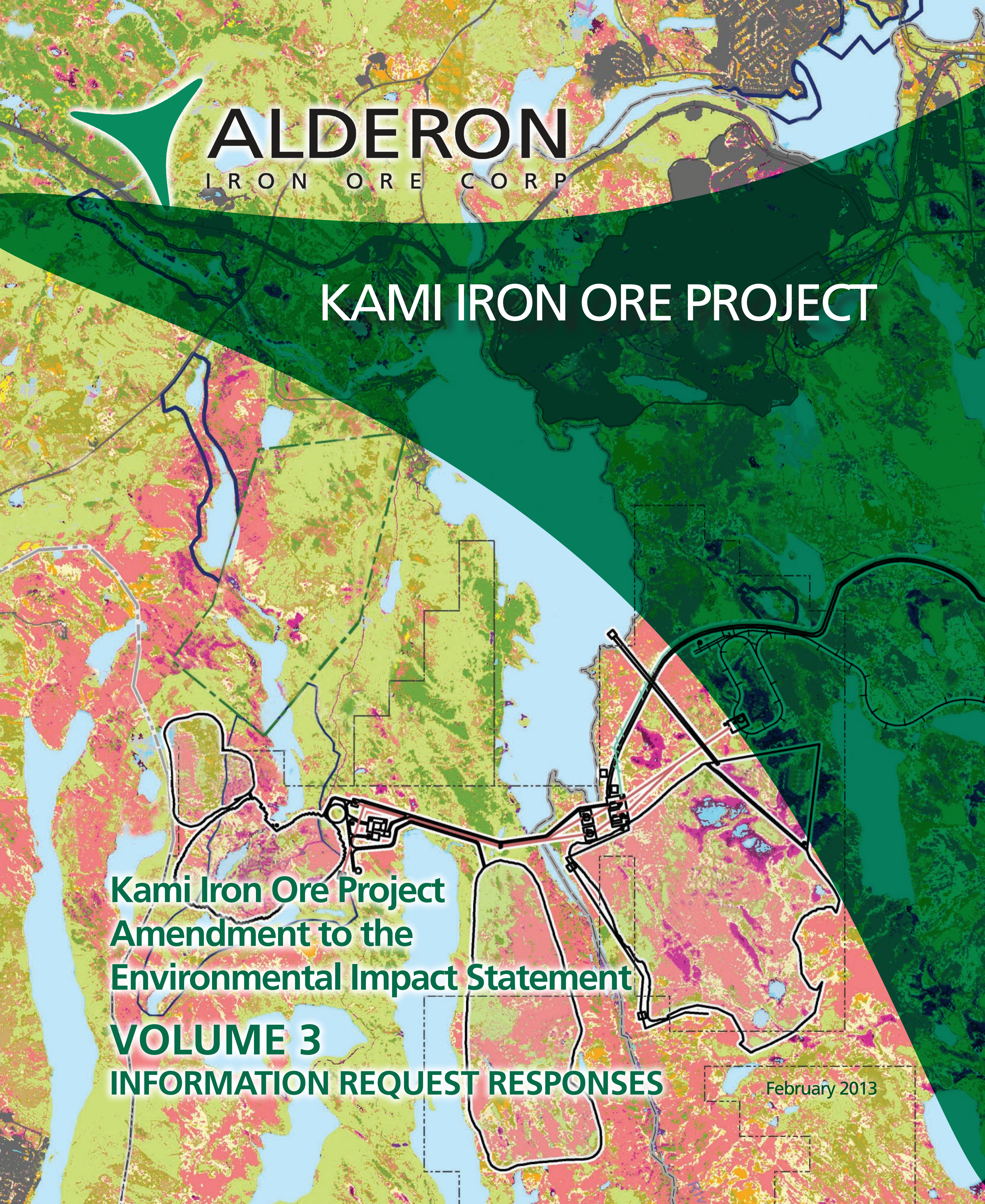


ALDERON
IRON ORE CORP

KAMI IRON ORE PROJECT

Kami Iron Ore Project Amendment to the Environmental Impact Statement

VOLUME 3
INFORMATION REQUEST RESPONSES

February 2013

INTRODUCTION

Alderon Iron Ore Corp (Alderon) is proposing to construct and operate the Kami Iron Ore Project, which will consist of an open-pit iron ore mine and associated infrastructure in Labrador West, as well as a terminal facility at the Port of Sept-Îles, Québec (the Project).

The Project was registered under federal and provincial environmental assessment (EA) processes in October 2011, and required the completion and submission of an Environmental Impact Statement (EIS) under the Newfoundland and Labrador *Environmental Protection Act* (Part X), which also fulfilled the requirements for a Comprehensive Study under the *Canadian Environmental Assessment Act*. Following the receipt of Final EIS Guidelines from the provincial and federal governments in mid-2012, Alderon submitted its EIS in late September 2012, which was subsequently made available for a governmental, Aboriginal and public review period.

In December 2012 the Governments of Canada and Newfoundland and Labrador provided Alderon with a series of additional questions and associated information requests (IRs) resulting from that EIS review process, and required that the Proponent submit additional information to address these as part of the EA process for the Project.

As part of the EIS review process, a total 419 IRs were received from regulatory agencies, 62 IRs were received from Aboriginal groups and 14 submissions were received from the public. This document (Volume 3) contains detailed responses and additional information for each of the IRs that were received.

Summaries of the IRs and associated Alderon responses are provided in Volumes 1 and 2 of this Amendment to the EIS.

This document and its supporting studies were prepared by Alderon, Stassinu Stantec and Stantec Consulting Ltd., Amec, Golder Associates and Worley Parsons.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

Printed on Earth Choice® (Rainforest Alliance Certified and FSC Certified) Paper

1.0 INFORMATION REQUESTS FROM FEDERAL GOVERNMENT

Alderon received comments from federal government departments and agencies (Environment Canada, Department of Fisheries and Oceans, Health Canada, Natural Resources Canada, and Transport Canada) on the Environmental Impact Statement (EIS) in December 2012. During the preparation of responses to the information requests, Alderon has met with the agencies, and incorporated their input into the responses as detailed below.

1.1 Information Requests Received from Environment Canada (EC)

Alderon received Environment Canada's comments on the EIS in December 2012. During the preparation of responses to the information requests, Alderon requested to meet with Environment Canada to provide an overview of Alderon's approach to answer their questions and ask for clarification on their comments, as appropriate. Alderon representatives met with Environment Canada on January 15, 2013 and were able to provide an overview of the additional information that was being prepared in response to their information requests. Alderon has incorporated input from Environment Canada into the responses below.

The following section includes the 64 information requests from Environment Canada and Alderon's response to each of these requests.

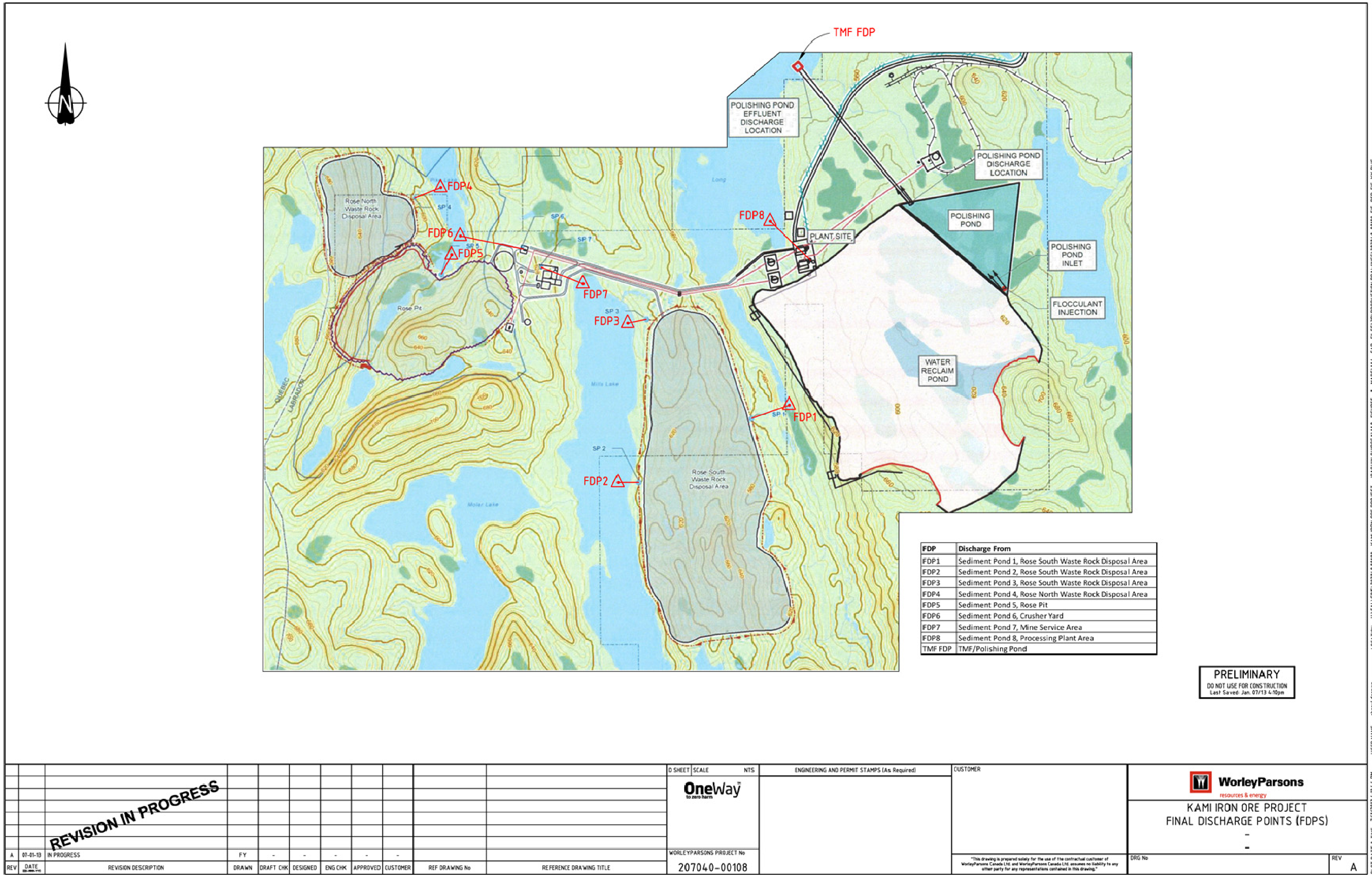
1.1.1 Information Request No. EC 01

There are several retention basins associated with the Project and they are mentioned throughout the document. It describes discharges from these basins will possibly be “to the environment” but no further description is given. Are these considered to be Final Discharge Points (FDP) as per the *Metal Mining Effluent Regulations* (*MMER*) and if so, is it possible to consolidate any of these discharges to reduce the number of FDPs?

Alderon Response to IR No. EC 01

Figure 1.1.1 summarizes the Final Discharge Points (FDP) currently anticipated for the Project. Opportunities to consolidate FDP will be evaluated during the detailed design phase.

Figure 1.1.1 Final Discharge Points and Sediment Ponds



FDP	Discharge From
FDP1	Sediment Pond 1, Rose South Waste Rock Disposal Area
FDP2	Sediment Pond 2, Rose South Waste Rock Disposal Area
FDP3	Sediment Pond 3, Rose South Waste Rock Disposal Area
FDP4	Sediment Pond 4, Rose North Waste Rock Disposal Area
FDP5	Sediment Pond 5, Rose Pit
FDP6	Sediment Pond 6, Crusher Yard
FDP7	Sediment Pond 7, Mine Service Area
FDP8	Sediment Pond 8, Processing Plant Area
TMF FDP	TMF/Polishing Pond

1.1.2 Information Request No. EC 02

The Proponent has stated that runoff and seepage generated from the waste rock disposal areas will be collected and managed at the toe of the facilities by means of small settling ponds around the perimeter of the facilities prior to discharge to the environment.

Environment Canada would like to state that any runoff and seepage generated from the waste rock disposal areas will be treated as effluent as per the MMER. The two proposed waste rock disposal areas are located in close proximity to several small and large waterbodies in the Project area (Ref Figure E-1). The Proponent is required to ensure that proper runoff and seepage collection and treatment is implemented to prevent any adverse water quality impacts on the adjacent waterbodies. Environment Canada requests that the Proponent provide the following information in this regard:

- The locations of the settling ponds around the waste rock disposal areas: This information is required in the EIS at least at a conceptual level with relevant design description.
- The volume and percentage of the total runoff and seepage that would be collected in these settling ponds.
- The dimensions (e.g., depth and width) of the settling ponds.

