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Joyce Lake Direct Shipping Iron Ore Project

Chapter 18:

Historic and Cultural Resources

File No. 121416571

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18.0 HISTORIC AND CULTURAL RESOURCES

As detailed in chapter 1, Joyce Direct Iron Inc. succeeded Labec Century Iron Ore Inc. ("Labec Century") as the Project Proponent on February 18, 2021 following an internal reorganization. All references to Labec Century as the Project proponent may be interpreted as now referring to Joyce Direct Iron Inc.

18.1 VC Definition and rationale for Selection

Historic and Cultural Resources include sites, materials, geological deposits and, in certain instances, landscape features of archaeological, historic, cultural/spiritual, paleontological or architectural importance. Such resources can date to the very distant past, or to the Pre-contact or Historic Periods.

These resources are valued by Indigenous people and the public at large, for their cultural, spiritual, natural and/or scientific importance. In Newfoundland and Labrador, these resources are protected and managed under the *Historic Resources Act* (1985), administered through the Provincial Archaeology Office (PAO) of the NLDTCAR.

Historic and Cultural Resources has been selected as a VC because these resources frequently comprise the only physical information on the lifeways of Indigenous people prior to the arrival of Europeans in North America. They can also help us understand the early history of a region and the interactions that occurred between different cultural groups, and the connections they had with their environment. Within the *Historic Resources Act* (1985), there are also provisions for the protection and management of paleontological and architectural resources.

The three broad categories comprising Historic and Cultural Resources include:

- Archaeological and Cultural Resources (such as the remains of campsites and objects - *e.g.,* stone tools - pre-dating 1960, as well as Indigenous and non- Indigenous burial sites and other sacred places and landscape features);
- Paleontological Resources (fossils); and
- Architectural Resources (such as historic buildings and other heritage properties).

18.1.1 Archaeological and Cultural Resources

All Archaeological Resources (defined as physical evidence of land use pre-dating 1960) discovered during field research or otherwise, are inventoried under the Borden System (the Canadian registry for archaeological remains) in accordance with the provincial *Historic Resources Act* (1985). In Newfoundland and Labrador, Cultural Resources can include Indigenous and non-Indigenous burial sites and other sacred/religious places and landscape features. Because there are both archaeological sites and cultural properties known for western

Labrador, they are assessed further in this EIS under the combined heading Archaeological and Cultural Resources.

Under current regulatory policy for Labrador, all material evidence of contemporary land use (defined as land use occurring after 1960) is recorded, inventoried and assigned ethnographic numbers. Contemporary sites can include, for example, remains of campsites or tilts (i.e., small, rough-constructed cabins), or other physical evidence of hunting, fishing or trapping. The presence of distinct cultural indicators, such as the manner in which a tent and/or stove was set, or the type of trap used for harvesting a particular species, can provide the information necessary to determine the cultural affiliation of the site. A detailed recording of contemporary sites has value not only because such materials can serve as proxy indicators of archaeological potential, but because physical evidence of land use from post-1960, used in conjunction with written and/or oral information, can contribute to the discussion of land use patterns and activities within a region. Though inventoried in a database for ethnographic remains compiled by the PAO, contemporary sites are not assigned numbers under the Borden System, are not classified as archaeological sites, and are not usually the subject of Stage 2 or 3 mitigation measures (*i.e.*, additional detailed recording, recovery and conservation).

Paleontological Resources are defined and managed pursuant to the *Historic Resources Act* (1985) and *Paleontological Resources Regulations*. Under the current regulatory framework for Newfoundland and Labrador, field research is not required for paleontological resources, although depending on the type of materials known to occur in a region, local geological deposits can be designated as significant fossil sites and afforded protection under the Act. In areas where fossils might be anticipated, due to the presence of specific geological deposits (*e.g.*, sedimentary rock), assessment involving field investigation by a qualified paleontologist can be requested by the PAO under Section 13 of the *Historic Resources Act* (1985) (Government of Newfoundland and Labrador 2011).

A review of relevant information-sources and consultation with geologists at the Geological Survey Division of the NLDIET confirmed that there are no known fossil types or fossil sites of concern located in the vicinity of the Project that are currently protected under the Newfoundland and Labrador *Paleontological Resources Regulations* (Dickson, Dr. L., pers. comm. 2012; Boyce, D., pers. comm. 2012; Conliffe, J., pers. comm. 2012). On the basis of these results, Paleontological Resources are not considered further in this EIS.

Architectural Resources are not managed under provincial legislation, although there are provisions in the *Historic Resources Act* (1985) to protect buildings, properties and/or landscapes that have been designated as Provincial Historic Sites. A search of the on-line database of the Heritage Foundation of Newfoundland and Labrador did not identify any protected/registered Architectural Resources in the vicinity of the Project (Heritage Foundation of Newfoundland and Labrador on-line website no date). On the basis of these results, Architectural Resources are not considered further in this EIS.

There are linkages between Historic and Cultural Resources and Chapter 19: Current Use of Lands and Resources for Traditional Purposes by Indigenous Persons, and Chapter 20: Other Contemporary Use of Lands and Resources included in this EIS.

18.1.2 Approach to Assessment of Effects

The assessment of Project-related environmental effects included completion of Stage 1 and Stage 2 Historic and Cultural Resources Assessments (Stage 1 and Stage 2 Assessment), which are used to characterize baseline conditions in the Project area. An initial Stage 1 Assessment, carried out under Permit 12.38 from the PAO and in accordance with the *Historic Resources Impact Assessment and Management Guidelines* (Government of Newfoundland and Labrador 1992), included background research using published and unpublished literature and databases, as well as map and aerial imagery analysis, to determine the area's archaeological potential. This was followed by a field study of Project infrastructure as configured in September 2012 (Stage 2 Assessment). The 2012 field study included a detailed examination of 24 ground locations and excavation of 124 shovel testpits; one archaeological site dating to the Pre-contact Period, *circa* 1500 to 1700 Anno Domini (AD), (GfDp-01- Attikamagen Lake 1) was identified (Stassinu Stantec 2014).

In early 2013, the Project footprint was revised to reflect new engineering and design parameters. Another field study was undertaken in 2013 for several areas; however no additional archaeological or cultural resources were recorded. While the majority of the revised access corridor is routed through areas with demonstrated low historic and cultural resources potential, the footprint of the proposed causeway is approximately 62 m from the Pre-contact Period archaeological site GfDp-01. As a result, Project-resource interactions could occur.

18.2 Scope of the Assessment

18.2.1 Regulatory Setting

In Newfoundland and Labrador, Archaeological and Cultural Resources are protected and managed under the *Historic Resources Act* (1985), which is administered through the PAO of the NLDTCAR. As outlined in the Historic Resource Assessment and Impact Summary Guidelines (Government of Newfoundland and Labrador 1992), Archaeological and Cultural Resources Assessment and Impact management is a process that can involve one to three stages:

- Stage 1 Historic Resources Assessment (Stage 1 Assessment);
- Stage 2 Detailed Historic Resources Impact Assessment (Stage 2 Assessment); and
- Stage 3 Impact Management and Mitigation (Stage 3).

A Stage 1 Assessment is normally the initial step in the process and determines the level of continued involvement within the Archaeological and Cultural Resources assessment process.

Where indicated, a Stage 2 Assessment follows Stage 1 Assessment and is designed to gain the fullest possible understanding of the Archaeological and Cultural Resources within an area and any interactions that may occur between them and the proposed development project. A Stage 2 Assessment was completed for this Project in 2013.

Stage 3 Impact Management and Mitigation follows from previous assessment studies and may include a broad range of activities. By acting upon results and recommendations of Stage 2 Assessment, Stage 3 involves the professional management of endangered Archaeological and Cultural Resources within a proposed development area. During Stage 3 emphasis is placed on efforts to conserve and protect the resource, preferably through site or area avoidance.

18.2.2 Influence of Consultation and Engagement on the Assessment

Issues or concerns regarding Archaeological Resources were raised during consultation and engagement activities with regulatory agencies (*i.e.,* PAO), Indigenous groups, stakeholder groups, and the general public. These specific concerns informed baseline data collection and are addressed through the effects analysis. Details on the issues raised by stakeholders are provided in Table 18.1.

Table 18.1 Issues Raised by Indigenous Groups and Stakeholders

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
No issues related to Historic and Cultural Resources were raised during consultation.			

18.2.3 Temporal and Spatial Boundaries

The temporal boundaries for the environmental assessment include the Project phases of Construction, Operation and Maintenance, and Closure and Decommissioning. The temporal boundary for Construction is one year (pre-operation), for Operation and Maintenance is approximately seven years, and for Closure and Decommissioning is approximately one year.

The spatial boundaries for the environmental effects assessment of Archaeological and Cultural Resources are defined below.

Project Development Area (PDA): The PDA is the area represented by the Project footprint as defined in Chapter 2: Project Description.

Local Study Area (LSA): The LSA is the maximum area within which Project-related environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The LSA includes the PDA and any adjacent areas where Project-related environmental effects may be expected to occur. To provide some degree of flexibility when establishing the locations for certain Project infrastructure, such as the haulage road right-of-way from the west side of Iron Arm south to the rail loop, a two km-wide corridor based on the projected centre-line of the road was included as part of the LSA. Buffer zones were also established around other Project features to account for adjustments that may be required as additional environmental and geotechnical information becomes available (Figure 18.1).

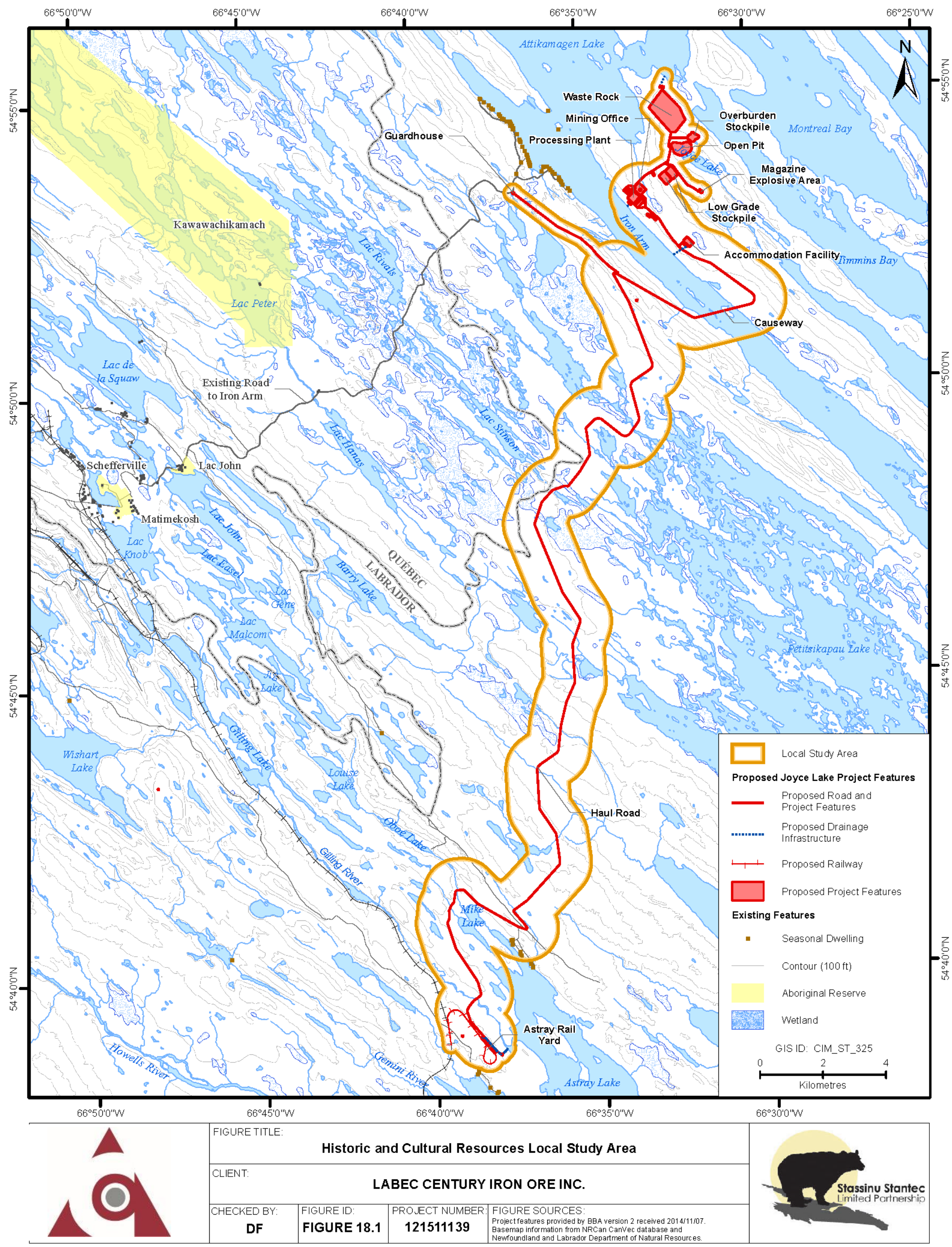

Figure 18.1 Historic and Cultural Resources: Local Study Area

Regional Study Area (RSA): Although effects on Archaeological and Cultural will not extend beyond the PDA, potential resources within the RSA are considered for the overall cultural/historical sequence of the region, and how Archaeological and Cultural Resources affected by the Project relate to this larger regional context.

The RSA is focused on areas in western Labrador and Québec that have been subject to previous archaeological and cultural investigations (Figure 18.2). Review of data pertaining to the RSA enables prediction of the nature and extent of Archaeological and Cultural Resources that may be present within the LSA. Findings from the RSA provide the context within which the potential of the PDA and LSA for Archaeological and Cultural Resources may be assessed.

18.2.4 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of Archaeological and Cultural Resources is focused on the loss or disturbance of archaeological, cultural/spiritual sites. These resources are protected under the *Historic Resources Act* (1985). The environmental effect and associated measurable parameter, with rationale, are summarized in Table 18.2.

Table 18.2 Measurable Parameters for Archaeological and Cultural Resources

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Loss or disturbance of Archaeological and Cultural Resources.	Number of known Archaeological and Cultural Resources that will be lost or disturbed as a result of Project activities.	Loss or disturbance of known Archaeological and Cultural Resources would be an adverse effect on Historic and Cultural Resources generally. The number of Archaeological and Cultural Resources that will be lost or disturbed as a result of the Project provides a measurable parameter that allows this environmental effect to be quantified.

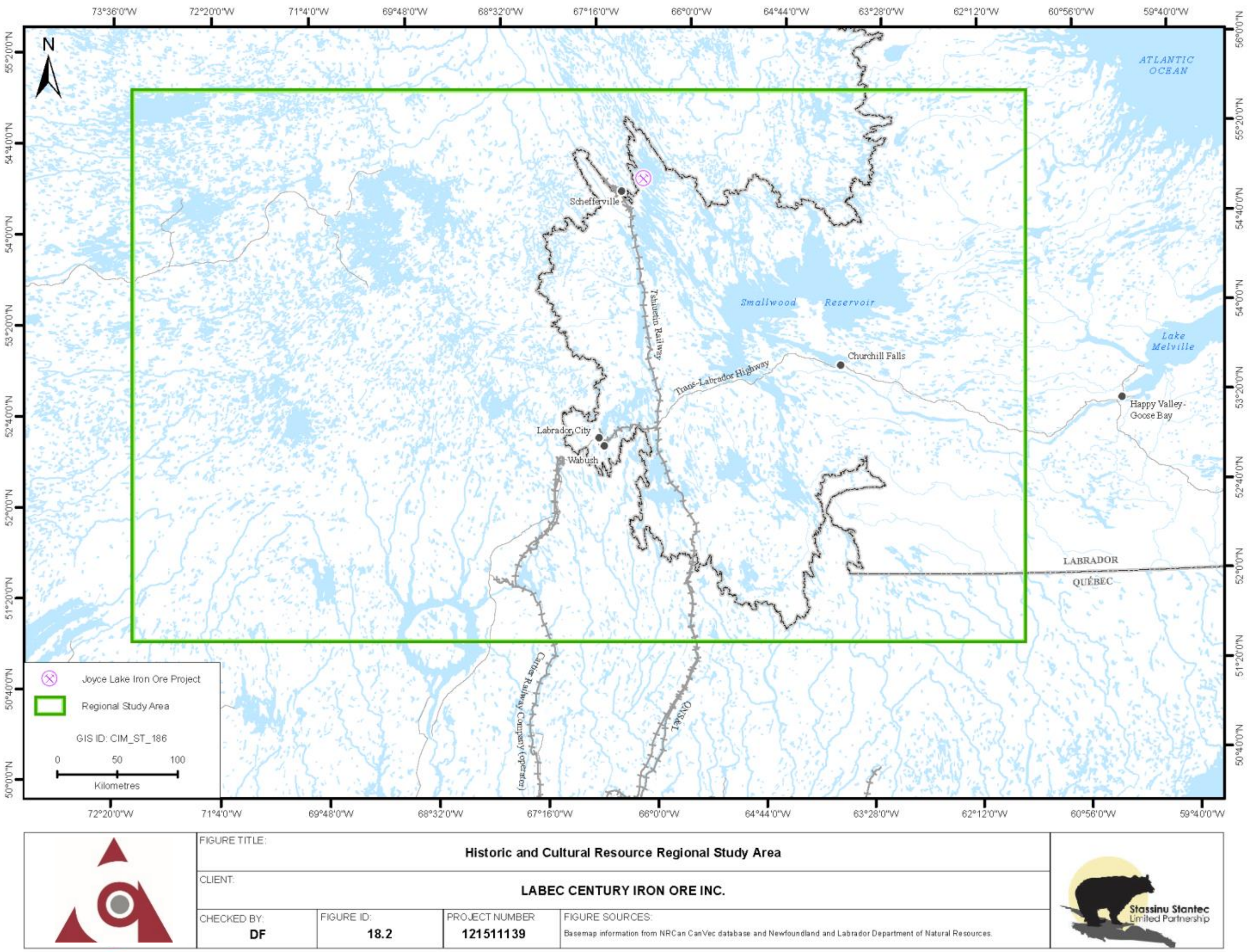

Figure 18.2 Historic and Cultural Resources: Regional Study Area

18.3 Standards or Thresholds for Determining the Significance of Residual Environmental Effects

The terms used to characterize residual environmental effects on Archaeological and Cultural Resources are consistent with professional standards and practices for the protection, management and research of such properties in the province of Newfoundland and Labrador. They are also consistent with the guidance provided by IAAC for this EIS.

- Direction
  - Neutral: no effect on Archaeological and Cultural Resources.
  - Adverse: loss or disturbance of Archaeological and Cultural Resources.
- Magnitude
  - Negligible: no likely effect on Archaeological and Cultural Resources.
  - Low: disturbance of Archaeological and Cultural Resources but with prior retrieval of the resource and associated information, and with all necessary regulatory approvals.
  - Moderate: disturbance or loss of a portion of an Archaeological and Cultural Resource, with retrieval of a portion of the resource and its associated information, or a direct effect on a known Archaeological and Cultural Resource that is of interest and concern to the associated community, but that does not reduce the overall integrity and cultural value of the site.
  - High: disturbance or loss of an Archaeological and Cultural Resource, with no retrieval of the resource and its associated information, or a direct effect on Archaeological and Cultural Resources, which reduces the overall integrity and cultural value of the site.
- Geographic Extent
  - Site-specific: effect confined to the PDA.
  - Local: any effect will be limited to the LSA.
  - Regional: effects may extend beyond the LSA.
- Frequency
  - Unlikely: Not likely to occur.
  - Once: effect occurs once.
  - Sporadically: effect occurs occasionally but not consistently throughout the life of the Project.

- Regularly: effect occurs at regular intervals throughout the life of the Project.
- Continuous: effect will occur continuously.

- Duration
  - Temporary: effect will occur but measures are taken to salvage and retrieve information from the resources, and/or move/rehabilitate the site.
  - Permanent: effect will be permanent and irreversible.
- Reversibility
  - Reversible: will likely recover to baseline condition after Project closure and reclamation.
  - Irreversible: unlikely to recover to baseline condition after Project closure and reclamation.
- Ecological / Socio-economic Context
  - Undisturbed: area has been relatively or not adversely affected by recent human activity.
  - Disturbed: area has been substantially previously disturbed by recent human development or human development is still present.
- Prediction Confidence
  - Low: there is a low level of confidence in the effects prediction.
  - Moderate: there is a moderate level of confidence in the effects prediction.
  - High: there is a high level of confidence in the effects prediction.

Significance criteria for Archaeological and Cultural Resources are defined by the Newfoundland and Labrador *Historic Resources Act* (1985). A significant adverse residual environmental effect on Archaeological and Cultural Resources is defined as a Project-related environmental effect that results in the loss or disturbance of known Archaeological and Cultural Resources without the appropriate documentation of site data, salvage and/or retrieval of the material culture and information it contains, and without prior approval from the PAO.

An adverse environmental effect that is not consistent with the above definition is rated as not significant.

18.4 Potential Project-VC Interactions

In Table 18.3, each Project activity and physical work is listed and each interaction resulting in a potential Loss or Disturbance of Archaeological and Cultural Resources rated as 0, 1, or 2 based on the level of interaction associated with each.

Table 18.3 Potential Project Environmental Effects to Archaeological and Cultural Resources

Project Activities and Physical Works	Potential Environmental Effect
	Loss or Disturbance of Archaeological and Cultural Resources
Construction	
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	2
Construction of Roads	2
Construction of Causeway	2
Construction of Site Buildings and Associated Infrastructure	2
Construction of Rail Loop and Associated Infrastructure	2
Construction of Stream Crossings	2
Installation of Water Supply Infrastructure (wells, pumps, pipes)	2
On-site Vehicle/Equipment Operation	0
Waste Management	0
Transportation of Personnel and Goods to Site	0
Expenditures	0
Employment	0
Operation and Maintenance	
Maintenance of Causeway	0
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	2
Dewatering Joyce Lake	2
Ore Processing (including crushing, conveying, storage, grinding, screening)	0
Waste Rock Disposal on Surface	2
Water Treatment (including mine water and surface runoff) and Discharge	0
Rail Load-Out and Transport	0
On-site Vehicle/Equipment Operation and Maintenance	0
Waste Management	0
Transportation of Personnel and Goods to Site	0
Fuel Transport	0
Fuel Storage and Dispensing	0
Progressive Rehabilitation	0
Expenditures	0
Employment	0

Table 18.3 Potential Project Environmental Effects to Archaeological and Cultural Resources

Project Activities and Physical Works	Potential Environmental Effect
	Loss or Disturbance of Archaeological and Cultural Resources
Site Decommissioning	0
Site Reclamation (building demolition, grading, scarifying)	0
Accidental Events	
Hydrocarbon Spill	2
Train Derailment	2
Forest Fire	2
Settling/Sedimentation Pond Overflow	2
Premature or Permanent Shutdown	0

KEY:
0 No interaction.
1 Interaction occurs; however, based on past experience, the resulting environmental effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.
2 Interaction occurs, and resulting environmental effect may exceed acceptable levels without implementation of specific mitigation. Further assessment is warranted.

The ratings listed above take a precautionary approach, whereby interactions with a meaningful degree of uncertainty are assigned a rating of 2, ensuring that a detailed environmental effects assessment is conducted.

18.4.1 Interactions Rated as 0

Activities rated as 0 include those which will not involve ground disturbance. Project activities during the Construction phase, with interactions rated as 0 include, onsite vehicle/equipment operation, waste management, transportation of personnel and goods to site, and expenditures and employment.

During the operation and maintenance phase of the project, activities rated as 0 include maintenance of causeway, ore processing (including crushing, conveying, storage, grinding, screening), water treatment (including mine water and surface runoff) and discharge, rail load-out and transport, on-site vehicle/equipment operation and maintenance, waste management, transportation of personnel and goods to site, fuel transportation, fuel storage and dispensing, progressive rehabilitation, and expenditures and employment.

During Project Closure and Decommission, activities rated as 0 include site decommissioning and site reclamation (building demolition, grading, scarifying, hydroseeding).

18.4.2 Interactions Rated as 1

For Archaeological and Cultural Resources, there are no Project activities identified in Table 18.3 with interactions rated as 1.

18.4.3 Interactions Rated as 2

Project activities with interactions rated as 2, and those which warrant further assessment, include activities include ground disturbance. This includes, site preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching and stockpiling), construction of roads, construction of site buildings and associated infrastructure, construction of rail loop and associated infrastructure, construction of stream crossings, installation of water supply infrastructure (wells, pumps, pipes), open pit mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering), and dewatering Joyce Lake. Also included are the following accidents and malfunctions: hydrocarbon spills, train derailment, forest fires and settling/sedimentation pond overflow.

18.5 Existing environment

18.5.1 Information Sources

The sources of information used to help characterize Archaeological and Cultural Resources baseline conditions within the RSA include:

- the digital Archaeological Site Record Inventory at the PAO in St. John's;
- reports and published literature regarding previous Historic and Cultural Resources assessments and research projects undertaken in western Labrador and adjacent parts of Québec;
- relevant historic, ethnohistoric and ethnographic sources;
- Project features identified on 1:50,000, NTS mapping and Landsat imagery;
- studies on various aspects of Indigenous peoples, culture and spirituality;
- studies on Indigenous Traditional Knowledge and use of various sectors of the RSA; and
- field studies completed within the PDA in 2012 and 2013.

While traditional knowledge pertaining specifically to Historic and Cultural Resourced was not identified, the traditional knowledge results identified in Chapter 3: Engagement and Traditional Knowledge have been considered and integrated throughout the assessment.

18.5.2 Method for Characterization of Baseline Conditions

18.5.2.1 Background Research

Background research for Archaeological and Cultural Resources began with a search of the Archaeological Site Record Inventory at the PAO to determine whether any archaeological or contemporary sites, or other cultural resources of importance, were registered for the LSA or RSA. In addition to providing site-specific information, such as site locations, time-period, and cultural group(s) represented (if known), the PAO data contributed to the determination of archaeological and cultural resources potential of the LSA.

To obtain an overview of the cultural/historical sequence of the RSA, background research also involved a review of reports and published literature on previous Historic and Cultural resources assessments and research projects undertaken in western Labrador and adjacent parts of Québec (*e.g.,* Thomson 1983, 1984, 1985; Penney 1986, 1988, 2010; Denton and McCaffrey 1988; Denton 1989; McCaffrey 1989, 2004, 2006a, 2006b; Niellon 1992; JWEL 1998; Loring et al. 2003; Neilsen 2005, 2009a, 2009b; McCaffrey et al. 2006; Minaskuat 2006, 2008; Brake 2007a, 2007b; Pintal 2007; LIM 2009). Background research for archaeological resources also included a review of relevant historic, ethnohistoric, and ethnographic sources (*e.g.*, Delanglez 1948; Mailhot 1997).

Sites of Indigenous and non-Indigenous cultural, historic and religious importance occur in western Labrador. In order to determine whether any cultural/spiritual sites are known for the RSA and LSA, a literature search of relevant historic, ethnohistoric and ethnographic sources was completed (*e.g.*, Delanglez 1948; Tremblay 1977; Tanner and Armitage 1986; Armitage 1990, 1992, 2010; Niellon 1992; Mailhot 1997; Weiler 1999; LIM 2009). As well, a review of existing studies on Indigenous culture, spirituality (Armitage 1992; Weiler 1999) and land-use in western Labrador (Tanner and Armitage 1986; LIM 2009; Armitage 2010; Nalcor Energy 2010) was conducted. No specific information on cultural/spiritual resources in western Labrador was identified through research of PAO data sources.

As part of the background research, the relative archaeological potential of the LSA was mapped on 1:50,000-scale, NTS images to create a predictive model. The purpose was to analyze and tentatively rate topographic zones as having either a Low, Moderate or Higher potential for archaeological materials so that specific locations where Project infrastructure will be situated could be targeted for subsequent ground survey and subsurface shovel-testing, if warranted. The method used for the archaeological potential mapping was developed for assessment of the Lower Churchill Project in 2000 (JWEL/IELP 2001), and subsequently refined in 2008 and 2010 (Stantec Consulting Ltd. 2010).

Determining the relative archaeological potential of an area involves four stages:

- defining Zone Types based on topographically- and hydrographically-defined conditions;
- incorporation of data into GIS for analysis;

- mapping the relative archaeological potential for each defined Zone Type; and
- revising/updating the archaeological potential mapping based on field observations and subsurface shovel-testing results obtained through field assessment.

Stage 1: Mapping Zone Types

Zone Types represent landforms, with distinctive topographic, hydrographic and vegetation features that are generally identifiable on Landsat imagery and, in some cases, 1:50,000-scale, NTS mapping. The majority of Zone Types are distinguished by topographic features, principally their slope and edge characteristics, and their relation to waterbodies. Modifications to the method described above (involving use of only four of the originally-defined 12 Zones Types) were necessitated by the topographic and hydrographic conditions and vegetation patterns specific to the LSA. Zone Types present in the LSA are described below.

- **Zone Type 01 (Contemporary Strategic Shoreline)** consists of all shorelines of major waterways that display strategic attributes that, in certain instances, have yielded evidence of past human habitation. Major waterways are defined to include coastal areas (not applicable in western Labrador), inland lakes greater than approximately 2 km^2 in area, and inland rivers wide enough for both banks to be distinguished on 1:50,000-scale, NTS mapping. Strategic attributes include prominent points of land, confluences, constrictions in waterways and locations above or below falls and rapids. The strategic significance of these attributes has been tested and verified during previous archaeological potential mapping/predictive modeling studies (JWEL/IELP 2001; Stantec Consulting Ltd. 2010).
- **Zone Type 02 (Contemporary Generic Shoreline)** consists of shorelines of major inland waterways that lack strategic attributes (such as those listed above).
- **Zone Type 09 (Upland)** consists of areas of moderate or steep slope. It effectively represents interfluvial upland, encompassing large areas of steep or moderate slope, hilltops and/or minor stream-courses lying between major waterways.
- **Zone Type 10 (Wetland)** consists of permanently, poorly-drained organic deposits (such as bogs or fens) large enough to be mapped at a 1:50,000 scale.

In most cases, review of aerial imagery for Historic and Cultural resource potential mapping does not identify specific locations of dry, level terrain that may have been suitable for past human habitation. It merely highlights Zone Types within which such terrain, if present, has a greater or lesser potential, relative to one another within the total area under study, to contain archaeological and/or cultural resources. For example, a shoreline zone containing a strategic point of land may lack level and dry, habitable terrain. An area therefore, that is rated as having Higher potential does not necessarily indicate that the potential is uniformly High; but its rating, relative to other mapped zones in the area under study is, to some degree, elevated. Zones rated as having Low potential does not confirm that there is no potential for archaeological and/or cultural resources to be present; but that the probability is lower than other mapped zones. Subsequent field assessment allows the potential mapping to be ground-truthed and revised, if indicated.

Stage 2: Incorporation into GIS and Data Analysis

The maps and associated zone-type attributes were digitized and incorporated into GIS files. Final output for the archaeological potential mapping/predictive model prepared as part of the background research was in the form of geo-referenced polygons.

Stage 3: Mapping Archaeological Potential

Stage 3 of the process consisted of assigning a relative archaeological potential rating of Low, Moderate, or Higher to each Zone.

Stage 4: Revising Archaeological Potential Mapping

The primary purpose of the pre-field research and archaeological and cultural resources potential mapping is to analyze and tentatively rate Zones as having either a Low, Moderate or Higher potential for archaeological materials so that specific locations where ground disturbance may occur can be accurately targeted for field assessment. The level of investigation during fieldwork can range from a helicopter over-flight (to visually inspect the area's topographic and hydrographic conditions and vegetation patterns), to a walk-over and/or shovel test-pitting of select locations. Depending on the results of fieldwork, the archaeological potential ratings assigned to zones during pre-field research can then be revised and updated with a higher degree of confidence to guide development and/or further field investigation.

18.5.2.2 2012 and 2013 Field Studies

The 2012 and 2013 field study for the characterization of Archaeological and Cultural Resources baseline conditions in the LSA commenced with a helicopter over-flight to view and photograph all mapped archaeological zones and a revised road corridor option in order to confirm and/or revise the archaeological and cultural potential ratings assigned during background research. Helicopter over-flight was followed by ground surveys involving close surface inspection and subsurface shovel testing of all zones rated as having Moderate or Higher potential, either during background research or subsequent to the over-flight. Zones considered to have Low archaeological potential following over-flight were not subject to a ground survey.

Sub-surface shovel testing was conducted when background research and/or close visual reconnaissance confirmed that a location had potential for buried Pre-contact materials or when specific historic and/or contemporary sites might be anticipated, but no surface-visible evidence was observed. In locations of particular interest, such as the shorelines of waterways intersected by, or adjacent to, Project infrastructure, shovel test pits were dug at roughly 5 m intervals or randomly along cut-lines or paths and in open woodland areas, to a depth of several centimetres below the uppermost layer of soil or sand. Generally, testing was focused on well-drained, level terrain suitable for human habitation and avoided locations with noticeable surface-water, that were sloped or had large distributions of surface-rock. Test pits were approximately 40 cm by 40 cm, and excavations were rarely deeper than 40 cm below the surface. All test pits were excavated with shovel and trowel and each was back-filled once testing was completed. Due to the generally rocky surface and sub-surface material present throughout the LSA, screening of soils for cultural materials was not necessary.

The number and location of all test pits were recorded and field notes and photographs were taken. At locations where archaeological or ethnographic materials were discovered, further shovel testing was completed to help determine the physical extent of the deposit, cultural affiliation and time-period involved. In areas where ethnographic materials were identified, strategic shovel testing was conducted to help confirm if archaeological materials were present. The approach of conducting only limited testing at any site identified during the Stage 2 Assessment eliminated any unnecessary site disturbances until an appropriate mitigation strategy, if required, could be developed and approved by the Proponent and PAO. Photographs were taken of all Zones and subsurface testing locations, and all identified archaeological and contemporary sites and features. All information regarding the nature and integrity of sites, including Global Positioning System (GPS) coordinates, was documented on Site Record Forms and provided to the PAO, who issued site registration numbers.

The PDA was revised on three occasions: August 2012; early 2013; and 2014. Revisions made in 2012 were assessed during the initial field study. The revised PDA was assessed during an additional field study in August 2013. Further alterations to the PDA in 2014 were not subjected to field assessment but rather were included on the most recent archaeological potential mapping (Figure 18.3).

18.5.3 Baseline Conditions

18.5.3.1 Cultural/Historical Overview (RSA)

While the majority of Historic and Cultural sites identified in Newfoundland and Labrador are in coastal areas, many sites are present in the near-coastal and interior portions of the Province, including western Labrador.

Background research completed prior to field study confirmed that the RSA lies within a region that has been occupied intermittently by Indigenous people for the past several millennia, and that the use by Indigenous people, Europeans and Euro-Canadians continued throughout the Historic Period and to the present day. A review of publicly available information sources indicated that, although cultural/spiritual sites are known for the RSA, none are documented for the LSA (Stassinu Stantec 2014). There remains potential, however, that physical evidence resulting from these occupations could be present within the LSA.

Figure 18.4 illustrates the different cultural traditions known to have occupied Labrador and parts of Québec over the past 8,000 years. Those known to have occupied the region in which the RSA is situated are highlighted.

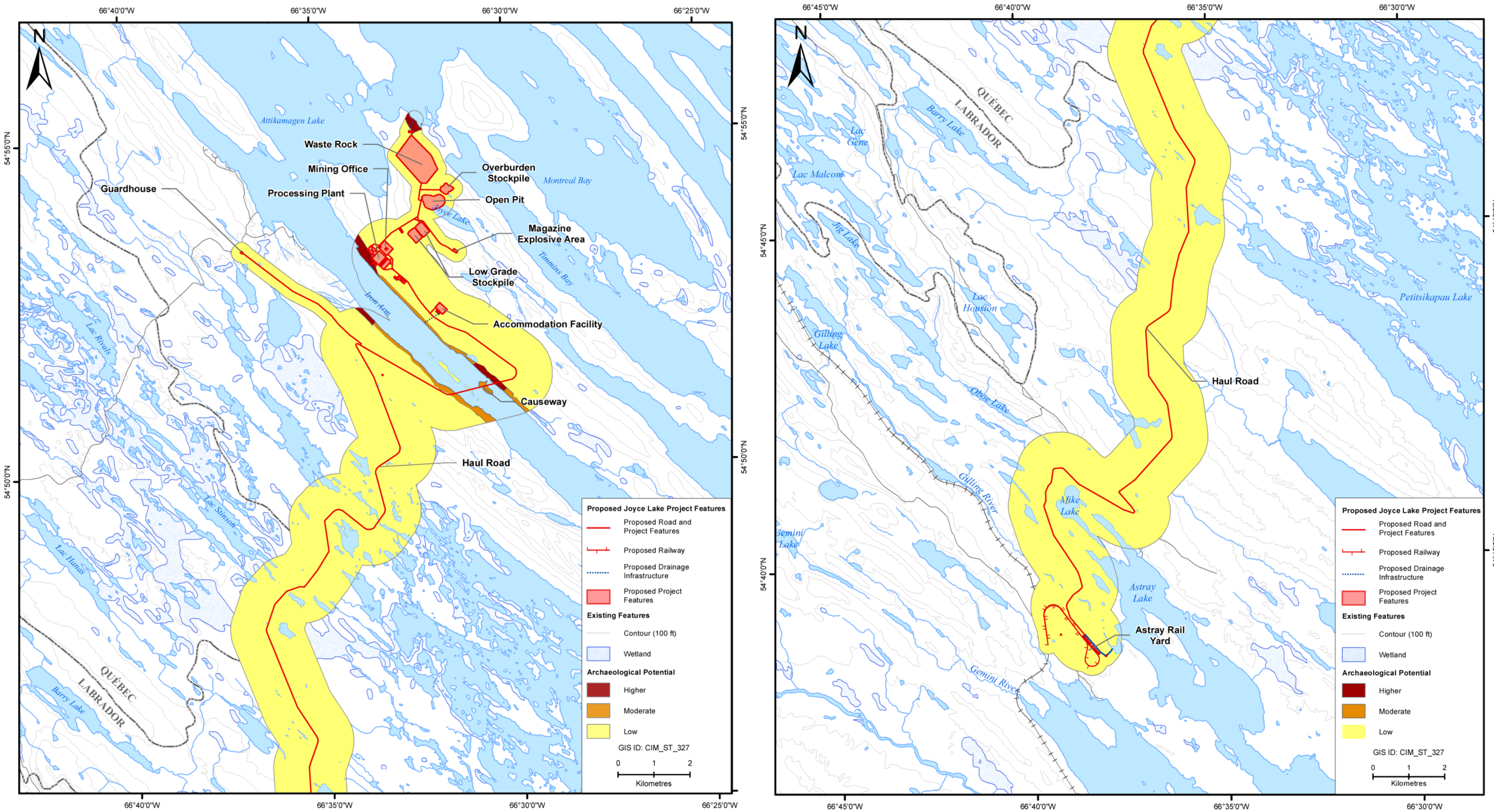

FIGURE TITLE: Archaeological Potential Mapping of Revised Project Footprint - December 2014			
CLIENT: LABEC CENTURY IRON ORE INC.			
CHECKED BY: DF	FIGURE ID: FIGURE 18.3	PROJECT NUMBER 121511139	FIGURE SOURCES: Project features provided by BBA version 2 recieved 2014/11/07. Basemap information from NRCan CanVec database and Newfoundland and Labrador Department of Natural Resources.

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Figure 18.3 Archaeological Potential Mapping of the Revised Project Footprint – December 2014

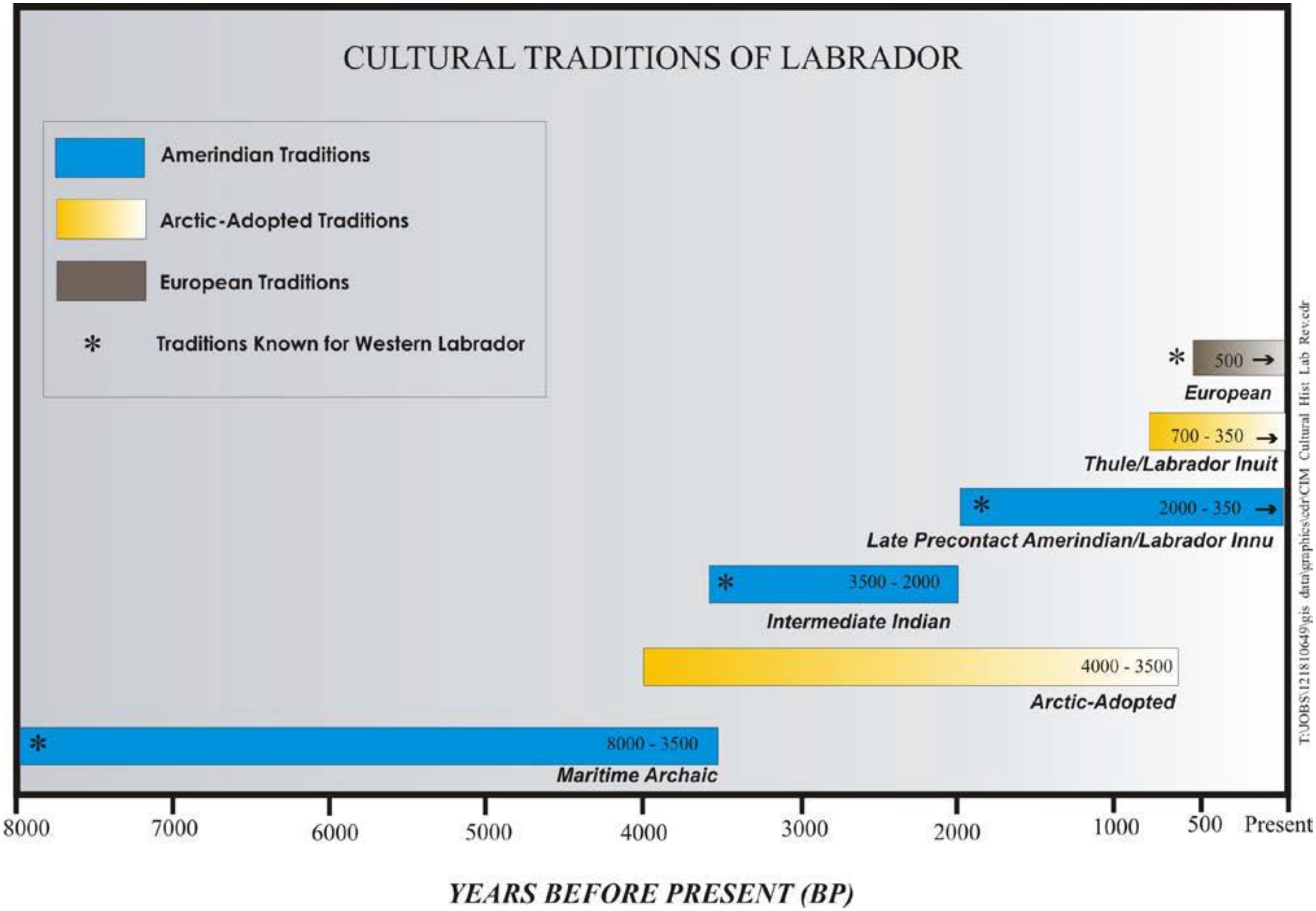

Figure 18.4 Cultural Traditions of Labrador

The Maritime Archaic Indian Tradition is the name given to the people who arrived in southern Labrador via the Maritimes and Lower North Shore of Québec approximately 8,000 years ago in the wake of retreating glaciers (McGhee and Tuck 1975; Pintal 1998; Schwarz 2010). The descendants of these first inhabitants gradually moved north along the coast and eventually reached northern Labrador over 6,500 years ago (Fitzhugh 1978a). There is little evidence of a Maritime Archaic Indian occupation in south-central Labrador; however, several archaeological sites attributable to this group have been identified to the north and in the near-coastal interior (Loring 2001). In western Labrador, evidence of a Maritime Archaic Indian occupation is limited to a number of stone artifacts found on the Lake Plateau (in an area now encompassed by the Smallwood Reservoir) and near Wabush (MacLeod 1967, 1968; Thomson 1984). The most recent dates for this cultural tradition obtained from archaeological sites in coastal Labrador fall around 3,500 years ago. However, dates for the material found in western Labrador have not been determined.

The next period in Labrador prehistory is referred to as the Intermediate Period, dating from 3,500 to 2,000 years ago (Fitzhugh 1972; Nagle 1978). Typically, Intermediate Period sites are small and contain few diagnostic artifacts. The majority of finds in the interior appear to be associated with the Intermediate Period (Schwarz 2007). The Intermediate Period of occupation in Labrador appears to have been focused on an interior-oriented lifestyle of hunting caribou and small game and fishing, similar to that documented for the Innu during the Historic Period. In northern Québec, this period of occupation is not clearly understood (McCaffrey 2006a), but it appears to have been less intensive than that of central Labrador. One archaeological site related to the Intermediate Period was found close to a chert outcrop near Schefferville, Québec, to the west of the LSA (Denton and McCaffrey 1988).

The Intermediate Period in Labrador is followed by the Late Pre-contact Period, dating from 2,000 years ago to the time of Indigenous contact with Europeans, *circa* 1500 to 1700 AD. This period is represented in coastal Labrador by Daniel Rattle and Point Revenge cultural complexes. Archaeological sites dating to this period frequently contain structures interpreted as the remains of communal dwellings analogous to the *shaputuan* of the historic Innu (Loring 1985). Research has revealed a pattern of marine and terrestrial resource exploitation (Fitzhugh 1978b; Loring 1992), with a much larger emphasis on maritime resources than during the previous period. In the central Labrador interior, archaeological sites dating to the Late Pre-contact Period are far less common than those of the Intermediate Period. This differs from northern Québec, where there are many Late Pre-contact Period sites dating to shortly after 2,000 years ago. These sites are known to contain evidence of far-ranging exchange or trade, pottery production and large, *shaputuan*-type dwellings containing a number of hearths (McCaffrey 2006b). Research has demonstrated that people associated with Late Pre-contact Period sites in the region are ancestral to the historic and contemporary Québec-Labrador Innu and Naskapi (Loring 1992).

Circa 1,300 AD, a people referred to as the Thule, ancestors of the Labrador Inuit, migrated south from the Arctic to the north coast of Labrador (Kaplan 1983; Fitzhugh 1994). After approximately 1500 AD, coastal Labrador and the Lower North Shore of Québec became a focus of European activities. Basque whaling efforts along the coast in the sixteenth century intensified (Tuck and Grenier 1989), as did fishing, sealing and fur trading by people from other European countries (McAleese 1991; Kennedy 1995). In the interior, European activity was more limited. However, trader and explorer Louis Jolliet visited the Ashuanipi area around 1695, providing the earliest written reference to the importance of Ashuanipi Lake as a major Innu gathering place (Delanglez 1948). Indigenous archaeological sites dating from the mid-seventeenth to the mid-nineteenth centuries have rarely been identified in interior Labrador and northern Québec. Consequently, the understanding of settlement patterns dating to the historic Period is based largely on ethnohistoric literature and fur-trade accounts, including the records of the Hudson Bay Company from interior trading posts in the region (McCaffrey 1988). In the latter half of the nineteenth century, when the fur trade in Labrador was at its peak, Innu mobility was gradually reduced. However, even at that time, long-distance travel by Innu across the Labrador Peninsula and as far south as the Lower North Shore of Québec continued (Mailhot 1997; Tremblay 1977).

The twentieth century saw many changes throughout Labrador. Among the more notable was the emergence of the Euro-Canadian communities of Happy Valley-Goose Bay and the mining communities of Labrador City and Wabush in western Labrador. The 1960s saw the implementation of government policies encouraging the Innu to become increasingly sedentary (Armitage 1990). Further policy shifts included development of the upper Churchill River for hydroelectric purposes, which resulted in the flooding of vast tracts of land and creation of the Smallwood Reservoir in 1971. Also developed at that time were roads, air travel and communication networks. Prior to those developments, the region had been a key hunting and gathering area for the Innu of Labrador-Ungava and the Lower North Shore of Québec (Loring et al. 2003). While the Sheshatshiu Innu continue to occupy most of the pre-settlement area, inter-band mobility is currently much diminished and it is now Innu from the Lower North Shore of Québec and Schefferville area who are the primary users of the RSA (Armitage 1990; also see Tanner and Armitage 1986).

Previous Archaeological Research in Western Labrador and Northeast Québec

Archaeological research in Labrador-Ungava has focused primarily on the Labrador coast to the east and southeast of the LSA, the Québec interior to the west and north, and the North Shore of the St. Lawrence River to the south (McCaffrey et al. 2006). In contrast, relatively little research has been conducted in northwest Labrador generally and in the vicinity of the RSA specifically.

To date, the archaeological research conducted in the interior of northwestern Labrador and adjacent parts of Québec has focused on six broad regions. Two of these, the Ashuanipi Region and the corridor of Highway 500 between Labrador City/Wabush and Churchill Falls, are relatively distant from the LSA. Nevertheless, the findings from these two regions are relevant to the current study and they are discussed below. Closer to the LSA, archaeological research has been conducted in the Menihek Region to the south and the Smallwood Reservoir Region of the Lake Plateau to the southeast. To the west of Joyce Lake, the Caniapiscau/Laforge Region in the interior of northern Québec has been subject to considerable archaeological research, as has the Schefferville Region in which the RSA is situated (Figure 18.5). Findings from each of these regions are presented below.

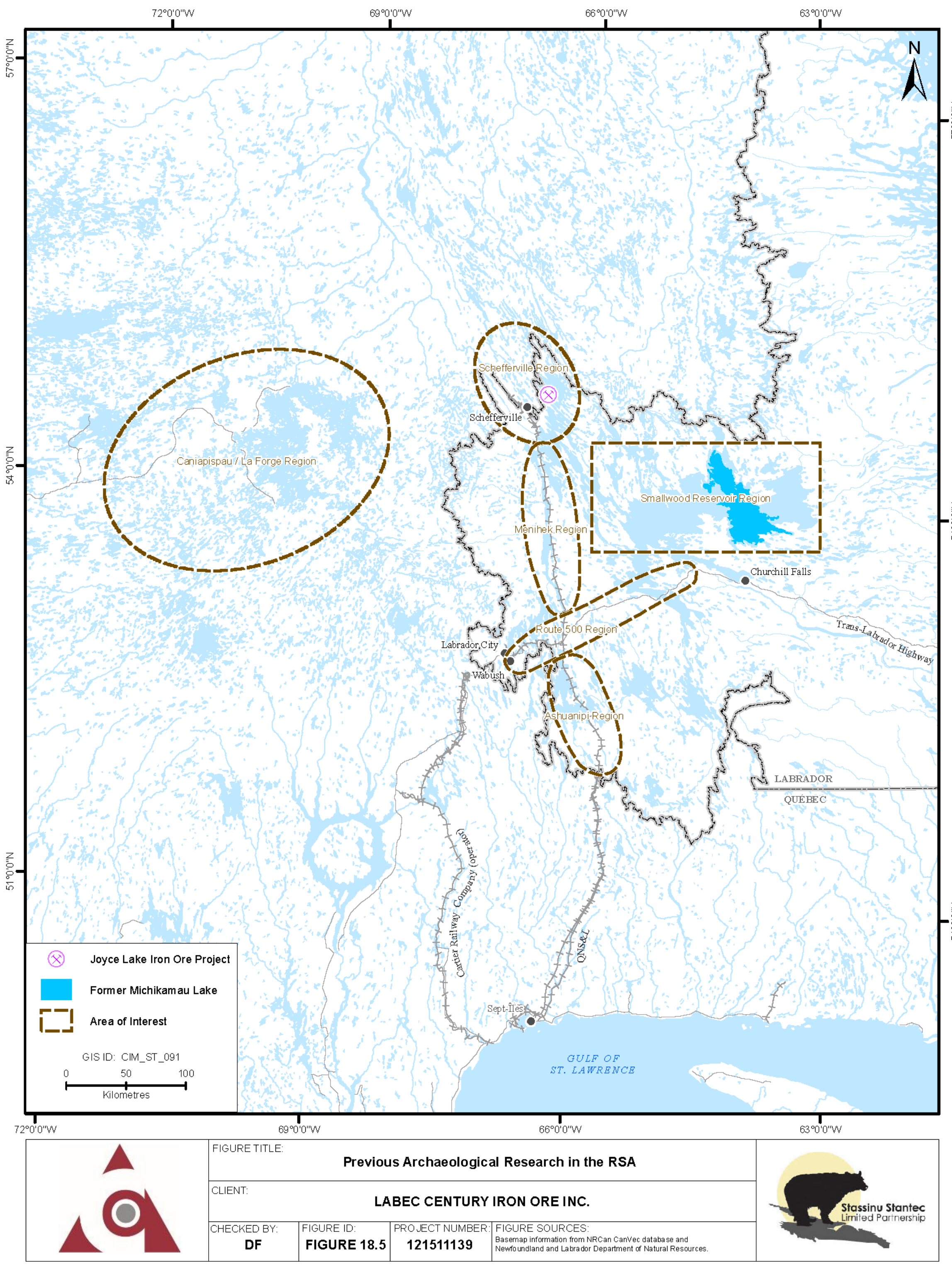

Figure 18.5 Previous Archaeological Research in the RSA

Ashuanipi Region

Research conducted in the Ashuanipi Region has led to the discovery of numerous Pre-contact Period and contemporary sites on Ashuanipi Lake (Niellon 1992; Neilsen 2005, 2009a), one of which, the Ferguson Bay 1 site, has been excavated (Brake 2007a; 2007b). In 2006, Minaskuat Limited Partnership was retained by LabMag GP Inc. to undertake a Stage 1 Assessment of a proposed development in western Labrador near Schefferville. In addition to evidence of contemporary land use, the assessment of the slurry pipeline corridor led to the discovery of 13 Pre-contact Period archaeological sites along the Ashuanipi drainage (Figure 18.5), from Wightman Lake north to the eastern shore of Menihek Lake (Minaskuat 2008).

Regionally, the main axis of travel during the Historic Period appears to have followed the Ashuanipi drainage. The relative abundance of archaeological sites suggests that the importance of the Ashuanipi for travel for Innu during the Historic Period was also true in the Pre-contact Period. There is also some potential that secondary historic travel routes lead from the Ashuanipi to the west and southwest toward Rivière aux Pékans and beyond to the Saint-Marguerite or Manicouagan.

Menihek Region

An archaeological survey carried out in the 1980s identified a number of Pre-contact Period archaeological sites on the west side of Menihek Lake, particularly near the mouth of McPhayden River (McCaffrey 1989) (Figure 18.5). During that study, McCaffrey surveyed the shorelines of three lakes in the region for lithic sources and identified five sites on Menihek Lake, with raw materials of the Wishart chert formation. Although no datable organic material was recovered from any of the sites, it was noted that several of the lithic artifacts located as surface finds exhibited similarities to certain cultural and chronological periods known for the region. While not confirmed, it was thought that some of the materials may relate to the late Maritime Archaic Indian Period, while other artifacts recovered by McCaffrey were thought to be similar to materials found along the Labrador coast and dating to the Intermediate Indian Period of occupation. If this is correct, these sites could date to between circa 3,500 and 2,000 years ago (McCaffrey 1989).

Smallwood Reservoir Region of the Lake Plateau

The Lake Plateau Region to the southeast of the LSA received little archaeological attention prior to the creation of Smallwood Reservoir in 1971 (Figure 18.5). However, the territory around the former Michikamau Lake (now part of Smallwood Reservoir) was surveyed for archaeological materials in the 1960s prior to flooding (MacLeod 1967, 1968). A total of eight sites were identified at that time, five of which contained Pre-contact Period components. MacLeod (1967) also noted a number of relatively large historic Innu campsites in his study area, including one he described as "…one of the last preserved major meeting places for the Naskapi from the north and Montagnais from farther south…". The sites recorded by MacLeod in the 1960s were subsequently submerged as a result of flooding for Smallwood Reservoir. In 1995, an archaeological survey undertaken along portions of the Smallwood Reservoir during a period of unusually low water levels indicated that despite erosion from fluctuating water levels and ice scouring, deflated archaeological deposits could still be identified (Loring et al. 2003).

Caniapiscau / Laforge Region

The Caniapiscau / Laforge region received considerable archaeological attention in the 1970s and 1980s in the context of hydroelectric development of Rivière La Grande (Figure 18.5). Archaeological work in this vast region began with a series of canoe-based surveys during the summers of 1972 and 1976 and grew in scale and duration over the following two decades. Hundreds of Pre-contact, Contact, and Historic Period sites were identified, and a number of these were fully excavated. Reports and publications based on this research provide evidence documenting Pre-contact occupation in the far interior of the eastern Subarctic and indicate that this history dates back at least 4,000 years. A number of regional syntheses have been produced (Denton 1989; McCaffrey 2006a, 2006b) and over 100 sites have been radiocarbon dated.

Schefferville Region

In 1984, archaeological surveys in the Schefferville region to the southwest of the LSA located evidence of pre-contact use of local chert outcrops (Denton and McCaffrey 1988) (Figure 18.5). Other surveys and excavations were also conducted in the area north of Schefferville and in western Labrador. A number of potential habitation locations were investigated, along with Fort Nascopie, a nineteenth century Hudson Bay Company post on Petitsikapau Lake (McCaffrey 1989).

In 2003, sections of a proposed mine site at Howells River to the southwest of the LSA were inventoried as part of a pre-feasibility historic and cultural resources study. It was determined that the region is dominated by low-lying shorelines and rocky terrain that is usually considered to have Low potential for archaeological resources. The survey did not yield any evidence of Pre-contact or Early Historic Period occupations, but ample evidence of recent Innu land use dating to the last 50 years was recorded. It was determined that the recorded sites appear to be associated with improved access from Schefferville, specifically along roads constructed to support mining exploration activities. Other archaeological surveys near geological formations revealed no evidence of pre-contact use, but high-quality chert outcrops in the area related to the formations identified in the 1980s were recorded and sampled (McCaffrey 2004).

In June 2006, a second historic resources assessment was carried out in the Howells River area. The 2006 assessment, a continuation of the work initiated in 2003, resulted in the identification of 37 additional sites of ethnographic interest, the majority of which are thought to be Innu fall and winter camps dating from the last 50 years. The 2006 historic and cultural resources research brought the total number of registered contemporary sites in the area to 56. Despite the two research projects completed in the area, no sites or materials dating to the Pre-contact or Historic Periods were recorded (McCaffrey 2004; Minaskuat 2006).

Cultural/Spiritual Sites

A review of existing studies on Indigenous culture, spirituality (Armitage 1992; Weiler 1999) and land use (Armitage 2010; Tanner and Armitage 1986; LIM 2009; Nalcor Energy 2010) in western Labrador identified two sites of cultural/spiritual importance along the Ashuanipi drainage system. These include a traditional Innu gathering site on Menihek Lake, approximately 105 km south of the LSA, marked by a statue of St. Anthony erected in 1970 (Minaskuat 2008), and a large Innu burial site on Ashuanipi Lake, approximately 255 km south of the LSA, visited by Père Babel in 1868 (Tremblay 1977; Tanner and Armitage 1986). However, no evidence of cultural/spiritual sites was identified within the LSA (Figure 18.6). No additional specific information on cultural/spiritual resources in western Labrador was identified through research of the PAO data sources.

18.5.3.2 2012 Stage 1 Historic and Cultural Resources Assessment

The relative archaeological potential of the LSA (as configured in August 2012) was mapped in its entirety as part of the background research for the Stage 1 Assessment prior to commencement of the field study.

For the 2012 program, 33 zones were defined as having either Low, Moderate or Higher archaeological potential, with 14 of the total assigned a rating of Low, eight a rating of Moderate and 11 a rating of Higher. The vast majority of terrain in the LSA was defined as having Low archaeological potential, as it is either sloped, has excessive surface-water, or has poorly defined and rocky shorelines that are generally unsuited for landing and deploying small craft and other aspects of human occupation, such as establishing campsites. Only a relatively limited area was considered to have Moderate or Higher archaeological potential.

The September 2012 and 2013 field study of the LSA involved a detailed examination of 24 individual locations and excavation of 124 test pits (Figure 18.7). This work resulted in the identification of one archaeological site and six contemporary sites (Figure 18.8). While contemporary sites (i.e., evidence of land use post-dating 1960) can provide insight into much earlier land use patterns and activities, and act as proxy indicators of archaeological potential, they are not subject to further assessment or mitigation under the *Historic Resources Act* (1985). One Pre-contact Period archaeological site (GfDp-01 - Attikamagen Lake 1), was identified on the east side of Iron Arm. While this site was, at the time, outside of the study area, it was identified for testing along with the surrounding area following helicopter overflight.

The archaeological site (GfDp-01 - Attikamagen Lake 1) is situated on a small point of land on the east side of Iron Arm in a Zone rated as having Higher archaeological potential during background research but subsequently revised to Moderate potential. The site is located in a grove of fir trees set back from a pebble and sand beach ideally suited to landing and deploying small and medium-sized craft. The terrain back from the beach is sheltered, level and relatively well-drained, and an ample supply of firewood is present throughout the surrounding area. The point of land where the site is located is ideally situated as a place to camp if travelling the lake in boats or on the ice in winter.

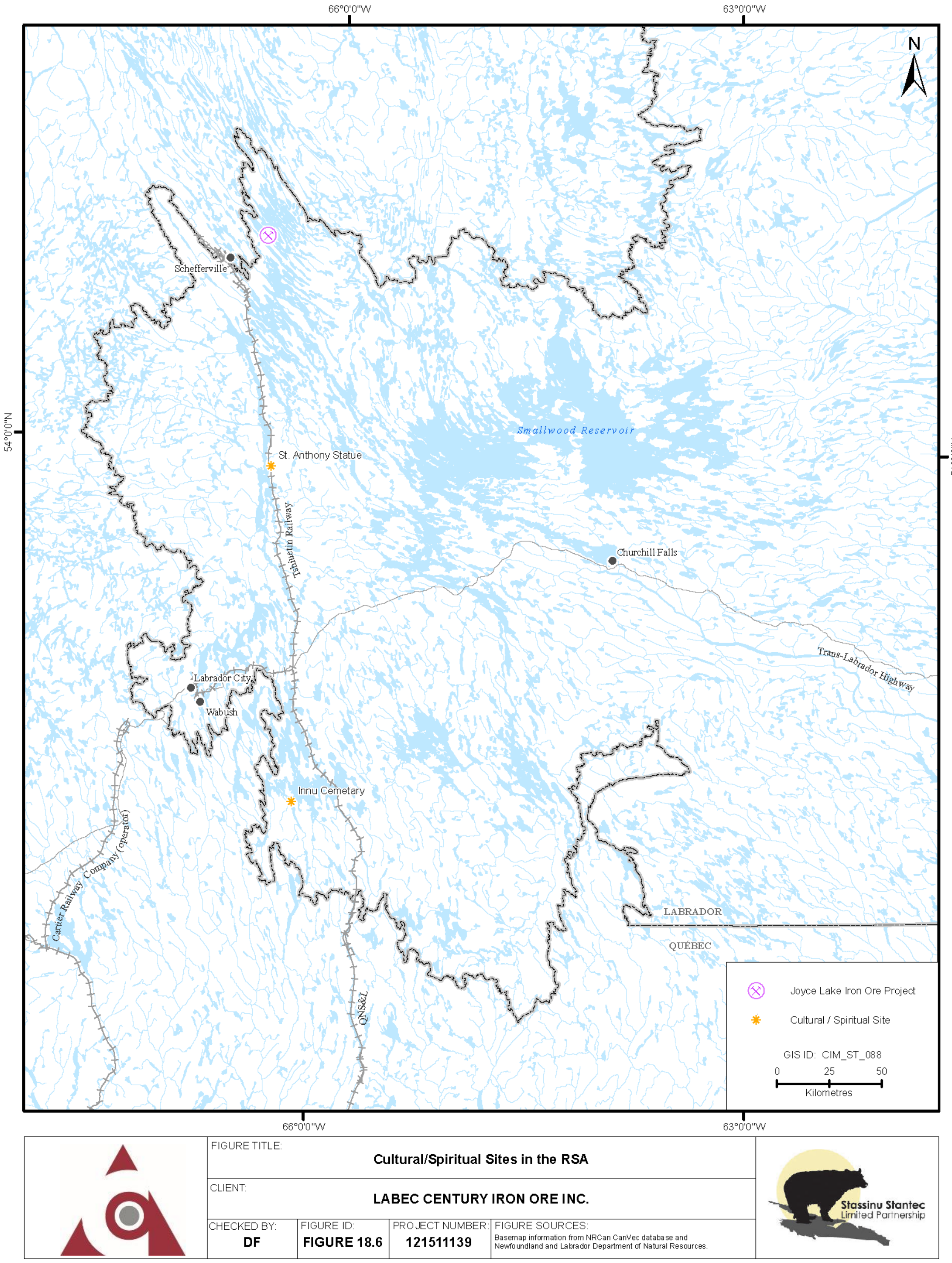

Figure 18.6 Cultural/Spiritual Sites in the RSA

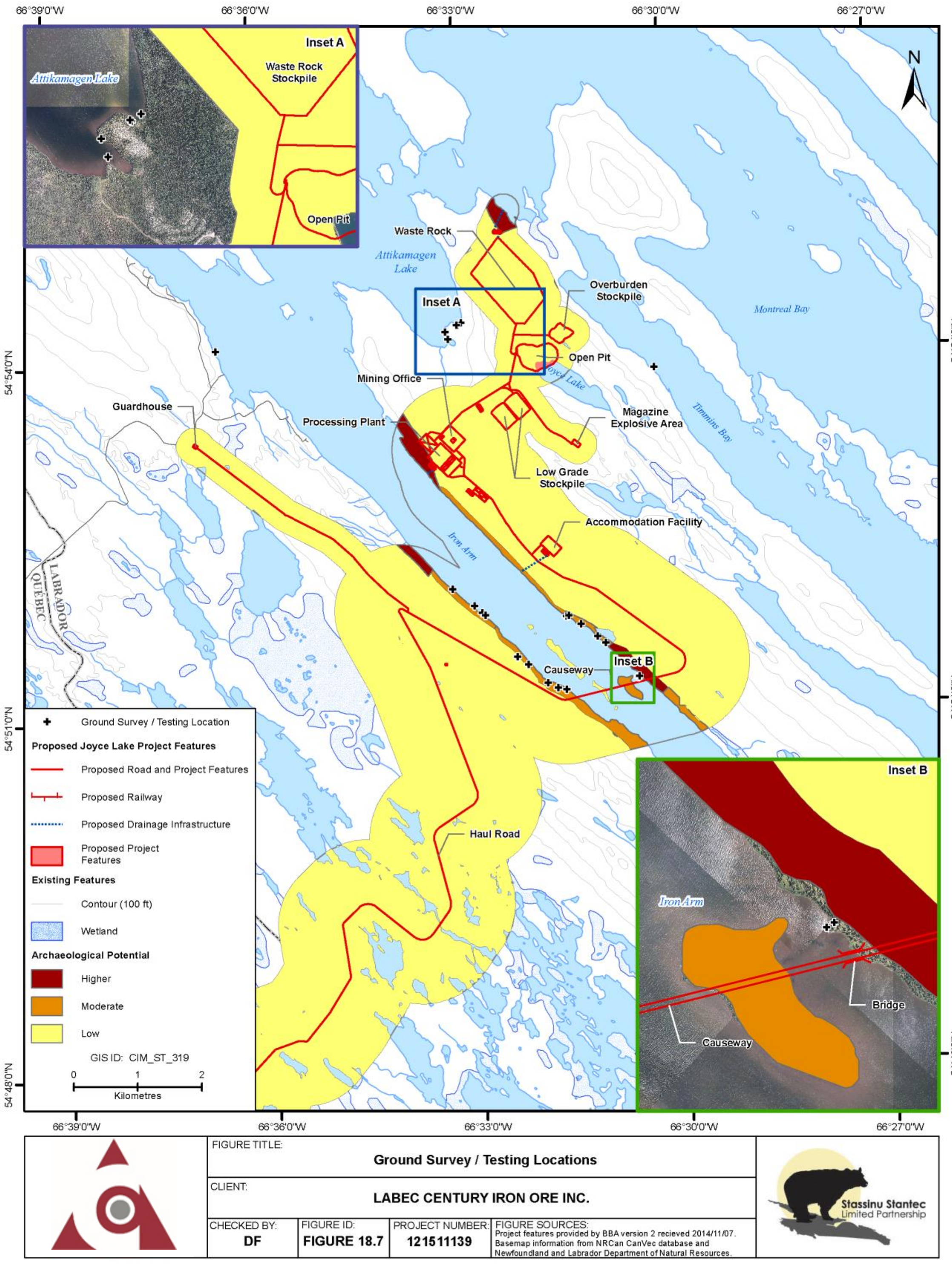

Figure 18.7 Ground Survey/Testing Locations

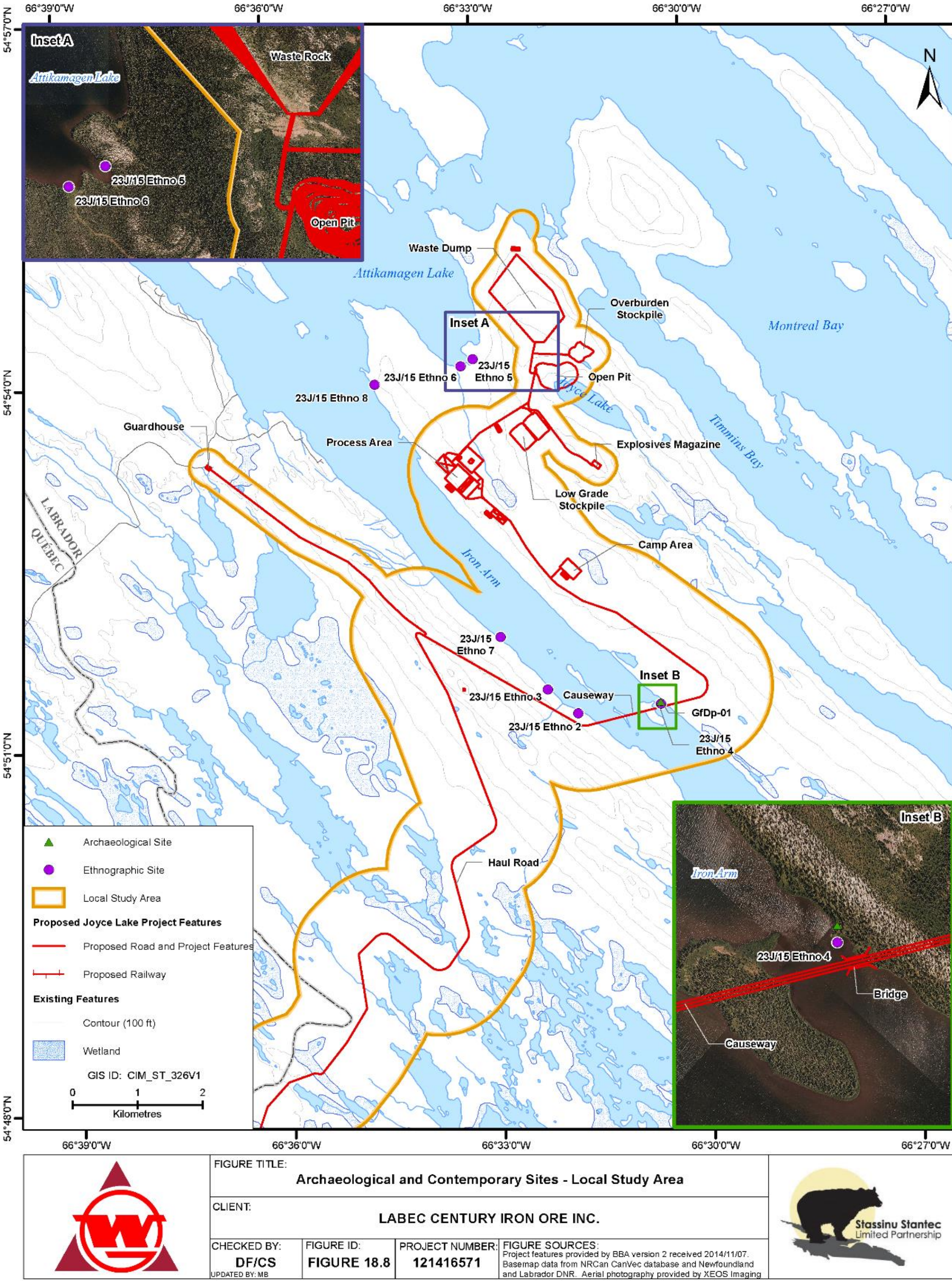

Figure 18.8 Archaeological and Contemporary Sites

Archaeological materials identified in two shovel test pits dug at the site included 145 flakes (*i.e.*, stone chipping debris from tool manufacture) of chert of which roughly half are wine-coloured, with the remaining being grey-white and beige. While no finished artifacts were identified among the assemblage, there were many small sharpening and thinning flakes suggesting that stone cores or preforms were being worked into finished tools at the site. It is also of note that all but four of the 145 flakes were concentrated in a single 40 cm by 40 cm test pit.

