rural residential Hôtel-de-Ville Road after the dismantling of the mining complex installations, which will promote the use of land and resources / decreased load on the municipal water and sewage services which will affect infrastructure and services.

9 SUMMARY TABLES

Tables 9-1 to 9-3, in the following pages, presents the overall balance of the impacts for each of the physical, biological and human environment respectively.

Table 9-1: Overall balance of the impacts on the physical environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Ambient air quality	Dust caused by the Mine operations. Health risks of the inhabitants.	Construction	Temporary increase in the levels of dust in the air and the rate of emissions associated with motor vehicles.	Several general measures	Negative	Not applicable	Not applicable	Medium	Medium	Point source	Short	Medium	Reversible	Low/not important
		Operational (overlapping phase)	Increased dust content in the ambient air.	Several general measures	Negative	Not applicable	Not applicable	Medium	Medium	Point source	Short	Low		Low/not important
		Operational	Increased dust content in the ambient air.	Several general measures	Negative	Not applicable	Not applicable	Medium	Medium	Point source	Long	Low		Low/not important
		Closure	The anticipated impacts will be similar in nature to those during the construction phase; however, less pronounced because there will be no shaft sinking.	Several general measures	Negative	Not applicable	Not applicable	Medium	Medium	Point source	Short	Medium		Low/not important
					Positive (stop of work)	Not applicable	Not applicable	Medium	Medium	Point source	Long	Low		Low/not important
Substrate and stability		Construction	Accelerated soil erosion, introduction of sediments and suspended solids in the water and the collapse of the excavation walls.	Several general measures and 4 specific measures	Negative	Low	Not applicable	Low	Low	Point source	Short	High		Low/not important
		Operational	Erosion of slopes, landslides and deformation of the tailings pond dams. **(GENERAL)**	2 general measures and 4 specific measures	Negative	Low	Not applicable	Low	Low	Point source	Long	Low	Reversible but irreversible for the subsidence zone	Very low/not important
		Operational	Erosion of slopes, landslides and deformation of the tailings pond dams. **(AREA OF SUBSIDENCE)**	2 general measures and 4 specific measures (section 6.2.2)	Negative	Low	Not applicable	Strong	Medium	Point source	Long	High		Medium/not important
		Closure	No anticipated impacts											No impact
Soil quality		Construction	The contamination of soil from accidental petroleum product spills, dangerous liquids, loss of soil, loss of land for other purposes, and the risk of improperly excavating and removing potentially contaminated soils.	4 general measures and 6 specific measures	Negative	Low	Not applicable	Low	Low	Point source	Short	Low	Reversible	Very low/not important
		Operational	Contamination of the soil from spills and infiltration of contaminants under structures that will be built.	4 general measures and 7 specific measures	Negative	Low	Not applicable	Medium	Low	Point source	Long	Medium		Low/not important
		Closure	Soil contamination.	4 general measures and 6 specific measures	Negative	Low	Not applicable	Medium	Low	Point source	Long	Medium		Low/not important

Table 9-1: Overall balance of the impacts on the physical environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Hydrological regime	Impacts on the streams. Water collection and discharges associated with the Mine operations.	Construction	Changes of surface runoff.	Several general measures	Negative	Not applicable	Not applicable	Low	Low	Point source	Short	High	Irreversible	Low/not important
		Operational	Modification of sub-watersheds and the flow of streams within the study area.	1 specific measure	Negative	Not applicable	Not applicable	Low	Low	Local	Long	High		Low/not important
		Closure	Flow modification of the Aux Vases River.											No impact
Groundwater flow regime		Construction	Modification of the local flow regime.	1 specific measure	Negative	Low	Not applicable	Low	Low	Point source	Short	Medium	Reversible but irreversible for the subsidence zone	Very low/not important
		Operational	Modification of the local flow regime.		Negative	Low	Not applicable	Strong	Medium	Point source	Long	High		Medium/not important
		Closure	Modification of the local flow regime.	1 specific measure	Negative	Low	Not applicable	Low	Low	Point source	Long	Low		Low/not important
Groundwater quality	Management of water infiltration on the site. Health risks of inhabitants.	Construction	Contamination from the accidental spill of petroleum products, solvents and hazardous liquids.	Several general measures and 3 specific measures	Negative	Medium	Not applicable	Low	Low	Point source	Short	Low		Very low/not important
		Operational	Contamination of the soil from spills and infiltration of contaminants under structures that will be built.	Several general measures and 3 specific measures	Negative	Medium	Not applicable	Medium	Medium	Point source	Long	Low	Reversible	Low/not important
		Closure	Contamination from the tailings pond seepage and from chlorides in the area of subsidence.	Several general measures and 3 specific measures	Negative	Medium	Not applicable	Low	Low	Point source	Long	Low		Low/not important
Surface water quality	Impacts on streams. The management of stormwater on the Mine site. Water collection and discharges associated with the operations of the Mine. Emissions to the environment (salt).	Construction	Emission of fine particles, de woody debris, and dust suppressants in the streams as well as risk of contamination from accidental spills.	Several general measures	Negative	High	Not applicable	Low	Medium	Point source	Short	Low		Low/not important
		Operational	Risk of contamination from accident spills as well as the deterioration of the overall water quality.	Several general measures (section 6.2.2)	Negative	High	Not applicable	Low	Medium	Point source	Long	Medium	Reversible	Medium/not important
		Closure	The emission of fine particles and infiltration from contaminated water into streams and the risk of contamination from accidental spills. On the other hand, the closure will result in an improvement of the surface water quality in the Shipshaw River.	Several general measures	Negative	High	Not applicable	Low	Medium	Point source	Long	Low		Very low/not important
					Positive (physico-chemical of the River)	High	Not applicable	Low	Medium	Point source	Long	Low		Low/not important