The Proponent is also requested to indicate whether or not a network of perimeter drainage collection ditching and pumping is planned around the toe of the waste rock disposal areas as it is not clear from the EIS.

Alderon Response to IR No. EC 02

Alderon acknowledges that any runoff and seepage generated from the waste rock disposal areas will be treated as effluent as per the MMER. In response to Environment Canada's request for additional information on the location and design of perimeter drainage collection ditching and sedimentation ponds to treat drainage from the waste rock disposal areas, to the information provided in the referenced section 2.5.3, the Reviewer is directed to Section 16.6.2.2, pages 16-136 through 16-147 of Volume 1 of the EIS for these details.

1.1.3 Information Request No. EC 03

Environment Canada questions whether the overburden material will be segregated and stored within the waste rock disposal areas in designated locations. If so, then the Proponent is requested to indicate the designated overburden storage areas within the two waste disposal areas in the EIS.

Alderon Response to IR No. EC 03

Overburden material will be removed from the open pit area and moved to, and stockpiled in strategic locations around the site for use in progressive and final rehabilitation. The exact locations of these stockpiles will be determined during the detailed design phase of the Project; however, they will generally be located within the planned footprints of the Tailings Management Facility (TMF) and waste rock disposal areas. Within the TMF, these stockpiles will be located to facilitate drainage collection with the tailings effluent and treated with the tailings effluent prior to release. Within the waste rock disposal areas, these stockpiles will be located upstream of where sedimentation ponds are shown in the Figure 1.1.1 and will be constructed in order to manage any runoff.

1.1.4 Information Request No. EC 04

Grading of the final waste rock pile should resemble natural patterns to prevent excessive erosion and thus higher than acceptable sediment loading in the runoff.

Alderon Response to IR No. EC 04

Waste rock disposal areas will be designed and developed in consideration of stability, materials placement, aesthetics, runoff management, and progressive rehabilitation. In general, the waste rock disposal areas will be developed in sections (vertically and laterally) to allow achievement of final slope and bench areas allowing for progressive rehabilitation at the earliest stage possible. Ditching, temporary grading, and coarse cover materials will be utilized to minimize dust generation and manage runoff (erosion) during disposal area development and post rehabilitation activities. The areas where final grades are achieved will then be prepared for revegetation, which will further protect against erosion, as per the Draft Rehabilitation and Closure Plan (Appendix A). The interim and final (rehabilitation) grading, configuration, topography, and drainage patterns of the waste rock disposal areas and surrounding areas will be maintained as close to natural patterns as possible.

1.1.5 Information Request No. EC 05

There are no criteria given for what will be used to define which waste rock is "suitable" for use in construction. The Proponent is requested to include in the EIS the criteria that will be used to classify waste rock.

Alderon Response to IR No. EC 05

It is intended to utilize waste rock from the open pit for civil construction purposes where possible, including general fill and construction of roads and containment dykes for some of the settling ponds and at the Tailings Management Facility. Specifications for the physical properties of the waste rock will vary according to each specific intended use, but will be based on criteria for gradation, strength and hardness, and resistance to abrasion in the case of road surfacing material. With respect to chemical properties, rock materials used for concrete aggregate must be resistant to chemical deterioration, and for fill applications only non-PAG (potentially acid generating) rock materials will be utilized.

1.1.6 Information Request No. EC 06

The EIS mentions the possible use of upstream dam construction for the Tailings Management Facility.

“Upstream raising of the containment dams by using the coarse fraction of the tailings solids as the construction material will also be considered.” and “Raising of the tailings area may include upstream raising of the containment dams by using the coarse fraction of the tailings solids as the construction material. In this upstream raising method, material from the upper tailings beach is used to construct progressive lifts over the deposited tailings. An advantage of this construction method is that the required volumes of borrow material are minimized and use / storage of tailings solids is maximized.”

The use of upstream dam construction is generally considered to be risky due to potential issues with dam stability. In addition, the rise of this type of dam is limited to approximately 5-10 m/year.

The Proponent is requested to provide more information on what testing will be done on the tailings in place prior to the use of upstream dam construction, in order to assure dam stability.

Alderon Response to IR No. EC 06

Several options for the construction of the Tailings Management Facility (TMF) are presently being evaluated as part of the detailed design of the Kami Project. Design and construction of the tailings dams will meet or exceed the standards established in the Canadian Dam Association's (CDA) Dam Safety Guidelines (CDA Guidelines) and will provide for the safe containment and management of the tailings and effluent. Construction planning may include the use of waste rock from the open pit for construction of perimeter containment dykes however the use of the coarse fraction of the tailings solids as the construction material for upstream tailings dam raises is no longer being considered as an option for dam construction. All construction materials will be tested using standard material and geotechnical methods prior to their use in construction of the tailings dams. The final TMF dam design and material testing specifications will be subject to additional review by regulators as part of the permitting process for the Project.

1.1.7 Information Request No. EC 07

The availability and quality of dam construction materials is important. The extraction of these from on-site sources should be considered as part of the EIS, should it be anticipated, as it may have impacts in the study area. Environment Canada requests that the Proponent include the location of anticipated on-site and off-site borrow sources in the EIS and consider the impacts of borrow site development on affected VECs.

Alderon Response to IR No. EC 07

Borrow materials will be used for many of the construction activities during Project development including road and rail construction, building and infrastructure foundation preparation and backfill, underground services trench bedding and backfill, hydrocarbon storage tank containment, sediment pond dams, storm runoff and effluent conveyance ditching, and Tailings Management Facility construction. In order to satisfy the various engineering requirements for each type of construction a variety of borrow sources may be required to obtain the specified materials directly, or to obtain materials that can be crushed, screened, mixed, or otherwise altered to meet the engineering specification for each material.

In order to minimize the effects of the Project, and to minimize construction costs (primarily purchase and transport costs to the site of off-site borrow materials), Alderon's design and geotechnical teams will review all available on-site soil and rock materials in terms of their suitability for the various requirements of the Project. The priority will be to utilize waste rock and overburden materials that must be excavated as part of the site development and stockpiled or disposed elsewhere if not used in construction whereever possible. This evaluation will be conducted in the detailed design phase of the Project where volumes of borrow materials for each construction area are better developed, specifications and schedules for borrow materials are determined, and the materials characteristics of the on-site soils and rock are better understood through advanced test work.

Some examples of how the on-site materials may be used as borrow materials are as follows:

- Road and Rail construction - esker sands and gravels, blasted and crushed / screened waste rock;
- Building and infrastructure foundation preparation and backfill - blasted and crushed/screened waste rock, overburden soils of low fines content;
- Underground services trench bedding and backfill - esker sands and gravels, overburden soils of low fines content;
- Hydrocarbon storage tank containment - glacial tills of high fines content;
- Dams for sediment ponds and TMF - blasted and crushed/screened waste rock, esker sands and gravels, glacial tills of high fines content;
- Concrete production - esker sands and gravels; and
- Progressive rehabilitation activities - overburden, organic soils, waste rock.

The locations of on-site quarries will consider environmental constraints identified through the environmental baseline studies. Mitigation measures as summarized in Chapter 27 of Volume 1 of the EIS also apply to quarries:

- Minimize construction footprint to the extent possible
- Use of appropriately sized sedimentation ditches and ponds.

- Restrict clearing activities to outside of the bird breeding season, whenever feasible.
- Restrict clearing and other activities within 800 m of an active raptor nest, and within 200 m of an inactive nest.
- Flag the boundaries of sensitive areas before commencing any work in the area
- Comply with all provincial and federal legislation, permits, approvals and guidelines.
- Implement erosion and sediment control.
- Conduct progressive rehabilitation and wetlands restoration
- Implement an Avifauna Management Plan.
- Locate borrow pits more than 100 m away from the high water mark of waterbodies, where feasible.
- Maintain natural buffers around wetlands and riparian zones
- Avoid sensitive species and their habitats to the extent feasible.
- Minimize disturbance and infilling within adjacent wetlands and maintain hydrological conditions to the extent feasible.
- Establish a replacement protected area that performs the regional protection functions of the Pike Lake South Management area.
- Delineate locations where plant species of conservation concern occur, and avoid those locations to the extent feasible.
- Where avoidance is not possible, investigate transplantation of plant species of conservation concern to alternate sites.

It is likely that not all of the borrow materials required for Project construction will be available on site; however, the potential volumes of required off-site borrow materials has not been developed at this time and is part of the detailed engineering phase of the Project. Off-site borrow materials are anticipated to be procured from local commercial quarries operated by others. The environmental effects resulting from off-site, local quarry(s) are addressed by the environmental approvals for that quarry(s).

1.1.8 Information Request No. EC 08

"The tailings will be dewatered at the processing plant using dewatering cyclones for dewatering coarse tailings and thickeners for dewatering **dry** tailings."

Remove the word dry or change to dewater tailings to a dry state.

Alderon Response to IR No. EC 08

The sentence should read: "The tailings will be dewatered at the processing plant using dewatering cyclones for dewatering coarse tailings and thickeners for dewatering fine tailings".

1.1.9 Information Request No. EC 09

The most distant pumping point will be about 5.2 km from the concentrator at the peak elevation of 80 m above the starting elevation. As tailings are pumped further and higher, booster pumping stations will be required along the path near the west.

Will there be emergency dump stations established in case of a power outage and the tailings lines have to be drained?

Alderon Response to IR No. EC 09

The design of the Project includes a Tailings Dump Pond (TDP) that is located outside of the Tailings Management Facility (TMF) at the toe of the tailings dam. The purpose of the TDP is to serve as storage for pipeline tailings in the event of an electrical or mechanical malfunction where the line needs to be 'dumped' or 'discharged' before the tailings slurry solids sand-out in the pipeline. The TDP will be designed to hold the entire volume of the tailings piping in the event of an emergency or if repairs or maintenance are required. It will include a sump pump to maintain a low water level in the pond so that there is always capacity to accept tailings in the event of an emergency. In the event of a tailings dump, the tailings and any storm water, that the tailings are in contact with, will be recovered and returned to the process for thickening and disposal within the TMF. The TDP will be designed to ensure that no tailings or storm water will be released to the environment as a result of an emergency tailings dump.

The final TMF design will be subject to additional review by regulators as part of the permitting process for the Project.

1.1.10 Information Request No. EC 10

This practice has been successfully employed by other proponents at mine sites and has proven to be very useful as a “water control measure”, i.e., for solids.

Alderon Response to IR No. 10

Management of site runoff during site preparation and construction will continue to be addressed at all phases of Project design and planning.

1.1.11 Information Request No. EC 11

“Proper drainage and terracing will be established to facilitate surface water collection within one or more basins to allow suspended solids to settle prior to release of the water into the environment.”

Is this considered a FDP? (see comment 3)

Alderon Response to IR No. EC 11

Runoff from the processing plant and associated buildings will be collected in a sedimentation pond proximal to the plant. The intent within the Project limits is to provide an efficient and integrated approach to water management from all sources. In general, water collected from the site will be managed in sedimentation ponds and released within the same catchment to meet Instream Flow Need (IFN) conditions where appropriate and secondly, recycled within the development to satisfy process water needs and minimize surface water extractions from Long Lake. Surplus water that is not required will be discharged from the Final Discharge Point (FDP) for the processing plant area which is intended to be Long Lake.

1.1.12 Information Request No. EC 12

"This sequence will begin early in site preparation and construction so that all runoff will be managed through the polishing pond as soon as possible."

This practice has been successfully employed by other proponents at mine sites and has proven to be very useful as a "water control measure", i.e., for solids.

Alderon Response to IR No. EC 12

Management of site runoff during site preparation and construction will continue to be addressed at all phases of Project design and planning.

1.1.13 Information Request No. EC 13

Excess water in the TMF will be conveyed to the polishing pond prior to final treatment and discharge to Long Lake via a pipeline, such that the mixing zone in Long Lake is reduced as much as possible (to optimize diffusion)

This will be a FDP as per the *MMER*.

Alderon Response to IR No. EC 13

Alderon acknowledges that the Tailings Management Facility discharge to Long Lake will be a Final Discharge Point as per the MMER.

1.1.14 Information Request No. EC 14

The EIS document states that "…although there are no regulatory requirements related to the colour of effluent discharged to the receiving environment, and there is no evidence of adverse effects on fish and fish habitat…".

While the colour of the effluent may not have an effect directly, the colour is caused by iron in the effluent (*"red water is caused by very fine colloidal reddish iron mineral or iron stained quartz / silica particles in suspension")* and iron may be toxic to fish.

As iron may be toxic to fish, the statement relating to the toxicity of the red effluent should be reviewed and potentially revised.

Alderon Response to IR No. EC 14

As described in detail below, Alderon intends to apply mechanical treatment to effluent from the Tailings Management Facility to eliminate the potential for 'red water' issues and therefore any impact to fish.