In the absence of finished artifacts, or significant sections thereof, it is not possible to confirm the cultural affiliation and age of the artifacts and the site. Excavation of 30 test pits over the entire point of land failed to identify any additional Pre-contact Period or Historic Period materials. Given the limited distribution of chipping debris recorded, it appears that the site was occupied for a brief period of time, possibly by a small group. The density of lithic materials recorded at the site could indicate a hearth may be present. If so, organic materials (such as charcoal or burnt bone) could provide additional information on the site, including the time-period when it was occupied and the cultural group represented.

The field study of the mine site in September 2012 was focused on assessment of the entire PDA, with particular emphasis directed toward investigation of the 11 zones assigned a rating of Higher archaeological potential and the eight assigned a rating of Moderate. All Moderate and Higher potential zones are located along the shorelines of relatively large lakes, including Attikamagen, Petitsikapau and Astray, or adjacent to smaller unnamed ponds, rivers and streams. However, due to the nature and extent of topographical conditions noted at various zones during the initial confirmatory aerial over-flight, specifically the prevalence of rocky and alder/willow-covered shorelines, with poorly drained, wet topography inland of the cobble beaches, several zones assigned a rating of Moderate and Higher potential during background research were revised to reflect actual conditions. No zones assigned a rating of Low were changed. The revisions to the archaeological potential zones are as follows:

- three of the 11 zones assigned a rating of Higher were revised to Moderate;
- seven of the 11 zones assigned a rating of Higher were revised to Low; and
- five of the eight zones assigned a rating of Moderate were revised to Low.

Regarding Zone JL-34), topographic and hydrographic information as well as the vegetation patterns and distribution of surface-rock observed during the helicopter over-flight, indicated that the entire length of the corridor, including the buffer zone on either side of the road centre-line, was of Low archaeological potential. In summary, the revised and updated archaeological potential of the PDA, based on aerial observations of ground conditions, concluded that one zone is rated as having Higher potential, six zones are rated as having Moderate potential, and 27 zones were rated as having of Low potential.

Complete descriptions of the identified zones can be found in Stassinu Stantec 2014 (Appendix AB).

18.5.3.3 2013 Stage 2 Historic and Cultural Resources Assessment

In early 2013, the PDA was revised further to meet new engineering and design parameters. To determine if the alterations resulted in infrastructure being shifted to areas that had not been subject to Stage 1 Assessment, archeological potential mapping was further refined to ensure complete coverage of the revised PDA and additional field work was completed. Final archeological potential mapping, including the updated 2012 and 2013 mapping, and the 2014 potential mapping are shown on Figure 18.3.

The ground survey and sub-surface testing completed as part of the 2013 Assessment commenced with a helicopter over-flight of all Zones, followed by a walk-over and thorough visual inspection of Zones JL-35 to JL-39 and excavation of 20 test pits at six discrete locations. Only one contemporary site, 23J/15 Ethno 8 (Attikamagen Lake Trap 2), was recorded.

18.6 Assessment of Project-Related Environmental Effects

Any activities that disturb the existing ground-cover have the potential to affect Archaeological and Cultural Resources. Alterations to the landscape (through forest, earth or rock extraction), and increased human activity resulting from improved access to the area, also increase the likelihood of interaction. The Project activities listed in Table 18.3 with interactions rated as 2 could result in an environmental effect on Archaeological and Cultural Resources due to the possibility of loss or disturbance of archaeological sites or places of cultural/spiritual importance.

18.6.1 Construction

The following activities and physical works to be undertaken during the construction phase of the Project include clearing and/or ground disturbance, with the potential to result in the loss or disturbance of Archaeological and Cultural Resources (Table 18.3):

- Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling);
- Construction of Roads;
- Construction of Causeway;
- Construction of Site Buildings and Associated Infrastructure;
- Construction of Rail Loop and Associated Infrastructure; and
- Construction of Stream Crossings.

Within the current PDA there is one archaeological site registered with the PAO, which was identified during the Stage 1 Assessment field survey carried out in September 2012. No additional resources were discovered during the 2013 Stage 2 Assessment. The location of the causeway on the eastern side of Iron Arm is approximately 62 m from the Pre-contact Period, archaeological site GfDp-01- Attikamagen Lake 1. Given the proximity of the site to the proposed causeway, there is potential for the Project to interact with Historic and Cultural Resources. If the site cannot be avoided through Project design and planning, the site will be excavated in accordance with PAO guidelines for archaeological research in the Province. Without mitigation, the site may be subject to permanent loss or disturbance. However, with the proposed mitigation measures, the site can be avoided, or the information it contains can be recovered, documented and preserved, with the research results and the archaeological materials made available for publication, educational purposes and public display.

Available information and the results of consultation with Indigenous groups in Labrador and Québec, and a review of traditional knowledge collected in the area, have not identified any other archaeological and/or cultural sites in or near the PDA or LSA. Any additional and relevant information that is obtained through such consultation activities will be considered in ongoing Project planning, as it becomes available. Therefore, considering the above information, the construction of the Project will not have an effect on or physically disturb any known Archaeological and Cultural Resources.

18.6.2 Operation and Maintenance

The majority of ground disturbance effects with potential to affect Historic and Cultural Resources will occur during the construction phase. During the Project Operation and Maintenance phase, the only additional ground disturbance beyond those areas affected during Project Construction will result from open pit mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering), dewatering Joyce Lake, and surface disposal of waste rock. One, archaeological site was identified within the PDA. Considering the above information, the operation and maintenance of the Project will not have an effect on, or physically disturb, any known Archaeological and/or Cultural Resources. The archaeological and cultural resources potential of the mine site and waste rock disposal areas is assessed as Low.

18.6.3 Closure and Decommissioning

During closure and decommissioning, Project activities will be limited to site decommissioning and reclamation (building demolition, grading, scarifying, hydroseeding) on previously disturbed areas. Therefore, no interactions with Archaeological and Cultural Resources will occur.

18.6.4 Mitigation of Project Environmental Effects

Potential interaction with the archaeological site GfDp-01- Attikamagen Lake 1 will be mitigated by either Project design changes, or systematic data recovery (SDR) of the materials. Additionally, a Project-specific EMP will detail the procedures to follow in the event of an accidental/inadvertent discovery of other Archaeological and Cultural Resources. Construction personnel will be provided with orientation and training that will include briefings related to Archaeological and Cultural Resources. In the event that undiscovered Archaeological and Cultural Resources are identified as a result of Project activities, the Proponent will implement a Stage 1 Assessment. No further activity would proceed in the area until an appropriate approach is approved by the PAO.

In the event any archaeological or cultural resources are identified during any phase of the Project, mitigation of sites and/or materials could include site avoidance and protection, or SDR. SDR includes the scientific and systematic investigation of unavoidable archaeological sites losses using accepted data recovery and reporting techniques and procedures. For cultural/spiritual sites identified during any phase of the Project, the site would be avoided until appropriate means and measures of documentation, interpretation and long-term preservation and stabilization are established in consultation with both Indigenous and non-Indigenous groups and persons, and the PAO. The current archaeological potential mapping of the LSA can be used to plan further field investigations and mitigation, if required.

18.6.5 Characterization of Residual Project Environmental Effects

There is one registered archaeological site situated within the PDA, which could be subject to permanent loss or disturbance from construction of the causeway. However, with the proposed mitigation measures, the site will either be avoided, or the information it contains will be recovered, documented and preserved, with the research results and the archaeological materials made available for publication, educational purposes and/or public display. The geographic extent of potential interactions is limited to the PDA where first-time ground disturbance occurs. Mitigation measures will be implemented in the event of an unexpected discovery. In the unlikely event that the Project does affect an Archaeological and Cultural Resource, it is anticipated that the affected resource would be small in magnitude (i.e., negligible or low) because none were observed during the field surveys and appropriate measures would be undertaken to salvage and retrieve the material culture and all associated information it contains.

18.6.6 Summary of Project Residual Effects

Based on the results of the field studies completed in 2012 and 2013, where no additional Archaeological and Cultural Resources were identified within the PDA or LSA, There is low archaeological potential for the majority of the PDA. Due to the low potential for resources and the implementation of mitigation measures there is low potential for interaction with Archaeological and Cultural Resources. There is a high degree of confidence in the environmental effects prediction.

A summary of residual adverse environmental effects is provided in Table 18.4.

18.7 Assessment of Cumulative Environmental Effects

In association with the Project-related environmental effects discussed above, an assessment was conducted of the potential cumulative effects of the Project in combination with those of other projects and activities within the RSA.

Table 18.4 Summary of Residual Environmental Effects: Archaeological and Cultural Resources

Project Phase	Mitigation/Compensation Measures	Residual Environmental Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context	Significance	Prediction Confidence	
Construction	Develop and Implement EMP in the event of an unexpected discovery Project design changes for avoidance and/or implementation of Stage 1 Assessment and potential SDR using an approach approved by the PAO.	A	L	S	P	S	I	U	N	H	Further field work and monitoring possible in the event of an unexpected discovery
Operation and Maintenance	Implementation of Stage 1 Assessment and potential SDR using an approach approved by the PAO in the event of an unexpected discovery	A	N/L	S	P	S	I	U	N	H	Further field work and monitoring possible in the event of an unexpected discovery
Closure and Decommissioning	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 18.4 Summary of Residual Environmental Effects: Archaeological and Cultural Resources

Project Phase	Mitigation/Compensation Measures	Residual Environmental Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context	Significance	Prediction Confidence	

Key:

Direction:

N Neutral.
A Adverse

Magnitude:

N Negligible: no likely effect on Archaeological and Cultural Resources.
L Low: disturbance of Archaeological and Cultural Resources but with prior retrieval of the resource and associated information, and with all necessary regulatory approvals.
M Moderate: disturbance or loss of a portion of an Archaeological and Cultural Resource, with retrieval of a portion of the resource and its associated information, or a direct effect on a known Archaeological and Cultural Resource that is of interest and concern to the associated community, but that does not reduce the overall integrity and cultural value of the site.
H High: disturbance or loss of an Archaeological and Cultural Resource, with no retrieval of the resource and its associated information, or a direct effect on Archaeological and Cultural Resources, which reduces the overall integrity and cultural value of the site.

Geographic Extent:

S Site-specific: effect confined to the PDA.
L Local: any effect will be limited to the LSA.
R Regional: effects may extend beyond the LSA.

Duration:

T Temporary: effect will occur but measures are taken to salvage and retrieve information from the resources, and/or move/rehabilitate the site.
P Permanent: effect will be permanent and irreversible.

Frequency:

U Unlikely: Not likely to occur.
O Once: effect occurs once per month or less.
S Sporadically: effect occurs occasionally but not consistently throughout the life of the Project.
R Regularly: effect occurs at regular intervals throughout the life of the Project.
C Continuous: effect will occur continuously.

Reversibility:

R Reversible: will likely recover to baseline conditions after the end of Project decommissioning.
I Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning.

Environmental or Socio-economic Context:

U Undisturbed: Area relatively or not adversely affected by human activity.
D Developed: Area has been substantially previously disturbed by human development (e.g., urban setting) or human development is still present.

Significance:

S Significant.
N Not Significant.

Prediction Confidence:

Based on scientific information and statistical analysis, and effectiveness of mitigation or effects management measure
L Low: there is a low level of confidence in the effects prediction.
M Moderate: there is a moderate level of confidence in the effects prediction.
H High: there is a high level of confidence in the effects prediction.

N/A Not Applicable.

The potential adverse residual environmental effects of the Project on Archaeological and Cultural Resources are presented in Table 18.5. The potential adverse residual environmental effects to Archaeological and Cultural Resources as a result of the Project would occur as a result of construction activities that result in ground disturbance within the PDA. There is one known Archaeological and Cultural Resource within the PDA. Mitigation is presented in Section 18.7. In the unlikely event that the Project does affect an Archaeological and Cultural Resource, it is anticipated that the affected resource would be small in magnitude (i.e., negligible or low) because none were observed during the field surveys and appropriate measures would be undertaken to salvage and retrieve the material culture and all associated information it contains. Therefore, residual environmental effects of the Project on Archaeological and Cultural Resources are not likely to occur.

Table 18.5 Potential Cumulative Environmental Effects

Other Projects and Activities with the Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects
	Loss or Disturbance to Archaeological and Cultural Resources
Champion Iron Ltd. Kami Iron Ore	0
Arcelor-Mittal Mont Wright Mine	0
Champion Iron Ltd. Fire Lake North Iron Ore Project	0
Tacora Resources Inc. Scully Mine	0
Champion Iron Ltd. Bloom Lake Mine and Rail Spur	0
IOC Labrador Operation	0
Lower Churchill Hydroelectric Generation Project	0
Maritime Transmission Link Project	0
LIM Houston 1&2	0
Tata Steel Minerals Canada - DSO Iron Ore Project	0
Champion Iron Ltd. Kami Iron Ore	0

Key:
0 Project environmental effects do not act cumulatively with those of other projects and activities.
1 Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of best management or codified practices.
2 Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

Any potential adverse residual environmental effects of other projects on Archaeological and Cultural Resources would be similarly limited to instances where construction activities result in ground disturbance that could affect Archaeological and Cultural Resources. All development activities in the Province are subject to the *Historic Resources Act* (1985) and in this way, new projects and activities will be governed by application of the legislation and related guidelines, which will reduce any potential adverse residual environmental effects on Archaeological and Cultural Resources on a project and cumulative basis.

As noted in Table 18.5, several existing mining projects and towns are located within the RSA for Archaeological and Cultural Resources, the effects of which are reflected in baseline conditions.

Due to the time-period when these projects and towns were developed, there is insufficient information available regarding the existence of any Archaeological and Cultural Resources in the locations of the existing projects prior to their development due to the lack of regulatory protection in place at the time.

The potential cumulative effects of the Project acting in combination with other projects and activities are summarized in Table 18.5. Residual environmental effects of the Project on Archaeological and Cultural Resources are not considered likely and thus a contribution to cumulative effects is also considered not likely.

A summary of potential interactions resulting from other projects and activities with the Historic and Cultural Resources is presented in Table 18.5.

18.8 Accidents and Malfunctions

Reasonable worst-case scenarios for accidents and malfunctions that may result from the Project and interact with Historic and Cultural Resources include:

- Train Derailment;
- Forest Fire; and
- Settling/Sedimentation Pond Overflow.

18.8.1 Train Derailment

Iron ore product will be transported by truck from the Project site to the Astray rail loop which connects directly to the Tshiuetin/QNS&L railway for transport to Sept-Îles. Diesel fuel will be transported by rail to Schefferville and then by contracted trucker to site. On average, iron ore will be transported on approximately four trains each week during summer months between the Astray rail loop and the Sept-Îles port. Each train set will carry approximately 24,000 tonnes of ore in 240 gondola cars. Based on the speed the train will be travelling in the rail loop (5 miles per hour or 8 km/h), the reasonable worst case is the derailment of a maximum of four to five cars. This could result in the iron ore being spilled onto the ground or at stream crossings. Such an event is highly unlikely.

It is estimated that diesel fuel transport frequency will be a maximum of six 96,000 L tank cars per week for all site purposes.

Fuel tank car numbers are based on shipment in standard 96,000 L tank cars similar to those already in fuel haulage service between Sept-Îles and Labrador City. In a reasonable worst case scenario (i.e., where six tanks of diesel fuel are de-railed), approximately 576,000 L (127,000 Imperial gallons) of diesel fuel could be released.

18.8.1.1 Emergency Response / Mitigation of Environmental Effects

The trains will be operated under current QNS&L and TSH Environmental and safety procedures. A detailed Emergency Response and Spill Response Plan will also be developed by Joyce Direct Iron. This plan will include measures such as:

- Immediate response through the use of absorbent booms and pads;
- Liquid clean up using a vacuum truck, if available (both fuel and groundwater);
- Reclamation of contaminated soils, removal of contaminated soils and replacement with clean soil.

Additional mitigation measures to be implemented to limit the potential for a train derailment include:

- Manual inspection of rolling stock to confirm there are no problems with the wheels, couplers, carbody or brakes;
- Track inspections in accordance with Transport Canada regulations;
- Properly maintained equipment; and
- Fuel transport amounts will be limited to the amounts required by the Project.

The Emergency Response and Spill Response Plan will also include measures for the removal and cleanup of spilled ore from the rail cars. To reduce the likelihood of such an event, emphasis will be placed on safety and accident prevention.

18.8.1.2 Characterization of Residual Environmental Effect

In the unlikely event of a train derailment, loss or disturbance of Archaeological and Cultural Resources could occur.

A train derailment may lead to the sudden deposition of materials (e.g., ore) or contaminants (such as fuel) onto adjacent terrain. Deposition of contaminants may compromise the scientific and cultural value of archaeological deposits and other types of cultural features. Deposition of materials will likely only affect surface-visible Archaeological and Cultural Resources. However, unidentified archaeological and cultural sites may be discovered and adversely affected during subsequent clean-up operations involving earth-moving equipment and consequent ground disturbances. No significant effects on Historic and Cultural Resources are predicted. This prediction is made with a high degree of confidence.

18.8.2 Forest Fire

Although unlikely, Project activities involving the use of heat or flame could result in a fire, which could spread to nearby vegetation. The occurrence of a forest fire has the potential to affect soil quality and quantity by increasing the risk of erosion and changing soil moisture storage levels through a reduction in plant consumption and increase in surface runoff.

18.8.2.1 Emergency Response/Mitigation of Environmental Effects

A plan for preventing and combating forest fires will be incorporated into the Emergency Response and Spill Response Plan.

18.8.2.2 Characterization of Residual Environmental Effects

A forest fire caused by the Project could disturb Archaeological and Cultural Resources by altering or destroying the cultural object and landscape of which they are a part, or contaminating the forest floor and underlying soils in which archaeological materials are situated. While unlikely, forest fires caused by the Project could potentially expand beyond the LSA to affect the RSA. Fire can destroy organic materials associated with an archaeological site or cultural object or landscape feature, such as the wooden elements of an historic tilt or structure, or grave markings not yet identified. They can also contaminate potentially-datable archaeological samples with modern charred organic matter. However, the LSA has almost certainly been subjected to many naturally occurring forest fires and therefore, forest fires caused by the Project on Archaeological and Cultural Resources are classified as disturbance rather than total loss. No significant effects on Historic and Cultural Resources are predicted. This prediction is made with a moderate degree of confidence.

18.8.3 Settling/Sedimentation Pond Overflow

Settling/sedimentation ponds will be established at waste rock, overburden, ROM stockpile areas, at the crushing and screening plant area, at the accommodation camp area, and at the rail loop. Run-off from the stockpiles and site run-off will be directed to the settling/sedimentation ponds prior to discharge to the receiving environment. The likelihood of an overflow is low because the ponds will be designed to contain run-off associated with a 1:100 year precipitation event and the entire project is scheduled to occur over a period of <10 years. However, in such an event, settling/ sedimentation ponds could overflow, releasing untreated water. Untreated water could have elevated levels of total suspended solids. No other contaminants are anticipated.

18.8.3.1 Emergency Response/Mitigation of Environmental Effects

In the unlikely event of an overflow event, contingency plans will be in place as part of the Emergency Response and Spill Response Plan to mitigate environmental effects to the receiving environment. Water sampling of TSS and pH levels will be conducted in downstream water bodies.

18.8.3.2 Characterization of Residual Environmental Effects

Settling/sedimentation ponds will be established at waste rock, overburden and run-of mine stockpile areas, at the processing plant, at the accommodation camp area and at the rail loop. The likelihood of an overflow is low because the ponds will be designed to contain run-off associated with a 1:100 year precipitation event. In the unlikely event of an overflow event, contingency plans will be in place as part of the Emergency Response and Spill Response Plan to mitigate environmental effects to the receiving environment. Overflow of the settling/ sedimentation ponds could lead to a buildup of sedimentation along shorelines, possibly in areas which have relatively higher potential for archaeological resources. Such an event could result in disturbance and loss of previously unidentified archaeological materials. The resulting effect would be a site disturbance rather than loss. No significant effects on Historic and Cultural Resources are predicted. This prediction is made with a high degree of confidence.

18.8.4 Summary of Residual Effects Resulting from Accidents and Malfunctions

A summary of residual environmental effects resulting from accidents and malfunctions is presented in Table 18.6.

18.9 Determination of Significance of Residual Adverse Environmental Effect

18.9.1 Project Residual Environmental Effects

As described in Section 18.6, any potential adverse residual environmental effects of the Project on Archaeological and Cultural Resources would occur primarily, if not exclusively, as a result of first-time clearing and/or ground disturbance during Project construction and any additional ground disturbance during operation and maintenance. Any such effects, if they did occur, would therefore be restricted to the PDA.

With the proposed mitigation and environmental protection measures in the event of an unexpected discovery, the environmental effect of loss or disturbance of Archaeological and Cultural Resources is predicted to be adverse but not significant during the construction and operation and maintenance phases. This determination is made with a high level of confidence based on the results of the literature review, field survey, and archaeological potential mapping.

During decommissioning, there will be no additional ground disturbance and no interaction between the Project and Archaeological and Cultural Resources. Therefore, there are no significant adverse residual environmental effects.

With the proposed mitigation and environmental protection measures, the environmental effect of the Project on Historic and Cultural Resources is not significant.

Table 18.6 Summary of Residual Environmental Effects – Accidents and Malfunctions

Project Phase	Emergency Response/Contingency Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context			
Operation and Maintenance											
Train Derailment	• Emergency Response and Spill Response Plan	A	L	S	P	U	I	U/D	N	H	Further field work and monitoring possible in the event of an unexpected discovery
Forest Fire	• Emergency Response and Spill Response Plan	A	H	S-R	P	U	I	U/D	N	M	Further field work and monitoring possible in the event of an unexpected discovery
Settling/Sedimentation Pond Overflow	• Emergency Response and Spill Response Plan	A	L	S	P	U	I	U/D	N	H	Further field work and monitoring possible in the event of an unexpected discovery

Table 18.6 Summary of Residual Environmental Effects – Accidents and Malfunctions

Project Phase	Emergency Response/Contingency Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context			

Key:

Direction:

N Neutral: no effect on Archaeological and Cultural Resources.
A Adverse – loss or disturbance of Archaeological and Cultural Resources.

Magnitude:

N Negligible: no likely effect on Archaeological and Cultural Resources.
L Low: disturbance of Archaeological and Cultural Resources but with prior retrieval of the resource and associated information, and with all necessary regulatory approvals.
M Moderate: disturbance or loss of a portion of an Archaeological and Cultural Resource, with retrieval of a portion of the resource and its associated information, or a direct effect on a known Archaeological and Cultural Resource that is of interest and concern to the associated community, but that does not reduce the overall integrity and cultural value of the site.
H High: disturbance or loss of an Archaeological and Cultural Resource, with no retrieval of the resource and its associated information, or a direct effect on Archaeological and Cultural Resources, which reduces the overall integrity and cultural value of the site.

Geographic Extent:

S Site-specific: effect confined to the PDA.
L Local: any effect will be limited to the LSA.
R Regional: effects may extend beyond the LSA.

Duration:

T Temporary: effect will occur but measures are taken to salvage and retrieve information from the resources, and/or move/rehabilitate the site.
P Permanent: effect will be permanent and irreversible.

Frequency:

U Unlikely: Not likely to occur.
O Once: effect occurs once per month or less.
S Sporadically: effect occurs occasionally but not consistently throughout the life of the Project.
R Regularly: effect occurs at regular intervals throughout the life of the Project.
C Continuous: effect will occur continuously.

Reversibility:

R Reversible: will likely recover to baseline conditions after the end of Project decommissioning.
I Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning.

Environmental or Socio-economic Context:

U Undisturbed: Area relatively or not adversely affected by human activity.
D Developed: Area has been substantially previously disturbed by human development (e.g., urban setting) or human development is still present.

Significance:

S Significant.
N Not Significant.

Prediction Confidence:

Based on scientific information and statistical analysis, and effectiveness of mitigation or effects management measure
L Low: there is a low level of confidence in the effects prediction.
M Moderate: there is a moderate level of confidence in the effects prediction.
H High: there is a high level of confidence in the effects prediction.

N/A Not Applicable.

18.9.2 Cumulative Environmental Effects

The characterization of the potential cumulative effects and associated mechanisms, combined with the proposed mitigation/effects management measures proposed in Section 18.7, indicate that there are no cumulative effects of loss or disturbance of Archaeological and Cultural Resources as a result of the Project in combination with the environmental effects of past, present, and reasonably foreseeable projects and activities that have been or will be carried out. This determination is made with a high level of confidence because there is no likely adverse residual environmental effect resulting from the Project.

18.9.3 Accidents and Malfunctions

The adverse residual environmental effects of a train derailment and subsequent clean-up on Archaeological and Cultural Resources in the PDA are predicted to be not significant because environmental effects would be of low magnitude and geographically restricted to the PDA. Terrain which could potentially be affected is generally rated as having relatively Low potential for Archaeological and Cultural Resources. In the event of a materials spill, the primary environmental effect would consist of ground disturbance during clean-up operations, which would be managed by routine implementation of the EMP.

The adverse residual environmental effects of a forest fire caused by the Project on Archaeological and Cultural Resources during construction, operation and maintenance or decommissioning and reclamation may significant, particularly due to the potential high magnitude and potential regional geographic extent of the environmental effects. However, with implementation of a forest fire prevention and response plan, forest fires are unlikely to occur and significant effects are therefore unlikely.

The adverse residual environmental effects of a hydrocarbon spill or an overflow of the settling/ sedimentation pond on Archaeological and Cultural Resources during operation and maintenance are predicted to be not significant because environmental effects would be of low magnitude and geographically restricted to the PDA.

The adverse residual environmental effects of a premature or permanent closure on Archaeological and Cultural Resources during any phase of the Project are not applicable for this activity.

18.10 Follow-up and Monitoring

As a result of the findings of the Stage 1 Assessment and the mitigation measures identified in Section 18.7, follow-up activities are not proposed for Archaeological and Cultural Resources.

Further field work and monitoring requirements are possible in the event of an unexpected discovery.

18.11 Summary

Project-related Historic and Cultural Resources assessments, involving extensive background research and field studies, identified one Pre-contact Period, Archaeological and Cultural Resource within the PDA. There are no known cultural/spiritual sites within the LSA. Background research determined that there was little or no potential for palaeontological or architectural resources within the LSA.

Without mitigation, the Pre-contact-Period archaeological site identified within the PDA could be subject to permanent loss or disturbance from construction of the causeway. However, with the proposed mitigation measures, the site will either be avoided, or the information it contains will be recovered, documented and preserved, with the research results and the archaeological materials made available for publication, educational purposes and/or public display. The geographic extent of potential interactions to Archaeological and Cultural Resources is limited to the PDA where first-time ground disturbance occurs. Mitigation measures will be implemented in the event of an unexpected discovery.

Based on the results of the background research and field survey undertaken to date, and the application of standard mitigation measures, significant adverse residual environmental effects on Historic and Cultural Resources are not likely to result from the Project.

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Chapter 19:

Current Use Of Land and Resources For Traditional Purposes By Indigenous Persons

File No. 121416571

Date: May 2021

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19.0 CURRENT USE OF LAND AND RESOURCES FOR TRADITIONAL PURPOSES BY INDIGENOUS PERSONS

As detailed in chapter 1, Joyce Direct Iron Inc. succeeded Labec Century Iron Ore Inc. ("Labec Century") as the Project Proponent on February 18, 2021 following an internal reorganization. All references to Labec Century as the Project proponent may be interpreted as now referring to Joyce Direct Iron Inc.

19.1 VC Definition and Rationale for Selection

This VC chapter focuses on the Current Use of Land and Resources for Traditional Purposes by Indigenous Persons, and assesses the potential effects of the Project on the practices, traditions and customs that distinguish the distinctive culture of Indigenous persons and which were practiced prior to European contact. The chapter also discusses these effects in the context of effects on the biophysical and other aspects of the socio-economic environment.

Section 35 of the Canadian *Constitution Act* (1982) recognizes and affirms the existing Indigenous and treaty rights of the Indian, Inuit, and Métis peoples of Canada, the nature, scope and existence of which have been further defined through various legal decisions as well as through Land Claims Agreements (treaties) between governments and particular Indigenous groups in specific areas.

CEAA, 2012 defines an environmental effect as: *"(a) any change that the project may cause in the environment, ….[and] (b) any effect of any change referred to in paragraph (a) on … (iii) the current use of lands and resources for traditional purposes by aboriginal persons...*".

A number of Labrador and Québec Indigenous communities and organizations claim Indigenous rights and/or title to areas of Labrador and Québec (Figures 19.1 to 19.4), including lands where Project components and activities will take place. These land claims, as well as Indigenous treaty rights, are discussed in Chapter 8: Potential or Established Indigenous Treaty Rights and Related Interests, and Chapter 23: Adverse Impacts and Measures to Address Adverse Impacts on Potential or Established Indigenous Treaty Rights and Related Interests.

In ongoing consultation with Indigenous groups in the vicinity of the Project, Labec Century has identified several geographical areas of traditional land use that have the potential to interact with the Project. These areas are discussed in Section 19.5. Consultation activities related to this VC are also discussed Section 19.2.2, and more generally in Chapter 3: Engagement and Traditional Knowledge.

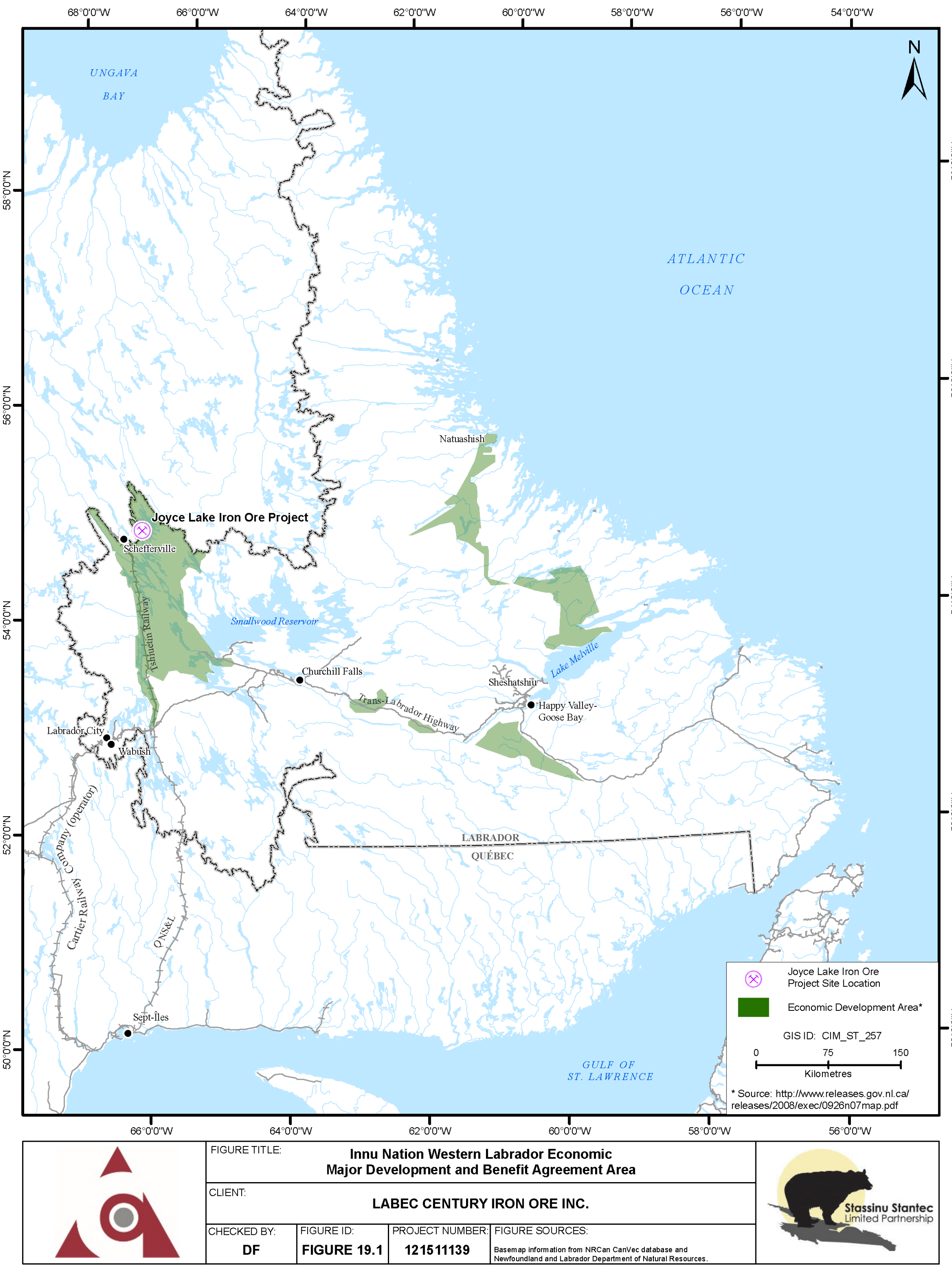

Figure 19.1 Innu Nation Western Labrador Economic Major Development and Benefit Agreement Area

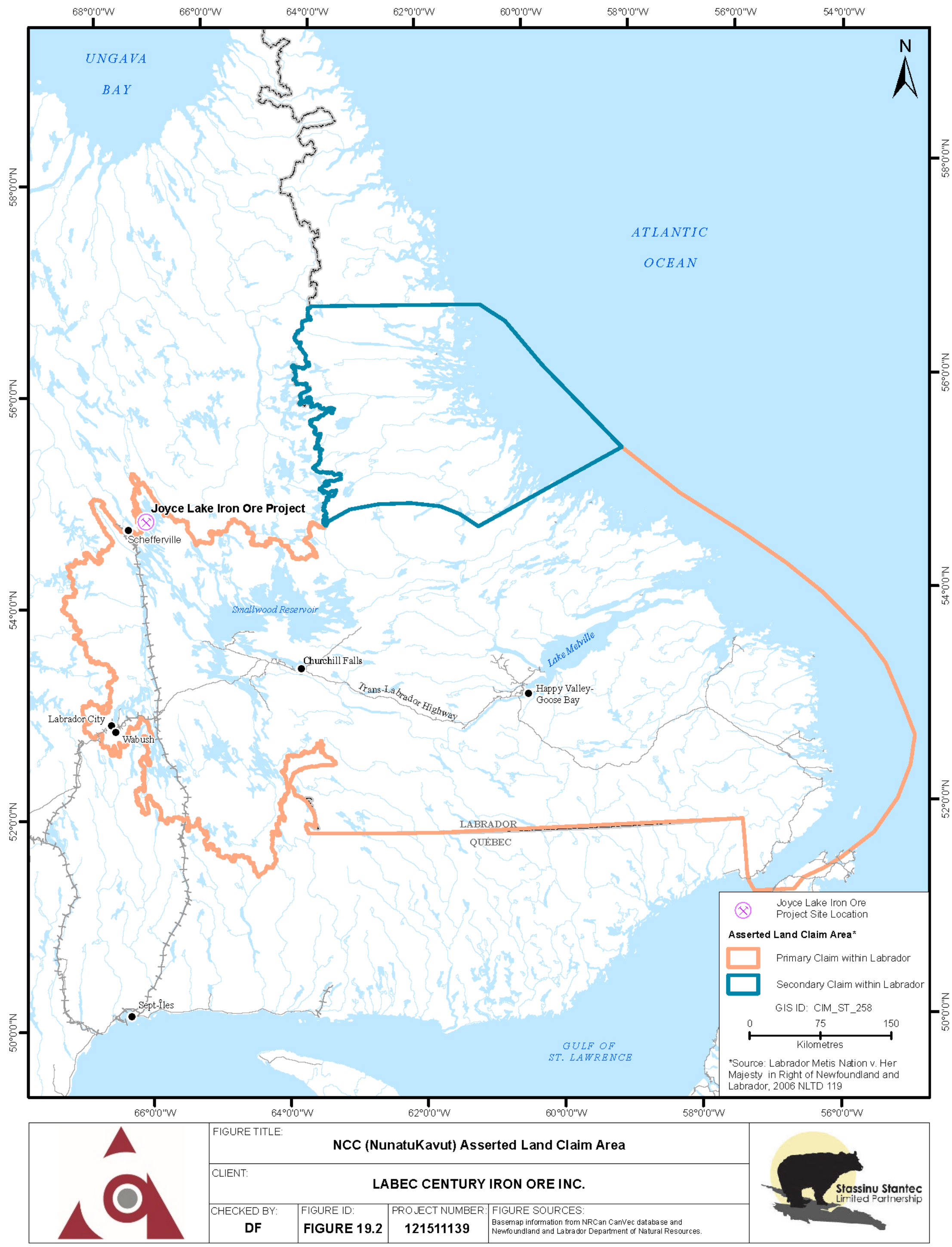

Figure 19.2 NunatuKavut Community Council Asserted Land Claim Area

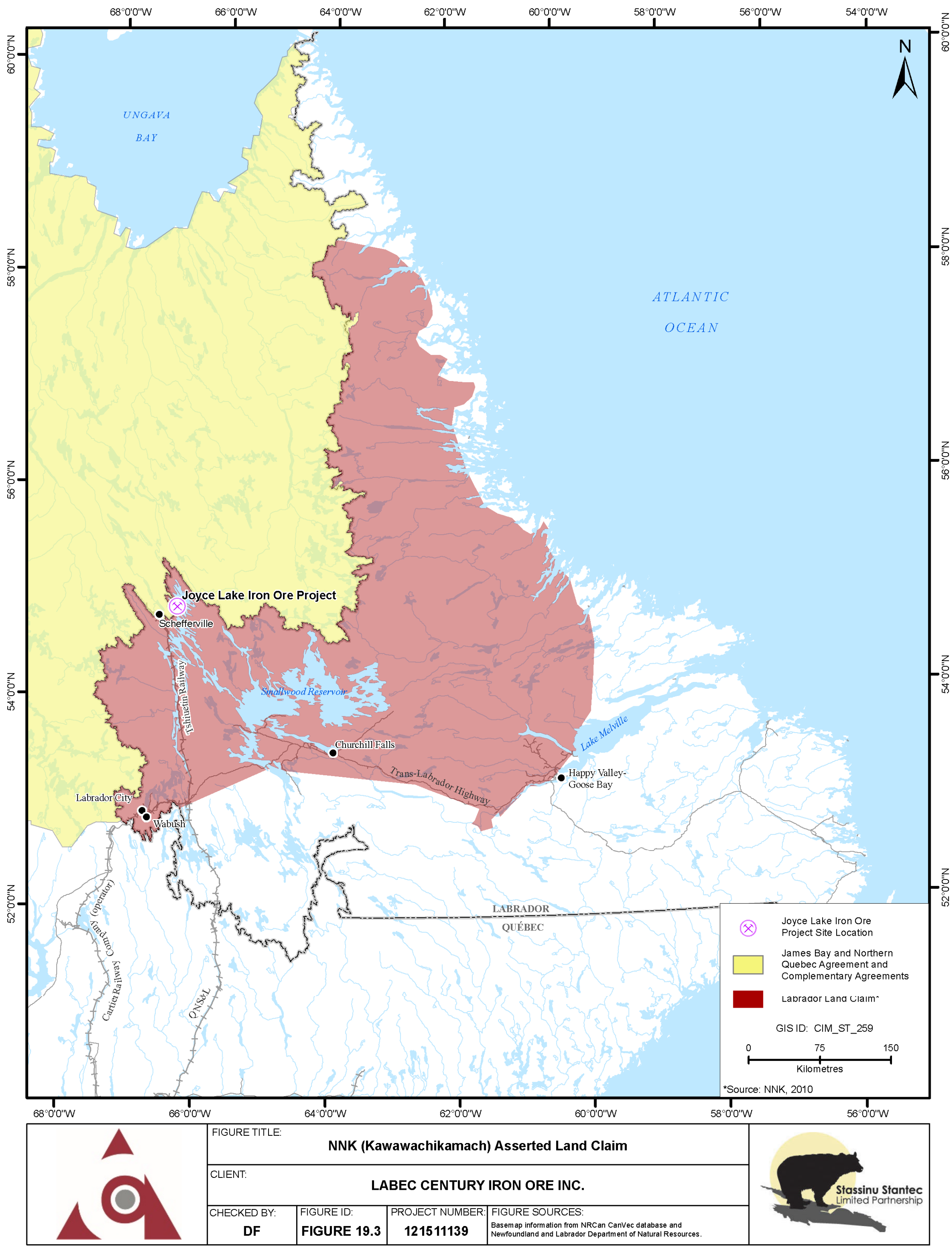

Figure 19.3 Naskapi Nation of Kawawachikamach Asserted Land Claim

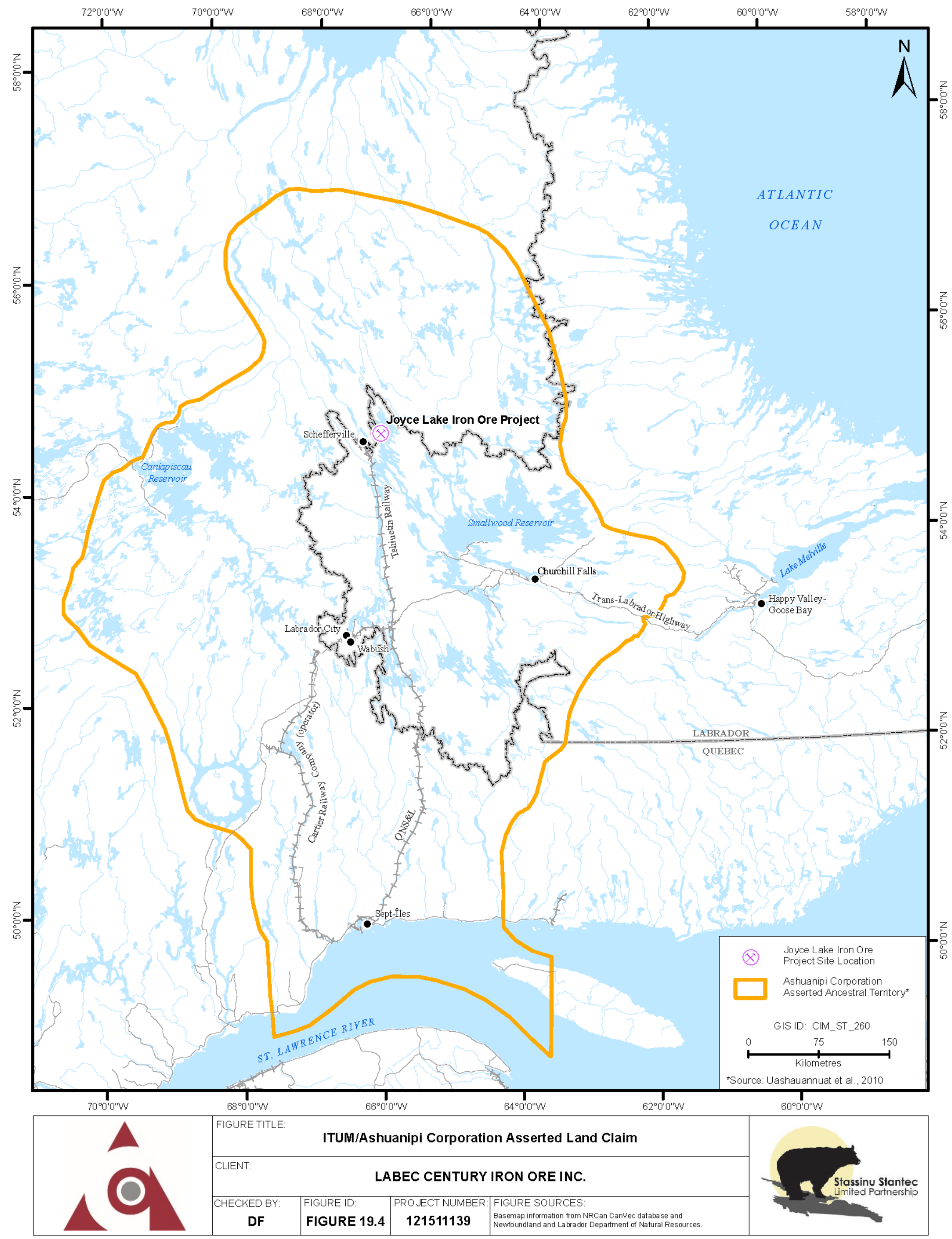

Figure 19.4 Innu Takuaikan Uashat mak Mani-Utenam /Ashuanipi Corporation Asserted Land Claim

This VC overlaps with other components of the biophysical and socio-economic environments, including several of the VCs considered elsewhere in this assessment. Potential effects to these activities may result from, for example, changes in air quality and noise levels (Chapter 10), changes in the availability and quality of vegetation, wildlife, water, fish resources, and/or other components of the biophysical environment (Chapters 11 to 17), and historic/cultural resources (Chapter 18).

19.1.1 Approach to Assessment of Effects

As required by both IAAC EIS Guidelines and NLDOECC EIS Guidelines, this assessment considers activities related to, but not limited to, hunting, fishing, trapping, cultural use, navigational use, and other traditional uses of the land (e.g., collection of medicinal plants, use of sacred sites). As required by these Guidelines, this information will be used to assess the effects of the Project on Indigenous land use by the following groups whose potential or established Indigenous rights and Treaty rights and related interests may be affected by the Project:

- Innu Nation of Labrador (Labrador);
- NunatuKavut Community Council (Labrador);
- Naskapi Nation of Kawawachikamach (Québec);
- Innu First Nation of Matimekush-Lac John (Québec); and
- Innu First Nation of Uashat mak Mani-Utenam (Québec).

The territories associated with each group are identified in Figures 19.1 to 19.4. As described in Section 19.5.1, the majority of information presented in the baseline study is based on a desktop review of existing and relevant sources. Primary data collection were through Labec Century's on-going engagement process and this has been presented as relevant and permitted

19.2 Scope of the Assessment

Both IAAC and the Province require that proponents ensure that Indigenous groups, especially those most likely to be affected by the Project, have access to timely and relevant information relating to the Project and its potential effects (and how these may adversely affect them). Details regarding Labec Century's engagement of the above groups are provided in Chapter 3: Engagement and Traditional Knowledge.

19.2.1 Regulatory Setting

Section 9.1.3 of IAAC EIS Guidelines state that the EIS should describe "current use of land and resources for traditional purposes by Aboriginal persons" (CEA Agency 2013). The NLDOECC EIS Guidelines state that "the Proponent shall incorporate into the EIS the local knowledge and Indigenous traditional knowledge to which it has access or that it may reasonably be expected to acquire through appropriate due diligence, in keeping with appropriate ethical standards and without breaching obligations of confidentiality". The assessment of effects and mitigation measures must integrate Indigenous traditional knowledge, which is a key element of this VC and related VCs (e.g., wildlife, fish and fish habitat). Through ongoing engagement, Labec Century has worked with Indigenous groups potentially affected by the Project to identify traditional knowledge related to land use, and such other components of the environment as the location and behaviour of fish and wildlife resources, and atmospheric effects such as lighting and dust. This information has been included in the assessment with the agreement of the participating Indigenous groups and with provisions regarding the use, management, and protection of said information. The Guidelines also state that the description of Indigenous use of land and resources for traditional purposes must include "activities related to, but not limited to, hunting, fishing, trapping, cultural, navigational use and other traditional uses of the land (*e.g.*, collection of medicinal plants, use of sacred sites). Potential effects on current uses include access to areas that are of importance or concern to Aboriginal groups" (CEA Agency 2013).

19.2.2 Influence of Consultation and Engagement on the Assessment

The Government of Newfoundland and Labrador issued its Aboriginal Consultation Policy on Land and Resource Development Decisions in April 2013. The Policy applies to land and resource development decisions that have the potential to adversely affect asserted Indigenous and treaty rights, and includes Indigenous groups whose land claims have been accepted for negotiation by both the Government of Canada and the Government of Newfoundland and Labrador (i.e., Innu Nation of Labrador), as well as Indigenous groups asserting land claims in Labrador which have not been accepted by negotiation by the Government of Newfoundland and Labrador. These include the NunatuKavut Community Council, Naskapi Nation of Kawawachikamach, and the Innu of Matimekush-Lac John and Uashat mak Mani-Utenam.

The Policy states that the Government of Newfoundland and Labrador will require project proponents to comply with requirements of the Policy and its guidelines, in some cases undertaking procedural aspects of consultation, and resolve any outstanding issues with Indigenous organizations. The views of Indigenous organizations whose asserted rights may be adversely affected by a proposed project must be considered by project proponents. Furthermore, project proponents are expected to "make reasonable efforts" to mitigate or, where practicable, eliminate potentially adverse effects on asserted rights (Government of Newfoundland and Labrador 2013).

Discussions between Labec Century and Indigenous groups from Québec and Labrador have been taking place since 2012 and are ongoing. Where possible, consultation was conducted with representatives of the Indigenous communities to confirm the extent and location of various traditional land and resource use activities.

Consultation was conducted with the aid of maps and aerial photographs on which interviewees could indicate the locations of key harvesting areas, special sites, traditional knowledge, and travel routes. The issues identified through these consultations are summarized in Table 19.1. Information has been obtained from representatives of Indigenous groups regarding traditional land and resource harvesting activities in the vicinity of the Project. Where possible, the results of this consultation are represented spatially (Figure 19.5).

Table 19.1 Key Resource Areas as Identified Through Consultation

Key areas	Species or activity	Summary
Attikamagen Lake (throughout)	Fishing	Lake trout, speckle trout and pike are the main species caught. Most lakes in the system are used for fishing. Everyone consumes fish. Year-round activity.
Iron Arm	Goose hunting	The goose hunt is conducted from the edge of ice, where there are openings in the lakes, in May.
Montreal Bay	Fishing	Paul M. showed photo of very large lake trout caught in the area.
Petitisikapau Lake	Ptarmigan hunting	Ptarmigan hunting takes place in winter, primarily on the islands, on Petitisikapau Lake. For both Innu and Naskapi
Freeman Lake	Fishing	Travel to Freeman Lake is via Astray Lake.
Goose River	Fishing	Spawning area for trout; good fishing.
Astray Lake	Fishing	Many Innu travel from the community to Astray Lake, which is a point of departure to other locations in the lake system.
Near Joyce Lake	Caribou hunting (past)	Paul M. indicated that many years (decades) ago caribou hunting took place at Joyce Lake.
Near cabins (Iron Arm)	Caribou (recent sighting)	Paul M. indicated that he saw caribou near to the cabins approx. 3 years ago.
Near cabins (Iron Arm and Astray)	Travel to resource harvesting areas	As soon as the ice melts, travel by boat to fishing or other harvesting areas is staged from areas near cabins.
Near communities and throughout	Bears	There appear to be more bears where development takes place (i.e., where there are people).
Throughout the area	Trapping of small mammals: fox, marten, otter, rabbit, porcupine	Furs are used for various purposes, and sometimes sold. Porcupine is “like caviar” to the Naskapi.
Lakes between Schefferville and Astray Lake (Lac John, Lac Gene, Barry Lake)	Fishing	Fishing takes place on most lakes in the area, including the ones near the communities.
Iron Arm	Fishing	Pike are found at Iron Arm and adjacent lakes

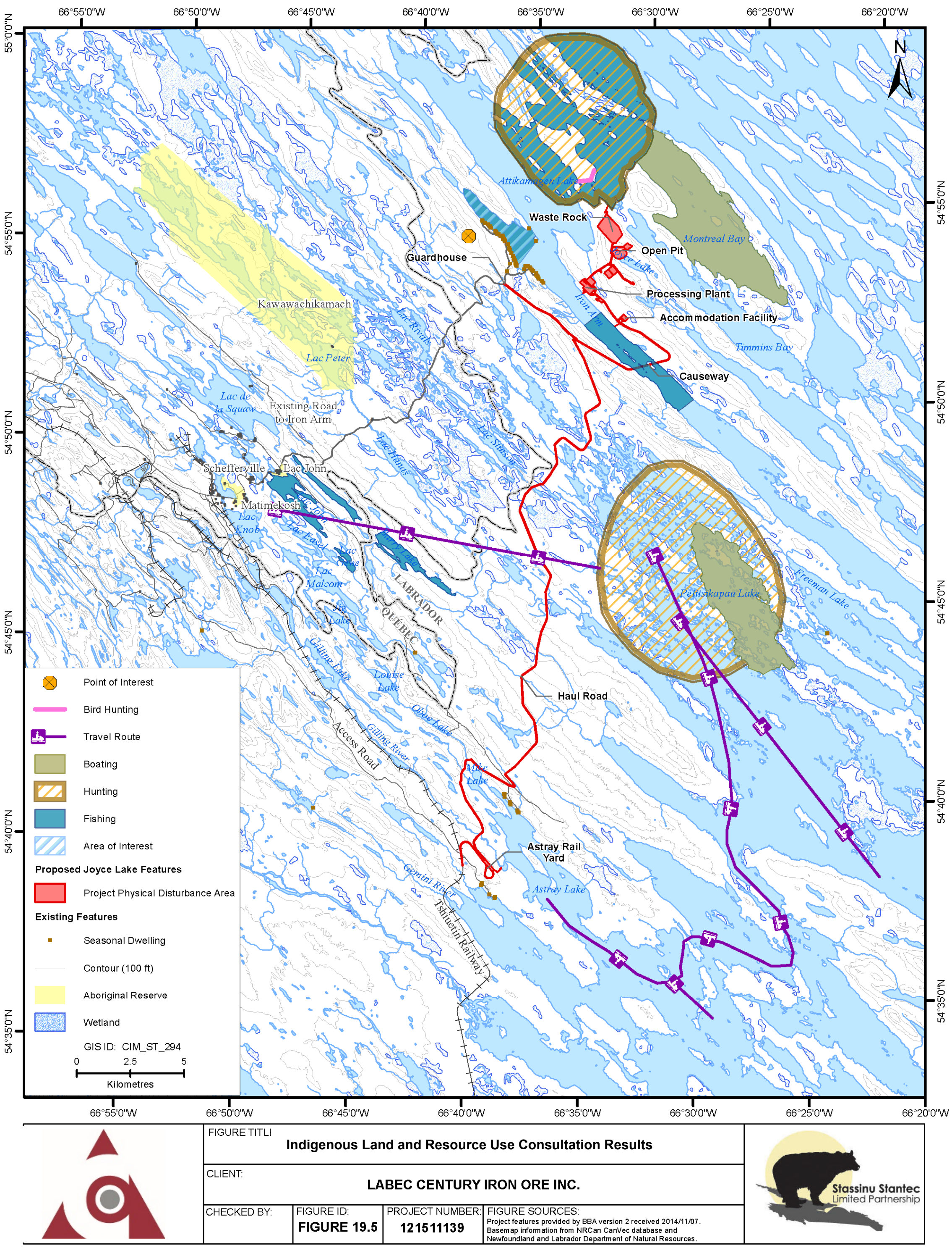

Figure 19.5 Indigenous Land and Resource Use Consultation Results

Consultation regarding current land use activities was undertaken by Stassinu Stantec on behalf of Labec Century for the Project in May and June 2013 as part of Labec Century's broader consultation activities. Initial consultation with a Labec Century consultant, who is a member of the local Innu community and who has been engaged in consultation with the Innu residents of Schefferville and Matimekush-Lac John, took place on Tuesday April 22, 2013 and on Tuesday May 28, 2013 in St. John's. During both meetings, maps and aerial photography showing the Project infrastructure were presented and discussed.

The Project area was identified generally an area of use by the Innu of Matimekush-Lac John, particularly the area from Petitsikapau Lake, south to Astray Lake. This was identified as a travel corridor to areas to the south. From Matimekush-Lac John, the Innu snowmobile to the east towards Petitsikapau Lake during the winter. During the summer, the Innu use the network of roads leading to Astray Lake and travel by boat into Petitsikapau Lake, which is used for fishing and ptarmigan hunting. The latter of these activities is concentrated on the small islands in the lake.

Following a meeting with the Naskapi Elders in Kawawachikamach on June 20, 2013, the Elders were provided with maps and there was a general discussion of use in the area in the context of Project activities. The Elders and Band Council representatives were provided with contact information if they wished to discuss land use activities and additional follow-up took place on December 4, 2014. During this Town Hall meeting, additional input was received on land use activities in the area. While no location specific information was provided, Iron Arm was confirmed as an area of fishing activity.

Table 19.2 summarizes the results of consultation as it relates to land and resource use activities by both Innu and Naskapi users. This use has also been represented on Figure 19.5.

Table 19.2 Issues Raised by Indigenous Groups

Question / Issue	Community/ Organization	Summary of Comments	Response
Indigenous Rights	Naskapi of Kawawachikamach	Hunters must be respected and fully compensated for impacts of mine.	Labec Century fully appreciates and respects hunters, however research and consultation has not identified the mine site area as a preferred area for hunting and other land use activities. Other areas, such as the lakes and rivers adjacent to the causeway, haulage road, and rail loop, have been identified as key land use areas for Indigenous residents and compensation for the impact of the mine will be addressed in negotiations towards an Impact and Benefits Agreement. Hunters and fishermen will be able to cross the haul road and additionally the upgraded and improved Iron Arm Project service road will improve access for vehicles to the Iron Arm area. The Project is expected to have minimal impact on species habitat and details of this are provided in the Environmental Impact Statement. Employees residing in camp will be restricted from hunting in the Project area.
Land and Resource Use/Indigenous Rights	Naskapi of Kawawachikamach	In the 80s or early 90s the Newfoundland Government banned hunting and seized firearms. The Naskapis went to court and fought this. There was a document produced by the Government protecting the land use of the Naskapis and this area specifically. Therefore if the Newfoundland Government says that Naskapis have no say, that is simply not true and we need to remind them of this document.	Labec Century recognizes the rights of area Indigenous groups to engage in land use activities in Newfoundland and Labrador. The effects of the Project on these rights are discussed in our Environmental Impact Statement for the Project and this document is public and part of the consultation process.

Table 19.2 Issues Raised by Indigenous Groups

Question / Issue	Community/ Organization	Summary of Comments	Response
Wildlife/Land and Resource Use	Naskapi of Kawawachikamach	How will the project affect hunting? We are still hunting heavily in that area, helicopters have already caused disturbance, and animals are already scared off by exploration activities. What will the hunters do once the mine is being constructed and operations begin? Caribou have been seen, but seem to flee the noise of choppers. Will caribou flee the sound of mining? What about other animals like moose? Future generations are going to inherit disturbed land.	Habitat loss for key species is expected to be low (<0.5% of habitat available in the area). Research and consultation has not identified the mine area as a preferred area for hunting and other land use activities. Other areas, such as the lakes and rivers adjacent to the causeway, haulage road, and rail loop, have been identified as key land use areas for Indigenous residents. Mitigation measures to reduce effects on habitat include: • Reduce construction footprint to the extent feasible; and • Restrict activities associated with maintenance (e.g., vegetation management, periodic grading and ditching). It is anticipated that if caribou were to return to the region in large numbers, they would generally avoid the open habitat created from Project construction. The EIS and Environmental Protection Plan include measures to reduce the effects on the movement and distribution of species. Mitigation will include: • Limit noise through the use of mufflers on equipment, enclosed motors and other equipment to attenuate sound propagation, and regular maintenance on vehicles and other equipment to reduce air and sound emissions; • Limit lighting to that required for safe operation, use motion sensors for security lighting, and/or shield exterior lights from above; and • Grade or engineer slopes along roads at locations of potential crossing points for caribou. A complete description of mitigation and effects on wildlife is provided in the EIS.

Table 19.2 Issues Raised by Indigenous Groups

Question / Issue	Community/ Organization	Summary of Comments	Response
Land and Resource Use	Naskapi of Kawawachikamach	Tata Steel has restricted people from hunting on some traditional grounds, (for security reasons) will this also happen with the construction of the project and the haulage road?	While there will be access restrictions to the mine site for public safety and security reasons, this area has not been identified as a preferred area for hunting and land use activities. While there will be access restrictions for public vehicles on the haul road, users will not be prevented from crossing the road to access adjacent areas. After mining operations end, the haul road would facilitate access to areas not previously accessible by vehicles, if regulations and consultation allow the road to remain in place after mining operations end. Similarly, the causeway, if consultation and regulations allow it to remain in place after mining operations end, will provide vehicle access to previously inaccessible areas. Concerns about access will also be addressed through ongoing consultation with area residents.
Land and Resource Use	Naskapi of Kawawachikamach	Outsiders will use the area to hunt and fish. This will affect Naskapis.	All mine employees who are staying in camp will be prohibited from hunting or fishing. This will be controlled by prohibitions on bringing fishing gear and/or hunting equipment into camp. Indigenous residents of nearby communities who commute to the Project can engage in these activities during non-working hours and the rotational work schedule will facilitate their use of the area during non-work hours

19.2.3 Temporal and Spatial Boundaries

The temporal boundaries for the environmental assessment include the Project phases of Construction, Operation and Maintenance, and Closure and Decommissioning. The temporal boundary for Construction is one year (pre-operation), for Operation and Maintenance is approximately seven years, and for Closure and Decommissioning is approximately one year.

The spatial boundaries for the environmental effects assessment of Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are defined below.

Project Development Area (PDA): The PDA is the area represented by the Project footprint as defined in Chapter 2: Project Description.

Local Study Area (LSA): The LSA is a larger area, centered on the PDA, that encompasses all planned Project components and activities and the potential "zones of influence" of Project-related disturbances (Figure 19.6). The LSA has been defined so as to encompass the PDA and adjacent areas where Project-related environmental effects may reasonably be expected to occur, through both the direct footprint of the Project itself as well as the likely geographic extent of the various other Project-related disturbances that may occur during construction and/or operations and eventual closure (such as noise, dust, visibility and others)

The LSA includes the communities of Schefferville, Matimekush-Lac John, and Kawawachikamach. The residents of these communities have been identified as having the highest concentration of Indigenous land and resource use in the vicinity of the Project.

Regional Study Area (RSA): The RSA includes the areas of traditional land and resource use (traditional territories) of Labrador and Québec Indigenous groups being considered in this assessment, in the context of the Project. The boundaries of the RSA also take into account such factors as the distribution and movement of wildlife populations that form a component of land use (e.g., the range of the various animal populations that may be affected). It is also the area within which cumulative effects for each VC may occur, depending on physical and biological conditions and the type and location of other past, present, and reasonably foreseeable projects. The RSA is the area within which the significance of residual Project environmental effects and cumulative environmental effects is predicted (Figure 19.7).

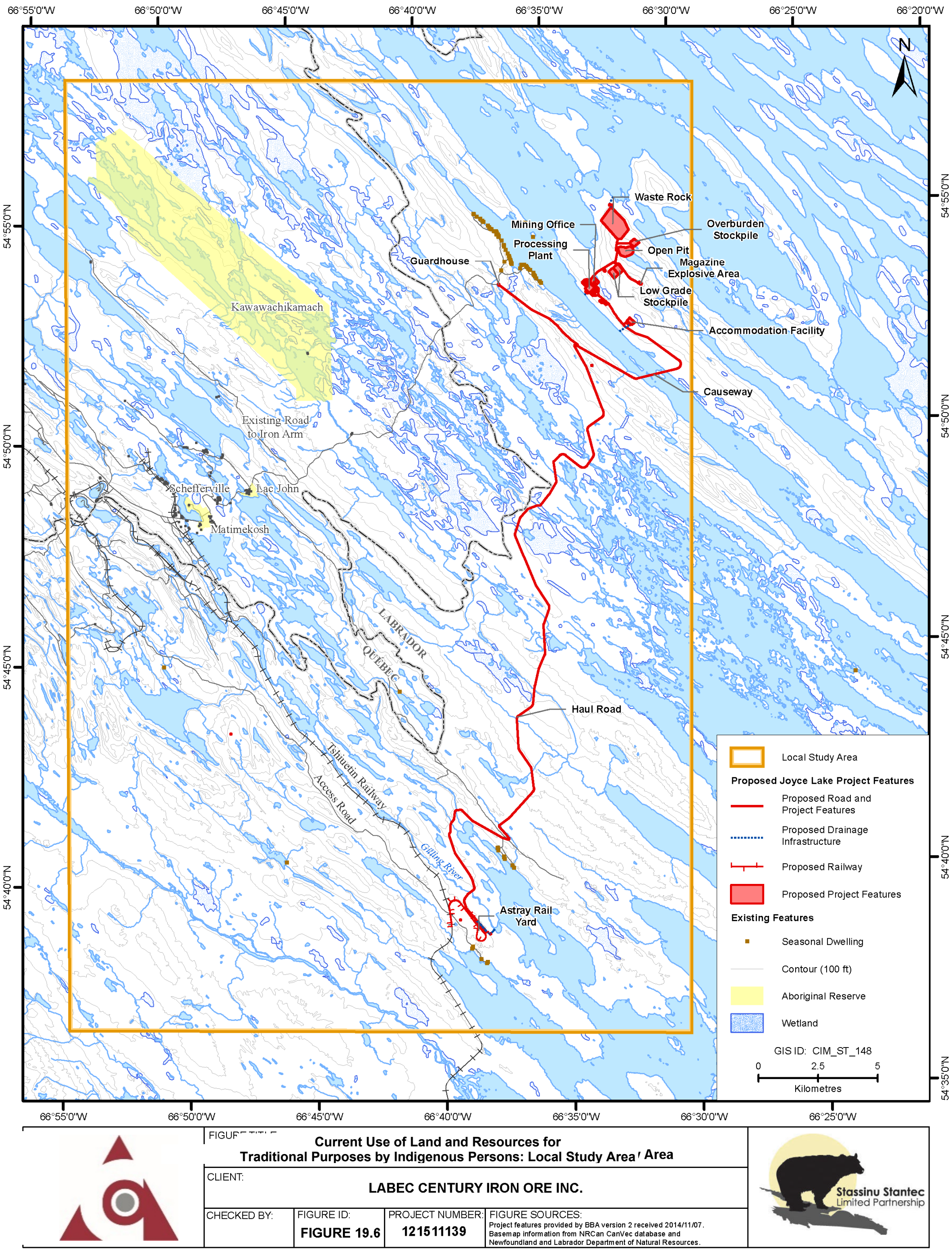

Figure 19.6 Current Use of Land and Resources for Traditional Purposes by Indigenous Persons: Local Study Area

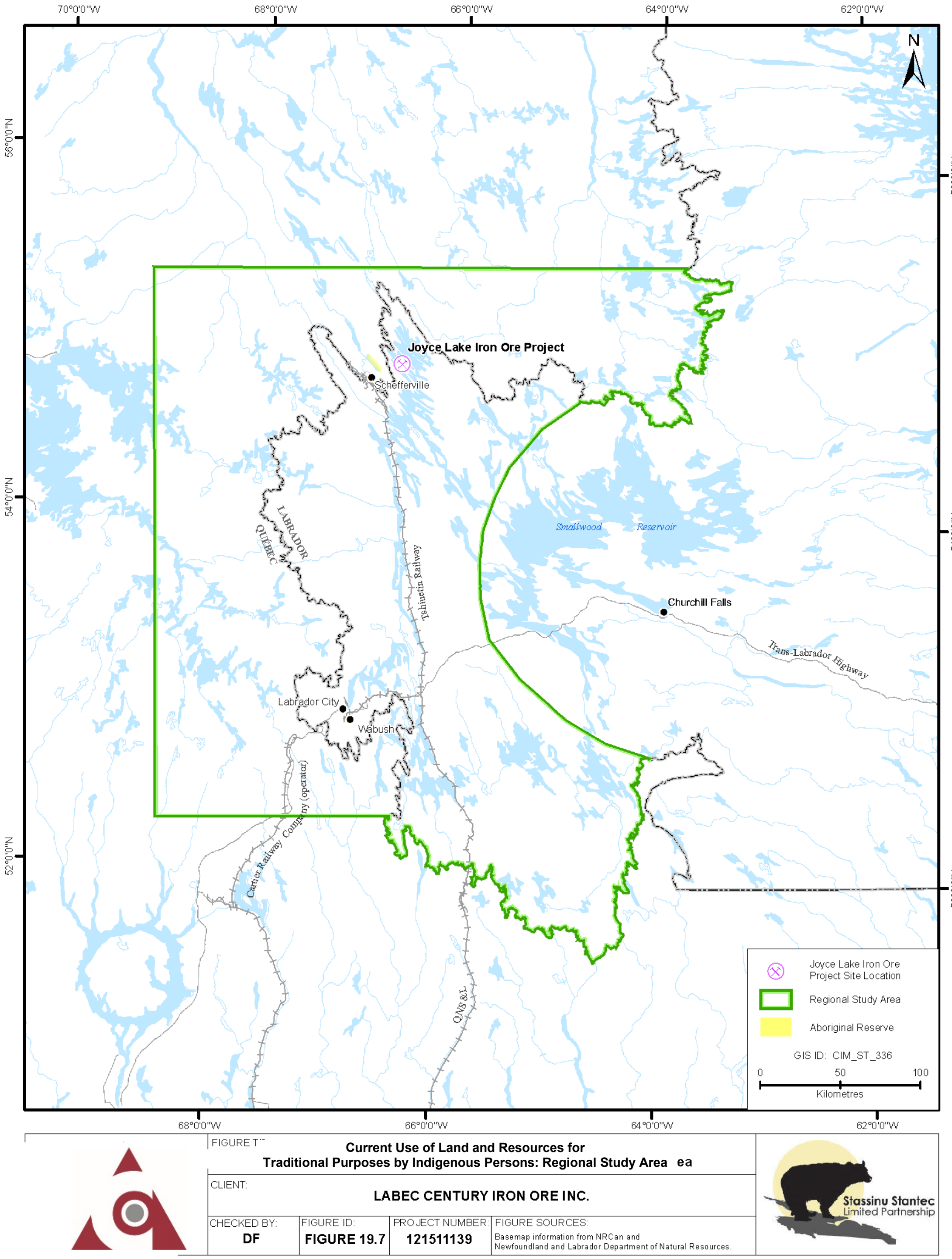

Figure 19.7 Current Use of Land and Resources for Traditional Purposes by Indigenous Persons: Regional Study Area

19.2.4 Selection of Environmental Effects and Measurable Parameters

The environmental effects assessment for the Current Use of Land and Resources for Traditional Purposes by Indigenous Persons VC is focused on the following environmental effect:

- Change in Activity Distribution (location, timing, and/or intensity).

This effect is considered to encompass the primary potential outcomes which may result from interaction with Project components, Indigenous land and resource use, and related effects on harvested species.

Required restrictions on access to the PDA during construction and operations may, for example, have a direct effect on the use of certain lands and resources for such activities. The presence of Project-related structures and disturbances may also result in Indigenous persons choosing not to use a larger area surrounding the Project site, which may further contribute to a change in the spatial and/or temporal distribution of land and resource use activities, particularly if alternate areas of comparable quality and distance from the communities are not available for such use.

An associated decrease in the use of particular land areas and lack of suitable alternative locations, in addition to constraints related to increased involvement in the wage economy, may also affect the overall levels of traditional land and resource use by individuals or communities. Subsequently, this may adversely affect the cultural value of these activities for the Indigenous community or organization in question.

The analysis and assessment of Project effects on this VC was based on an extensive review of existing and publicly-available information, as well as information obtained through Indigenous engagement initiatives. These initiatives were both general in nature and specific to the identification of potential effects of the Project on Indigenous land and resource use. While it may be possible to quantify some of the potential environmental effects, doing so is often difficult for social and cultural issues such as those related to Indigenous land and resource use, and the cultural importance of these activities. In these cases, the identified measurable parameters are primarily used as key concepts upon which to focus the effects assessment, rather than to generate quantitative effects predictions.

The measurable parameters used for the assessment of the potential environmental effects, and the rationale for their selection, are indicated in Table 19.3.

Table 19.3 Measurable Parameters for Current Use of Land and Resources for Traditional Purposes

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Activity Distribution (location, timing, and/or intensity)	Area available for traditional land and resource use activities by each group or the timing, frequency and duration of activities	The interaction between the Project and land and resource use activities can result in changes to the areas, times and intensity of use.

19.3 Standards or Thresholds for Determining the Significance of Residual Environmental Effects

Terms that will be used to characterize residual environmental effects for Indigenous Land and Resource Use are in accordance with guidance provided under CEAA 2012 (Federal Environmental Assessment Review Office 1994).