Table 9-1: Overall balance of the impacts on the physical environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Sediment quality		Construction	Emission of fine particles and woody debris in streams as well as the risk of accident contamination from spills.	Several general measures	Negative	Low	Not applicable	Low	Low	Point source	Short	Low		Very low/not important
		Operational	Risk of contamination of sediments from accidental spills and the deterioration of the overall quality of the sediments.	Several general measures	Negative	Low	Not applicable	Low	Low	Point source	Long	Low	Reversible	Low/not important
		Closure	The emission of fine particles and risk of contamination from accidental spills. On the other hand, the closure will result in an improvement of the sediment quality in the Shipshaw River.	Several general measures	Negative (contamination)	Low	Not applicable	Low	Low	Point source	Long	Low		Very low/not important
					Positive (sediment of the river)	Low	Not applicable	Low	Low	Point source	Long	Low		Very low/not important
Background noise	Increased road traffic. Noise caused by the operation of the Mine.	Construction	Increased noise level can be a nuisance for nearby residences.	3 specific measures (section 6.2.1)	Negative	Not applicable	High	Low	Medium	Local	Short	Medium		Medium/not important
		Operational	Increased noise level can be a nuisance for nearby residences.	4 specific measures (section 6.2.2)	Negative	Not applicable	High	Low	Medium	Local	Long	Medium	Reversible	Medium/not important
		Closure	Increased noise level can be a nuisance for nearby residences.	3 specific measures	Negative	Not applicable	High	Low	Medium	Point source	Short	Medium		Low/not important
Vibration perception	Fear with respect to blasting	Construction	Risk of vibrations that can be perceived by the residents in the vicinity of the Mine.	3 general measures										No impact
		Operational	Risk of vibrations that can be perceived by the residents in the vicinity of the Mine.	3 general measures									Reversible	No impact
		Closure	No anticipated impacts											No impact

Table 9-2: Overall balance of the impacts on the biological environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Benthic fauna		Construction	The emission of fine particles and woody debris in streams and their accumulation in the sediment as well as the risk of contamination of sediments from spills.	Several general measures	Negative	Medium	Not applicable	Low	Low	Point source	Short	Low	Reversible	Very low/not important
		Operational	Contamination of sediments and benthic fauna by spills and the release of contaminants that may have an impact on these same components in the Shipshaw River.	Several general measures	Negative	Medium	Not applicable	Low	Low	Point source	Short	Low		Very low/not important
		Closure	The emission of fine particles and contamination of sediments and benthic fauna by spills and contamination of these components by the infiltration of contaminated water.	Several general measures	Negative (contamination risk)	Medium	Not applicable	Low	Low	Point source	Long	Low		Very low/not important
					Positive (conditions improvement)	Medium	Not applicable	Low	Low	Point source	Long	Low		Very low/not important
Ichthyofauna and habitats	Impacts on the ichtyenne fauna and habitats	Construction	The disturbance of certain fish populations and fish habitat, loss of fish habitat and decreased flows in Brûlé Lake and resulting disturbances of fish population dynamics.	Several general measures and 5 specific measures	Negative	Medium	Medium	Low	Low	Local	Long	High	Reversible; however, irreversible loss of habitat and flow reduction in Lake Brûlé.	Low/not important
		Operational	No anticipated impacts											No impact
		Closure	No anticipated impacts											No impact
Vegetation and wetlands	Impacts on the vegetation and wetlands	Construction	The loss of area currently colonized by plant groups, including wetlands as well as the disturbance of plant groupings.	Several general measures (section 7.2.1)	Negative	Medium	Not applicable	Medium	Medium	Local	Long	High	Reversible for the vegetation and irreversible for the wetlands	Medium/not important
		Operational	The disturbance of plant groupings.	2 general measures	Negative	Low	Not applicable	Low	Low	Point source	Short	Low		Very low/not important
		Closure	Return to natural vegetation of the site.	4 general measures	Positive	Low	Not applicable	Low	Low	Local	Long	High		Low/not important
Herpetofauna and habitats		Construction	Disturbance due to ambient noise, temporary or permanent habitat loss and mortality of less mobile individuals.	Several general measures and one specific measures	Negative	Low	Low	Low	Low	Local	Long	High	Reversible	Low/not important
		Operational	The decrease in quality of habitat near the final outfall of the final effluent in the Shipshaw River and the disturbance of herpetofauna.	The quality of the final effluent water will meet the current regulations (REMM and Directive 019).	Negative	Low	Low	Low	Low	Point source	Long	High		Low/not important
		Closure	Revegetation	Will be defined in the restoration plan	Positive	Low	Low	Low	Low	Local	Long	High		Low/not important