Tailings effluent discharged from the Process Plant will be pumped to the Tailings Management Facility (TMF) and will flow to retention ponds for sedimentation and treatment. Treatment of the water from the TMF is currently anticipated to be completed via mechanical treatment that involves an enhanced coagulation/settling treatment system which includes pH adjustment, feed of sand (as a ballast to improve settling and settling substrate), polymer feed, inclined plate settling chamber, ongoing removal of settled sludge and sand recovery system similar. The system uses the same mechanical treatment that is in use at a number of similar iron ore facilities.

An important part of the plant operations is based on the re-use of process water. The plant will reclaim water from the TMF, as a primary source of process water supply. Depending on weather conditions and rain fall, it has been forecasted that there will be either a surplus or a deficit of water at the TMF. During the water surplus periods, residual water needs to be removed from the tailings facility to the environment. This excess water needs to meet regulatory quality standards and requirements before it is discharged to the Long Lake. The system of treatment of excess water will be sized based on the detailed design and a detailed water balance for the site but the initial design indicates that the system will need to treat a flow rate 760 m^3/h.

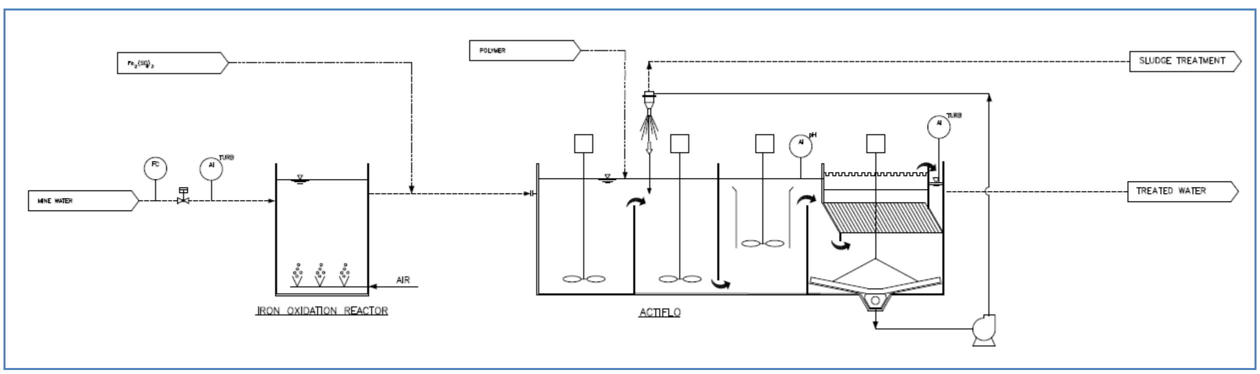
The primary water quality concern for the TMF surplus water discharge is the “red water” condition, which is an aesthetic issue in waste water associated with iron ore mining and processing effluents. There is no evidence of adverse effects of red water on fish and fish habitat (Canada Gazette 2009). The source of “red water“ is the presence of very fine colloidal reddish iron particles (typically ranging from 1 nm to 1 micron) produced when iron dissolves and reacts with water and dissolved oxygen. These suspended particles are iron oxide (Fe_2O_3), oxy-hydroxide (FeO.OH) and hydroxide ($Fe(OH)_3$), characterized by a red discoloration.

The water from the TMF will be treated using Ballasted flocculation or “Mechanical Treatment”, which is a high-rate coagulation-flocculation-sedimentation process applied in the water treatment industry. A simplified Process Flow Diagram (PFD) for the mechanical treatment is shown in Figure 1.1.2 below. The process includes the combined use of a micro sand and a polymer coagulant to get the iron particles to connect together to form a ‘floc’ which is heavier in weight and settles out of the water at an increased rate. The micro sand provides a surface area that enhances flocculation and acts as a “ballast” or “weight”. The resulting floc settles quickly, allowing for higher flow rates, short retention times and the ability to provide treatment under dramatically changing flow rates without impacting final effluent quality.

The ballasted-flocculation process consists of two steps, oxidation and clarification. Water oxidation is conducted in an Oxidation Reactor where air is added to oxidize dissolved ferrous iron (Fe_2+) present in the water to form suspended ferric iron (Fe_3+) hydroxide particles. The water flows from the oxidation stage to a coagulation chamber where a coagulant is added to start the micro-flocculation and then to a Maturation tank where polymeric flocculant and microsand are added to continue floc formation. In this tank, a turbo-mixer creates ideal conditions for the suspended iron particles to combine with the microsand. From the Maturation tank, the fully formed iron sediments enter a settling tank equipped with a lamella clarifier, which provides the rapid and effective removal of the microsand/sludge floc. The clarified water exits the system via a series of collection trough or weirs. The clarified water is monitored for turbidity to provide real-time monitoring of red water conditions and allow adjustments to the process to be completed if the turbidity increases above target discharge set points.

The sand and iron sludge mixture settles to the bottom of the clarifier where scrapers force the sludge into a center cone from which it is continuously withdrawn and pumped to a hydrocyclone where sludge and micro sand are separated by centrifugal force. After separation, the micro sand is returned to the process for re-use and the iron sludge is dewatered and disposed of within the TMF.

Figure 1.1.2 Simplified Process Flow Diagram (PFD)



The proposed mechanical treatment system is not standard practice at older mines but has been used extensively on iron ore and other mines around the world. One potential vendor of this equipment is Veolia Water who have installed over 800 Actiflo treatment plants globally include many in Canada. A selected list of Veolia's Mining Experience in Canada is provided in Table 1.1.1 below. For reference, the preliminary expected capacity for the Kami mechanical water treatment system is 760 m^3/h or approximately 18,000 m^3/d.

Table 1.1.1 Selected Mining Experience in Canada

Mine Operator	Location	Capacity (m^3/d)
Niobec Mine	St-Honoré-de-Chicoutimi, QC	14,400
Meadowbank Mining	Meadowbank, NU	50,000
GoldCorp	Red Lake, ON	6,000

Mine Operator	Location	Capacity (m^3/d)
GoldCorp II	Red Lake, ON	30,000
Williams Operating Corporation	Marathon, ON	2,000
Trevali Mining Corporation	Bathurst, NB	1,000

References:

Canada Gazette. 2009. Regulations Amending the Metal Mining Effluent Regulations. Volume 143 (4). February 18.

1.1.15 Information Request No. EC 15

Does the Proponent have a preliminary list of FDPs and their locations?

Alderon Response to IR No. EC 15

Table 16.51 in the EIS summarizes the current final discharge points (FDP) for the sedimentation ponds proposed for the Project. In addition, it is proposed that the FDP for the Tailings Management Facility and associated polishing pond be the remaining downstream portions of TDA01. Waste water from washrooms, showers and kitchens at the plant buildings will be collected, treated and discharged along with the storm water runoff from the Processing Plant area. Figure 1.1.1 above summarizes the final discharge points (FDP) currently anticipated for the Project.

1.1.16 Information Request No. EC 16

2.8.1 Tailings Management, Pg. 2-97

Various possible tailings management options were assessed and evaluated based on current industry practices and standards, approaches being used at other northern mine sites in the region, overall technical and economic feasibility and potential environmental issues and interactions. Other possible tailings management approaches that were identified and considered include:

- Tailings disposal in open pit;
- Tailings disposal in natural waterbodies;
- Conventional tailings storage in an engineered impoundment;
- Dry stacking of dewatered tailings; and
- Co-disposal of tailing and waste rock.

As per the Code of Practice for Metal Mines, alternatives were considered for tailings management.

Alderon Response to IR No. EC 16

Comment noted.

1.1.17 Information Request No. EC 17

Common Nighthawk have been recorded in the Labrador City area, and should be added to the list of species at risk in this section (see website: http://eBird.org).

Alderon Response to IR No. EC 17

EIS, Volume 1, Section 3.0 (Description of the Existing Environment), page 3-3, should read:

"Species at risk and species of conservation concern which have been observed in the Project area include: the Olive-sided Flycatcher (Threatened), Common Nighthawk (Threatened) and the Rusty Blackbird (species of special concern)."

1.1.18 Information Request No. EC 18

The source of the ELC classification should be shown, and the extent of the ground truthing conducted to determine accuracy of the ELC should be stated.

Alderon Response to IR No. EC 18

Baseline vegetation studies for the Project were completed to investigate and document existing characteristics of vegetation, wetlands and forest cover types within and around the Project. Baseline vegetation information provides context for the environmental assessment and identifies potential landscapes, vegetation communities and species at risk / species of conservation concern with potential to interact with the Project. Details associated with these studies are provided, in part, in a separate ELC Report completed for the Project. Environmental baseline reports are provided as Appendices B (ELC Report) trough G.

The ELC for the Project, encompassing the RSA, LSA and PDA, is based on a regional land cover classification. A variety of data formats including satellite imagery (RapidEye 5m multispectral), aerial ortho-photos, elevation and field survey data were used during the preparation of the ELC, providing as accurate a classification as possible. This combination of data sources resulted in a field survey program that was designed to support the systematic remote-sensing-based mapping program. A detailed description of the methods used to prepare the ELC is provided in Section 5.0 of the ELC report (Appendix B).

Field surveys were conducted to gather quantitative information on vegetation communities, to "train" the computer-based supervised classification algorithm, and to provide a basis for classifying vegetation types within the ELC context. Vegetation data were collected during two separate field programs in 2011 (July 25 to July 31, and September 28 to October 4), coinciding with the early to mid-summer and late summer phenology for most plants. In total, 64 survey locations were established and described in and around the RSA, LSA and PDA in 2011.

Baseline 2011 survey site location information is presented in Figure 5.1 of the ELC report (Appendix B), with detailed descriptions of the various vegetation communities provided in Section 6.2. An additional 36 locations were identified independently using existing aerial photography.

Upon completion of the ELC, an accepted approach was used to test its accuracy. Classified categories were compared to ground-truthed sites, and high resolution ortho-corrected air photos were used to verify and adjust the algorithm for areas of specific interest.

1.1.19 Information Request No. EC 19

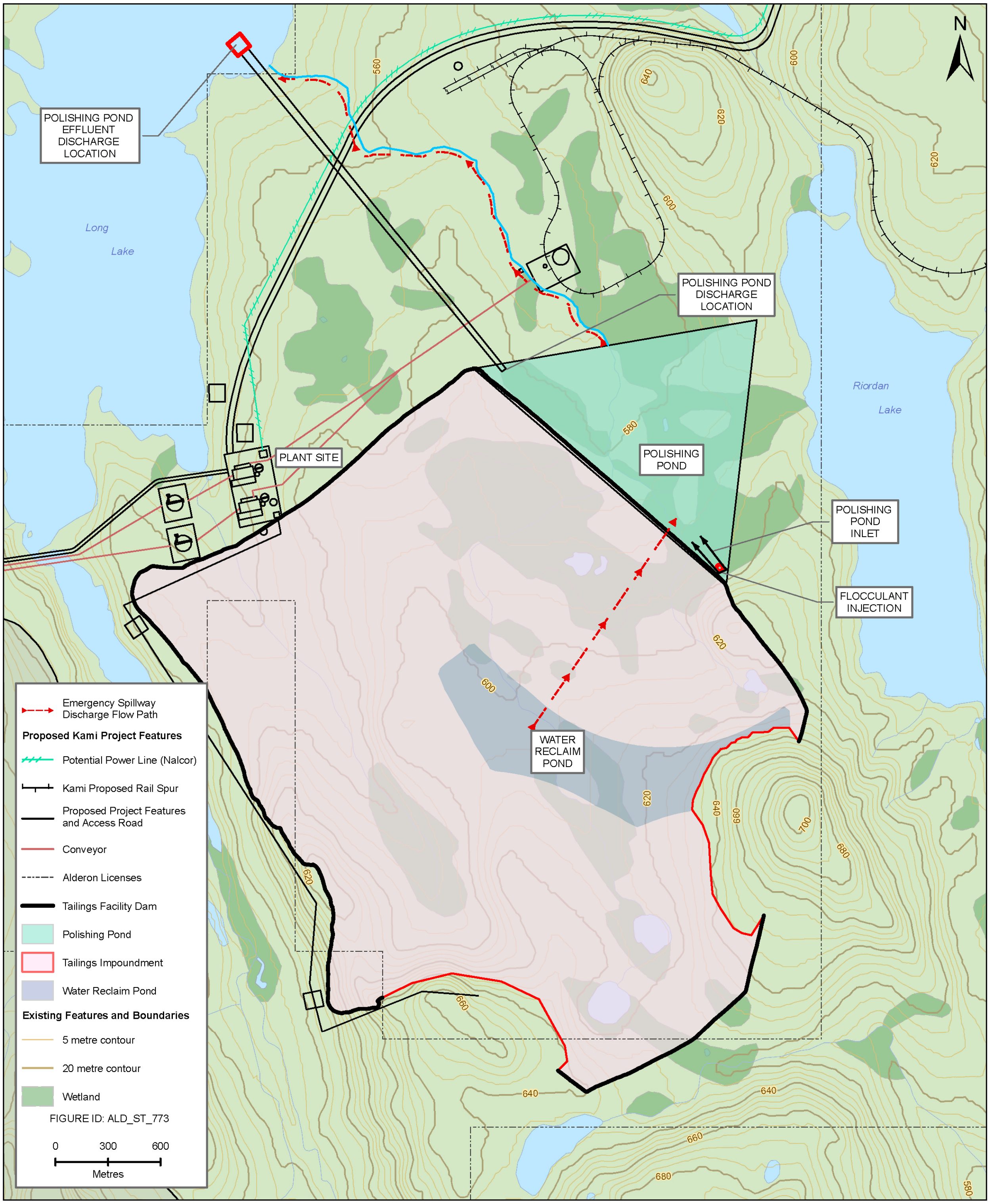
The potential for dyke breaches in the tailings management facility should be considered and included in Table 4.1, if necessary.