- Direction
  - Adverse: a decrease in activity.
  - Positive: an increase in activity.
  - Neutral: no change in activity.
- Magnitude
  - Negligible: affects a minimal number of Indigenous land and resource users.
  - Low: affects a small number of Indigenous land and resource users.
  - Moderate: affects less than the majority of Indigenous land and resource users for one or more activities.
  - High: affects the majority of Indigenous land and resource users across multiple activities.
- Geographic Extent
  - Site-specific: effects are restricted to the PDA.
  - Local: effects extend beyond the PDA into other portions of the LSA.
  - Regional: effects extend beyond the LSA into other portions of the RSA.
- Frequency
  - Unlikely (U): Not likely to occur.
  - Once: Effect occurs occasionally during the life of the Project (e.g., preparation / clearing).
  - Sporadic: Effect occurs sporadically, at irregular intervals, without any predictable pattern during the life of the Project (e.g., vegetation clearing, road maintenance).
  - Regular: Effect occurs on a regular basis and at regular intervals during the life of the Project (e.g., fuel transport).
  - Continuous (e.g., presence of causeway).

- Duration
  - Short-Term: Effect restricted to site-preparation or construction phase of the Project (i.e., one year).
  - Medium Term: Effect extends throughout the construction and operation phases of the Project (i.e., up to seven years).
  - Long-Term: Effect continues beyond the current generation of land user.
  - Permanent: measurable parameter unlikely to recover to baseline conditions.
- Reversibility
  - Reversible: will recover after Project closure and reclamation.
  - Irreversible: permanent.
- Ecological/Socio-economic Context
  - Undisturbed: Area relatively or not adversely affected by human activity.
  - Disturbed: Area has previously been substantially disturbed by human development or human development is still present.
- Prediction Confidence
  - Low: there is a low level of confidence in the prediction of environmental effects.
  - Moderate: there is a moderate level of confidence in the prediction of environmental effects
  - High: there is a high level of confidence in the prediction of environmental effects.

A significant adverse effect on the Current Use of Land and Resources for Traditional Purposes by Indigenous Persons is defined as one which will result in a change in the current spatial and temporal distribution of, and/or an overall decrease in, activity levels by those Indigenous persons who currently undertake such activities within the RSA, resulting in a reduction in the overall value of such activities for the community over the long-term.

19.4 Potential Project-VC Interactions

Table 19.4, identifies each Project activity and physical work for the Project. Each interaction is rated as 0, 1, or 2 based on the level of interaction associated with each activity or physical work. A rating of “0” indicates no predicted interaction between the Project and the potential effects. A rating of “1” indicates that while an interaction occurs, based on past experience, the resulting environmental effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted for those interactions rated as a 1. Those interactions rated as a "2" are carried forward for further assessment. The rating takes a precautionary approach, whereby interactions with a meaningful degree of uncertainty have been assigned a rating of 2, ensuring that a detailed environmental effects assessment is conducted.

Table 19.4 Potential Project Environmental Effects to Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Project Activities and Physical Works	Potential Environmental Effects
	Change in Activity Distribution (location, Timing, and/or Intensity)
Construction	
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	2
Construction of Roads	2
Construction of Causeway	2
Construction of Site Buildings and Associated Infrastructure	2
Construction of Rail Loop and Associated Infrastructure	2
Construction of Stream Crossings	1
Installation of Water Supply Infrastructure (wells, pumps, pipes)	0
On-site Vehicle/Equipment Operation	1
Waste Management	0
Transportation of Personnel and Goods to Site	0
Expenditures	0
Employment	2
Operation and Maintenance	
Maintenance of Causeway	0
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	2
Dewatering Joyce Lake	0
Ore Processing (including crushing, conveying, storage, grinding, screening)	0
Waste Rock Disposal on Surface	0
Water Treatment (including mine water and surface runoff) and Discharge	0
Rail Load-Out and Transport	2
On-site Vehicle/Equipment Operation and Maintenance	1
Waste Management	0
Transportation of Personnel and Goods to Site	1
Fuel Transport	1
Fuel Storage and Dispensing	1
Progressive Rehabilitation	1
Expenditures	0
Employment	2

Table 19.4 Potential Project Environmental Effects to Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Project Activities and Physical Works	Potential Environmental Effects: Change in Activity Distribution (location, Timing, and/or Intensity)
Closure and Decommissioning	
Site Decommissioning	1
Site Reclamation (building demolition, grading, scarifying)	1
Accidental Events	
Hydrocarbon Spill	2
Train Derailment	2
Forest Fire	2
Settling/Sedimentation Pond Overflow	2
Premature or Permanent Shutdown	0

KEY:
0 No interaction.
1 Interaction occurs; however, based on past experience, the resulting environmental effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.
2 Interaction occurs, and resulting environmental effect may exceed acceptable levels without implementation of specific mitigation. Further assessment is warranted.

19.4.1 Interactions Rated as 0

Expenditures has been rated as 0 for all phases of the Project. While expenditures may result in interaction with local business, the interaction with land use is captured under the discussion of employment.

During the Construction, activities related to waste management, transportation of personnel and goods, and installation of water supply infrastructure will not interact with land and resource use activities and are rated as 0. These activities will take place in an area previously disturbed by Project activities and will be spatially limited to the mine site, which has been demonstrated as having limited or no land use as discussed in Section 19.5.3.

During Operations, ore processing will not interact with Current Use of Land and Resources for Traditional Purposes by Indigenous Persons. Progressive reclamation has also been rated 0.

19.4.2 Interactions Rated as 1

In the Construction phase, activities rated as 1 include the construction of stream crossings and on-site vehicle/equipment operation.

Stream crossings will be conducted as per Department of Fisheries and Oceans requirements. Interactions with navigation will be managed through Project design.

During operations, transportation of goods and materials to site is rated as 1 because this will be managed through standard operating procedures for both road and rail transport. This includes measures to reduce noise and emissions.

Progressive reclamation, site decommissioning, and site reclamation are rated as 1 because they will occur in an area subject to previous disturbance. However, due to the relationship between these activities and the potential reversibility of other Project effects, it has also been discussed as a potential mitigation.

19.4.3 Interactions Rated as 2

Project activities or physical works that may result in interactions with land and resource use that, without the implementation of Project-specific mitigation measures, may exceed acceptable levels include:

Construction

- Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)
- Construction of Roads
- Construction of Causeway
- Construction of Site Buildings and Associated Infrastructure
- Construction of Rail Loop and Associated Infrastructure

Operations

- Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)
- Rail Load-Out and Transport

Employment during all phases of the Project is rated 2 because of the potential to influence land and resource use activities.

Accidents and Malfunctions

With the exception of Premature or Permanent Shutdown, all Accidents and Malfunctions are rated 2. This includes:

- Hydrocarbon Spill
- Train Derailment
- Forest Fire
- Settling/Sedimentation Pond Overflow

19.5 Existing Environment

19.5.1 Information Sources

The main sources of information considered for this assessment are:

- Direct consultation with Québec Innu communities through Leonard McKenzie, a resident of Matimekush-Lac John, and directly by Labec Century;
- Direct consultation with the Naskapi of Kawawachikamach;
- Semi-structured interviews involving members of the Indigenous communities considered in this assessment;
- Recent environment assessment reports, and related studies, conducted in the Regional Study Area (i.e., involving the Indigenous groups considered in this assessment); and
- Published literature (books, special reports, articles published in academic peer-reviewed journals).

The local study areas in the reviewed studies were defined based on the locations of specific resource development projects, and therefore the geographical focus of such studies is typically different from the Project LSA, although the regional context and the Indigenous groups considered are the same. The Innu and Naskapi resource use reports prepared in connection with the environmental impact assessment for the DSO Iron Ore Project (Tata Steel) are key sources of information for the assessment because of the proximity to Schefferville and the Indigenous communities in question.

Indigenous Traditional Knowledge pertaining to Indigenous Land and Resource is presented in Table 19.5.

Table 19.5 Indigenous Traditional Knowledge - Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Group	Source	Page or Date Reference	Comment or Excerpt	Map Reference (Figure 3.1)
Fisheries and Navigation				
Naskapi of Kawawachikamach	Weiler, M. 2009. Naskapi Land Use in the Schefferville, Quebec, Region. Prepared as an Appendix to the Environmental Assessment of the Direct Shipping Ore Project	p. 7	Fishing during the early phase of settlement at Schefferville was focused on the Attikamagen Lake system.	2
Naskapi of Kawawachikamach	Consultation		Montreal Bay Very large lake trout in the area	10

Table 19.5 Indigenous Traditional Knowledge - Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Group	Source	Page or Date Reference	Comment or Excerpt	Map Reference (Figure 3.1)
Naskapi of Kawawachikamach	Consultation		Goose River Spawning area for trout; good fishing	5
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		Fishing takes place on most lakes in the area, including the ones near the communities. Specifically the Lakes between Schefferville and Astray Lake (Lac John, Lac Gene, Barry Lake)	3, 8 and 9
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		Attikamagen Lake (throughout) Lake trout, speckle trout and pike are the main species caught. Most lakes in the system are used for fishing. Everyone consumes fish. Year-round activity.	2
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		Pike are found at Iron Arm associated lakes Iron Arm and associated lakes	6
Innu (Schefferville)	Consultation	.	Astray Lake Many Innu travel from the community to Astray Lake, which is a point of departure to other locations in the lake system	1
Innu (Schefferville)	Consultation		Freeman Lake was identified as a key Innu fishing area Travel to Freeman Lake is via Astray Lake.	4
Innu (Schefferville)	Consultation		Many Innu travel from the community to Astray Lake, which is a point of departure to other locations in the lake system.	1
Birds and Wildlife				
Naskapi of Kawawachikamach	Weiler, M. 2009. Naskapi Land Use in the Schefferville, Quebec, Region. Prepared as an Appendix to the Environmental Assessment of the Direct Shipping Ore Project	p. 8	"Small game harvesting in the Schefferville region was reported to occur to the northwest and the south and southeast of Attikamagen Lake. These areas show the highest level of small game harvesting activity based on the sample of interviewed harvesters."	2

Table 19.5 Indigenous Traditional Knowledge - Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Group	Source	Page or Date Reference	Comment or Excerpt	Map Reference (Figure 3.1)
Naskapi of Kawawachickamach	Weiler, M. 2009. Naskapi Land Use in the Schefferville, Quebec, Region. Prepared as an Appendix to the Environmental Assessment of the Direct Shipping Ore Project	p. 7	The area of Attikamagen Lake and the series of lakes to the northwest of it was one of three core areas for hunting caribou in the early decades of settlement near Schefferville.	2
Naskapi of Kawawachikamach	Consultation Assessment Report CEAR Doc#501		The Naskapi moved with the herd, ranging through its annual range, travelling north to Ungava Bay, east to the coast and south to the Churchill River (Henriksen 1978). They hunted caribou during the migration past Indian House Lake.	NA
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		Ptarmigan hunting takes place in winter, primarily on the islands, on Petitisikapau Lake. For both Innu and Naskapi	11
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		Many years (decades) ago caribou hunting took place near Joyce Lake.	7
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		Caribou seen near to the cabins on Iron Arm approx. 3 years ago.	6
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		Near cabins (Iron Arm and Astray) As soon as the ice melts, travel by boat to fishing or other harvesting areas is staged from areas near cabins.	1 and 6
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		There appear to be more bears where development takes place – i.e., where there are people.	NA
Naskapi of Kawawachikamach/ Innu (Schefferville)	Consultation		Trapping of small mammals: fox, marten, otter, rabbit, and porcupine Furs are used for various purposes, and sometimes sold. Porcupine is “like caviar” to the Naskapi.	NA

Table 19.5 Indigenous Traditional Knowledge - Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Group	Source	Page or Date Reference	Comment or Excerpt	Map Reference (Figure 3.1)
Innu (Matimekush – Lac John)	Clément, D. 2009. Innu Use of the Territory and Knowledge of its Resources. Prepared as an Appendix to the Environmental Assessment of the Direct Shipping Ore Project.		Attikamagen Lake has been identified as a rutting area for Caribou. Peat bogs are the preferred location for calving, which occurs in May or June.	2
Naskapi Nation of Kawawachikamach	Alderon Iron Ore Corp. 2012. Environmental Impact Statement: Kami Iron Ore Mine and Rail Infrastructure, Labrador	Vol. II, Chapter 22	The caribou once came through the Kawawachikamach community but no longer. At one point there were 900,000 caribou; now there are around 80,000. One caribou came into the Kawawachikamach community over Christmas (2012), and this was the first in 6 years.	12
Naskapi Nation of Kawawachikamach	Consultation Assessment Report CEAR Doc#501	p.13-9	The Naskapi moved with the herd, ranging through its annual range, travelling north to Ungava Bay, east to the coast and south to the Churchill River (Henriksen 1978). They hunted caribou during the migration past Indian House Lake.	NA

19.5.2 Methodology for Characterization of Baseline Conditions

Baseline conditions were characterized using the information and findings of studies conducted since 2008 pertaining to Indigenous land and resource use both within the RSA and in western Labrador generally. These studies present detailed information relating to Indigenous land and resource use, including maps indicating the location of land and resource use activities and information gathered through surveys and interviews. Matimekush-Lac John and the Naskapi of Kawawachikamach are the most frequent Indigenous users of the area due to relative proximity to the Project. Of these groups, the Naskapi of Kawawachikamach appear to have the most intense use of the Iron Arm area and the surrounding lakes, while Innu land use is centered nearer the community and near Astray Lake in the southern part of the LSA. While this assessment considers use by all Indigenous groups with asserted land claims in the area, it also considers the relative intensity of use in its determinations. While this use cannot be quantified, core areas of use and important activities have been defined. These areas and activities will be used in the identification of key mitigation.

19.5.3 Baseline Conditions

The key findings of a literature review and consultation conducted for the Baseline Study on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are detailed below:

- For both the Naskapi of Kawawachikamach and the Innu of Matimekush-Lac John, land and resource use activities appear to be concentrated in areas within relatively short distances of their respective communities.
- Attikamagen (including Iron Arm), Astray and Petitsikapau Lakes are important locations for fishing and wildlife harvesting activities.
- Past mining employment has had a substantial effect on current patterns of traditional land and resource use, particularly in the second half of the 20th century.
- The peninsula of land where Joyce Lake is located is not, itself, an area of use. Specifically, Indigenous consultation indicated that Joyce Lake itself is not used for fishing or other activities. While Historic Resource Assessments associated with the Project uncovered Pre-contact sites in the area of the causeway, there was no evidence of historic or contemporary land use in the immediate vicinity of the Joyce Lake.

The findings discussed above are linked, to the extent that mining activity from the 1950s to 1980s played a crucial role in the re-location of Indigenous (Innu and Naskapi) people to the Schefferville area. During that period, mine employment influenced the selection of resource harvesting areas due to the time limitations that it entailed for many individuals who were employed at the IOC mine. The network of roads which was developed primarily in connection with mining activity also influenced the selection of wildlife resource-harvesting areas, as it made some areas easier to reach from the communities of Kawawachikamach and Matimekush-Lac John. Construction of the railway had a similar effect, with the availability of train transportation making part of the travel to certain traditional resource-harvesting areas considerably more efficient and less time-consuming.

It is understood that traditional wildlife resource harvesting activities grew in importance (from a subsistence point of view) following the closure of the IOC mine in 1982, because there was a drastic decrease in wage employment opportunities and consequently an increase in individuals' time available to spend on resource harvesting activities. In the absence of mining sector wage employment, traditional activities re-gained their importance as a means of subsistence.

19.5.3.1 The Historic Period

Areas in northeast Québec and Labrador traditionally used by both the Innu and the Naskapi appear to have had relatively fluid territorial boundaries over the years. The area in the vicinity of the Project appears to have been used as both a resource harvesting area and as a travel route, connecting the St. Lawrence North Shore with the interior and Ungava Bay, as well as with North West River and the Atlantic coast of Labrador (Mailhot 1986).

Mailhot (1986) examined kinship and patterns of territorial mobility in the eastern Québec-Labrador Peninsula, and found that both Innu and Naskapi bands were open systems with changing membership and continuous interaction with one another. Linkages were found between the Labrador Innu and bands of the St. Lawrence coast (Sept-Îles, Mingan, St. Augustin, La Romaine) and the bands of Davis Inlet and Fort Chimo/Schefferville. Given this inter-band mobility, hunting groups were found to be characterized by "extreme fluidity." Social ties, according to Mailhot (1986), provide an "access key" to different regions irrespective of whether these are within the territory of an individual's band. This is an important consideration in the area being considered for this Project due to the substantial overlap between the Indigenous groups in question.

Regionally, the principal axis of travel during the Historic Period appears to have followed the Ashuanipi drainage. Archaeological evidence from the Ashuanipi suggests that this was the case in the Pre-Contact Period as well. There is also some potential that secondary historic travel routes lead from the Ashuanipi to the west and southwest toward Rivière aux Pékans and beyond to the Saint-Marguerite or Manicouagan (Minaskuat 2008). The Moisie River, which drains into the St. Lawrence River near Sept-Îles, is also part of a canoe route that that had been used for centuries as an access route to the interior of the peninsula (Boutet 2013).

Drawing on data from the 19th century, Gélinas (2012) identified the area surrounding the Project as part of the region that had not been systematically exploited and settled prior to the 1950s. At this time, both the Innu from the Sept-Îles area and the Naskapi from further north relocated to the Schefferville area. While, as noted above, the area was important for travel and hunting related to migratory caribou, settlement in the area was unlikely because the resource base in the region could not support the subsistence of a permanent population. Also, the groups that frequented the area were focused on migratory activities for most of their history prior to the mid-19th century.

Tanner (1977) quotes General James Murray, Governor of Québec in 1762, as describing the Montagnais (Innu) as inhabiting a "vast tract of Country from Labrador to the Saguenay….They take as many names as they have villages but are all the same people and speak the same language." Fort Nascopie on Petitsikapau Lake served as an important trading post for the Innu of the Central Plateau region, and was active from 1838 to 1873. While caribou hunting was the most important subsistence and cultural activity for the Innu, they participated to a variable degree in the fur trade depending on the degree to which they relied on the products available through trading. As primary activities, trapping could not occur in harmony with caribou hunting due to the differing habitats. The result was that trapping and caribou hunting became competing interests in the region (Clement 2009).

The shortage of resources in the area and the subsequent closure of Fort Nascopie in 1873 resulted in organizational change among the Innu in the area, with subsequent dispersion to Fort Chimo, Sept- Îles, Mingan, and North West River. The closure of additional trading posts in the region resulted in the rise of importance of Sept-Îles and the Sept-Îles reserve was created in 1909 (Clement 2009).

According to Henriksen (1973), the Naskapi were nomadic caribou hunters in the interior of the Québec-Labrador peninsula until around 1916, at which time the caribou herds changed their migration route and stopped passing through Indian House Lake. The shortage of food and the possibility of starvation induced the Naskapi to move to locations on the coast, where the Hudson Bay Company had maintained a presence (i.e., Fort Chimo, Voisey's Bay, and Davis Inlet).

Henriksen (1973) identified the Naskapi as "a small group of people who hunt in a vast tract of land with almost no competition from outside groups. The boundaries of their hunting territory are determined by the distance they wish and are able to travel." Due to the mobility required by the Naskapi hunting system and the migratory nature of caribou as the preferred species, it was difficult to operate using a family territory hunting system. As a result, hunting territories with fixed boundaries appear to not have been a feature of Naskapi land tenure (Henriksen 1973).

In the early 20th century, beaver reserves were established in Québec (Péribonka and Bersimis being the first two), with the stated purpose of conservation of beaver populations, which had been in decline due to intensive trapping activity by both Indigenous and non-Indigenous trappers. The reserves were also intended to protect the fur market and generate employment for the Indigenous population (Lavoie 2012).

The Saguenay Beaver Reserve (Réserve à Castor de Saguenay), including Matimekush and John Lake (Clement 2009), was created in 1954 and granted exclusive trapping rights, with lots allocated to Innu families based on the trapping areas/hunting grounds traditionally used by those families. Figure 19.8 shows the area covered by the Saguenay Beaver Reserve and its individual lots. Lots 209, 208, 211, and 212 are in close proximity to the Project site. The majority of the PDA is within Lot 209, with portions of the haulage road and rail loop in Lot 211.

A report cited by Gélinas (2012) indicates that some individual trappers often exceeded the maximum permitted number of harvested beavers (10 per family), and the excess pelts were recorded beside the names of trappers who had not gone out to trap. Gélinas (2012) and Lavoie (2012) indicate that in the 1950s and later, wage labour was preferred over trapping as a main source of income. Reports on the Saguenay Beaver Reserve indicate that there had not been any trapping in many areas since the beginning of mining development in the early-1950s (Lavoie 2012).

19.5.3.2 The Contemporary Period (1950 to 1990 AD) and Current Land Use Patterns

Due to substantial overlap between land use patterns in the contemporary period and current patterns of use, they are discussed together in the section below. Current land use in the region is strongly linked to the growth and decline of the mining industry and the related sedentarization of Indigenous groups who settled in the Schefferville area to participate in wage employment. These events shaped Indigenous land use in the region to the present day.

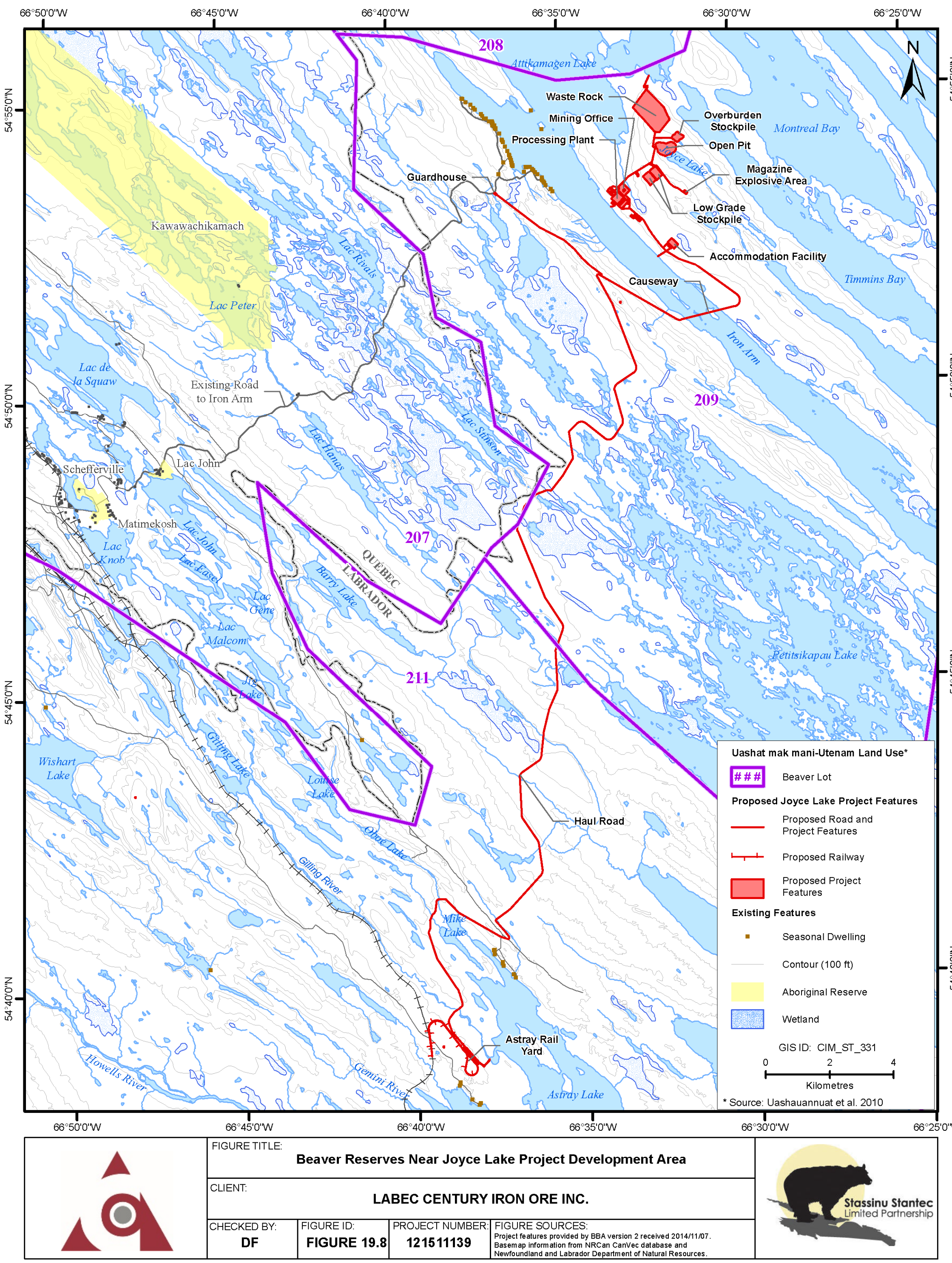

Figure 19.8 Beaver Reserves Near Joyce Lake Project Development Area

Gélinas (2012) stated that, with the advent of mining in the region in the 1950s, there existed a strong preference for wage employment over trapping or other activities. Such opportunities in the mining sector attracted many Innu and Naskapi to the Schefferville area, from the Sept-Îles area and from Fort Chimo on Ungava Bay, respectively. As discussed by Weiler (1992), the Innu were drawn to the area by promises of wage employment while the Naskapi were encouraged to move to Schefferville in the 1950s, in order to provide easier access to social and health services, and to promote their integration into "mainstream" Canadian society. These developments resulted in changes in both the frequency and intensity of land use for both groups.

During the period of operations of the IOC mine in Schefferville, the Naskapi and Innu employed at the mine continued to engage in traditional harvesting activities, using vacation time or days off to be out on the land. However, mine employment brought about a number of changes in the lifestyles of the Naskapi and Innu hunters. Due to work schedules, it became more difficult for hunters to travel long distances during normal work periods. This resulted in resource harvesting activities becoming concentrated in areas within relatively short distances of Schefferville (Boutet 2010).

Naskapi of Kawawachikamach

The Northeastern Québec Agreement, which was signed in 1978 as a result of negotiations following the James Bay and Northern Québec Agreement, has provisions which grant the Naskapi some exclusive harvesting rights in certain areas of northeast Québec. The agreement aimed to secure certain rights relating to social and economic well-being and usufruct in allotted lands. This agreement is described as having "reduced and legally entrenched the total hunting territory of the Naskapi" by increasing the importance of the Québec-Labrador boundary, which does not correspond to the range of the Indigenous people in the region. This had led to claims that would legally recognize harvesting rights across provincial boundaries. For the Naskapi, these claims are based on both traditional and contemporary usage of the area directly adjacent to the Project, including Iron Arm/Attikamagen Lake, and both Astray and Petitsikapau Lakes (DND 1994). Both of these areas are in the immediate area of the Project, with Project infrastructure interacting directly with Iron Arm.

A 1994 report commissioned by the Department of Defence during the assessment of low-level flying activity in Labrador stated that "The Naskapi are able to pursue a way of life that, while substantially different in many respects from that of their people 20 years ago, retains a traditional system of land use for the purposes of subsistence and economic gain" (DND 1994). Key areas of Naskapi land use have been identified within the RSA, with mining roads in the area used to increase access to hunting areas. The Naskapi engage in land use much further away from the community with the area of regular use bounded by Attikamagen and Astray Lakes to the south, Howells River to the west, and the Murdoch and Keating rivers to the east. The Naskapi are known to travel as far as Lac Romanet. The Caniapiscau, George and La Baleine rivers were other noted corridors of land use activity (DND 1994).

The most recent overview of Naskapi land use patterns in the area was completed by Weiler (2009). By reviewing the results of a series of land use surveys, which took place between 1983 and 2006, Weiler established the pattern of use that has emerged over that period. This time frame is particularly important, because it means the study documents land use changes as a result of the advancement and decline of mining activity in the region. As a result of these considerations, Weiler (2009) is a key source for this study.

In the first period covered by Weiler, approximately 1950 to 1980, caribou hunting was identified as the most economically and culturally important resource activity for the Naskapi. Activities were centered in three areas: portions of a ridge between Schefferville and Howells River, an area to the west of Howells River, and the Attikamagen Lake area and the series of lakes to the northwest.

The availability of caribou in the Schefferville region has varied over time, with the population having been low across the eastern Québec/Labrador Peninsula during parts of the first half of the twentieth century and also in the first decades of Naskapi settlement near Schefferville. The population of the George River caribou herd began to rebound in the 1970s and the Naskapi community had by then adapted to its relocation from Fort Chimo and settled in the vicinity of Schefferville. Boutet (2010) cites studies (e.g., Bergerud et al. 2008) indicating an increase in the size, and expansion of the range, of the George River caribou herd between the late-1950s and early-1980s, With increased access to snowmobiles and bush planes by the early 1980s, Naskapi hunters were able to expand their range and recapture some of their traditional harvesting areas (Boutet 2010).

A second survey conducted by Weiler (2009) in 1993, a decade after closure of the IOC mine and following relocation of the Naskapi community to a newly constructed village 15 km from Schefferville, revealed that the George River caribou population had been recovering and that, in the absence of mine employment, traditional wildlife harvesting activities had once again become a key part of the Naskapi economy. The ridge between Schefferville and Howells River had become part of the usual caribou migratory route again, and this became a prime caribou hunting area. An extensive system of dirt roads, established by the IOC, facilitated access to the area by hunters, without the expenses that would be incurred when traveling to more distant hunting locations (Weiler 2009).

Fishing is a staple economic activity for the Naskapi due to the ability to fish year round and the subsequent stability of the food supply, particularly during periods when caribou hunting is less productive (Weiler 2009). Throughout the period covered by Weiler, the Attikamagen Lake region is identified as an area of particular importance for fishing. Preferred species in order of quantity harvested include lake trout, whitefish, sucker, pike, speckled or brook trout and ouananiche (DND 1994).

Small game harvesting is usually carried out as a secondary activity while traveling or harvesting other resources. Winter is the most productive season, likely related to the concentrated effort for other resources during that season. During the first period studied by Weiler (2009), the highest concentration of small game harvesting for the Naskapi in the Schefferville area was to the north and southeast of Attikamagen Lake, the latter of which areas is in the RSA.

Trapping was not historically a major economic activity for the Naskapi, who traditionally had a mobile and nearly self-sufficient lifestyle in the decades prior to settlement in the Schefferville area. The importance of this activity was elevated as settlement and caribou decline resulted in the need for additional income. Trapping areas identified included portions of the Howells River basin, Baussac and Matemacec lakes, and Attikamagen Lake. Species of interest included forest dwellers such as marten, weasel, ermine, wolverine, lynx and squirrel, as well as riparian species such as beaver, muskrat, mink and otter. Wolves, as well as red and arctic foxes, were encountered throughout the region (Weiler 2009). Trapping appears to have been most profitable within about 130 km of Kawawachikamach. In this area, trapping occured between Elsie Lake and lower lac Tudor, as well as near Keating, Attikamagen and Vacher lakes, closer to the reserve.

Waterfowl hunting is a particularly important activity in the springtime, because ice conditions at that time of year make other harvesting activities more difficult. Waterfowl (geese and ducks) are also harvested to a lesser extent during the autumn migration. Key areas identified in the 1983/84 survey by Weiler (2009) include Attikamagen Lake, parts of the Swampy Bay and Ferrum river basins, and parts of the Howells and Goodwood watersheds. Attikamagen Lake was reported to be the best known and most heavily frequented waterfowl harvesting area, according to the 2006 survey by Weiler. This is consistent with the areas identified in the early 1990s and is also a preferred area identified by Innu in the area (DND 1994).

Particularly due to their mobility as a group, travel routes through the area have been important to the Naskapi, who have traditionally relied on often fluctuating resources. One of the traditional routes identified by Weiler is centered on Attikamagen and Petitsikapau lakes, which links the southern and northern limits of the Naskapi territory, connecting Ungava Bay in the North and the central lake plateau around the Attikamagen, Petitsikapau and Michikamau lakes in the South. Other major routes include one that follows Howells River and connects Ungava Bay with the region via the Koksoak, Caniapiscau and Goodwood rivers, while another route follows the Swampy Bay River and connects to Ungava Bay via the lower Koksoak and lower Caniapiscau rivers. The 2006 survey conducted by Weiler confirmed the Howells River as a traditional north-south travel route, and identified two winter crossings, at Rosemary and Stakit lakes (Weiler 2009).

Older studies indicate that residents of Kawawachikamach engage in berry picking and gathering of medicinal plants within approximately 30 km of the community, focusing on areas that are easily accessed by road (DND 1994). Small quantities of Labrador tea are also harvested. The Howells River valley is considered to be an area rich with plant resources; the resources harvested there include berries (blueberry, bilberry, cranberry, cloudberry, cowberry), medicinal plants (Labrador tea, mosses, birch, tamarack) and specialty woods used for implements and crafts. Due to the valley's milder microclimate, it is believed that some of the medicinal plants grown in the valley are more effective and that the specialty woods are “stronger” (Weiler 2009).

The area between Schefferville and Iron Arm, along the existing road to the area, has a number of cabins that are seasonally occupied by Naskapi residents of Kawawachikamach (Figure 19.9). These cabins are used as a base for many land and resource use activities in the region, particularly fishing activity in Iron Arm and bird hunting in the Attikamagen Lake area generally. Similar cabins identified along Astray Lake (Figure 19.10) have been identified as belonging to Innu of Matimekush-Lac John.

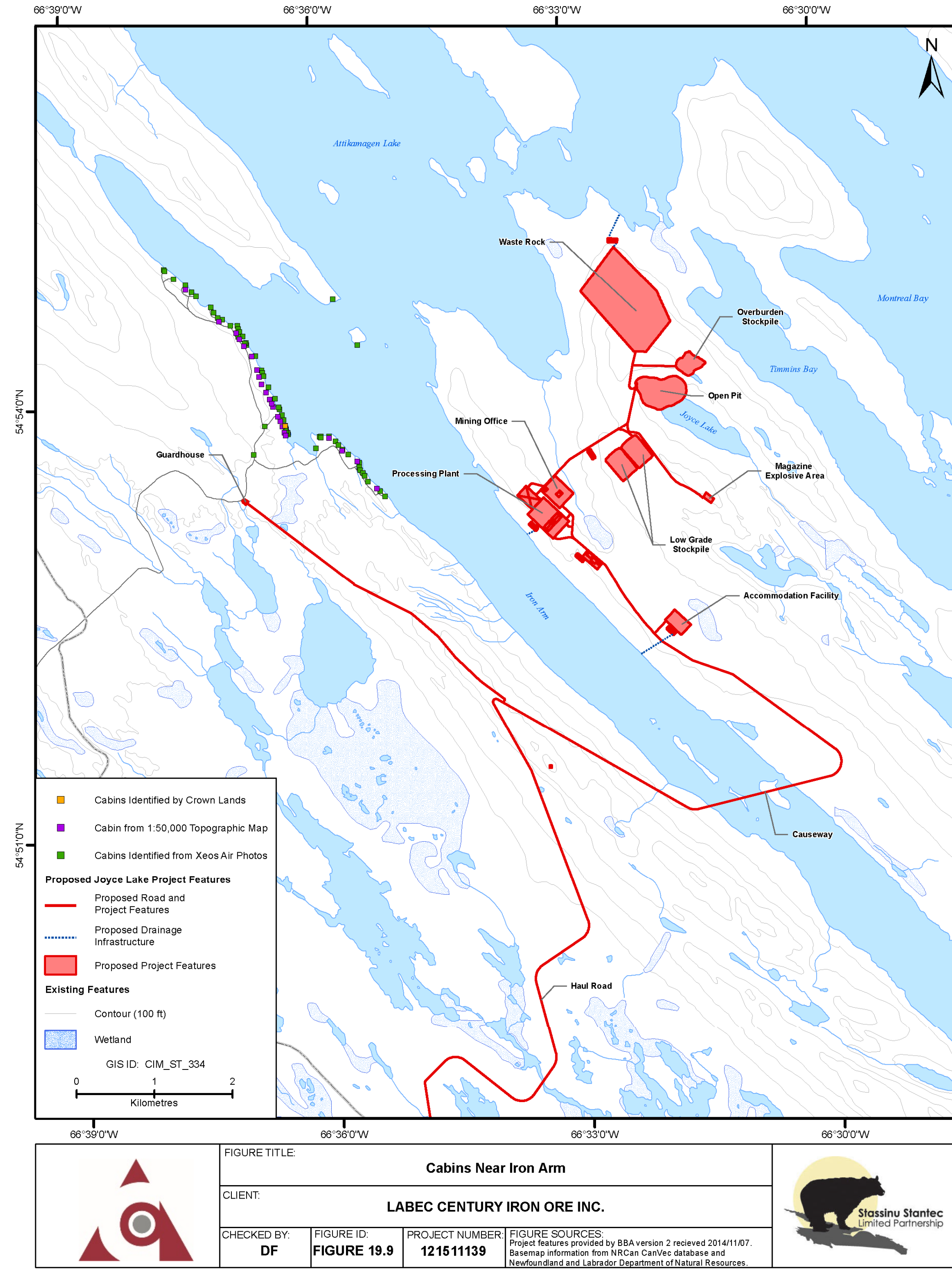

Figure 19.9 Cabins near Iron Arm

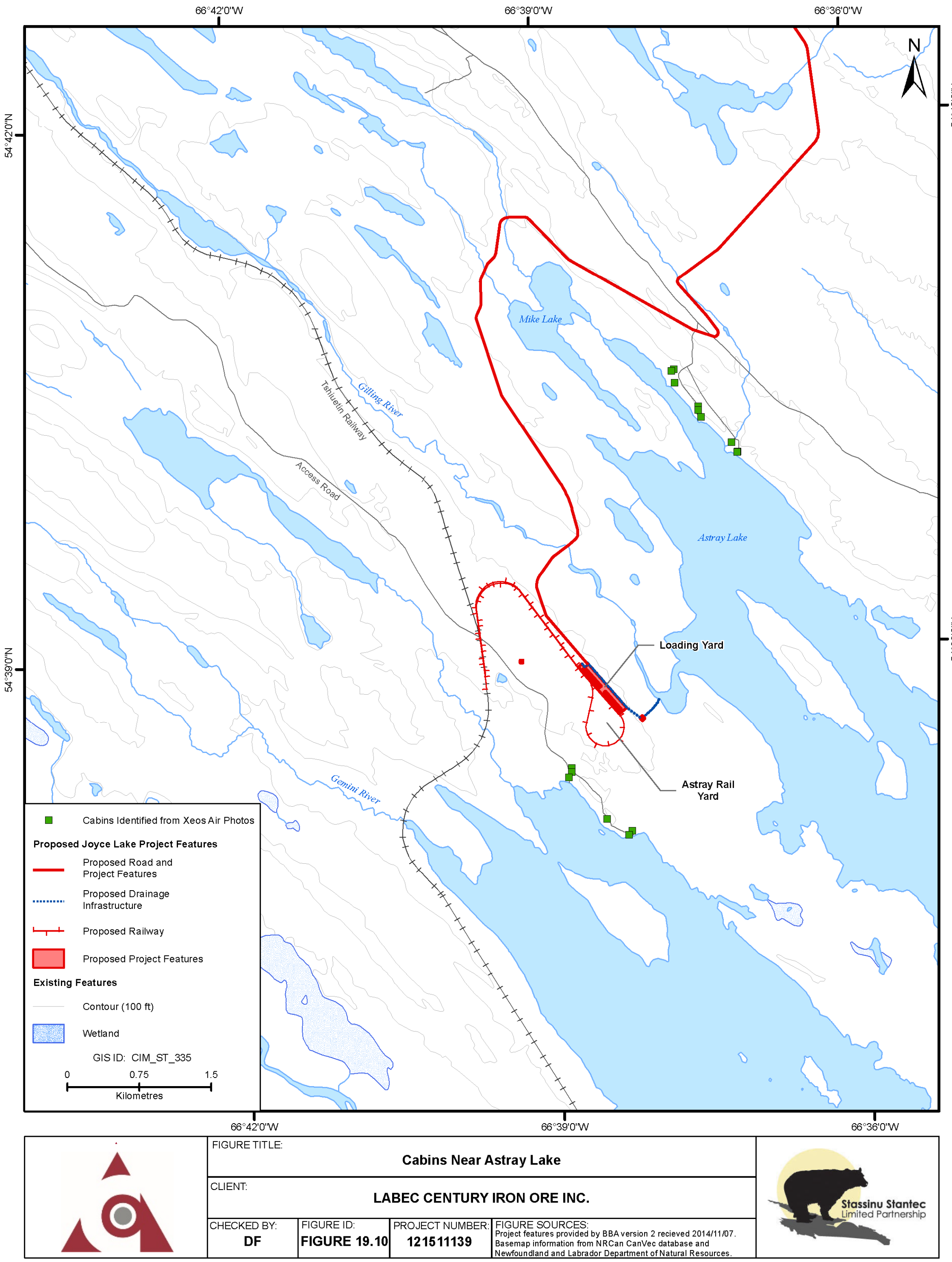

Figure 19.10 Cabins near Astray Lake

Innu of Matimekush-Lac John

The *Mishta Shipu Innuat*, previously associated with the Moisie River, moved from the Sept-Îles area to Schefferville. Employment opportunities at the Iron Ore Company of Canada (IOC) mine in Schefferville in the 1950s resulted in many Innu from the Sept-Îles area focusing on wage employment rather than resource harvesting and other subsistence activities. This trend started during exploration in the 1940s when a number of Innu individuals had already been employed in prospecting activities and also as loggers or casual labourers in the construction of camps and of the railway linking the mining area of Schefferville area to the port of Sept-Îles (Boutet 2013). While settlement in the Schefferville area caused territorial occupation and movements to change, there is no differentiation made between the territories of the Innu of Matimekush-Lac John and those of Uashat mak Mani-Utenam (Figure 19.4). The territories are shown as a single unit, and together with the lands of the Saguenay Beaver Reserve, depict the traditional territory for the Québec Innu active in the region of the PDA (Nalcor 2010). The Schefferville Innu were recognized as an autonomous band in 1968 when, despite pressure to return to original territories, many families decided to remain in the area (Clement 2009).

Two annual migration cycles characterized the movements of the Innu who later settled in Matimekush-Lac John, and this cycle of seasonal activity remained the same in the post-settlement period. However, traditional routes changed to accommodate an increased focus on the area around the community, including new roads constructed for the mining industry (Clement 2009). Increased activity in the forestry and mining sectors, combined with the sedentarization of the Indigenous population of the region, resulted in significant changes in the ways that Innu relate to the land. There was a considerable reduction in the number of individuals or families engaged full-time in hunting and other harvesting activities, and harvesting excursions on the land no longer lasted several months (Lacasse 1996). Following the completion of the railway in 1954, many families abandoned the ancestral travel routes in favour of the train, which provided a more efficient way to reach hunting grounds. This new method of travel largely meant the end of long migrations on foot and had implications for the Innu's traditional knowledge of the land (Boutet 2013). Travel was also supplemented by snowmobiles, and occasionally, aircraft (Clement 2009). Tanner (1976) states that these changes did not erase the previous system of land tenure, but simply added an element into the culture.

Gravel roads used by the Innu in the Schefferville area include one that links the town to Annabel and Leroy lakes, running along the shores of Lake La Cosa. Another gravel road is located to the west, linking Schefferville to Lac Le Fer and crossing the Howells River. A number of secondary dirt roads join these gravel roads. Other important routes include a dirt road from Schefferville to Wishart Lake (a point from which users travel by snowmobile or all-terrain vehicle to Stakit Lake and the Howells River) and a road from Schefferville to the northeast crossing Squaw Lake and continuing to Lake Vacher (Clément 2009). The latter road described by Clement appears to be the existing road that links Schefferville with Attikamagen Lake. Identified trails and cabins are shown in Figure 19.11.

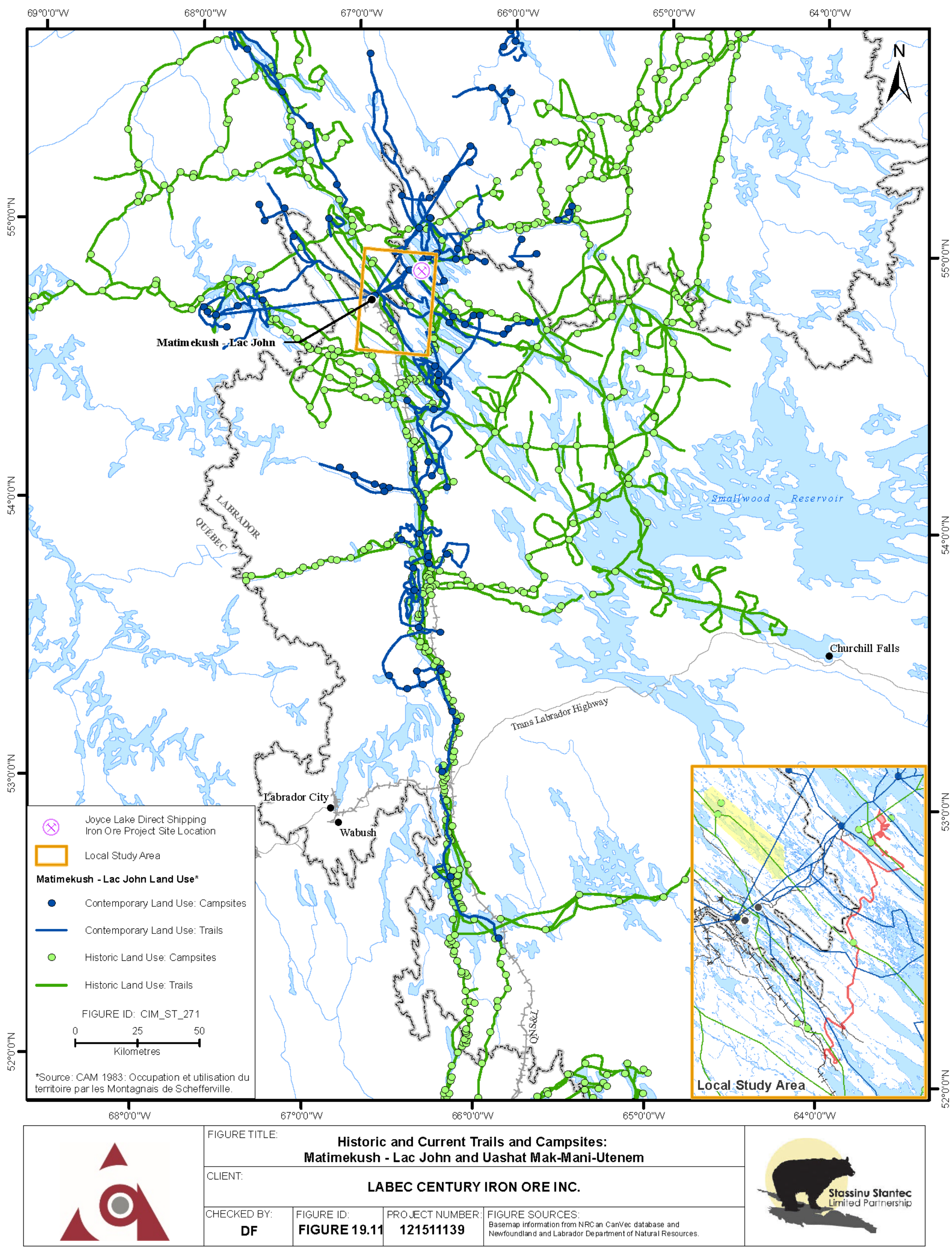

Figure 19.11 Historic and Current Trails and Campsites: Matimekush-Lake John and Uashat Mak-Mani-Utenem

For those Innu and Naskapi individuals engaged in employment at the IOC mine in Schefferville, the nature of industrial work (i.e., scheduled wage employment) meant that permission had to be obtained from supervisors in order to be absent from the workplace during important periods of the caribou hunt (e.g., early-fall and late-winter). This may have meant in some instances having to take leave without pay or forfeiting certain benefits of employment in order to participate in harvesting activities. Due to caribou being more abundant in areas away from the IOC mine, some families developed new strategies for accessing hunting areas, including taking service roads or the train to areas around Menihek Lake, or using float planes (at considerable cost) to access areas further north including the George River. The salaries earned at the IOC mine made some of these practices possible. As noted by Hammond (1976), hunting groups which included mine employees were often able to travel longer distances in search of caribou and reportedly harvested larger numbers of animals.

A decline in mining activity in the 1980s and the closure of the IOC mine in 1982 resulted in a reversion to subsistence harvesting activities by the Naskapi and Innu of the Schefferville area. The period from the 1950s to 1980s had been a time of significant social re-organization, with integration into the wage economy and land and resource use becoming more centered around the community (Mailhot 1997). However, while the intensity and spatial distribution of land and resource use had shifted, it remained an important cultural activity for residents of the region.

Innu of Uashat mak Mani-Utenam

Traditional practices known as *Innu Aitun* are an important part of the cultural identity of the Innu of Uashat mak Mani-Utenam. They have traditionally used a vast territory extending from the Moisie and St. Marguerite rivers on the St. Lawrence coast to the Petitsikapau, Caniapiskau and Michikamau lakes in the North (Figure 19.4) (Hydro Québec 2007 and Nalcor 2012). This covers an area from south of Sept-îles to north of Schefferville. The Innu of Uashat state that this territory continues to be used today, and that travel for traditional purposes takes place within its boundaries. As discussed in Nalcor (2012), information on traditional and current use of the Innu of Uashat mak Mani-Utenam is rare, however it is clear that traditional use is an important element of the group's cultural tradition (Nalcor 2012).

According to a study completed for the Hydro-Québec la Romaine complex (Castonguay, Dandenault et Associés 2006), an arrangement with the Innu of Matimekush-Lac John for communal net fishing has existed for many years. The Nalcor Labrador-Island Transmission Link study (Nalcor 2012) indicates that traditional land resource use activities by the Innu of Uashat mak Mani-Utenam are currently practiced primarily along or near the coast of the St. Lawrence, and at the mouth of some of the rivers of the region. This conclusion is reinforced by a study completed in support of the environmental impact assessment of the Hydro-Québec La Romaine complex, which indicates that several traditional resource use activities are indeed practiced along the coast of the St. Lawrence and at the mouth of various rivers (Castonguay, Dandenault et Associés 2006). Funds provided to the group as part of the compensation for the construction of the Sainte-Marguerite-3 Complex, led to the construction of camps and snowmobiles across the territory, facilitating land use (Nalcor 2012).

Between 2002 and 2005, the Innu of Uashat mak Mani-Utenam harvested a number of wildlife species from within the identified traditional territory. Large game included caribou, moose, and black bear; furbearers such as beaver, otter, lynx, marten and fox were trapped; duck and geese were the main bird species harvested; small game included hare, porcupine, and Ptarmigan. Fishing was a key activity, with a variety of species being caught: pike, burbot, brook trout, Atlantic salmon, and lake trout. In addition, various plant products were harvested, including blueberry, raspberry, partridgeberry, and cloudberry. The extent to which the above-mentioned species are harvested within or near the region of the PDA by members of this group is not known.

Innu Nation

Although there is some documentation of harvesting and land use in western Labrador by the Sheshatshiu Innu First Nation, there was a limited volume of information available and no direct evidence of land and resource use in the vicinity of the Project.

The approximate limit of Sheshatshiu Innu band territory extends west from Sheshatshiu, along the Churchill River to Churchill Falls. A number of areas in western Labrador have been identified as areas where land use activities took place, usually while engaged in activities with other bands, such as the Innu of Uashat Mak Mani-Utenam. These places include the Ashuanipi River, Ashuanipi Lake and Lac Joseph, east of Wabush, which have previously been identified as part of a major travel route for Indigenous populations across the Québec-Labrador peninsula and correspond to one of six sub-regions occupied by the Innu of Labrador and northeastern Québec (Tanner 1944; Tanner 1976; Mailhot 1986; Armitage 1989).

Three core areas were identified for contemporary land and resource use by Sheshatshiu Innu (Mailhot 1997; Armitage and Stopp 2003):

- the group of lakes at the headwaters of Eagle River and its tributaries, which had been an important area since pre-settlement times;
- one which is bounded by Uinnukapau (Winnokapau Lake) in the south, Smallwood Reservoir (formerly Mishikamau) in the west, Atshuku-nipi (Seal Lake) in the north, and Nipishish (Nipishish Lake) in the east; and
- another which is centered on three lakes - Ashuapamatikuan (Shipiskan Lake), Ashtunekamuku (Snegamook Lake), and Shapeiau (Shapio Lake).

None of these core areas is within the RSA.

NunauKavut

The 2012 NunatuKavut Community Council land use study completed for the Champion Iron Ltd. Kami Project in western Labrador included a survey that is described as holding a "low level of confidence in representing the entire NunatuKavut Community Council population but well represents the membership in the Labrador west area." The results of this survey are incorporated into the sections below. Among those surveyed, Western Labrador area, the Churchill River, Port Hope Simpson Area, and communities along the south east coast of Labrador are identified as preferred areas for land and resource use activities. Based on mapping provided in the 2012 Land Study, the furthest extent of land use by NunatuKavut Community Council members in the area is approximately 100 km south of the PDA (NunatuKavut Community Council 2012).

19.6 Assessment of Project-Related Environmental Effects

The Project will result in changes in the accessibility of certain areas within the PDA during specific periods of the construction and operations phases. This change will be due to site access restrictions and landscape alterations resulting from the development of Project components and activities within the PDA. Project activities may therefore result in changes in patterns of traditional land and resource use in terms of the location, timing, and/or intensity of activities. There may also be avoidance of the LSA as a result of activity in the area. However, the RSA has been the focus of mining activity since 1950 and users are familiar with undertaking land use activities in areas of industrial activity.

19.6.1 Construction

During construction, site preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling) will result in the disturbance of approximately 412.8 ha, including a variety of wildlife habitats for species that are harvested during land and resource use activities. Total habitat disturbances for key species defined by Indigenous groups in the area are detailed in Table 19.6. This includes an analysis of the percentage of habitat lost within the LSA and the RSA. Habitat disturbance for these species is discussed further in Chapter 16: Birds, Wildlife and their Habitats.

Table 19.6 Habitat Disturbance of Key Species (Primary Habitat)

Species	Area Disturbed	% of Habitat in the LSA	% of Habitat in the RSA
Grouse/Ptarmigan	357.9	7.5	0.3
Canada Goose	63.9	6.6	0.4
Porcupine	357.9	7.5	0.3
Bear	357.9	7.5	0.3
Caribou	357.9	7.5	0.3

Much of this disturbance is the result of activities on the Joyce Lake peninsula. Historic and cultural resources research, secondary source research, and Indigenous consultation have not identified any use of this area, so this disturbance is not expected to affect use.

Site disturbance will be limited to the PDA and, through progressive reclamation, as well as rehabilitation and decommissioning, this disruption will be medium term in duration and will be reversible. Reclamation and rehabilitation will be done in a manner that will restore the area to its previous state, including restoration of habitats consistent with the baseline.

As indicated in Section 19.5, Iron Arm and Attikamagen, Astray, and Petitsikapau Lakes have been identified as important locations for fishing and wildlife harvesting for the Indigenous (Naskapi and Innu) communities in the Schefferville area. Project-related effects resulting from access restrictions and/or land disturbance are anticipated to occur in these locations but are limited to road construction. Other site restrictions will be in the immediate vicinity of the mine area. Based on this information, it is expected that the construction phase of the Project may affect the distribution (location, timing, and/or intensity) of traditional use of land and resources by Indigenous persons. However, most site restrictions will be associated with access to the mine area on the Joyce Lake peninsula. As has been discussed, the peninsula and Joyce Lake has not been identified as an area of use.

Construction of the causeway across Iron Arm could cause some interference with fishing activity, including associated navigation on Iron Arm. Construction will occur following consultation with local Indigenous groups to reduce disruption to fishing activity. Construction will also occur during appropriate timing windows to reduce disruption on fish and fish habitat. Additional discussion of the effects of the causeway is provided in Chapter 15: Fish and Fish Habitat.

Because of the isolation of Project activities, the construction of the haulage road will represent the most visible landscape disturbance during the Construction phase, with roads accounting for a total disturbance of 201.8 ha, or approximately 49% of the total Project disturbance. However, the roads will also substantially increase access to many parts of the LSA, particularly to the Astray Lake area, which has been defined as an area of substantial use for both fishing and hunting for area Innu, as well as an access point for travel to the south. This represents a potential positive effect on the distribution and timing of land use.

As discussed in Section 19.5.3, there are a number of cabins on Iron Arm that are known to be occupied by the Naskapi residents of Kawawachikamach (Figure 19.11). These cabins are integral to Naskapi land use in the area, including fishing in Attikamagen Lake and Iron Arm. At a minimum distance 5.8 km from the causeway and 1.7 km from mining and processing activities, these cabins should not be affected by noise or disturbance resulting from Project activity. There will be increased traffic on the adjacent road as a result of Project activity. However, as part of the Project, Labec Century will contribute to the ongoing maintenance of the existing road leading to the cabins. This will improve the reliability of this road and improve access to this important component of Indigenous land use in the area. There are additional cabins near Astray Lake that have been associated with use by Innu residents of Matimekush-Lac John (Figure 19.10). These cabins are a minimum of 352 m from the rail loop infrastructure. Access to these cabins will be substantially improved by the presence of the road.

As noted in Chapter 18: Historic and Cultural Resources, the discovery of contemporary sites in the Howells River area, southwest of the LSA, appear to be associated with improved access from Schefferville, specifically along roads constructed to support mining exploration activities (McCaffrey 2004). Improved access resulting from highway and resource road construction was also discussed in the assessment of the Lower Churchill Project, where the construction of the Trans Labrador Highway is noted to have increased both the amount and intensity of land use (Minaskuat 2009). Given the distance of non-Indigenous communities from the LSA, it is not anticipated that increased access will result in increased competition for resources in the area.

Construction of the rail loop and associated infrastructure will have similar effects in terms of land disturbance and site access restrictions to the construction of roads. The effects on land and resource use will likely be primarily in the form of decreased opportunities to engage in resource harvesting activities in certain areas within the PDA, and a possible spatial redistribution of some resource harvesting activities as a result of both site access restrictions and increased activity. However, the area of disturbance related to the construction of the rail loop and associated infrastructure is relatively small (27 ha) and limited to the immediate vicinity.

During construction, Project-related environmental effects related to operation noise will be mitigated by well-established and proven measures. The mitigation measures will be selected in consultation with Indigenous groups. Noise effects are discussed in Chapter 10: Atmospheric Environment and Climate.

Project-related employment opportunities may result in some Indigenous persons choosing to spend more of their time engaged in wage employment and less time undertaking traditional land and resource use activities. This could affect the distribution of activity in regards to its timing, as periods of considerable Project-related activity may result in a re-scheduling of traditional land and resource use activities. The spatial distribution of activity may change in two ways: Indigenous persons employed by the Project may choose to fish and hunt in areas closer to the local communities and PDA (as their time available to travel for hunting or fishing may be more limited), or they may pursue traditional resource-harvesting activities at more distant locations as a result of the income earned through Project-related work, which can allow for purchase of better equipment and the chartering of planes. As noted in Section 19.5.3.2, salaries earned from previous projects in the area are noted to have facilitated hunting across a broader area made some of these practices possible (Hammond 1976).

The Project will operate on a rotational work schedule. As a result, the adverse effects of employment, such as reduced opportunity, may be reduced and the positive elements of the effects can be optimized.

While Project construction will interact with, and in some cases have a potentially adverse effect on, the location, timing, and/or intensity of the Current Use of Land and Resources for Traditional Purposes by Indigenous Persons, it is unlikely that these activities will result in an adverse effect on the overall activity distribution. As discussed above, the habitat disturbance for key species is low relative to the overall habitat in both the LSA and RSA. In addition, construction of new access roads and maintenance of existing roads will have a positive effect in that it will improve access to areas that have been defined as areas of intense use (Iron Arm and Astray Lake).

Finally, much of the local site disturbance related to Project construction is on the Joyce Lake peninsula, which Indigenous groups in the area have identified as an area that they do not typically use due to the lack of fish in Joyce Lake and the difficulty in accessing the area. Therefore, activities on the peninsula are not likely to affect the overall quality and value of the experience.

19.6.2 Operation and Maintenance

Although there will not be any substantial, additional land disturbance or access restrictions with respect to the operation and maintenance phase of the Project, many of the access restrictions implemented during the construction phase will remain in place. Therefore, potential implications for Indigenous land and resource use are likely to be a continuation of those experienced during the Construction phase. Relevant mitigation measures put in place during the Construction phase will continue throughout operations. Mining operations will be far removed from the areas of core use identified in the LSA and RSA. As a result, aesthetics should not be an issue during operations.

The presence of the causeway during operation will not interact with fishing activity and associated navigation. In order to maintain navigability, causeway design includes two free-span sections that are 4 m wide and 2.7 m above the high water mark. While the causeway should not interfere with these activities directly, Indigenous land users in the area may avoid the area due to noise and fear of vehicle collisions. As during construction, Project-related environmental effects related to operation noise will be mitigated with well-established and proven mitigation measures. Mitigation measures will be selected in consultation with Indigenous groups. Noise effects are discussed in Chapter 10: Atmospheric Environment and Climate.

Both open pit mining and the subsequent dewatering of Joyce Lake have the potential to affect the location and timing of land and resource use activities. However, as noted previously, the Joyce Lake peninsula has not been identified as an area of use. The operations phase of the Project will also result in other types of disturbances, such as atmospheric disturbances, particularly noise and dust. Analyses of the atmospheric effects of the Project have also indicated that these emissions and associated disturbances will have a limited geographic zone of influence (WSP 2014). These analyses are provided in Chapter 10: Atmospheric Environment and Climate.

The treatment of water, including mine water and surface runoff and discharge, has the potential to have an adverse effect on water quality, and fish and fish habitat. Areas where there will be discharges include the waste rock and overburden stockpiles (Figures 2.2 to 2.5), and diversion ditches that will capture runoff from roads and other infrastructure. A settling pond system will be used to ensure that all discharges meet water quality standards. Project-related discharges will be subject to regular monitoring and testing. As a result of treatment, discharges will not have a direct adverse effect on Indigenous land and resource use. However, because of Project activity and discharges, there may be a presumption that the water in the area is tainted, which may result in the perception that quality of fish and other resources (i.e., waterfowl) has been affected.

As with the construction phase, employment opportunities throughout operations may result in some Indigenous persons choosing to spend more of their time working to earn wages and less time engaged in traditional land and resource use activities. The effects of wage employment on Indigenous land and resource use are as discussed under construction phase effects.

19.6.3 Mitigation of Project Environmental Effects

Mitigation related to the monitoring and treatment of discharges and effluents related to the Project, are discussed in Chapter 2: Project Description. VC-specific mitigation is discussed in the following chapters of this assessment.

- Chapter 10: Atmospheric Environment and Climate;
- Chapter 11: Water Resources;
- Chapter 15: Fish and Fish Habitat; and
- Chapter 16: Birds, Wildlife and their Habitats.

The participation of affected Indigenous communities in effects monitoring and the ongoing communication of the results can reduce perceptions of contamination and reduce the loss of confidence in the quality of environment and, subsequently reduce the effects on the distribution of the activity. This is particularly true with respect to areas such as Attikamagen Lake and Iron Arm, which are areas of relatively intense use and which contain discharge points for the Project.

A number of mitigation measures will be implemented to avoid or reduce adverse effects of the Project on Indigenous land and resource use activities. Rotational work schedules will be used to provide maximum flexibility for Indigenous employees who work for the Project, but still wish to participate in traditional land and resource use activities. This will also benefit any Indigenous employees who have homes outside the RSA, such as in Western Labrador or Happy Valley-Goose Bay, and who wish to continue to take advantage of land and resource use opportunities near their communities or in other traditional locations.

All mine employees who are staying in camp will be prohibited from engaging in consumptive land and resource use activities. This will be controlled by prohibitions on bringing fishing gear into camp. Indigenous Residents of nearby communities who commute to the Project will be allowed to engage in these activities during non-working hours and the rotational work schedule will facilitate their use of the area during non-work hours.

Mitigation with a direct relationship to land and resource use have been discussed here, however a complete list of mitigation and commitments can be found in Chapter 25: Commitments.

19.6.4 Characterization of Residual Project Environmental Effects

In general, any Project components or activities that have the potential to restrict access, result in the disturbance of habitat, interact with or restrict access to fish habitat, or result in emissions to the atmospheric aquatic or terrestrial environments, have the potential to directly or indirectly affect the location, timing, and/or intensity of land and resource use activities. While the Project is in an area of relatively high use by the Indigenous groups in nearest proximity, the overall magnitude of the habitat disturbance is low in the context of overall habitat in both the LSA and RSA. Much of the disturbance related to the Project is limited to the Joyce Lake Peninsula, which consultation determined is not an area that was typically used by groups in the vicinity.

Changes in access within the LSA as a result of construction and operations will be both adverse and positive, with both access restrictions and increased access as a result of Project activities. The Project footprint and associated site disturbance will also result in the alteration of the landscape within the LSA, and could subsequently alter the perceived value of the area for land and resource use activities.

Residual environmental effects resulting from decommissioning and reclamation will be both positive and adverse. Although there will be continued restrictions in access during decommissioning and reclamation activities, the goal of this phase is to prepare the environment to return to a pre-Project state, including restoration of habitat specific to a pre-Project state.

Labec Century will continue to consult with relevant Indigenous communities and organizations in Labrador and Québec through established and/or informal engagement processes. This will include ongoing Project updates and the provision of a forum which will include the establishment of a mechanism to identify and address issues on an ongoing basis.

19.6.5 Summary of Project Residual Effects

With mitigation in place, the residual effects on Current Use of Land and Resources for Traditional Purposes will be of low magnitude, short-term, reversible, and limited to the LSA. During construction, the effect will be continuous. During operations, the effect will be of moderate magnitude, continuous, medium term in duration, and limited to the LSA. Effects resulting from changes in access will be both positive and adverse throughout both construction and operation.

The level of confidence in the predictions for Project-related residual effects on Current Use of Land and Resources for Traditional Purposes is high, based upon the experience of the assessment team, the understanding of current baseline conditions, the level and nature of the described interaction, and the known effectiveness of mitigation measures.

A summary of residual environmental effects is provided in Table 19.7.

19.7 Assessment of Cumulative Environmental Effects

Traditional land and resource use is an integral element of culture and society for the Indigenous people and communities of Labrador and Québec. The nature, intensity and distribution of traditional land and resource use in the region have been affected by the settlement of Indigenous people into communities and the associated lifestyle changes. The development and subsequent cessation of mining activities in the RSA throughout the last half of the 20th century has also been a factor in the development of land and resource use patterns in the area.

A summary of interactions resulting from other projects and activities with Current Use of Land and Resources for Traditional Purposes by Indigenous Persons is presented in Table 19.8.

19.7.1 Interactions Rated as 0

The following projects are rated as 0 for cumulative effects:

- Champion Iron Ltd. Kami Iron Ore;
- Champion Iron Ltd. Fire Lake North Iron Ore Project;
- IOC Labrador Operation (Carol Mining Project);
- Tacora Resources Inc. Scully Mine;
- Arcelor-Mittal Mont Wright Mine;
- Champion Iron Ltd. Bloom Lake Mine and Rail Spur;

Table 19.7 Summary of Residual Environmental Effects

Project Phase	Mitigation/Compensation Measures	Residual Environmental Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context	Significance	Prediction Confidence	
Change in Activity Distribution (Location, Timing, and/or Intensity)											
Construction	• Improve access, rotational work schedule	A/P	L	LSA	ST	C	R	U	N	H	Ongoing consultation and engagement to determine if effects predictions are accurate and if additional mitigation is necessary.
Operation and Maintenance		A/P	L	LSA	MT	C	R	U	N	H	
Closure and Decommissioning	• Rehabilitate to baseline habitat	P	L	PDA	ST	C	I	U	N	M	

KEY

Direction:
P Positive.
A Adverse.
N Neutral.

Magnitude:
N Negligible: Affects a negligible number of Indigenous land and resource users;
L Low: Affects a small number of Indigenous land and resource users
M Moderate: Affects less than the majority of Indigenous land and resource users for one or more activities.
H High: Affects the majority of Indigenous land and resource users across multiple activities.

Geographic Extent:
S Site-specific: effects are restricted to the PDA.
L Local: effects extend beyond the PDA into other portions of the LSA.
R Regional: effects extend beyond the LSA into other portions of the RSA.

Duration:
Quantitative measure; or
ST Short-term.
MT Medium-term.
LT Long-term.
P Permanent – will not change back to original condition.

Frequency:
O Once: Effect occurs occasionallyduring the life of the Project (e.g., preparation / clearing).
S Sporadic: Effect occurs sporadically, at irregular intervals, without any predictable pattern during the life of the Project.
R Regular: Effect occurs on a regular basis and at regular intervals during the life of the Project.
C Continuous.
U Unlikely to occur

Reversibility:
R Reversible.
I Irreversible.

Environmental or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Disturbed: Area has been substantially previously disturbed by human development (e.g., urban setting) or human development is still present.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis, and effectiveness of mitigation or effects management measure
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

N/ANot Applicable.

Table 19.8 Potential Cumulative Environmental Effects

Other Projects and Activities with the Potential for Cumulative Environmental Effects	Change in Activity Distribution
Champion Iron Ltd. Kami Iron Ore	0
Arcelor-Mittal Mont Wright Mine	0
Champion Iron Ltd. Fire Lake North Iron Ore Project	0
Tacora Resources Inc. Scully Mine	0
Champion Iron Ltd. Bloom Lake Mine and Rail Spur	0
IOC Labrador Operation (Carol Mining Project)	0
Labrador Iron Mines (LIM) Houston 1&2	2
Tata Steel Minerals Canada (TSMC) DSO Iron Ore Project	2
Lower Churchill Hydroelectric Generation Project	0
Maritime Transmission Link Project	0

- Lower Churchill Hydroelectric Generation Project; and
- Maritime Transmission Link Project.

Project residual effects are limited to the LSA. As a result, there is no spatial overlap with the projects noted above. There is no interaction and Project environmental effects do not act cumulatively with those other projects and activities.

19.7.2 Interactions Rated as 2

Due to their proximity to the Project and to the Indigenous communities identified as the most frequent users of the RSA, LIM's Houston 1&2, and the TSMC DSO Iron Ore Project have been rated as 2.

19.7.3 Summary of Cumulative Environmental Effects

19.7.3.1 Change in Activity Distribution (Location, Timing, and/or Intensity)

LIM's Houston 1&2, and the TSMC DSO Iron Ore Project are in the vicinity of the Project and both have resulted in ground disturbance and access limitations that could have an effect on the distribution of activities.

Both projects also draw from Indigenous communities for their work force. As with the Project, project-related employment opportunities may result in some Indigenous persons choosing to spend more of their time engaged in wage employment and less time engaged in traditional land and resource use activities. This could affect the distribution of activity in regards to timing, as periods of considerable Project-related activity may result in a re-scheduling of traditional land and resource use activities.

Indigenous persons employed by the Project may choose to fish and hunt in areas closer to the local communities and PDA (as their time available to travel for hunting or fishing may be more limited). Cumulatively, this could result in an increase in hunting in the vicinity of the Project and may affect the availability of resources in the area. However, an overall increase in employment may have broader community effects due to the pooling of resources available to engage in land and resource use at more distant locations as result of the income earned through Project-related work.

There is also potential for cumulative effects on wildlife resources in the area as a result of additional pressure on these resources and the overall loss of habitat in the RSA. This is discussed in more detail in Chapter 16: Birds, Wildlife and their Habitats.

19.7.3.2 Mitigation of Cumulative Environmental Effects

A rotational work force will be used to manage the effects of employment on land and resource use for the Project. A rotational work force provides the opportunity to balance between the benefits of wage employment and the opportunity to engage in land use activities. In particular, a rotational work force may enhance the ability of land and resource users to take advantage of the positive effects of wage employment, such as the ability to purchase higher quality equipment.

19.7.3.3 Characterization of Residual Cumulative Environmental Effects

The potential cumulative environmental effects for the Project are both adverse, but low in magnitude and short to medium term in duration.

19.8 Accidents and Malfunctions

Due to the nature of mining projects and other industrial developments, an accidental or unplanned event must be considered in the evaluation of potential environmental effects. The potential accidental events or malfunctions that may be associated with the Project and which are relevant to Indigenous land and resource use are:

- Forest Fire:
- Train Derailment;
- Hydrocarbon Spill;
- Settling/sedimentation Pond Overflow; and
- Premature or Permanent Shutdown.

19.8.1 Forest Fire

Although unlikely, Project activities involving the use of heat or flame could result in a fire. Fires can alter habitat and cause direct mortality for wildlife species, consume riparian vegetation, destabilize shore area soils, and lead to erosion and sedimentation events. The extent and duration of a fire would be dependent on response efforts and meteorological conditions.