Table 9-2: Overall balance of the impacts on the biological environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Birds and habitats	Impacts on the avian fauna, migratory birds and their habitats	Construction	The loss of habitat and disturbance of fauna due to the disruption of ambient noise levels.	Several general measures and one specific measures (section 7.2.1)	Negative	Medium	Medium	Medium	Medium	Local	Long	High	Reversible and irreversible for the habitat loss (wetlands)	Medium/not important
		Operational	Disturbance of birds and their habitats		Negative	Medium	Medium	Low	Low	Point source	Long	High		Low/not important
		Closure	Revegetation	Will be defined in the restoration plan	Positive	Low	Medium	Low	Low	Local	Long	High		Low/not important
Mammals and habitats	Impacts on mammals and their habitats	Construction	Temporary and permanent habitat loss, mortality of less mobile individuals and the disturbance of mammals due to the disruption of ambient noise levels.	Several general measures and one specific measures (section 7.2.1)	Negative	Medium	Medium	Medium	Medium	Local	Long	High	Reversible	Medium/not important
		Operational	The disturbance of mammals and their habitats.		Negative	Medium	Medium	Low	Low	Point source	Long	High		Low/not important
		Closure	Revegetation	Will be defined in the restoration plan	Positive	Medium	Medium	Low	Low	Local	Long	High		Low/not important

Table 9-3: Overall balance of the impacts on the human environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Planning and development of land	Impacts on agricultural lands	Construction	No anticipated impacts											No impact
		Operational	The change of potential development of blueberry fields, blueberry-forests and cranberry crops on agricultural land affected by the transfer of mining rights.	1 specific measure	Negative	Not applicable	Medium	Low	Low	Point source	Long	High	Irreversible in operational and reversible in closure	Low/not important
		Closure	The reduction of development potential of the land due to the area of subsidence, industrial zone and tailings pond.	5 improvement measures	Negative	Not applicable	Medium	Low	Low	Point source	Short	Medium		Very low/not important
Population and regional economy	Local procurement. Local employment and training of the workforce. Promoting local businesses.	Construction	The creation and maintenance of jobs and economic impacts for local and regional suppliers as well as expenditures for extraregional construction workers within the area for shelter, food, transportation and entertainment, which will benefit local businesses.	2 improvement measures (section 8.2.1)	Positive	Not applicable	High	Strong	Strong	Local to Regional	Short	High		Strong/important
		Operational	The creation and maintenance of jobs and economic impacts for local and regional suppliers as well as expenditures for extraregional construction workers within the area for shelter, food, transportation and entertainment, which will benefit local businesses.	2 improvement measures (section 8.2.2)	Positive	Not applicable	High	Strong	Strong	Regional	Long	High		Very strong/important
		Closure	Job loss, reduction in the shopping area and potential reduction in property values. Creation or maintenance of jobs and economic benefits for local and regional suppliers.	4 specific measures (section 8.2.3)	Negative	Not applicable	High	Medium	Medium	Regional	Medium	Medium	Irreversible	Medium/not important
					Positive	Not applicable	High	Low	Low	Local	Short	High		Low/not important
Social strcutre (social cohesion)	Increased road traffic. Dust caused by the Mine operations. Impacts on the real estate market. Current Niboec practices (communication).	Construction	The risk of deteroriation of social cohesion during the construction phase of the mining complex.	3 specific measures (section 8.2.1)	Negative	Not applicable	High	Medium	Medium	Local	Short	Medium		Medium/not important
		Operational	The risk of deterioration of social cohesion during the operational phase of the mining complex.	5 specific measures	Negative	Not applicable	High	Low	Low	Local	Long	Low	Reversible	Low/not important
		Closure	The deterioration of social cohesion during the period of closure of the mining complex.	3 specific measures (section 8.2.3)	Negative	Not applicable	High	Medium	Medium	Local	Medium	Medium		Medium/not important
Social structure (commitment to the environment)	Approximation of infrastructure of inhabitated areas. Impact on the real estate market. Current Niboec practices (communication).	Construction	The increased commitment of the local population to its environment.	2 specific measures	Negative (neighbouring residents)	Not applicable	High	Medium	Medium	Point source	Short	Medium		Low/not important
					Positive (local pop.)	Not applicable	High	Medium	Medium	Local	Short	Medium		Medium/not important
		Operational	The increased commitment of the local population to its environment.	2 specific measures (section 8.2.2)	Negative (neighbouring residents)	Not applicable	High	Medium	Medium	Point source	Long	Medium	Reversible	Medium/not important
					Positive (local pop.)	Not applicable	High	Medium	Medium	Local	Long	Medium		Medium/not important
		Closure	The potential reduction of the commitment of the local population to its environment.	4 specific measures (section 8.2.3)	Negative	Not applicable	High	Medium	Medium	Local	Medium	Medium		Medium/not important