Alderon Response to IR No. EC 19

The approach to the assessment of accidental events was to assess and predict potential environmental effects from reasonable worst case scenarios. With respect to a dyke breach at the TMF, as stated in Section 4.5.1 of Volume 1 of the EIS, under sub-heading "Dyke Breach at Polishing Pond", the dykes located at the TMF will be designed to standards of the Canadian Dam Association (CDA) Dam Safety Guidelines and will first require a hazard consequence assessment process. Further information on these guidelines and processes is included in Alderon's response to IR No. EC 21. It will include features such as an emergency spillway to provide relief of larger runoff events such as from the Probable Maximum Precipitation event. These features, as well as the design of the TMF (i.e., tailings will be deposited starting from the tailings dam crest and form a tailings beach extending within the TMF away from the dam, which will progressively move the tailings impoundment water farther away from the tailings dam) serve to lower the risk of a flooding breach of the tailings dam.

In the event of a tailings dam breach, tailings impoundment water would have to migrate through the tailings beach to the breach, and in the process, peak flows would be expected to be attenuated to low consequence levels. The emergency spillway will be located such that the flow path will be through the existing watercourse channel to Long Lake. The emergency spillway flow path to the tailings dam will be via the polishing pond and will reduce the suspended solids concentration leaving from the polishing pond. Water sampling would be carried out during an emergency discharge to measure the TSS concentration entering downstream waterbodies. Figure 1.1.3 shows the location of the emergency spillway flow path.

Figure 1.1.3 Emergency Spillway Flow Path



1.1.20 Information Request No. EC 20

Granted that the statistical analysis indicates that the probability of a rail spill of fuel or derailment is low, consequences of such event might be high in part depending on where the incident may happen along the train track. Apart from having identified the Wabush water supply area, as there been any work done toward identifying sensitive areas (rivers, lakes, protected / important habitats, water supply, wells etc.) along the train track? It is recommended that specific emergency contingency plan be prepared for each identified sensitive areas.`

The proponent provides an over view of actions to be taken to recover lost fuel, including use of absorbent booms and pads, vacuum truck and physical reclamation of contaminated soil. There is however very little detail on how a fuel spill from a derailment might be addressed. There is no information provided in regard to pre-planned missions, response procedures, equipment inventories / availability and how will it be made available for a remote incident site, storage sites, who will be responding on site, training of responding personnel, etc.

The proponent evaluated the fuel spill worst case scenario as a release of 180 000 gallons of diesel (six tanks of 30 000 gallons). However giving the estimate of fuel transport frequency being "*Three tank cars per week of diesel heating oil for boiler fuel during the 24-week heating season; and six tanks cars per week of diesel fuel for mine vehicles.*" the worst case scenario should be based on a release of 270, 000 gallons of fuel.

Alderon Response to IR No. EC 20

Potentially sensitive areas along the proposed rail infrastructure may include stream crossings, wetland crossings and any areas identified as supporting species at risk, as well as areas used by communities for recreation and resource use purposes. While each of these areas was not specifically identified in Section 4.5.1 of Volume 1 of the EIS, these sensitive areas have been assessed within their respective VEC chapters in relation to the potential for direct and indirect effects during Project construction and operation of the rail infrastructure (e.g., Wetlands, Section 17.6.2; stream crossings and associated fish habitat, Section 18.6.1; Protected Areas, Section 19.6.5; and SAR/SOCC, Section 20.6). As these identified areas are immediately adjacent to the rail infrastructure, the effects of a train derailment have also been assessed for each (e.g., Wetlands, Section 17.8; stream crossings and associated fish habitat, Section 18.8; Protected Areas, Section 19.8; and SAR/SOCC, Section 20.8). Each stream crossing is also identified in Section 2.5.7, Table 2.7. As suggested by the Reviewer, the Emergency Response and Spill Response Plan will identify site-specific mitigation and response procedures, particularly in relation to these identified sensitive areas.

A detailed Emergency Response and Spill Response Plan will be developed by Alderon and submitted to appropriate regulatory agencies for review prior to the initiation of Project activities. The Emergency Response and Spill Response Plan will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

The SMF is a part of the overall Kami Project management system that includes quality management systems, document control, risk management and Health, Safety and Environment (HSE) systems. The framework is made up of three main systems, the components of which are:

1. The Sustainable Project Delivery (SPD) system will provide a high level approach to sustainability management by establishing clear objectives, tracking of key Project commitments, support for engineering and procurement activities and reporting on overall sustainability performance.

2. The Environmental Management System (EMS) will provide detailed management of regulatory and permit requirements and includes environmental protection plans and procedures. The EMS will include environmental monitoring and reporting on specific construction and operational activities. Environmental Management Plans will be developed in consultation with relevant regulatory agencies and stakeholder groups.

3. The Social Responsibility System (SRS) will manage and track the commitments made in various guidance documents and contracts (e.g., benefits agreement) as well as establish plans for effective Project communications, community liaison and complaints management.

Working closely with the HSE team, the SMF will facilitate the incorporation of sustainability issues into employee orientation, daily tailgate and safety meetings, contractor management, monitoring and incident response procedures.

Section 30 of the *Metal Mining Effluent Regulations* (MMER) requires that an Emergency Response and Spill Response Plan (ERSRP) be completed and must be available for review by Environment Canada. The ERSRP is intended to describe measures taken to prevent any unplanned releases or deposits of deleterious substances and to mitigate the effects of such a release should it occur. The MMER specify that the ERSRP must include the following:

- Identification of accidental spills that can reasonably be expected to occur and the potential damage or danger that could result (i.e., a site risk analysis);
- A description of the measures to be used to prevent, prepare for and respond to an accidental release of a deleterious substance;
- A list of the individuals who are to implement the ERSRP and a description of their roles and responsibilities;
- The identification of the emergency response training required for each of the individuals listed above;
- A list of the emergency response equipment included as part of the plan, and the equipment's location; and
- Alerting and notification procedures including the measures to be taken to notify members of the public who may be adversely affected by the accidental event.

While the requirements of the MMER are in specific relation to the accidental release of deleterious substances, it is recognized that the potential for other accidental events have been identified through the Project planning process and response procedures for these events would also be developed by Alderon. A proposed Table of Contents for the ERSRP is provided in Appendix I.

The Reviewers' comment is acknowledged. During the 24-week heating season, up to nine tank cars combined of diesel heating oil and fuel could result in the release of 270,000 gallons of product should a worst case train derailment occur. A train derailment was assessed as having a potential for significant residual environmental effect for Water Resources (Section 16.8); and Freshwater Fish, Fish Habitat and Fisheries (Subsection 18.8). The effects predictions remain unchanged.

1.1.21 Information Request No. EC 21

Proponent should provide detailed contingency and mitigation plan for each of the dyke break scenarios.

Details should be provided about the location and receiving watercourse of the emergency spillway discharge. What mitigation measures will put in place to reduce TSS discharge coming from the emergency spill way (ex. emergency sediment retaining barriers). Will sampling be undertaken to monitor TSS levels during an emergency discharge?

Alderon Response to IR No. EC 21

The Canadian Dam Safety Guidelines (CDA) will be used for hazard consequence assessment including emergency spillway discharges, tailings dam breach, and polish pond dam breach. Each potential emergency will be evaluated with the consideration of the consequences of failure so that appropriate preventive, mitigative or remedial action can be taken. This will involve the following:

- Preparation of flood inundation maps;
- Identification of flooded areas including infrastructures, surface water resources, sensitive ecological and protected areas, community and cultural sensitivities;
- Assess potential human, economic losses and environmental impacts including fisheries and water quality; and
- Development of contingency and mitigation plans based on the above consideration.

This hazard consequence assessment will be carried out during the detailed design stage when adequate information is available.

The Emergency spillway discharge flow path is shown in Figure 1.1.3 (Alderon Response to EC 19). The Emergency flow path from the tailings area to the polishing pond will be provided as shown in Figure 1.1.3. The emergency spillway will be located such that the flow path will be through the existing watercourse channel to Long Lake. The emergency spillway flow path to the tailings dam will be via the polishing pond and will reduce the suspended solids concentration leaving from the polishing pond. Water sampling will be carried out during an emergency discharge to measure the TSS concentration entering downstream waterbodies.

1.1.22 Information Request No. EC 22

As previously mentioned the proponent should consider a fuel product transfer accident / malfunction at the mine site (transfer between tank cars to AST fuel tank, and AST fuel tank to machineries) in their accident and malfunctions scenarios.

There is no information provided in regard to the unloading installation, secondary containment, procedures and emergency response and spill response plan. This information should be provided.

Alderon Response to IR No. EC 22

Alderon will develop a detailed Emergency Response and Spill Response Plan (ERSRP) during the detailed design phase of the Project. Detailed ERPs development are typically completed in conjunction with detailed design due to the iterative nature of ERSRP and final design. As such the potential for an accident or malfunction spill release associated with a fuel product transfer between tank cars and an AST fuel tank and AST fuel tanks to machinery, will be addressed in the detailed ERSRP. Relevant federal and provincial regulatory guidance regarding AST design and fueling and fuel transfer facility planning will be incorporated into the detailed design process to ensure that the design of fuel transfer facilities mitigates and reduces the probability of accidents and malfunctions. These regulatory guidance documents include but are not limited to:

- CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products;
  - *Specifically the Code of Practice indicates that Field –Erected or Shop-Fabricated ASTs must have:*
    - Corrosion protection;
    - Secondary containment;
    - Leak detection;
    - Containment sumps; and
    - Piping in accordance with Part 5 of the Code;
  - *Additionally, the Code of Practice states that Field –Erected ASTs must have overfill protection for:*
    - For pipeline delivery, in the form of an alarm system that will automatically alert pipeline or terminal personnel so that action can be taken to prevent the storage tank from being overfilled;

  - Truck, rail, ship, or barge delivery, in the form of a visual and audible alarm system for detecting a high level that will activate and alert personnel in enough time to terminate the flow of the product to the storage tank and prevent an overfill (See Appendix B, note B.3.3.1(1)(e)(ii)); or
  - In conformance with API RP 2350-96, "Overfill Protection for Storage Tanks in Petroleum Facilities"; and
  - Shop fabricated ASTs must be designed and fitted with similar overfill protection measures
- National Fire Code of Canada;
- CSA Standard B139, Installation Code for Oil-Burning Equipment;
- NEWFOUNDLAND AND LABRADOR REGULATION 58/03 - *Storage and Handling of Gasoline and Associated Products Regulations*, 2003 under the *Environmental Protection Act* (O.C. 2003-225) which provides:
  - *AST construction and installation criteria and standards; and*
  - *Direction and standards on leak and spill response including the development of contingency plan procedures for reporting, containing, removing and cleaning up after a spill or leak;*
- NL *Fire Prevention Act.*

It is anticipated that train tank car to AST fuel tank transfer zones will be constructed to the design criteria stated above for ASTs, thereby mitigating the potential for accidental or malfunctional spill release to the environment in the train to AST transfer. As mentioned above Alderon's detailed ERSRP will provide emergency response measures to a wide range of potential accidents and malfunctions based on the following:

- Mitigative design;
- Preventative operations;
- Monitoring and surveillance;
- Spill detection;
- Emergency response to report, contain, control, clean up; and
- Remediate effects.

1.1.23 Information Request No. EC 23

How many fuel tanks will be on site and what will be the volume of each tank? What will be the maximum volume of each fuel stored on site? Will there be any other hazardous product stored at this storage facility? If there are other hazardous products stored on site, a site specific response plan should be supplied for these products including worse case scenarios for review.