19.8.1.1 Emergency Response/Mitigation of Environmental Effects

Fire suppression water systems will be maintained on site. The fire suppression water supply at the mine and processing sites will be extracted from wells and stored in a 200,000 L fire water tank prior to use. The fire suppression water at the rail loop will be extracted from Astray Lake. Staff will be trained to prevent and control fires. A plan for preventing and combating forest fires will be incorporated into the Emergency Response and Spill Response Plan.

The nearest district forest management unit office in Labrador is in Wabush, which has staff and equipment to provide initial suppression activities. The Town of Schefferville also provides fire control services. Labec Century is discussing a reciprocal response arrangement with the Town of Schefferville, approximately 20 km away from the site. In the event of a fire, the on-site response and proximity of fire suppression services in Schefferville will limit the size of any burn.

In the unlikely event of a large fire, local emergency response and fire-fighting capability will be called to respond to reduce the severity and extent of damage and to protect the safety of workers. The nearest district forest management unit office in Labrador is in Wabush, which has staff and equipment to provide initial suppression activities.

19.8.1.2 Characterization of Residual Environmental Effects

The effects of a forest fire on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are predicted to be adverse, because environmental effects could be have a high magnitude, affecting the majority of users in the area. Forest fires have the potential to alter the landscape and deplete forest and brush cover, thereby reducing or eliminating the distribution of traditionally harvested flora and fauna. It could also reduce the ability to travel on the land and result in loss of cabins. The magnitude and geographic extent of the environmental effect is largely dependent on the scale and intensity of the forest fire; extensive fires have the potential to affect a large number of users and activities, and may result in significant adverse residual environmental effects, if uncontrolled. Factors influencing the extent and duration of a resulting fire would be dependent on response efforts and meteorological conditions, and may also include time of year, type of fire, and degree of fuel loading. Reversibility of the physical effects of a fire is high, but would be anticipated to occur over a number of years. The restoration of important habitats would rely upon the re-establishment of vegetation communities through succession and the maintenance of those ecological conditions that existed prior to disturbance, and thus environmental effects on habitat may be of short to long duration. The likelihood of a forest fire occurring naturally is low; fire cycles in Labrador can exceed 400-500 years (Elson 2009). In the very unlikely case of a large, uncontrolled fire caused by project activities, significant effects on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons could occur. This prediction is made with a moderate level of confidence.

19.8.2 Train Derailment

A train derailment could lead to the sudden deposition of materials (e.g., iron ore product) or contaminants (such as diesel fuel) onto adjacent terrain. Deposition of contaminants may compromise habitat, as well as fish and animal health. Derailment may lead to restricted access in the area and potential avoidance due to fears of contaminated fish and/or wildlife. Avoidance would likely last far longer than the direct effects of the spill and as a result, the effects of a train derailment have the potential to be of moderate duration within the LSA and would be reversible.

Iron ore product will be transported by truck from the Project site to the Astray rail loop which connects directly to the Tshiuetin/QNS&L railway for transport to Sept-Îles. Diesel fuel will be transported by rail to Schefferville and then by contracted trucker to site. On average, iron ore will be transported on approximately four trains each week during summer months between the Astray rail loop and the Sept-Îles port. Each train set will carry approximately 24,000 tonnes of ore in 240 gondola cars. Based on the speed the train will be travelling in the rail loop (5 miles per hour or 8 km/h), the reasonable worst case is the derailment of a maximum of four to five cars. This could result in the iron ore being spilled onto the ground or at stream crossings. Such an event is highly unlikely.

It is estimated that diesel fuel transport frequency will be a maximum of six 96,000 L tank cars per week for all site purposes.

Fuel tank car numbers are based on shipment in standard 96,000 L tank cars similar to those already in fuel haulage service between Sept-Îles and Labrador City. In a reasonable worst case scenario (i.e., where six tanks of diesel fuel are de-railed), approximately 576,000 L (127,000 Imperial gallons) of diesel fuel could be released.

19.8.2.1 Emergency Response/Mitigation of Environmental Effects

The trains will be operated under current Tshiuetin/QNS&L environmental and safety procedures. A detailed Emergency Response and Spill Response Plan will also be developed by Labec Century. This plan will include measures such as:

- Immediate response through the use of absorbent booms and pads;
- Liquid clean up using a vacuum truck (both fuel and groundwater);
- Reclamation of contaminated soils, removal of contaminated soils and replacement with clean soil.

Additional mitigation measures to be implemented to limit the potential for a train derailment include:

- Manual inspection of rolling stock to confirm there are no problems with the wheels, couplers, carbody or brakes;
- Track inspections in accordance with Transport Canada regulations;
- Properly maintained equipment; and
- Fuel transport amounts will be limited to the amounts required by the Project.

To reduce the likelihood of such an event, emphasis will be placed on safety and accident prevention. Effective and rapid response procedures will be in place, in the unlikely event of a Train Derailment.

19.8.2.2 Characterization of Residual Environmental Effects

A train derailment may result in the deposition of hazardous materials and/or crushed and screened iron ore into surrounding lands. Such spills are usually highly localized and can be effectively cleaned up by on-site crews using standard equipment and spill response materials. The magnitude and duration of any environmental effect depends on a number of factors including the nature of material spilled, the quantity spilled, the location of the spill, and the time of year in which the incident occurs.

In the event of a materials spill, the principal environmental effect would consist of disruptions in access during clean-up operations, which may be managed by routine implementation of the Emergency Response and Spill Response Plan. The transportation of dangerous goods is strictly regulated in Newfoundland and Labrador, and across Canada, and the regulatory spill response system is a highly coordinated and effective means of dealing with such events. Track inspections (both manual and electronic) are carried out in accordance with Transport Canada regulations to identify track defects that could lead to derailment. With appropriate mitigation, the magnitude of the environmental effects attributable to these infrequent and unlikely accidents and malfunctions is likely to be low; under potentially worse case scenarios magnitude could be moderate. Reversibility of the environmental effects will depend on the specific habitat involved, and the proportion of habitat affected, and the potential for those habitats to be used by traditionally harvested species; but would be anticipated to occur naturally over a number of years. Significant effects on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are not anticipated; this prediction is made with a high level of confidence.

19.8.3 Settling/Sedimentation Pond Overflow

Settling/sedimentation ponds will be established at waste rock, overburden, run-of-mine stockpile areas, at the crushing and screening plant area, at the accommodation camp area, and at the rail loop. Run-off from the stockpiles and site run-off will be directed to the settling/sedimentation ponds prior to discharge to the receiving environment. The likelihood of an overflow is low because the ponds will be designed to contain run-off associated with a 1:100 year precipitation event. In such an event, settling/sedimentation ponds could overflow, releasing untreated water. Untreated water could have elevated levels of total suspended solids. No other contaminants are anticipated.

19.8.3.1 Emergency Response/Mitigation of Environmental Effects

In the unlikely event of an overflow, contingency plans will be in place as part of the Emergency Response and Spill Response Plan to mitigate environmental effects to the receiving environment. Water sampling of TSS and other MMER parameters will be conducted in downstream water bodies. Applicable stakeholders, including regulatory agencies, First Nations and communities, will be consulted to discuss such events and mitigation measures to be implemented.

Measures to mitigate such an event include regular inspections of water levels in the settling ponds as part of a site-wide infrastructure monitoring program. The capacity of settling ponds will be maintained by periodically removing settled solids for disposal as per permit conditions as part of water management infrastructure maintenance program.

19.8.3.2 Characterization of Residual Environmental Effects

Settling/sedimentation pond overflow could result in the release of sediment and/or debris downstream.

The Emergency Response and Spill Response Plan will address emergency preparedness measures necessary to provide effective response in the unlikely event of a settling/sedimentation pond overflow. The magnitude of adverse residual environmental effects of a settling/ sedimentation pond overflow is largely dependent on the volume released, but anticipated to be low following implementation of mitigation and emergency response measures. In the unlikely event of an overflow, environmental effects are anticipated to be short- to long-term in duration and reversible over a number of years. Significant effects on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are not anticipated; this prediction is made with a high level of confidence.

19.8.4 Premature or Permanent Shutdown

As currently planned, the mine will have an operational production period of seven years, (following one year of construction) at which time decommissioning and rehabilitation will commence. However, should factors arise that result in the premature shutdown of the mine, regulatory requirements include provision for financial assurance from Labec Century.

19.8.4.1 Emergency Response/Mitigation of Environmental Effects

Rehabilitative measures may be implemented by the NL Minister of Natural Resources, in which case costs incurred by the Crown in implementing these measures may be recovered by drawing on the financial assurance provided by the proponent. Any required cost expenditures over and above the financial assurance provided would be considered debt by Labec Century to the Crown.

19.8.4.2 Characterization of Residual Environmental Effects

In the event of a premature or permanent shutdown, it is anticipated that adverse environmental effects would be low, under the assumption that rehabilitative measures would be realized following implementation by the Crown. Residual environmental effects would be site-specific, and short to long term duration for some habitats following site rehabilitation, or permanent for other habitats that may not return to pre-Project conditions (e.g., open pit). Significant effects on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are not anticipated; this prediction is made with a high level of confidence.

19.8.5 Summary of Residual Effects Resulting from Accidents and Malfunctions

A summary of residual environmental effects resulting from accidents and malfunctions is summarized in Table 19.9.

19.9 Determination of Significance of Residual Adverse Environmental Effects

19.9.1 Project Residual Environmental Effects

A significant adverse effect on the Current Use of Land and Resources for Traditional Purposes by Indigenous Persons is defined as one which will result in a change in the current spatial and temporal distribution and/or an overall decrease in activity levels by those Indigenous persons who currently undertake such activities within the RSA, resulting in a reduction in the overall value of such activities for the community over the long-term. With mitigation and environmental protection measures in place, the Project is not likely to result in an overall decrease in activity levels within the RSA. In some areas, land and resource use activities may be enhanced due to improved/increased access to key areas. As a result, the environmental effects of the Project on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are predicted to be not significant.

19.9.2 Cumulative Environmental Effects

The cumulative environmental effects resulting from the Project on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are predicted to be not significant for all phases. The potential cumulative effects are limited to those related to employment and these effects will be managed through the use of a rotational work force. There is also a cumulative loss of area available for resource use as a result of the combined effects of project footprints. Finally, there is a cumulative increase in access due to the construction of new roads. However, with mitigation in place and based on the limited overlap between projects, the cumulative effects of the Project on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are predicted to be not significant.

19.9.3 Accidents and Malfunctions

The residual adverse environmental effect on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons resulting from accidental events (forest fire, hydrocarbon spill, settling/sedimentation pond overflow, and train derailment) are low to moderate in magnitude, short to long-term in duration and limited in geographical extent. These effects will be mitigated through the implementation of the EPP and associated management plans. As a result, residual adverse environmental effects resulting from accidents and malfunctions are not significant.

Table 19.9 Summary of Residual Environmental Effects – Accidents and Malfunctions

Project Phase	Emergency Response/Contingency Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context			
Forest Fire	Emergency Response and Spill Response Plan	A	H	S/R	ST/LT	U	R	U	N/S	M	Ongoing engagement with Indigenous communities and organizations. Monitor success of response measures.
Hydrocarbon spill	Emergency Response and Spill Response Plan and Containment Design	A	M	L	ST/MT	U	R	U	N	H	Ongoing engagement with Indigenous communities and organizations. Monitor success of response measures.
Train Derailment	Emergency Response and Spill Response Plan	A	L/M	S	ST/MT	U	R	U	N	H	Ongoing engagement with Indigenous communities and organizations.. Monitor success of response measures.
Settling/Sedimentation Pond Overflow	Emergency Response and Spill Response Plan and Containment Design	A	M	S/L	ST	U	R	U	N	H	Ongoing engagement with Indigenous communities and organizations. Monitor success of response measures.
Premature/Permanent Shutdown	Work with NLDNR to implement rehabilitative measures.	N	N	S	ST/P	U	R/I	U	N	H	

Table 19.9 Summary of Residual Environmental Effects – Accidents and Malfunctions

Project Phase	Emergency Response/Contingency Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context			

Key:

Direction:
P Positive,
A Adverse,
N Neutral

Magnitude:
L Low,
M Moderate,
H High

Geographic Extent:
S Site-specific: environmental effect confined to the PDA.
L Local: environmental effect extends into the LSA.
R Regional: environmental effect extends into the RSA, where indirect or cumulative environmental effects may occur.

Reversibility:
R Reversible: effect is reversible following closure and reclamation
I Irreversible: residual environmental effect is permanent (i.e., remains indefinitely as a residual effect).

Duration:
ST Short-term: residual environmental effect occurs during the Construction phase (i.e., one year)
MT Medium-term: residual environmental effect extends through the Operations and Maintenance phase (i.e., up to seven years)
LT Long-term: residual environmental effect is greater than seven years
P Permanent: measurable parameter unlikely to recover to baseline

Frequency:
Quantitative measure; or
O Once per month or less.
S Occurs sporadically at irregular intervals.
R Occurs on a regular basis and at regular intervals.
C Continuous.
U Unlikely to occur

Environmental or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Disturbed: Area has been substantially previously disturbed by human development or human development is still present.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis, and effectiveness of mitigation or effects management measure
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

19.10 Follow-up and Monitoring

Consultation with affected Indigenous groups will continue throughout the Project to monitor the effects of the Project on Indigenous land and resource use and verify the predictions of the assessment. This will include the establishment of a mechanism to address issues that may arise as a result of Project activities and the implementation of additional mitigation as necessary. Of particular importance, given the relative proximity of Project infrastructure, will be ongoing engagement of the cabin owners on Iron Arm. Labec Century will also consult with Indigenous employees to determine the effects of Project employment on land and resource use activities.

19.11 Summary

A number of Labrador and Québec Indigenous communities and organizations claim Indigenous rights and/or title to areas of Labrador and Québec (Figures 19.1 to 19.4), including lands where Project components and activities will take place. These land claims, as well as Indigenous treaty rights, are discussed in Chapter 8: Potential or Established Indigenous Treaty Rights and Related Interests, and Chapter 23: Adverse Impacts and Measures to Address Adverse Impacts on Potential or Established Indigenous Treaty Rights and Related Interests.

In ongoing consultation with Indigenous groups in the vicinity of the Project, Labec Century has identified several geographical areas of traditional land use that have the potential to interact with the Project. These areas are discussed in Section 19.5. Consultation activities related to this VC are also discussed Section 19.2.2, and more generally in Chapter 3: Engagement and Traditional Knowledge.

With mitigation and environmental protection measures in place, the Project is not likely to result in an overall decrease in activity levels within the RSA. In some areas, land and resource use activities may be enhanced due to improved/increased access to key areas. As a result, the environmental effects of the Project on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are predicted to be not significant.

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Chapter 20:

Other Contemporary Use of Lands and Resource

File No. 121416571

Date: May 2021

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20.0 ENVIRONMENTAL ASSESSMENT – CONTEMPORARY LAND AND RESOURCE USE BY NON-INDIGENOUS GROUPS

As detailed in chapter 1, Joyce Direct Iron Inc. succeeded Labec Century Iron Ore Inc. ("Labec Century") as the Project Proponent on February 18, 2021 following an internal reorganization. All references to Labec Century as the Project proponent may be interpreted as now referring to Joyce Direct Iron Inc.

20.1 VC Definition and rationale for Selection

Contemporary Use of Land and Resources by non-Indigenous people is defined as any land use or harvesting, including industrial uses, undertaken by non-Indigenous persons or communities in western Labrador and Schefferville, Québec. For the purposes of this VC, 'contemporary' refers to the period from 2000 to present. The purpose of this VC is to identify and describe contemporary use of land and resources by non-Indigenous people in western Labrador generally and, more specifically, for areas where the Project infrastructure will be situated and where physical disturbance resulting from the Project will occur. This VC was selected for environmental assessment to satisfy requirements under Section 4.22 of the Newfoundland and Labrador EIS Guidelines for the Project.

In ongoing consultations with non-Indigenous and Indigenous groups in the vicinity of the Project, Labec Century has not identified areas of non-Indigenous activities which overlap with the PDA. However, an environmental assessment of potential non-Indigenous industrial and recreational activities in the LSA and RSA of the Project has been conducted consistent with a precautionary approach. There are linkages between this VC and Chapter 19: Current Use of Land and Resources for Traditional Purposes by Indigenous Persons, and Chapter 18: Historic and Cultural Resources.

20.2 Scope of the Assessment

20.2.1 Regulatory Setting

Section 4.22 of the Newfoundland and Labrador EIS Guidelines for the Joyce Lake Direct Shipping Iron Ore Project required the environmental assessment process to include an assessment of the effects of the Project on other (i.e., non-Indigenous) contemporary use of land and resources within the Project property boundaries and along the right-of-way of associated infrastructure in Newfoundland and Labrador. The provincial Guidelines specifically required consideration of:

- Residential and Recreational Property;
- Outdoor Recreation and Tourism;
- Hunting, Trapping and Guiding;

- Forestry
- Mineral Exploration;
- Agriculture;
- Labrador Rail Transportation;
- Float Planes; and
- Communication Towers.

20.2.2 Influence of Consultation and Engagement on the Assessment

Discussions between Labec Century and stakeholders, including area Indigenous groups and regulatory agencies have been ongoing since 2012. Relevant issues for this VC have been summarized in Table 20.1.

Table 20.1 Issues Related to Contemporary Use of Land and Resources by Non-Indigenous People

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
No issues related to Contemporary Use of Land and Resources by Non-Indigenous People were raised during consultation. Issues related to wildlife are addressed in Chapter 16: Wildlife, Birds and their Habitats			

20.2.3 Temporal and Spatial Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Project on Contemporary Use of Land and Resources by non-Indigenous people include the project phases of Construction, Operation and Maintenance, and Closure and Decommissioning. The temporal boundary for Construction is one year (pre-operation), for Operation and Maintenance is approximately seven years, and for Closure and Decommissioning is approximately one year.

The spatial boundaries for the environmental effects assessment of Contemporary Use of Land and Resources by non-Indigenous people are defined below.

Project Development Area (PDA): The PDA is the area represented by the Project footprint as defined in Chapter 2: Project Description.

As per Section 4.22 of the Newfoundland and Labrador Environmental Impact Statement Guidelines for the Joyce Lake Direct Shipping Iron Ore Project, the spatial boundaries of the environmental assessment of the effects of the Project on Contemporary Use of Land and Resources by non-Indigenous people should include the Project property boundaries and the right-of-way of associated infrastructure in Newfoundland and Labrador. This area is interpreted in this chapter to include the PDA and the road and rail corridors for the Project in Newfoundland and Labrador.

Local Study Area (LSA): The LSA is defined as a larger area, centered on the PDA, that encompasses all planned Project components and activities and the potential "zones of influence" of Project-related disturbances. The LSA has been defined to encompass the PDA and adjacent areas where Project-related environmental effects may reasonably be expected to occur, through both the direct footprint of the Project as well as the likely geographic extent of the various other Project-related disturbances that may occur during construction and/or operations and eventual closure (such as noise, dust, visibility and others) (Figure 20.1).

Regional Study Area (RSA): The RSA includes the areas of other contemporary use of land and resources by non-Indigenous people to provide a regional context of land use patterns across western Labrador (Figure 20.2).

20.2.4 Selection of Environmental Effects and Measurable Parameters

There are no identified non-Indigenous uses (e.g., residential property, forestry, mineral exploration, agriculture, communication towers, or other similar industrial activities) within the Project property boundaries and along the right-of-way of associated infrastructure in Newfoundland and Labrador (see Section 5.5). The environmental effects assessment for Contemporary Use of Land and Resources by non-Indigenous people VC is focused on environmental effects related to potential recreational use (including fishing, hiking, hunting, and camping) by non-Indigenous people. The following environmental effects are therefore considered for the assessment of the Project on non-Indigenous land and resource use:

- Change in access for recreational purposes; and
- Change in level of activity/use for recreational purposes.

The environmental effects and associated measurable parameters, with rationale, are summarized in Table 20.2.

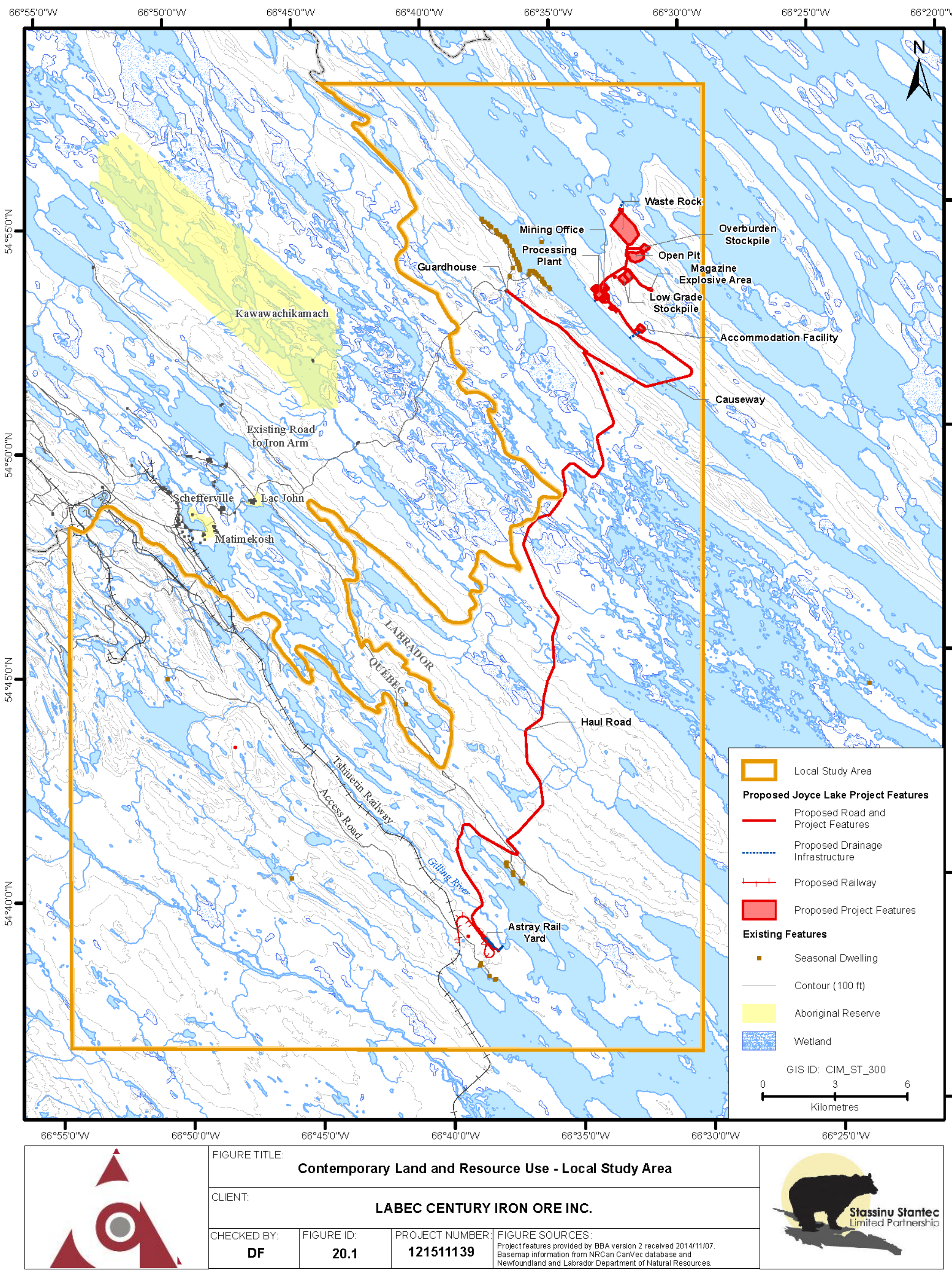

Figure 20.1 Contemporary Use of Land and Resources by Non-Indigenous People: Local Study Area

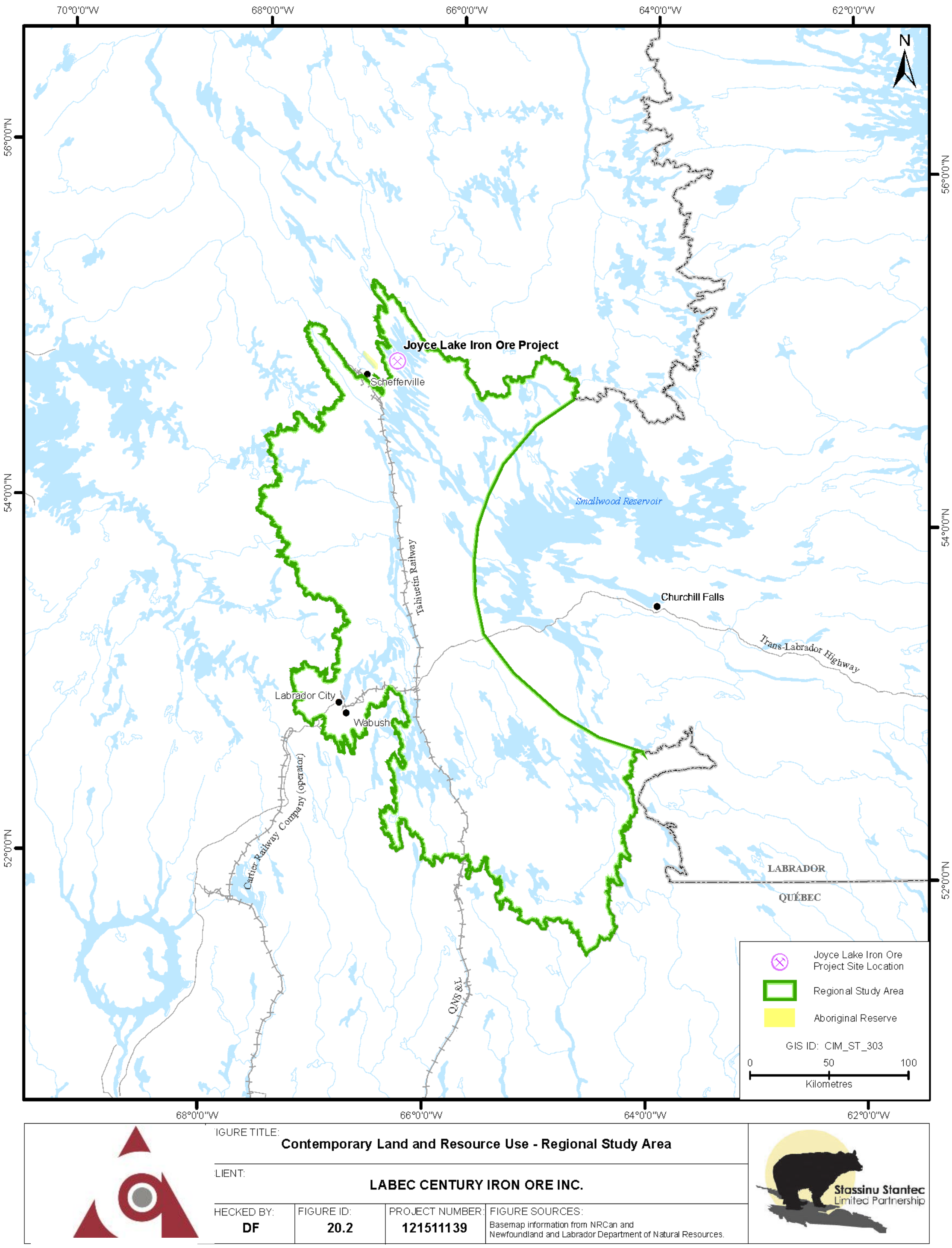

Figure 20.2 Contemporary Use of Land and Resources by Non-Indigenous People: Regional Study Area

Table 20.2 Measurable Parameters for Contemporary Use of Lands and Resources by Non-Indigenous People

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Access for recreational purposes	Measured by changes in access to waterbodies, snowmobile trails, hiking trails, outdoor recreational areas	The Project may affect access to areas for recreational activities by non-Indigenous people
Change in Level of Activity/Use for recreational purposes	Measured by changes in opportunity to conduct hunting, fishing, hiking and camping	The Project may affect the way non-Indigenous land users use areas for recreational purposes

20.3 Standards or Thresholds for Determining the Significance of Residual Environmental Effects

Terms that will be used to characterize residual environmental effects for Contemporary Use of Land and Resources by non-Indigenous people are:

- Direction:
- Neutral;
- Adverse; or
- Positive.
- Magnitude:
- Low (affects a small group of land and resource users)
- Moderate (affects less than the majority of land and resource users across multiple activities)
- High (affects the majority of land and resource users across multiple activities)
- Geographic Extent:
- Within the PDA;
- Within the LSA; or
- Within the RSA.
- Frequency:
- Not likely to occur;
- Occurs once;

- Occurs sporadically at irregular intervals;
- Occurs on a regular basis and at regular intervals; or
- Occurs continuously.
- Duration:
- Short Term (restricted to the Construction phase);
- Medium Term (continues through Operations and Maintenance phase);
- Long Term (16 to 50 years); or
- Permanent (measurable parameter unlikely to recover to baseline / existing conditions for generations).
- Reversibility:
- Reversible (the effect can be reversed to existing conditions); or
- Irreversible (the effect cannot be reversed).
- Ecological/Socio-economic Context:
- Undisturbed (area relatively or not adversely affected by human activity); or
- Disturbed (area has been substantially previously disturbed by human development or human development is still present).
- Prediction Confidence
- Low
- Moderate
- High

A significant adverse effect on Contemporary Use of Land and Resources by non-Indigenous people is defined as one where use of the land by the Project is not compatible with adjacent land use as designated through a regulatory land use process, or the Project results in wide restrictions or degrades land and resource use to a point where other activities, including recreation, cannot continue at or near contemporary levels within the RSA over the long term.

20.4 Potential Project-VC Interactions

Each Project activity and physical work is listed in Table 20.3, and each interaction rated as 0, 1, or 2 based on the level of interaction with the VC.

Table 20.3 Potential Project Environmental Effects to Contemporary Use of Land and Resources by Non-Indigenous People

Project Activities and Physical Works	Potential Environmental Effects	
	Change in Access for Recreational Purposes	Change in Level of Activity / Use for Recreational Purposes
Construction		
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	1	1
Construction of Roads	1	1
Construction of Causeway	1	1
Construction of Site Buildings and Associated Infrastructure	1	1
Construction of Rail Loop and Associated Infrastructure	1	1
Construction of Stream Crossings	0	0
Installation of Water Supply Infrastructure (wells, pumps, pipes)	0	0
On-site Vehicle/Equipment Operation	1	1
Waste Management	1	1
Transportation of Personnel and Goods to Site	1	1
Expenditures	0	0
Employment	0	0
Operation and Maintenance		
Maintenance of Causeway	1	1
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	1	1
Dewatering Joyce Lake	1	1
Ore Processing (including crushing, conveying, storage, grinding, screening)	1	1
Waste Rock Disposal on Surface	1	1
Water Treatment (including mine water and surface runoff) and Discharge	1	1
Rail Load-Out and Transport	1	1
On-site Vehicle/Equipment Operation and Maintenance	1	1
Waste Management	1	1
Transportation of Personnel and Goods to Site	1	1
Fuel Transport	1	1
Fuel Storage and Dispensing	1	1
Progressive Rehabilitation	1	1
Expenditures	0	0
Employment	0	0

Table 20.3 Potential Project Environmental Effects to Contemporary Use of Land and Resources by Non-Indigenous People

Project Activities and Physical Works	Potential Environmental Effects	
	Change in Access for Recreational Purposes	Change in Level of Activity / Use for Recreational Purposes
Closure and Decommissioning		
Site Decommissioning	1	1
Site Reclamation (building demolition, grading, scarifying)	1	1
Accidents and Malfunctions		
Hydrocarbon Spill	2	2
Train Derailment	2	2
Forest Fire	2	2
Settling/Sedimentation Pond Overflow	2	2
Premature or Permanent Shutdown	2	2

Key:
0 No interaction.
1 Interaction occurs; however, based on past experience, the resulting environmental effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.
2 Interaction occurs, and resulting environmental effect may exceed acceptable levels without implementation of specific mitigation. Further assessment is warranted.

The rating takes a precautionary approach, whereby interactions with a meaningful degree of uncertainty will be rated “2”.

20.4.1 Interactions Rated 0

Potential Project environmental effects on access to recreational areas and level of use for recreational purposes from expenditures and employment, construction of stream crossings, and installation of water supply infrastructure are assessed to be negligible and have been rated as 0.

20.4.2 Interactions Rated 1

Potential environmental effects on access to recreational areas and level of use for recreational purposes from other routine activities in the construction, operation and closure phases have been assessed to be manageable to acceptable levels through standard operating practices and through the application of best management practices, and have been rated as 1. For example, although, no prime recreational areas have been identified in the PDA, access to recreational areas in the LSA or RSA will not be inhibited by Project infrastructure. Potential Project effects (air and water quality) on the level of use of the LSA and RSA for recreational activities will be mitigated by implementing an EMP (Chapter 7).

20.4.3 Interactions Rated 2

Accidents and malfunctions such as hydrocarbon spills, train derailment, forest fire and settling pond overflow have the potential to cause adverse effects to valued components (air quality, water quality, wildlife habitat, fish and fish habitat) in the PDA, LSA and RSA that may exceed acceptable levels and result in changes to access to and level of use of the LSA and RSA for recreation purposes, and have been rated as 2 and further assessed in Section 20.6 below.

Even though non-Indigenous land uses, including recreational use, in the PDA and LSA are sparse or non-existent (as noted in Section 20.5) and interactions of Accidents and Malfunctions with these uses are highly unlikely, these events have been rated as 2 consistent with a precautionary approach.

20.5 Existing environment

20.5.1 Information Sources

The existing environment for Contemporary Use of Lands and Resources by non-Indigenous people was characterized through a review and analysis of government data, publicly available secondary source material, and consultation with communities in the RSA and other stakeholders.

The sources of information include:

- Statistics Canada and other agencies and departments of the Government of Canada;
- The Newfoundland and Labrador Statistics Agency, NLDOECC, and other agencies and departments of the Government of Newfoundland and Labrador;
- Institute de statistiques du Québec and other agencies and departments of the Government of Québec;
- Local service providers; and
- Municipal governments and local and regional authorities and boards.

While traditional knowledge pertaining specifically to Contemporary Use of Lands and Resources by non-Indigenous People was not identified, the traditional knowledge results identified in Chapter 3: Engagement and Traditional Knowledge have been considered and integrated throughout the assessment.

20.5.2 Baseline Conditions

Detailed information was gathered on a number of recreational, subsistence and commercial activities that occur in western Labrador including: cabin use, hunting, fishing, boating / water navigation; trapping (for commercial and recreational purposes); snowmobiling and skiing; wood harvesting (for firewood and saw-logs); berry-picking; birding and geo-caching; guiding; forestry; mineral exploration; agriculture, transportation; seaplane usage; communications towers; and municipal water supplies. This discussion focuses on Contemporary Use of Land and Resources by non-Indigenous people. A similar discussion of the existing environment for Contemporary Use of Land and Resources by Indigenous Groups is presented in Chapter 19.

20.5.2.1 Residential and Recreational Property

No cabins or recreational property belonging to, or occupied by, non-Indigenous people have been identified within the PDA; however, a number of cabins belonging to area Indigenous residents exist in the LSA (see Chapter 19 for details).

20.5.2.2 Outdoor Recreation and Tourism

No contemporary outdoor recreation and tourism activities (such as fishing, berry picking and plant harvesting, walking trails, recreation parks and beaches, snowmobiling trails, camping) by non-Indigenous people have been identified in the PDA; however, some of these activities may occur in the LSA or RSA (Chapter 19: Contemporary Use of Land and Resources by Indigenous Persons for Traditional Purposes). Many of the preferred locations for fishing and other tourism activities are located close to existing roads and travel corridors in the RSA, including the Trans Labrador Highway, which are far removed from the PDA.

20.5.2.3 Hunting, Trapping and Guiding

Hunting, trapping and guiding activities by non-Indigenous people have not been identified in the PDA; however, such activities occur in the LSA and RSA along waterways, wetlands, and in wooded areas, and is largely a recreational activity (see Chapter 19 for a discussion of contemporary land and resource use by Indigenous groups).

Hunting and trapping in Newfoundland and Labrador are regulated by the NLDFAA Wildlife Division in accordance with the *Wildlife Act* and regulations; whereas hunting of migratory birds is managed by CWS, which administers the MBCA, including the issuance of migratory game bird hunting permits (ECCC 2020). The Province also develops annual guides for hunting and trapping activities (NLDFFA 2020). Regulations governing hunting, fishing, and trapping in the Province include special provisions for non-resident hunting. The nearby community of Schefferville has an Indigenous population of approximately 50%. Other users require a non-resident hunting permit, as well as the services of a registered guide, to legally hunt in the LSA and RSA. Given the opportunities available to residents within the province of Québec, it is not considered likely that they would legally use the LSA or RSA.

For the Indigenous residents of Schefferville and Matimekush-Lac John, Clement (2009) noted increased use in the immediate area of the community. It is likely that this opportunistic activity would also apply to other residents.

20.5.2.4 Forestry

Currently, there are no commercial forestry operations in the PDA; however, some forestry-related activities occur in the RSA.

The Project is located within Forest Management District 22, which covers approximately 8 million hectares, making it the largest forest management district in Newfoundland and Labrador. The district contains only sporadic commercial forest stands, dominated by black spruce. While this forest district has not been used for large scale commercial harvesting, small scale commercial and subsistence harvesting have been carried out in the sections of the district overlapping with the RSA (NLDNR 2011)

20.5.2.5 Mineral Exploration

Other than ongoing iron ore exploration activities by Labec Century, there are no other mineral exploration activities in the PDA. However, there is mineral exploration and mining activities within the LSA and RSA, with most of these mining projects focused on iron ore deposits in the Labrador Trough (see Figure 20.2, Section 20.2.3).

20.5.2.6 Agriculture

There are no commercial agricultural activities identified within the PDA, LSA or RSA (Land Resource Stewardship Division 2004).

20.5.2.7 Labrador Rail Transportation

The QNS&L Railway, which overlaps with the LSA and RSA, was originally designed and constructed by IOC to move direct shipping ore from mines at Schefferville, Québec, to port facilities at Sept-Îles, Québec. The original main line was approximately 580 km (360 miles) long and was constructed between 1950 and 1954. The QNS&L Railway expanded in 1960 with the construction of an approximately 60 km (37-mile) branch from Ross Bay Junction to Labrador City. This line allowed QNS&L Railway to serve IOC's new Carol Lake Mine and the nearby Wabush Mine. The railway features a 0.4% ascending ruling grade for loaded train movements. The low grade profile allowed QNS&L Railway to operate the heaviest regular freight trains in North America when first opened and continues to do so.

The current single track main line of the QNS&L Railway stretches approximately 418 km (260 miles) between Sept Iles, Ross Bay Junction and Labrador City. The approximately 212 km (132-mile) portion of the original QNS&L main line between Ross Bay Junction and Schefferville was sold to Tshiuetin Rail Transportation in 2005. Tshiuetin Rail Transportation is jointly owned by three First Nations Groups including:

- Innu Takuaikan Uashat Mak Mani-Utenam;
- Naskapi Nation of Kawawachikamach; and
- Nation Innu Matimekush-Lac John.

The Tshiuetin Rail Transportation maintains an interchange for all types of freight traffic with the QNS&L Railway at Ross Bay Junction.

The QNS&L Railway is considered a federally regulated railway because it crosses a provincial boundary. Federally regulated railways are governed by the provisions of the *Canada Transportation Act* (the Act), which is administered by the Canada Transportation Agency. QNS&L Railway provides a number of services for multiple clients as a result of its obligations under the Act including:

- Unit train service for IOC;
- Unit train service for Tacora Resources Inc.;
- Unit train service for Champion Iron Limited;
- Passenger train service for Tshiuetin Rail Transportation between Sept-Iles and Ross Bay Junction;
- General freight/supply and maintenance train service operated by QNS&L Railway; and
- Unit train service for Tata Steel Minerals Canada Ltd.

QNS&L Railway is wholly owned by IOC. IOC is majority owned (59%) by Rio Tinto, with minority owners Mitsubishi Corporation and the Labrador Iron Ore Royalty Income Fund.

20.5.2.8 Float Planes

There are no float plane marinas in the PDA and no identified use of the PDA by floatplanes. Although infrastructure for float planes exist in the RSA, the number of planes using these facilities has not been confirmed.

Given the varied nature of land use activities that occur within the RSA (i.e., hunting, fishing, and mineral exploration), it is likely that waterbodies in the RSA are used by float planes occasionally.

20.5.2.9 Communication Towers

There are no communication towers within the PDA; however, communication towers exist in the RSA.

20.6 Assessment of Project related Environmental Effects

Effects assessment was completed for all interactions rated as “1” in Table 20.3. There are no significant effects as a result of the Project. A summary of Project effects is presented in Table 20.4.

20.7 Assessment of Cumulative Environmental Effects

Environmental effects on Other Contemporary Use of Land and Resources will be limited to the LSA. Other contemporary use of land and resources, including similar mining projects, occur in the RSA (see Figure 20.2), and there are many locations for non-Indigenous people to pursue recreational activities outside of the area affected by the Project and other similar projects and activities in the RSA. Because of the localized nature of environmental effects on Other Contemporary Use of Land and Resources, the mitigation measures that will be implemented for the Project and other similar mining projects in the RSA, and regulatory control over activities such as hunting, fishing, and wood harvesting, it is unlikely that the cumulative effects of the Project in combination with other projects and activities would result in changes so that the levels and distribution of Contemporary Use of Land and Resources, including recreational activities, by non-Indigenous people, could not continue at current levels within the RSA over the long-term.

20.8 Accidents and Malfunctions

The potential Project-related environmental effects from Accidents and Malfunctions are the only interactions with Contemporary Use of Land and Resources by non-Indigenous people that have been rated as “2” in Table 20.3. The detailed effects assessment in this subsection is therefore focused on these interactions.

Accidental events as a result of the Project are unlikely, as Labec Century has developed mitigation measures to reduce their likelihood. Should an accidental event occur, Labec Century’s response measures will avoid or reduce effects of such events on Contemporary Use of Land and Resources by non-Indigenous people. An ERP will be developed to address potential incidents that could occur during Project Construction, Operation and Closure activities. The ERP for the Project is discussed in Chapter 7: Environmental Management.

Table 20.4 Summary of Residual Environmental Effects

Project Phase	Mitigation/Compensation Measures	Residual Environmental Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context	Significance	Prediction Confidence	
Construction	• Implement Environmental Management Plan	N	L	S	ST	U	R	U	N	H	
Operation and Maintenance	• Implement Environmental Management Plan	N	L	S	ST	U	R	U	N	H	
Closure and Decommissioning	• Implement Environmental Management Plan	N	L	S	ST	U	R	U	N	H	

Key:

Direction:
P Positive.
A Adverse.
N Neutral.

Magnitude:
N Negligible: Affects a negligible number of non-Indigenous land and resource users;
L Low: Affects a small number of non-Indigenous land and resource users
M Moderate: Affects less than the majority of non-Indigenous land and resource users for one or more activities.
H High: Affects the majority of non-Indigenous land and resource users across multiple activities.

Geographic Extent:
S Site-specific: effects are restricted to the PDA.
L Local: effects extend beyond the PDA into other portions of the LSA.
R Regional: effects extend beyond the LSA into other portions of the RSA.

Duration:
Quantitative measure; or
ST Short-term.
MT Medium-term.
LT Long-term.
P Permanent – will not change back to original condition.

Frequency:
O Once: Effect occurs occasionally during the life of the Project (e.g., preparation / clearing).
S Sporadic: Effect occurs sporadically, at irregular intervals, without any predictable pattern during the life of the Project.
R Regular: Effect occurs on a regular basis and at regular intervals during the life of the Project.
C Continuous.
U Unlikely to occur

Reversibility:
R Reversible.
I Irreversible.

Environmental or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Disturbed: Area has been substantially previously disturbed by human development (e.g., urban setting) or human development is still present.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis, and effectiveness of mitigation or effects management measure
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

N/A Not Applicable.

20.8.1 Hydrocarbon Spill

Fuel storage on the site will include diesel and fuel oil tanks located at the rail unloading area, near the diesel generators at the mine site, and the process plant area. The maximum total storage capacity for diesel fuel will be 250,000 L. The fuel storage tanks will be located in secondary containment to control spills and will comply with requirements of the applicable provincial and federal acts and regulations, as well as the conditions of the permit and authorizations. The control measures will be able to contain the maximum capacity of all tanks in a storage area.

Potential fuel spills could occur at either the storage areas or during transportation from Schefferville to the mine site. Spills at the storage sites have varying degrees of potential impact to fish and fish habitat. The storage area at the railyard will have secondary containment and is also surrounded by a surface water collection system. Fuel storage at all other locations will similarly have additional secondary containment as well as a water collection system and settling pond.

Fuel will be transported to the various storage sites within the PDA by contractor truck from Schefferville. During transportation of fuel along the existing service and site roads there is potential for the complete loss of fuel directly into a watercourse or Iron Arm. This accident was deemed to be of lower consequence than a spill occurring during rail transportation. The mitigation and characterization of residual effects for these two scenarios is similarly applicable to both.

A worst case scenario for fuel storage is the entire capacity of the six railcars or of any single storage area being released. Based on the volume, characteristics and location of the storage areas, a spill of up to 50,000 L at the Astray Railyard is likely the worst case as the location is 300 m from known fish habitat within the Gilling River and is also directly upstream of Astray Lake.

20.8.1.1 Emergency Response/Mitigation of Environmental Effects

The main mitigation measures for a hydrocarbon spill relate to prevention and rapid and effective cleanup. As part of the Emergency Response and Spill Response Plan, spill prevention and response protocols will include the inspection of vehicles and hydraulics on a daily basis for leaks or damage that could cause minor spills and rapid spill response. Vehicles and equipment will be stored in controlled areas where secondary containment of spills can be provided. Staff will be trained in the handling of emergency response and spill scenarios. Response equipment stored on site will include containment and absorbent booms, pads, barriers, sand bags, and skimmers, as well as natural and synthetic sorbent materials.

20.8.1.2 Characterization of Residual Environmental Effects

The worst case scenario would be the discharge of 50,000 L of diesel fuel at the Astray rail yard. To reach fish habitat the spill would need to breach the double-walled tank with built in containment, the additional secondary containment, collect in and exceed the capacity of the surface water collection system and settling pond, and then flow 300 m down an engineered spillway into the Gilling River. Diesel fuel reaching the Gilling River would have direct environmental effects on the river and likely Astray Lake.

20.8.1.3 Emergency Response/Mitigation of Environmental Effects

The Project infrastructure is entirely within Labrador; since the Labrador/Québec border in this area is a drainage divide, it is not likely that a hydrocarbon or fuel spill will contaminate the water supplies of the Québec communities. Similarly, such a spill would not likely affect the water supplies in western Labrador due to the distance of the Project from these communities. Diesel and fuel storage tanks will be designed to mitigate and reduce the probability of accidents and malfunctions. The fuel storage tanks will be located in secondary containment to control spills and will comply with requirements of the applicable provincial and federal regulations and guidelines, and the conditions of the permits and authorizations.

As part of the EMP and ERP, spill prevention and response protocols will include the daily inspection of vehicles and hydraulics for leaks or damage that could cause minor spills and rapid spill response. Vehicles and equipment will be stored in controlled areas where containment of spills can be provided. An appropriate number of staff will be trained in the handling of emergency response and spill scenarios. Response equipment stored on site will include containment and absorbent booms, pads, barriers, sand bags, and skimmers, as well as natural and synthetic absorbent materials. The ERP will include designated persons responsible for managing spill response efforts, including their authority, role and contact details, and a description of steps to be taken to immediately contain and recover spills. In the event of a spill, hydrocarbon-saturated soil will be removed for temporary storage, and eventual treatment/disposal.

20.8.1.4 Characterization of Residual Environmental Effects

A fuel spill may limit access to and level of use of recreational areas in the LSA for a small group of non-Indigenous groups over the short-term (i.e., restricted to duration of the Construction phase [one year]). However, with the implementation of spill measures as noted above to remediate soils, any effects will be localized and reversible. A summary of the characterization of residual environmental effects from hydrocarbon spills is presented in Table 20.4.

20.8.2 Train Derailment

20.8.2.1 Emergency Response/Mitigation of Environmental Effects

Train derailment could cause damage to community infrastructure (including railway and nearby roads) and biophysical valued components (water bodies, vegetation, wildlife and wildlife habitat and soil). The recovery initiatives would include the repair or reconstruction of a wide range of infrastructure and could last for an extended period. A train derailment would not contaminate the local water supply of RSA communities due to the existence of a drainage divide between Labrador and Québec and the distance of the railway from the water supplies of the Western

Labrador communities. However, in the event of an accident at the Project site or in transit, emergency response procedures will be implemented.

A detailed ERP will be developed by Labec Century and will contain specific measures related to train derailment and hydrocarbon spill response. Response measures to recover lost fuel and iron ore product include:

- Immediate response through use of absorbent booms and pads;
- Liquids cleanup by use of vacuum truck, if available. This process can be used to capture both fuels and groundwater near the site for removal and disposal;
- Removal of the iron ore product from the site of the train derailment, if practicable; and
- Physical reclamation of contaminated soils; removal of contaminated soil and replacement with clean soil.

Other mitigation measures to prevent such an accident and reduce effects on Contemporary Use of Land and Resources by non-Indigenous people include the following:

- Manual inspection of rolling stock will be undertaken before trains are loaded at the rail loop at the mine site, to confirm there are no problems with wheels, couplers, carbody, or brakes. Defective equipment will be removed from the train and kept out of service until repaired;
- Track inspections (both manual and electronic) will be carried out in accordance with Transport Canada regulations to identify track defects that could lead to derailment; and
- Fuel will be transported along the rail line to the rail loop at the Project site. The volume of fuel will be limited to the quantities necessary to supply the needs of the mine vehicles and boilers.

To reduce the likelihood of such an event, emphasis will be placed on safety and accident prevention. Effective and rapid response procedures will be in place, in the unlikely event of a train derailment.

20.8.2.2 Characterization of Residual Environmental Effects

A train derailment may result in the deposition of hazardous materials and/or crushed and screened iron ore into surrounding lands. Such spills are usually highly localized and can be effectively cleaned up by on-site crews using standard equipment and spill response materials. The magnitude and duration of any environmental effect depends on a number of factors including the nature of material spilled, the quantity spilled, the location of the spill, and the time of year in which the incident occurs.

In the event of a materials spill, the principal environmental effect would consist of disruptions in access during clean-up operations, which may be managed by routine implementation of the Emergency Response and Spill Response Plan. The transportation of dangerous goods is strictly regulated in Newfoundland and Labrador, and across Canada, and the regulatory spill response system is a highly coordinated and effective means of dealing with such events. Track inspections (both manual and electronic) are carried out in accordance with Transport Canada regulations to identify track defects that could lead to derailment. With appropriate mitigation, the magnitude of the environmental effects attributable to these infrequent and unlikely accidents and malfunctions is likely to be low; under potentially worse case scenarios magnitude could be moderate. Reversibility of the environmental effects will depend on the specific habitat involved, and the proportion of habitat affected, and the potential for those habitats to be used by traditionally harvested species; but would be anticipated to occur naturally over a number of years. Significant effects on Contemporary Use of Land and Resources by non-Indigenous People; this prediction is made with a high level of confidence.

20.8.3 Forest Fire

Although unlikely, Project activities involving the use of heat or flame could result in a fire. Fires can alter habitat and cause direct mortality for wildlife species, consume riparian vegetation, destabilize shore area soils, and lead to erosion and sedimentation events. The extent and duration of a fire would be dependent on response efforts and meteorological conditions.

20.8.3.1 Emergency Response/Mitigation of Environmental Effects

A forest fire caused by the Project could lead to the short-term closure of the highways and railway and cause disruption at the local airport and could result in damage to biophysical valued components (e.g., water bodies, wildlife and wildlife habitat) in the PDA and LSA, which could affect access to and level of use of these resources for recreational purposes by non-Indigenous people.

Fire suppression water systems will be maintained on site. The fire suppression water supply at the mine and processing sites will be from Attikamagen Lake and will be stored in water reservoirs prior to use. The fire suppression water at the rail loop will be sourced from Astray Lake. Staff will be trained to prevent and control fires. A plan for preventing and combating forest fires will be incorporated into the ERP.

The nearest district forest management unit office in Labrador is in Wabush, which has staff and equipment to provide initial suppression activities. The Town of Schefferville also provides fire control services. Labec Century is discussing a reciprocal response arrangement with the town of Schefferville, approximately 20 km away from the site. In the event of a fire, the on-site response and proximity of fire suppression services in Schefferville will limit the size of any burn.

20.8.3.2 Characterization of Residual Environmental Effects

Although unlikely, The effects of a forest fire on Contemporary Use of Land and Resources by non-Indigenous People are predicted to be adverse because the environmental effects could be have a high magnitude. Forest fires have the potential to alter the landscape and deplete forest and brush cover, thereby reducing or eliminating the distribution of traditionally harvested flora and fauna. The magnitude and geographic extent of the environmental effect is largely dependent on the scale and intensity of the forest fire; extensive fires have the potential to affect a large number of users and activities, and may result in significant adverse residual environmental effects, if uncontrolled. Factors influencing the extent and duration of a resulting fire would be dependent on response efforts and meteorological conditions, and may also include time of year, type of fire, and degree of fuel loading. Reversibility of the physical effects of a fire is high, but would be anticipated to occur over a number of years. The restoration of important habitats would rely upon the re-establishment of vegetation communities through succession and the maintenance of those ecological conditions that existed prior to disturbance, and thus environmental effects on habitat may be of short to long duration. The likelihood of a forest fire occurring naturally is low; fire cycles in Labrador can exceed 400 to 500 years (Elson 2009). In the very unlikely case of a large, uncontrolled fire caused by project activities, significant effects on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons could occur. This prediction is made with a moderate level of confidence.

20.8.4 Settling/Sedimentation Pond Overflow

Settling/sedimentation ponds will be established at waste rock, overburden, run-of-mine stockpile areas, at the crushing and screening plant area, at the accommodation camp area, and at the rail loop. Run-off from the stockpiles and site run-off will be directed to the settling/sedimentation ponds prior to discharge to the receiving environment. The likelihood of an overflow is low because the ponds will be designed to contain run-off associated with a 1:100 year precipitation event. In such an event, settling/sedimentation ponds could overflow, releasing untreated water. Untreated water could have elevated levels of total suspended solids. No other contaminants are anticipated.

20.8.4.1 Emergency Response/Mitigation of Environmental Effects

In the unlikely event of an overflow, contingency plans will be in place as part of the Emergency Response and Spill Response Plan to mitigate environmental effects to the receiving environment. Water sampling of TSS and other MDMER parameters will be conducted in downstream water bodies. Applicable stakeholders, including regulatory agencies, First Nations and communities, will be consulted to discuss such events and mitigation measures to be implemented.

Measures to mitigate such an event include regular inspections of water levels in the settling ponds as part of a site-wide infrastructure monitoring program. The capacity of settling ponds will be maintained by periodically removing settled solids for disposal as per permit conditions as part of water management infrastructure maintenance program.

20.8.4.2 Characterization of Residual Environmental Effects

Settling/sedimentation pond overflow could result in the release of sediment and/or debris downstream.

The Emergency Response and Spill Response Plan will address emergency preparedness measures necessary to provide effective response in the unlikely event of a settling/ sedimentation pond overflow. The magnitude of adverse residual environmental effects of a settling/sedimentation pond overflow is largely dependent on the volume released, but anticipated to be low following implementation of mitigation and emergency response measures. In the unlikely event of an overflow, environmental effects are anticipated to be short- to long-term in duration and reversible over a number of years. Significant effects on Contemporary Use of Land and Resources by non-Indigenous people are characterized as reversible are not anticipated; this prediction is made with a high level of confidence.

20.8.5 Premature or Permanent Shutdown

As currently planned, the mine will have an operational production period of seven years, (following one year of construction) at which time decommissioning and rehabilitation will commence. However, should factors arise that result in the premature shutdown of the mine, regulatory requirements include provision for financial assurance from Labec Century.

20.8.5.1 Emergency Response/Mitigation of Environmental Effects

Rehabilitative measures may be implemented by the NLDIET, in which case costs incurred by the Crown in implementing these measures may be recovered by drawing on the financial assurance provided by the proponent. Any required cost expenditures over and above the financial assurance provided would be considered debt by Labec Century to the Crown.

20.8.5.2 Characterization of Residual Environmental Effects

In the event of a premature or permanent shutdown, it is anticipated that adverse environmental effects would be low, under the assumption that rehabilitative measures would be realized following implementation by the Crown. Residual environmental effects would be site-specific, and short to long term duration for some habitats following site rehabilitation, or permanent for other habitats that may not return to pre-Project conditions (e.g., open pit). Significant effects on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are not anticipated; this prediction is made with a high level of confidence. Significant effects on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons could occur are not anticipated; this prediction is made with a high level of confidence.

20.8.6 Summary of Residual Effects Resulting from Accidents and Malfunctions

A summary of residual environmental effects resulting from accidents and malfunctions is summarized in Table 20.5.

Table 20.5 Summary of Residual Environmental Effects of Accidents and Malfunctions on Contemporary Use of Land and Resources by Non-Indigenous People

Project Phase	Emergency Response/Contingency Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context			
Operation and Maintenance											
Hydrocarbon Spill	• Implementation of ERP	A	L	L	ST	S	R	U	N	H	No follow up monitoring recommended
Train Derailment	• Implementation of ERP	A	L	L	MT	N	R	U	N	H	No follow up monitoring recommended
Forest Fire	• Implementation of ERP	A	L	L	LT	S	R	U	N	H	No follow up monitoring recommended
Settling Pond Overflow	• Implementation of ERP	A	L	L	MT	U	R	U	N	H	No follow up monitoring recommended
Premature/ Permanent Shutdown	• Implementation of ERP	A	L	L	MT	U	R	U	N	H	No follow up monitoring recommended

Table 20.5 Summary of Residual Environmental Effects of Accidents and Malfunctions on Contemporary Use of Land and Resources by Non-Indigenous People

Project Phase	Emergency Response/Contingency Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context			

Key:

Direction:
P Positive.
A Adverse.
N Neutral.

Magnitude:
L Low: Affects a small group of land and resource users
M Moderate: Affects less than the majority of land and resource users for one or more activities.
H High: Affects the majority of land and resource users across multiple activities.

Geographic Extent:
S Site (PDA).
L Local: within the LSA.
R Regional: within the RSA.

Duration:
Quantitative measure; or
ST Short-term (restricted to Construction phase).
MT Medium-term (continues through Operations and Maintenance phase).
LT Long-term (16 to 50 years).
P Permanent (will not return to baseline conditions for generations).

Frequency:
O Once per month or less.
S Occurs sporadically at irregular intervals.
R Occurs on a regular basis and at regular intervals.
C Continuous.
U Unlikely to occur

Reversibility:
R Reversible (the effect can be reversed to existing conditions)
I Irreversible (the effect cannot be reversed)

Ecological or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Disturbed: Area has been substantially previously disturbed by human development (e.g., urban setting, industrial activities) or human development is still present.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis, and effectiveness of mitigation or effects management measure
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

N/A Not Applicable

20.8.7 Assessment of Cumulative Environmental Effects

Environmental effects as a result of Accidents and Malfunctions on Contemporary Use of Land and Resources by non-Indigenous people will be limited to the LSA. Other contemporary use of land and resources, including similar mining projects, occur in the RSA (see Figure 20.2), and there are many locations for non-Indigenous people to pursue recreational activities outside of the area affected by the Project and other similar projects and activities in the RSA. Because of the localized nature of environmental effects on Contemporary Use of Land and Resources by non-Indigenous people, the mitigation measures that will be implemented for the Project and other similar mining projects in the RSA, and regulatory control over activities such as hunting, fishing, and wood harvesting, it is unlikely that the cumulative effects of the Project in combination with other projects and activities would result in changes so that the levels and distribution of Contemporary Use of Land and Resources, including recreational activities, by non-Indigenous people, could not continue at current levels within the RSA over the long-term.

20.9 Determination of Significance of Residual Adverse Environmental Effect

Potential project environmental effects on Contemporary Use of Land and Resources by non-Indigenous people from routine project activities and physical works can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices.

The residual adverse environmental effect on access and level of activity/use of the LSA and RSA for recreational purposes by non-Indigenous people resulting from accidental events is not likely to be significant. This determination has been made with a high level of confidence as Labec Century will have a number of emergency and safety plans and procedures in place to reduce the likelihood and effects of accidents and malfunctions beyond the PDA on recreation-related activities by non-Indigenous people. Labec Century will also have emergency services available to respond immediately to accidents and malfunctions.

The cumulative effects on Contemporary Use of Land and Resources by non-Indigenous people of all past, present, and reasonably foreseeable projects and activities, in combination with the environmental effects of the Project, are considered to be not significant.

20.10 Follow-up and Monitoring

The monitoring of access and level of activity / use for recreational purposes by non-Indigenous people is within the mandate of the relevant government departments and agencies, as part of their normal planning processes. Labec Century will assist by liaising with these departments and agencies, as requested, and through the timely provision of information about Project activities and plans.

20.11 Summary

Potential environmental effects on access to recreational areas and level of use for recreational purposes from other routine activities in the Construction, Operation and Closure phases have been assessed to be manageable to acceptable levels through standard operating practices and through the application of best management practices.

Accidents and malfunctions such as hydrocarbon spills, train derailment, forest fire and settling pond overflow have the potential to cause adverse effects to valued components (air quality, water quality, wildlife habitat, fish and fish habitat) in the PDA, LSA and RSA. Residual and cumulative effects from accidents and malfunctions on Contemporary Use of Land and Resources by non-Indigenous people are predicted to be not significant if mitigation measures developed for the Project are implemented.

20.12 References

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Joyce Lake Direct Shipping Iron Ore Project:

Chapter 21:

Community Services and Infrastructure

File No. 121416571

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21.0 ENVIRONMENTAL ASSESSMENT – COMMUNITY SERVICES AND INFRASTRUCTURE

As detailed in chapter 1, Joyce Direct Iron Inc. succeeded Labec Century Iron Ore Inc. ("Labec Century") as the Project Proponent on February 18, 2021 following an internal reorganization. All references to Labec Century as the Project proponent may be interpreted as now referring to Joyce Direct Iron Inc.

21.1 VC Definition and Rationale for Selection

As a result of Project development, there will be increased economic activity in the area of Schefferville, QC, which is the closest community to the Project. There will also be increased activity in the communities of western Labrador, which serves as the economic and service center for the region. As a result of this activity, there will be demands on local business, services, and infrastructure, such as highways, medical facilities, and accommodations.

A temporary increase in the local population caused by temporary in-migration of Project construction and operations employees, including FIFO workers, may place an increased demand on services and infrastructure in nearby communities. Community Services and Infrastructure has been selected as a VC to satisfy requirements under Section 4.22 of the Newfoundland and Labrador EIS Guidelines for the Joyce Lake Direct Shipping Iron Ore Project (the Project). It has also been selected to address socio-economic conditions that affect communities in the LSA and their residents as specified in the CEA Agency EIS Guidelines.

21.1.1 Approach to Assessment of Effects

The effects of a Project on the socio-economic environment are felt in those areas that will provide services and infrastructure to the Project and its employees, where any Project-related demands will be experienced, and where expenditures and related multiplier effects will occur. The potential effects on Community Services and Infrastructure were identified through consultation with regulators, including the NLDIET, and engagement with stakeholders, Indigenous groups, and local communities. Baseline data on infrastructure and services capacity in the LSA have been collected to determine how communities will respond to additional demands, and thus, the effects of the Project on community services and infrastructure.

Baseline data on demographics related to the Community Services and Infrastructure VC were drawn from secondary sources, including:

- Statistics Canada and other agencies and departments of the Government of Canada;
- The Newfoundland and Labrador Statistics Agency and other agencies and departments of the Government of Newfoundland and Labrador;

- Institute de statistiques du Québec and other agencies and departments of the Government of Québec; and
- Municipal governments and local and regional authorities and boards.

In addition, information about services and infrastructure was collected through organization websites, personal and telephone interviews with the above types of groups, and agencies at the community level. A full list of references and sources is provided in Chapter 27.

A wide range of the most recently available data on baseline conditions and, where appropriate and available, trends, are presented in Section 21.5 and in the Socio-economic Baseline Report (Appendix AC).

The information available through these sources provides a reliable description of the existing environment for the purpose of the environmental assessment.

21.2 Scope of the Assessment

21.2.1 Regulatory Setting

The CEA Agency EIS Guidelines stipulate that in describing the socio-economic environment, the proponent will provide information on the functioning and health of the socio-economic environment, encompassing a broad range of matters that affect communities and Indigenous peoples in the LSA in a way that recognizes interrelationships, system functions and vulnerabilities.

Municipal authorities and relevant government departments and agencies are responsible for monitoring demands on community services and infrastructure as part of their normal planning processes. Labec Century will offer timely provision of information about Project activity and plans as input to local planning decisions.

21.2.2 Influence of Consultation and Engagement on the Assessment

Labec Century recognizes the importance of communications with federal, provincial, and municipal regulatory agencies, stakeholders, and the public, and has conducted a stakeholder consultation program as part of the issues scoping exercise for the Project. The consultation program focused primarily on the area(s) most likely to be affected by the Project, including the Town of Schefferville in the province of Québec and local Indigenous groups.

The issues or concerns regarding Community Services and Infrastructure were raised during consultation and engagement activities with regulatory agencies, Indigenous groups, stakeholder groups, and the general public. These concerns informed baseline data collection and are addressed through the effects analyses.

Labec Century has engaged and consulted with a variety of stakeholders, Indigenous groups, and members of the public throughout the EA process, and is committed to being responsive to questions and concerns that arise. Consultation activities have identified community concerns regarding the management of Project waste, particularly raw sewage, and future support from Labec Century for new community infrastructure as part of an IBA with Indigenous groups. Details on the issues raised by stakeholders are provided in Table 21.1.

Table 21.1 Issues Raised by Indigenous Groups and Stakeholders

Question / Issue	Community/ Organization	Summary of Comments	Response
Infrastructure	Naskapi of Kawawachikamach	There is already too much traffic on Iron Arm road, what will be done to avoid this?	The existing road between Schefferville and Iron Arm will be upgraded and widened where necessary. This road once improved is planned to be used for Project construction access and during operations for service vehicles only. No product will be hauled on this road and the road will be open for use by the public. The improved road will provide better public access by vehicle to the Iron Arm area.

21.2.3 Temporal and Spatial Boundaries

The temporal boundaries for the environmental assessment include the Project phases of Construction, Operation and Maintenance, and Closure and Decommissioning. The temporal boundary for Construction is one year (pre-operation), for Operation and Maintenance is approximately seven years, and for Closure and Decommissioning is approximately one year.

The spatial boundaries for the environmental effects assessment of Community Services and Infrastructure are defined below.

Project Development Area (PDA): The PDA is the Project footprint as described in Chapter 2: Project Description.

LSA and Regional Study Area (RSA): For Community Services and Infrastructure, the RSA is the same as the LSA since Project-effects, including cumulative effects, will be felt where Project workers reside and in the nearest service areas. The LSA and RSA include the Québec communities of Schefferville, Matimekush-Lac John and Kawawachikamach. They also include the towns of western Labrador (Labrador City and Wabush), which are approximately 200 km from the Project site, as these will provide services and infrastructure to the Project and its employees and experience any Project-related demands (Figure 21.1). These are the communities that will potentially be affected by the Project activity and expenditures and which are of concern to the public.

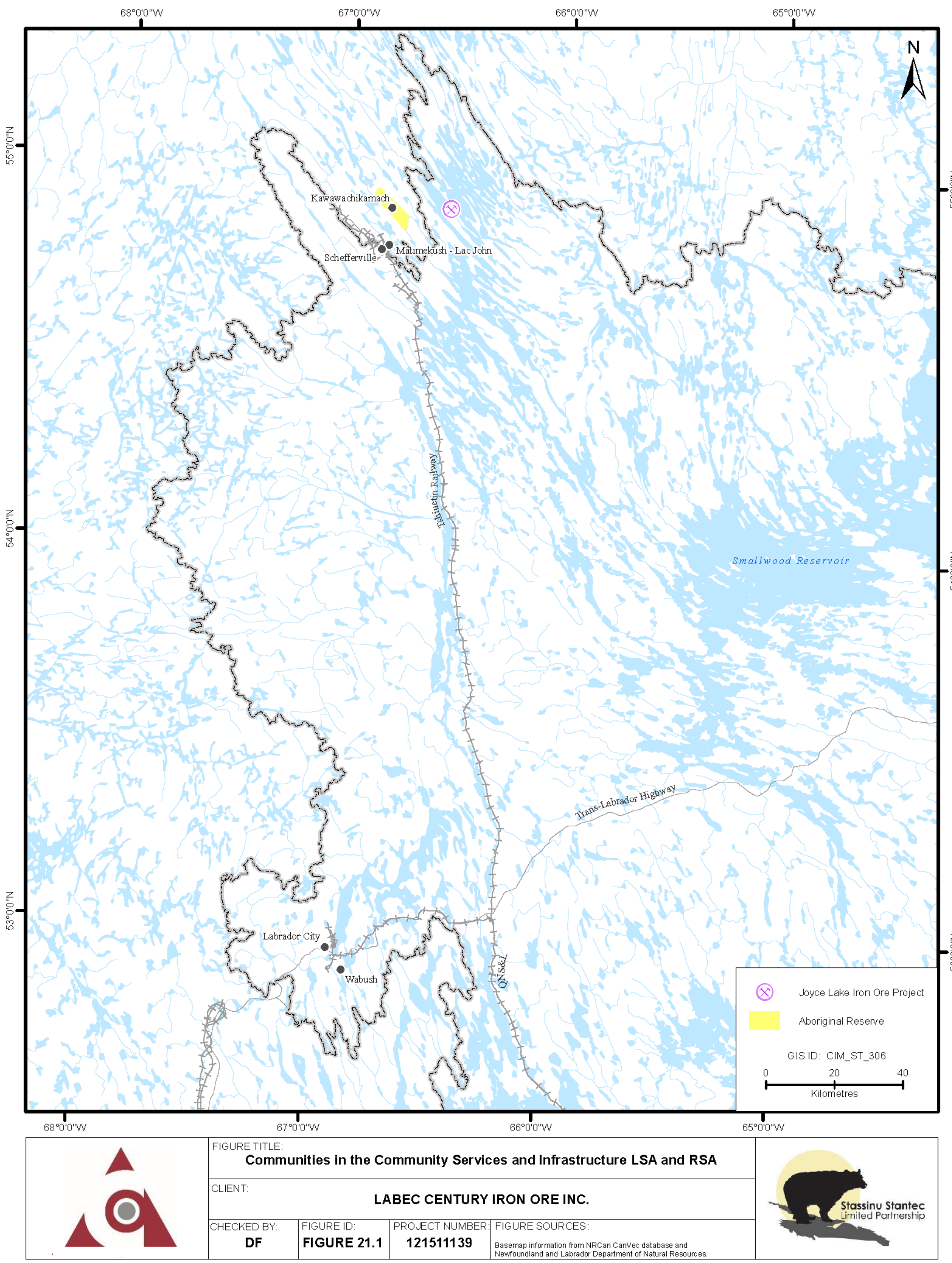

Figure 21.1 Communities in the Community Services and Infrastructure LSA and RSA

21.2.4 Selection of Environmental Effects and Measurable Parameters

The environmental assessment of Community Services and Infrastructure is focused on the following effect:

- Change in capacity of Community Services and Infrastructure.

This was selected as an environmental effect to be assessed because the Project may place additional demands on Community Services and Infrastructure, such as housing, other accommodations, emergency response services and infrastructure (e.g., fire, medical and police), and support services and infrastructure (e.g., health and emergency services). Measurable parameters to facilitate analysis of this effect are presented in Table 21.2.

Table 21.2 Measurable Parameters for Community Services and Infrastructure

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in capacity of Community Services and Infrastructure	Municipal services and infrastructure capacity	Project activity and Project-related population and business growth may exceed the capacity of existing services and infrastructure.
	Transportation infrastructure and services capacity	Project activity and Project-related population and business growth may exceed the capacity of existing services and infrastructure.
	Health care facility and services capacity	Project activity and Project-related population and business growth may exceed the capacity of existing services and infrastructure.
	Police officer to population ratio	Project activity and Project-related population and business growth may exceed the capacity of existing services and infrastructure.
	Housing and accommodations availability	Project activity and Project-related population and business growth may exceed the capacity of existing services and infrastructure.