Table 9-3: Overall balance of the impacts on the human environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Use of land and resources (residential)	Impacts on the real estate market	Construction	No anticipated impacts											No impact
		Operational	The potential pressure of the housing market in Saint-Honoré and the neighbouring municipalities to accommodate the new workers at the Mine and the change of land use for residential purposes on a stretch of road from Hôtel-de-Ville to Saint-Honoré.		Negative	Not applicable	High	Medium	Medium	Local	Long	Medium	Reversible	Medium/not important
		Closure	The restoration of the rural residential road of Hôtel-de-Ville after the dismantling of the mining complex and facilities.		Positive	Not applicable	High	Medium	Medium	Local	Long	High		Medium/not important
Use of land and resources (agriculture and forestry)	Dust caused by the Mine operations. Psychologique stress on farmers. Impacts on the agricultural land and woodlots. Impacts on groundwater.	Construction	The significant concerns are related to the operating phase.											No impact
		Operational	The encroachment onto the land with agricultural potential, the immobilization of land or fallow crops and loss of agricultural income, the risk for the certification of agricultural products located adjacent to the Mine due to the dust and immobilization of forest areas.	Several general measures and 5 specific measures	Negative	Not applicable	Medium	Low	Low	Point source	Long	High	Reversible	Low/not important
		Closure	No anticipated impacts											No impact
Use of land and resources (accommodation and food service industry)		Construction	The pressure on existing local services (accommodation, catering) due to the influx of new workers.	1 improvement measure	Negative	Not applicable	Medium	Medium	Low	Regional	Short	Medium	Reversible	Low/not important
		Operational	No anticipated impacts											No impact
		Closure	No anticipated impacts											No impact
Use of land and resources (fishing, hunting and trapping)	Security around the Mine. Loss of space used for recreational and sporting activities.	Construction	The temporary displacement of hunting, fishing and trapping activities.	1 general measure and 3 specific measures	Negative	Not applicable	Medium to high	Low	Low	Point source	Short	Medium		Very low/not important
		Operational	The displacement of hunting, fishing and trapping activities during the operation of the Mine	2 specific measures	Negative	Not applicable	Medium	Low	Low	Local	Long	Medium	Reversible	Low/not important
		Closure	No anticipated impacts											No impact
Use of land and resources (snowmobile and ATV)	Increased road traffic. Security adjacent to the Mine. Loss of space used for recreational and sporting activities.	Construction	The modification of snowmobile and ATV trails resulting in the change of course for users, and the increased risk of accidents on these trails due to increased traffic on different access roads during construction.	2 specific measures	Negative	Not applicable	Medium to high	Low	Medium	Point source	Short	Medium		Low/not important
		Operational	The risk of accidents on the ATV and snowmobile trails due to increased traffic on different roads for the mining operation.	2 specific measures	Negative	Not applicable	Medium to high	Low	Medium	Point source	Long	Low	Reversible	Low/not important
		Closure	The risk of accidents on the ATV and snowmobile trails due to increased traffic on different roads for the mining operation.	2 specific measures et 1 improvement measure	Negative	Not applicable	Medium to high	Low	Low	Point source	Short	Medium		Very low/not important

Table 9-3: Overall balance of the impacts on the human environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Infrastructure and services (roads)	Increased road traffic. Security adjacent to the Mine. Work with municipal representatives.	Construction	Increased traffic on local roads due to the movement of workers and supply of construction materials (heavy vehicles), which could adversely affect the safety of road users.	6 specific measures	Negative	Not applicable	Medium	Low	Low	Local	Short	High	Reversible	Low/not important
		Operational	The increased movement of heavy vehicles on local roads due to the movement of machinery, which could adversely affect the safety of road users.	4 specific measures	Negative	Not applicable	Medium	Low	Low	Local	Long	High		Low/not important
		Closure	The increased movement of heavy vehicles on local roads due to the movement of machinery, which could adversely affect the safety of road users.	1 specific measure	Negative (heavy vehicles)	Not applicable	Medium	Low	Low	Local	Short	Medium		Very low/not important
					Positive (workforce)	Not applicable	Medium	Low	Low	Local	Long	High		Low/not important
Infrastructure and services (drinking water and wastewater)	Work completed by municipal representatives	Construction	No anticipated impacts											No impact
		Operational	Increased demand on the municipal wastewater and drinking water infrastructure.	1 specific measure (section 8.2.2)	Negative	Not applicable	Medium	Low	Medium	Local	Long	Medium	Reversible	Medium/not important
		Closure	Decreased load on the municipal network		Positive	Not applicable	High	Medium	Medium	Local	Long	High		Medium/not important
Infrastructure and services (power lines and airport approach beacons)		Construction	No anticipated impacts											No impact
		Operational	The infringement on the integrity of the power lines and airport approach beacons.	2 specific measures	Negative	Not applicable	Medium	Low	Low	Local	Long	Low	Reversible	Low/not important
		Closure	No anticipated impacts											No impact
Quality of life (physical and psychological well-being of the population)	Increased road traffic. Noise caused by Mine operations. Dust caused by the Mine operations. Fear with respect to blasting. Security adjacent to the Mine. Logical stress and impacts. Impact on the real estate market. Health risks (air and water quality). Current Niboec practices (communication).	Construction	The change in ambient air and noise quality and vibrations that can modify the physical well-being of residents and cause psychological reactions such as anger, frustration and changes in lifestyle.	Several general measures and 7 specific measures (section 8.2.1)	Negative	Not applicable	High	Low	Medium	Local	Short	High		Medium/not important
		Operational	The modification of the physical well-being of households located close to the new mining infrastructure can lead to psychological reactions because of nuisance, the perception of health risks related to the impact on the air and water quality, lifestyle disturbance of those households displaced as a result of the acquisition of their property by Niobec and the potential devaluation of the properties close to the Mine.	Several general measures and 11 specific measures (section 8.2.2)	Negative	Not applicable	High	Low	Medium	Local	Long	Medium	Reversible	Medium/not important
		Closure	The modification in the physical well-being of the population due to pollution and potential deterioration of the quality of life in a portion of the population from its concerns about the potential impact on their health due to environmental contamination from the Mine tailings.	1 general measures and 5 specific measures (section 8.2.3)	Negative	Not applicable	High	Low	Medium	Local	Long	Low		Medium/not important