Alderon Response to IR No. EC 23

The fuel storage on the site will include diesel and fuel oil tanks located at the rail unloading area, fuel oil tanks at the process boilers and diesel tanks located near the mine site for vehicle re-fueling. The maximum total capacity for diesel will be 1,400,000 Liters and the maximum capacity of fuel oil will be 500,000 Litres. The exact number and configuration of tanks will be developed as part of detailed design based on availability of commercially available tank systems. The fuel storage tanks will be located in secondary containment to control spills and management of the tanks and the fuels will be an essential components of the Emergency Response and Spill Response Plans and Spill Response Plans for the facility as required within Alderon's Sustainability Management Framework (see Appendix J for further information) as well as the requirements of the applicable provincial and federal acts and regulations and the conditions of the various Permit Approvals and Certificates of Approvals required prior to construction and operation of the Project.

It is anticipated that there will be hazardous materials stored and used on site. The *Environmental Emergency Regulations* (1999, 2003, amendments 2011) require notification of the presence of any hazardous products as outlined in the Regulation within 90 days and that a response plan be prepared to deal with a spill or other emergency related to that product. Alderon commits to these requirements and intends to have appropriate emergency plans and notifications in place prior to any hazardous materials being transported to, and stored or used on the site. The development of emergency plans will be part of Alderon's Environmental Management System which will be guided by the Sustainability Management Framework as presented in Appendix J.

1.1.24 Information Request No. EC 24

Have preferential paths toward receiving waters and drainage features been identified? Emergency containment and recovery measure plans specific to preferential paths toward receiving waters and drainage features should be provided for further review.

Alderon Response to IR No. EC 24

The Fuel tank farm is proposed to be located just downstream of the tailings dam and east of the small tributary of Long Lake as shown in Figure 1.1.4 below. The preferential oil spill flow paths are overland towards the small tributary and then into Long Lake via the small tributary (Figure 1.1.4) in the case of secondary containment breach.

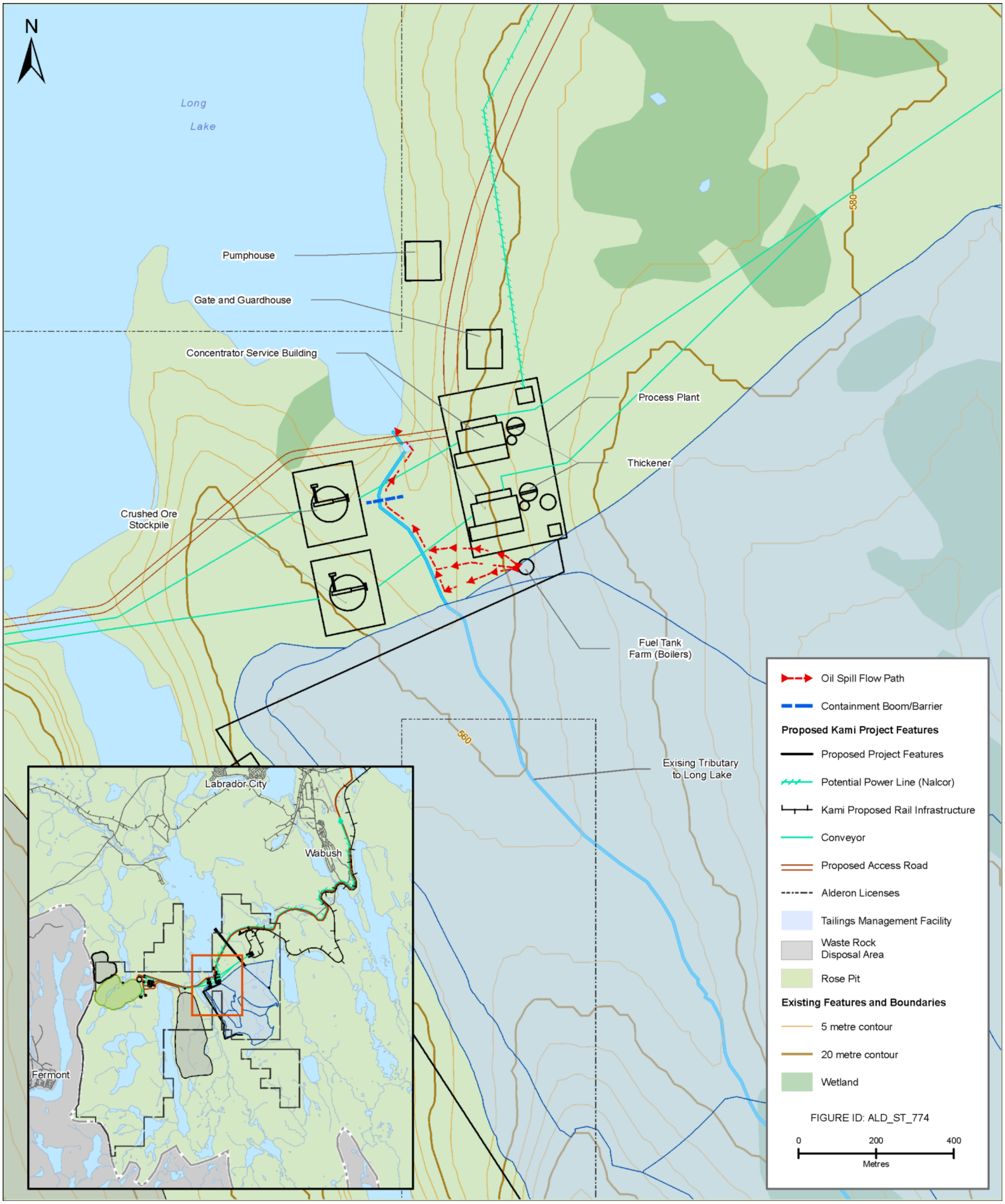
Emergency containment and recovery plans specific to the preferential flow path will include the following but not limited to:

- Identification of persons responsible for managing spill response efforts, including their authority, role and contact details;
- An appropriate number of staff will be trained in the handling of emergency response and spill scenarios;

- Diagrams of the surrounding layout, topography, evacuation paths and drainage flow paths, ground and surface water resources, sensitive ecological and protected areas;
- Quantities of oil that could be released, with predicted flow path, and flow rate;
- Immediate containment and recovery of spill material using equipment includes a variety of booms, barriers, sand bags, and skimmers, as well as natural and synthetic sorbent materials before it reaches Long Lake;
- Excavation and removal of hydrocarbon saturated soil for temporary storage, and treatment/disposal;
- Interception and removal of hydrocarbon entrapped within the fractured bedrock using recovery wells and immiscible scavenger methods;
- Scare and landing avoidance tactics will be used to protect birds and animals by keeping them away from oil spill areas. Devices such as propane scare-cans, floating dummies, and helium balloons will be used particularly to keep away birds;
- Repair the secondary containment breach;
- Conduct post-spill response investigation to evaluate the performance of spill prevention measures; and
- Collect post-response samples of soil and water for testing.

Note that if during detailed design the tank farm is located within the mill battery limit, a secondary containment breach would drain toward a sedimentation pond which would form a tertiary containment system for an accidental release.

Figure 1.1.4 Fuel Tank Farm Location and Preferential Spill Flow Path



1.1.25 Information Request No. EC 25

Understanding that the sedimentation pond may be used as an emergency containment feature in case of release escaping a storage tank secondary containment; procedures should be in place to quickly recover any hydrocarbons from the sedimentation pond. Doing so may prevent contamination of birds that might be present in the area of the polishing pond (potential violation to the *Migratory Birds Convention Act*) and reduce the toxic water-soluble fraction of diesel from entering the water column of the sedimentation pond (potential violation to the *Fisheries Act*). In addition, procedures should be clearly written for action to be taken if product is found on the surface of the pond to determine its source and to address the cause of the release immediately in order to prevent a potential for chronic sheening on the polishing pond.

Please provide detail Emergency Response and Spill Response Plan for the AST Fuel tank and product transfer facilities.

Alderon Response to IR No. EC 25

Accidental releases of hydrocarbons in the sedimentation pond will be rapidly recovered to minimize avian contamination and the potential downstream release of water soluble or entrained hydrocarbon product or fractions. The Emergency Response and Spill Response Plan (ERSRP) will include procedures to monitor the sedimentation ponds for hydrocarbon containment, recover hydrocarbon product, report the release, investigate the release source and address causal factors of the release to prevent ongoing or repeated release to the drainage system and sedimentation ponds.

As indicated in EC 22, Alderon will develop a detailed ERSRP during the detailed design phase of the Project. As further indicated in the response to EC 22, Alderon is required by regulation to provide the ERSRP in the form of a spill or leak contingency plan in association with require AST registration under NL Regulation 58/03. It is anticipated that a number of required environmental approvals will be made contingent on the submission of a Project-specific ERSRP acceptable to regulatory authorities.

1.1.26 Information Request No. EC 26

There is no mention in the reviewed section of substances regulated by the *Environmental Emergency Regulations of the Canadian Environmental Protection Act*. Are there any substances regulated under *Environmental Emergency Regulations* to be stored on site for this project?

Alderon Response to IR No. EC 26

Based on the current Project design, Alderon does not anticipate that there will be any substances regulated under the *Environmental Emergency (E2) Regulation*s stored at quantities above the specified minimum quantities as per the regulation, however this will be reviewed during the detailed design and permitting phases of the Project. Regardless, as a best practice, the facility will develop an E2 Plan as part of the overall Emergency Response and Spill

Response Plan in order to effectively manage the hazardous materials that will be stored on-site.

The main substances that will be stored at the Kami mine site will be primarily petroleum hydrocarbon products including diesel for fueling of mobile equipment and fuel oil for steam generation as well as smaller volumes of propane, lubricants, oils and hydraulic fluids for maintenance of equipment on the site. Water treatment chemicals including coagulants for removal of fine particulates from waste water will also be used on the site. The exact water treatment chemicals have not been selected and will be chosen as part of detailed design and could change over time in order to optimize water treatment.

The facility will also have small volumes of chemicals associated with equipment maintenance (oil, waste oil, varsol), boiler make-up water, potable water (chlorine), grey water treatment from washrooms and kitchens (lime, coagulants) and a quality control laboratory.

The *Environmental Emergency Regulations* (1999, 2003, amendments 2011) require notification of the presence of any hazardous products as outlined in the Regulation within 90 days and that a response plan be prepared to deal with a spill or other emergency related to that product. Alderon commits to these requirements and intends to have appropriate emergency plans and notifications in place prior to any hazardous materials being transported to, and stored or used on the site. The development of emergency plans will be part of Alderon's Environmental Management System which will be guided by the Sustainability Management Framework as presented in Appendix J.

1.1.27 Information Request No. EC 27

The Avifauna Management Plan should be submitted to EC-CWS for review.

Alderon Response to IR No. EC 27

As indicated in the EIS, Alderon will design and implement an Avifauna Management Plan to reduce incidental take for any area to be cleared. This plan will be submitted to EC-CWS for review prior to construction.

A proposed Table of Contents for the Avifauna Management Plan is provided in Appendix I.

1.1.28 Information Request No. EC 28

The Proponent is requested to explain why the potential interaction of the effluent from the Kami Project and the effluent from the Wabush mine is not taken into consideration in the cumulative effects analysis.

Alderon Response to IR No. EC 28

The EIS provides an assessment of the potential Project-specific environmental effects of the proposed Project, as well as its likely cumulative environmental effects in combination with other relevant projects and activities that have been or will be carried out. Baseline conditions have been characterized and reflect the cumulative effect of other exising projects and activities. The approach and methods used in the cumulative effects assessments for each VEC were as described in Chapter 6 (Sections 6.1 to 6.3) of Volume 1, Part I of the EIS. The referenced Section 6.4 (Results of the Cumulative Effects Assessment) merely summarizes the overall conclusions of the environmental assessment in that regard, but the detailed cumulative effects assessments for each VEC are provided in Volume 1 (Chapters 14-26). Chapter 16 of Volume 1 of the EIS in particular provides the environmental effects assessment for Water Resources, with the associated cumulative effects assessment provided in Section 16.7.