21.3 Standards or Thresholds for Determining the Significance of Residual Environmental Effects

The effects of the Project on Community Services and Infrastructure are characterized using the following descriptors:

- Direction
  - Adverse: Decrease in capacity of Community Services and Infrastructure
  - Positive: Increase in capacity of Community Services and Infrastructure
  - Neutral: No change in capacity of Community Services and Infrastructure

- Magnitude
  - Reduction: Reduces existing levels
  - Neutral: Adds nothing to existing levels
  - Increase: Adds to existing levels
- Geographic Extent
  - Québec communities
  - Western Labrador communities
- Frequency
  - Unlikely: Not likely to occur
  - Once: environmental effect occurs once during the life of the Project (e.g., clearing)
  - Sporadic: environmental effect occurs sporadically, at irregular interval, and is not predictable (e.g., hydrocarbon spills)
  - Rarely: environmental effect occurs infrequently (e.g., establishment of causeway)
  - Frequently: environmental effect occurs regularly during the life of the Project, and may be at predictable intervals or specific times
  - Continuous (e.g., on-site labour force)
- Duration
  - Short Term: Effect restricted to construction phase
  - Medium Term: Effect extends through operation phase
  - Long Term: Effect extends beyond closure
  - Permanent: measurable parameter unlikely to recover to baseline
- Reversibility
  - Reversible: will recover after Project closure and reclamation
  - Irreversible: permanent

- Prediction Confidence
  - Low: there is a low level of confidence in the prediction of environmental effects
  - Moderate: there is a moderate level of confidence in the prediction of environmental effects
  - High: there is a high level of confidence in the prediction of environmental effects

A significant adverse residual environmental effect on Community Services and Infrastructure occurs when demands from the Project exceed the existing capacity of the infrastructure or decrease the quality of the associated service system on an ongoing and consistent basis during the life of the Project.

21.4 Potential Project-VC Interactions

In Table 21.3, each Project activity and physical work for the Project is listed, and each interaction rated 0, 1, or 2 based on the level of interaction associated with each activity or physical work and on existing standard operating procedures and practices.

Table 21.3 Potential Project Environmental Effects to Community Services and Infrastructure

Project Activities and Physical Works	Potential Environmental Effects
	Change in Capacity of Community Services and Infrastructure
Construction	
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	0
Construction of Roads	0
Construction of Causeway	
Construction of Site Buildings and Associated Infrastructure	0
Construction of Rail loop and Associated Infrastructure	0
Construction of Stream Crossings	0
Installation of Water Supply Infrastructure (wells, pumps, pipes)	0
On-site Vehicle / Equipment Operation	0
Waste Management	2
Transportation of Personnel and Goods to Site	1
Expenditures	1
Employment	1
Operation and Maintenance	
Maintenance of Causeway	0
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	0
Dewatering Joyce Lake	0
Ore Processing (including crushing, conveying, storage, grinding, screening)	0

Table 21.3 Potential Project Environmental Effects to Community Services and Infrastructure

Project Activities and Physical Works	Potential Environmental Effects
	Change in Capacity of Community Services and Infrastructure
Waste Rock Disposal on Surface	0
Water Treatment (including mine water and surface runoff) and Discharge	0
Rail Load-Out and Transport	0
On-site Vehicle/Equipment Operation and Maintenance	0
Waste Management	2
Transportation of Personnel and Goods to Site	1
Fuel Transport	0
Fuel Storage and Dispensing	0
Progressive Rehabilitation	0
Expenditures	1
Employment	1
Closure and Decommissioning	
Site Decommissioning	0
Site Reclamation (building demolition, grading, scarifying)	1
Accidents and Malfunctions	
Hydrocarbon Spill	2
Train Derailment	2
Forest Fire	2
Settling/Sedimentation Pond Overflow	0
Premature or Permanent Shutdown	0

The rating takes a precautionary approach, whereby interactions with a meaningful degree of uncertainty will be rated 2, ensuring that a detailed environmental effects assessment is conducted.

21.4.1 Interactions Rated 0

Project effects on Community Services and Infrastructure are related to expenditures on supplies and services and employment that are involved in all of the Project activities and works. Most other Project activities and physical works have been rated 0 and are not considered in the assessment.

21.4.2 Interactions Rated 1

The Project will have a negligible short-term direct effect on the communities of western Labrador and Québec. Peak construction workforce will be 325 workers and the peak operations workforce will be 269 workers. Some of them will already be residents of the LSA communities when hired. Some workers will likely come from communities outside of the LSA and, due to the structure of work rotations (two weeks on/two weeks off), it is assumed that these workers will return to their home communities during their time off.

Due to the Project's relatively small workforce, short operation phase relative to other mines in western Labrador, and employee work schedule, it is very unlikely that any workers and their families will move to the LSA communities. Therefore, it unlikely that there will be an effect on community social or physical infrastructure or services as a result of Project-related population increase.

An accommodation camp will be in operation year-round and will house 150 workers at a time. The provision of this camp by Labec Century will reduce any effects that additional people in the Project area will have on housing and accommodations in the LSA communities. While the camp is being constructed, approximately 50 beds will be available at Labec Century's exploration camps and company houses in Schefferville. As for the remaining required beds during the peak construction period, Labec Century will likely lease available camp facilities in the area, as well as upgrade existing Labec Century-owned facilities to accommodate more beds, and if necessary, bringing in temporary camp facilities. Local workers will already have housing in these communities, so this, along with the design of the work rotation schedule and the housing provided by Labec Century described above, will ensure that all of the workers who require housing, even at peak employment, will have accommodations.

The commute system for construction workers will be designed to transport construction workers to and from their communities as efficiently as possible. Improvements to Iron Arm Road will allow access to the Project site each day and encourage local employment. Some construction workers will be coming from outside the LSA communities and will arrive by airplane through Schefferville Airport on charter and regular flights. Again, the small workforce and work rotation schedule will help to reduce effects on Schefferville Airport. In addition, a number of upgrades have been made recently and are planned for the upcoming summer to better accommodate traffic through Schefferville Airport (G. Boudreau, pers. comm. 2013).

As a result of the work rotation schedule and design of the transportation system for workers, there will be few occasions when commuting workers will spend more than a short period in western Labrador and Québec communities while en route to or from the work site. Therefore, there is a very small likelihood of interactions between workers and local residents that might place demands on policing or healthcare services and infrastructure.

Workers will be able to eat meals at the site camp or other Labec Century facilities and will not have to rely on food services provided within the LSA communities. The Project will not rely on municipal services and infrastructure, such as water, sewer and power, from LSA communities because potable water will be available at the camp and Project site through the installation of groundwater wells and water treatment units. All electrical power required for the Project will be supplied by local generators, which will run on diesel fuel.

It is likely that the Project will not place additional demands on safety and security services in the LSA communities. General site and camp security will help reduce demands on the local police system. The work forces of other mining projects in the area have not put additional demands on the police resources in western Labrador (Labrador West Chamber of Commerce 2010).

Community crime rates in western Labrador are generally well below provincial averages and the Sûreté du Québec, which provides police services in Schefferville, has plans to increase its force from four to six individuals in Schefferville (J.C. Filion, pers. comm. 2013). Fire-fighting equipment and trained personnel will also be on-site.

Most workers will continue to receive general healthcare in their home communities. Any minor injuries or health problems will be addressed through the provision of first-aid at the worksite. If additional care for such issues is required, workers will use the health clinic in Schefferville. Workers will be transported to the hospital in Labrador City for more specialized care.

Effects of the Project on local healthcare services and infrastructure will also be minor because the labour force will be small and accidents will be reduced through rigorous enforcement of Labec Century's occupational health and safety standards. As a result, no new Project-related demands on health services and infrastructure are anticipated. A human health risk assessment was not required for this Project. Effects of the Project on air quality, water quality, noise and potential contamination of country foods are discussed in chapters 10 (Atmospheric Environment and Climate), 11 (Water Resources), 12 (Groundwater Resources), 13 (Terrain and Acid Rock Drainage / Metal Leaching), 19 (Current Use of Land and Resources for Traditional Purposes by Indigenous Persons) and 20 (Other Contemporary Use of Land and Resources).

During closure and decommissioning, the scale of employment will be smaller and of shorter duration than operations, and hence is not expected to result in new Project-related demands on Community Services and Infrastructure.

21.4.3 Interactions Rated 2

During consultation with stakeholders and local residents the issue of waste management, particularly raw sewage from the camp, was raised. Sewer systems in the Quebec communities are very old and those in western Labrador are at or near capacity, although the Wabush Town Council has plans to spend $12,000,000 to upgrade wastewater treatment in the near future. As a result of these concerns, waste management has been rated 2 during Construction and Operation and Maintenance (Table 21.3). There are also several accidents and malfunctions that require more detailed analysis and consideration in the EIS, in order to predict, manage and evaluate the potential effects. These interactions have been rated 2 and are discussed in Section 21.8.

21.5 Existing Environment

21.5.1 Information Sources

The secondary sources of information for the assessment include:

- Statistics Canada and other agencies and departments of the Government of Canada;
- The Newfoundland and Labrador Statistics Agency and other agencies and departments of the Government of Newfoundland and Labrador;

- Institute de statistiques du Québec and other agencies and departments of the Government of Québec;
- Local service providers; and
- Municipal governments and local and regional authorities and boards.

Interviews also took place with some service providers and members of local government in the LSA communities.

While traditional knowledge pertaining specifically to Community Services and Infrastructure was not identified, the traditional knowledge results identified in Chapter 3: Engagement and Traditional Knowledge have been considered and integrated throughout the assessment.

21.5.2 Methodology for Characterization of Baseline Conditions

Baseline data on demographics related to the Community Services and Infrastructure VC were drawn from some of the secondary sources listed above. In addition, information about services and infrastructure was collected through organization websites, personal and telephone interviews with the above types of groups, and agencies at the community level.

A wide range of the most recently available data on baseline conditions and, where appropriate and available, trends, are presented in the Baseline Conditions (Section 21.5.3) section of this chapter and also in the Socio-Economic Baseline Report (Appendix AC). This includes information on current capacities and hence the ability of the communities to handle any additional demands.

The information available through these sources provides a reliable description of the existing environment for the purpose of the environmental assessment. It is used in the assessment to provide regional context for the Project and to assess the Project effects on the capacity and use of infrastructure and services in the assessment area.

21.5.3 Baseline Conditions

21.5.3.1 Municipal Services and Infrastructure

Québec Communities

The Matimekosh Reserve and Lac John Reserve are jointly administered by Conseil de la Première Nation des Innus de Matimekush-Lac John (CPNIMLJ). The band council consists of a chief and four councilors, who are elected for two-year terms according to a customary process and pursuant to the *Indian Act*. The council is involved in negotiations and selects the council director and administration. Council manages garbage collection and disposal, waste water treatment and maintenance of the sanitary sewer system and storm sewer system.

The Naskapi Nation of Kawawachikamach is governed by a chief and council officers, who are elected every three years. The Naskapi Nation of Kawawachikamach council consists of a chief, deputy chief and four councilors. The band council manages garbage collection and a landfill located in Schefferville (AANDC 2011).

Schefferville was established by IOC to support the mining of iron ore deposits in the area. Incorporated in 1955 at the beginning of the IOC's activities, it has maintained its legal status despite the closing of the iron ore mines there in 1982. Schefferville is located in the municipalité régionale de comté (MRC) de Caniapiscau in northeastern Québec, within the Côte-Nord Administrative Region of the Province of Québec; the regional county municipality seat is Fermont. Responsibilities of the MRC include territorial planning, realty assessment for property taxes, waste management, emergency planning, local economic development and employment assistance, tourism, and representation of local interests at regional meetings (CLD de la MRC de Caniapiscau 2012).

Water and Sewer

In Kawawachikamach, water is supplied to households from two community wells with a pump station, while sewage is pumped to a community septic tank and lagoon. The water system in Kawawachikamach was constructed in 1982 and has a design capacity of 870 m^3/d. A water treatment plant was installed in October 2006 as part of an investment of $2 million by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) (Canada.ca news release archive).

In Schefferville, drinking water is taken from Lac Knob which lies within the municipal boundary. The chlorination and pumping station are gravity fed, with water being distributed to the community via waterlines that serve both Schefferville and the Matimekosh reserve. The sewer and water systems were both originally installed in 1955. A physico-chemical wastewater treatment system was installed in 1999.

Power and Communication

IOC built and installed the Menihek/Schefferville interprovincial electrical system, including the Menihek hydroelectric generating plant, in 1954 to support its mining operations and supply electricity to the Town of Schefferville. The 18.7 MW Menihek generating station is the only source of electricity for this area; it is not connected to the main Labrador interconnected system (NL Hydro 2007).

In 2007, Nalcor Energy (Nalcor) and Hydro-Québec entered into a 40-year power purchase agreement to supply electricity to Hydro-Québec for its customers in Schefferville, Kawawachikamach and Matimekush-Lac John. Hydro-Québec purchased a guaranteed minimum of 40-million kW hours annually from Nalcor. Both Nalcor and Hydro-Québec entered into a contract with the operator, Kawawachikamach Energy Services Inc., a First Nations company, to operate and maintain the Menihek/Schefferville electrical system (NL Hydro 2007). In 2007, the Menihek generating station generated 13 GWh (gigawatt hours) and in 2011, it generated 42 GWh, which is approximately 25% of the plant’s generating capacity (Nalcor 2011).

Solid Waste

The Tricomm écocentre in Schefferville opened in 2017 and services the three communities of Kawawachikamach, Lac-John and Schefferville. Waste not processable by the écocentre is burned or disposed of in the accompanying Schefferville landfill, which was constructed in 2019. Under Québec legislation, waste materials generated outside Québec cannot be disposed of in a landfill in Québec. Consequently, mining companies operating in Labrador are required to have their own management plan for the disposal of all waste material including vehicles, tires of all size and scrap metals.

Western Labrador Communities

The Towns of Labrador City and Wabush work closely together in a number of areas, including economic development, to achieve economies of scale as well as mutual goals. This includes the ability to maintain community infrastructure, particularly as much of it is now over forty years old.

The Town of Labrador City is responsible for a variety of municipal services, including maintenance, construction and operation of streets and sidewalks, including snow and ice removal, integrated solid waste management, potable water treatment and distribution, sanitary sewer collection and distribution, storm water management and control and fly control and lawn sweeping.

The Town of Wabush provides full water and sewage service, a volunteer fire brigade, garbage collection, street lighting, snow clearing, neighbourhood playgrounds, and community recreation facilities.

Private developers are responsible for servicing future expansions to the municipal infrastructure of Labrador City and Wabush, such as roads, sidewalks and municipal piped systems for newly designated areas for future development (Town of Labrador City 2010).

Water and Sewer

Beverly Lake, which is located northeast of Labrador City, is the Town's only municipal water supply. This lake continues to supply the Labrador City population of 7,220 (Statistics Canada 2017). The water is pumped from Beverly Lake to an approximately 1,893,000 L (500,000-gallon) water tower. The pump house was rebuilt in the early 1990s with two pumps at approximately 14,000 L/minute (3,700 gallons/minute). There is also an emergency diesel system, which can pump approximately 12,492 L/minute (3,300 gallons/minute) (Town of Labrador City 2010). The Town of Labrador City has plans to extend water infrastructure with the construction and commissioning of a new water storage reservoir and sewage lift station (Town of Labrador City 2011).

Dumbell Lake is designated as a future water supply for Labrador City. If demands on the current water supply increase due to greater activity in the commercial/industrial sector, it may not be able to meet both domestic and industrial demands. The Town's intent is to reserve Dumbell Lake as an extra source of water supply to compliment the Beverly Lake system in the long term plans for the Town (Town of Labrador City 2010).

The municipal water supply in Wabush comes from Wahnahnish Lake, which is located south of the Town. The Town of Wabush has a grid distribution network which services approximately 1,200 customers (NL Hydro 2010).

Labrador City is serviced with separate sanitary and storm sewers. The sanitary sewers empty into one of two sewage treatment plants that discharge into Little Wabush Lake. The storm sewer system also empties into Little Wabush Lake. With a treatment capacity for approximately 5,000 people, the plant treats approximately 681.375 L/day (180,000 gallons/day) (Town of Labrador City 2010). According to the Town of Labrador City's 2014 budget, there are plans to proceed with a preliminary engineering design for the replacement of the Harrie Lake sewage treatment plant (Town of Labrador City 2014).

The second plant treats approximately 6,056,660 L/day (1.6 million gallons/day) to primary effluent quality. This plant has a treatment capacity for approximately 20,000 people. Primary treatment is considered sufficient for the system (Town of Labrador City 2010). Construction and commissioning of a new water storage reservoir and sewage lift station will involve an extension of the sewer infrastructure (Town of Labrador City 2011).

Labrador City's current wastewater distribution system is at or near capacity and it is becoming a challenge to keep effluent quality near allowable standards. A substantial increase in population would require a plant retrofit to meet these standards, including an expansion of the capacity of the primary and secondary digester tanks for the storage and processing of sludge (P. Boland, pers. comm. 2012.).

The Town of Wabush maintains one primary sewage treatment plant. In 2019, over $12,000,000 of municipal, provincial and federal funds were made available to upgrade the treatment plant (Infrastructure Canada 2019). New development projects in the area will be required to build their own septic systems (CBC News 2014).

Power and Communications

Power is provided to western Labrador by Nalcor. Labrador City and Wabush are equipped with technological and telecommunications infrastructure with advanced fibre optic cables throughout communities and industrial sites (Labrador West n.d.).

The hydro-electric availability in western Labrador comes from Churchill Falls. The Churchill Falls generating station, the largest underground power station in the world, generates 5,428 MW of power. The Churchill Falls generating station provides 225 MW to the mining industry in western Labrador. In addition, Western Labrador currently has 127 MW of recall power available for industrial development. With the development of the Lower Churchill, Labrador will have increased energy capacity (Labrador West n.d.).

Western Labrador is at its peak in terms of electrical consumption and with recent interruptions in electricity it is evident that the capacity is being exceeded with the current electrical infrastructure. Based on mining projects already in construction or near sanction, existing generating capacity in Labrador may be exhausted by 2015-17 (NLDNR 2012). Plans for the construction of a transmission line to provide power for planned development in western Labrador have been put on hold due to the recent close of existing mines and the suspension of other planned mining developments in western Labrador, including Champion Iron Ltd.'s Kamistiatusset (Kami) iron ore mine (NLDNR 2014).

Nalcor is continuing its $20 million, multi-year capital project to upgrade the distribution system in Labrador City to meet load growth in the area. The project includes the construction of two new terminal stations and the conversion of the existing distribution system to a higher voltage to enable more electrical load. The system upgrade process began in 2009 and is expected to be complete in 2015 (Nalcor 2012).

Solid Waste

For decades, garbage in Labrador City and Wabush was processed by an incinerator, but this practice ended in 2010 when the incinerator permanently ceased operations (CBC News 2010). As of 2010, a temporary landfill site began accepting domestic and commercial waste while construction and demolition waste, white goods or scrap metal were temporarily being accepted at the old incinerator site. The new landfill site, which accepts all waste streams, opened in February 2013 and the old incinerator site was closed permanently. The new landfill is expected to have a life span of 10 to 15 years. However, with further cell development, it would have the capacity to accept waste beyond that time period (Dunham 2013; P. Reccord, pers. comm. 2012).

21.5.3.2 Transportation Infrastructure

Québec Communities

Roads

Schefferville has an 8 km municipal road network, including access roads to the airport and railway station. Within the municipal limits there are also approximately 200 km of former mining roads constructed by IOC. These roads are on government land and provide access to resources contained primarily in Labrador. They also lead to the resort areas of Squaw Lake, Chatal Lake and Maryjo Lake. The municipality has no obligation to maintain these access roads.

Matimekush-Lac John has no year-round access to the highway system and must use plane or train to access the nearest service centre. Kawawachikamach can be accessed by a gravel-surfaced, all-season road from Schefferville (AANDC 2011; Naskapi Nation of Kawawachikamach n.d.; Transport Ferroviaire Tshiuetin Inc. 2009).

Airport

The Schefferville Airport is owned by Transport Canada and leased and operated by the Schefferville Airport Corporation. The airport is designated a Remote Airport under the National Airports Policy. The Schefferville Airport has a total land area of 125 ha and includes a 200 m^2 air terminal building that was built in 1971, a 1,500 m asphalt runway, a combined fire hall and maintenance garage. Several companies fly into Schefferville Airport, including Air Saguenay, Aviation Québec, Air Labrador and Air Inuit.

Transport Canada has recently undertaken some renovation work in the airport building and there are plans to expand the tarmac to allow the landing of choppers and larger planes. Air traffic volumes at the Schefferville Airport have risen in recent years. Although no data have been compiled with regard to the travel air and passenger movements through Shefferville Airport, it is likely some of the air traffic increase is due to the increase in mining activity (G. Boudreau, pers. comm. 2013).

Rail

IOC operates the 420-km QNS&L, which IOC built to move iron ore to Sept-Îles. It also provides regularly scheduled, year-round, passenger service (NLDTW 2006). In 2005, Tshiuetin Rail Transportation Inc. acquired the northern section of the QNS&L Railway line (the Menihek Subdivision), which runs between Emeril Junction, situated on the Trans Labrador Highway, 63 km from western Labrador, and Schefferville, Québec. Tshiuetin Rail Transportation Inc. now operates this portion of the rail line for passenger and freight rail services (Labrador West n.d.). Schefferville is served by the Menihek subdivision of the QNS&L Railway, which delivers most of the freight that comes into the community.

Western Labrador Communities

Roads

The Trans-Labrador Highway is the primary public road in Labrador. Phase I of the Trans Labrador Highway (Route 500) is a two-lane highway which runs between western Labrador and Happy Valley-Goose Bay. It has a service level of “A” (free-flowing traffic), with a capacity to carry 1,000 vehicles per hour. Traffic counts completed in 2011 indicate that approximately 1,400 vehicles travelled this section of highway each day, an increase from approximately 200 vehicles per day in 2006 (J. Morrissey, pers. comm. 2012). The widening and surfacing of Phase 1 of the Trans Labrador Highway was completed in 2014. The project was originally estimated to cost $290 million, but as of March 2011, the province had spent $501.3 million and it is estimated to cost another $428 million to complete the project (CBC News 2012a).

In western Labrador, Route 500 of the Trans Labrador Highway connects with Québec Route 389, which runs 570 km north from Baie-Comeau to the Québec-Labrador border. The capacity of Route 500 west of Labrador City is approximately 1,700 passenger cars per hour in each direction. In 2011, the Average Annual Daily Traffic on Route 500 from western Labrador to Québec was approximately 1,600 vehicles (J. Morrissey, pers. comm. 2012). The majority of the road from Baie-Comeau to western Labrador is paved, and upgrades to Route 389 from Baie-Comeau and Fermont are being explored (Hyron Regional Economic Development Corporation 2008). There is no road link between western Labrador and the Schefferville area.

There is evidence of increased travel between Québec and western Labrador in recent years. Paving of additional sections of the Trans Labrador Highway is resulting in increased travel volumes to the coast and ferry crossings to the island (Labrador West Chamber of Commerce 2010). There has also been concern about the increasing number of large trucks operating in residential areas of western Labrador (Higdon 2011). The Wabush Town Council has submitted an application for $10,000,000 in funding to address road work and sidewalk restoration from 2012 to 2015 (Town of Wabush n.d. (a)).

Airport

Labrador City and Wabush are serviced by the Wabush Airport, which is located within 5 km of each Town's centre. The airport is owned and operated by Transport Canada, which provides air traffic control services, including navigational landing aids, runway, apron and taxiway maintenance and fuel ground and terminal services. The airport hosts five airlines that provide regularly scheduled flights: Air Canada Express, Provincial Airlines Ltd., Pascan Aviation, Air Inuit and Air Liaison (Transport Canada 2012). The paved runway strip is 1,948 m in length and it is capable of handling jet service.

In 2010, as a result of increased mining and exploration activity in the region, the Wabush Airport showed a 28% increase in traffic volume over the previous year, servicing just under 100,000 passengers. This was the largest single year increase in eight years. Between 2011 and 2012, air passenger movements at Wabush Airport increased approximately 30% from 150,569 to 196,478 (NLDTCR 2013). This growth was expected to continue into the foreseeable future as new workers travel in and out of the area increasing both commercial and charter traffic (Transport Canada 2011). However, Wabush Airport saw a decrease in passenger movements of nearly 8% between 2012 and 2013 (NLDTCR 2014).

Improvements to the Wabush Airport were announced in 2011. These included a $1.7 million roof restoration for the Air Terminal and Maintenance Buildings, which were completed by early Fall 2011. Parking upgrades to the South Airport Terminal Building worth $30.5 million, apron expansion and a new parallel taxiway were also funded in 2016. A Master Plan for Wabush Airport was completed in January 2013 and Transport Canada is currently preparing a summary document to be released to the public. Transport Canada will use recommendations from this new master plan to decide what additional upgrades, if any, should be completed at Wabush Airport to ensure that it continues to meet the needs of western Labrador well into the future (A. Cayouette, pers. comm. 2013).

Railway

Western Labrador is served by the QNS&L Railway, described above.

Wabush Mines has its own short railway, the Wabush Railway, connecting the mine with the QNS&L Railway. The Bloom Lake Railway, opened by Consolidated Thompson, consists of approximately 31 km of single-track railway located in the Province of Newfoundland and Labrador. The railway connects the Bloom Lake Mill's load-out system with the existing QNS&L Railway close to Wabush Mines. Both of these railways transport iron ore and are operated by Labrador West Rail Services.

21.5.3.3 Health Services and Facilities

Québec Communities

Since 2001, healthcare and social services in Kawawachikamach have been provided by the Naskapi Local Community Service Centre (CLSC) (Naskapi Nation of Kawawachikamach n.d.). The Naskapi CLSC is administered by a board of directors composed mainly of Naskapis, overseen by the Council of the Nation, and jointly funded by Health Canada and the Government of Québec (Naskapi Nation of Kawawachikamach n.d.).

The Naskapi CLSC employs 18 staff, including six nurses, three part-time physicians and one part-time dentist. It offers minor emergency services, sampling and diagnostic services, nurse/physician consultation, home care, childhood prevention and promotion services, pharmacological services, pre- and post-natal services, psycho-social services, immunization, medical transportation of patients, and specialist services for dentistry, ophthalmology, otorhinolaryngology, nutrition, psychology, ergotherapy, and occupational therapy.

Naskapi CLSC medical services are provided exclusively to the Naskapi Nation of Kawawachikamach. However, emergency services are provided to people outside of the community, with the cost for such services billed to the Québec provincial government (L.M. Lortie, pers. comm. in LIM 2009). The Naskapi CLSC's medical centre and social services currently operate at capacity, and it has incurred a deficit each year since 2007. Current staffing levels cannot accommodate the growth of Kawawachikamach, which is expected to see a doubling of population within 15 years (L.M. Lortie, pers. comm. in LIM 2009).

Health services in Matimekush-Lac John are available through the Poste de soins infirmiers (CPNIMLJ 2012). In 2004, the clinic was expanded and renovated (Conseil tribal Mamuitun 2005). The clinic provides preventative, curative and emergency services to the community and is staffed with nurses, a community health nurse, a nutritionist, psychologists, doctors, a home care nurse, liaison officer and support and administrative staff (CPNIMLJ 2012). In addition, full-time general practitioners and medical specialists are brought to the clinic several times a year to provide care in such areas as ophthalmology, dentistry, optometry, and otolaryngology (CPNIMLJ 2012). The clinic also arranges appointments and transport for clients seeking specialist care in Sept-Îles and Québec City (CPNIMLJ 2012). In addition to medical services, the clinic offers a home care assistance and rehabilitation program (CPNIMLJ 2012).

Schefferville Indigenous healthcare and social services are provided by the Innu CLSC, which employs 16 staff. The Innu CLSC is an incorporated body administered by a board of directors composed mainly of and jointly funded by Health Canada and the Québec provincial government. The dispensary provides the following services for the Innu community: minor emergency services; pharmacological services; sampling and diagnostic services; pre- and post-natal services; nurse/physician consultation; psycho-social services; home care; immunization; childhood prevention and promotion services; medical transportation of patients; specialization in diabetes treatment and prevention; and specialist services for dentistry, ophthalmology, otorhinolaryngology, nutrition, psychology, ergotherapy, and occupational therapy.

The Dispensaire de Schefferville provides the non-Indigenous community with the following health care services: minor emergency services; pharmacological services; sampling and diagnostic services; pre- and post-natal services; nurse/physician consultation; medical transportation of patients; and immunization. It is open 24-hours per day from Monday to Friday. In March 2013, the Dispensaire de Schefferville had one nurse and one physician. They are able to treat only one patient at a time and there are no immediate plans to hire additional staff (O. Leblanc, pers. comm. 2013). The dispensary will receive patients and stabilize their conditions but may be transferred to the Sept-Îles Hospital if they require further care. Patients from Newfoundland and Labrador are generally sent to the hospital in western Labrador for further treatment.

In response to the pressures on health services, the Québec Minister of Health announced an investment of $23 million in the health infrastructure of Kawawachikamach, Schefferville and Fermont to be allocated over the next 10 years. The investment targets only physical infrastructure, with investments in staffing promised in response to demand. Of the total, $16 million is allocated to construct a new CLSC in Naskapi and $6 million is earmarked for the expansion of the Schefferville CLSC and the erection of housing for on-call doctors (Lecavelier 2012).

Western Labrador Communities

The Captain William Jackman Memorial Hospital, located in Labrador City, is a fully accredited health facility which serves western Labrador. It has 20 beds, six of which are designated long-term care beds for levels three and four nursing care. Fourteen beds are for acute care. Inpatient units provide care to medical, surgical, obstetrical, pediatric, respite, palliative, and intensive care patients.

The hospital is served by six family physicians, a general surgeon, and an anaesthesiologist. There are also a number of visiting specialists who come to the hospital on a regular basis (Labrador-Grenfell Health 2007). In western Labrador, dental services are provided by fee-for-service dentists. There are two dentists in the area, while one other visits for two weeks each month.

Construction of a new hospital for western Labrador began in 2011 and the hospital opened in November 2014. It has 14 acute and 14 long-term care beds, general laboratory and x-ray services, a computed tomography scanner, surgery suites, satellite dialysis and community services (NLDHCS 2011). The new hospital was allocated approximately $25.7 million through the 2012 provincial budget. The hospital will represent an overall investment of approximately $90 million (NLDHCS 2012).

There is a Medical Clinic in Wabush which is staffed by one doctor.

The Labrador West Community Needs Assessment report indicated that local health infrastructure is increasingly able to deal with the bulk of the population's health care needs, particularly as a result of recent investments in medical equipment and the construction of a new hospital. The assessment report also states that, although the existing physicians' practices are not calling for a recruitment campaign to bring other general practitioners to the community, the population could support one or two additional general practitioners (Labrador West Chamber of Commerce 2010).

Labrador-Grenfell Health has a Child, Youth and Family Services office in western Labrador. It has the mandate to provide child protective intervention services, youth services, adoption services, family and rehabilitative services, community corrections, child care services and residential services (Labrador Grenfell Health 2007).

Mental Health Services are provided at the Captain William Jackman Memorial Hospital. It has two addictions counselors, one addictions coordinator/officer, 4.5 mental health counselors as well as the regional mental health and addictions clinical manager. There is a need for a full-time psychiatrist in western Labrador. A psychiatrist visits the area twice a year while Labrador-Grenfell health tries to recruit someone on a more permanent basis (Vrbanic 2011a). Wait times for mental health counseling in Labrador City have been up to four to six weeks, as position vacancies are a challenge to the department (Aura Environmental Research and Consulting Ltd. 2008). The hiring of an intake worker to oversee and manage mental health and addictions referrals in Labrador West has resulted in a substantial improvement in the assessment and prioritization of clients on the wait list, thereby resulting in a considerable increase in the number of client visits (Labrador-Grenfell Health 2013).

21.5.3.4 Safety

Québec Communities

In remote areas of Québec, including Schefferville and Matimekush-Lac John, police services are provided by the Sûreté du Québec through the Poste auxiliaire de la MRC de Caniapiscau in Schefferville. In March 2013, it had four permanent officers and there are plans to increase this number to six over the coming year (J.C. Filion, pers. comm. 2013).

Policing in Kawawachikamach is provided by the Naskapi Police Force, which receives assistance from the Sûreté du Québec upon request. In 2019, the Naskapi Police Force had six permanent officers (Statistics Canada 2020). The Naskapi Police Force also enlists the services of security guards and police helpers. More than 63% of the Police Force's interventions, which numbered 189 during 2009-10 were alcohol-related. Police interventions in Kawawachikamach increased by 38% in 2009-10 in comparison to the average of the previous eight years, but this may be due to an increase in police coverage (Naskapi Nation of Kawawachikamach 2010). Between April and August 2016, there were a total of 31 filed complaints involving domestic violence in Kawawachikamach, 24 of which were made against men and 7 against women. Among the filed complaints, 20 involved alcohol abuse and 2 involved drug abuse. (Naskapi Nation of Kawawachikamach 2018)

The Sûreté du Québec patrols the roads and highways and also responds to calls from the community. In 2011-12, the Sûreté du Québec reported a total of 125 vehicle collisions involving on-road vehicles, off-road vehicles such as all-terrain vehicles, and snowmobiles and boats. This represents a 31% increase over 2010-11 (Sûreté du Québec 2012).

Property crimes reported for the 2011-12 year totaled 112, which represents an increase of approximately 30% over the previous year and a 37% increase over 2009-10 levels. Misdemeanors were the most commonly reported type of property crime with 36 incidents, followed by break-ins (32 reported incidents), theft (24) and vehicle theft (14) (Sûreté du Québec 2012). Crimes against persons increased approximately 45% between 2010-2011 and 2011-2012. Of the 97 crimes against persons committed in 2011-12, 66 involved conjugal violence or abuse. This represents a 20% increase over the preceding year, but a 28% decrease from 2009-2010 levels. The rate of reported incidence of conjugal violence and abuse in 2011 was 483 per 100,000 inhabitants in the region, much higher than the average of 277 incidents per 100,000 inhabitants for the province as a whole. In 2011, a total of 10 incidents were reported in Schefferville and 17 in Matimekush (Laforest and Maurice 2012; Sécurité du Québec 2012).

Western Labrador Communities

Police services are provided to Labrador City and Wabush by the Royal Newfoundland Constabulary (RNC). As of May 15, 2013, the RNC had 26 employees in western Labrador, of which 21 were police officers and five were civilian staff. This number is down from 22 police officers in 2011. In 2011, there were 203 police officers per 100,000 population in western Labrador. This is lower than the officer per population ratio for Corner Brook (222 officers per 100,000 population) but higher than the ratio for the Northeast Avalon (171 officers per 100,000 population) (RNC 2012, 2014).

Calls for police service in Labrador have been on the rise since 2009, when calls numbered 2,939. In 2013, there were 3,419 calls for police service in Labrador, up approximately 3% from 3,326 in 2012 (RNC 2014). In 2012, Labrador City and Wabush residents placed 3,175 calls for services (Newfoundland and Labrador Department of Justice 2012). Community crime rates in western Labrador are generally well below provincial averages (on average 29% below the RNC's reported crime rate in its other jurisdictions for the 2009 fiscal year of April 1, 2009 to March 31, 2010), although there is a perception that drug-related crimes in particular are getting worse and are not captured in the crime rate data the RNC collects (Labrador West Chamber of Commerce 2010).

21.5.3.5 Housing and Accommodations

Québec Communities

In total, the Québec communities near the Project site contained 431 occupied dwellings in 2016. The majority of these units are band housing (Statistics Canada 2017).

There is a shortage of housing in Kawawachikamach. In 2009-10, the housing stock comprised approximately 158 single-family dwellings, duplexes, apartments, maisonettes, and cottages, including two units constructed in 2009-2010. In 2011, there were 169 private dwellings in Kawawachikamach, 149 of which were occupied (Statistics Canada 2012). All of these units were owned by the Naskapi Nation of Kawawachikamach and maintained with funds from its operations and maintenance budget. They are allocated on a first-come-first-served basis. The Naskapi Nation of Kawawachikamach maintains a chronological list of housing requests, and at the end of the 2009-10 fiscal year, there were approximately 113 outstanding applications for housing (Naskapi Nation of Kawawachikamach 2008, 2010). As of 2016, there are 160 privately occupied dwellings in Kawawachikamach, 155 of which is owned and operated by the Naskapi Nation of Kawawachikamach (Statistics Canada 2017).

In 2006, there were 197 private dwellings in Schefferville; however, only 95 were occupied, down from 110 in 2001, a decrease of approximately 14%. Of these occupied dwellings, 15 were privately owned with an approximate average value of $54,700, and 60 were rented (Statistics Canada 2002, 2007). Almost half (47%) of the dwellings in Schefferville were single-detached houses. The remaining housing consisted of semi-detached houses (approximately 32%) and small apartment buildings (approximately 21%) (Statistics Canada 2007). In 2011, the number of private dwellings in Schefferville had decreased to 178, of which 110 were occupied (Statistics Canada 2012). Between 2011 and 2016, the population continued to decline by 27.2%, and the number of private dwellings being occupied had declined to just 76 (Statistics Canada 2017).

In 2006, there were 172 residential units in Matimekush and 12 in Lac-John (AANDC 2011). In 2011, there were 212 housing units in Matimekush-Lac John and of these, 179 were occupied (Statistics Canada 2012). There is also a residence for teachers in the community (CPNIMLJ 2012). Following an increase in population of 13.5% between 2011-2016, the number of private dwellings also increased to 225, 194 of which are privately occupied (Statistics Canada 2017).

Temporary Accommodations

There are four hotels in the Schefferville region: the Hôtel Auberge Guest House, the Hôtel-Motel Royal, the Hôtel du Bla Bla and the Hôtel Innutel Rodeway (CLD de la MRC de Caniapiscau 2018).

Occupancy rates depend on the regional mining activities, especially during the summer. These rates have declined slightly over 2011-2013 (C. Shatter, pers. comm. 2013; S. Fortier, pers. comm. 2013). Due to its location, Schefferville has very little room to expand: it is surrounded by the Matimekosh Reserve, Lac Pearce, and land owned by Transport Canada (New Millennium Capital Corp. 2010).

Western Labrador Communities

In Labrador City, the number of occupied dwellings increased by 3.2% between 1991 and 2006, from 2,695 to 2,780. In 2006, 78.8% of these were owned and 21.4% were rented. By 2011, the number of occupied private dwellings increased 2.8% to 2,859. In 2016, the number of occupied private dwellings was 3,450. The average value of a home in Labrador City in 2016 was $267,395 and the average monthly rent was $892 (Statistics Canada 2007, 2012, 2017).

Between 1991 and 2006, the number of occupied private dwellings in Wabush increased from 680 to 690 (1.5%). The majority (84.1%) was owned and 15.2% was rented in 2006. By 2011, the number of occupied private dwellings increased 6.2% to 733. In 2016, the number of occupied private dwellings was 745. The average value of a home in Wabush was $297,239 in 2016 and average monthly rent was $915 (Statistics Canada 2007, 2012, 2017).

Housing availability and affordability has fluctuated with changes in local economic conditions. Economic growth driven by prosperity in the mining sector had led to a shortage of housing and a major increase in housing prices. For example, a bungalow that would have cost between $100,000 in 2007 would have sold for approximately $350,000 in 2012 (Bailey 2012). However, as a result of declining iron ore prices, there have been several shutdowns and delays in the area, including the closure of Wabush Mines, which resulted in the loss of over 500 jobs (CBC News 2015). Associated changes in the local real estate market have included greatly reduced selling prices and rents, more homes on the market, and increased apartment vacancies (CBC News 2015).

In 2015, it was reported that a bungalow in Wabush that would have sold for over $350,000 in 2013 had dropped to approximately $220,000. A local real estate company in Labrador West indicated that houses listed for sale were on the rise, with the company listing approximately 145 homes for sale in 2015 (CBC News 2015).

Until 2015, the local rental market was characterized by low vacancy and high rents. In 2012, there were also reports of renters being evicted from their apartments once the buildings had been purchased by mining companies so that the units could be used to house mine workers (The Canadian Press 2012). Instances such as this one caused organizations such as the Labrador West Housing and Homelessness Coalition to push for rent control regulations in the province (CBC News 2012a). However, rents fell as contractors left the area. For example, in Wabush, bungalows in 2015 rented for approximately $1,500 per month compared to $4,000 per month during peak periods of demand (CBC News 2015).

Leveraging provincial funding for low-income housing is difficult for families in western Labrador because median salaries in that area are substantially above provincial averages. In January 2012, the Newfoundland and Labrador Housing Corporation changed the income required to qualify for social housing in western Labrador from $32,500 to $65,000 to help more people access affordable units. This is double the limit for the rest of the Province. As of January 31, 2012, ten families were on a waiting list for social housing in western Labrador (CBC News 2012b).

Demand on housing is also influenced by the fact that many people are choosing to remain in western Labrador once they retire. Past trends indicate that approximately 65% of retirees have chosen to maintain residency in western Labrador (Labrador West n.d.). Increasing rents mean that some low-income seniors had been displaced from homes (Jancewicz 2011). Despite a large and growing aging population in western Labrador, there is currently no seniors' residence in the community (Labrador Chamber of Commerce 2010), however, land has been identified for one by the Towns of Labrador City and Wabush and a promotional package has been developed to attract a developer to build, own and operate a seniors' complex at that site (Labrador West n. d.).

Affordable and social housing is obviously in great need in western Labrador. The most substantial shortage of housing is in the rental apartment category, since no new units were constructed between 2005 and 2010. Private sector developers have been responding to the local housing market demand, but largely through the importing of mini-homes, not the construction of rental units. The business case for affordable rental units is difficult to create in the context of a northern, resource-based community where long-term certainty on market conditions is elusive compared to southern, diversified, urbanized communities. In August 2014, the provincial government announced an investment of $280,000 through Newfoundland and Labrador Housing Corporation to help build a 10-unit apartment building for single-parent families in western Labrador. In addition to the apartments, the building will also provide a community space with offices for a housing support worker and other professionals in the fields of nursing, social work and mental health. Construction is anticipated to be completed by January 2015 (Newfoundland and Labrador Department of Education 2014).

To help solve the housing crisis, municipal councils in Labrador City and Wabush are encouraging local real estate developers to build new homes of all sizes in an effort to make housing more affordable. In addition, some mining companies are building additional accommodations for workers and offering housing subsidies (Jancewicz 2011). However, expanding the housing supply is a challenge in Labrador West where there is such a short construction season and much of the surrounding land has mineral rights attached to it. To address this, the Labrador City Town Council has changed bylaws to allow increased use of land inside the Town boundaries, by increasing the storage sizes allowed for apartments and by shrinking lot sizes to increase the overall number of lots available (Schmuel 2012).

New residential construction is underway in Wabush and Labrador City. Since 2010, both towns have put great efforts into new housing developments. There are ongoing developments in Labrador City's Harrie Lake district (mini homes) and Osprey Ridge (bungalows and some mixed development) and in Wabush's Jean Lake Estates (Viva Group 2014). Private residential developments will also continue in areas known as Hudson Drive West, Quartzite Crescent and Retty Extension (Town of Labrador City 2012). The most recent municipal plan for the Town of Wabush indicates that there is plenty of vacant land for future residential development in Wabush (Town of Wabush, n. d.(b)).

As discussed above, reduced iron ore prices in 2014 have led to mine closures, including Wabush Mines, and to the suspension of other planned mining developments in western Labrador. Many workers who moved to western Labrador for work in the mining industry may now struggle to pay mortgages on expensive homes. Since 2014, houses in the area continue to drop in value, leading to a drastic change in 2019. The town of Wabush passed a budget, which included almost doubling of the town's property tax mill rate from 4.9 to 8.9 (CBC News 2019). At this point, it is uncertain how the housing market will respond to the recent recovery of iron ore prices, but a revival of mining activity in western Labrador may bring much needed support.

Temporary Accommodations

Labrador City has four hotels/motels, bed-and-breakfasts and inns, which offer more than 100 rooms between them, and Wabush has one hotel with 83 rooms (Newfoundland and Labrador Tourism 2012). The newest of these is the Northern Inn and Suites in Labrador City, which has 24 rooms, and it is fully pre-booked on a year-long lease by an IOC contractor (Labrador West Chamber of Commerce 2010). The occupancy rate in western Labrador has been increasing in recent years. In 2011, the occupancy rate was 82.7%, up 13.4% from the previous year (NLDTCR 2011, 2012).

The use of short-term accommodation as housing for contract workers in western Labrador has led to a shortage of room availability for travelers, sports teams and created client overflow for the local women's shelter. There have been reports of travelers being unable to find rooms in western Labrador (Labrador West Housing and Homelessness Coalition 2011).

Hope Haven, a shelter and resource facility for women and children escaping domestic abuse, opened in 2004. With 10 employees, Hope Haven has the capacity to house nine residents for a six-week period. Occupancy at the shelter has increased substantially in recent years and it now has residents almost every day of the year. In 2008, Hope Haven handled 59 crisis telephone calls and accommodated 59 individuals (32 women, 27 children). Hope Haven had at least one resident 70% of the 2008 calendar year (260 days) and in 2009 the house was occupied for 321 days (Goss Gilroy Inc. 2009; Vrbanic 2010). The shelter had plans to expand with the addition of ten new affordable housing units in 2008; unfortunately, this project was cancelled (M. Kelly, pers. comm. 2012).

The Labrador West Status of Women Council provides supportive counseling for women in crisis, single mothers, senior care, sexual harassment/assault, senior women, women's health issues, child care, family dating violence and discrimination. It also provides outreach-general information sessions, mediation services and referrals to agencies, such as legal aid, social service supports, and employment services (Labrador West Status of Women of Council n.d.).

There are no emergency accommodations for men or youth in western Labrador. Based on information provided by stakeholders to the Labrador West Community Plan on Housing and Homelessness (Labrador West Housing and Homelessness Coalition 2011), a general-purpose emergency accommodation facility is needed in the area.

IOC owns and operates the Labrador Lodge, a worker camp which was constructed to provide accommodations and logistical support for contractors and workers servicing IOC mining operations in Labrador City. In 2011, the company expanded its temporary workers camp and doubled its capacity (Vrbanic 2011b). Also, in 2011, a former Labrador City school was refurbished and turned into 80 apartments to house IOC workers. In March 2012, IOC completed an apartment building in Labrador City, which will provide short-term accommodations to new employees relocating to western Labrador. The building has 32 two-bedroom units and 16 three-bedroom units. IOC has also constructed 25 new townhouses in Wabush (VOCM 2012).

21.6 Assessment of Project-Related Environmental Effects

During consultation with stakeholders and local residents the issue of waste management, particularly raw sewage from the camp, was raised. Sewer systems in the Quebec communities are very old and those in western Labrador are at or near capacity, although the Wabush Town Council has plans to spend over $12,000,000 to upgrade the wastewater treatment plant in the near future. As a result of these concerns, waste management has been rated 2 for Construction and Operation and Maintenance (Table 21.4).

Labec Century plans to deal with domestic sanitary waste by installing commercially available waste water treatment units in four locations, including the mine site, the processing plant, accommodations camp, and the rail yard. Maintenance of the facilities will be conducted in compliance with applicable legislation. In response to these concerns, Labec Century prepared presentation materials which were used at consultation events to show the company’s commitment to environmental compliance.

Domestic solid waste sources, including waste from office and lunchroom activities, and construction wastes, will be disposed of in compliance with the applicable Newfoundland and Labrador regulations. All hazardous wastes generated on-site will be disposed of by a licensed contractor and in compliance with applicable regulations. Domestic solid waste will be separated into recyclable and non-recyclable portions, and sent to licensed facilities. A Project Waste Management Plan will be developed to manage domestic waste, waste water, and hazardous wastes.

Since the Project will not place demands on municipal sewer services and infrastructure of LSA communities because of the installation of groundwater wells and water treatment units, effects of the Project on waste management are expected to be not significant.

Table 21.4 Summary of Residual Environmental Effects – Community Services and Infrastructure

Project Phase	Mitigation/Compensation Measures	Direction	Residual Environmental Characteristics: Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Capacity of Community Services and Infrastructure											
Construction	• Installing waste treatment units and filtration system • Waste Management Plan	A	I	WL/ QC	ST	U	N/A	N/A	N	H	No follow-up or monitoring recommended
Operation	• Installing waste treatment units and filtration system • Waste Management Plan	A	I	WL/ QC	ST	U	N/A	N/A	N	H	No follow-up or monitoring recommended
Closure and Decommissioning	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Key:

Direction:
P Positive
A Adverse
N Neutral

Magnitude:
R Reduces existing levels
N Adds nothing to existing levels
I Adds to existing levels

Geographic Extent:
QC Québec communities
WL Western Labrador

Duration:
ST Short term
MT Medium term
LT Long term
P Permanent – measurable parameter unlikely to recover to baseline.

Frequency:
U Unlikely to occur
O Occurs once
S Occurs sporadically at irregular intervals
R Occurs rarely
F Occurs regularly
C Continuous

Reversibility:
R Reversible
I Irreversible

Environmental or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity
D Disturbed: Area has been substantially previously disturbed by human development or human development is still present

Significance:
S Significant
N Not Significant

Prediction Confidence:
L Low level of confidence
M Moderate level of confidence
H High level of confidence

N/A Not Applicable

21.7 Assessment of Cumulative Environmental Effects

A summary of interactions resulting from other projects and activities with Community Services and Infrastructure is presented in Table 21.5.

Table 21.5 Potential Cumulative Environmental Effects

Other Projects and Activities with the Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects
Champion Iron Ltd. Kami Iron Ore	1
Arcelor-Mittal Mont Wright Mine	1
Champion Iron Ltd. Fire Lake North Iron Ore Project	1
Tacora Resources Inc. Scully Mine	1
Champion Iron Ltd. Bloom Lake Mine and Rail Spur	1
IOC Labrador Operation	1
Lower Churchill Hydroelectric Generation Project	1
Maritime Transmission Link Project	1
LIM Houston 1&2	1
Tata Steel Minerals Canada - DSO Iron Ore Project	1

Key:
0 Project environmental effects do not act cumulatively with those of other projects and activities.
1 Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of best management or codified practices.
2 Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

An assessment was conducted of the potential cumulative effects of the Project in combination with those of other past, present, and future projects and activities. All identified other projects and activities in the Province have the potential for cumulative effects with the Project; however, with the application of best management practices and mitigation measures, these are unlikely to diminish the capacity of Community Services and Infrastructure beyond acceptable levels.

Municipal infrastructure, including waste management, is the responsibility of individual municipalities. Labec Century will install waste water treatment units and a filtration system to deal with Project waste so the Project will not likely affect community sewage infrastructure. The company is committed to disposing of Project waste in compliance with the applicable Newfoundland and Labrador regulations. Labec Century will communicate relevant Project information to municipal authorities to reduce any effects on Community Infrastructure and Services.

Typically, resource development projects in western Labrador manage their own waste with Project landfills and all future development projects will be responsible for building their own septic systems. As a result, the cumulative effects of the Project in combination with other projects and activities on Community Services and Infrastructure are predicted to be not significant.

21.8 Accidents and Malfunctions

The accidents and malfunctions scenarios that could affect Community Services and Infrastructure include:

- Hydrocarbon spill;
- Train derailment; and
- Forest fire.

21.8.1 Hydrocarbon or Fuel Spill

21.8.1.1 Emergency Response/Mitigation of Environmental Effects

Since the Labrador/Québec border in the vicinity of the Project is a drainage divide, there are no protected water supply areas with which Project effluent could interact. Therefore, it is not likely that a hydrocarbon or fuel spill would contaminate the water supplies of the Québec communities. Similarly, such a spill would not likely affect the water supplies in western Labrador due to the distance of the Project from these communities. Labec Century will also implement preventative and response measures to reduce the likelihood effects of such an incident. For instance, diesel and fuel storage tanks will be designed to mitigate and reduce the probability of accidents and malfunctions. The fuel storage tanks will be located in secondary containment to control spills and will comply with requirements of the applicable provincial and federal regulations and guidelines, and the conditions of the permits and authorizations.

As part of the Emergency Response Plan and Spill Response Plan, spill prevention and response protocols will include the inspection of vehicles and hydraulics for leaks or damage. Vehicles and equipment will be stored in controlled areas where containment of spills can be provided. Staff will be trained in the handling of emergency response and spill scenarios. Response equipment stored on site will include containment and absorbent booms, pads, barriers, sand bags, and skimmers, as well as natural and synthetic absorbent materials. The Emergency Response Plan and Spill Response Plan will include the identification of persons responsible for managing spill response efforts, including their authority, role and contact details, and a description of steps to take to immediately contain and recover spills. In the event of a spill, hydrocarbon-saturated soil will be removed for temporary storage, and eventual treatment/disposal.

21.8.1.2 Characterization of Residual Environmental Effects

As a result of mitigation measures implemented by Labec Century, the residual adverse environmental effect of a hydrocarbon or fuel spill on Community Services and Infrastructure is predicted to be not significant. This prediction is made with a high level of confidence.

21.8.2 Train Derailment

A train derailment could lead to the sudden deposition of materials (e.g., iron ore concentrate) or contaminants (such as fuel) onto adjacent terrain. Deposition of contaminants may compromise habitat, as well as fish and animal health. Derailment may lead to restricted access in the area and potential avoidance due to fears of contaminated fish and/or wildlife. Avoidance would likely last far longer than the direct effects of the spill and as a result, the effects of a train derailment have the potential to be of moderate duration within the LSA and would be reversible.

Iron ore product will be transported by truck from the Project site to the Astray rail loop which connects directly to the Tshiuetin/QNS&L railway for transport to Sept-Îles. Diesel fuel will be transported by rail to Schefferville and then by contracted trucker to site. On average, iron ore will be transported on approximately four trains each week during summer months between the Astray rail loop and the Sept-Îles port. Each train set will carry approximately 24,000 tonnes of ore in 240 gondola cars. Based on the speed the train will be travelling in the rail loop (5 miles per hour or 8 km/h), the reasonable worst case is the derailment of a maximum of four to five cars. This could result in the iron ore being spilled onto the ground or at stream crossings. Such an event is highly unlikely.

It is estimated that diesel fuel transport frequency will be a maximum of six 96,000 L tank cars per week for all site purposes.

Fuel tank car numbers are based on shipment in standard 96,000 L tank cars similar to those already in fuel haulage service between Sept-Îles and Labrador City. In a reasonable worst case scenario (i.e., where six tanks of diesel fuel are de-railed), approximately 576,000 L (127,000 Imperial gallons) of diesel fuel could be released.

21.8.2.1 Emergency Response/Mitigation of Environmental Effects

A train derailment could cause damage to Community Services and Infrastructure, including the railway and nearby roads, causing them to temporarily close. Such an event might require emergency response and medical assistance, which would place additional demands on these services. The recovery initiatives would include the repair or reconstruction of the infrastructure and could last for an extended period. A train derailment would not contaminate the local water supply of LSA communities due to the existence of a drainage divide between Labrador and Québec and the distance of the railway from the water supplies of the Western Labrador communities. However, in the event of an accident at the Project site or in transit, appropriate emergency response procedures will be implemented.

The trains will be operated under current Tshiuetin/QNS&L environmental and safety procedures. A detailed Emergency Response and Spill Response Plan will also be developed by Labec Century. This plan will include measures such as:

- Immediate response through the use of absorbent booms and pads;

- Liquid clean up using a vacuum truck, where available (both fuel and groundwater);
- Reclamation of contaminated soils, removal of contaminated soils and replacement with clean soil.

Additional mitigation measures to be implemented to limit the potential for a train derailment include:

- Manual inspection of rolling stock to confirm there are no problems with the wheels, couplers, carbody or brakes;
- Track inspections in accordance with Transport Canada regulations;
- Properly maintained equipment; and
- Fuel transport amounts will be limited to the amounts required by the Project.

To reduce the likelihood of such an event, emphasis will be placed on safety and accident prevention. Effective and rapid response procedures will be in place, in the unlikely event of a Train Derailment.

21.8.2.2 Characterization of Residual Environmental Effects

As a result of mitigation measures implemented by Labec Century, the residual adverse environmental effect of a train derailment on Community Services and Infrastructure is predicted to be not significant (i.e., it would not exceed the existing capacity of the infrastructure or decrease the quality of the associated service system on an ongoing and consistent basis during the life of the Project). This prediction is made with a high level of confidence.

21.8.3 Forest Fire

Although unlikely, Project activities involving the use of heat or flame could result in a fire. Fires can alter habitat, disrupt transportation networks and place demand on emergency response forces. The extent and duration of a fire would be dependent on response efforts and meteorological conditions.

21.8.3.1 Emergency Response/Mitigation of Environmental Effects

Fire suppression water systems will be maintained on site. The fire suppression water supply at the mine and processing sites will be extracted from Attikamagen Lake and stored in water reservoirs prior to use. The fire suppression water at the rail loop will be extracted from Astray Lake. Staff will be trained to prevent and control fires. A plan for preventing and combating forest fires will be incorporated into the Emergency Response and Spill Response Plan.

The nearest district forest management unit office in Labrador is in Wabush, which has staff and equipment to provide initial suppression activities. The Town of Schefferville also provides fire control services. Labec Century is discussing a reciprocal response arrangement with the Town of Schefferville, approximately 20 km away from the site. In the event of a fire, the on-site response and proximity of fire suppression services in Schefferville will limit the size of any burn.

In the unlikely event of a large fire, local emergency response and fire-fighting capability will be called to respond to reduce the severity and extent of damage and to protect the safety of workers.

21.8.3.2 Characterization of Residual Environmental Effects

The effects of a forest fire caused by the Project on Community Services and Infrastructure are not anticipated to exceed system capacity. Therefore, the residual adverse effects of a forest fire caused by the Project on municipal services and infrastructure in the Québec communities and western Labrador is predicted to be not significant. This prediction is made with a high level of confidence.

21.8.4 Summary of Residual Effects Resulting from Accidents and Malfunctions

Residual environmental effects resulting from accidents and malfunctions are summarized in Table 21.6.

21.9 Determination of Significance of Residual Adverse Environmental Effect

21.9.1 Project Residual Environmental Effects

Due to the Project's relatively small workforce, short operation phase, use of accommodation camp and other Labec Century-owned housing, and employee work schedule, it is very unlikely that any workers and their families will move to the LSA communities. Therefore, it unlikely that there will be an effect on community social or physical infrastructure or services as a result of Project-related population increase.

The issue of waste management, particularly raw sewage from the camp, was raised during consultation with stakeholders and local residents. However, as a result of planned mitigations, such as the installation of commercially available waste water treatment units, and the use of a Waste Management Plan to manage domestic waste, waste water, and hazardous wastes, wastes will be managed so as to avoid contamination of the surrounding environment.

Effects on Community Services and Infrastructure are expected to be adverse and add to existing levels for the short term. However, since the Project will not place demands on municipal sewer services and infrastructure of LSA communities because of the installation of groundwater wells and water treatment units, effects of the Project are expected to be not significant.

Table 21.6 Summary of Residual Environmental Effects – Accidents and Malfunctions

Project Phase	Emergency Response/Contingency Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context			
Operation and Maintenance											
Fuel Spill	• Implementation of ERP	A	R	WL/QC	ST	N	N/A	N/A	N	H	No follow-up or monitoring recommended
Train Derailment	• Implementation of ERP	A	R	WL/QC	ST	N	N/A	N/A	N	H	No follow-up or monitoring recommended
Forest Fire	• Implementation of ERP	A	R	WL/QC	ST	N	N/A	N/A	N	H	No follow-up or monitoring recommended

Key:

Direction:
P Positive
A Adverse
N Neutral

Magnitude:
R Reduces existing levels
N Adds nothing to existing levels
I Adds to existing levels

Geographic Extent:
QC Québec communities
WL Western Labrador

Duration:
ST Short term
MT Medium term
LT Long term
P Permanent – measurable parameter unlikely to recover to baseline.

Frequency:
N Not likely to occur
O Occurs once
S Occurs sporadically at irregular intervals
R Occurs rarely
F Occurs regularly
C Continuous

Reversibility:
R Reversible
I Irreversible

Environmental or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity
D Disturbed: Area has been substantially previously disturbed by human development or human development is still present

Significance:
S Significant
N Not Significant

Prediction Confidence:
L Low level of confidence
M Moderate level of confidence
H High level of confidence

N/A Not Applicable

21.9.2 Cumulative Environmental Effects

Resource development projects in western Labrador typically manage their own waste with Project landfills and all future development projects will be responsible for building their own septic systems. Labec Century will install waste water treatment units and a filtration system to deal with Project waste so the Project will not likely affect community sewage infrastructure. The company is committed to disposing of Project waste in compliance with its Waste Management Plan and with the applicable Newfoundland and Labrador regulations.

Municipalities are responsible for maintaining and monitoring their own services and infrastructure. Where service and infrastructure improvements are made, all projects and users generally could benefit. Labec Century will communicate relevant Project information to municipal authorities to reduce any effects on Community Infrastructure and Services.

With the application of best management practices and mitigation measures, the cumulative effects of the Project in combination with other projects and activities on Community Services and Infrastructure are predicted to be not significant.

21.9.3 Accidents and Malfunctions

The residual adverse environmental effect on Community Services and Infrastructure resulting from accidental events is not significant. This determination has been made with a high level of confidence because Labec Century will have a number of emergency and safety plans and procedures in place to reduce the likelihood and effects of accidents and malfunctions on Community Services and Infrastructure. In addition, Labec Century will have emergency services available to respond immediately to accidents and malfunctions.

21.10 Follow-up and Monitoring

The monitoring of demands on community services and infrastructure is within the mandate of the relevant government departments and agencies, as part of their normal planning processes. For example, municipal authorities track housing demand, housing starts and residential land supply as inputs to local planning decisions. Labec Century will assist by liaising with these departments and agencies, as requested, and through the timely provision of information about Project activity and plans.

21.11 Summary

Community Services and Infrastructure was selected as a VC because the Project has the potential to affect the ability of nearby communities, Schefferville, Matimekush-Lac John and Kawawachikamach in Québec, as well as the nearest communities in Labrador, Labrador City and Wabush, to deliver physical and social services and infrastructure.

However, the Project will likely have negligible short-term effects on Community Services and Infrastructure, due mainly to the small work force that will be required during construction and operations and maintenance. Some of the workers will already be residents of the LSA communities and the remainder will come from other parts of the province and elsewhere, therefore, the effects on any one community will be diluted. In addition, work rotations will allow workers to travel to their original place of residence during their time off and, as a result, they will continue to use the services and infrastructure of their home communities. Finally, the accommodations camp and other housing provided by Labec Century will likely house all non-local workers requiring shelter during the Project construction and operations. The camp will provide most major services required by employees to live comfortably, therefore, their use of services and infrastructure of the communities within the LSA will be minimal.

Although accidents and malfunctions caused by the Project are unlikely, they would have the potential to affect Community and Services should they occur. However, Labec Century will have a number of mitigations in place to reduce these effects. These include the ERP, as well as training Project personnel to respond to accidents and malfunctions and placing paramedic personnel at the Project site. As a result of these mitigations, it is likely that the adverse effects of accidents and malfunctions on Community Services and Infrastructure will be not significant.

Follow-up and monitoring of effects will be the responsibility of the appropriate government departments and agencies. However, Labec Century will continue to evaluate potential Project-related implications of the use of local, regional and provincial infrastructure and services. This will include direct Project requirements, as well as indirect and induced increases in use of and demand for infrastructure and services by Project workers and their families.

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Joyce Lake Direct Shipping Iron Ore Project:

Chapter 22:

Economy, Employment and Business

File No. 121416571

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22.0 ENVIRONMENTAL ASSESSMENT – ECONOMY, EMPLOYMENT AND BUSINESS

As detailed in chapter 1, Joyce Direct Iron Inc. succeeded Labec Century Iron Ore Inc. ("Labec Century") as the Project Proponent on February 18, 2021 following an internal reorganization. All references to Labec Century as the Project proponent may be interpreted as now referring to Joyce Direct Iron Inc.

22.1 VC Definition and Rationale for Selection

Economy, Employment and Business (EEB) was selected for environmental assessment to satisfy requirements under Section 4.23 of the NLDOECC EIS Guidelines for the Joyce Lake Direct Shipping Iron Ore Project (the Project). Understanding the Project's effects on EEB is fundamental to assessing socio-economic implications for the lives of residents and of revenues to governments.

While small relative to most mines, the Project is expected to generate economic benefits through all phases, including contributions to government revenues through GDP, taxes, and royalties. The Project will also result in regional and provincial employment and contract procurement. Implementation of a Project Benefits Plan and Gender Equity and Diversity Plan subject to approval by the Government of Newfoundland and Labrador will enhance economic benefits, including those realized by under-represented groups such as women, Indigenous people, and persons with disabilities. EEB has been selected as a VC because of the opportunity for the Project to contribute to the economy of Labrador and the Province as a whole. Project effects associated with EEB are generally of interest to the public and to the Government of Newfoundland and Labrador.

In accordance with the NLDOECC EIS Guidelines, the assessment of EEB considers the following:

- Economy of Labrador and the rest of the Province;
- Taxes and royalties;
- GDP;
- Employment in Labrador and the rest of the Province;
- Skilled and unskilled labour supply in Labrador and the rest of the Province;
- Employment equity and diversity, including under-represented groups (e.g., women, persons with disabilities, Indigenous groups);
- Expenditures in Labrador and the rest of the Province;

- Business capacity: goods and services; and
- Economic activities related to tourism.

The Project is expected to have positive effects on EEB through the direct, indirect, and induced effects of Project expenditures on labour, supplies, and services. Effects may also include benefits to economically disadvantaged groups such as women, Indigenous people, and persons with disabilities. There are linkages between this VC and Chapter 21: Community Services and Infrastructure, as Project employment has potential to influence population, which is the primary driver for potential effects on services and infrastructure.

22.1.1 Approach to Assessment of Effects

The economic effects of the Project were assessed by standard methods, whereby the anticipated effects of Project employment and expenditures are measured against current economic conditions. The potential effects of employment and expenditures were identified through consultation with regulators, including NLDIET, and engagement with stakeholders such as labour organizations, education and training institutions, Indigenous groups, and local communities (see Section 22.2.2). The mechanisms for potential economic effects resulting from a project of this size are well-understood, based on past experience with similar projects and information collected on baseline economic conditions.

A detailed characterization of baseline economic conditions is provided in Section 22.5 (Existing Environment). The information was collected from a wide range of secondary sources and supplemented through the Proponent’s consultation and engagement activities. The information collected from these sources provides a reliable description of the existing environment for the purpose of the effects assessment.

22.2 Scope of the Assessment

22.2.1 Regulatory Setting

Assessment of Project effects on EEB is required by the NLDOECC EIS Guidelines for the Project. The economic effects of the Project also have potential to interact with the socio-economic conditions of Indigenous communities, which must be addressed according to the IAAC EIS Guidelines. According to the NLDOECC EIS Guidelines, the EIS must also include commitments to develop and submit a Newfoundland and Labrador Benefits Plan that meets the approval of the Minister of Natural Resources, as well as a Gender Equity and Diversity Plan that meets the approval of the Minister of Natural Resources and the Minister Responsible for the Status for Women.

The EIS must also include commitments to:

- provide quarterly reports to that meet the approval of the Minister of Immigration, Population Growth and Skills during the construction phase, as well as for the duration of the operations phase, including information by gender on the following;
  - the number employed (by 4-digit National Occupation Code 2006),
  - the number of full-time/part-time employees,
  - the number of apprentices (by level) and journeypersons,
  - Indigenous organizations, and
  - source of the workforce.

22.2.2 Influence of Consultation and Engagement on the Assessment

Labec Century has engaged and consulted with a variety of stakeholders, Indigenous groups, and members of the public throughout the EA process, and is committed to being responsive to questions and concerns that arise. Accordingly, these issues are included in the assessment of the VC. Details on the issues raised by stakeholders are provided in Table 22.1.

Table 22.1 Issues Raised by Indigenous Groups and Stakeholders

Question / Issue	Community/ Organization	Summary of Comments	Response
Employment	Naskapi of Kawawachikamach Elders and Band Council	Concern about the ages of the workforce Question about how people can find employment with the Project	Opportunities will not be limited to younger residents. Ability to do the work is the main consideration. Century promotes from within – a Naskapi resident who began as a helper is now being trained as a driller. In the past, Century has accepted referrals from the Band Council or from other Indigenous Employees.
Employment	Naskapi Nation of Kawawachikamach	Chief asked who will be responsible for hiring for the project. Chief Swappie explained that the Naskapi Nation Band Council had a Human Resources coordinator that would be able to provide a list of qualifications of suitable workers to assist in the hiring process.	It was explained that Leonard McKenzie would be assisting in the hiring process for projects and he will follow up with the Human Resources coordinator to obtain the list for future consideration.

Based on research conducted to establish existing conditions, stakeholder consultation, and experience with recent projects that are comparable in terms of scope and jurisdiction, it is anticipated that key issues associated with this VC are:

- Benefits related to employment and business contracts;
- Geographical distribution of economic benefits; and
- Issues related to economic benefits for diverse groups (e.g., benefits for women, Indigenous persons, and persons with disabilities).

Accordingly, the effects assessment for EEB will focus on these issues along with the items prescribed in the NLDOECC EIS Guidelines.

22.2.3 Temporal and Spatial Boundaries

The temporal boundaries for the environmental assessment include the Project phases of Construction, Operations and Maintenance, and Closure and Decommissioning. The temporal boundary for Construction is one year (pre-operation), for Operations and Maintenance is approximately seven years, and for Closure and Decommissioning is approximately one year.

The spatial boundaries for the environmental effects assessment of EEB are defined as:

Project Development Area (PDA): The PDA is the Project footprint as described in Chapter 2: Project Description.

Local Study Area (LSA): The LSA encompasses western Labrador (i.e., Economic Zone 2, as defined by the Newfoundland and Labrador Statistics Agency, which includes the Menihek region, where the Project is located) as well as the adjacent communities in northeastern Québec (Schefferville, Matimekush-Lac John, and Kawawachikamach) (Figure 22.1).

Regional Study Area (RSA): The RSA is defined as Labrador (Figure 22.1). However, because some measurable parameters for Economy (e.g., GDP) are only calculated at the provincial level, the RSA for Economy extends to the entire Province.

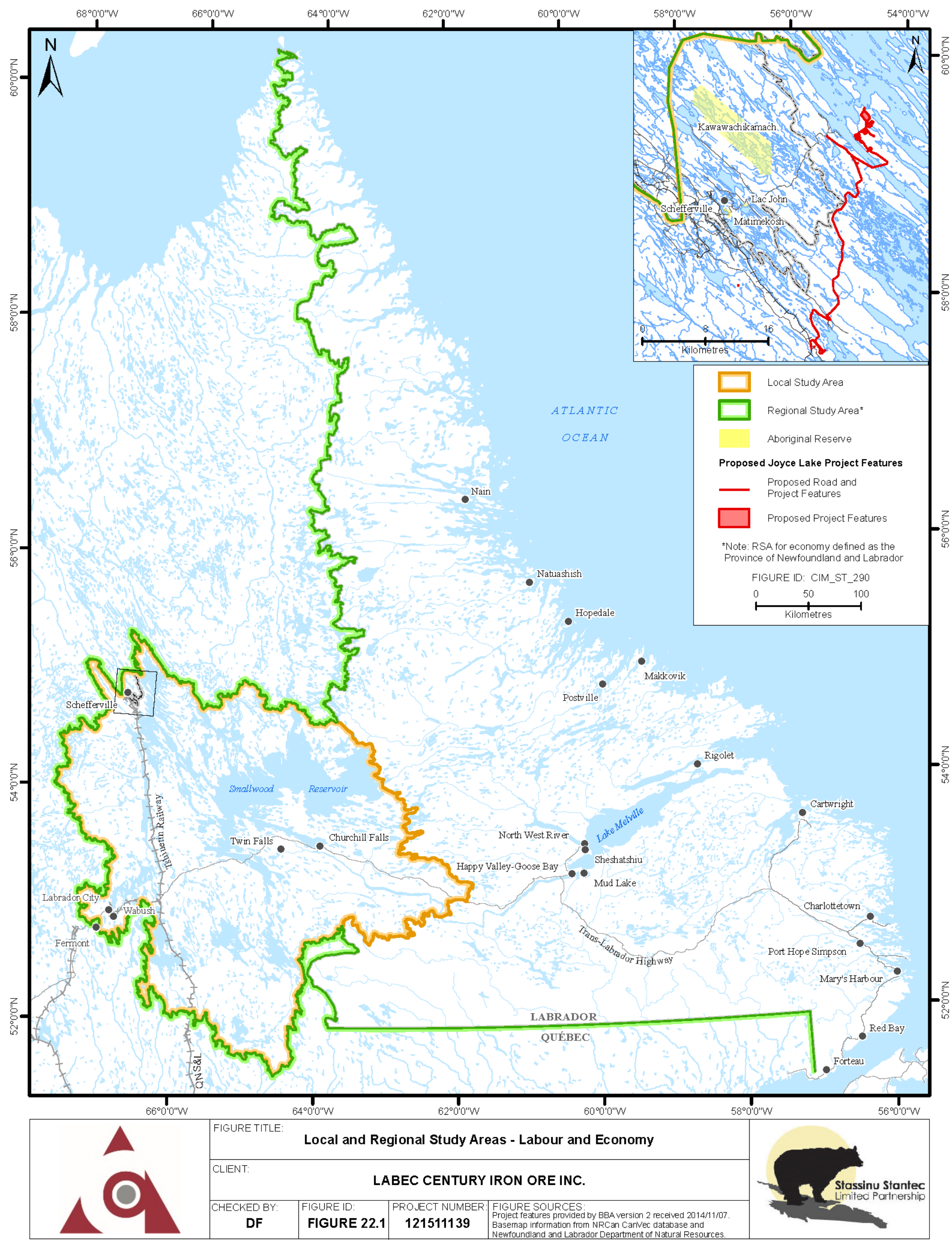


Figure 22.1 Local and Regional Study Areas

22.2.4 Selection of Environmental Effects and Measurable Parameters

The assessment of the effects of the Project on EEB is focused on each of these effects:

- Change in Economy;
- Change in Employment; and
- Change in Business.