Table 9-3: Overall balance of the impacts on the human environment

Component of environment	Public concerns	Phase of the project	Anticipated impacts	General and specific mitigation measures	Nature	Ecosystem value	Socio-economic value	Degree of disturbance or benefit	Intensity	Scope	Duration	Probability of occurrence	Reversibility	Importance of residual impact
Quality of life (services to the community and economic security)	Work completed by municipal representatives	Construction	Improving the economic security of the population, the potential financial difficulty for people with low or fixed incomes, the improvement of commercial services and pressure on existing services.	4 specific measures	Positive	Not applicable	Medium	Medium	Medium	Local	Short	Medium		Medium/not important
		Operational	Improving the economic security of the population, increased property value, and improvement of municipal, business and community services.	6 specific measures	Positive	Not applicable	Medium	Medium	Medium	Local	Long	Medium		Medium/not important
		Closure	The loss of jobs and reduction of local procurement in the region, possible deterioration of household economic security and the reduction in services to the community.	4 specific measures (section 8.2.3)	Negative	Not applicable	High	Medium	Medium	Regional	Medium	Medium	Irreversible	Medium/not important
Heritage and archaeology		Construction	Modification in the archaeological potential of the work site.	1 general measure	Negative	Not applicable	Medium	Low	Low	Point source	Short	Low	Irreversible	Very low/not important
		Operational	No anticipated impacts											No impact
		Closure	No anticipated impacts											No impact
Landscape	Dust caused by the Mine operations. Discomfort due to light pollution at night. Impact on the vegetation.	Construction	Modification of the agro-forestry, agricultural and industrial landscapes.	Several general measures and 1 specific measure (section 8.2.1)	Negative	Not applicable	Medium	Medium	Medium	Point source	Short	High	Reversible	Medium/not important
		Operational	Modification of the agro-forestry, agricultural and industrial landscapes.	8 specific measures (section 8.2.2)	Negative	Not applicable	Medium	Medium	Medium	Point source	Long	High		Medium/not important
		Closure	Positive since the mining infrastructure will be dismantled and the restoration work, in accordance with the restoration program and plans, will be carried out.		Positive	Not applicable	Medium	Medium	Low	Point source	Long	High		Low/not important
Navigation		Construction	Disruption of navigation on the Shipshaw River.	8 specific measures	Negative	Not applicable	Low	Low	Low	Point source	Short	High	Reversible	Low/not important
		Operational	No anticipated impacts											No impact
		Closure	Disruption of navigation on the Shipshaw River.	8 specific measures	Negative	Not applicable	Low	Low	Low	Point source	Short	High		Low/not important

10 ASSESSMENT OF THE CUMULATIVE EFFECTS

10.1 Background and methodology

By cumulative effects, the CEAA expects environmental changes caused by the project based on other works, or other previous, present and possible future projects.

The assessment of the cumulative effects focuses on the valued environmental components (VECs) and valued social components (VSCs). The social components refer to the natural and human environment, which are important to specialists or by the affected population, and that may be modified or touched in a significant manner by the project.

Cumulative effects evaluation considers the project's stakes which were identified in the ESIA and following public consultations completed by Niobec. Based on these considerations, the following VECs and VSCs were retained for the assessments of cumulative effects because they are associated with the project's stakes and they will undergo a non-negotiable impact as part of the project: air quality, water quality, vegetation and wetlands, current and projected land use and quality of life

Many VECs and VSCs in the study area will not undergo any cumulative effects because they will not be interacting with other project activities, both in space and time, or because the residual impact on these components is low or very low.

The assessment of cumulative effects includes many steps, including: project identification, actions or significant events which are most susceptible of having affected the VECs and VSCs in the past, present or future, the description of the reference state which corresponds to the situation existing a few years ago (the time limit of the past), the description of the historical tendency which is established with the combined influence of the projects, actions and significant events, assessment to determine if the identified cumulative effect requires attenuation measures and additional environmental monitoring programs which are different than those proposed in the project specific environmental assessment, and finally the identification of the importance of the cumulative effects which consists of determining for each VEC and each VSC if there are any cumulative effects, or if there is a potential for cumulative effects.

10.2 Analysis of valued environmental and social components

10.2.1 Air quality

In the region, several companies generating air emissions were established over the decades and are currently active. To the industrial activities are also added the impact of the increase in road circulation on local and regional roads and associated pollutants from gas emissions. Rail transportation has also been present in the area for many decades and will increase in the next years, in part due to new rail links.