The environmental effects of other on-going and adjacent mining projects and other projects and activities were a key consideration of the cumulative effects assessments for all relevant VECs, and were considered integrally within the cumulative effects assessments. The Wabush Mines project is listed and described specifically in Section 6.2.1 of Volume 1 of the EIS, and is included in the "Potential Cumulative Effects" summary tables provided for each VEC. As described in Section 6.2.1, the effects of past projects and activities (including Wabush Mines) are included and reflected in the existing (baseline) environmental conditions for each VEC, and the assessment and evaluation of cumulative environmental effects considers the nature and degree of change from this baseline as a result of the Project in combination with the effects of other on-going and reasonably foreseeable future projects

Wabush Mines discharges its effluent through its Tailings Management Facility at Flora Lake. Flora Lake discharges to Wabush Lake as indicated in the EIS, Volume 1, Chapter 16, pages 16-58 and 16-115, and Table 16-53. As described in Chapter 16, if the Project effluent assimilative mixing zone boundary is defined as the point at which water quality re-attains baseline or CWQG concentrations (p. 16-68) and as the mixing zone was contained within the LSA (p. 16-78, 16-126, Figures 16-36, 16-37) and did not extend to the RSA, no effluent water quality cumulative effect would be generated. Project mixing zone boundaries are contained within the LSA boundary, therefore no effluent water quality cumulative effect was demonstrated.

1.1.29 Information Request No. EC 29

As the EIS notes that there is a second basin on the property which contains iron oxide, the possible future mining of this basin should be considered in the cumulative effects assessment and the likelihood of expansion to this basin should be discussed.

Alderon Response to IR No. EC 29

The results of the Preliminary Economic Assessment (PEA) indicated that the Mills Lake mineralization would require a different processing route versus that of Rose Lake mineralization. Upon review of the PEA results, it was determined that the development and exploitation of the Mills Lake mineralization was not feasible within the existing technologies, market conditions, and Project impacts. If the Mills Lake mineralization is considered to be feasible in the future, the proposed work would be required to undergo an environmental assessment at that time.

1.1.30 Information Request No. EC 30

It should be stated as to how the value of the "*farthest measurable effect of the Project on Birds*" was obtained.

Alderon Response to IR No. EC 30

The farthest measurable effect of the Project on Birds was obtained in consideration of a number of factors including the definition of the LSA (Local Study Area) and the RSA (Regional Study Area). The LSA is comprised of the Project Development Area (PDA) where potential direct effects (physical site disturbance) and an allowance for indirect effects (e.g., noise, visual, behavioural avoidance) plus an additional 500 m area that was determined on the results of physical parameter modelling (e.g., air emissions or particulates, dust). The LSA is estimated to be 71 km^2. This area is then compared to an RSA that provides regional context as to the extent of the direct and indirect effects. The RSA is defined to capture the farthest measurable effect of the Project on "Birds, Other Wildlife and Their Habitat", and "Protected Areas". The RSA estimated area of influence is 1,193 km^2, and is the area within which cumulative effects may occur.

The RSA used to capture the farthest measurable effect of the Project on birds was determined with the consideration of the following baseline data sources, used to determine the known or likely presence of wildlife species in the RSA, LSA or PDA:

- Traditional knowledge (e.g., consultations with Aboriginal Groups described in Section 10 of Volume 1 of the EIS);
- Reviews of the peer-reviewed literature and other information sources, wildlife field surveys (wildlife surveys included under the VEC of Birds, Other Wildlife, and their Habitats and Protected Areas in Section 19 of Volume 1 of the EIS which have been appended to these responses); and
- An ecological land classification.

Data from citizen initiative data sources such as Breeding Bird Survey (BBS) routes, Christmas Bird Counts, and eBird, as well as published and unpublished literature by the Study Team and Stantec, including peer-reviewed academic journals, research project reports, and government publications, were used to summarize life history information (including habitat use) and determine the likelihood of presence for various wildlife species within the RSA. These considerations allowed the determination of the extent of the LSA and RSA (Figure 13.16 on page 13-54 in Section 13 of the EIS for the LSA and Figure 13.17 on page 13-55 in Section 13 of the EIS for the RSA) for Birds, Other Wildlife and their Habitats and Protected Areas. The extent of the LSA and RSA delineated the area used to evaluate the farthest measurable effect of the Project on Birds.

1.1.31 Information Request No. EC 31

The provided explanation does not sufficiently detail why the regional study areas for wetlands and birds are not similar. The report should discuss the effects of this scale difference upon the analysis of the project's effects upon the migratory birds VEC.

Alderon Response to IR No. EC 31

The identification of the Wetland Regional Study Area (RSA) was based on the extent of existing watershed boundaries and stream layers from digital datasets in GIS format, consistent with the objectives of the Study. Watershed boundaries are typically defined by topographic divides and delineate areas where surface water runoff drains into surface waterbodies, including lakes, ponds, rivers, streams, and wetlands. Effects on topography, local hydrology, and surface water (including wetlands) associated with Rose Pit and the Rose North Waste Rock Disposal Area for example are located east of the provincial topographic divide and therefore primarily restricted to Newfoundland and Labrador. "*With respect to groundwater, preliminary assessment suggests that the effects of mine dewatering will be limited to the watershed hosting the open pit, with drawdown effects not expected to extend more than 1500 m from the open pit mine* (EIS, Volume 1, Chapter 16, pg. 16-80)." Adverse effects on wetlands in the area of Lac Daviault, Fermont, and beyond are not anticipated.

In terms of the Birds, Other Wildlife and their Habitats, and Protected Areas VEC, the RSA includes the mechanism for the 'transmission' of direct effects from surface disturbance and indirect effects such as noise or visual emissions differs from that of surface or ground water (as in the Wetlands VEC). Recognizing the movements of species within and adjacent to the Local Study Area (LSA), a different RSA was selected that encloses a reasonable 'population' from which the interactions of the Project may be evaluated.

1.1.32 Information Request No. EC 32

Further information should be provided to EC-CWS and detailed in the report. The survey methodology should be fully described, and should include site selection protocols, habitat considerations, amount of times surveyed, etc. It should be noted that insufficient detail or improper methods may result in the need for additional migratory bird surveys in order to determine effects of the project on the migratory bird VEC.

Alderon Response to IR No. EC 32

A general overview of the methods used for songbird and waterfowl surveys is provided below. A full, detailed description of survey methods is provided in Appendix C and Appendix D.

Methods for Songbirds Surveys

Field Sampling Methods

Several field-based survey programs were completed during 2011 and 2012 to gain additional knowledge on the distribution and abundance of songbirds within the Study Area and surrounding area. The 2011 breeding songbird surveys occurred June 27 through July 1, at a time when migrants had returned to the area, based on the presence of Yellow-bellied Flycatchers (*Empidonax flaviventris*), typically a late arriving migrant. The 2012 breeding songbird surveys occurred July 2 through July 8.

The field crew conducted a series of 10-minute point count surveys at four locations of interest spaced at least 300 m apart, recording each waypoint with a handheld GPS unit. Surveys commenced at dawn (approximately 0515 hours) and, with the exception of one day in 2012, no point counts were initiated after 0900 hours, due to documented declines in the frequency of song later in the morning (Ralph et al. 1993). All birds heard or seen during this period were recorded on a field data sheet by the ornithologist in distance categories of less than 50 m, 50 m to 100 m, and greater than 100 m. Vegetation data, including forest, shrub, and ground cover species, were recorded. Photos of habitat were taken at each point count. Data were organized by birds heard and/or seen during two consecutive 5-minute surveys at each point count. As these surveys rely on auditory cues, poor weather (i.e., precipitation and/or windy conditions) resulted in a delay (or postponement for that day) until conditions improved.

High winds (winds ranking greater than 3 on the Beaufort Scale) and heavy rain adversely affect the observers' ability to detect avian species. Bibby et al. (2000) recommend the restriction of point counts to wind conditions of Beaufort 3 and below, with a preference for Beaufort 2 and below if possible, and to avoid counting in precipitation exceeding occasional light drizzle or brief showers.

Data Analysis

Field data from the survey sites were entered electronically into a database (i.e., Microsoft Excel) for summary and analysis. There were two analyses conducted: 1) the data were input into a species diversity calculation; and 2) the avifauna community was described by ecotype in the study area.

Quality Assurance / Quality Control Procedures

To facilitate consistent delivery of high quality products and services, Stassinu Stantec developed and implemented a Quality Management System (QMS) within its operations. The

QMS is registered to International Organization for Standardization 9001:2000 (QMS - Requirements) by QMI Management Systems, Registration (CERT-0011312:026332).

An in-house technical review process was conducted by senior technical reviewers to confirm the resulting report and the data within it adequately addressed the work scope and conformed to the quality requirements stipulated by Stassinu Stantec. In addition, the report was reviewed by Gord Parsons, a local naturalist with extensive knowledge of the area and its species.

Methods for Waterfowl Surveys

<u>Field Surveys</u>

Nine aerial surveys for waterfowl were conducted from late May through mid-September 2011. Surveys were designed to assess the distribution and abundance of the migratory waterfowl as they moved through or remained during three periods of activity:

- Spring Staging and Breeding Pairs – three surveys completed on May 20, May 31, and June 8-9;
- Brood Rearing – two surveys completed on July 12 and July 27;
- Fall Staging – four surveys completed on August 17, August 24-25, September 8, and September 14-15.

Field maps were prepared from GIS data showing wetlands and proposed Project features and were used in combination with 1:50,000 National Topographic Series map. The Study Team attempted to search all areas of open water and/or potential habitat within the 400 km^2 Study Area.

Prior to departure by helicopter, the Survey Team reviewed Stantec's Health and Safety Checklist and discussed related issues and contingencies in the event of an incident. Similarly, the pilot reviewed safety procedures prior to the commencement of each survey. Each survey team comprised three observers and a helicopter pilot who would assist with observations. Field observations were keyed to American Ornithological Union (AOU) abbreviations for consistency. Although not taxonomically considered a species of waterfowl (i.e., not belonging to the Order Anseriformes), Common Loon were included as such in this report due to their similar ecology and use of wetland habitats.

Aerial surveys were usually conducted during a single day when visibility and wind conditions were suitable (i.e., near sunrise or sunset with light winds and no precipitation). Aircraft speed did not exceed 130 km/h (70 knots) and altitude was maintained below 60 m (200 ft) above ground level (agl). While techniques were similar throughout the nine surveys, logistical considerations (e.g., availability of helicopter, accommodations) influenced the model of helicopter employed, and consequently the pilot and crew member availability. Three different helicopter models were used during the course of nine surveys, including Bell 206 Long Ranger equipped with bubble windows, A-Star, and Eurocopter EC-120.

Data Analysis

During spring surveys, there was documentation of the population structure of waterfowl species in terms of the number of females, males, and immature individuals observed. Breeding pairs were determined using 'indicated pairs' (calculated as observed pairs plus calculated pairs, which equals lone males plus males in groups of four or less) (Dzubin 1969) to distinguish individuals that likely breed in a given area. Spacing between individuals, group size, and behaviour were used in making this determination.

A compilation of all sightings were documented with GPS locations for entry into a GIS. Data were organized by survey and by species over the nine surveys indicating presence, activity, and habitat use over the course of the study. Abundance was derived from summaries of aerial surveys. Observations of other wildlife were also recorded on each survey and are presented in a series of maps.

Quality Assurance / Quality Control Procedures

To facilitate consistent delivery of high quality products and services, Stassinu Stantec developed and implemented a Quality Management System (QMS) within its operations. Observations in particular were checked against field data to ensure accuracy. The QMS is registered to International Organization for Standardization 9001:2000 (QMS - Requirements) by QMI Management Systems Registration (CERT-0011312:026332).

An in-house technical review process was conducted by senior technical reviewers to confirm the resulting report and the data within it adequately addressed the work scope and conformed to the quality requirements stipulated by Stassinu Stantec. In addition, the report was reviewed by Gord Parsons, a local naturalist with extensive knowledge of the area and its species.

References:

Bibby, C.J., N.D. Burgess, D.A. Hill and S. Mustoe. 2000. Bird Census Techniques, Second Edition. Academic Press.

Dzubin, A. 1969. Assessing breeding populations of ducks by ground counts. Saskatoon Wetlands Seminar. Canadian Wildlife Service Report Series No. 6: 178-230.

Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Handbook of field methods for monitoring landbirds. U.S. Dep. Agric. For. Serv. PSW-GTR-144, Albany, CA. 41 pp.

1.1.33 Information Request No. EC 33

Further information should be provided to EC-CWS and detailed in the report. The survey methodology should be fully described, and should include site selection protocols, habitat considerations, amount of times surveyed, etc. It should be noted that insufficient detail or improper methods may result in the need for additional migratory bird surveys in order to determine effects of the project on the migratory bird VEC.

Alderon Response to IR No. EC 33

A general overview of the methods used for songbird and waterfowl surveys is provided below. A full, detailed description of methods is provided in Appendix C and Appendix D.