The environmental effects and associated measurable parameters, with rationale, are summarized in Table 22.2.

Table 22.2 Measurable Parameters for EEB

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Economy	• GDP • Income • Taxes	GDP is a standard measure of the Project's economic effects. Direct/indirect/induced effects of Project expenditures, business taxes, and royalties, will contribute to provincial revenues
Change in Employment	• Employment in the Province, Labrador, and western Labrador • Employment of women and Indigenous persons	Direct/indirect/induced effects of Project employment will contribute to local, regional, and provincial economies and contribute to the well-being of economically disadvantaged groups
Change in Business	• Labrador business capacity • Women-led and Indigenous business capacity • Economic activities related to tourism	Project contracts will contribute to local, regional, and provincial, while enhancing business capacity and contributing to the well-being of economically disadvantaged groups. There is potential for the Project to interact with local tourism businesses.

22.3 Standards or Thresholds for Determining the Significance of Residual Environmental Effects

Terms that will be used to characterize residual environmental effects for EEB are in accordance with guidance provided by IAAC.

- Direction
  - Adverse: a decrease in the measurable parameters
  - Positive: an increase in the measurable parameters
  - Neutral: no net change in the measurable parameters

- Magnitude
    - Low: change in economic indicators (e.g., employment) within typical variation
    - Medium: change in economic indicators (e.g., employment) exceeding those experienced during typical economic cycles
    - High: change in standard economic indicators (e.g., employment) substantially and persistently exceeding those experienced during typical economic cycles
- Geographic Extent
    - Site-specific: effects are restricted to the PDA
    - Local: effects extend into the LSA
    - Regional: effects extend into the RSA
- Frequency
    - Unlikely: Not likely to occur
    - Once: Effect occurs occasionally, or once during the life of the Project (e.g., clearing)
    - Sporadic: Effect occurs sporadically, at irregular intervals, without any predictable pattern during the life of the Project (e.g., hydrocarbon spills)
    - Rarely: effect occurs infrequently
    - Frequently: Effect occurs on a regular basis and at regular intervals during the life of the Project
    - Continuous
- Duration
    - Short Term: 1 to 2 years
    - Medium Term: 2 to 5 years
    - Long Term: more than 5 years
    - Permanent
- Reversibility
    - Reversible: will return to baseline conditions after Project closure and reclamation
    - Irreversible: permanent

- Socio-economic Context
  - Low Resilience: low capacity for economic conditions to recover from an effect with consideration of the baseline conditions
  - Moderate Resilience: moderate capacity for economic conditions to recover from an effect with consideration of the baseline conditions
  - High Resilience: high capacity for economic conditions to recover from an effect with consideration of the baseline conditions
- Prediction Confidence
  - Low: low level of confidence
  - Moderate: moderate level of confidence
  - High: high level of confidence

A significant adverse residual socio-economic effect of the Project on EEB is one that is highly distinguishable from current conditions and trends; and cannot be managed or mitigated through adjustments to programs, policies, plans, or through other mitigation measures.

22.4 Potential Project-VEC Interactions

In Table 22.3, each Project activity and physical work for the Project is listed, and each interaction rated as 0, 1, or 2 based on the level of interaction associated with each activity or physical work.

Table 22.3 Potential Project Environmental Effects to EEB

Project Activities and Physical Works	Potential Environmental Effects		
	Change in Economy	Change in Employment	Change in Business
Construction			
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	0	0	0
Construction of Roads	0	0	0
Construction of Causeway	0	0	0
Construction of Site Buildings and Associated Infrastructure	0	0	0
Construction of Rail loop and Associated Infrastructure	0	0	0
Construction of Stream Crossings	0	0	0
Installation of Water Supply Infrastructure (wells, pumps, pipes)	0	0	0
Onsite Vehicle / Equipment Operation	0	0	0
Waste Management	0	0	0
Transportation of Personnel and Goods to Site	0	0	0
Expenditures	2	2	2
Employment	2	2	2

Table 22.3 Potential Project Environmental Effects to EEB

Project Activities and Physical Works	Potential Environmental Effects		
	Change in Economy	Change in Employment	Change in Business
Operations and Maintenance			
Maintenance of Causeway	0	0	0
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	0	0	0
Dewatering Joyce Lake	0	0	0
Ore Processing (including crushing, conveying, storage, grinding, screening)	0	0	0
Waste Rock Disposal on Surface	0	0	0
Water Treatment (including mine water and surface runoff) and Discharge	0	0	0
Rail Load-Out and Transport	0	0	0
Onsite Vehicle/Equipment Operation and Maintenance	0	0	0
Waste Management	0	0	0
Transportation of Personnel and Goods to Site	0	0	0
Fuel Transport	0	0	0
Fuel Storage and Dispensing	0	0	0
Progressive Rehabilitation	0	0	0
Expenditures	2	2	2
Employment	2	2	2
Closure and Decommissioning			
Site Decommissioning	0	0	0
Site Reclamation (building demolition, grading, scarifying)	0	0	0
Expenditures	2	2	2
Employment	2	2	2
Accidents and Malfunctions			
Hydrocarbon Spill	2	2	2
Train Derailment	2	2	2
Forest Fire	2	2	2
Sedimentation/Settling Pond	2	2	2
Premature/Permanent Shutdown	2	2	2

Key:
0 No interaction.
1 Interaction occurs; however, based on past experience, the resulting environmental effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.
2 Interaction occurs, and resulting environmental effect may exceed acceptable levels without implementation of specific mitigation. Further assessment is warranted.

The rating takes a precautionary approach, whereby interactions with a meaningful degree of uncertainty will be rated 2, allowing for a more detailed environmental effects assessment.

22.4.1 Interactions Rated 0

None of the Project activities or physical works will directly cause effects on EEB. All of them are accordingly rated 0. In consideration of the nature of the interactions and the planned implementation of known and proven effects management, the potential effects of all Project activities and physical works that were rated 0 in Table 22.3 on EEB during any phase of the Project are not considered further in the assessment.

There is expected to be negligible interaction between the Project and economic activities related to tourism during all Project phases. During Construction, workers will be housed in a temporary accommodations camp, limiting the potential for increased demand on tourism facilities (e.g., hotels and restaurants) in nearby Quebec communities and western Labrador.

Potential interaction with tourism could result if the Project overlapped important areas for outdoor recreation or hunting, trapping and guiding. Potential overlap with the PDA and known recreation areas is assessed in Chapter 20: Other Contemporary Use of Land and Resources. As discussed in Section 20.5.2.2, no contemporary outdoor recreation and tourism activities (such as fishing, berry picking and plant harvesting, walking trails, recreation parks and beaches, snowmobiling trails, camping) or Hunting, trapping and guiding activities by non-Indigenous people have been identified in the PDA. Potential interactions with Indigenous land and resource use for traditional purposes are assessed in Chapter 19: Current Use of Land and Resources for Traditional Purposes by Indigenous Persons.

During Operations and Maintenance, activities in the PDA will continue to have little potential for interaction with tourism due to limited spatial overlap as described above. Decommissioning and Closure activities will reclaim the PDA to pre-Project conditions and increase access to the area for potential tourism-related outdoor activities.

Based on the negligible interaction between the Project and activities related to tourism, the potential adverse effect on tourism in local municipalities is rated 0.

22.4.2 Interactions Rated 2

The Project has the potential to result in effects on EEB through the expenditures on supplies and services and the employment that are involved in all of the Project activities and works. The direct, indirect and induced effects of Project expenditures and employment, together with proponent and other Project-related business taxes and royalties, will also contribute to local, regional and provincial economies. The economic effects of Project expenditures and employment are of public and regulatory interest. As such, these interactions require more detailed analysis and consideration in the environmental assessment in order to predict, manage and evaluate the potential effects, and are accordingly rated 2. Additionally, the potential accidents and malfunctions listed in Table 22.3 have the potential to interact with EEB in such a way as to require specific mitigation to address adverse economic effects. As such, these interactions have been rated 2 and are discussed further in Section 22.8.

22.5 Existing Environment

22.5.1 Information Sources

The baseline data presented in this report are drawn from a wide range of secondary sources including:

- Statistics Canada and other agencies and departments of the Government of Canada;
- Newfoundland and Labrador Statistics Agency and other agencies and departments of the Government of Newfoundland and Labrador;
- Institute de statistiques du Québec and other agencies and departments of the Government of Québec; and
- Municipal governments and local and regional authorities and boards.

While traditional knowledge pertaining specifically to EEB was not identified, the traditional knowledge results identified in Chapter 3: Engagement and Traditional Knowledge have been considered and integrated throughout the assessment.

22.5.2 Methodology for Characterization of Baseline Conditions

Baseline conditions for the LSA (i.e., western Labrador and adjacent communities in northern Québec) and RSA were characterized based on data collected through primary and secondary research. Baseline data in western Labrador were collected for Economic Zone 2, an administrative unit used by the Newfoundland and Labrador Statistics Agency for the compilation and presentation of regional socio-economic data. Further detail is provided for the towns within the LSA where necessary. EEB data for the Province are also discussed as appropriate to define regional and provincial baseline conditions.

22.5.3 Baseline Conditions

22.5.3.1 Economy

Newfoundland and Labrador

The economy of Newfoundland and Labrador has undergone a major shift since offshore oil production began with the Hibernia project in 1997. The NLDF estimates that provincial GDP grew by more than 50% between 1997 and 2010, averaging an annual growth rate of 3.6%. Approximately half of this economic growth is attributed to oil and gas production (NLDF 2011).

After the global recession in 2009, provincial GDP grew by an estimated 6.1% in 2010, fueled by investment growth and a rebound in exports. GDP growth and employment growth in Newfoundland and Labrador have remained robust since 2010. Provincial GDP increased by 4.0% in 2019, representing the second-highest growth among the Canadian provinces (NLDF 2011, 2012, 2020).

The provincial unemployment rate has decreased since the 2009 recession (Newfoundland and Labrador Statistics Agency 2020). In 2019, unemployment declined to 11.9%, the lowest on record since 2013 (NLDF 2020).

Provincial economic decline was expected in 2020 compared to 2019. This is due to several factors, including responses to the COVID-19 pandemic, declines in oil production, and project delays in the Labrador mining industry (NLDF 2020). Selected provincial economic indicators for 2010-2020 are provided in Table 22.4.

Labrador

Labrador's economy is traditionally based on raw material extraction and the service industry. The following sections provide an overview of mining, forestry, and tourism.

Mining

The mining industry in Labrador is centered on iron ore production in western Labrador and nickel ore production at Voisey's Bay. These two sectors are the dominant contributors of GDP for the provincial mining industry. In 2020, the forecast value of mineral shipments was expected to total over $4.1 billion, of which approximately $3.0 billion was attributed to iron ore production and approximately $680 million was attributed to nickel production (NLDIET 2020a).

Forestry

Labrador's forests are generally identified as an underused resource, providing a foundation for further economic development in the region (NLDLAA 2006; NLDNR & Innu Nation 2012). Labrador has 18 million ha of forested land. With 5.5 million ha of productive forest, gross merchantable timber is estimated at 180,000,000 m^3 (NLDLAA 2006). Forestry Management District 19 in central Labrador contains the majority of Labrador's forest resources. The district is further subdivided into three separate units: 19A, 19B, and 19C. District 19A is the focus of forest management planning for 2018 to 2022. It is expected that commercial harvesting in central Labrador will increase during 2013 to 2017 (NLDFLR & Innu Nation 2017).

Tourism

Tourism is a growing focus of economic development in Labrador (NLDLAA 2006). Nature tourism and adventure tourism remain the region's main draws, with attractions such as the Torngat Mountains National Park, the Proposed National Park Reserve in the Mealy Mountains, and the Battle Harbour National Historic Site.

Tourism in Labrador was once limited to a short summer season with approximately 50 fishing and hunting outfitter businesses. However, with the construction of the groomed winter trail network, as well as other transportation links, the industry is evolving into a year-round opportunity. Winter tourism products include the Cain's Quest Snowmobile Endurance Race, the Labrador Winter Games, and regional winter festivals (NLDLAA 2006).

Table 22.4 Selected Economic Indicators, Newfoundland and Labrador, 2010-2020

Economic Indicators	2010	2011	2012	2013	2014	2015	2016	2017	2018e	2019e	2020f
Population as of July 1 (000's)	522	525	526.3	527.1	528.2	528.1	529.4	528.2	525.6	523.5	522.1
% Change	1.02%	0.6%	0.2%	0.2%	0.2%	0.0%	0.2%	-0.2%	-0.5%	-0.4%	-0.3%
GDP at Market Prices ($Millions)	29,107	33,562	32,063	34,491	34,301	31,161	31,519	33,690	33,961	35,349	N/A
% Change	16.30%	15.30%	-4.50%	7.60%	-0.60%	-9.20%	1.10%	6.90%	0.80%	4.10%	
Labour Force, Annual Average (000s)	261.2	265.3	274.5	274.5	270.9	270.8	268.7	262.9	261.4	257.3	247.4
% Change	2.60%	1.60%	3.50%	0.00%	-1.30%	0.00%	-0.80%	-2.20%	-0.60%	-1.60%	-3.80%
Employment, Annual Average (000s)	222.8	231.9	240.8	242.7	238.6	236.2	232.6	224.1	225.3	226.6	213.6
% Change	3.60%	4.10%	3.80%	0.80%	-1.70%	-1.00%	-1.50%	-3.70%	0.50%	0.60%	-5.70%
Unemployment Rate, Annual Average (%)	14.7	12.6	12.3	11.6	11.9	12.8	13.4	14.8	13.8	11.9	13.7
Consumer Price Index (2002 = 100)	117.4	121.4	123.9	126	128.4	129	132.5	135.7	137.9	139.3	N/A
% Change	2.40%	3.40%	2.10%	1.70%	1.90%	0.50%	2.70%	2.40%	1.60%	1.00%	N/A
Newsprint Shipments (thousands of metric tonnes)	259.1	227.4	245.9	242.2	241.4	254.7	238.2	248.2	233.9	219.4	N/A
% Change	-0.02	-0.122	0.082	-0.015	-0.003	0.055	-0.065	0.042	-0.058	-0.062	N/A
Value of Fish Landings ($Millions)	468.2	613.8	581.5	643.9	703.9	855.9	787.6	776.3	796.4	802	615.7
% Change	10.60%	31.10%	-5.30%	10.70%	9.30%	21.60%	-8.00%	-1.40%	2.60%	0.70%	-23.20%
Value of Mineral Shipments ($Millions)	3768.1	4,492.70	3,833.70	3,979.10	3,104.10	2,698.80	2,696.50	3,402.90	2,878.50	3,723.40	4,168.50
Change	85.60%	19.20%	-14.70%	3.80%	-22.00%	-13.10%	-0.10%	26.20%	-15.40%	29.40%	12.00%
Value of Iron Ore Shipments ($Millions)	2596.6	2,513.50	2,295.60	2,529.90	1,707.60	1,468.80	1,659.80	2,398.40	1,809.00	2,642.90	3,047.50
% Change	113.20%	-3.20%	-8.70%	10.20%	-32.50%	-14.00%	13.00%	44.50%	-24.60%	46.10%	15.30%
Value of Manufacturing Shipments ($000)	5,155.00	5,462.80	7,161.10	6,088.80	5,992.70	5,579.50	4,831.30	6,209.00	7,120.10	7,226.80	N/A
% Change	18.12%	5.97%	31.09%	-14.97%	-1.58%	-6.89%	-13.41%	28.52%	14.67%	1.50%	N/A
Oil Production (Millions of Barrels)*	100.7	97.3	72.2	83.6	78.9	62.7	76.7	80.6	84	95.5	N/A
% Change	3.10%	-3.40%	-25.80%	15.80%	-5.70%	-20.50%	22.50%	5.00%	4.30%	13.70%	N/A

Table 22.4 Selected Economic Indicators, Newfoundland and Labrador, 2010-2020

Economic Indicators	2010	2011	2012	2013	2014	2015	2016	2017	2018e	2019e	2020f
Housing Starts Number)	3,606	3,488	3,885	3,862	2,119	1,697	1,398	1,400	1,096	945	N/A
% Change	18.00%	-3.30%	11.40%	-26.30%	-26.00%	-19.90%	-17.60%	0.10%	-21.70%	-13.80%	N/A
Retail Trade North American Industrial Classification System ($Millions)	7,453	7,833	8,171	8,594	8,912	8,972	9,011	9,227	9,009	8,995	N/A
% Change	4.70%	5.10%	4.30%	5.20%	3.70%	0.70%	0.40%	2.40%	-2.40%	-0.20%	N/A
New Motor Vehicle Sales (Number)	31,669	30,816	33,606	35,439	35,440	35,019	33,687	33,251	30,254	30,501	N/A
% Change	10.10%	-2.70%	9.10%	5.50%	0.00%	-1.20%	-3.80%	-1.30%	-9.00%	0.80%	N/A
Notes: e = estimate f = forecast N/A = not available Source: Newfoundland and Labrador Statistics Agency 2020											

Tourism statistics indicate decreasing number of visitors to the Labrador region. Between 2016 and 2017, roofed accommodation occupancy levels in Labrador decreased by almost 5.4 percentage points, while average daily room rates in Labrador decreased by 1.1% (NLDTCAR 2017).

Western Labrador

The main economic drivers in western Labrador are mining, hydroelectricity generation at Churchill Falls, and tourism.

Mining

Mining is the primary economic driver in western Labrador, with iron ore being the most economically important mineral commodity. Large-scale mining development projects are generally long term and capital intensive, often resulting in major economic and employment benefits similar to operations already existing in western Labrador (NLDLAA 2006).

Iron Ore Company of Canada, owned by Rio Tinto, is Canada's largest iron ore pellet producer and operates an open pit mine, concentrator, and pellet plant at Carol Lake in western Labrador, port facilities in Sept-Îles, QC, and the QNS&L Railway, a 420-km rail line that links the mine and the port facilities. It is typical for mines in western Labrador to use this railway to ship product to market.

IOC began production from the Carol Lake Mine in 1962. Proven and probable reserves are 1.5 billion tonnes; measured and indicated resources are 2.4 billion tonnes. Annual mine production at the open pit operation is in the 35 to 38 million tonne range at an average grade of approximately 40% total iron. Annual production capacity is 18 million tonnes of iron ore product of which 12.5 million tonnes can be pelletized (NLDF 2011).

IOC has completed an iron ore product expansion program to increase production capacity to 23.3 million tonnes. In 2018, IOC completed construction of Moss pit, a new open pit mine at its Labrador West mine site. During Project operations, a portion of IOC's existing labour force (an estimated 136 persons) will be redeployed from the existing mine pits to carry out mining and support activities at Wabush 3 (IOC 2014).

Tacora Resources Inc. restarted the Scully Mine and mill, consisting of an iron ore mine and concentrating plant at Wabush. Production has been ramping up since 2019 and at full operation approximately 6 million tonnes of iron ore concentrate is expected to be shipped annually. The mine is expected to provide 287 person-years of employment annually over its 26 year lifespan (NLDIET 2020b).

Labrador Iron Mines Ltd. (LIM) began operations near Schefferville in 2011. In its first year of operation, LIM shipped 412,000 tonnes of iron ore to China, under a transportation and sales agreement with Rio Tinto. LIM was expected to ship approximately 1.7 million tonnes of ore in 2012 (NLDNR 2012). However, LIM put production and shipping on hold for 2014 as a result of declining ore prices and lack of immediate access to high quality ore, ultimately closing James mine and Silver Yards processing plant and rehabilitating both sites (LIM 2020). LIM is advancing the Houston direct shipping iron ore project near Schefferville to a Preliminary Economic

Assessment and is expected to produce 2 million tonnes of iron ore annually over a project lifespan of approximately 10 years (LIM 2021).

In addition to operating mines, there are several development properties in western Labrador including Champion Iron Ltd.'s Kamistiatusset (Kami) project and Tata Steel Minerals Canada Ltd.'s (TSMC) Elross Lake project.

Champion Iron Ltd. (Champion) has proposed to develop the Kami project, an open-pit iron ore mine in western Labrador and to build associated infrastructure at the Port of Sept-Îles, Québec. The proposed mine site is located 6 km south of Wabush Mines in the vicinity of the towns of Wabush, Labrador City and Fermont. The mine site is situated entirely within Labrador and has an approximate area of 7,700 ha. The project will produce up to 16 million metric tonnes of iron ore iron ore product per year that will be transported by existing railway to the Port of Sept-Îles, QC.

The proposed project includes construction, operation, rehabilitation and closure of the following primary components: open pit, waste rock disposal areas, processing infrastructure, ancillary infrastructure to support the mine and processing plant, and a rail transportation component. The Project is released from provincial and federal assessment and is permitted to begin construction (NLDNR 2014). However, as of November 2020, the Project was on hold, pending receipt of start-up financing (The Star 2020).

Tata Steel Minerals Canada Ltd. is a partnership between Tata Steel of India and New Millennium Iron Corp, which is developing an iron ore project in the Menihek area of northwestern Labrador. TSMC began shipments from Sept-Îles to Europe in 2013. Full capacity is expected to be approximately 4.2 million tonnes. The project will operate year round for an expected life of 12 years and will support an estimated 180 person years of employment annually (NLDIET 2020b).

Churchill Falls

Churchill Falls is located approximately 240 km east of Labrador City. The community is centred on Nalcor Energy's Churchill Falls hydro-electric generating station, which employs approximately 250 people (Nalcor Energy n.d.).

Tourism

Tourism development has been pursued as an area of diversification to the economy of western Labrador. Reflecting western Labrador's intention to expand tourism, the 2017-2020 Provincial Tourism Product Development Plan gives a goal of doubling tourism spending for the province. One focus is to expand and capitalize on the burgeoning winter tourism industry (NLDTCII 2017).

Québec Communities

The communities of Kawawachikamach, Schefferville, and Matimekush-Lac John share a similar economic structure, which is largely based on small businesses in the sales and services sector. While employment and business in these communities are primarily service-based, mining and other industrial activity continues to play a role in the regional economy.

Schefferville was constructed by IOC to support its mining operations in 1953. The town was constituted in 1955. The mining industry was the economic foundation for Schefferville until IOC ceased operations there in 1982. Tourism development and mining industry renewal are the primary economic prospects for Schefferville (MRC de Caniapiscau 2012).

Economic activities in Kawawachikamach are primarily in the fields of arts and handicraft, trapping, tourism, outfitters, construction and transport. However, mining development has also contributed to the local economy. In 2010, New Millennium Capital Corp. and the Naskapi Nation of Kawawachikamach signed an IBA for the development of the company's direct shipping iron ore project located near Schefferville, QC. This IBA establishes processes and sharing of benefits through training, employment, business opportunities, and financial participation in the project (New Millennium 2012). In 2010, LIM signed an IBA with the Naskapi Nation based on a 2008 Memorandum of Understanding (LIM 2011).

The Naskapi Nation of Kawawachikamach has also pursued a number of other economic development projects, including work with the Schefferville Airport Corporation, and with Kawawachikamach Energy Services Inc. on the Menihek Power Dam. Other sectors being developed include projects for the commercialization of caribou, and hunting and fishing operations (Naskapi Nation of Kawawachikamach n.d.).

The Naskapi Nation of Kawawachikamach is also a part owner of Tshiuetin Rail Transportation Inc. (Transport Ferroviaire Tshiuetin 2009). In 2005, the Innu of Matimekush-Lac John, in collaboration with the communities of Uashat mak Mani-Utenam and Kawawachikamach, created Tshiuetin Rail Transportation Inc. in order to provide transportation services for individuals living in these Indigenous communities. The 217 km of railway extends from Schefferville in Québec to Emeril Junction in Labrador, where it connects to the QNS&L Railway (Transport Ferroviaire Tshiuetin 2009).

22.5.3.2 Employment

Newfoundland and Labrador

Consistent with the economic trends discussed above, employment conditions in the Province have improved during the past decade. The labour force has increased since the mid-1990s (Newfoundland and Labrador Statistics Agency 2021). Over the five-year period between 2016 and 2020, average annual employment decreased from 232,600 to 213,600. The annual average unemployment rate for this period increased from 13.4% to 13.7% (Table 22.5). In 2020, the total population aged 15 years and older was approximately 439,500. With a participation rate of 56.3%, the provincial labour force in 2013 was approximately 247,400 (Newfoundland and Labrador Statistics Agency 2020).

Table 22.5 Labour Force Characteristics, Newfoundland and Labrador, 2016 to 2020

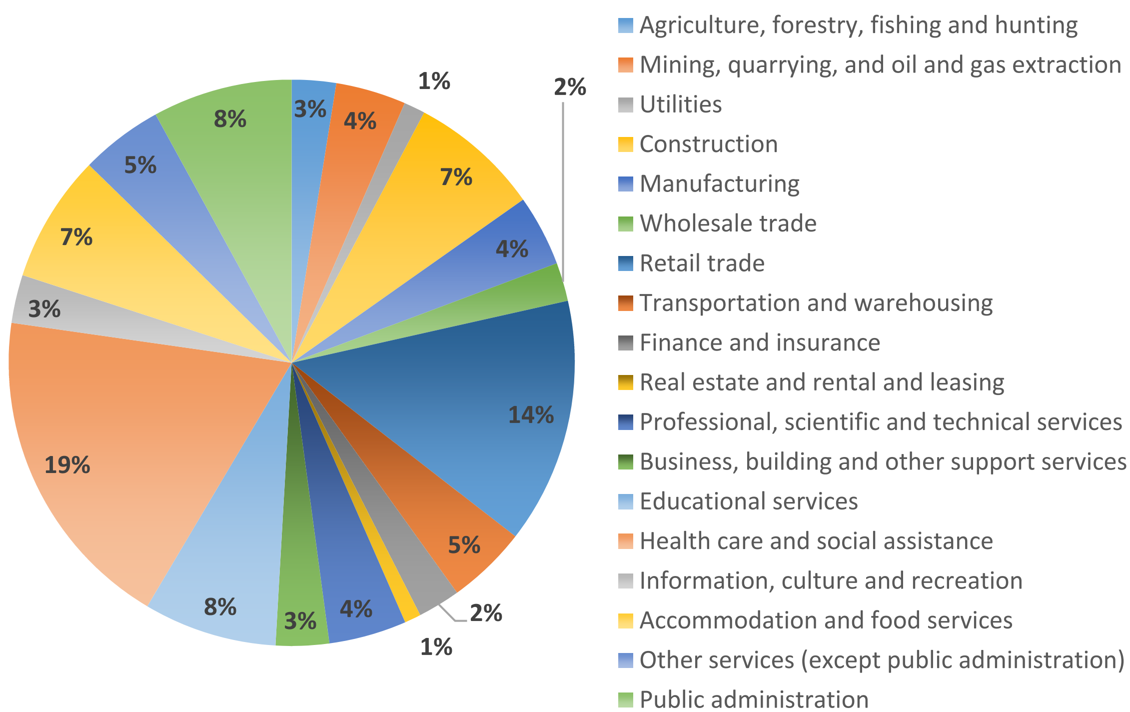
	2016	2017	2018	2019	2020
Total Population, 15 years and older (000s)	444.3	445.5	443.6	440.6	439.5
Labour Force (000s)	268.7	262.9	261.4	257.3	247.4
Employment (000s)	232.6	224.1	225.3	226.6	213.6
Participation Rate (%)	60.5	59	58.9	58.4	56.3
Employment Rate (%)	52.4	50.3	50.8	51.4	48.6
Unemployment Rate (%)	13.4	14.8	13.8	11.9	13.7
Source: Newfoundland and Labrador Statistics Agency 2021					

In 2020, the provincial labour force was composed of 48.9% men and 51.1% women (Table 22.6). The participation rate for males stood at 59.7%, while the rate for females was 53.0%. At 17.1%, the male unemployment rate was higher than that for females, which stood at 10.0% (Newfoundland and Labrador Statistics Agency 2021).

Table 22.6 Labour Force Characteristics by Gender, Newfoundland and Labrador, 2020

	Men	Women	Total
Labour Force (000s)	214.8	224.7	439.5
Employment (000s)	128.3	119.1	247.4
Participation Rate (%)	59.7	53.0	56.3
Employment Rate (%)	49.6	47.7	48.6
Unemployment Rate (%)	17.1	10.0	13.7
Source: Newfoundland and Labrador Statistics Agency 2021			

In 2011, public services accounted for the greatest proportion of employment in Newfoundland and Labrador. Approximately 7% of the provincial labour force worked in construction and related positions. Agriculture and other resource-based industries, which include mining, along with oil and gas, fisheries, and other extractive activities, represented approximately 7% of total provincial employment (Figure 22.2) (Statistics Canada 2021).



Source: Statistics Canada 2021

Figure 22.2 Employment by Industry, Newfoundland and Labrador, 2020

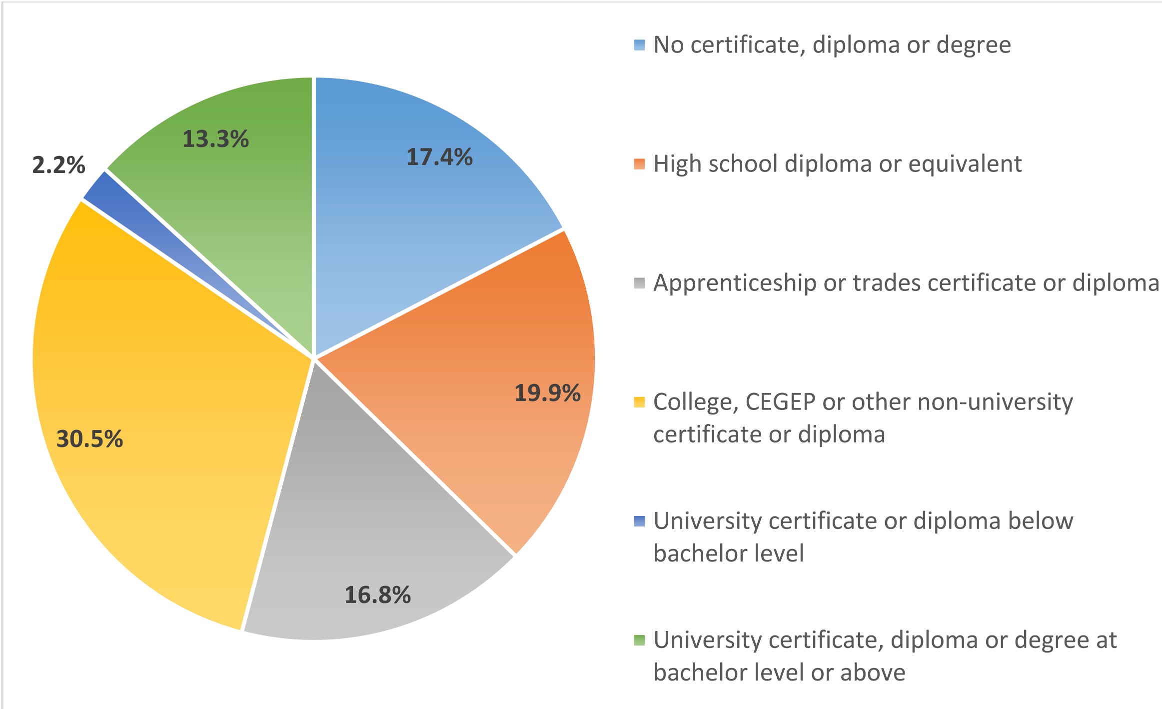
Labrador

In 2016 the total labour force in Labrador was 13,645 (Table 22.7). At 68.5%, the participation rate was higher than the Province's rate of 60.1%, while the unemployment rate for Labrador was 14.2%. The participation rate was 9.0 percentage points higher for men than for women in 2016. There was also a higher unemployment rate for men in Labrador: 15.7% compared to 12.5% for women (Newfoundland and Labrador Statistics Agency 2018).

Table 22.7 Labour Force Characteristics by Gender, Labrador, 2016

	Total	Men	Women
Labour Force	13,645	7,305	6,340
Participation Rate (%)	68.5%	73.1%	64.1%
Employment Rate (%)	59.2%	62.4%	56.2%
Unemployment Rate (%)	14.2%	15.7%	12.5%
Source: Newfoundland and Labrador Statistics Agency 2018			

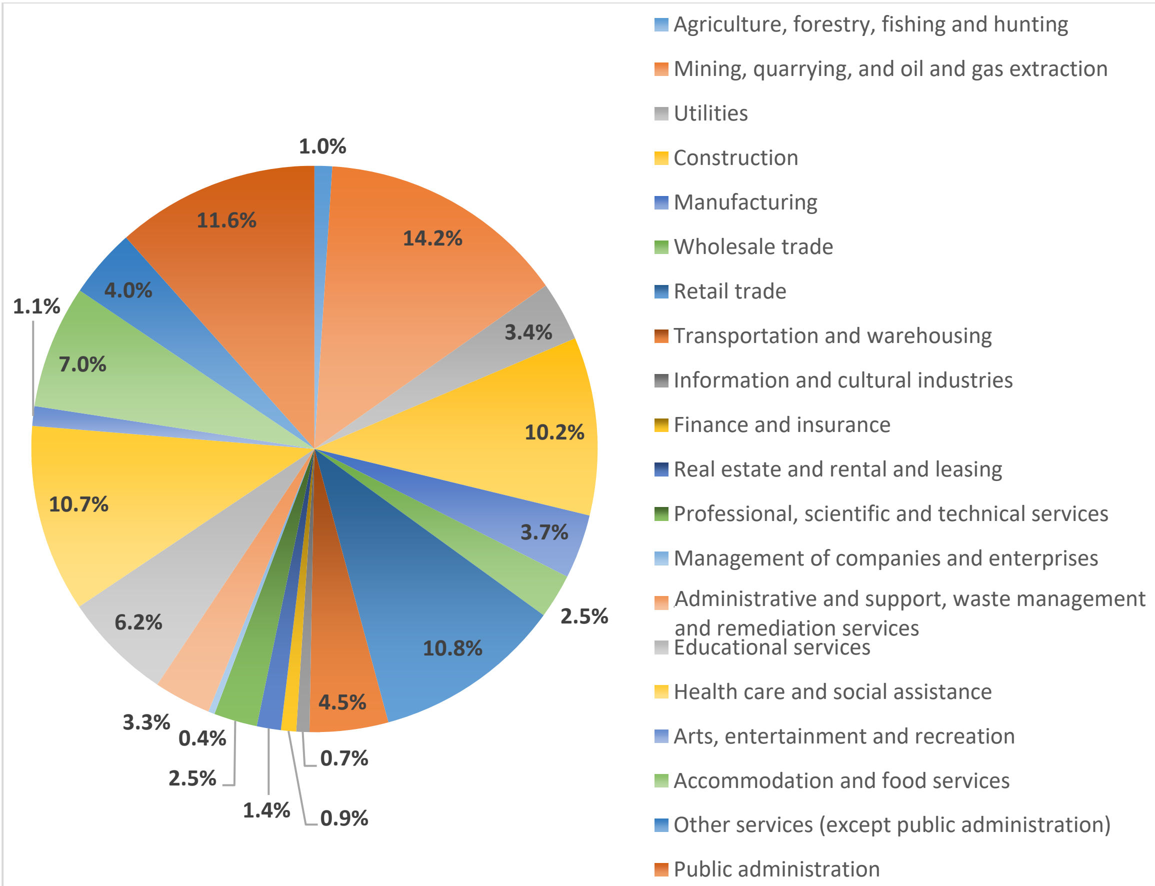
In 2016, 47.3% of the population of Labrador age of 25 to 64 had a non-university or trades certificate or diploma, compared to 41.0% for the Province as a whole. However, 17.4% of the population of Labrador had not completed high school (Figure 22.3), and only 13.3% had a university certificate, diploma or degree at the bachelor level or above (Newfoundland and Labrador Statistics Agency 2018).



Source: Newfoundland and Labrador Statistics Agency 2018

Figure 22.3 Education Level, Labrador, 2016

In 2016, 20,045 people aged 15 and over were in the labour force in Labrador. The main source of employment by industry in Labrador (Figure 22.4) was mining, quarrying and oil and gas extraction which employed 1,900 people. Other industries supporting larger proportions of employment included public administration (1,550), retail trade (1,445), health care and social assistance (1,430) and construction (1,360) (Newfoundland and Labrador Statistics Agency 2018).



Source: Newfoundland and Labrador Statistics Agency Accounts 2018

Figure 22.4 Employment by Industry, Labrador, 2016

Western Labrador

In Western Labrador, participation rates were higher, unemployment rates were lower, and the average annual income was higher than figures for Labrador and for the entire province in 2016 (Table 22.8). Unemployment rates in Labrador City, Wabush, and Churchill Falls were also well below those for the Province and for Labrador.

Table 22.8 Labour Force Characteristics, Western Labrador, 2016

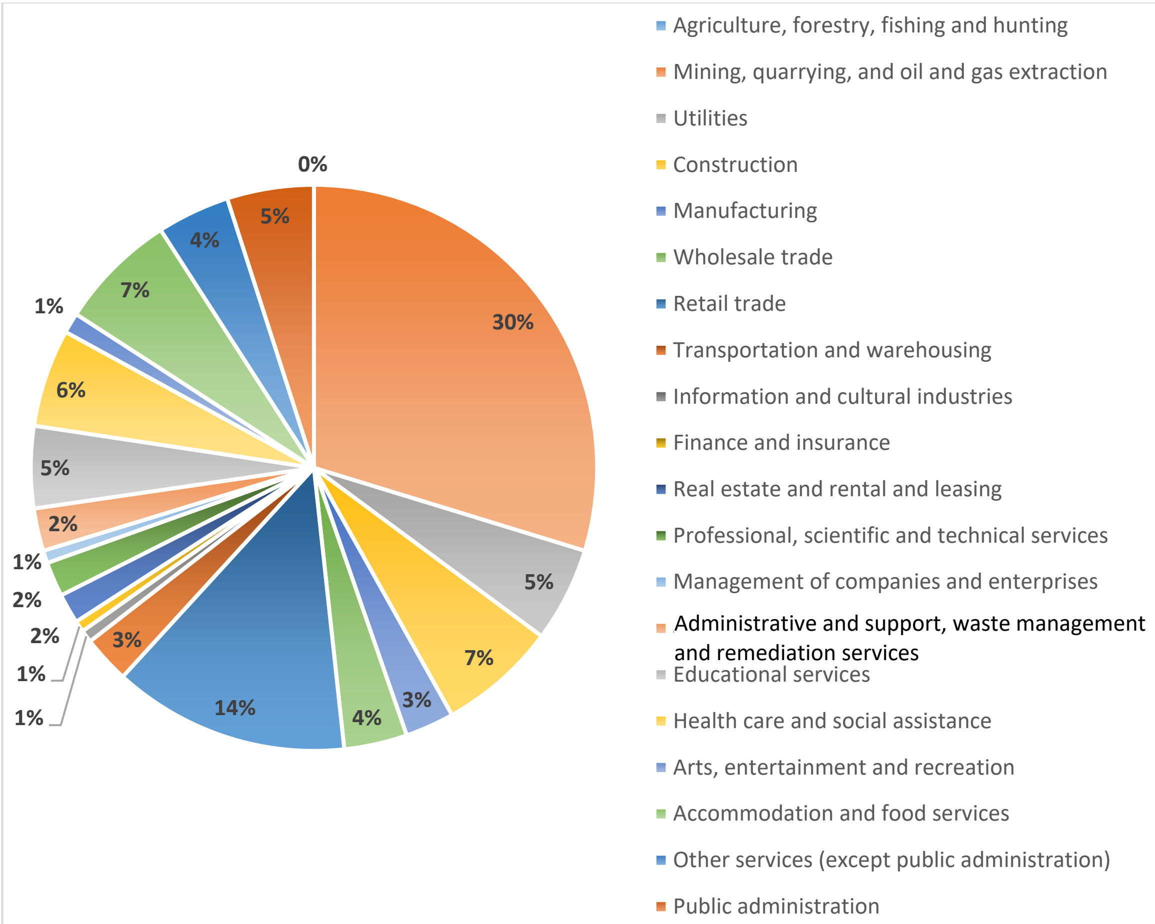
	Labrador City	Wabush	Churchill Falls	Western Labrador Total	Newfoundland and Labrador Total
Total Population, 15 years and older	5,845	1,495	490	7,830	437,935
Labour Force	4,160	1,085	375	5,620	256,855
Participation Rate (%)	71.2	72.6	76.5	71.8	58.7
Unemployment Rate (%)	8.5	11.1	2.0	8.6	15.6
Median Total Income, 2015	$58,149	$55,936	$71,296	$59,255	$31,754
Source: Newfoundland and Labrador Statistics Agency 2018, Statistics Canada 2017					

The labour force of western Labrador was composed of 3,170 men (56%) and 2,455 women (44%) in 2016 (Table 22.9). As was the case for Labrador as a whole, in western Labrador the participation rate for men was higher than that for women. The unemployment rate for men was low at 7.4%, while for women the unemployment rate was 10.2% (Newfoundland and Labrador Statistics Agency 2018).

Table 22.9 Labour Force Characteristics by Gender, Western Labrador, 2016

	Total	Men	Women
Labour Force	5,620	3,170	2,455
Participation Rate (%)	71.8	78.5	64.9
Unemployment Rate (%)	8.6	7.4	10.2
Employment Rate	65.5	72.5	58.1
Source: Newfoundland and Labrador Statistics Agency 2018			

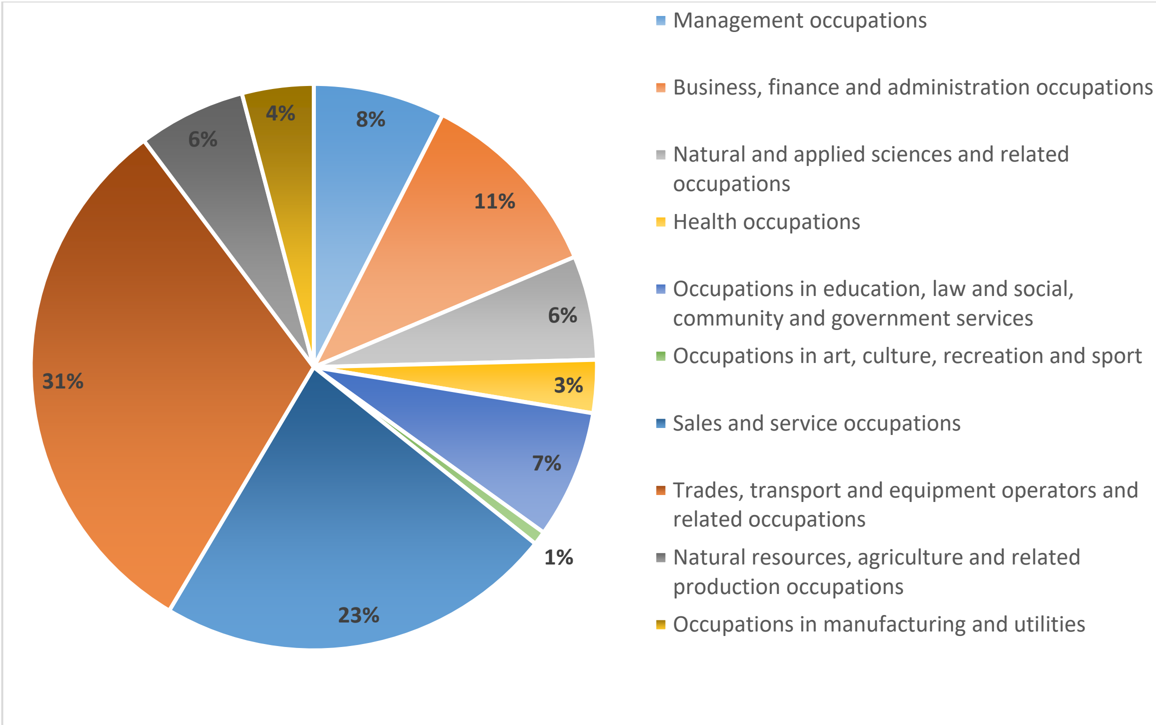
As of 2016, the highest percentage of employment (30%) was in mining, quarrying and oil and gas extraction (Figure 22.5). Construction and retail trade employed 7% and 14% of the population, respectively. Accommodation and food services accounted for 7% of regional employment, while health care and utilities accounted for 6% and 5% of employment, respectively. Few western Labrador residents worked in wholesale trade (4%), manufacturing (3%) or finance and real estate (2%) (Newfoundland and Labrador Statistics Agency 2018).



Source: Newfoundland and Labrador Statistics Agency 2018

Figure 22.5 Employment by Industry, Western Labrador, 2016

The main occupations of residents of western Labrador were trades, transport and equipment operation (31%) and sales and service (23%) (Figure 22.6). Occupations unique to primary industry accounted for approximately 6% of positions, while approximately 11% of occupations were classified under business, finance, and administration (Newfoundland and Labrador Statistics Agency 2018).



Source: Newfoundland and Labrador Statistics Agency 2018

Figure 22.6 Employment by Occupation, Western Labrador, 2016

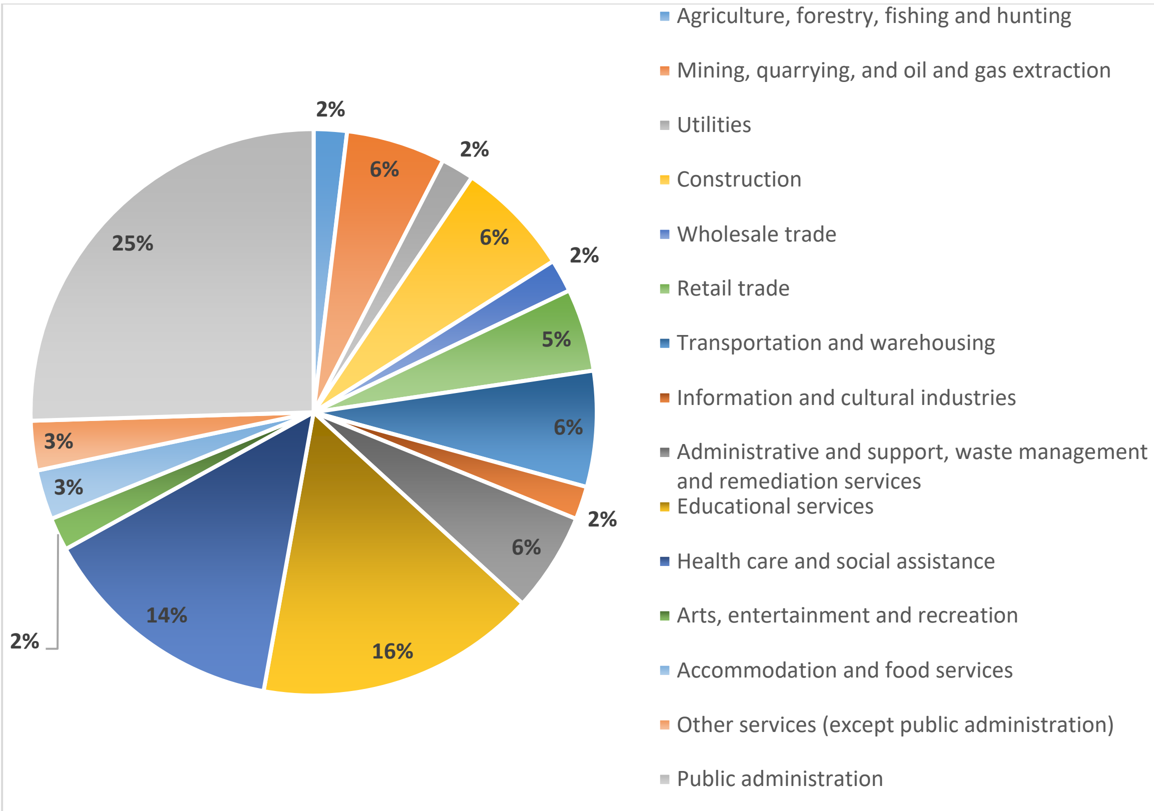
Québec Communities

In 2016, the total labour force for Kawawachikamach, Matimekosh, and Schefferville consisted of 610 people. Labour force information for Lac John is not available. The participation rate was lower for the northeastern Québec communities (59.8%) than for western Labrador (71.8%) (Table 22.10). The unemployment rate for the northeastern Québec communities was also high, at 29.5%, compared to western Labrador, where it was approximately 9%.

Table 22.10 Labour Force Characteristics, Northeastern Québec Communities, 2016

	Kawawachikamach	Matimekosh	Lac John	Schefferville	Québec Communities Total
Total Population, 15 years and Older	435	450	N/A	135	1,020
Labour Force	255	240	N/A	115	610
Participation Rate (%)	58.6	53.3	N/A	85.2	59.8
Unemployment Rate (%)	29.4	33.3	N/A	21.7	29.5
Median Income, 2015	$23,488	$31,317	N/A	N/A	N/A
Source: Statistics Canada 2017					

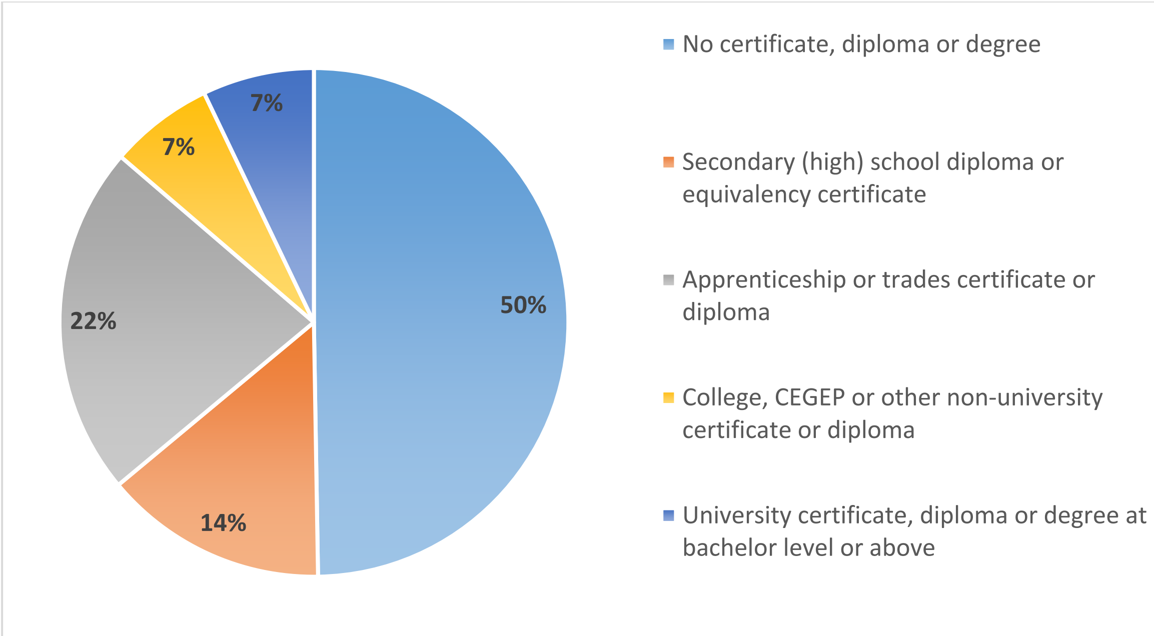
In 2016, the main source of employment in the Québec communities by industrial sector was public administration, followed by educational services, health care and social assistance, and transportation and warehousing (Figure 22.7).



Source: Statistics Canada 2017

Figure 22.7 Employment by Industry, Northeastern Québec Communities, 2016

As of 2016, half (50%) of the population of the Québec communities had less than a high school education, while approximately 36% had some form of post-secondary education. Seven percent of the northeastern Québec community residents had a university degree, and an additional 14% held a post-secondary certificate or diploma (Figure 22.8).



Source: Statistics Canada 2017

Figure 22.8 Education Level, Northeastern Québec Communities, 2016

22.5.3.3 Business

Newfoundland and Labrador

In 2019, there were 15,861 businesses in Newfoundland and Labrador. Small businesses formed the majority, with 54.1% employing one to four persons (Table 22.11). A further 5,253 businesses (33.1%) employed five to 19 employees, 1,649 (10.4%) employed 20 to 99 people, and 281 (1.8%) had between 100 and 199 employees. Businesses that employ over 500 people are uncommon; in 2019 there were 90 businesses in this category, representing <1% of all businesses (Newfoundland and Labrador Statistics Agency 2020).

Table 22.11 Number of Businesses by Employment Size, Newfoundland and Labrador, 2019

Employment Size Range	Number	Percent
1 to 4	8,588	54.1%
5 to 19	5,253	33.1%
20 to 99	1,649	10.4%
100 to 499	281	1.8%
500 +	90	0.6%
Total	15,861	100.0%
Source: Newfoundland & Labrador Statistics Agency 2020		

As indicated in Table 22.12, the top five North American Industrial Classification System industry code categories of business in the province, based on the number of operations are: other services, retail trade, construction, health care, and accommodation and food services.

Table 22.12 Number of Businesses by Industry, Newfoundland and Labrador, 2019

Industry	Number	Percent
Agriculture, Forestry, Fishing and Hunting	407	2.6%
Mining and Oil and Gas Extraction	85	0.5%
Utilities	26	0.2%
Construction	2,095	13.2%
Manufacturing	389	2.5%
Wholesale Trade	605	3.8%
Retail Trade	2,405	15.2%
Transportation and Warehousing	684	4.3%
Information and Cultural Industries	132	0.8%
Finance and Insurance	381	2.4%
Real Estate, Rental and Leasing	728	4.6%
Professional, Scientific and Technical	1,114	7.0%
Management of Companies and Enterprises	73	0.5%
Administrative and Support, Waste Management and Remediation	521	3.3%
Educational Services	170	1.1%
Health Care and Social Assistance	1,763	11.1%
Arts, Entertainment and Recreation	349	2.2%
Accommodation and Food Services	1,266	8.0%
Other Services	1,188	13.8%
Public Administration	428	2.7%
Unknown Industry	52	0.3%
Total	**861**	**100.0%**
Source: Newfoundland & Labrador Statistics Agency 2020		

Labrador

In 2019, there were 642 businesses in Labrador, representing 4.0% of the total for the province (Table 22.13). Of these, 207 (32%) employed one to four persons, 289 (45%) had five to 19 employees and 80 (12%) had between 20 and 99 employees (Newfoundland and Labrador Statistics Agency 2020).

Table 22.13 Number of Businesses by Employment Size, Labrador, 2019

Number of Employees	Number of Businesses
1-4	207
5-19	289
20-99	80
100-499	8
500+	0
Total	**642**
Note: Number of business does not sum to total as data are suppressed by Statistics Canada for confidentiality purposes Source: Newfoundland & Labrador Statistics Agency 2020	

The relative number of companies in each category for Labrador, based on the number of employees, are similar to those for the Province (Table 22.14).

Table 22.14 Number of Businesses by Industry, Labrador, 2013

Industry	Labrador
Agriculture, Forestry, Fishing and Hunting	x
Mining and Oil and Gas Extraction	x
Utilities	X
Construction	67
Manufacturing	12
Wholesale Trade	44
Retail Trade	116
Transportation and Warehousing	19
Information and Cultural Industries	5
Finance and Insurance	15
Real Estate, Rental and Leasing	42
Professional, Scientific and Technical	21
Management of Companies and Enterprises	5
Administrative and Support, Waste Management and Remediation	21
Educational Services	4
Health Care and Social Assistance	60
Arts, Entertainment and Recreation	18
Accommodation and Food Services	54
Other Services	70
Public Administration	16
Total	**624**

Key:
x data not available
Note: Number of business does not sum to total as data are suppressed by Statistics Canada for confidentiality purposes
Source: Newfoundland and Labrador Statistics Agency 2020

Western Labrador

As of 2013, the business community of western Labrador included 259 companies, representing 1.6% of all businesses in the province (Newfoundland and Labrador Statistics Agency 2020). Most had five to 19 employees (Table 22.15). The types of business by industry are presented in Table 22.16.

Table 22.15 Number of Businesses by Employment Size, Western Labrador, 2019

Number of Employees	Number of Businesses
1-4	101
5-19	110
20-99	40
100-499	8
500+	0
Total	259

Source: Newfoundland and Labrador Statistics Agency 2020

Table 22.16 Number of Businesses by Industry, Western Labrador, 2019

Industry Code	Number of Businesses
Agriculture, Forestry, Fishing and Hunting	0
Mining and Oil and Gas Extraction	x
Utilities	x
Construction	23
Manufacturing	5
Wholesale Trade	28
Retail Trade	46
Transportation and Warehousing	11
Information and Cultural Industries	x
Finance and Insurance	8
Real Estate and Rental Leasing	21
Professional, Scientific and Technical Services	12
Management of Companies and Enterprises	x
Administrative and Support, Waste Management, and Remediation	12
Educational Services	x
Health Care and Social Assistance	20
Arts, Entertainment and Recreation	11
Accommodation and Food Services	21
Other Services (Except Public Administration)	29
Public Administration	x
Total	259

Key:
x data not available
Source: Newfoundland and Labrador Statistics Agency 2020

Québec Communities

As discussed above, small businesses in the sales and services sector are the foundation for economy, employment, and business in the four Québec communities near the Project. Retail businesses in Schefferville include the Northern Store, which employed 16 people on a part-time and full-time basis providing food, alcohol and general merchandise, as well as Duberco, Inc. and Radio, which both provide fuel services including aircraft and diesel. Both Duberco, Inc. and Radio employ one person full-time and hire up to an additional two seasonal workers. National Automobile Rentals is also located in Schefferville, employing a single person. There is also a hardware store and a convenience store, each with two employees. Other businesses in Schefferville include two restaurants, an automotive service shop and a Canada Post office.

The majority of businesses within Kawawachikamach are owned, either wholly or through joint ventures, by members of the Naskapi Nation or the Naskapi Band. These businesses include Naskapi Imuun Inc., a wholly-owned Naskapi company responsible for internet services and cellular telephone services, Garage Naskapi Inc. which operates a gas bar, and Kawawachikamach Energy Services Inc., which operates the Menihek Generating Station, manages utility billing to Schefferville region, and maintains the associated transmission lines Naskapi Nation of Kawawachikamach, no date). Other businesses in the community include a post office, gas station, restaurant, general store, an arcade, a video club, and a convenience store (AANDC 2011).

22.6 Assessment of Project-Related Environmental Effects

22.6.1 Assessment of Change in Economy

Mining projects can have a wide range of positive effects on local, regional, provincial and national economies. Many of these economic effects are consequent of the effects on employment and business, and of industrial benefits initiatives detailed in benefits and diversity plans. As such, there are close linkages between effects management measures aimed at employment and business and the potential magnitude, duration, and extent of effects of economy. The nature of Project effects on EEB, and ways in which they can be beneficially managed, are largely common to Construction, Operations and Maintenance, and Closure and Decommissioning activities. Accordingly, potential effects and effects management measures are similar for all three Project phases.

22.6.1.1 Construction

The construction phase of mining projects is similar to that for other types of projects that require site clearing, the development of access infrastructure, and the supply and use of goods, services and labour. During Construction, the Project will generate economic benefits, contributing to employment and income paid to workers through direct, indirect, and induced employment. Direct employment refers to employees working at the Project site, while indirect and induced employment refers to employees working for Project supplier companies and additional employment resulting from Project-related increases in consumer expenditures, respectively. There is potential for economic spin-off benefits from increased spending as members of the labour force gain Project-generated employment and associated incomes, as well as from spending by Labec Century and its contractors and sub-contractors during construction. There will also be contributions to government revenues from provincial and federal taxes during construction, as a result of expenditures on Project goods and services as well as income taxes related to Project employment.

Construction activities and physical works will require the procurement of goods and services, some of which will be supplied by qualified companies in the Province. Business contracts secured through the construction of projects result in increased employment and income locally, regionally, and provincially. Additionally, such contracts may allow for the establishment or further development of local, regional, and provincial business capacity and expertise related to mining and other industries, which can increase competitiveness for future economic opportunities.

22.6.1.2 Operations and Maintenance

During Operations and Maintenance, the benefits to the local, regional, and provincial economies will continue as residents gain employment, and Project workers purchase goods and services, and generate other economic activity, leading to increased personal incomes and taxes for government. Proponent taxes and royalties will also contribute to government revenue. Projects of this type offer the potential for relatively highly-paid jobs and business opportunities. These economic benefits can also result in positive social effects on individuals, families, and businesses in communities near the Project (see Chapter 9: Benefits of the Project and of the Environmental Assessment).

22.6.1.3 Closure and Decommissioning

During Closure and Decommissioning, there will be reduced expenditures and associated direct, indirect and induced economic effects. Expenditures will include short-term opportunities for people and businesses in Labrador and the rest of the Province.

22.6.1.4 Management of Project Environmental Effects

The primary objective of effects management for issues relating to EEB is to generate or enhance potential economic benefits and, where necessary, mitigate or prevent adverse effects. Successful management of effects can be measured using various indicators, such as by the number of people from particular targeted subsets of a population who are employed on a project. Changes in employment, unemployment and participation rates, skill levels and incomes are indicators of success. Similarly, the number of contracts awarded to local and Indigenous businesses and capacity development reflect the effectiveness of local business participation strategies.

Many potential effects to EEB can be anticipated and managed through Project design and proponent policies and practices established and implemented at the outset of the project rather than subsequently mitigated. Such designed-in management tools are now standard and have been applied to all major construction projects developed in Newfoundland and Labrador over the past 25 years.

Economic benefits from the Project will increase when residents and businesses within the region and Province can take advantage of the employment and business opportunities that arise. The more people and companies involved in these opportunities, the greater the revenues to government from personal and corporate taxes. Labec Century's policies on employment and procurement will enhance benefits by giving priority consideration to local and Indigenous workers and businesses, as outlined below.

Labec Century's employment and benefits policy will be governed in part by any contractual agreements, yet to be negotiated, which include Impact and Benefit Agreements with Indigenous groups and agreements with the government of Newfoundland and Labrador. Labec Century expects to negotiate these agreements prior to starting work on the Project.

Whenever possible priority for employment as well as provision of goods and services will be given to skilled and qualified residents and competitive businesses in the local area of the Project (i.e., Schefferville, Matimekush-Lac John, and Kawawachikamach).

Priority for employment as well as the competitive provision of goods and services will also be given to skilled and qualified residents and competitive businesses in compliance with Newfoundland and Labrador as well as federal government requirements.

Labec Century will facilitate initiatives related to training and diversity.

More detail on employment and benefits initiatives will be defined in the Project Benefits and Diversity Plans. These plans are subject to approval by the Government of Newfoundland and Labrador.

22.6.1.5 Characterization of Residual Project Environmental Effects

Based on FS figures, the total capital cost of the Project is estimated at $259.6 million. Total operating cost over the life of the mine is approximately $1,032 million. A substantial portion of Project costs will contribute to provincial GDP, while benefits planning measures, including local employment and procurement, will enhance provincial economic benefits.

The Project will also contribute to provincial and federal government revenue, both directly as a result of Project activities, and indirectly as a result of increased incomes and associated taxes.

Based on the FS figures, it is anticipated that the Project will have a positive effect on GDP, incomes, and taxes. This positive effect on Economy will extend to the RSA, affecting regional and provincial economies throughout all Project phases.

There will be a short-term positive effect occurring continuously during Construction, which effect is expected to be of low magnitude. This is based on the size of the Project and its capital expenditures, which are relatively small compared to a project that would be within typical economic cycles in the Labrador mining sector.

The positive effect on Economy will continue throughout Operations and Maintenance as a result of operating expenditures. This effect will be long-term, continuous, and of low magnitude (i.e., within typical economic variation).

Because employment and expenditures will be reduced during Closure and Decommissioning, the magnitude of the positive effect will be relatively small compared to Construction and Operations and Maintenance. The positive effect will be low magnitude, short-term, and continuous during this phase. Economic benefits, particularly those enhanced through the Project Benefits Plan, such as education and training, are expected to have lasting benefits that will extend beyond the Project life.

There is a high degree of confidence regarding the positive effects on the Economy because of the predicted increases to GDP, income, and taxes.

22.6.2 Assessment of Change in Employment

22.6.2.1 Construction

As with most construction projects, the Project will use specialist commuting labour, drawn from multiple skilled trades, who work for differing (and in some cases quite short) durations. Construction employment typically provides competitive wages, often with additional compensation as employees work overtime to meet construction schedules.

22.6.2.2 Operations and Maintenance

Operation and maintenance will continue to provide local and Indigenous workers with employment. Many mining projects use FIFO arrangements, which see workers spending set periods at the worksite and offsite. The Project will provide accommodations on-site. However, Labec Century will also be hiring locally. Local workers will be able to live in their communities and commute to the site.

Hourly wages and benefits at FIFO worksites may be similar to those at conventional ones. However, employees often earn higher take-home pay because of long hours and overtime. In addition, their living costs are reduced during the period they live at the work site, adding to their disposable income. From a household economy perspective, the rosters associated with many FIFO projects are also attractive to some workers because they allow them time to engage in, for example, subsistence activities, and in some cases even to hold second jobs or run small businesses.

22.6.2.3 Closure and Decommissioning

As the Project nears the completion of operation and maintenance, there will be diminishing employment during closure and decommissioning, leading to the eventual end of Project employment. There will be some need for labour during decommissioning and reclamation activities for the Project but to a much lesser scale than during construction or operation and maintenance.

22.6.2.4 Management of Project Environmental Effects

As discussed in Section 22.6.1.4, Labec Century's Benefits Plan will enhance economic benefits to Labrador and the Province through active recruitment and procurement policies and practices. The Project Gender Equity and Diversity Plan will include employment strategies for women, Indigenous persons, and other under-represented groups.

22.6.2.5 Characterization of Residual Project Environmental Effects

Construction

During Construction, it is estimated that the Project will require approximately 310 workers at peak employment. Detailed construction information is currently being identified in conjunction with the development of a contracting strategy for the Project, ongoing negotiations with relevant Indigenous groups, and through the finalization of the Project Benefits Plan. Labec Century understands that the Benefits Plan must be submitted and approved by the Government of Newfoundland and Labrador prior to the release of the Project from the EA process, and commits that it will include all the required labour force requirements information.

Certain positions, such as those in management, will be required throughout the Construction phase, while other occupations will be required for short periods. Based on Construction employment estimates, the Project is expected to have a low magnitude, positive effect on Employment during construction. The effect will be short-term, occurring continuously throughout the project phase. The positive effect will extend beyond the RSA, with the employment of qualified personnel from the provincial labour force.

Operations and Maintenance

During Operations and Maintenance, the workforce will include approximately 269 employees at peak production. Detailed Operations and Workforce labour force estimates, including the National Occupation Code associated with each position approximate timelines for employment, are provided in Chapter 2: Project Description. In addition to the contractor workforce, the Project will support employment of Labec Century employees.

The residual effect on Employment during Operations and Maintenance is expected to be positive, of low magnitude, long-term, and continuous. As with Construction, the effect will extend beyond the RSA as qualified workers are hired from the provincial labour force.

Closure and Decommissioning

Closure and Decommissioning will result in some additional employment, the scale of which will be reduced compared to Construction and Operations and Maintenance. The resulting effect on Employment will be positive, of low magnitude, short-term, and continuous through the Project phase. The effect will extend beyond the RSA to the provincial labour force.

22.6.3 Assessment of Change in Business

22.6.3.1 Construction

Construction activity requires a range of goods and services, some of which will fall within the capacity of qualified supply companies in the Province. Contracts awarded to Newfoundland and Labrador businesses will contribute to indirect and induced employment and incomes, while also allowing businesses to build on their expertise and competitiveness to win future contract bids.

22.6.3.2 Operations and Maintenance

Through Operations and Maintenance, effects on local, regional, and provincial businesses will be similar to those described above for construction.

22.6.3.3 Closure and Decommissioning

During Closure and Decommissioning there will be some minor associated contracts for local, regional, and provincial businesses. However, as with employment, the business opportunities will be greatly diminished compared to Operations and Maintenance.

22.6.3.4 Management of Project Environmental Effects

As discussed above, Labec Century's Benefits Plan will enhance local economic benefits through active local recruitment and procurement policies and practices.

The Project Gender Equity and Diversity Plan will include a business access strategy for companies owned and/or operated by women, Indigenous persons and other under-represented groups.

22.6.3.5 Characterization of Residual Project Environmental Effects

There will be a positive effect on Business through all Project phases as a result of contracts with qualified local and Indigenous businesses. Based on the size of the Project and projected capital and operating costs compared to typical mining operations in Labrador, these effects are predicted to be of low magnitude, falling within the range of typical variation in the Labrador mining sector. The participation of local and Indigenous businesses will be enhanced through the Project Benefits Plan.

During Construction, the positive effect on Business will be short-term, occurring continuously. The effect will extend to the RSA, as businesses from Labrador and elsewhere in the Province are contracted to supply materials and services.

During Operations and Maintenance, the positive effect on Business will be long-term, occurring continuously throughout the Project phase. As with Construction, the positive effects of business contracts are expected to extend to the RSA.

Closure and Decommissioning will result in some additional contracting, which will result in a low magnitude positive effect on Business in the RSA and elsewhere in the Province. The effect will be short-term and continuous.

There is a high confidence in predictions regarding positive effects on Business, based on the expected scale of the Project and its expenditures compared to typical economic variation in Labrador, and the Province in general.

A summary of residual environmental effects is provided in Table 22.17.

Table 22.17 Summary of Residual Environmental Effects – EEB

Project Phase	Mitigation/Compensation/ Management Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context			
Change in Economy											
Construction	• Benefits Plan and Gender Equity and Diversity Plan initiatives	P	L	R	ST	C	N/A	N/A	N/A	H	To be determined in the Benefits Plan and the Gender Equity and Diversity Plan
Operations and Maintenance		P	L	R	LT	C	N/A	N/A	N/A	H	
Closure and Decommissioning		P	L	R	ST	C	N/A	N/A	N/A	H	
Change in Employment											
Construction	• Benefits Plan and Gender Equity and Diversity Plan initiatives	P	L	L/R	ST	C	N/A	N/A	N/A	H	To be determined in the Benefits Plan and the Gender Equity and Diversity Plan
Operations and Maintenance		P	L	L/R	LT	C	N/A	N/A	N/A	H	
Closure and Decommissioning		P	L	L/R	ST	C	N/A	N/A	N/A	H	
Change in Business											
Construction	• Benefits Plan and the Gender Equity and Diversity Plan initiatives	P	L	L/R	ST	C	N/A	N/A	N/A	H	To be determined in the Benefits Plan and the Gender Equity and Diversity Plan
Operations and Maintenance		P	L	L /R	LT	C	N/A	N/A	N/A	H	
Closure and Decommissioning		P	L	L/R	ST	C	N/A	N/A	N/A	H	

Table 22.17 Summary of Residual Environmental Effects – EEB

Project Phase	Mitigation/Compensation/ Management Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context			

KEY:

Direction:
P Positive
A Adverse
N Neutral

Magnitude:
L Low: change in economic indicators (e.g., employment) but within typical variation
M Moderate: change in economic indicators (e.g. employment) exceeding typical economic cycles
H High: change in standard economic indicators (e.g. employment) substantially and persistently exceeding the typical economic cycles

Geographic Extent:
S Site-specific: effects are restricted to the PDA
L Local: effects extend into the LSA
R Regional effects extend into the RSA

Duration:
Quantitative measure; or
ST Short-term: 1 to 2 years
MT Medium-term: 2 to 5 years
LT Long-term: >5 years
P Permanent – will not change back to original condition.

Frequency:
Quantitative measure; or
U Unlikely: Not likely to occur
O Once: Once per month or less.
S Sporadic: Occurs sporadically at irregular intervals.
R Regular: Occurs on a regular basis and at regular intervals.
C Continuous.