Past and present mining activities (Niobec mine) have affected air quality. For the future, the only currently announced mining project which could lead to cumulative effects on air quality are Niobec's projects. As well, the rare earths deposit belonging to IAMGOLD and located 1 km north of the Niobec mine in Saint-Honoré could one day be exploited and the mineral could be treated on the site.

Based on the low number of ongoing projects in the study area which are likely to further affect the air quality, previous years tendency should be maintained or improved during the operation of Niobec's expansion project.

No additional attenuation or compensation measures or monitoring of the cumulative effects on air quality are planned outside of those planned in the ESIA as part of the present project.

The cumulative effect of the expansion of the Niobec mine project and of the other projects, actions and past, present or future events on air quality is considered to be globally unimportant for the spatial limits considered based on the analysis criteria.

10.2.2 Water quality

The projects, actions or events which are most likely to influence this VEC concern mining, industrial and forestry activities as well as groundwater withdrawals by the Saint-Honoré and Saguenay municipalities located in the study area for cumulative effects.

In the study area, the only mine which was operated in the past and that is still operated is Niobec's mine. Based on ongoing Niobec studies, the tailings pond has not presented any aquifer contamination risks.

The Shipshaw River was subject to floating wood in the past and its natural flow has been altered since the 1920 by the successive construction of hydroelectric facilities by Alcan (now Rio Tinto Alcan). Erosion of the river banks over the years can have affected the water quality, as well as agricultural (including blueberry farms) and forestry activities.

The main project presently envisioned which could possibly modify the water quality in the Shipshaw River is a new effluent for a rare earths treatment plant operated by IAMGOLD. This eventual project will require a combined research with the current Niobec mine project at the level of wastewater treatment.

As for groundwater quality, the current tailings pond could lead to long term negative repercussions. However, the current monitoring of groundwater at the mine does not show any noticeable impact on groundwater quality. The new tailings pond will be practically sealed and groundwater which could be reached by any form of contaminant will be confined.

It is difficult to establish a precise historical tendency of surface and groundwater quality in the area of study because of available information. Certain anthropological activities have affected water quality without our knowing the exact impacts on this VEC.

No additional attenuation measures above those in the ESIA for the reduction of the cumulative effects on the surface and groundwater quality VEC are planned. As such, the main project which could affect water quality is that of the exploitation of the rare earths deposits which will probably be completed in complement with current mine's operations and the expansion project. The same attenuation measured planned for the expansion project would therefore be applicable. The monitoring program which will be established for the expansion project could be adapted for the exploitation of the rare earths deposit.

The potential cumulative effect on the water quality of the Shipshaw river basin is considered to be unimportant.

As to groundwater quality, no cumulative effect is expected based on current knowledge of future developments but ongoing complementary hydrology and geochemical studies will confirm this.

10.2.3 Vegetation and wetlands

Since the population settled in the region, many activities have required deforestation and encroachment on wetlands.

Few future projects, which could encroach on large areas of vegetated land and particularly wetlands, are planned in the study area. We should note projects like the new access road on 7th rural road for the Niobec mine and the Gaz Métro pipeline from Saguenay to the Côte-Nord region. The future tailings pond associated with the IAMGOLD rare earths exploitation project at Saint-Honoré, if it goes forward, would probably encroach on wetlands or forests located north of the present mine.

Reviews of literature did not obtain any precise information about wetland historical tendencies for the study area.

Niobec is currently evaluating the realisation of a compensation program for wetlands that will be lost. As well, the relocation of floral species with a special status to a similar habitat located nearby is envisioned. The other major project promoters planned in the study area, such as IAMGOLD for its rare earths development project and Gaz Metro for its pipeline project, will also be responsible to compensate for lost wetlands.

In summary, in spite of wetland and forest encroachment by the Niobec project, the establishment of a compensation project and attenuation measures, combined with the relatively important presence of wetlands in the study area, the cumulative effect on this VEC is unimportant.

10.2.4 Current and projected land use

Within the mining projects, only the current Niobec mine located in Saint-Honoré since the 1970 is operational. In an undetermined length of time, it remains a possibility that IAMGOLD would exploit the rare earths deposits in Saint-Honoré, which would possibly require the development of a new tailings pond as well as the use of territory that is currently used for agroforestry (IAMGOLD 2012). The study

area also includes sandpits and quarries, principally located in the Saint-Honoré municipality.

Within the other currently envisioned projects that will modify land use, let us mention the access road for the Niobec mine. The construction of a new bridge crossing the Saguenay River is also projected to reduce circulation on the Dubuc Bridge. Its exact location is not yet known. As well, Gaz Métro plans to build a 450 km pipeline between Saguenay and Sept-Îles (affected width of 23m) (Gaz Métro 2012). This project has been delayed to an unknow date.

Before the start of operations of the expansion project for the Nibec mine, a few projects are planned in the study area but land use will remain mostly the same as current land use.

No additional attenuation measures, compensation measures and land use monitoring projects above those in the ESIA are planned for the cumulative effect on land use, which mostly concerns agroforestry land. If IAMGOLD's rare earths development project goes forward, the project most likely lead to cumulative effects on land use, and many of the same measures would be put into effect and some would be adjusted to the specific needs of the project. As to the Gaz Métro project which is mostly planned in forested areas, compensation measures for lost forest area will need to be implemented.