Methods for Songbirds Surveys

Field Sampling Methods

Several field-based survey programs were completed during 2011 and 2012 to gain additional knowledge on the distribution and abundance of songbirds within the Study Area and surrounding area. The 2011 breeding songbird surveys occurred June 27 through July 1, at a time when migrants had returned to the area, based on the presence of Yellow-bellied Flycatchers (*Empidonax flaviventris*), typically a late arriving migrant. The 2012 breeding songbird surveys occurred July 2 through July 8.

The field crew conducted a series of 10-minute point count surveys at four locations of interest spaced at least 300 m apart, recording each waypoint with a handheld GPS unit. Surveys commenced at dawn (approximately 0515 hours) and, with the exception of one day in 2012, no point counts were initiated after 0900 hours, due to documented declines in the frequency of song later in the morning (Ralph et al. 1993). All birds heard or seen during this period were recorded on a field data sheet by the ornithologist in distance categories of less than 50 m, 50 m to 100 m, and greater than 100 m. Vegetation data, including forest, shrub, and ground cover species, were recorded. Photos of habitat were taken at each point count. Data were organized by birds heard and/or seen during two consecutive 5-minute surveys at each point count. As these surveys rely on auditory cues, poor weather (i.e., precipitation and/or windy conditions) resulted in a delay (or postponement for that day) until conditions improved.

High winds (winds ranking greater than 3 on the Beaufort Scale) and heavy rain adversely affect the observers' ability to detect avian species. Bibby et al. (2000) recommend the restriction of point counts to wind conditions of Beaufort 3 and below, with a preference for Beaufort 2 and below if possible, and to avoid counting in precipitation exceeding occasional light drizzle or brief showers.

Data Analysis

Field data from the survey sites were entered electronically into a database (i.e., Microsoft Excel) for summary and analysis. There were two analyses conducted: 1) the data were input into a species diversity calculation; and 2) the avifauna community was described by ecotype in the study area.

Quality Assurance / Quality Control Procedures

To facilitate consistent delivery of high quality products and services, Stassinu Stantec developed and implemented a Quality Management System (QMS) within its operations. The QMS is registered to International Organization for Standardization 9001:2000 (QMS - Requirements) by QMI Management Systems, Registration (CERT-0011312:026332).

An in-house technical review process was conducted by senior technical reviewers to confirm the resulting report and the data within it adequately addressed the work scope and conformed to the quality requirements stipulated by Stassinu Stantec. In addition, the report was reviewed by Gord Parsons, a local naturalist with extensive knowledge of the area and its species.

Methods for Waterfowl Surveys

Field Surveys

Nine aerial surveys for waterfowl were conducted from late May through mid-September 2011. Surveys were designed to assess the distribution and abundance of the migratory waterfowl as they moved through or remained during three periods of activity:

- Spring Staging and Breeding Pairs – three surveys completed on May 20, May 31, and June 8-9;
- Brood Rearing – two surveys completed on July 12 and July 27;
- Fall Staging – four surveys completed on August 17, August 24-25, September 8, and September 14-15.

Field maps were prepared from GIS data showing wetlands and proposed Project features and were used in combination with 1:50,000 National Topographic Series map. The Study Team attempted to search all areas of open water and/or potential habitat within the 400 km^2 Study Area.

Prior to departure by helicopter, the Survey Team reviewed Stantec's Health and Safety Checklist and discussed related issues and contingencies in the event of an incident. Similarly, the pilot reviewed safety procedures prior to the commencement of each survey. Each survey team comprised three observers and a helicopter pilot who would assist with observations. Field observations were keyed to American Ornithological Union (AOU) abbreviations for consistency. Although not taxonomically considered a species of waterfowl (i.e., not belonging to the Order Anseriformes), Common Loon were included as such in this report due to their similar ecology and use of wetland habitats.

Aerial surveys were usually conducted during a single day when visibility and wind conditions were suitable (i.e., near sunrise or sunset with light winds and no precipitation). Aircraft speed did not exceed 130 km/h (70 knots) and altitude was maintained below 60 m (200 ft) above ground level (agl). While techniques were similar throughout the nine surveys, logistical considerations (e.g., availability of helicopter, accommodations) influenced the model of helicopter employed, and consequently the pilot and crew member availability. Three different helicopter models were used during the course of nine surveys, including Bell 206 Long Ranger equipped with bubble windows, A-Star, and Eurocopter EC-120.

Data Analysis

During spring surveys, there was documentation of the population structure of waterfowl species in terms of the number of females, males, and immature individuals observed. Breeding pairs were determined using 'indicated pairs' (calculated as observed pairs plus calculated pairs, which equals lone males plus males in groups of four or less) (Dzubin 1969) to distinguish individuals that likely breed in a given area. Spacing between individuals, group size, and behaviour were used in making this determination.

A compilation of all sightings were documented with GPS locations for entry into a GIS. Data were organized by survey and by species over the nine surveys indicating presence, activity, and habitat use over the course of the study. Abundance was derived from summaries of aerial surveys. Observations of other wildlife were also recorded on each survey and are presented in a series of maps.

Quality Assurance / Quality Control Procedures

To facilitate consistent delivery of high quality products and services, Stassinu Stantec developed and implemented a Quality Management System (QMS) within its operations. Observations in particular were checked against field data to ensure accuracy. The QMS is registered to International Organization for Standardization 9001:2000 (QMS - Requirements) by QMI Management Systems Registration (CERT-0011312:026332).

An in-house technical review process was conducted by senior technical reviewers to confirm the resulting report and the data within it adequately addressed the work scope and conformed to the quality requirements stipulated by Stassinu Stantec. In addition, the report was reviewed by Gord Parsons, a local naturalist with extensive knowledge of the area and its species.

References:

Bibby, C.J., N.D. Burgess, D.A. Hill and S. Mustoe. 2000. Bird Census Techniques, Second Edition. Academic Press.

Dzubin, A. 1969. Assessing breeding populations of ducks by ground counts. Saskatoon Wetlands Seminar. Canadian Wildlife Service Report Series No. 6: 178-230.

Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Handbook of field methods for monitoring landbirds. U.S. Dep. Agric. For. Serv. PSW-GTR-144, Albany, CA. 41 pp.

1.1.34 Information Request No. EC 34

Common Nighthawk have been recorded in the Labrador City area (see website: http://eBird.org). The occurrence of the species as given in this section should be updated.

Alderon Response to IR No. EC 34

EIS, Volume 1, Chapter 13, page 13-69, paragraph 1, should read:

"There are three records of Common Nighthawk (Chordeiles minor) a threatened species under SARA, in the Labrador City Area. Observations of individuals were made in 2003, 2006, and 2011 proximate to the Town of Labrador City and the Trans Labrador Highway (G. Parsons, http://ebird.org/ebird/map/)."

Reference:

Parsons, G. Naturalist in Labrador West, Newfoundland and Labrador. Correspondence in 2011-2012.

1.1.35 Information Request No. EC 35

On October 11, 2012 (since the writing of the EIS documents), the Canadian Council of Ministers of the Environment (CCME) agreed to begin implementing a new Air Quality Management System. Details can be found at: http://www.ccme.ca/ourwork/air.html?category_id=146.

Alderon Response to IR No. EC 35

The comment is noted. Alderon is committed to being a responsible corporate citizen in its environmental affairs. The Air Quality Management System comprises a shared responsibility of all industries within an airshed to work toward better ambient air quality, and includes standards of performance that Alderon support.

1.1.36 Information Request No. EC 36

Many of the control efficiency values presented in Table 14-27 appear to be quite high (e.g., 98 percent for road dust suppression) compared to common estimates (see US EPA AP-42). Since the mitigation design details have not been finalized, there is some possibility that the emissions used in the Air Modelling Study have been underestimated. We would request that more conservative, referenced values for control efficiencies be used or that a commitment be made to re-model once the design details are complete and a better estimate can be used.

Alderon Response to IR No. EC 36

Since issuing the EIS, more detailed and accurate information has become available regarding the processes and activities that have the potential to generate particulate emissions. Alderon has conducted additional air dispersion modelling for total suspended particulate (TSP), particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), based on refined input data and dust control measures. In refining the model input data and dust control measures related to the fugitive release of particulate matter during Project operations each input was thoroughly reviewed by Stantec in consultation with Project design engineers.

Some of the refinements made during this review process include the following:

- Revised blasting area and number of blasts per year;
- Revised number of holes to be drilled per year;
- Revised haul truck travel route and traffic partitioning to both the north rose disposal area and the south rose disposal area;
- Modified assumptions regarding the amount of exposed area open to wind erosion on stockpiles following a disturbance;
- Enclosed reclaim tunnel with a dust collection system for the reclaim of crushed ore from the crushed ore stockpiles;
- Enclosed process plant feed systems within the process plant buildings;
- Wet ore processing within the process plants versus dry processing;
- Wet concentrate handling versus dry during final concentrate handling and conveying; and
- Revised silt content in tailings based on actual lab testing results.

Table 1.1.2 below lists the Project activities that will result in fugitive releases of dust, the refined mitigation measures that will be implemented to control the dust being emitted from that activity, the target control efficiency and the resulting estimated emission rates.

The maximum predicted ground level concentrations for TSP, PM_{10} and $PM_{2.5}$ at each discrete receptor location (cabin locations) based on modelling the refined set of inputs for the 1-hour, 24-hour and annual time averaging periods are presented in Table 1.1.3.

Table 1.1.2 Project Activities, Planned Mitigation and Particulate Emission Rates

Activity	Uncontrolled Emission Rate (g/s)			Planned Mitigation	Control Efficiency (%)	Controlled Emission Rate (g/s)		
	TPM	PM_{10}	$PM_{2.5}$			TSP	PM_{10}	$PM_{2.5}$
Blasting (annual)	1.61	0.837	0.0483	-	-	4.5	2.34	0.135
Drilling	0.331	0.331	0.331	-	-	0.662	0.662	0.662
Material Handling - Loading Mined Ore into Haul Trucks	1.09	0.516	0.078	-	-	1.09	0.516	0.078
Unpaved Road - Haul Truck Travel to Primary Crusher No.1	51.8	13.7	1.37	Dust Suppression / Vehicle Restrictions	98	1.036	0.274	0.0274
Unpaved Road - Haul Truck Travel to Primary Crusher No.2	68.6	17.5	1.75	Dust Suppression / Vehicle Restrictions	98	1.372	0.35	0.035
Material Handling - Unloading of Mined Ore to Gyratory Crusher	1.09	0.516	0.078	-	-	1.09	0.516	0.078
Material Handling - Loading of Overburden/Waste Rock	2.34	1.11	0.168	-	-	2.34	1.11	0.168
Unpaved Road - Haul Truck Travel to Rose North Disposal Area	125.4	33.4	3.34	Dust Suppression / Vehicle Restrictions	98	2.508	0.668	0.0668
Unpaved Road - Haul Truck Travel to Rose South Disposal Area	551	146.7	14.7	Dust Suppression / Vehicle Restrictions	98	11.02	2.934	0.294
Material Handling - Unloading of Overburden/Waste Rock	2.34	1.11	0.168	-	-	2.34	1.11	0.168
Wind Erosion - Rose North Waste Pile	-	-	-	Assumes that at any given time only approximately 6% of the pile is exposed to wind erosion or contains newly deposited material.	94	0.009	0.004	0.002

Activity	Uncontrolled Emission Rate (g/s)			Planned Mitigation	Control Efficiency (%)	Controlled Emission Rate (g/s)		
	TPM	PM_{10}	$PM_{2.5}$			TSP	PM_{10}	$PM_{2.5}$
Wind Erosion - Rose East Waste Pile	-	-	-	Assumes that at any given time only approximately 6% of the pile is exposed to wind erosion or contains newly deposited material.	94	0.254	0.127	0.051
Wind Erosion - ROM Stockpile Small	-	-	-	Assumes that at any given time only approximately 6% of the pile is exposed to wind erosion or contains newly deposited material.	94	0.0002	0.0001	4.37E-05
Wind Erosion - ROM Stockpile Large	-	-	-	Assumes that at any given time only approximately 6% of the pile is exposed to wind erosion or contains newly deposited material.	94	0.002	0.001	0.0005
Crusher Buildings	0.807	0.41157	0.12105	Baghouse	-	0.807	0.41157	0.12105
Material Handling - Loading to Crusher Conveyor	80.7	40	40	Enclosed building with bag house / collection at transfer points.	99	0.807	0.4	0.4
Material Handling - Conveying to Crushed Ore Stockpile	80.7	40	40	Uncovered Conveyor / Undisturbed Material	99.9	0.0807	0.04	0.04
Material Handling - Stacking Conveyor	80.7	40	40	Minimize drop height/coarse material.	95	4.035	2	2
Wind Erosion - Crushed Ore Stockpile 1	-	-	-	Assumes that at any given time only approximately 6% of the pile is exposed to wind erosion or contains newly deposited material.	94	0.0003	0.0001	5.77E-05
Wind Erosion - Crushed Ore Stockpile 2	-	-	-	Assumes that at any given time only approximately 6% of the pile is exposed to wind erosion or contains newly deposited material.	94	0.0003	0.0001	5.77E-05
Material Handling - Reclaim of Crushed Ore from Stockpile	80.7	40	40	Enclosed in reclaim tunnel - dust collection with baghouse.	99	0.807	0.4	0.4