Reversibility:
R Reversible.
I Irreversible.

Environmental or Socio-Economic Context
L Low Resilience: low capacity for economic conditions to recover from an effect with consideration of the baseline conditions
M Moderate Resilience: moderate capacity for economic conditions to recover from an effect with consideration of the baseline conditions
H High Resilience: high capacity for economic conditions to recover from an effect with consideration of the baseline conditions

Significance
S Significant
N Not significant

Prediction Confidence
L Low: low level of confidence
M Moderate: moderate level of confidence
H High: high level of confidence

N/A Not Applicable

22.7 Assessment of Cumulative Environmental Effects

A summary of interactions resulting from other projects and activities with EEB is presented in Table 22.18.

Table 22.18 Potential Cumulative Environmental Effects

Other Projects and Activities with the Potential for Cumulative Environmental Effects	Potential Cumulative Environmental Effects		
	Change in Economy	Change in Employment	Change in Business
Champion Iron Ltd. Kami Iron Ore	1	1	1
Arcelor-Mittal Mont Wright Mine	0	0	0
Champion Iron Ltd. Fire Lake North Iron Ore Project	0	0	0
Tacora Resources Inc. Scully Mine	1	1	1
Champion Iron Ltd. Bloom Lake Mine and Rail Spur	0	0	0
IOC Labrador Operation	1	1	1
LIM Houston 1&2	1	1	1
Lower Churchill Hydroelectric Generation Project	0	0	0
Maritime Transmission Link Project	0	0	0
Tata Steel Minerals Canada - DSO Iron Ore Project	1	1	1

Notes:
0 = Project environmental effects do not act cumulatively with those of other projects and activities.
1 = Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of best management or codified practices.
2 = Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

Potential cumulative effects to EEB relate to Changes in Economy, Changes in Employment, and Changes in Business as a result of Project activities in combination with those of other past, present, and future projects and activities in the RSA. The environmental effects of past and present projects and activities on Economy, Employment and Business in the RSA are reflected in the characterization of baseline conditions provided above in Section 22.5.

As has been described, Newfoundland and Labrador has undergone strong economic growth during the past decade, during which the primary economic drivers have been offshore oil production and, until recently, mining and other projects in Labrador. These positive economic effects are reflected in the state of the EEB in the Province, and especially Labrador. However, as discussed in Section 22.5, economic growth is expected to slow in 2021, with the short-term being described as a period of disturbance related to the COVID-19 pandemic. As discussed in Section 22.5, the Labrador mining sector remains a substantial contributor to the provincial economy. An upturn in metal prices has affected the mining sector in Labrador, leading to the restart of Tacora (Scully mine), the reactivation of Houston 1&2 and the purchase of the Kami Iron Ore Project.

While the Project is relatively small compared to most of those listed in Table 22.18, it will contribute to the local, regional and provincial economies by delivering taxes, royalties, employment and business opportunities. These economic contributions will partially offset any adverse economic effects related to project closures and delays in the Labrador mining sector. Labec Century's Benefits Plan will include a range of effects management mechanisms and initiatives designed to enhance economic benefits to Labrador and the rest of the Province, and to enhance the distribution of benefits to diverse groups including women and Indigenous people.

All identified other projects and activities in the Province have the potential for cumulative effects with the Project. Other ongoing or reasonably foreseeable projects within Labrador will be subject to similar provincial benefits planning pressures and requirements. Given this, and their location, the economic effects of the following projects interact with the same jurisdictions, labour force and businesses as the Project:

- Champion Iron Ltd. Kami Iron Ore;
- IOC Labrador Operation;
- Tacora Resources Inc. Scully mine;
- LIM Houston 1 & 2; and
- Tata Steel Minerals Canada DSO Iron Ore Project.

The positive economic benefits generated by the Project will act cumulatively with the IOC Labrador Operation, as well as with other projects as those that are in development move to operations and projects that are on hold are restarted. The combined economic contribution of concurrently active projects will provide benefits to the economy of Labrador and the Province, including employment and business contracts associated with the mining industry. The cumulative economic effect of the Project with other active projects will also offset losses in employment and business as a result of project closures and delays.

The projects listed in Table 22.18 that are located in Québec will place only limited demands on the labour force and businesses in Labrador, for historic and language reasons, while the Project provincial benefits planning requirements will concentrate its labour force, supply and services demand in Newfoundland and Labrador, further reducing overlap. Given this, these Québec projects will have nominal overlap with the residual effects of the Project and are not expected to interact cumulatively with Project effects on EEB.

22.8 Accidents and Malfunctions

Accidents and malfunctions have limited potential to have effects on EEB. Possible accidental events related to the Project include:

- Train Derailment;
- Forest Fire;

- Hydrocarbon Spill;
- Settling/Sedimentation Pond Overflow;
- Premature or Permanent Shutdown.

Aside from premature or permanent shutdown, the possible events listed above would have limited effects on EEB, in that they are biophysical in nature and are not likely to have effects on the measurable parameters for this VC (e.g., employment, GDP, business contracts, and government revenues). To the extent that an accidental event could lead to short-term disruption of Project activities, there could also be a short-term disruption in positive economic benefits from the Project, but this would not cause an adverse economic effect (i.e., there would not be a reduction in the measurable parameters compared to baseline economic conditions).

Similarly, a premature or permanent shutdown would result in a premature or permanent disruption of economic benefits generated by the Project. It is currently planned that the mine will be operational for approximately seven years, at which time Closure and Decommissioning will commence. Should market conditions change or other factors arise that result in the premature shutdown of the mine, economic benefits related to the Project such as employment and procurement contracts would end sooner than expected. However, other economic benefits, particularly those enhanced through the Project Benefits Plan, such as education and training initiatives, are expected to have lasting benefits that will extend beyond the Project life.

As a smaller operation contributing to the wider industrial benefits of mining in Labrador, it is unlikely that the premature or permanent shutdown of the Project would lead to adverse economic effects on EEB. As described in the above discussion of effects during Closure and Decommissioning, the experience, training, and skills developed by workers at the Project will enhance their qualifications for employment at other operations as the Project ends. Similarly, contracts awarded to local contractors and subcontractors through all phases of the Project will lead to increased capacity and experience in the local supply sector, enhancing qualifications to secure future contracts.

A summary of residual environmental effects resulting from accidents and malfunctions is provided in Table 22.19. Residual effects related to accidents and malfunctions are predicted to be not significant. This determination has been made with a high level of confidence because accidents and malfunctions are not expected to lead to a reduction in the measurable parameters for EEB and, therefore, are not expected to result in adverse effects on this VC. Labec Century will have a number of emergency and safety plans and procedures in place to reduce the likelihood and effects of accidents and malfunctions on EEB. This will include communications strategies to keep economic stakeholders, the labour force, and the business community informed of any accidents or malfunctions and their consequences for scheduled Project activities. This will reduce disruption in economic benefits generated by the Project in the case of a temporary shutdown related to an accidental event, or a premature permanent shutdown.

Table 22.19 Summary of Residual Environmental Effects – Accidents and Malfunctions

Project Phase	Emergency Response/Contingency Measures	Direction	Residual Environmental Characteristics						Significance	Prediction Confidence	Recommended Follow-up and Monitoring
			Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-economic Context			
Train Derailment	• Communications strategies to keep economic stakeholders, labor force, business community and public informed of developments	N	L	L/R	ST	C	R	N/A	N/A	H	N/A
Forest Fire		N	L	L/R	ST	C	R	N/A	N/A	H	N/A
Hydrocarbon Spill		N	L	L/R	ST	C	R	N/A	N/A	H	N/A
Settling/Sedimentation Pond Overflow		N	L	L/R	ST	C	R	N/A	N/A	H	N/A
Premature or Permanent Shutdown.		A	L	L/R	LT/ P	C	R/I	N/A	NS	H	N/A

Key

Direction:
- P Positive: an increase in the measurable parameters
- A Adverse: a decrease in the measurable parameters
- N Neutral: no net change in the measurable parameters

Magnitude:
- L Low: change in economic indicators (e.g., employment) but within typical variation
- M Moderate: change in economic indicators (e.g. employment) exceeding typical economic cycles
- H High: change in standard economic indicators (e.g. employment) substantially and persistently exceeding the typical economic cycles

Geographic Extent:
- S Site-specific: effects are restricted to the PDA
- L Local: effects extend into the LSA
- R Regional: effects extend into the RSA

Duration:
Quantitative measure; or
- ST Short-term: 1 to 2 years
- MT Medium-term: 2 to 5 years
- LT Long-term: >5 years
- P Permanent – will not change back to original condition.

Frequency:
Quantitative measure; or
- N Not likely to occur
- O Once: Effect occurs occasionally, or once during the life of the Project (e.g., clearing)
- S Sporadic: Effect occurs sporadically, at irregular intervals, without any predictable pattern during the life of the Project (e.g., hydrocarbon spills)
- R Rarely: Effect occurs infrequently
- F Frequently: Effect occurs on a regular basis and at regular intervals during the life of the Project
- C Continuous.

Reversibility:
- R Reversible.
- I Irreversible.

Environmental or Socio-Economic Context
- L Low Resilience: low capacity for economic conditions to recover from an effect with consideration of the baseline conditions
- M Moderate Resilience: moderate capacity for economic conditions to recover from an effect with consideration of the baseline conditions
- H High Resilience: high capacity for economic conditions to recover from an effect with consideration of the baseline conditions

Significance
- S Significant
- N Not significant

Prediction Confidence
- L Low: low level of confidence
- M Moderate: moderate level of confidence
- H High: high level of confidence

N/A Not Applicable

22.9 Determination of Significance of Residual Adverse Environmental Effect

22.9.1 Project Residual Environmental Effects

The Project is expected to contribute economic benefits through all phases, particularly during construction and operation and maintenance. Economic benefits will be delivered through positive Project effects on EEB, including contributions to government revenues through GDP, taxes, and royalties, as well as regional and provincial employment and contract procurement. Employment and procurement from local and regional labour and goods and service supplies will be enhanced through Labec Century's benefits strategy and the subsequent Project Benefits Plan. In addition, the Gender Equity and Diversity Plan initiatives will enhance economic benefits to under-represented groups such as women, Indigenous people, and persons with disabilities.

While the Project stands to make an important contribution to the regional and provincial economy, because it is a small project, the positive effects on Economy are expected to be of low magnitude during all Project phases. Additionally, as described in Section 22.2, Change in Economy is measured at the provincial level, since the measurable parameters for this effect (e.g., GDP, taxes) are calculated provincially. While the Province can expect to receive positive economic effects from the Project, as a small operation the Project will likely contribute benefits that are low in magnitude.

Project effects on Employment and Business will be positive and of low magnitude. They will mostly occur within the RSA, with some additional hiring and employment occurring at the provincial level, drawing on skilled labour from elsewhere, as necessary. During Construction and Operations and Maintenance, employment of workers and procurement from businesses in western Labrador and elsewhere in the region will have a positive effect on the measurable parameters for Economy and Business in the RSA. As with Economy, positive effects will be diminished during Closure and Decommissioning. Positive economic effects will be enhanced through all Project phases by the effects management measures contained within the Project Benefits Plan and Gender Equity and Diversity Plan.

The Project will result in no residual adverse effect on EEB. With the proposed enhancement measures discussed below for procurement and employment, the residual economic effect of local and regional contract procurement during all project phases is predicted to be positive.

22.9.2 Cumulative Environmental Effects

The residual cumulative environmental effect on EEB is positive for all Project phases.

22.9.3 Accidents and Malfunctions

The residual adverse environmental effect on EEB resulting from accidental event scenarios is not significant because accidents and malfunctions are not expected to lead to a reduction in the measurable parameters for EEB and, thus, are not expected to produce adverse effects on this VC. Furthermore, to reduce any disruption in economic benefits generated by the Project in the case of a temporary shutdown related to an accidental event, or a premature permanent shutdown, Labec Century will have communications strategies in place to keep economic stakeholders informed of any accidents or malfunctions and their consequences for scheduled Project activities.

22.10 Follow-up and Monitoring

The follow-up and monitoring policies and practices for all Project phases will be as specified in the Project Benefits Plan and the Gender Equity and Diversity Plan. The Benefits Plan and Gender Equity and Diversity Plan will provide a description of Labec Century's process for monitoring and reporting benefits and diversity performance, including success in meeting quantitative and other targets, based on its own performance and that of its contractors and sub-contractors.

22.11 Summary

Economy, Employment and Business represent the primary means by which the Project will deliver benefits to adjacent communities and to the region and province within which it is located. This includes both the direct effects of Project employment and expenditures and their indirect and induced effects throughout the economy. Project-related effects also include benefits to economically disadvantaged groups such as women, Indigenous people, and persons with disabilities.

Potential interactions between the Project and EEB were identified for all Project activities and physical works. Economy, Employment and Business will not be directly affected by Project activities or physical works, but rather through expenditures on supplies and services and employment that are involved in all of the Project activities and works. The direct, indirect, and induced effects of Project expenditures, together with proponent business taxes and royalties will also contribute to government revenues.

The assessment of Project-related effects was carried out for all phases of the Project. It was determined that the Project will generate positive effects on EEB. Due to differences in the geographical scale at which Project benefits will be distributed there are differences in determination of significance for positive effects on each sub-component of this VC. Positive effects on Economy, measured at the provincial level, are expected to be of low magnitude due to the Project's small size compared to most of the other mining projects in the RSA. Positive effects on Employment and Business, however, are expected to be delivered at the local and regional level due to the implementation of Labec Century's Benefits Plan. The Project will contribute to local employment and to the local business community.

The Project will result in no residual adverse effect on EEB. With the proposed enhancement measures for procurement and employment, the residual economic effect of local and regional contract procurement during all project phases is predicted to be positive.

Cumulative effects were also assessed with consideration of other projects that effect the same jurisdictions, labour force and businesses as will the Project. The Project will interact with concurrently active projects to contribute positive cumulative effects on EEB. The positive economic effects of the Project will also provide economic and social benefits during a period of slowed economic growth in the region related to other project closures and delays in the Labrador mining sector. This includes contributing to economic growth at the provincial, regional and local levels, by delivering taxes, royalties, employment, business opportunities and related capabilities.

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Joyce Lake Direct Shipping Iron Ore Project:

Chapter 23:

Adverse Impacts and Measures to Address Adverse Impacts on Potential or Established Indigenous and Treaty Rights and Related Interests

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23.1 Introduction

The potential adverse impacts of a Project on the ability of Indigenous peoples to exercise their potential or established Indigenous and treaty rights and current use of the land and resources for traditional purposes is an important consideration in the CEAA EA process given the critical importance of these rights and interests both in the context of the socioeconomic environment and the Canadian constitutional framework. In particular, CEAA, 2012 defines an "environmental effect" to specifically include (a) any change that the Project may cause in the environment… [and] (b) any effect of any change referred to in paragraph (a) on …iii. the current use of lands and resources for traditional purposes by Indigenous persons…".

An Indigenous right protects an activity that is an element of a practice, custom or tradition that was an integral part of an Indigenous group's distinctive culture prior to contact with the Europeans, such as religious practices or harvesting practices. The existence of such rights is analyzed on a site-specific basis under Canadian law. The potential or established Indigenous and Treaty rights and related interests of the Indigenous groups potentially affected by the Project are identified in Section 8.2, and the potential adverse impacts of the Project are described in Section 19.6**.**

This chapter will identify the specific issues and concerns raised by Indigenous groups in relation to the potential adverse impacts of the Project and where and how Indigenous traditional knowledge or other relevant information was incorporated into the consideration of potential adverse effects on potential or established Indigenous and treaty rights and related interests. In addition, this chapter will also describe, as specific commitments, the measures identified by the proponent to mitigate the potential adverse impacts of the Project on potential or established Indigenous treaty rights and related interests and how the proponent intends to implement them and any potential adverse impacts on potential or established Indigenous and treaty rights and related interests that have not been fully mitigated as part of the EA and consultations with Indigenous groups.

23.2 Current Use of Lands and Resources for Traditional Purposes by Indigenous Persons

Traditional patterns of land use and resource use is a core aspect of life for the Labrador and Québec Indigenous communities whose traditional territory is asserted to include the interior of the Québec-Labrador peninsula. As is outlined in detail in Chapter 8: Potential or Established Indigenous and Treaty Rights and Related Interests, five Indigenous groups have asserted Indigenous rights and/or Indigenous title to lands in the vicinity of the Study Area. These groups include the Innu Nation (on behalf of the Mushuau Innu First Nation and the Sheshatshiu Innu First Nation), the NunatuKavut Community Council (on behalf of the southern Inuit), the Naskapi Nation of Kawawachikamach, La Nation Innu Matimekush-Lac John, and the Innu Takuaikan Uashat mak Mani-Utenam. None of the five Indigenous groups currently have a settled land claim or a signed treaty which confirms their Indigenous rights and/or Indigenous title to lands in the vicinity of the Study Area, although the Innu Nation is in negotiations towards a Final Agreement which will engage a treaty right if the current land selections are confirmed. As discussed in Chapter 8: Potential or Established Indigenous and Treaty Rights and Related Interests, All five Indigenous groups have asserted claims in Labrador that overlap the PDA. Consequently, there is a duty to consult and where appropriate accommodate the asserted rights of affected groups.

The pattern of traditional activities of the Indigenous groups potentially affected by the Project has changed over time as a result of wide fluctuations in available natural resources, as well as economic and political decisions which were outside their direct control. The interior plateau of the Québec-Labrador peninsula did not contain sufficiently reliable wildlife resources to sustain permanent occupation in the historic period and a system based on shared use of the vast interior region by highly mobile family groups of both Innu and Naskapi Indigenous peoples therefore existed for hunting, trapping, fishing and foraging. This system remained relatively constant until the early 20th century when the decline of caribou populations ended nomadic subsistence hunting as a traditional way of life.

As discussed in Chapter 8: Potential or Established Indigenous and Treaty Rights and Related Interests, as the fur trade declined and trading posts closed, historical sources indicate that some of the Innu of the interior relocated to permanent communities. Beginning in the mid-20th century, when the Schefferville, Québec area was first opened to mining in the 1950's, wage-earning employment became available both for mine related work and rail and road infrastructure. As detailed in Chapters 8: Potential or Established Indigenous and Treaty Rights and Related Interests and 19: Current Use of Land and Resources for Traditional Purposes by Indigenous Persons, Naskapi and Innu people relocated to the Schefferville area and traditional patterns of use changed as a result of a transition to wage employment. This relocation also led to the establishment of Innu reserves at Lac John and Matimekush, and a Naskapi Nation reserve at Kawawachikamach in the Schefferville area.

Settlement altered the traditional pattern of land and resource use in the study area. Due to settlement, and the availability of road and rail access to hunting and fishing areas surrounding the communities, the geographical extent, nature, frequency and timing of these traditional harvesting activities were carried out over shorter distances, and for shorter durations, particularly by members of the two indigenous groups who had established residence in the region. This pattern was augmented by the resurgence of the GRCH commencing in the 1970's which, particularly after the closure of the IOC mine in 1982, led to an expanded range for the annual migrations of caribou. It is also important to note that through broader participation in the wage earning economy and the mining industry, many Indigenous persons and Indigenous groups have expanded traditional hunting activities by virtue of float plane to hunt in other areas outside the immediate area of Schefferville.

In terms of the current use of lands and resources for traditional purposes by Indigenous persons, as outlined in sections 8.2 and 19.5.3.2, Indigenous communities undertake land and resource area use activities for traditional purposes to varying degrees in the study area.

The current traditional activities of members of the Naskapi Nation of Kawawachikamach are mostly concentrated in the areas around their community and others that are accessible by railway and road. Their traditional activities include hunting caribou when available, waterfowl hunting in the spring and winter, fishing and small game hunting year round, plant and berry gathering, and the use of the area for travel for traditional activities and to and from cabins occupied by community members. Specifically, in terms of current use there are a number of cabins in the study area used by Naskapi residents of Kawawachikamach. The Naskapis have toponyms associated with geographical locations and natural resource availability in the study area. These factors indicate that the study area remains an attractive resource area used year round for members of the Naskapi Nation of Kawawachikamach for the wildlife resources traditionally harvested by Naskapis. The adjacency of the resources to the community of Kawawachikamach also allows accessible harvesting areas to pass on traditional knowledge to younger members of the Naskapi Nation of Kawawachikamach which will continue to provide a valuable cultural benefit to the community.

The traditional activities of members of La Nation Innu Matimekush-Lac John also tend to be concentrated near their reserves and other areas that are accessible by railway and road. Their traditional activities also include hunting caribou, waterfowl hunting, fishing and small game hunting, plant and berry gathering, and the use of the area for travel for traditional activities and to and from cabins occupied by community members. Specifically, in terms of current use there are a number of cabins in the study area used by Innu residents of Matimekush-Lac John. The Innu also have toponyms associated with geographical locations and natural resource availability in the study area. These factors indicate that the study area remains an attractive resource area used year round for members of La Nation Innu Matimekush-Lac John for the wildlife resources traditionally harvested by Innu. The adjacency of the resources to their communities also allows accessible harvesting areas to pass on traditional knowledge to younger members of La Nation Innu Matimekush-Lac John which will continue to provide a valuable cultural benefit to these communities.

In terms of the other Indigenous groups, the existing information available to the proponent indicates the Innu Nation currently tend to concentrate their traditional activities in core areas outside the study area.

Some members of the NunatuKavut Community Council live and work in the Labrador West area and currently undertake land and resource use activities in the Labrador West Area, including hunting, trapping and fishing. Finally, the Innu Takuaikan Uashat mak Mani-Utenam traditionally engaged in trapping and hunting activities in the beaver reserves in the vicinity of the study area, used the historic and current Innu trail and campsite system and maintain family and kinship relationships with the Innu of Matimekush-Lac John. Like the Innu Nation however, its members currently tend to concentrate their traditional activities in core areas outside the study area.

23.3 Specific Issues and Concerns Raised by the Indigenous Groups

Life in northern communities for both Indigenous and non-Indigenous residents is characterized by an emphasis on outdoor activities and responsible and sustainable access to the wildlife and natural resources of surrounding areas. Joyce Direct Iron recognizes that natural resource and development projects such as the Joyce Lake Direct Shipping Iron Ore Project may impact traditional land and resource use activities by Indigenous groups. Impacts may occur by a direct disturbance or interference with their established activities during the construction of the Project or its operations or closure phases. Alternatively, impacts may result indirectly by a project adversely affecting the natural wildlife in reducing the overall availability and/or quality of those resources for Indigenous groups.

In the context of this Project, the specific issues and concerns raised by Indigenous groups are identified in Table 3.4 herein but in general, issues and concerns were expressed regarding effects of the Project on:

- Wildlife;
- Fisheries and Fish Habitat;
- Consultation;
- Employment;
- Project Benefits;
- Water Quality;
- Waste Management;
- Noise;
- Fuel Storage; and
- Transportation.

The Project itself is relatively small in terms of its temporal continuity and footprint. However, it is recognized that it will still cause some interference with the current use of land or resources for traditional purposes by members of both the Naskapi Nation of Kawawachikamach and La Nation Innu Matimekush-Lac John. In terms of the Innu Nation, the NunatuKavut Community Council and the Innu Takuaikan Uashat mak Mani-Utenam, other areas of Labrador and/or Québec are much more important for those groups for land and resource use activities rather than the localized area around Schefferville with its existing Indigenous populations. The existing and available information does not indicate that the Project is likely to result in significant adverse effects to wildlife resources, fish or plant resources.

There is one known site of historic, cultural or spiritual importance which may be adversely affected by the Project, the Pre-Contact Period archaeological site GfDp-01 – Attikamagen Lake

1 site identified on the east side of Iron Arm. The identification of that site and the planned mitigation measures are described in Chapter 18: Historic and Cultural Resources.

As a result, and based on the current information, the Project is likely to affect localized use of land and resources for traditional purposes primarily by the Naskapi Nation of Kawawachikamach and the Innu Matimekush-Lac John, who will not continue to enjoy free and open access to the local project area during the Project construction, operations and closure phases. Based on the information currently available, the Project is not likely to affect the location or timing of the current use of land and resources by the Innu of Labrador, the NunatuKavut Community Council or the Innu Takuaikan Uashat mak Mani-Utenam to the same degree.

The availability of additional wage earning employment in the Area will have some additional impact, primarily on the members of the Naskapi Nation of Kawawachikamach and La Nation Innu Matimekush-Lac John living in the Schefferville area, as their participation in Project work will reduce their ability and availability for current use of land and resources for traditional activities.

Joyce Direct Iron will continue to consult with members of all the potentially affected Indigenous groups with respect to both the reduced access to use of land and resources in the study area and the time related issues which may affect the ability of its Indigenous employees to participate in those traditional activities. Joyce Direct Iron is committed to discussing flexible work rotations and/or cultural leave provisions for Indigenous workers during particular times of the year to allow for their participation in, for example, the seasonal goose and waterfowl hunting. This type of workplace measure will encourage, with the participation of Indigenous groups, the pursuit of traditional land and resource use activities by members of Indigenous groups potentially affected by the Project.

Table 23.1 identifies the potential for effects with Indigenous Treaty Rights. These interactions are discussed in Chapter 19: Current Use of Land and Resources for Traditional Purposes by Indigenous Persons through the linkages with other VCs within the EIS. No significant residual effects are predicted as a result of the Project.

Table 23.1 Potential for Effects with Indigenous Treaty Rights

Chapter	VC	Potential Direct Effect	Potential Indirect Effect
10	Atmospheric Environment and Climate	✓	
11	Water Resources	✓	
12	Groundwater Resources	✓	
13	Terrain and Acid Rock Drainage / Metal Leaching		✓
14	Wetlands	✓	
15	Fish and Fish Habitat	✓	
16	Birds, Wildlife and their Habitat	✓	
17	Species at Risk and Species of Conservation Concern		
18	Historic and Cultural Resources	✓	
19	Current Use of Land and Resources for Traditional Purposes by Indigenous Persons	✓	

Table 23.1 Potential for Effects with Indigenous Treaty Rights

Chapter	VC	Potential Direct Effect	Potential Indirect Effect
20	Other Contemporary Use of Land and Resources		
21	Community Services and Infrastructure		
22	Economy, Employment and Business		✓

23.4 Measures to Mitigate Potential Adverse Impacts on Potential or Established Indigenous and Treaty Rights or Related Interests

The recognition and protection of the current pattern of land and resource use for traditional purposes by Indigenous persons is a key aspect of the EA process. In addition, the use of the land and resources for traditional purposes by Indigenous persons is recognized and protected under the Canadian constitutional framework.

Indigenous knowledge identified Iron Arm as a traditional and current Indigenous fishery. Construction, operations and closure of the Project is unlikely to interfere with access to or use of this fishery. During construction, Joyce Direct Iron will limit in-water construction in Iron Arm to timing windows established to mitigate impact on fisheries. Joyce Direct Iron has designed causeway bridges with 2.7m of clearance to be easily passable by boats. Additional mitigation measures outside of these windows will be agreed upon in consultation with local stakeholder groups and DFO. To mitigate potential impact on the Iron Arm fishery during all phases, Joyce Direct Iron will forbid employees staying in camp from fishing. This will be controlled by prohibitions on bringing fishing gear into camp.

Indigenous groups identified Iron Arm as a traditional goose hunting area, conducted along the edge of ice at ashkui. Joyce Direct Iron will monitor ashkui formation and use by waterfowl in spring. This will be conducted through efforts of the Onsite Environmental Monitor and the participation of Indigenous Communities in effects monitoring activities.

Indigenous knowledge identified the region north and northeast of the Project as a traditional Indigenous hunting ground for caribou. Construction, operations and closure of the Project is unlikely to interfere with access to or use of this hunting ground. To mitigate potential impact on this area, Joyce Direct Iron will forbid employees staying in camp from hunting or harassing wildlife. This will be controlled by prohibitions on bringing hunting gear into camp. Some access points to the Joyce Lake peninsula may remain after closure to allow greater access to this traditional hunting ground, if approved.

Some of the specific measures that would be implemented by Joyce Direct Iron to avoid or reduce any adverse effects caused by the Project through its construction, operations and closure phases are identified in Chapters 10 to 22 and in Table 25.1.

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Joyce Lake Direct Shipping Iron Ore Project:

Chapter 24:

Cumulative Environmental Effects

File No. 121416571

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24.0 CUMULATIVE ENVIRONMENTAL EFFECTS

As detailed in chapter 1, Joyce Direct Iron Inc. succeeded Labec Century Iron Ore Inc. ("Labec Century") as the Project Proponent on February 18, 2021 following an internal reorganization. All references to Labec Century as the Project proponent may be interpreted as now referring to Joyce Direct Iron Inc.

24.1 Cumulative Environmental Effects Assessment Methods and Scoping

The assessment of Project effects that may act in combination with other projects or activities that have been or will be carried out is necessary to meet the cumulative environmental effects requirements of CEAA 2012, and IAAC and NLDOECC EIS Guidelines.

24.1.1 Methods

Cumulative effects are the result of multiple projects or activities. They are residual effects on the environment (i.e., environmental effects that remain after mitigation measures have been put in place) that are likely to arise from the Project in combination with other projects or activities that have been or will be carried out. To demonstrate that the full range of potential effects from this Project have been assessed, residual environmental effects of the Project were considered for each effect pathway within individual VCs, and then combined to provide an overall prediction of the potential risk posed by the Project.

The cumulative effects assessment methods used in this EIS address, and are consistent with, the requirements of CEAA 2012, IAAC EIS Guidelines and the NLDOECC EIS Guidelines for the Project, the OPS – Assessing Cumulative Environmental Effects Under CEAA 2012 (Government of Canada 2014), and are consistent with the Technical Guidance for Assessing Cumulative Environmental Effects under CEAA 2012. As prescribed in the OPS, a five-step methodology was used (Scoping, Analysis, Mitigation, Significance, Follow-up).

Detailed Cumulative Effects Analyses

The EIS assesses and evaluates cumulative effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out. The cumulative effects assessment is presented in detail in a separate subsection for each VC in Chapters 10 to 22. The method for conducting the detailed analysis for each VC is presented below.

The general level of analysis of cumulative effects for each VC was based on:

- the probability of the effect
- the likely scale or magnitude of the effect, and
- the extent to which these effects can be accurately and reasonably quantified and described within the receiving environment.

Depending on the probability, likely magnitude, and extent, potential cumulative effects of the Project in combination with each of the other projects were rated as 0 (no interaction and therefore no effect), 1 (likely to interact, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of best management or codified practices), or 2 (likely to interact, and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation).

The cumulative effects assessment considered the cumulative effect on each VC as a result of the Project's likely residual environmental effects and those of other relevant projects and activities, using a staged approach detailed below.

- Past and on-going projects and activities and their environmental effects are reflected in the existing environment subsections for each VC in Chapters 10 through 22. An overview of these previous and on-going developments and other human activities in the general area of the Project is provided in Tables 24.1 and 24.2. The current condition of the VC as a result of these natural and/or anthropogenic factors, and thus its overall sensitivity or resiliency to further disturbance or change, was integrally considered throughout the environmental effects assessment.

- With the current VC condition established, the cumulative effects assessment for each VC then summarized and considered whether and how this current condition will be changed by the introduction of the Project and its residual environmental effects.

- Other ongoing and likely future projects and activities that are relevant to this VC and its cumulative effects assessment were identified. These comprise any current or reasonably foreseeable future projects or activities whose effects on the VC would likely overlap in space and time with those of the Project (e.g., overlap with the Project area or its zone of influence, affect the same wildlife populations or communities). Where such interaction with the effects of another identified project was considered likely or unlikely to occur, the rationale for this determination was also provided.

- In cases where the predicted residual environmental effects of the Project on the VC will overlap in space and time with those of one or more other existing and/or future projects and activities, the potential cumulative effects of the Project in combination with those of these other relevant developments were assessed and evaluated. The same effects descriptors and significance definition and approach used for the Project-specific environmental effects assessment were used for the cumulative effects assessment. The significance of cumulative environmental effects was then determined.

Table 24.1 Summary of Other Projects and Activities

Owner	Project	Location	Distance to Joyce Lake	Project Type/Status	Production Rate	Product Transport	Employed/ Operating Life
Champion Iron Ltd.	Kami Iron Ore	Wabush, Labrador City and Fermont (QC)	230 km	Iron ore mine/ on hold	7.8 million tonnes per year	QNS&L Railway	Currently on hold. If it proceeds: 500+/ 23 years
ArcelorMittal	Mont-Wright Mine	Fermont, QC	245 km	Iron ore mine/active	15 million tonnes per year concentrate; 9 million tonnes per year pellets	Railway to Port Cartier Facility	Approx. 900/16 years
Champion Iron Ltd.	Fire Lake North Iron Ore Project	Fermont (QC)	245 km	Open-pit mine & iron ore/ Prefeasibility Study completed. Feasibility Study being conducted/EA in prog ress	Average production of 9.3 million tonnes per year	361 km new rail line to Pointe-Noire port facility	Approx. 400/20 years
Tacora Resources Inc.	Scully Mine	Wabush	225 km	Iron ore mine/ active	6 million tonnes per year	QNS&L Railway	260/26 years
Champion Iron Ltd.	Bloom Lake Mine and Rail Spur	Quebec (400 km north of Sept Iles)	221 km	Iron ore mine/ active	7.4 million tonnes per year (Phase I)	Bloom Lake Railway, QNS&L Railway	Approx. 600/21 years
IOC	Labrador Operation	Labrador City	220 km	Iron ore mine/ active	Up to 22 million tonnes per year of concentrate, with pelletizing capacity	QNS&L Railway	Approx. 2,000/50 years
Labrador Iron Mines	Houston 1&2 iron ore project	Western Labrador	25 km	Iron ore mine/on hold	2 million tonnes per year	Tshiuetin Rail Transportation and QNS&L Railway	Not available/10+ years

Table 24.1 Summary of Other Projects and Activities

Owner	Project	Location	Distance to Joyce Lake	Project Type/Status	Production Rate	Product Transport	Employed/ Operating Life
Nalcor	Lower Churchill Hydroelectric Generation Project	Muskrat Falls	420 km	Hydroelectric facility/under construction	3,074 MW/16.7 TW hours per year	Overhead Transmission Line	Approx. 2,700 peak/ongoing
NSP Maritime Link Inc.	Maritime Transmission Link Project	Island of Newfoundland/ Nova Scotia	>500 km	Transmission Line/active	500 MW HVdc and 230 kV HVac transmission lines	Not applicable	17/50+ years
Tata Steel Minerals Canada	DSO Iron Ore Project	NL, QC	35 km	Iron ore mine/ in development	4 million tonnes per year	Tshiuetin Rail Transportation and QNS&L Railway	Phase 1: construction 300 (peak) Phase 1 ops: 190 Phase 2 construction: 20 Phase 2 ops: 15/10 years

Table 24.2 Projects and Activities Considered for Assessment of Cumulative Effects

Champion Iron Ltd., Kami Project
Champion Iron Ltd. (Champion) has proposed to develop an open-pit iron ore mine in western Labrador and to build associated infrastructure at the Port of Sept-Îles, Québec. The proposed mine site is located 6 km south of Wabush Mines in the vicinity of the towns of Wabush, Labrador City and Fermont. The mine site is situated entirely within Labrador and has an approximate area of 7,700 ha. The project will produce up to 7.8 million metric tonnes of iron ore concentrate per year that will be transported by existing railway to the Port of Sept-Îles, QC. The proposed project includes construction, operation, rehabilitation and closure of the following primary components: open pit, waste rock disposal areas, processing infrastructure, tailings management facility, ancillary infrastructure to support the mine and processing plant, and a rail transportation component. The project is currently on hold, pending receipt of start-up financing; if the project proceeds, operations are projected to be approximately 23 years.
ArcelorMittal, Mont-Wright Mine
The Mont-Wright mining complex includes a concentrator, workshops and an automated concentrate train loading system in Fermont, QC. The site is linked by company rail to the Port-Cartier industrial complex, which includes a pellet plant, storage areas and port facilities for shipping. The company's stockpile areas at Port-Cartier have a capacity for 2.5 million tonnes of concentrate and 1.7 million tonnes of pellets (ArcelorMittal 2012). The current area of development is approximately 47 km^2.
Champion Iron Ltd., Fire Lake North Iron Ore Project
The Fire Lake North Project is being developed by Champion Iron Mines Ltd. (Champion). The Fire Lake North project is situated entirely in northern Québec, approximately 55 km south-west of Wabush and immediately adjacent to the north of ArcelorMittal's Fire Lake pit. The Fire Lake North project covers 173 km^2 of mineral claims and consists of two specular hematite deposits referred to as the East deposit and West deposit. A total of 464.6 Mt of Mineral Reserves will be processed over 20 years using conventional open pit mining and processing methods. Over the 20-year mine life, an annual average of 9.3 million tonnes of concentrate at 66% Fe will be produced. The material collected from the open pit mines will be ground and treated to separate hematite particles into a concentrate. The tailings generated will be pumped to a tailings management facility located near the concentrator, while the final hematite concentrate will be filtered, dried and loaded into rail cars for delivery to the Port of Sept-Îles. The project includes a rail link from Fire Lake North to Pointe-Noire, rail garages and rolling stock. The Pointe-Noire site includes a stockyard and ship loading facilities where the concentrate will be stockpiled and loaded onto ships prior to final delivery to Champion's clients.
Tacora Resources Ltd., Scully Mine
The Scully Mine is operated by Tacora Resources Ltd. (Tacora). The Scully Mine previously operated from 1965 to 2014 as Wabush Mines, producing iron ore concentrate that was pelletized at Pointe-Noire, Quebec. The Scully Mine is adjacent to Wabush and entirely in Labrador. The mine produces ore from an open pit, grinds and concentrates ore, and disposes of tailings in a tailings pond. The restart of the mine is ongoing, and at full production the mine is expected to produce up to 6 million tonnes per year of iron ore concentrate over a 26 year mine life. The concentrate is sold without pelletizing to Tacora's clients and is delivered via the Pointe-Noire site's stockyard and ship loading facilities. The area of development is approximately 21 km^2.
Champion Iron Ltd., Bloom Lake Mine and Rail Spur
The Bloom Lake iron ore mine (Bloom) is located in Québec approximately 12 km from Fermont and abuts the Labrador border. Bloom was acquired by Champion in 2015 after Cliffs Natural Resources (Cliffs) shut down operations in late 2014. Champion restarted the mine, with first production occurring 2018. The mine reserves are estimated to be 807 million tonnes. The mine produces ore from two open pits, grinds and concentrates ore, and disposes of tailings in a series of tailings ponds. Bloom has a mine life of 20 years and a nameplate capacity of 7.4 million tonnes per year of iron ore concentrate, which is sold to clients and delivered via the ship loading facilities and stockyard at Pointe-Noire. Champion is currently expanding the mine to increase production to 15 million tonnes per year of iron ore concentrate. The end-of-life area of development of the expanded mine is in excess of 15 km^2. An approximately 31 km long railway was constructed to transport iron concentrate from the mine in Québec to the QNS&L Railway in western Labrador.

IOC, Labrador Operation
Iron Ore Company of Canada, owned by Rio Tinto, is Canada's largest iron ore pellet producer and operates an open pit mine, concentrator, and pellet plant at Carol Lake in western Labrador, port facilities in Sept-Îles, QC, and the QNS&L Railway. IOC began production from the Carol Lake Mine in 1962. Proven and probable reserves are 1.5 billion tonnes; measured and indicated resources are 2.4 billion tonnes. Annual mine production at the open pit operation is in the 35 to 38 million tonne range at an average grade of approximately 40% total iron. Annual production capacity is 18 million tonnes of iron ore product of which 12.5 million tonnes can be pelletized (NLDF 2011). IOC has completed an iron ore product expansion program to increase production capacity to 23.3 million tonnes. In 2018, IOC completed construction of Moss pit, a new open pit mine at its Labrador West mine site. During Project operations, a portion of IOC's existing labour force (an estimated 136 persons) will be redeployed from the existing mine pits to carry out mining and support activities at Wabush 3 (IOC 2014).
Labrador Iron Mines, Schefferville Iron Ore Mine and Houston 1 & 2 iron ore project
LIM began operations near Schefferville in 2011. In its first year of operation, LIM shipped 412,000 tonnes of iron ore to China, under a transportation and sales agreement with Rio Tinto. LIM was expected to ship approximately 1.7 million tonnes of ore in 2012 (NLDNR 2012). However, LIM put production and shipping on hold for 2014 as a result of declining ore prices and lack of immediate access to high quality ore, ultimately closing James mine and Silver Yards processing plant and rehabilitating both sites (LIMH 2020). LIM is advancing the Houston 1 & 2 iron ore project near Schefferville to a Preliminary Economic Assessment and is expected to produce 2 million tonnes of iron ore annually over a project lifespan of approximately 10 years (LIM 2021).
Nalcor Energy, Lower Churchill Hydroelectric Generation Project
The Lower Churchill Hydroelectric Generation Project will include hydroelectric generation facilities at Gull Island and Muskrat Falls, and interconnecting transmission lines to the existing Labrador grid. The Muskrat Falls site is being constructed at the current time, and will consist of a generation facility 824 MW in capacity and will also include dams and a reservoir. The Muskrat Falls Reservoir will be 59 km long and the area of inundated land will be 41 km². If it proceeds, the Gull Island site will consist of a generation facility with a capacity of 2,250 MW and include a dam and a reservoir. The Gull Island Reservoir will be 232 km long, and the area of inundated land will be 85 km². The transmission lines consist of a 735 kV link between Gull Island and Churchill Falls and a double circuit 230 kV transmission line between Muskrat Falls and Gull Island. The 735 kV transmission line is 203 km long and the 230 kV transmission line is 60 km long. Both lines are north of the lower Churchill River, generally parallel to an existing right-of-way, and the tower structures are built of lattice-type steel (Nalcor Energy 2009).
NSP Maritime Link Inc., Maritime Transmission Link Project
ENL Maritime Link Inc., a wholly owned subsidiary of Emera Newfoundland and Labrador Holdings Inc., is proposing to design, develop and operate the Maritime Link Transmission Project between the Island of Newfoundland and Cape Breton, Nova Scotia. The transmission link is a 500 MW high voltage transmission system that includes: transmission line along new and existing corridors between Granite Canal and Cape Ray, NL; two subsea cables spanning the Cabot Strait (approximately 180 km) from Cape Ray to Point Aconi in Cape Breton, NS; and a new transmission line (approximately 50 km) parallel to the existing transmission corridor centerline between Point Aconi and Woodbine (ENL 2011). First power was delivered in 2017 (ENL 2011). Total employment during the operations and maintenance phase is expected to be approximately 17.
Tata Steel, DSO Project
The DSO Project is a two-phased open pit iron ore mining project located in western Labrador, approximately 10 km northwest of Schefferville, QC. The previously mined site consists of 10 open pit deposits. Ore will be trucked to a plant for crushing, screening and washing to produce lump ore and sinter fine ores. From the plant, the ore is transported via rail to a marshalling yard in Schefferville, and then sent via rail to Sept-Îles, QC for shipment to customers. TSMC began shipments from Sept-Îles to Europe in 2013. Full capacity is expected to be approximately 4.2 million tonnes. The project will operate year round for an expected life of 12 years and will support an estimated 180 person years of employment annually (NLDIET 2020).

The cumulative effects assessment considered and analyzed each of the potential types of cumulative effects that may occur from:

- potential additive effects, where the total cumulative effect is equal to the sum of the individual effects that have contributed to it;
- interactive or synergistic effects, where the total environmental effect may be greater or less than the sum of the contributing effects, such as possible reactions between them, the exceedance of some ecological or social threshold; and
- induced activities and their effects.

In summary, the cumulative effects assessment assessed and evaluated the overall (total) environmental effect on the VC resulting from the likely residual effects of the Project in combination with those of other relevant projects and activities.

Summary Presentation of the Cumulative Effects Assessment

As per Section 3.5 of IAAC EIS Guidelines, the cumulative effects assessment is provided in this stand-alone section. A description of the methods and scoping has been provided for ease of reference; the results of the cumulative effects assessment completed for each VC are summarized and presented.

24.1.2 Scoping

24.1.2.1 Valued Components

The assessment of cumulative environmental effects considers all of the VCs for which Project-related residual environmental effects were predicted. These VCs are:

- Atmospheric Environment and Climate
- Water Resources
- Groundwater Resources
- Terrain and ARD/ML
- Wetlands
- Fish and Fish Habitat
- Birds, Wildlife and their Habitat
- Species at Risk and Species of Conservation Concern
- Historic and Cultural Resources
- Current Use of Land and Resources for Traditional Purposes by Indigenous Persons
- Other Contemporary Land and Resource Use
- Community Services and Infrastructure
- EEB

24.1.2.2 Assessment Boundaries

Boundaries are established for each VC to focus the environmental assessment. Boundaries include spatial, temporal, and administrative.

Spatial Boundaries

The spatial boundaries reflect the geographic range over which environmental effects of the Project and other projects and activities may occur, recognizing that some environmental effects may extend beyond the Project footprint. The PDA is the area of physical disturbance resulting from the Project and includes the pit, waste rock disposal areas, processing area, accommodations area, on-site roads, and rail loop. The LSA is the maximum area within which Project-related environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The RSA is a broader area defined for each VC within which cumulative effects for each VC may occur, depending on physical and biological conditions and the type and location of other past, present, and reasonably foreseeable projects. It is also the area that captures the expected overall spatial extent of the Project's effects, based on factors such as the distribution or movement of the VC (e.g., the range of the various animal populations that may be affected, the communities or regions/economic zones that may feel Project benefits or effects). The RSA is the area within which the significance of residual cumulative environmental effects is predicted.

LSAs and RSAs are defined for each VC.

Temporal Boundaries

The temporal boundaries for the environmental assessment include the Project phases of Construction, Operation and Maintenance, and Closure and Decommissioning. The temporal boundary for Construction is one year (pre-operation), for Operation and Maintenance is approximately seven years, and for Closure and Decommissioning is approximately one year.

Temporal boundaries that reflect seasonal variations or life cycle requirements for biological VCs or forecasted trends for socio-economic VCs are also described where relevant in Chapters 10 through 22.

Administrative Boundaries

Relevant regulations, policy, and administrative/management mechanisms are described for each VC to establish the associated administrative boundaries.

24.1.2.3 Scoping of Other Projects and Activities

The other projects and activities considered in the cumulative environmental effects assessment in this EIS were identified in the NLDOECC EIS Guidelines, review of materials in the public domain, and knowledge of the Study Team. Tables 24.1 and 24.2 provide an overview of these projects and activities and Figure 24.1 displays their location. Each of these projects or activities is considered as relevant in the cumulative effects analysis for each VC.

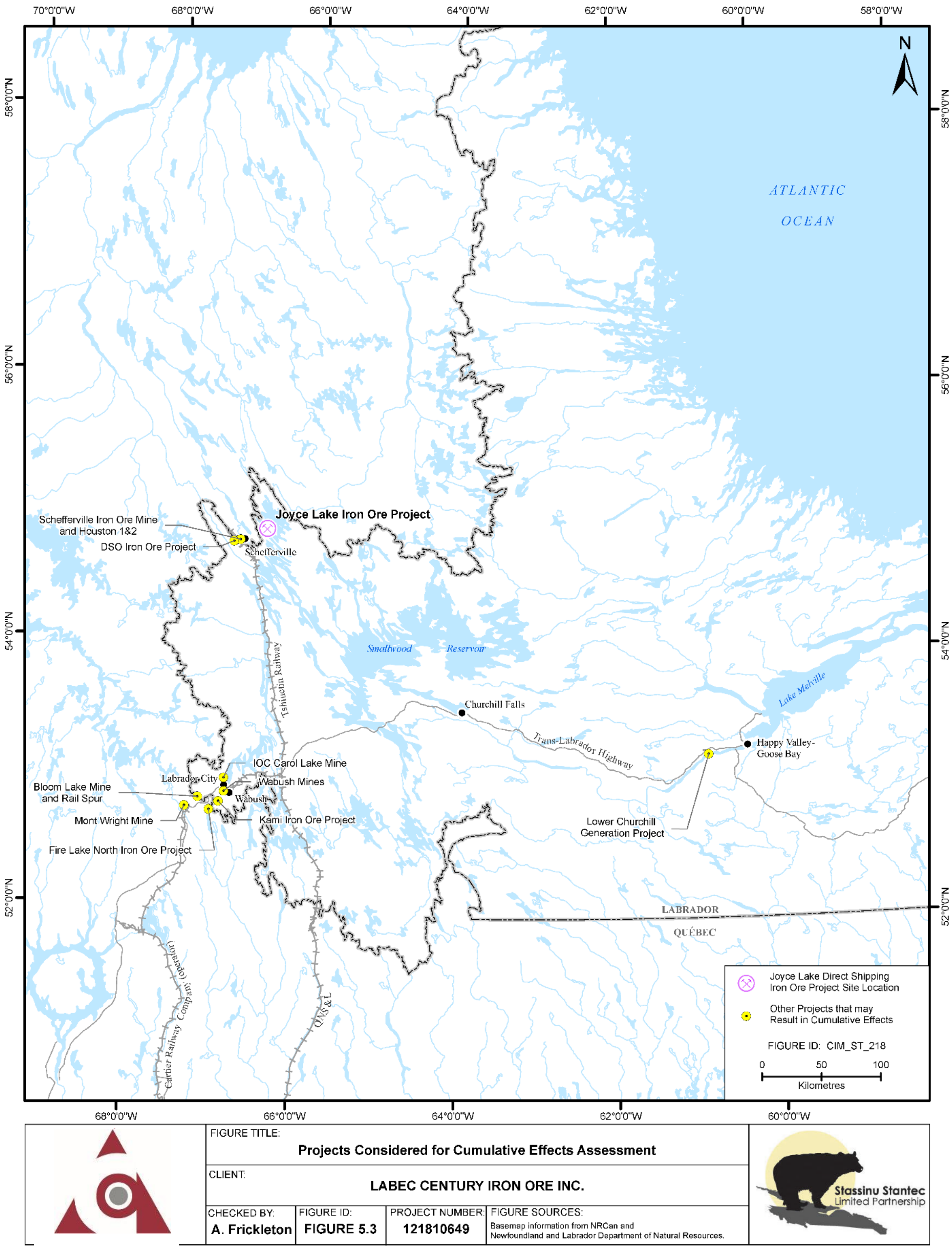

Figure 24.1 Projects Considered for Cumulative Effects Assessment Potential Interactions with Other Projects and Activities

The residual environmental effects of the Project on each VC could overlap temporally and spatially with the residual environmental effects of past, present, and future physical activities within the applicable RSA for each VC. The RSA for each VC is presented in Chapters 10 to 22.

Table 24.3 applies the criteria from Section 24.1.1 to determine whether further assessment of cumulative environmental effects is warranted for each VC and each environmental effect, and indicates where the residual effects of the Project may overlap and interact cumulatively with the environmental effects of other projects and activities in the applicable RSA for each VC. The potential cumulative environmental effects identified in Table 24.3 are assessed in detail for each VC in Chapters 10 to 22.

Where interactions have been rated as 0, there is no potential for cumulative effects due to the localized nature of residual Project effects such that they do not overlap temporally or spatially with effects of other projects and activities (e.g., Groundwater Resources).

Where interactions have been rated as 1, there is potential for Project residual effects to combine with effects of other projects and activities, but the predicted cumulative effects can be managed to acceptable levels with the implementation of standard mitigation and best management practices and do not require further assessment. For additional information on cumulative effects, including mitigation, refer to the cumulative effects analyses presented for each VC in Chapters 10 to 22.

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as "0" or "1")
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Atmospheric Environment and Climate											
Effect on Air Quality	0	0	0	0	0	0	1	0	0	1	Interactions between the Project and the Lower Churchill Hydroelectric Generation Project, the Maritime Transmission Link Project, the Kami Iron Ore Project, IOC Labrador Operation, Fire Lake North Iron Ore Project, Wabush Mines, Mont-Wright Mine and Bloom Lake Mine and Rail Spur are not anticipated due to the distance between these projects and the proposed Project. Similarly, vibration and lighting interactions with Houston 1&2 and the TSMC DSO Project are not anticipated due to the distance from the proposed Project. These interactions have therefore been ranked as 0 for cumulative effects and do not warrant further assessment. Although the Houston 1&2 and the TSMC DSO Iron Ore Project, which are located within 25 to 30 km of the proposed Project, have the potential to result in cumulative effects in air quality and acoustics, the resulting cumulative effects are unlikely to exceed acceptable levels due to the separation distance between these projects and mitigation likely to be used by all projects. The resulting residual environmental effects are not likely to be significant and these interactions have therefore been ranked as a 1. Further assessment is not warranted.
Effect on the Acoustic Environment	0	0	0	0	0	0	1	0	0	1	
Effect on Greenhouse Gases	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Effect on Vibration	0	0	0	0	0	0	0	0	0	0	
Effect on Lighting	0	0	0	0	0	0	0	0	0	0	

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as "0" or "1")
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Water Resources											
Change in Surface Water Quantity	0	0	0	0	0	0	1	0	0	1	Interactions are ranked 0 for those projects that are either located in a different watershed or outside the RSA, beyond which Project residual effects on water resources are not measurable and therefore no potential for cumulative effects. Although the Houston 1&2 and the TSMC DSO Iron Ore Project are within the RSA, the Project's residual effects on surface quantity, quality, and drainage patterns are negligible to low in magnitude and therefore the cumulative effects with these two projects will be negligible to low. Significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.
Change in Surface Water Quality	0	0	0	0	0	0	1	0	0	1	
Change in Surface Water Drainage Patterns	0	0	0	0	0	0	1	0	0	1	
Groundwater Resources											
Changes in Groundwater Level	0	0	0	0	0	0	0	0	0	0	Due to the large distances (greater than 25 km) between the Project and other projects and activities, and the presence of numerous intervening major surface water bodies that would limit overlapping effects to groundwater resources, there are no residual effects from the Project that would result in cumulative effects with other projects and activities. No further assessment is warranted.
Change in Groundwater Quality	0	0	0	0	0	0	0	0	0	0	

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as "0" or "1")
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Terrain and Acid Rock Drainage/Metal Leaching											
Effect on Landforms and Terrain Stability (terrain integrity)	0	0	0	0	0	0	1	0	0	1	Interactions are ranked 0 for those projects that are located outside the RSA, beyond which Project residual effects on terrain and acid rock drainage/metal leaching will not occur, and therefore no potential for cumulative effects. Although the Houston 1&2 and the TSMC DSO Iron Ore Project are within the RSA, adverse residual environmental effects resulting from the Project will be limited in scale and extent with the implementation of mitigation and best management practices and therefore unlikely to result in measurable cumulative effects in combination with these two projects. Significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.
Change in Soil Quality and Quantity	0	0	0	0	0	0	1	0	0	1	
Change in Snow and Ice	0	0	0	0	0	0	1	0	0	1	
ARD/ML	0	0	0	0	0	0	0	0	0	0	Because there are no likely residual environmental effects resulting from the Project, there are no likely cumulative effects resulting from ARD/ML. Significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as “0” or “1”)
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Wetlands											
Change in Wetland Area or Function	0	0	0	0	0	0	1	0	0	1	Interactions are ranked 0 for those projects that are located outside the RSA, beyond which Project residual effects on wetlands will not occur, and therefore no potential for cumulative effects. Although the Houston 1&2 and the TSMC DSO Iron Ore Project will cumulatively result in a cumulative loss of wetland in the RSA, the area of wetlands that will be affected by the Project is low. With the application of codified environmental protection practices, adherence to regulations and the conditions of environmental approvals, cumulative wetland effects as a result of these projects will be reduced. Project-specific environmental protection measures designed for the Joyce Lake DSO Project will be detailed in a separate Environmental Protection Plan and Wetland Mitigation and Monitoring Plan. Given the low level of interaction and the application of mitigation measures, significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as "0" or "1")
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Fish and Fish Habitat											
Change in Fish Habitat/Production	0	0	0	0	0	0	1	0	0	1	Interactions are ranked 0 for those projects that are either located in a different watershed or outside the RSA, beyond which Project residual effects on fish and fish habitat are not measurable and therefore no potential for cumulative effects. Where potential hydrologic connections may exist for projects that are located closer to the Joyce Lake DSO Project (Houston 1&2 and the TSMC DSO Iron Ore Project), the likelihood that environmental effects would interact cumulatively in a measurable way is low given the implementation of mitigation measures and the limited area potentially affected. Significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.
Change in Fish Health or Mortality	0	0	0	0	0	0	1	0	0	1	
Birds, Wildlife and their Habitat											
Change in Habitat	0	0	0	0	0	0	1	0	0	1	Interactions may occur for individuals of species with home ranges that potentially overlap the project footprint of the Houston 1&2 and the TSMC DSO Iron Ore Project. However, given the general availability of primary habitat in the RSA, and the high mobility of potentially affected individuals, it is anticipated that few individuals would be adversely affected following the implementation of standard mitigation measures and best management practices. Significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as "0" or "1")
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Change in Distribution and Movement	0	0	0	0	0	0	2	0	0	2	With the exception of the Houston 1&2 and the TSMC DSO Iron Ore Project, residual effects of the Project in combination with residual effects of other projects and physical activities are not likely given the distances of separation. Cumulative effects with the Houston 1&2 and the TSMC DSO Iron Ore Project are assessed in Section 24.3.1.
Change in Mortality Risk	0	0	0	0	0	0	2	0	0	2	With the exception of the Houston 1&2 and the TSMC DSO Iron Ore Project, residual effects of the Project in combination with residual effects of other projects and physical activities are not likely given the distances of separation. Cumulative effects with the Houston 1&2 and the TSMC DSO Iron Ore Project are assessed in Section 24.3.1.
Change in Health	0	0	0	0	0	0	2	0	0	2	With the exception of the Houston 1&2 and the TSMC DSO Iron Ore Project, residual effects of the Project in combination with residual effects of other projects and physical activities are not likely, given the distances of separation. Cumulative effects with the Houston 1&2 and the TSMC DSO Iron Ore Project are assessed in Section 24.3.1.

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as "0" or "1")
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Species at Risk and Species of Conservation Concern											
Change in Rare Plant Species and Uncommon Plant Communities	0	0	0	0	0	0	1	0	0	1	With the possible exception of the Houston 1&2 and the TSMC DSO Iron Ore Project, residual effects of the Project in combination with residual effects of other projects and physical activities are not likely given the distances of separation. There are no uncommon plant communities recognized on the Joyce Lake Peninsula or in association with other Project infrastructure (i.e., haul road, rail loop), and therefore no Project effect and no cumulative effect on uncommon plant communities. Project effects on rare plant species (including loss of individuals or habitats in the PDA) are predicted to not act cumulatively with other projects or activities that would result in the degradation, alteration, or loss of important habitat in such a way as to cause a decline in distribution or abundance such that the likelihood of the long-term viability of rare plant species and uncommon communities within the RSA is substantially reduced as a result. Significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.
Change in Habitat (Bird and Wildlife SAR/SOCC)	0	0	0	0	0	0	1	0	0	1	Interactions may occur for individuals of species with home ranges that potentially overlap the project footprint of the Houston 1&2 and the TSMC DSO Iron Ore Project. However, given the high mobility of potentially affected individuals, and the general availability of primary habitat in the RSA and adjacent areas, it is anticipated that few individuals would be adversely affected following the implementation of standard mitigation measures and best management practices.

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as "0" or "1")
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Change in Distribution and Movement (Bird and Wildlife SAR/SOCC)	0	0	0	0	0	0	2	0	0	2	With the exception of the Houston 1&2 and the TSMC DSO Iron Ore Project, residual effects of the Project in combination with residual effects of other projects and physical activities are not likely, given the distances of separation. Cumulative effects with the Houston 1&2 and the TSMC DSO Iron Ore Project are assessed in Section 24.3.2.
Change in Mortality Risk (Bird and Wildlife SAR/SOCC)	0	0	0	0	0	0	2	0	0	2	
Change in Health (Bird and Wildlife SAR/ SOCC)	0	0	0	0	0	0	2	0	0	2	
Historic and Cultural Resources											
Loss or Disturbance of Archaeological and Cultural Resources	0	0	0	0	0	0	0	0	0	0	Due to the low archaeological potential for the majority of the PDA and implementation of mitigation measures, there is low potential for residual effects from the Project and therefore no predicted interaction with effects from other projects and activities to result in cumulative effects. No further assessment is warranted.
Current Use of Land and Resources for Traditional Purposes by Indigenous Persons											
Change in Activity Distribution (location, timing, and/or intensity)	0	0	0	0	0	0	2	0	0	2	With the exception of overlap of the Houston 1&2 and the TSMC DSO Iron Ore Project, residual effects of the Project in combination with residual effects of other projects and physical activities are not likely given the distances of separation. Cumulative effects with the Houston 1&2 and the TSMC DSO Iron Ore Project are assessed in Section 24.3.3.

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as “0” or “1”)
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Other Contemporary Land and Resource Use											
Change in Access for Recreational Purposes	0	0	0	0	0	0	1	0	0	1	With the possible exception of the Houston 1&2 and the TSMC DSO Iron Ore Project, residual effects of the Project in combination with residual effects of other projects and physical activities are not likely given the distances of separation. Given the localized nature of environmental effects on other contemporary use of land and resources, the mitigation measures that will be implemented for the Project and the other two projects in the RSA, and regulatory controls for activities such as hunting, fishing and wood harvesting, it is unlikely that the cumulative effects of the Project in combination with the other two projects and activities would result in changes so that the levels and distribution of land and resource use by non-Indigenous people could not continue at current levels within the RSA over the long-term. Significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.
Change in Level of Activity / Use for Recreational Purposes	0	0	0	0	0	0	1	0	0	1	
Community Services and Infrastructure											
Change in Capacity of Community Services and Infrastructure	1	1	1	1	1	1	1	1	1	1	With the application of best management practices and mitigation measures, cumulative effects of the Project in combination with other projects and activities are unlikely to diminish the capacity of community services and infrastructure beyond acceptable levels. Significant cumulative effects are therefore unlikely to occur. No further assessment is warranted.

Table 24.3 Potential Interactions with Other Projects and Activities

Environmental Effect	Potential Cumulative Environmental Effects										Reasons that Further Assessment is Not Warranted (only applicable for potential cumulative effects marked as "0" or "1")
	Kami Iron Ore	Mont-Wright Mine	Fire Lake	Wabush Mines	Bloom Lake Mine & Rail Spur	IOC Labrador	Houston 1 & 2	Lower Churchill Hydroelectric Generation Project	Maritime Transmission Link Project	TSMC DSO Iron Ore Project	
Economy, Employment and Business											
Change in Economy	1	0	0	1	0	1	1	0	0	1	The positive economic benefits resulting from the Project will act cumulatively with currently active mining projects (e.g., IOC Carol Lake/Labrador Operation), and with future projects, resulting in a positive cumulative effect regionally, including employment and business contracts associated with the mining industry. Significant adverse cumulative effects are therefore unlikely to occur. No further assessment is warranted.
Change in Employment	1	0	0	1	0	1	1	0	0	1	
Change in Business	1	0	0	1	0	1	1	0	0	1	

Key:

0 Project environmental effects do not act cumulatively with those of other projects and activities.
1 Project environmental effects act cumulatively with those of other projects and activities, but the resulting cumulative effects are unlikely to exceed acceptable levels with the application of best management or codified practices.
2 Project environmental effects act cumulatively with those of other projects and activities and the resulting cumulative effects may exceed acceptable levels without implementation of project-specific or regional mitigation.

24.2 Assessment of Cumulative Effects

Interactions rated as 2 in Table 24.3 were subjected to further assessment in their respective VC Chapters and a summary is provided below.

24.2.1 Assessment of Cumulative Environmental Effects on Birds, Wildlife and their Habitats

Other Projects/Activities and Potential Interactions

Project residual effects could potentially combine with effects from LIM's Houston 1&2 and TSMC's DSO Iron Ore Project to result in cumulative effects on Birds, Wildlife and their Habitat. In particular, activities that result in habitat fragmentation and the creation of sensory disturbance (lighting, noise, human presence) could result in a change in distribution and movement and change in health, particularly during seasonal/annual migrations.

A cumulative risk of mortality could be experienced as a result of vehicle collisions, collisions associated with light attraction, and direct mortality associated with clearing activities, particularly for species with home ranges that have the potential to overlap both the PDA and nearby projects (e.g., black bear and lynx).

Mitigation of Cumulative Environmental Effects

Joyce Direct Iron will comply with all provincial and federal legislation, permits, policies, and guidelines; current and future projects are and will also be subject to such regulations aimed at protecting migratory birds, wildlife, and their habitat. Mitigation measures that will be undertaken for the Project are identified in Sections 16.6.2 to 16.6.4. These same mitigation measures will also address cumulative environmental effects on distribution and movement, mortality risk, and health of birds and wildlife. Additional mitigation may include the support of future initiatives, including collaboration with other proponents, government agencies, or other third parties, in regards to mitigation, environmental protection planning, best management practices, or research and recovery planning (e.g., caribou).

Residual Cumulative Environmental Effects

Given the distance between projects, and following implementation of standard mitigation measures (including reducing site lighting and noise levels, and restricting all activities to the PDA or respective footprints of other projects), a relatively small proportion of populations is likely vulnerable to adverse cumulative effects.

Residual cumulative environmental effects are anticipated to be adverse and low in magnitude, following implementation of standard and proven mitigation measures and best management practices. Environmental effects are likely to be sporadic (e.g., mortality as a result of collisions), medium- to long-term in duration, and reversible.

Determination of Significance

It is understood that other projects (current and future) are or will be subject to federal and provincial provisions that protect migratory birds, wildlife and their habitat, and will be required to implement similar well-established and proven mitigation measures to limit adverse environmental effects. It is expected that the likelihood of the long-term viability or survival of populations within the RSA will not be threatened, and therefore residual cumulative environmental effects on Birds, Wildlife and their Habitat are predicted to be not significant.

24.2.2 Assessment of Cumulative Environmental Effects on Species at Risk and Species of Conservation Concern

Other Projects/Activities and Potential Interactions

Project residual effects could potentially combine with effects from LIM's Houston 1&2 and the Tata's DSO Iron Ore Project to result in cumulative effects on SAR and SOCC (Bird and Wildlife SAR/SOCC). Similar to that assessed above for Birds, Wildlife and their Habitat, activities that result in habitat fragmentation and the creation of sensory disturbance (lighting, noise, human presence) could result in a change in distribution and movement and change in health, particularly for SAR/SOCC during seasonal/annual migrations.

A cumulative risk of mortality could be experienced as a result of vehicle collisions, collisions associated with light attraction, and direct mortality associated with clearing activities, particularly for species with home ranges that have the potential to overlap both the PDA and nearby projects.

Cumulative effects could result in changes to health for bird and wildlife SAR/SOCC via displacement and resultant stress associated with potential increases in competition, predation, and search times to find suitable habitat and/or having to settle in lower quality habitats. Light exposure and noise may also increase stress. Potential interactions are greatest for migratory SAR/SOCC (e.g., birds, bats).

Mitigation

Joyce Direct Iron will comply with all provincial and federal legislation, permits, policies, and guidelines; current and future projects are and will also be subject to such regulations aimed at protecting SAR and SOCC. Mitigation measures that will be undertaken for the Project are identified in Sections 17.6.1 to 17.6.5. These same mitigation measures will also address cumulative environmental effects pertaining to distribution and movement, mortality risk, or health of birds and wildlife. Additional mitigation includes supporting collaborative initiatives with proponents of other projects and activities, government agencies and other third parties. An example of such initiatives may include the participation in research and recovery planning for SAR and SOCC.

Residual Cumulative Environmental Effect

Given the distance between projects, and following implementation of standard mitigation measures (including reducing site lighting and noise levels, and restricting all activities to the PDA or respective footprints of other projects) and best management practices, residual cumulative environmental effects are anticipated to be adverse and low in magnitude. Environmental effects are likely to be sporadic (e.g., mortality as a result of collisions), medium- to long-term in duration, and reversible.

Determination of Significance

The contribution of the Project to potential cumulative environmental effects is anticipated to be negligible to low when considered in the context of the RSA. The Project will not likely result in a change or decline in the distribution or abundance of SAR and SOCC or their habitats, such that the likelihood of long-term viability within the RSA is substantially reduced as a result. It is understood that other projects (current and future) are or will be subject to federal and provincial provisions that protect SAR/SOCC and their habitat, and will be required to implement similar well-established and proven mitigation measures so that the likelihood of the long-term viability or survival of populations within the RSA will not be threatened. Therefore, residual cumulative environmental effects on SAR and SOCC are predicted to be not significant.

24.2.3 Assessment of Cumulative Environmental Effects on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Other Projects/Activities and Potential Interactions

Due to their proximity to the Project and to the Indigenous communities identified as the most frequent users of the RSA, the Houston 1&2 project, and the TSMC DSO Iron Ore Project have been identified as likely to interact with the Project, resulting in potential cumulative effects on activity and/or distribution (location, timing and/or intensity).

LIM's Houston 1&2 project, and TSMC's DSO Iron Ore Project have resulted in ground disturbance and access limitations that could have an effect on the distribution of land and resource use activities. Both projects also draw from Indigenous communities for their work force. As with the Project, employment opportunities may result in some Indigenous persons choosing to spend more of their time engaged in wage employment and less time engaged in traditional land and resource use activities. This could affect the distribution of activity in regard to timing, as periods of considerable Project-related activity may result in a re-scheduling of traditional land and resource use activities.

Indigenous persons employed by the Project may choose to fish and hunt in areas closer to the local communities and PDA (as their time available to travel for hunting or fishing may be more limited). This could result in an increase in hunting in the vicinity of the Project and may affect the availability of resources in the area. However, an overall increase in employment may have broader community effects due to the pooling of resources available to engage in land and resource use at more distant locations as result of the income earned through Project-related work.

Mitigation

The proposed rotational work force arrangement will manage some of the effects on Indigenous land and resource use for the Project. A rotational work force will provide the opportunity for Indigenous employees to balance the benefits of wage employment and the opportunity to engage in land use activities. In particular, a rotational work force arrangement may enhance the ability of land and resource users to take advantage of the positive effects of wage employment, such as the ability to purchase higher quality equipment. Other measures that Joyce Direct Iron will implement to mitigate adverse effects on land and resource use include reclamation of the project site at closure, ongoing consultation and engagement, and participation of Indigenous Communities in effects monitoring activities.

Residual Cumulative Environmental Effect

The potential cumulative environmental effects for the Project are both adverse and positive. For example, there will be a cumulative loss of area available for resource use as a result of the combined effects of project footprints, but a cumulative increase in access due to the construction of new roads. The cumulative effects will low in magnitude and short to medium-term in duration. Joyce Direct Iron will continue to consult and engage affected Indigenous groups to manage effects on Indigenous land and resource use.

Determination of Significance

With mitigation in place and based on the limited overlap between projects, the cumulative effects of the Project on Current Use of Land and Resources for Traditional Purposes by Indigenous Persons are predicted to be not significant.

24.3 Accidental Events

Section 19(1)(a) of CEAA 2012 requires the assessment of the environmental effects of accidents and malfunctions that may occur in relation to the designated project. Accordingly, as per IAAC's OPS, *Assessing Cumulative Environmental Effects Under the Canadian Environmental Assessment Act, 2012*, "the environmental effects of accidents and malfunctions must be considered in the assessment of cumulative environmental effects if they are likely to result from the designated project in combination with other physical activities that have been or will be carried out" (CEA Agency 2014).

Accidental events as a result of the Project are unlikely, as Joyce Direct Iron has mitigations in place to reduce their likelihood. However, should an accidental event occur, Joyce Direct Iron's response measures will address adverse effects of such events; an ERP will be developed to deal with potential incidents that could occur during Project construction, operation and decommissioning activities. It will be submitted to appropriate regulatory agencies for review prior to the initiation of Project activities.

Given the low likelihood of adverse residual environmental effects occurring from an accident or malfunction as a result of the Project, the possibility of these effects interacting cumulatively with residual effects of routine Project activities and/or those from other projects and activities in the RSA is also low. Significant adverse cumulative environmental effects are not likely to occur.

24.4 Follow-Up and Monitoring

Follow-up and monitoring requirements are described for each VC in Chapters 10 to 22. Separate follow-up and monitoring programs are or will be required of the proponents of other projects and activities.

In consultation with the appropriate regulatory authorities, Joyce Direct Iron will evaluate the need for monitoring plans to verify predicted effects on Birds, Wildlife and their Habitats and to confirm Joyce Direct Iron's intended objective for SAR and SOCC which includes the protection of species at risk, and their habitats.