If all future projects currently being considered are completed, a cumulative effect is expected on the current and projected land use, primarily agroforestry. The effect remains difficult to assess considering the hypothetical implementation of some projects and the eventual announcement of other projects which are not currently known. Based on current knowledge, the cumulative effect is unimportant.

10.2.5 Quality of life

Many projects, actions or significant events have affected, currently affect or risk affecting the quality of life in the study area. However, since they are often sources of jobs and economically beneficial, most are well accepted. Certain projects have however been exempt from that when they were announced, having led to preoccupations for the quality of life. Section 8.7.1 of the ESIA discusses that in more detail.

During the meetings with residents, fears and preoccupations linked to the Niobec mine's expansion project and to the current mine's operation were expressed (see chapter 4). We can therefore expect that similar preoccupations with IAMGOLD's rare earths development project. A synergy of Niobec's projects would most probably attenuate many of the resident's fears.

Transportation constitutes one of the main irritants in the study area. A new bridge over the Saguenay River as well as bypass roads or new roads are planned to attenuate the effect of transportation on the quality of life.

Tendencies relative to quality of life should maintain themselves until the operation of the expanded Niobec mine, meaning that this VSC will continue to be prized.

No additional attenuation measures, compensation measures or monitoring above those planned as part of the expansion project will need to be instilled to reduce the cumulative effect on the quality of life in the study area. If IAMGOLD's rare earths development project goes forward, the project most likely to lead to cumulative effects on the quality of life, many of the same measures would be implemented and adjusted as required.

As part of Niobec's expansion project, the residents' fears, mostly located in Saint-Honoré, establish cumulative effects on the quality of life because preoccupations are already present for the mine's current operations. This remains hypothetical, because many recent attenuation measures have been put forward for the current operations and others will be added to counter the possible inconveniences of the expansion project. As well, certain projects will improve the quality of life in the study area, particularly road projects (specifically the new access road to the Niobec mine) and bridge projects, which will reduce the irritants linked to road circulation. Ultimately, the cumulative effect on the quality of life VSC will be unimportant.

11 TECHNOLOGICAL HAZARDS AND EMERGENCY MEASURES PLAN

Niobec pursues an objective of continuous improvement in order to achieve the highest standards in environment, health and safety (EHS) during the construction phase of the expansion project. All work will be governed by existing laws and by the project execution plan, which covers EHS. Each contractor working on the site will subscribe to this program to ensure the protection of the environment and the health and safety of its employees. The EHS management plan will comply with all laws and regulations in force.

Meanwhile, the strategy that will be deployed in the operational phase is designed to provide efficient management, which will ensure EHS compliance. This strategy's philosophy is to promote proven systems in EHS. It includes preventive maintenance and continuous improvement programs designed to ensure the implementation of high standards which will gradually improve and adapt as the project develops. Training programs are an important part of this strategy.

11.1 Historical incidents

Since its opening in 1976, the Niobec Mine has not had any tailings pond dam breaches, even during the 1996 flood. Furthermore, the Mine has not had any major ground collapses, even during the 1988 earthquake. However, several spills have occurred since 2001, including six involving hydraulic oil, four with diesel fuel, three hydrochloric acid spills, two waste oil and one heating oil spill and one tailings spill.

11.2 Technological hazards

It should be noted that due to the early stage of completion of the expansion project, a risk analysis, with a detailed impact assessment and probability of accidents could not be completed with the available data.

The following are the technological hazards identified: storage and use of chemical petroleum products, propane and explosives, fire, collapse and landslide of the underground mine, tailings pond and water retention pond dam breaches, cracking of the ground surface outside the area of subsidence, use of nuclear gauges, suspended dust, handling of radioactive slag, aircraft crash or collision with infrastructure, as well as natural disasters such as flooding, heavy rain and earthquakes.

These technological hazards represent potential problems, such as environmental contamination (soil, ground and surface water, air), health risks, injuries, loss of life, property and economic loss.

Prevention and mitigation measure are in place to reduce the potential effects and consequences in an emergency situation of the technological hazards identified above.

11.3 Emergency plan

Niobec has an emergency plan applicable to the current operation of the Mine. It includes, among other things, response, evacuation and rescue procedures, the means of communication with employees and media and the responsibilities of the emergency committee. It also includes training and exercise guidelines. This plan will be adapted to include activities related to the expansion of Niobec.

12 MONITORING PROGRAM

12.1 Environmental monitoring

The environmental monitoring program will examine the operation of the Niobec equipment and facilities and monitor any environmental disturbances caused by the construction, operation and closure and decommissioning of the expansion project. Environmental monitoring will ensure compliance with the mitigation and compensation measures proposed in the environmental impact assessment, requirements of governmental approvals, proponent commitments outlined in various documents as well as requirements of relevant laws and regulations.

The environmental monitoring program will begin following the approval of the implementation of the expansion project. It will include a list of elements requiring monitoring, all planned means and measures to protect the environment, detailed characteristics of the monitoring program, an invention mechanism in the event of non-compliance, legal and environmental requirements and monitoring reporting and Niobec commitments regarding the dissemination of the environmental monitoring results with the concerned population.

12.2 Environmental monitoring during the operational phase

Since its opening in 1976, Niobec has undertaken several environmental monitoring programs in order to protect the environment. Niobec has made a formal commitment to respect environmental standards, maintain a program of continuous improvement of their environmental performance and to prevent pollution.

The environmental monitoring program associated with the expansion project will aim to follow the evolution of some environmental components, including the most sensitive areas, such as air and water (ground and surface water) and compare them with the conditions prior to the project in order to identify trends or impacts that may have resulted from project activities or natural events. The environmental monitoring program will identify and document any changes in the environment as compared to the original reference state (whether or not related to the project), to verify the impact assessment and evaluate the effectiveness of mitigation or compensation.

Subsequent to the implementation of the expansion project, Niobec will adjust current monitoring programs in order to take into account the new elements brought into each of the planned phases (construction and operation) with a more specific emphasis on the operating and closure phases (post-operation and post-restoration).

Monitoring programs will be updated in accordance with provincial and federal requirements applicable to the project. Other programs not currently subject to regulatory requirements will also be applied to ensure the success of the project and its social and environmental acceptability.

Niobec anticipates the expansion project will include the following monitoring programs: tailings ponds (stability structures, tailings and associated water, and revegetation), effluent quality, groundwater quality, ambient noise, vibrations, atmospheric emissions, air quality in the underground complex, flow rates and pressures in the influent and effluent pipes, ionizing radiation, social environment and the biological environment (aquatic and avian wildlife and wetlands).

12.3 Environmental monitoring during the post-closure phase

Following the complete closure of the Mine, an environmental surveillance and monitoring program will be implemented in the post-closure phase. This program will verify the anticipated impacts and ensure the proper functioning and success of the implemented restoration plan. The monitoring programs proposed by Niobec are as follows: integrity of the works, quality of surface and ground water and the effectiveness of revegetation.

13 SUSTAINABLE DEVELOPMENT

13.1 Sustainable development approach of the project

Niobec chose to design and implement the expansion project from the perspective of sustainable development (SD), which will affect all stages of development and implementation, particularly in the context of the ESIA. The various consultations carried out by Niobec helped improve the project from the design phase.

Sources of improvements mainly affected the following aspects of the Niobec Mine: operation and management of the tailings and water, land-use and establishment of the acquisition and mitigation zones, maintenance and creation of jobs, the development of worker health and safety, maximizing positive effects for the community, responsible management of tailings, training and knowledge for the development and construction of a LEED certified building.

The Niobec Mine expansion project was developed to meet the 16 principles of the Sustainable Development Act which was adopted by the National Assembly of Québec on April 13, 2006. It was analyzed using the “Guide pour la considération des principes de développement durable dans les travaux des commissions d’enquête du Bureau d’audiences publiques sur l’environnement”.

14 PRELIMINARY COMPENSATION PROJECT, FISH HABITAT

Certain developments of the expansion project will cause permanent destruction of fish habitat in streams, notably the establishment of a new tailings pond. The implementation of a compensation project is required under the *Fisheries Act*. The objective of this project is to achieve no net loss of the productive capacity of fish habitat.

The results of a preliminary study demonstrate that an improvement project in Bras-Cimon Creek, which until recently received effluent from the Niobec Mine, could compensate for fish habitat losses. This compensation project, located in the same watershed as the affected streams, will include physical improvements (cleanup, spawning ground, sill, shelters and ditches) as well as the partial relocation of the Brook Trout population from the area that will be affected by the project. The restoration of Bras-Cimon Creek will return a portion of the streams to its natural state and create attractive conditions for the survival of Brook Trout. The ecological value of the replacement habitat will be similar or higher than that of the affected habitat.

15 PRELIMINARY COMPENSATION AVENUES, WETLANDS

During the design stage of a project that is likely to affect a wetland, the MDDEFP and various federal authorities encourage the use of the mitigation sequence “AVOID-MINIMIZE-COMPENSATE”

The objective of the compensation aims to mitigate the unavoidable residual losses, while considering the area and lost ecological functions. The four measures of compensation include restoration, ecological enhancement, creation and protection.

The development of certain components of the Niobec Mine expansion project will result in the permanent destruction of wetlands, including the establishment of a new tailings pond. As the surface areas affected are large, it would be difficult to compensate for the whole surface area in a single project. The compensation plan measures must include several projects subscribing to an overall strategy to compensate of the losses associated with the expansion project.

To order to establish preliminary compensation avenues, several environmental organizations in the region were contacted. This approach has enabled the creation of a list of some compensation, enhancement or protection of wetlands projects where Niobec could invest as part of its compensation project. These projects represent some interesting avenues and the feasibility of achieving them could be analyzed in the framework of the compensation plan. In addition, two drained bogs were identified near the Niobec facilities. These two bogs could possibly be restored into productive bogs. The Niobec site is also surrounded by several important wetland complexes, especially bogs. Some of these environments deserve to be enhanced by improvements that could increase their productivity. These wetlands may represent some interesting avenues to integrate into the compensation plan. Finally, the protection of several wetlands could add to the overall compensation plan.

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