Consultation with affected Indigenous groups will continue throughout the Project, and will include the effects of the Project on Indigenous land and resource. Consultation will also include the establishment of a mechanism to address issues that may arise as a result of Project activities and the implementation of additional mitigation as necessary.

Monitoring activities associated with the Project and other activities will support the development and implementation of adaptive management measures if previously unanticipated adverse environmental effects are identified, thereby reducing the overall potential for cumulative environmental effects.

24.5 References

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Chapter 25:

Commitments

File No. 121416571

Date: May 2021

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25.0 COMMITMENTS

25.1 Summary of Commitments

Design features and mitigation measures have been integrated into the Project to avoid or reduce environmental effects. The majority of Project and cumulative environmental effects will be addressed through the application of mitigation measures for each VC. A summary of mitigation, monitoring and follow-up commitments is presented in Table 25.1, with an indication of the relevance of each to changes to the environment and effects of changes to the environment as prescribed in Section 5 of CEAA 2012. Many of the effects associated with the commitments are positive.

Table 25.1 Summary of Commitments

No.	Proponent Commitments	EIS Section Reference	Relevant Category of Environmental Effect Under Section 5 of CEAA, 2012				
			Changes to the Environment			Effects of Changes to the Environment	
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General							
1	Joyce Direct Iron will comply with conditions attached to permits, authorizations and approvals issued by mandated government agencies	n/a	✓		✓	✓	✓
2	A committee of the Board of Directors of Joyce Direct Iron will oversee the continuing development and implementation of environmental policies on an open and transparent basis to build cooperation and trust with the local community and stakeholders	Section 1.2.1	✓		✓	✓	✓
Project Design							
3	All roads will be designed to reduce cut and fill and will have a maximum grade of 10%.	Section 2.5.4	✓			✓	
4	The rock causeway in Iron Arm will be designed and constructed to allow access for navigation and to not impede passage of fish and other wildlife.	Section 2.5.4	✓		✓	✓	✓
5	Management of surface run-off and drainage will include construction of diversion ditches.	Section 2.5.7	✓		✓	✓	✓
6	Run-off from stockpiled material areas (i.e., overburden, waste rock, and ore) will be managed and captured through the use of diversion ditches and local appropriately-sized settling ponds, to control discharge to meet regulated limits prior to discharge.	Section 2.5.7	✓		✓	✓	✓

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7	Ditches, culverts and settling ponds will be designed, as a minimum, for a 1-in-100 year storm event.	Section 2.5.8	✓		✓	✓	✓
8	Road alignments will be planned to reduce, to the extent practicable, the number of watercourse crossings, habitat disturbance of sensitive habitats (such as wetlands), and direct and indirect effects on SOCC.	Section 2.6.1	✓		✓	✓	✓
9	Sediment control measures (e.g., sediment traps) will be implemented to control sediment from entering adjacent watercourses.	Section 2.6.1, 2.6.2	✓		✓	✓	✓
10	In addition to dust associated with access roads, dust will be suppressed at the open pit and other exposed areas as required.	Section 2.6.4	✓		✓	✓	✓

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11	Mitigation measures to prevent train derailment include: • Inspection of rolling stock will be undertaken before trains are loaded at the rail loop, to confirm there are no problems with wheels, couplers, carbody, or brakes. Defective equipment will be removed from the train and kept out of service until repaired. • Track inspections of the rail loop will be done and haulage contractor will be required to inspect main haulage rail lines in accordance with Transport Canada regulations. • Fuel will be transported along the rail line to Schefferville. The volume of fuel will be limited to the quantities necessary to supply the needs of the mine and associated facilities. • In the rail loop, the maximum speed will be 5 mph or 8 km/hr.	Section 2.6.3	✓		✓	✓	✓
12	Locomotives will be arranged for distributed power operation within the 240 car train with two units on the front and a second locomotive approximately at the 160 car point. This will help reduce excessive stresses in railcar couplings and provide adequate air pressure for braking systems in severe weather conditions.	Section 2.6.3	✓		✓	✓	✓

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13	Response measures to recover lost fuel from a spill event will include: • Immediate response through use of absorbent booms and pads. • Liquids cleanup including the use of a vacuum truck, if available. This process can be used to capture both fuels and groundwater near the site for removal and disposal. • Physical reclamation of contaminated soils; removal of contaminated soil and replacement with clean soil.	Section 2.6.3	✓			✓	
14	Fire water systems will be maintained on site.	Section 2.6.3	✓			✓	✓
15	Animals will have the right-of-way in all cases, except along the train route for safety reasons.	Section 2.6.3	✓			✓	
16	As required, water trucks will be available on site for dust suppression at waste rock disposal areas and on roadways.	Section 2.6.4	✓			✓	
Environmental Management and Planning							
17	Detailed EMPs, including an ERP and EPP, for all phases of the Project will be developed in consultation with provincial and federal governments, Indigenous groups, the public, and other stakeholders	Section 7.1	✓		✓	✓	✓

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18	A Water Management Plan will be developed for the Project. This plan will outline water management in and around the major Project component areas (i.e., ore stockpiles and overburden/waste rock disposal areas, open pit, and roads, rail yards, and water crossings)	Section 7.2.2	✓		✓	✓	✓
19	A sewage facility site will be located at the workers camp. It will develop solid waste that will be disposed of through a contracted service.	7.2.3	✓	✓	✓	✓	✓
20	Domestic solid waste will be separated into recyclable and non-recyclable portions, and sent to licensed facilities	Section 7.2.3				✓	
21	All staff authorized to handle hazardous materials will be appropriately trained in handling, storage and disposal of these hazardous material s	Section 7.2.3	✓		✓	✓	✓
22	The site-specific ERP will be developed to reduce, contain, and control potential releases of hazardous material	Section 7.2.3	✓		✓	✓	✓
23	An idling policy will be in place for all passenger vehicles	Section 10.6.1				✓	
24	The Project footprint will be progressively rehabilitated throughout the duration of the Project as opportunity allows	Section 7.2.6	✓			✓	
25	A Rehabilitation and Closure Plan will be prepared and submitted, as required under the Newfoundland and Labrador *Mining Act*, Chapter M-15.1, Sections (8), (9) and (10)	Section 7.2.6	✓			✓	

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26	A follow-up and monitoring program will be designed in consultation with provincial and federal governments, and Indigenous groups, and conducted, as appropriate, during all phases of the Project	Section 7.3	✓		✓	✓	✓
Atmospheric Environment and Climate							
27	Joyce Direct Iron will install a dust control system on sections of the product haul road in the immediate vicinities of the seasonal cabins during periods when generation of dust is high and to ensure the regulatory standards are not exceeded at the cabins.	Section 10.6.1				✓	
28	Speed restrictions will be in place for vehicles, on the public service road	Section 10.6.1					
29	Advance warning to nearby sensitive receptors of noise-causing activities	Section 10.6.2				✓	
30	Selecting stockpiling sites that are as far away from sensitive receptors as practically feasible	Section 10.6.1				✓	
31	Development of GHG Management Plan	Section 10.6.3					
32	Waste heat from generators will be partially captured and used to heat living and working spaces.	Section 10.6.3					
33	Blasting will be conducted according to a comprehensive blast design and will be implemented under a strictly controlled environment.	Section 10.6.4				✓	

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34	A complaint driven noise monitoring plan will be developed in consultation with regulatory authorities, and will be incorporated into the Project Environmental Management and/or Protection Plans.	Section 10.10.2				✓	
35	Worker accommodation will offer a variety of plant-based foods to reduce the project's carbon footprint.	Section 10.6.3					
36	Worker accommodations will be designed with sufficient ventilation so as to reduce the need to open windows and reduce heating efficiency.	Section 10.6.3					
37	Worker accommodations will be insulated to reduce heating power requirements.	Section 10.6.3					
38	The Management Plan would include features to promote comprehensive equipment maintenance to maximize fuel efficiency, and anti-idling policies for personnel vehicles to avoid the unnecessary release of GHG emissions when equipment is not used	Section 10.6.3					
39	Limit train speed to 5 mph on rail loop	Section 10.6.4	✓		✓	✓	✓
40	Locate portable lighting equipment where it is not visible in surrounding urban areas	Section 10.6.4				✓	
41	Proper shielding and the use of full horizontal cutoff fixtures will be implemented as appropriate. The construction lighting will be subject to guidelines in the EMP.	Section 10.6.4				✓	

Table 25.1 Summary of Commitments

No.	Proponent Commitments	EIS Section Reference	Relevant Category of Environmental Effect Under Section 5 of CEAA, 2012: Changes to the Environment: Changes to Components within Federal Jurisdiction	Changes to the Environment: Changes Occurring on Federal or Transboundary Lands	Changes to the Environment: Changes that are Directly Linked or Necessarily Incidental to Federal Decisions	Effects of Changes to the Environment: Effects on Indigenous People	Effects of Changes to the Environment: Effects that are Directly Linked or Necessarily Incidental to Federal Decisions
Water Resources							
42	Optimize water harvesting and re-use	Section 11.6.1, Table 11.74				✓	
43	Restore existing water balance conditions, to the extent feasible	Section 11.6.3, Table 11.74				✓	
44	Use of appropriately sized sedimentation ditches and ponds	Table 11.74	✓		✓	✓	✓
45	Restore natural drainage patterns and maintain or restore existing water balance condition, to the extent feasible	Table 11.74				✓	
46	Manage effluent treatment to meet MDMER and NL ECWSR discharge limits	Table 11.74	✓		✓	✓	✓
47	Reduce drainage interactions and alterations	Section 11.6.1, Table 11.74	✓		✓	✓	✓
48	Construct open pit mine, Joyce Lake, waste rock, low grade ore and overburden stockpile area perimeter ditches	Section 11.6.2, Table 11.1, Table 11.74, Figure 11.50	✓		✓	✓	✓
49	Construct access roads and rail line drainage	Section 11.6.2, Table 11.74, Figure 11.50, Figure 11.51				✓	
50	Prepare and implement Water Management Plan	Section 11. 6.2, Table 11.1, Table 11.77	✓		✓	✓	✓

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51	Construction and operation of WWTP to treat sanitary effluent to regulatory criteria	Section 11.5.3, 11.6.2, Table 11.74					
52	Storage tanks for petroleum or other hazardous materials will comply with regulations and have secondary containment.	Section 11.6.2, 11.8.3				✓	
53	Installation of oil-water separator devices downstream of areas with hydrocarbon release	Section 11.6.2, 11.8.1, 11.8.3	✓		✓	✓	✓
54	Use of bottom-draw, reverse slope outlet pipes at facility sedimentation ponds to capture LNAPLs	Section 11.6.2	✓		✓	✓	✓
55	Availability of spill containment and clean up supplies and materials	Section 11.6.2, 11.8.1, 11.8.3	✓		✓	✓	✓
56	Routine spill/hydrocarbon monitoring and surveillance	Section 11.8, Table 11.76				✓	
57	DFO guidance on culvert embedment and fish passage will be followed so water crossing do not constitute a barrier to fish passage	Section 11.6.2, Table 11.1, Table 11.54,	✓		✓	✓	✓
58	A minimum culvert size of 600 mm to be installed, although larger may be required in many instances. This reduces the potential for blockage due to ice, sediment, beaver activities and vegetation	Section 11.6.2	✓		✓	✓	✓

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59	Where the water table is close to the ground in areas of peat, culvert will be installed to maintain equal water levels and natural drainage on both sides of the road to reduce excessive ponding or drying of peat areas and wetland areas on either side of the road	Section 11.6.2				✓	
Groundwater Resources							
60	Blast monitoring as needed	Section 12.10.1				✓	
61	Excavation drainage water control using settling pond	Section 12.6.1	✓		✓	✓	✓
62	Install groundwater monitoring wells at the open pit mine and select mine components (e.g., waste rock stockpiles, bulk fuel storage areas) for regular monitoring of groundwater levels and groundwater quality during the Operation and Maintenance phase, as well as post-closure.	Section 12.4.2					
63	Install groundwater monitoring wells around the perimeter and at varying distances out from the open pit mine to observe the extent of groundwater level decline around the open pit mine as part of mine development / operation, and to determine whether or not there is any effect on Project water supply wells, or nearby surface water features.	Section 12.10.1					
64	Install groundwater monitoring wells adjacent to the northeast and southwest shores of Joyce Lake, and along the watershed divide between Joyce Lake and the other water bodies to monitor groundwater levels and hydraulic gradients during and after the lake dewatering operations	Section 12.10.4					

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65	Monitoring wells installed in the waste rock stockpile area will be used to detect and characterize chemistry of seepage leaving the waste rock stockpile area during operations, and to determine whether or not long-term (post-closure) monitoring is warranted	Section 12.10.2					
66	Carry out regular groundwater level monitoring at the open pit mine, and select mine components (e.g., waste rock stockpiles, bulk fuel storage areas) over the Operation and Maintenance phase.	Table 12.6					
67	Select wells located at the open pit mine and other specific mine components will be sampled for groundwater quality during the Operation and Maintenance phase following a regular schedule, as deemed appropriate based on consultation with provincial and federal regulators as part of development of the Project's EPP.	Section 12.10	✓		✓	✓	✓
68	Groundwater quality sampling will be carried out of any water supply wells installed at the mine site over the Operation and Maintenance phase. Water supply wells will be sampled for groundwater quality following a regular schedule, as deemed appropriate based on consultation with provincial and federal regulators as part of development of the Project's EPP.						

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69	Select wells located adjacent to open pit mine and other specific mine components (e.g., waste rock stockpiles, bulk fuel storage areas) will be monitored for groundwater levels and groundwater quality following decommissioning for a period of time, as deemed appropriate based on consultation with provincial and federal regulators as part of development of the Project's EPP. Post-closure groundwater monitoring will be carried out to confirm effectiveness of mitigation or decommissioning, and/or declining trends in established seepage plumes	Section 12.10	✓		✓	✓	✓
70	Groundwater quality monitoring at the open pit mine and select mine components (e.g., waste rock stockpiles, bulk fuel storage areas), during both the Operation and Maintenance phase and following decommissioning will be carried out for a variety of chemical parameters, as determined based on the water quality issue of concern and in consultation with provincial and federal regulators as part of development of the Project's EPP.	Section 12.10.	✓		✓	✓	✓
71	Avoid water well development in any area affected by fuel spills	Table 12.11					
72	If required, the volume and chemistry of the open pit sump discharge will be regularly monitored for general chemistry and metals on a scheduled as deemed appropriate, based on consultation with provincial and federal regulators as part of development of the Project's EPP.	Section 12.10.1	✓		✓	✓	✓
73	The pit wall rock, excavated waste rock, and ore will be inspected on a regular basis for sulfide mineralization. Standard ARD abatement procedures will be implemented if warranted	Section 12.6.1	✓		✓	✓	✓

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74	The pit walls will be regularly monitored for measurable groundwater inflows; with a contingency plan for management of anomalous joint-related groundwater inflows from pit walls using interception, depressurization techniques and/or other groundwater inflow management strategies	Section 12.6.1				✓	
75	Precipitation will be monitored as an aid in differentiating the proportions of rainfall and groundwater seepage in the total Open Pit discharge	Section 12.6.1					
76	Groundwater quality monitoring is unlikely necessary but may be warranted at site-specific sources of contaminations, such as the above-ground storage tanks, generator fuel tanks, hazardous chemical storage compounds, and any solid waste landfill	Section 12.10.4	✓		✓	✓	✓
77	Results of groundwater monitoring will be reported to authorities as required.	Section 12.10.5	✓		✓	✓	✓
78	In the unlikely event that an on-site water supply well is adversely affected by drawdown from the mine operation, it will be inspected, assessed, and if warranted, remediated to the requirements of the user. Options include: • Provision of bottled water (temporary) due to effects from equipment, vibration or blasting during road, mine or infrastructure development; • Provision of particulate filters (temporary to permanent) • Well deepening (in case of water level lowering leading to substantial yield loss) • Well replacement (in case of total well collapse, loss of yield).	Section 12.6.1					

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Terrain and ARD/ML							
79	Steep slopes will be avoided where possible. Areas of sensitive terrain will be avoided where practicable	Section 13.6.1, Table 13.6					
80	Where steep slopes and sensitive terrain cannot be avoided, further detailed investigations may be considered by qualified personnel and additional mitigation measures may be implemented	Section 13.6.1, Table 13.6				✓	
81	Compacted snow pads will be used for winter Project activities on sensitive terrain, if necessary	Section 13.6.1, Table 13.6				✓	
82	Where thaw sensitive or previously identified potentially unstable slopes, monitoring and additional mitigation will be considered	Section 13.6.1, Table 13.6				✓	
83	Banks of stream crossings will be stabilized where required	Section 13.6.1, Table 13.6				✓	
84	Manage the collection and storage of soil stockpiles	Section 13.6.1, Table 13.6					
85	Promote the vegetation of soil stockpiles to prevent erosion	Section 13.6.1, Table 13.6				✓	
86	Design surface drainage to prevent flooding of stockpile areas	Section 13.6.1, Table 13.6				✓	

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87	Follow erosion control protocols	Section 13.6.1, Table 13.6	✓		✓	✓	✓
88	Measure and track volumes of soil stored in stockpiles from salvage to replacement	Section 13.6.5 Table 13.6					
89	Undertake progressive rehabilitation	Section 13.6.5 Table 13.6				✓	
90	Follow through with fugitive dust suppression programs	Section 13.6.5 Table 13.6				✓	
91	Design facilities and activities to reduce dust emissions	Section 13.6.5 Table 13.6				✓	
92	Use of snow fences and snow removal	Section 13.6.5 Table 13.6				✓	
93	Implementation of speed limits on service road	Section 13.6.5 Table 13.6					
94	Manage blasting so that the vibrations will not affect ice cover at nearby lakes	Section 13.6.5 Table 13.6				✓	
95	Effluent discharge will be monitored to meet MDMER discharge criteria	Section 13.6.5 Table 13.6	✓		✓	✓	✓

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96	In the event PAG materials are discovered, strategies may include degradation of PAG materials and treatment of effluents to meet regulatory requirements.	13.11	✓		✓	✓	✓
Wetlands							
97	Development and implementation of a Wetland Mitigation and Monitoring Plan	Section 14.6.2, Table 14.10				✓	
98	Develop an EMS that will provide detailed management of regulatory and permit requirements and includes EPPs and procedures	Section 14.6.2, Table 14.10	✓		✓	✓	✓
99	Assign environmental monitor to oversee implementation of proposed mitigation measures	Section 14.6.2, Table 14.10				✓	
100	Avoid sensitive species and their habitats, where feasible	Section 14.6.2, Table 14.10				✓	
101	Reduce effects on wetlands by limiting construction activities to the PDA, and reduce Project footprint	Section 14.6.2, Table 14.10				✓	
102	Protect remnant wetlands that have not been affected by mine activities and maintain natural buffers around wetlands and riparian zones whenever possible	Section 14.6.2, Table 14.10				✓	
103	Maintain natural drainage, where possible	Section 14.6.2, Table 14.10	✓		✓	✓	✓

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104	Where practical, limit construction to winter months when soil and water are more likely to be frozen and vegetation is dormant, if feasible	Section 14.6.2, Table 14.10				✓	
105	Adjust distribution line pole placements to span wetlands or limit the number of poles located in wetlands, wherever possible	Section 14.6.2, Table 14.10				✓	
106	Use mats (e.g., rig mats) and wide-track vehicles to spread the distribution of equipment weight when crossing wetlands during the growing season or when wetlands are not frozen, if possible	Section 14.6.2, Table 14.10				✓	
107	Maintain hydrology at stream crossings	Section 14.6.2, Table 14.10	✓		✓	✓	✓
108	Conduct invasive plant species management	Table 14.10				✓	
109	Conduct progressive rehabilitation and wetland restoration	Section 14.6.2, Table 14.10				✓	
110	Rehabilitate access routes that are no longer needed	Table 14.10				✓	
111	Reclamation of disturbed sites will be initiated as soon as the work areas are no longer required and will be carried out progressively over the lifespan of the Project	Table 14.10				✓	
112	Restrict clearing activities to outside of the bird breeding season, whenever feasible	Table 14.10				✓	

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113	Flagging the avoidable wetland boundaries clearly in the field where they intersect with construction activities.	Section 14.6.2, Table 14.10					
114	Pre-construction communication with the construction crew on regarding wetland flagging, keeping machinery and vehicles out of wetlands, and maintaining sediment and erosion control around wetlands.	Section 14.6.2, Table 14.10	✓		✓	✓	✓
115	On-site environmental observer assigned to confirm that construction practices are consistent with the goals and plans of the Project-specific EPP.	Section 14.6.2, Table 14.10				✓	
116	Avoid siting of temporary work areas (for example, lay-down areas for equipment and materials storage) in wetlands	Section 14.6.2, Table 14.10				✓	
117	Salvage and stockpile wetland soils (peat) separately from upland soils for use in site reclamation	Section 14.6.2, Table 14.10					
Fish and Fish Habitat							
118	Development and implementation of a Fish Habitat Offsetting Plan	Table 15.15	✓		✓	✓	
119	Design and application of erosion protection and control measures on site and application of an approved dewatering plan for Joyce Lake.	Table 15.15	✓		✓	✓	
120	Preparation and implementation of a Fish Removal Plan/Fish Salvage and Relocation Plan for Joyce Lake.	Table 15.15	✓		✓	✓	

Table 25.1 Summary of Commitments

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121	Where feasible, in-water construction or maintenance will be limited to the provincial timing windows established by DFO to mitigate effects from in-water construction (June 15 to September 15). As required, additional mitigation measures to manage construction outside of these windows will be agreed upon in consultation with DFO and with local stakeholder groups.	Table 15.15	✓		✓	✓	
122	Two 8-m bridge spans will be incorporated to allow fish passage through the causeway. Additional culverts may be added as necessary to increase fish passage.	Table 15.15	✓	✓	✓	✓	
123	Reducing in-water works associated with the Iron Arm causeway, and if such is required, using available measures to isolate these works, which reduce potential fish mortalities .	Table 15.15	✓	✓	✓	✓	
124	The use of open-bottomed culverts at crossings AR4 and AR7 and a clear span bridge across the Gilling River (AR14).	Table 15.15	✓	✓	✓		
125	The watercourse crossing structures will be inspected, cleaned and repaired on a regular basis, as required, to maintain normal water flows.	Table 15.15	✓		✓		
126	Fuel storage tanks will be equipped with secondary containment to control spills and will comply with requirements of the applicable provincial and federal acts and regulations, and the conditions of the permit and authorizations. Storage area around railyard will include surface water collection system	Section 15.8.1	✓		✓	✓	

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127	Fire water systems will be maintained on site. Any additional water pump intakes will be screened in compliance with the DFO Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO 1995).	Section 15.8.3.	✓		✓	✓	
128	Settling/sedimentation ponds will be established at the waste rock, overburden and run-of mine stockpile areas, at the process crushing and screening plant, at the accommodation camp area and at the Astray rail loop.	Section 15.8.4					
129	Adherence to relevant federal and provincial regulations, statutory requirements and mitigation included in relevant permits.	Table 15.15					
Birds, Wildlife and Their Habitats							
130	Develop and implement an Avifauna Management Plan	Section 16.6.3	✓			✓	
131	Install stream crossings (e.g., bridges, culverts, ditches) in accordance with pertinent regulations and guidelines	Section 16.4.2	✓		✓	✓	✓
132	Allow fuel trucks to travel only on approved access roads	Section 16.6.3, Section 16.6.4	✓		✓	✓	
133	Flag the boundaries of sensitive areas before commencing any work in the area, and avoid locations of sensitive species, to the extent feasible	Section 16.6.1, Section 16.6.2, Section 16.6.4				✓	
134	Consider clearing by mulching and mechanized forestry equipment.	Section 16.6.1				✓	

Table 25.1 Summary of Commitments

No.	Proponent Commitments	EIS Section Reference	Relevant Category of Environmental Effect Under Section 5 of CEAA, 2012				
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135	Equipment will be required to arrive on-site free from fluid leaks	Section 16.6.3, Section 16.6.4	✓		✓	✓	✓
136	Establish a site for equipment maintenance, repair and cleaning that is at least 100 m from any lake, river, stream or wetland	Section 16.6.3, Section 16.6.4	✓		✓	✓	✓
137	Locate borrow pits more than 100 m away from the high water mark of water bodies, where feasible	Section 16.6.1	✓		✓	✓	✓
138	Maintain natural buffers around wetlands and riparian zones	Section 16.6.1	✓		✓	✓	✓
139	Reduce disturbance and infilling within adjacent wetlands and maintain hydrological conditions to the extent feasible	Section 16.6.1	✓		✓	✓	✓
140	Nuisance Black Bear management program will be included in the EPP	Section 16.6.2, Section 16.6.4				✓	
141	Runoff from development will be directed away from wetlands	Section 16.6.1, Section 16.6.2				✓	
142	Monitor ashkui formation and use by waterfowl in spring. This will be conducted through efforts of the Onsite Environmental Monitor and is an opportunity to incorporate additional Traditional Knowledge going forward.					✓	
143	Allow wildlife to pass through construction sites without harassment	Section 16.6.2				✓	

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144	Construction of roads at right angles to key movement corridors for birds and wildlife (particularly caribou), to the extent feasible, to encourage animals to cross over versus linger alongside roads;	Section 16.6.2, 16.6.3				✓	
145	Graded or engineered slopes to be constructed along roads at locations of potential crossing points for caribou	Section 16.6.2, Table 16.1				✓	
146	Reduce or eliminate disturbance to or encounters with caribou and other wildlife where feasible	Section 16.6.3				✓	
147	Invasive species management					✓	
148	Limit lighting to that required for safe operation	Section 16.6.1, Section 16.6.2				✓	
149	Limit situations leading to potential collisions (e.g., maximum speed limits on service roads)	Section 16.6.3				✓	
150	Record the location, observations of poaching, and results of any monitoring programs conducted by Joyce Direct Iron related to wildlife populations in the area, and provide this information to relevant governing departments	Section 16.6.3				✓	
151	Use fences and passageways as a means to intercept dispersing amphibians, if necessary	Section 17.6.4					
152	Develop and implement a site-specific Emergency Spill Prevention and Response Plan	Section 16.6.3, Section 16.6.4	✓			✓	

Table 25.1 Summary of Commitments

No.	Proponent Commitments	EIS Section Reference	Relevant Category of Environmental Effect Under Section 5 of CEAA, 2012				
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153	When taking water from a body of water, pump hoses, where necessary, will be equipped with an appropriate device to avoid entrainment of amphibian larvae, eggs, or other aquatic species, as necessary	Section 17.6.3	✓		✓	✓	✓
154	Waste/garbage will not be buried in the pit during progressive reclamation activities	Section 16.6.4				✓	
155	Dust control measures will be implemented and may include wet suppression techniques and through limiting the maximum speed of vehicle	Section 16.6.2				✓	
156	Do not feed wildlife	Section 16.6.2					
157	Relocate raptor nests where necessary	Section 16.6.1					
158	Restrict clearing activities to outside of the bird breeding season, whenever feasible	Section 16.6.1	✓			✓	
159	Where feasible schedule Project activities and reclamation activities so that not all available habitat is disturbed simultaneously	Section 16.6.1	✓			✓	
160	Survey for birds, wildlife, nests or eggs before disposing of materials on the surface (e.g., stockpiling), using a biologist	Section 16.6.3	✓			✓	
Species at Risk/Species of Conservation Concern							
161	Maintain natural buffers around wetlands and riparian zones	Section 17.6.2	✓		✓	✓	✓
162	Avoid direct effects to rare plant and/or their habitats to the extent feasible	Section 17.6.1				✓	

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163	Delineate locations where rare plants occur, and avoid those locations to the extent feasible	Section 17.6.1				✓	
164	To preserve growth medium, the topsoil will be stripped and stored for later reclamation (seed source), where feasible	Section 17.6.1					
165	Non-native and invasive species management	Section 17.6.2, Section 17.6.3				✓	
166	Use of seed mixtures free of non-native and invasive species weeds and use of native species (where available) during site reclamation	Section 17.6.1				✓	
167	Incorporate bat surveys into an EPP and avoid known roosting locations						
168	Install bat boxes in appropriate locations/habitats, if necessary	Section 17.6.2, Section 17.6.3					
169	Establish a site for equipment maintenance, repair and cleaning that is at least 100 m from any lake, river, stream or wetland	Section 17.6.4, Section 17.6.5	✓		✓	✓	✓
170	Implement various erosion, sediment and dust control measures	Section 17.6.3	✓		✓	✓	✓
171	When taking water from a body of water, pump hoses, where necessary, will be equipped with an appropriate device to avoid entrainment of amphibian larvae, eggs, or other aquatic species, if necessary		✓		✓	✓	✓
172	Reduce disturbance to or encounters with SAR / SOCC					✓	

Table 25.1 Summary of Commitments

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173	Prohibit hunting or harassment of wildlife on Project site	Section 17.6.4				✓	
174	Maintain hydrology at stream crossings through approved methods to install culverts	Section 17.6.3	✓		✓	✓	✓
175	Restrict clearing activities to outside of the bird breeding season, whenever feasible, and implement an Avifauna Management Plan	Section 17.6.3	✓			✓	
176	Mitigation measures will be finalized by Joyce Direct Iron in consultation with experts, and where appropriate, the regulatory authority	Section 17.4.2, Section 17.6.2	✓			✓	
177	Comply with provincial and federal legislation, permits, approvals and guidelines	Section 17.6.1	✓			✓	
178	Reduce construction footprint (i.e., the PDA) to the extent feasible and restrict construction activities to the PDA	Section 17.6.1, Section 17.6.4	✓			✓	
179	Sediment control measures will be taken to prevent the release of material into surface water features with bordering Project components during construction.	Section 17.6.1	✓			✓	
180	Natural surface water flow patterns will be maintained in wetlands. The drainage structures (e.g., ditches) will also provide storage for sediment and runoff associated with higher precipitation events	Section 17.6.1				✓	
181	Scheduling construction in potentially sensitive rare plant habitats (e.g., wetlands, riparian areas) to occur during seasonally dry or frozen ground conditions (i.e., negligible risk of ground disturbance/compaction), if practicable and feasible.	Section 17.6.1					

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182	Regularly inspecting and cleaning equipment prior to, during and immediately following construction in wetland areas to limit the amount of plant matter that is transported from one construction area to another	Section 17.6.1				✓	
Historic and Cultural Resources							
183	Discovery will be mitigated by either avoidance through Project design or through recovery.	Section 18.6.1				✓	
184	Develop and Implement EMP in the event of an unexpected discovery	Table 18.4				✓	
185	Construction personnel will be provided with orientation and training that will include briefings related to Archaeological and Cultural Resources	Section 18.6.1				✓	
186	Potential interaction with the identified archaeological site (GfDp-01) will be mitigated by either Project design changes, or systematic data recovery for the materials	Section 18.6.1				✓	
Current Use of Land and Resources by Indigenous Persons							
187	Complete reclamation activities, including re-vegetation with native plant species as per the Reclamation and Closure Plan and other regulatory requirements.	Section 19.6.4				✓	
188	After closure, some access points will remain to allow future resource use, if approved	Table 19.2-				✓	

Table 25.1 Summary of Commitments

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189	Ongoing consultation and engagement during construction and operation with local communities	Table 19.2		✓		✓	
190	Participation of Indigenous Communities in effects monitoring activities	Section 19.6.3		✓		✓	
191	All mine employees who are staying in camp will be prohibited from engaging in consumptive land and resource use activities. This will be controlled by prohibitions on bringing hunting or fishing gear into camp. Indigenous residents of nearby communities who commute to the Project will be allowed to engage in these activities during non-working hours and the rotational work schedule will facilitate their use of the area during non-work hours.	Section 19.6.3				✓	
192	Disruptions in access to cabins along Iron Arm and closures of Iron Arm road during construction will be minimal, made in consultation with local communities, and strictly for safety purposes	Section 19.5.3.2				✓	
193	Rotational work schedules to be used to provide maximum flexibility for Indigenous employees who work for the Project, but still wish to participate in traditional land and resource use activities.	Section 19.6.3				✓	

Table 25.1 Summary of Commitments

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Other Contemporary Use of Land and Resources							
194	Response measures to recover lost fuel and iron ore from a train derailment incident include: • Immediate response through use of absorbent booms and pads; • Liquids cleanup including vacuum truck, if available. This process can be used to capture both fuels and groundwater near the site for removal and disposal; • Removal of the iron ore from the site of the train derailment, if practicable; and • Physical reclamation of contaminated soils; removal of contaminated soil and replacement with clean soil.	Section 20.8.2	✓		✓	✓	✓
195	Other mitigations to prevent train derailment and reduce effects on Current Use of Land and Resources by non-Indigenous people include the following: • Inspection of rolling stock will be undertaken before trains are loaded at the rail loop at the mine site, to confirm there are no problems with wheels, couplers, carbody, or brakes. Defective equipment will be removed from the train and kept out of service until repaired; • Track inspections to be carried out in accordance with Transport Canada regulations to identify track defects that could lead to derailment; and • Fuel will be transported along the rail line to the rail loop or Schefferville. The volume of fuel will be limited to the quantities necessary to supply the needs of the mine vehicles and other facilities.	Section 20.8.2	✓		✓	✓	✓

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196	Fire suppression water systems will be maintained	Section 20.8.3	✓		✓	✓	✓
197	Measures to reduce the likelihood of settling pond overflow include: • regular inspections of water levels in the settling ponds as part of site-wide infrastructure monitoring program • the capacity of settling ponds will be maintained by periodically removing settled solids for disposal as per permit conditions as part of water management infrastructure maintenance program.	Section 20.8.4	✓		✓	✓	✓

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198	Measures to be taken during premature / permanent shutdown include: • Fencing of the entrance ramp to the open pit using boulders or other means to prevent inadvertent access; • Posting of signage indicating an "Open Hole" around the perimeter of the open pit; • Locking of buildings housing mechanical, hydraulic and electrical systems to prevent inadvertent access; • Fencing, locking, or otherwise securing (e.g., with warning signage) electrical systems on the Project site to prevent inadvertent entry or contact; • Identifying and quantifying remaining chemicals and petroleum products on the Project site for transfer off site for other uses or disposal at approved facilities; • Visually inspecting ore and waste rock stockpiles to assess stability at the start of temporary or permanent closure and stabilizing stockpiles, if required; and • Maintaining Project site water management infrastructure (e.g., settling ponds, diversion ditches) as per design specifications.	Section 20.8.5	✓		✓	✓	✓
Community Services and Infrastructure							
199	An on-site accommodation camp with wastewater treatment systems will be in operation year-round	Section 21.4.2	✓		✓	✓	✓
200	All power required for the Project will be supplied by local generators, which will run on diesel fuel.	Section 21.4.2					

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201	General site and camp security to be established	Section 21.4.2					
202	An ERP will be developed to deal with all potential incidents that could occur during Project construction, operation and closure activities	Section 21.8	✓		✓	✓	✓
203	Fire water systems will be maintained on site	Section 21.8.3	✓			✓	✓
204	Staff will be trained to prevent and control fires. A plan for preventing and combating forest fires will be incorporated into the ERP	Section 21.8.3	✓		✓	✓	✓
205	Work rotations will allow workers to travel to their original place of residence during their time off and, as a result, they will continue to use the services and infrastructure of their local place of residence	Section 21.11				✓	
206	An accommodation complex will be in operation year-round and will house approximately 144 workers at a time to reduce effects that staff new to the area will have on housing in the LSA communities	Section 21.4.2				✓	
207	Accommodation complex will have a kitchen so workers will be able to eat at the camp and will not have to rely on food services provided within the LSA communities.	Section 21.4.2				✓	
208	The Project will not rely on municipal services and infrastructure, such as water, sewer, power, from LSA communities.	Section 21.4.2				✓	

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209	Most workers will continue to receive general health care in their home communities. Any minor injuries or health problems will be addressed through the provision of first aid at the worksite.	Section 21.4.2				✓	
Economy, Employment and Business							
210	Joyce Direct Iron's employment and benefits policy will be governed in part by any contractual agreements, yet to be negotiated, which include IBAs with Indigenous groups and agreements with the Government of Newfoundland and Labrador. Joyce Direct Iron expects to negotiate these agreements prior to starting work on the Project.	Section 22.6.1		✓		✓	
211	Additional initiatives will be explored to facilitate initiatives related to training and diversity.	Section 22.6.1					
212	Detail on employment initiatives will be defined in the Project Benefits and Diversity Plans. These plans are subject to approval by the Government of Newfoundland and Labrador.	Section 22.6.1					

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213	Provide quarterly reports to meet the approval of the Minister of Advanced Education and Skills, during the construction phase, as well as for the duration of the operations phase, including information by gender on the following: • the number employed (by 4-digit NOC 2006) • the number of full-time/part-time employees • the number of apprentices (by level) and journeypersons • Indigenous organizations • source of the workforce.	Section 22.2.1					
214	Develop and implement employment and business access strategies for women and other under-represented groups, including members of Indigenous groups	Section 22.6.2		✓		✓	
215	Joyce Direct Iron will work with education and training institutions to facilitate the employment of local residents.	Section 9.3.3; Section 22.1.1					
216	The Proponent will negotiate an IBA with the Innu Nation and reach appropriate agreements with the other Indigenous communities that have asserted claims.	Section 9.3.4; Section 22.6.1				✓	
217	Joyce Direct Iron has committed to making additional recruitment efforts to encourage more women to apply and is prepared to participate in supporting training programs specifically designed for women entering the mining industry as a career.	Section 9.3.4; Section 22.6.2					
218	Joyce Direct Iron will also work to promote business access by companies owned and operated by women, cooperating with appropriate organizations.	Section 9.3.4; Section 22.6.3					

25.2 References

DFO (Fisheries and Oceans Canada). 1995. DFO Freshwater Intake End-of-Pipe Fish Screen Guideline. Ottawa, ON. 27 pp. Available at: https://www.regionaldistrict.com/media/20153/Fish%20screen%20guidelines.pdf

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Joyce Lake Direct Shipping Iron Ore Project:

Chapter 26:

Summary and Conclusions

File No. 121416571

Date: May 2021

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26.0 SUMMARY AND CONCLUSIONS

Joyce Direct Iron (the Proponent) is proposing to develop an open pit iron ore mine in western Labrador, approximately 20 km to the northeast of the Town of Schefferville, Québec. The ore deposit for the Joyce Lake Direct Shipping Iron Ore Project (the "Project") lies on a peninsula of land in Attikamagen Lake (Figure 1.1). The mine will produce up to 2.5 million tonnes (Mt) of iron ore product per year. The product will be transported by dedicated trucks to the Astray rail loop which will be directly connected to the railway owned by Tshiuetin Rail Transportation Inc. and subsequently connecting to QNSL, for transportation to the Port of Sept-Îles.

As detailed in chapter 1, Joyce Direct Iron Inc. succeeded Labec Century Iron Ore Inc. ("Labec Century") as the Project Proponent on February 18, 2021 following an internal reorganization. All references to Labec Century as the Project proponent may be interpreted as now referring to Joyce Direct Iron Inc.

The Project was registered with NLDOECC on October 15, 2012, followed by an amendment to the registration document, filed on November 13, 2012. The Minister of Environment and Conservation determined that an EIS was required on December 14, 2012. A Project Description and Summary were accepted for review by IAAC on November 19, 2012. IAAC determined that a federal environmental assessment was required on January 4, 2013. The EIS was subsequently prepared by Labec Century in accordance with the requirements of IAAC EIS Guidelines and NLDOECC EIS Guidelines.

This chapter provides a summary of the EIS including a summary of the potential effects of the Project, mitigation measures, and residual and cumulative effects and their significance. The specific mitigation measures related to public concerns and potential effects on Indigenous rights and related interests are also summarized. A description of the outstanding concerns and outstanding Indigenous issues is provided.

26.1 Summary of Consultation

During the preparation of the EIS, Labec Century held meetings and public sessions in the communities of Sept-Îles, Schefferville and Kawawachikamach, Quebec, St. John's and Happy-Valley-Goose-Bay, Newfoundland and Labrador to provide Project information and solicit Project-related feedback. Labec Century has actively engaged with a variety of stakeholders, including Indigenous groups, members of the public, and regulatory agencies throughout the Project design and EA processes. Issues and responses have been documented and incorporated throughout the EIS, including through Project design and effects management procedures.

The Labec Century Indigenous Engagement Strategy was informed by The Government of Newfoundland and Labrador's Indigenous Consultation Policy on Land and Resource Development Decisions and Indigenous Consultation and Accommodation Updated Guidelines for Federal Officials (AANDC 2011). The strategy recognizes the location of the Project within Labrador, and its proximity to both Newfoundland and Labrador and Quebec-based Indigenous groups. Labec Century has structured its Indigenous engagement activities, as per the federal EIS guidelines, to provide adequate time for Indigenous groups to review the relevant information in advance and to ensure there are sufficient opportunities for individuals and groups to provide oral input in the language of their choosing.

Since the exploration/pre-development phase in 2010, Labec Century has held more than 30 meetings and phone calls with the Innu Nation of Labrador, Naskapi Nation of Kawawachikamach, Innu of Matimekush-Lac John, and Innu of Uashat mak Mani-Utenam. Labec Century has also considered comments received by both IAAC and NLDOECC in consultation processes related to the Project Description/Registration and Draft Guidelines.

A summary of topics discussed during meetings with Indigenous groups included the proper protocol for consultation, Project updates, Project employment, IBA, and specific issues and concerns.

Labec Century remains committed to continuing and expanding its outreach activities to ensure interested parties are aware of and understand the Project, and are provided with opportunities to discuss the conclusions of the EA and the Project generally. Following the submission of the EIS, Labec Century will be an active participant in the review of the document by all stakeholders, particularly the Indigenous groups and communities most likely to be affected by the Project.

26.2 Summary of Potential Effects, Adverse Residual Effects and their Significance

26.2.1 Potential Environmental Effects

The assessment methods used in the preparation of this EIS included an evaluation of the potential environmental effects for each VC that may arise during the Project as well as from accidental effects. The evaluation of potential cumulative effects considered whether there was a residual environmental effect of the Project that would interact cumulatively with the residual environmental effects of other past, present, or future (i.e., certain or reasonably foreseeable) physical activities in the vicinity of the Project. Cumulative effects of ten other projects or activities in combination with the Project were assessed.

In support of the EA process, additional studies were undertaken including:

- Air Quality Modelling
- Noise Modelling
- Historic and Cultural Resources Baseline Study
- Socio-Economic Baseline Study
- Surface Water Baseline Study
- Fish and Fish Habitat Baseline Study
- Vegetation Baseline Study

- Rare Plant Survey
- Avifauna Baseline Study
- Mammal and Herpetofauna Baseline Study
- Water and Sediment Quality Baseline Study
- Geotechnical Engineering Feasibility Study – Open Pit Design
- Geotechnical Engineering Feasibility Study – Surrounding Areas
- Hydrogeological Study

These studies are appendices submitted with the EIS.

The potential interactions of Project features and activities with the existing environment were identified and potential effects were assessed for the Construction, Operation and Maintenance, and Closure and Decommissioning phases. The activities reflect the scope of the Project as prescribed in the EIS Guidelines and form the basis of the effects assessment. Accidental events were also assessed, including train derailment, forest fire, hydrocarbon spill, settling/ sedimentation pond overflow, and premature or permanent shutdown. The probability of an accidental event is low.

The potential interactions between project activities, possible accidental events, resulting effects, and each of the VCs are summarized in Tables 26.1 to 26.7.

Table 26.1 Potential Effects – Atmospheric Environment and Climate

Project Activities and Components	Atmospheric Environment and Climate				
	Change in Air Quality	Change in GHG Emissions	Change in Acoustic Environment	Change in Vibration	Change in Lighting
Construction					
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	✓	✓	✓	✓	✓
Construction of Roads	✓	✓	✓	✓	✓
Construction of Causeway	✓	✓	✓	✓	✓
Construction of Site Buildings and Associated Infrastructure	✓	✓	✓	✓	✓
Construction of Rail Loop and Associated Infrastructure	✓	✓	✓	✓	✓
Construction of Stream Crossings	✓	✓	✓	✓	✓
Installation of Water Supply Infrastructure (wells, pumps, pipes)	✓	✓	✓	✓	✓
On-site Vehicle/Equipment Operation	✓	✓	✓		✓
Waste Management		✓			
Transportation of Personnel and Goods to Site	✓	✓	✓		✓
Expenditures					
Employment					
Operation and Maintenance					
Maintenance of Causeway	✓	✓	✓		
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	✓	✓	✓	✓	✓
Dewatering Joyce Lake			✓	✓	
Ore Processing (including crushing, conveying, storage, grinding, screening)	✓	✓	✓	✓	✓
Waste Rock Disposal on Surface	✓	✓	✓	✓	✓
Water Treatment (including mine water and surface runoff) and Discharge	✓	✓	✓	✓	✓
Rail Load-Out and Transport	✓	✓	✓	✓	✓
On-site Vehicle/Equipment Operation and Maintenance	✓	✓	✓	✓	✓
Waste Management		✓			

Table 26.1 Potential Effects – Atmospheric Environment and Climate

Project Activities and Components	Atmospheric Environment and Climate				
	Change in Air Quality	Change in GHG Emissions	Change in Acoustic Environment	Change in Vibration	Change in Lighting
Transportation of Personnel and Goods to Site	✓	✓	✓		✓
Fuel Transport	✓	✓	✓		✓
Fuel Storage and Dispensing	✓	✓	✓		✓
Progressive Rehabilitation	✓	✓	✓		
Expenditures					
Employment					
Closure and Decommissioning					
Site Decommissioning	✓	✓	✓	✓	✓
Site Reclamation (building demolition, grading, scarifying)	✓	✓	✓	✓	✓
Accidents and Malfunctions					
Hydrocarbon Spill	✓	✓	✓		✓
Train Derailment	✓	✓	✓		✓
Forest Fire	✓	✓	✓		✓
Settling/Sedimentation Pond Overflow					
Premature or Permanent Shutdown					

Table 26.2 Potential Effects – Terrain and Acid Rock Drainage/ Metal Leaching

Project Activities and Components	Terrain and Acid Rock Drainage/ Metal Leaching			
	Effects on Landforms and Terrain Stability	Change in Soil Quality and Quantity	Change in Snow and Ice	ARD/ML
Construction				
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	✓	✓	✓	✓
Construction of Roads	✓	✓	✓	✓
Construction of Causeway	✓		✓	
Construction of Site Buildings and Associated Infrastructure	✓	✓	✓	✓
Construction of Rail Loop and Associated Infrastructure	✓	✓	✓	✓
Construction of Stream Crossings	✓		✓	✓
Installation of Water Supply Infrastructure (wells, pumps, pipes)	✓			
On-site Vehicle/Equipment Operation		✓	✓	
Waste Management				
Transportation of Personnel and Goods to Site				
Expenditures				
Employment				
Operation and Maintenance				
Maintenance of Causeway	✓		✓	
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	✓	✓	✓	✓
Dewatering Joyce Lake	✓		✓	✓
Ore Processing (including crushing, conveying, storage, grinding, screening)		✓	✓	✓
Waste Rock Disposal on Surface	✓	✓	✓	✓
Water Treatment (including mine water and surface runoff) and Discharge				✓
Rail Load-Out and Transport			✓	
On-site Vehicle/Equipment Operation and Maintenance		✓	✓	
Waste Management				
Transportation of Personnel and Goods to Site				

Table 26.2 Potential Effects – Terrain and Acid Rock Drainage/ Metal Leaching

Project Activities and Components	Terrain and Acid Rock Drainage/ Metal Leaching			
	Effects on Landforms and Terrain Stability	Change in Soil Quality and Quantity	Change in Snow and Ice	ARD/ML
Fuel Transport				
Fuel Storage and Dispensing				
Progressive Rehabilitation	✓	✓	✓	
Expenditures				
Employment				
Closure and Decommissioning				
Site Decommissioning	✓	✓	✓	✓
Site Reclamation (building demolition, grading, scarifying, hydroseeding)	✓	✓	✓	✓
Accidents and Malfunctions				
Hydrocarbon Spill		✓	✓	
Train Derailment		✓	✓	✓
Forest Fire	✓	✓		
Settling/Sedimentation Pond Overflow	✓	✓	✓	
Premature or Permanent Shutdown				

Table 26.3 Potential Effects – Water Resources, Groundwater Resources, and Fish and Fish Habitat

Project Activities and Components	Water Resources			Groundwater Resources		Fish and Fish Habitat	
	Change in Surface Water Quantity	Change in Surface Water Quality	Change in Surface Water Drainage Patterns	Changes in Groundwater Level	Change in Groundwater Quality	Change in Fish Habitat / Production	Change in Fish Health or Mortality
Construction							
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	✓	✓	✓	✓	✓	✓	✓
Construction of Roads	✓	✓	✓			✓	✓
Construction of Causeway	✓	✓	✓			✓	✓
Construction of Site Buildings and Associated Infrastructure	✓	✓	✓	✓	✓	✓	✓
Construction of Rail Loop and Associated Infrastructure	✓	✓	✓			✓	✓
Construction of Stream Crossings	✓	✓	✓			✓	✓
Installation of Water Supply Infrastructure (wells, pumps, pipes)	✓	✓	✓			✓	✓
On-site Vehicle/Equipment Operation	✓	✓	✓			✓	
Waste Management		✓				✓	✓
Transportation of Personnel and Goods to Site		✓					
Expenditures							
Employment							
Operation and Maintenance							
Maintenance of Causeway	✓	✓				✓	✓
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	✓	✓	✓	✓		✓	✓
Dewatering Joyce Lake	✓	✓	✓	✓		✓	✓

Table 26.3 Potential Effects – Water Resources, Groundwater Resources, and Fish and Fish Habitat

Project Activities and Components	Water Resources			Groundwater Resources		Fish and Fish Habitat	
	Change in Surface Water Quantity	Change in Surface Water Quality	Change in Surface Water Drainage Patterns	Changes in Groundwater Level	Change in Groundwater Quality	Change in Fish Habitat / Production	Change in Fish Health or Mortality
Ore Processing (including crushing, conveying, storage, grinding, screening)							
Waste Rock Disposal on Surface	✓	✓	✓		✓	✓	
Water Treatment (including mine water and surface runoff) and Discharge	✓	✓	✓			✓	✓
Rail Load-Out and Transport	✓	✓					
On-site Vehicle/Equipment Operation and Maintenance	✓	✓				✓	
Waste Management	✓	✓			✓	✓	✓
Transportation of Personnel and Goods to Site		✓					
Fuel Transport		✓			✓		
Fuel Storage and Dispensing		✓			✓		
Progressive Rehabilitation	✓	✓	✓			✓	
Expenditures							
Employment							
Closure and Decommissioning							
Site Decommissioning	✓	✓	✓			✓	✓
Site Reclamation (building demolition, grading, scarifying, hydroseeding)	✓	✓	✓			✓	
Accidents and Malfunctions							
Hydrocarbon Spill	✓	✓	✓		✓	✓	✓
Train Derailment	✓	✓	✓		✓	✓	✓
Forest Fire	✓	✓	✓			✓	✓
Settling/Sedimentation Pond Overflow	✓	✓	✓			✓	✓
Premature or Permanent Shutdown	✓	✓	✓			✓	✓

Table 26.4 Potential Effects – Wetlands, and Birds Wildlife and their Habitat

Project Activities and Components	Wetlands	Birds, Wildlife and their Habitat				
	Change in Wetland Area or Function	Change in Habitat	Change in Distribution and Movement	Change in Mortality Risk	Change in Health	Change in Protected Areas
Construction						
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	✓	✓	✓	✓	✓	
Construction of Roads	✓	✓	✓	✓	✓	
Construction of Causeway	✓	✓	✓	✓	✓	
Construction of Site Buildings and Associated Infrastructure	✓	✓	✓	✓	✓	
Construction of Rail Loop and Associated Infrastructure	✓	✓	✓	✓	✓	
Construction of Stream Crossings	✓	✓	✓	✓	✓	
Installation of Water Supply Infrastructure (wells, pumps, pipes)	✓	✓	✓	✓	✓	
On-site Vehicle/Equipment Operation	✓	✓	✓	✓	✓	
Waste Management		✓	✓	✓	✓	
Transportation of Personnel and Goods to Site	✓	✓	✓	✓	✓	
Expenditures						
Employment						
Operation and Maintenance						
Maintenance of Causeway	✓	✓	✓	✓	✓	
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	✓	✓	✓	✓	✓	
Dewatering Joyce Lake	✓	✓	✓	✓	✓	
Ore Processing (including crushing, conveying, storage, grinding, screening)		✓	✓	✓	✓	
Waste Rock Disposal on Surface	✓	✓	✓	✓	✓	
Water Treatment (including mine water and surface runoff) and Discharge	✓	✓	✓	✓	✓	
Rail Load-Out and Transport		✓	✓	✓	✓	
On-site Vehicle/Equipment Operation and Maintenance	✓	✓	✓	✓	✓	

Table 26.4 Potential Effects – Wetlands, and Birds Wildlife and their Habitat

Project Activities and Components	Wetlands	Birds, Wildlife and their Habitat				
	Change in Wetland Area or Function	Change in Habitat	Change in Distribution and Movement	Change in Mortality Risk	Change in Health	Change in Protected Areas
Waste Management		✓	✓	✓	✓	
Transportation of Personnel and Goods to Site	✓	✓	✓	✓	✓	
Fuel Transport	✓	✓	✓	✓	✓	
Fuel Storage and Dispensing	✓	✓	✓	✓	✓	
Progressive Rehabilitation	✓	✓	✓	✓	✓	
Expenditures						
Employment						
Closure and Decommissioning						
Site Decommissioning	✓	✓	✓	✓	✓	
Site Reclamation (building demolition, grading, scarifying, hydroseeding)	✓	✓	✓	✓	✓	
Accidents and Malfunctions						
Hydrocarbon Spill	✓	✓	✓	✓	✓	
Train Derailment	✓	✓	✓	✓	✓	
Forest Fire	✓	✓	✓	✓	✓	
Settling/Sedimentation Pond Overflow	✓	✓	✓	✓	✓	
Premature or Permanent Shutdown	✓	✓	✓	✓	✓	

Table 26.5 Potential Effects – Species at Risk and Species of Conservation Concern

Project Activities and Components	Species at Risk and Species of Conservation Concern				
	Change in Rare Plant Species and Uncommon Plant Communities	Change in Habitat (Bird and Wildlife SAR/SOCC)	Change in Distribution and Movement (Bird and Wildlife SAR/SOCC)	Change in Mortality Risk (Bird and Wildlife SAR/SOCC)	Change in Health (Bird and Wildlife SAR/SOCC)
Construction					
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	✓	✓	✓	✓	✓
Construction of Roads	✓	✓	✓	✓	✓
Construction of Causeway	✓	✓	✓	✓	✓
Construction of Site Buildings and Associated Infrastructure	✓	✓	✓	✓	✓
Construction of Rail Loop and Associated Infrastructure	✓	✓	✓	✓	✓
Construction of Stream Crossings	✓	✓	✓	✓	✓
Installation of Water Supply Infrastructure (wells, pumps, pipes)	✓	✓	✓	✓	✓
On-site Vehicle/Equipment Operation	✓	✓	✓	✓	✓
Waste Management		✓	✓	✓	✓
Transportation of Personnel and Goods to Site	✓	✓	✓	✓	✓
Expenditures					
Employment					
Operation and Maintenance					
Maintenance of Causeway	✓	✓	✓	✓	✓
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	✓	✓	✓	✓	✓
Dewatering Joyce Lake	✓	✓	✓	✓	✓
Ore Processing (including crushing, conveying, storage, grinding, screening)	✓	✓	✓	✓	✓
Waste Rock Disposal on Surface	✓	✓	✓	✓	✓

Table 26.5 Potential Effects – Species at Risk and Species of Conservation Concern

Project Activities and Components	Species at Risk and Species of Conservation Concern				
	Change in Rare Plant Species and Uncommon Plant Communities	Change in Habitat (Bird and Wildlife SAR/SOCC)	Change in Distribution and Movement (Bird and Wildlife SAR/SOCC)	Change in Mortality Risk (Bird and Wildlife SAR/SOCC)	Change in Health (Bird and Wildlife SAR/SOCC)
Water Treatment (including mine water and surface runoff) and Discharge	✓	✓	✓	✓	✓
Rail Load-Out and Transport		✓	✓	✓	✓
On-site Vehicle/Equipment Operation and Maintenance	✓	✓	✓	✓	✓
Waste Management		✓	✓	✓	✓
Transportation of Personnel and Goods to Site	✓	✓	✓	✓	✓
Fuel Transport	✓	✓	✓	✓	✓
Fuel Storage and Dispensing		✓	✓	✓	✓
Progressive Rehabilitation	✓	✓	✓	✓	✓
Expenditures					
Employment					
Closure and Decommissioning					
Site Decommissioning	✓	✓	✓	✓	✓
Site Reclamation (building demolition, grading, scarifying, hydroseeding)	✓	✓	✓	✓	✓
Accidents and Malfunctions					
Hydrocarbon Spill	✓	✓	✓	✓	✓
Train Derailment	✓	✓	✓	✓	✓
Forest Fire	✓	✓	✓	✓	✓
Settling/Sedimentation Pond Overflow	✓	✓	✓	✓	✓
Premature or Permanent Shutdown	✓	✓	✓	✓	✓

Table 26.6 Potential Effects – Historic and Cultural Resources, and Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Project Activities and Components	Historic and Cultural Resources	Current Use of Land and Resources for Traditional Purposes by Indigenous Persons
	Loss or Disturbance of Archaeological and Cultural Resources	Change in Activity Distribution (location, timing, and/or intensity)
Construction		
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	✓	✓
Construction of Roads	✓	✓
Construction of Causeway	✓	✓
Construction of Site Buildings and Associated Infrastructure	✓	✓
Construction of Rail Loop and Associated Infrastructure	✓	✓
Construction of Stream Crossings	✓	✓
Installation of Water Supply Infrastructure (wells, pumps, pipes)	✓	
On-site Vehicle/Equipment Operation		✓
Waste Management		
Transportation of Personnel and Goods to Site		
Expenditures		
Employment		✓
Operation and Maintenance		
Maintenance of Causeway		
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	✓	✓
Dewatering Joyce Lake	✓	
Ore Processing (including crushing, conveying, storage, grinding, screening)		
Waste Rock Disposal on Surface	✓	
Water Treatment (including mine water and surface runoff) and Discharge		
Rail Load-Out and Transport		✓

Table 26.6 Potential Effects – Historic and Cultural Resources, and Current Use of Land and Resources for Traditional Purposes by Indigenous Persons

Project Activities and Components	Historic and Cultural Resources	Current Use of Land and Resources for Traditional Purposes by Indigenous Persons
	Loss or Disturbance of Archaeological and Cultural Resources	Change in Activity Distribution (location, timing, and/or intensity)
On-site Vehicle/Equipment Operation and Maintenance		✓
Waste Management		
Transportation of Personnel and Goods to Site		✓
Fuel Transport		✓
Fuel Storage and Dispensing		✓
Progressive Rehabilitation		✓
Expenditures		
Employment		✓
Closure and Decommissioning		
Site Decommissioning		
Site Reclamation (building demolition, grading, scarifying, hydroseeding)		
Accidents and Malfunctions		
Hydrocarbon Spill	✓	✓
Train Derailment	✓	✓
Forest Fire	✓	✓
Settling/Sedimentation Pond Overflow	✓	✓
Premature or Permanent Shutdown	✓	

Table 26.7 Potential Effects – Other Contemporary Land and Resource Use, Community Services and Infrastructure, and Economy Employment and Business

Project Activities and Components	Other Contemporary Land and Resource Use		Community Services and Infrastructure	Economy, Employment and Business		
	Change in Access for Recreational Purposes	Change in Level of Activity / Use for Recreational Purposes	Change in Capacity of Community Services and Infrastructure	Change in Economy	Change in Employment	Change in Business
Construction						
Site Preparation (including clearing, grubbing, excavation, material haulage, grading, removal of overburden, ditching, and stockpiling)	✓	✓				
Construction of Roads	✓	✓				
Construction of Causeway	✓	✓				
Construction of Site Buildings and Associated Infrastructure	✓	✓				
Construction of Rail Loop and Associated Infrastructure	✓	✓				
Construction of Stream Crossings						
Installation of Water Supply Infrastructure (wells, pumps, pipes)						
On-site Vehicle/Equipment Operation	✓	✓				
Waste Management	✓	✓	✓			
Transportation of Personnel and Goods to Site	✓	✓	✓			
Expenditures			✓	✓	✓	✓
Employment			✓	✓	✓	✓
Operation and Maintenance						
Maintenance of Causeway	✓	✓				
Open Pit Mining (including drilling, blasting, ore and waste haulage, stockpiling, dewatering)	✓	✓				
Dewatering Joyce Lake	✓	✓				
Ore Processing (including crushing, conveying, storage, grinding, screening)	✓	✓				
Waste Rock Disposal on Surface	✓	✓				

Table 26.7 Potential Effects – Other Contemporary Land and Resource Use, Community Services and Infrastructure, and Economy Employment and Business

Project Activities and Components	Other Contemporary Land and Resource Use		Community Services and Infrastructure	Economy, Employment and Business		
	Change in Access for Recreational Purposes	Change in Level of Activity / Use for Recreational Purposes	Change in Capacity of Community Services and Infrastructure	Change in Economy	Change in Employment	Change in Business
Water Treatment (including mine water and surface runoff) and Discharge	✓	✓				
Rail Load-Out and Transport	✓	✓				
On-site Vehicle/Equipment Operation and Maintenance	✓	✓				
Waste Management	✓	✓	✓			
Transportation of Personnel and Goods to Site	✓	✓	✓			
Fuel Transport	✓	✓				
Fuel Storage and Dispensing	✓	✓				
Progressive Rehabilitation	✓	✓				
Expenditures			✓	✓	✓	✓
Employment			✓	✓	✓	✓
Closure and Decommissioning						
Site Decommissioning	✓	✓		✓*	✓*	✓*
Site Reclamation (building demolition, grading, scarifying, hydroseeding)	✓	✓	✓	✓*	✓*	✓*
Accidents and Malfunctions						
Hydrocarbon Spill	✓	✓	✓	✓	✓	✓
Train Derailment	✓	✓	✓	✓	✓	✓
Forest Fire	✓	✓	✓	✓	✓	✓
Settling/Sedimentation Pond Overflow	✓	✓		✓	✓	✓
Premature or Permanent Shutdown	✓	✓		✓	✓	✓
Note: Economy, Employment and Business include potential effects on Expenditures and Employment during Closure and Decommissioning (✓*)						

A summary of environmental effects is presented in Table 26.8, with an indication of the relevance of each to changes to the environment and effects of changes to the environment as prescribed in Section 5 of CEAA 2012.

Table 26.8 Summary of Environmental Effects in Accordance with Section 5 of CEAA 2012

Potential Effect	Relevant Category of Environmental Effect under Section 5 of CEAA, 2012				
	Changes to the Environment			Effects of Changes to the Environment	
	Changes to Components Within Federal Jurisdiction	Changes Occurring on Federal or Transboundary Lands	Changes that are Directly Linked or Necessarily Incidental to Federal Decisions	Effects on Indigenous People	Effects that are Directly Linked or Necessarily Incidental to Federal Decisions
Atmospheric Environment and Climate					
Change In Atmospheric Environment				✓	✓
Change in Acoustic Environment				✓	✓
Change in GHGs				✓	✓
Change in Vibration Environment				✓	
Change in Lighting Environment				✓	
Water Resources					
Change in Surface Water Quantity	✓		✓	✓	✓
Change in Surface Water Quality	✓		✓	✓	✓
Change in Surface Water Drainage Patterns	✓		✓	✓	✓
Groundwater Resources					
Changes in Groundwater Level				✓	
Change in Groundwater Quality				✓	
Terrain and Acid Rock Drainage/ Metal Leaching [1]					
Effects on Landforms and Terrain Stability		✓		✓	
Change in Soil Quality and Quantity		✓		✓	
Change in Snow and Ice				✓	
Wetlands					
Change in Wetland Area or Function				✓	

Table 26.8 Summary of Environmental Effects in Accordance with Section 5 of CEAA 2012

Potential Effect	Relevant Category of Environmental Effect under Section 5 of CEAA, 2012				
	Changes to the Environment			Effects of Changes to the Environment	
	Changes to Components Within Federal Jurisdiction	Changes Occurring on Federal or Transboundary Lands	Changes that are Directly Linked or Necessarily Incidental to Federal Decisions	Effects on Indigenous People	Effects that are Directly Linked or Necessarily Incidental to Federal Decisions
Fish and Fish Habitat					
Change in Fish Habitat/Production	✓		✓	✓	✓
Change in Fish Health or Mortality	✓		✓	✓	✓
Birds, Wildlife and their Habitat[2]					
Change in Habitat	✓		✓	✓	✓
Change in Distribution and Movement	✓	✓	✓	✓	✓
Change in Mortality Risk	✓		✓	✓	✓
Change in Health	✓	✓	✓	✓	✓
Species at Risk and Species of Conservation Concern					
Change in Rare Plant Species and Uncommon Plant Communities	✓		✓	✓	✓
Change in Habitat (Bird and Wildlife SAR/SOCC)	✓		✓	✓	✓
Change in Distribution and Movement (Bird and Wildlife SAR/SOCC)	✓	✓	✓	✓	✓
Change in Mortality Risk (Bird and Wildlife SAR/SOCC)	✓		✓	✓	✓
Change in Health (Bird and Wildlife SAR/SOCC)	✓	✓	✓	✓	✓
Historic and Cultural Resources					
Loss or Disturbance of Archaeological and Cultural Resources				✓	
Current Use of Land and Resources for Traditional Purposes by Indigenous Persons					
Change in Activity Distribution (location, timing, and/or intensity)				✓	

Table 26.8 Summary of Environmental Effects in Accordance with Section 5 of CEAA 2012

Potential Effect	Relevant Category of Environmental Effect under Section 5 of CEAA, 2012				
	Changes to the Environment			Effects of Changes to the Environment	
	Changes to Components Within Federal Jurisdiction	Changes Occurring on Federal or Transboundary Lands	Changes that are Directly Linked or Necessarily Incidental to Federal Decisions	Effects on Indigenous People	Effects that are Directly Linked or Necessarily Incidental to Federal Decisions
Other Contemporary Current Land and Resource Use[3]					
Community Services and Infrastructure					
Change in Capacity of Community Services and Infrastructure		✓		✓	
Economy, Employment and Business[4]					
Change in Economy					
Change in Employment		✓		✓	
Change in Business		✓		✓	

Notes:
1 There are no predicted residual effects regarding ARD or metal leaching
2 There are no predicted residual effects for protected areas
3 There are no predicted residual effects for Other Contemporary Current Land and Resource Use
4 The residual effects are positive

A summary of mitigation, monitoring and follow-up commitments is presented in Table 25.1, with an indication of the relevance of each to changes to the environment and effects of changes to the environment as prescribed in Section 5 of CEAA 2012.

26.2.2 Residual, Accidental and Cumulative Environmental Effects

Sections 10.5, 10.6, 10.7, 11.6, 11.7, 11.8, 12.7, 12.8, 12.9, 13.6, 13.7, 13.8 14.7, 14.8, 14.9, 15.6, 15.7, 15.8, 16.6, 16.7, 16.8, 17.6, 17.7, 17.8, 18.6, 18.7, 18.8, 19.6, 19.7, 19.8, 20.5, 20.6, 20.7, 21.6, 21.7, 21.8, 22.6, 22.7, and 22.8 of the EIS present the residual, accidental and cumulative effects assessment respectively, for each VC. Effects predictions, including potential environmental effects, mitigation and residual effects are summarized for each VC in the respective VC sections.

Table 26.9 summarizes the significance of residual effects findings for each VC, and, where applicable, the likelihood of significant residual adverse environmental effects occurring.

There are no likely significant residual effects or cumulative environmental effects predicted for any of the VCs. As discussed in the relevant sub-sections of each VC, although significant effects could occur to several VCs as a result of accidental events, the likelihood of occurrence is low.

There are no likely significant effects and therefore the capacity for renewable resource to meet the needs of the present and those of the future are not likely to be significantly affected.

Table 26.9 Summary of Residual Environmental Effects

VC	Construction, Operation and Maintenance, and Closure and Decommissioning Phases	Cumulative Effects	Accidental Events	
	Significance of Residual Environmental Effect	Significance of Residual Environmental Effect	Significance of Residual Environmental Effect	Likelihood of Significant Effect
Atmospheric Environment and Climate	N	N	S (Forest Fire)	L
Water Resources	N	N	S (Hydrocarbon Spill, Train Derailment, Forest Fire)	L
Groundwater Resources	N	N	S (Hydrocarbon Spill, Train Derailment)	L
Terrain and Acid Rock Drainage/ Metal Leaching	N	N	N	N/A
Wetland	N	N	S (Forest Fire)	L
Fish and Fish Habitat	N	N	N	N/A
Birds, Wildlife, and their Habitat	N	N	S (Forest Fire)	L
Species at Risk and Species of Conservation Concern	N	N	S (Forest Fire)	L
Historic and Cultural Resources	N	N	N	N/A
Current Use of Land and Resources for Traditional Purposes by Indigenous Persons	N	N	N	N/A
Other Contemporary Land and Resource Use	N	N	N	N/A
Community Services and Infrastructure	N	N	N	N/A
Economy, Employment and Business	N	N	N	N/A

Key:
N = Not significant residual environmental effect (adverse)
S = Significant residual environmental effect (adverse)
L = Low likelihood
N/A = Not Applicable

26.2.3 Summary of Effects of the Environment on the Project

In accordance with the requirements of IAAC and NLDOECC Final Guidelines, the potential effects of the environment on the Project were assessed. Local conditions and natural hazards, such as severe or extreme weather conditions that could adversely affect the Project were analyzed.

In accordance with the requirements of both IAAC and NLDOECC Guidelines, the EIS focused on the following potential environmental conditions that could affect the Project:

- Climate conditions, including air temperature, precipitation, wind and storms;
- Climate change including, but not limited to, the effect of extreme weather events;
- Geotechnical and geophysical hazards, including potential seasonal subsidence, seismicity and faulting, risks associated with cut/fill slopes and constructed facilities;
- Geological fractures and faults and associated implications of these features on foundation stability of major Project components;
- Extreme and/or unusual hydrological conditions, including drought, flooding or ice jams;
- Groundwater level and potential effects on mining operations; and
- Forest fires and potential effects on Project infrastructure and safe operations.

To mitigate such conditions and events, engineering design standards will adhere to national and international standards for site-specific normal and extreme physical environmental conditions and provide design criteria that are satisfactory for withstanding the potential physical environmental conditions. Design codes consider physical environmental criteria, such as temperature, wind, snow and ice loading, and drainage. Planning and design of the Project has and will continue to consider extreme climatic, hydrologic, and geohazard criteria.

Experience of other iron ore mines in the area, in combination with prescribed codes and standards, provides a high level of confidence that potential effects resulting from environmental conditions can be mitigated to acceptable levels, with the potential exception of a large-scale fire. Site monitoring will be undertaken to identify potential issues and verify effective mitigation. With this in mind, it is unlikely that environmental conditions would result in effects on the Project which in turn would result in effects on the environment (i.e., as a result of an accident or malfunctions).

26.3 Conclusions

Labec Century Iron Ore Inc. has demonstrated a commitment to maximizing environmental, economic, and social benefits of the Project. The EA process for the Project has and will continue to shape Project design, planning and implementation, which will result in a Project that will create local and regional social and economic benefits.

Changes to the environment and environmental effects will be mitigated to reduce or avoid adverse effects. Given the mitigation measures that will be implemented, changes to the environment and effects of these changes (including cumulative effects from other past, present, and certain or reasonably foreseeable future physical activities) resulting from Project activities through the Construction, Operation and Maintenance, and Closure and Decommissioning phases are predicted to be not significant. Effects of changes to the environment on Indigenous peoples (including cumulative effects) resulting from Project activities are also predicted to be not significant.

In summary, the Project is not likely to result in significant adverse residual environmental effects, including cumulative effects, provided that the proposed mitigation measures are implemented. Monitoring programs will be implemented where warranted to verify the effectiveness of mitigation measures and the accuracy of effects predictions.

The Project will result in community and social benefits through direct and indirect economic effects, including government revenues from royalties, capital expenditures, wages, salaries, and benefits, non-wage spending on companies providing goods and services in support of the Project, and spinoff economic activity associated with increased employment and income in the region. In addition to community and social benefits, the Project will contribute to increases in scientific knowledge.

26.4 References

AANDC (Aboriginal Affairs and Northern Development Canada). 2011. Aboriginal Consultation and Accommodation, Updated Guidelines for Federal Officials to Fulfill the Duty to Consult. Available at: http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ/STAGING/texte-text/intgui_1100100014665_eng.pdf.