Activity	Uncontrolled Emission Rate (g/s)			Planned Mitigation	Control Efficiency (%)	Controlled Emission Rate (g/s)		
	TPM	PM_{10}	$PM_{2.5}$			TSP	PM_{10}	$PM_{2.5}$
Material Handling - Conveying of Reclaimed Crushed Ore to Process Plants	80.7	40	40	Uncovered Conveyor / Undisturbed Material.	99.9	0.0807	0.04	0.04
Feeding to Process Plants[2]	80.7	40	40	Enclosed in building with dust collection and is a wet process.	99.9	0.0807	0.040	0.040
Process Plants - Grinding/Screening[3]	Neg.	Neg.	Neg.	Wet process.	-	Neg.	Neg.	Neg.
Material Handling - Final Concentrate Loading to Conveyor	30.4	15.2	15.2	3.5% to 6% moisture - no dust collection.	99	0.304	0.152	0.152
Material Handling - Final Concentrate Conveying	30.4	15.2	15.2	Uncovered Conveyor / Undisturbed Moist Material	99.9	0.0304	0.0152	0.0152
Material Handling - Rail Car Loading	30.4	15.2	15.2	Baghouse on hopper - no dust collection at discharge chute - moist material.	99	0.304	0.152	0.152
Wind Erosion - Tailings Pond	-	-	-	-	94	6.14	3.07	1.23

Table 1.1.3 Maximum Predicted Ground Level Concentrations for Discrete Receptor Locations

Cabin ID	UTM E (m)	UTM N (m)	All Sources								
			TSP (µg/m^3)			PM_{10} (µg/m^3)			$PM_{2.5}$ (µg/m^3)		
			1 Hour	24 Hour	Annual	1 Hour	24 Hour	Annual	1 Hour	24 Hour	Annual
79	638143	5859198	87.7	29.0	2.3	72.5	20.1	1.6	39.6	10.7	0.8
85	638096	5860234	88.5	23.5	1.8	72.3	17.2	1.3	35.5	8.6	0.6
86	634649	5859985	154.6	30.4	2.2	122.8	22.9	1.6	63.9	11.2	0.7
87	638121	5860165	89.3	24.2	1.9	73.0	17.7	1.4	36.0	8.9	0.6
89	638022	5859898	85.7	23.9	1.9	72.7	17.2	1.4	34.5	8.6	0.6
90	638179	5859442	83.3	26.8	2.1	72.5	19.0	1.5	35.5	9.9	0.7
91	636207	5859604	83.6	20.8	1.6	65.0	14.6	1.1	39.9	9.0	0.6
92	636581	5859380	133.3	28.0	2.4	94.4	18.7	1.6	49.6	10.3	0.7
94	634510	5859647	153.6	33.0	2.4	121.8	24.8	1.7	66.7	11.9	0.7
95	634678	5859495	163.1	35.5	2.5	124.6	26.4	1.8	71.8	12.8	0.8
96	636304	5859415	96.6	23.6	1.8	73.6	16.4	1.2	46.3	10.1	0.6
97	636640	5859182	122.0	26.6	2.3	88.6	17.5	1.6	46.3	9.7	0.7
98	637947	5858833	98.2	30.7	2.6	78.2	20.6	1.7	46.5	11.1	0.9
99	636610	5859072	116.9	25.1	2.3	77.1	16.4	1.4	44.1	9.5	0.7
100	637941	5858760	100.2	31.4	2.6	79.3	20.9	1.8	47.9	11.4	0.9
101	636443	5858875	107.4	26.0	2.1	77.9	17.4	1.4	52.4	11.3	0.7
102	637892	5858730	100.0	30.6	2.6	78.7	20.3	1.8	48.0	11.0	0.9
103	636583	5858537	95.7	24.9	2.3	68.7	16.1	1.4	50.7	10.5	0.8
104	637858	5858700	103.0	31.1	2.7	80.7	20.5	1.8	49.7	11.1	0.9
105	637523	5858525	103.4	28.5	2.7	77.3	18.0	1.8	53.7	9.6	0.9
106	636312	5857907	116.1	30.6	2.8	80.8	18.6	1.7	60.9	14.9	0.9
107	636542	5858958	110.3	25.5	2.2	74.1	17.0	1.4	48.8	10.5	0.7

Cabin ID	UTM E (m)	UTM N (m)	All Sources								
			TSP (µg/m³)			PM_{10} (µg/m³)			$PM_{2.5}$ (µg/m³)		
			1 Hour	24 Hour	Annual	1 Hour	24 Hour	Annual	1 Hour	24 Hour	Annual
110	641281	5858271	203.0	45.4	3.2	167.5	34.1	2.3	76.8	14.3	1.1
112	641268	5858220	194.4	44.4	3.2	160.0	33.2	2.3	73.4	13.9	1.1
113	636120	5858266	131.9	30.1	2.7	95.0	19.2	1.7	69.5	14.2	0.9
114	636120	5858107	151.6	33.1	2.9	106.1	22.2	1.9	78.7	16.4	1.0
115	641256	5858126	199.2	45.4	3.3	162.8	33.8	2.4	73.8	14.1	1.1
116	637564	5858087	130.1	33.1	3.3	93.4	20.2	2.1	68.7	11.5	1.2
117	637567	5858027	137.9	34.7	3.4	98.1	21.1	2.2	72.8	12.2	1.2
118	636142	5858000	149.6	32.9	3.0	102.3	21.8	1.9	77.5	16.4	1.0
129	643361	5857543	129.7	24.3	2.2	108.2	19.4	1.7	43.1	9.0	0.7
121	640971	5858278	207.1	48.1	3.4	169.3	35.6	2.5	78.4	14.9	1.2
122	636155	5857880	147.1	32.6	3.1	99.0	21.4	1.9	76.1	16.3	1.0
124	640790	5857815	242.9	57.8	4.2	189.4	41.1	3.0	83.3	17.6	1.5
126	636113	5857736	175.7	39.7	3.4	116.1	26.0	2.1	91.3	20.0	1.2
128	636076	5857545	181.2	44.1	3.7	129.3	28.5	2.3	104.3	22.2	1.2
120	640785	5857909	248.7	58.4	4.2	195.2	41.7	3.0	86.5	17.4	1.4
130	637458	5857492	141.9	40.4	4.2	92.7	22.5	2.5	75.6	15.1	1.5
131	636020	5857328	171.9	40.5	3.9	131.2	25.7	2.3	106.1	19.9	1.3
133	641547	5857428	198.6	42.4	3.5	173.5	31.5	2.7	68.3	14.5	1.2
134	641832	5857274	192.5	38.7	3.5	154.7	29.3	2.6	59.4	13.5	1.1
135	636107	5857197	157.5	35.8	3.9	118.1	22.2	2.3	96.6	17.6	1.2
136	636085	5857085	175.8	39.2	4.2	130.3	24.2	2.5	105.5	18.8	1.3
137	641798	5857046	201.5	41.3	3.7	159.9	30.9	2.7	61.8	14.1	1.1
138	636911	5856921	232.3	52.9	6.1	149.5	31.0	3.4	138.5	27.0	2.4
139	636086	5857040	169.1	40.3	4.2	123.7	24.0	2.5	100.7	18.6	1.3

Cabin ID	UTM E (m)	UTM N (m)	All Sources								
			TSP (µg/m³)			PM₁₀ (µg/m³)			PM₂.₅ (µg/m³)		
			1 Hour	24 Hour	Annual	1 Hour	24 Hour	Annual	1 Hour	24 Hour	Annual
140	636116	5856825	176.7	53.4	4.9	124.6	30.8	2.8	100.3	24.6	1.5
141	637251	5856653	273.2	127.3	9.8	168.8	65.8	5.3	157.9	58.7	4.1
142	636333	5856540	197.5	72.8	5.8	123.5	39.8	3.3	108.2	33.8	1.9
143	636571	5855889	392.8	87.1	9.5	258.5	48.4	5.1	241.6	45.3	3.0
146	636377	5856488	213.1	79.3	6.2	131.9	43.0	3.4	116.4	36.9	2.0
144	636394	5856120	396.8	151.0	9.0	265.6	91.1	4.8	247.6	83.0	2.7
145	636340	5856300	336.8	116.1	8.5	229.2	73.7	4.7	212.7	66.2	2.7
147	634667	5855402	457.6	118.8	9.1	334.1	81.8	5.7	117.7	26.0	1.9
149	634546	5855504	504.9	130.5	10.4	355.3	87.2	6.3	144.5	31.3	2.3
150	636889	5855883	372.5	143.6	11.8	234.4	73.3	6.3	221.8	73.2	4.8
151	634622	5855529	510.1	137.7	10.2	345.0	89.6	6.1	124.0	28.4	2.0
153	634714	5855771	591.8	186.7	12.8	365.4	105.0	6.9	124.5	34.0	2.3
154	636977	5855810	374.8	96.6	12.1	237.8	49.0	6.4	224.4	49.0	4.9
158	636719	5855716	311.6	87.6	9.6	208.3	45.6	5.2	193.6	45.6	3.3
167	641794	5855094	240.4	46.9	3.8	200.2	33.9	2.6	78.3	13.4	1.1
168	637470	5854747	134.0	34.7	5.5	103.8	22.7	3.3	69.8	18.1	1.6
170	637486	5854714	133.6	35.3	5.5	103.7	23.1	3.3	69.5	17.7	1.6
176	637584	5853982	111.7	34.4	4.2	83.7	23.2	2.6	44.1	12.2	1.1
179	634680	5853241	218.9	32.3	4.7	114.4	21.4	2.4	53.7	10.3	0.8
184	633405	5852612	133.2	26.5	1.8	114.0	21.0	1.3	53.0	9.0	0.5
191	634831	5851658	107.1	25.7	1.9	92.8	19.9	1.3	44.5	9.4	0.6
192	635111	5851137	110.4	25.0	1.7	94.5	19.3	1.2	45.1	8.9	0.5
193	635155	5851046	117.2	26.5	1.7	99.8	20.4	1.2	47.4	9.3	0.5
194	632625	5851130	91.9	21.1	1.2	80.8	17.7	0.9	35.0	7.9	0.4

Cabin ID	UTM E (m)	UTM N (m)	All Sources								
			TSP ($\mu g/m^3$)			PM_{10} ($\mu g/m^3$)			$PM_{2.5}$ ($\mu g/m^3$)		
			1 Hour	24 Hour	Annual	1 Hour	24 Hour	Annual	1 Hour	24 Hour	Annual
195	633169	5850770	83.9	21.2	1.2	73.7	17.6	0.9	33.4	8.3	0.4
196	635473	5850235	97.7	20.5	1.3	83.8	15.9	0.9	39.8	7.2	0.4
197	636055	5849778	100.4	17.1	1.3	87.1	14.1	1.0	35.4	6.1	0.4
199	635107	5848978	77.9	18.4	0.9	68.7	15.2	0.7	32.1	6.9	0.3
200	635065	5848939	76.8	18.3	0.9	67.8	15.2	0.7	31.7	6.9	0.3
201	634313	5848305	64.1	16.2	0.8	58.2	13.8	0.6	26.3	6.4	0.3
306	637543	5856841	204.1	83.5	7.2	118.9	44.4	4.1	99.0	39.5	2.8
308	636827	5855954	384.3	134.8	12.3	236.7	68.7	6.5	224.2	68.6	4.9
309	638211	5859648	84.4	27.4	2.1	74.1	19.6	1.5	35.5	10.2	0.7
310	637489	5858449	106.8	29.0	2.8	78.5	18.2	1.8	55.8	9.8	1.0
312	634694	5853216	195.5	31.3	4.3	110.1	21.3	2.3	52.4	10.3	0.8
313	641288	5858122	218.8	48.1	3.4	178.6	35.8	2.5	80.3	14.9	1.2
314	641447	5857463	184.6	41.6	3.5	145.8	30.1	2.5	64.5	13.8	1.2
315	641866	5856392	247.5	49.9	4.3	198.9	38.1	3.1	78.7	16.6	1.2
316	630917	5856047	364.7	62.9	4.1	290.6	48.5	3.3	76.1	17.5	0.8
317	630872	5856089	348.1	59.9	3.9	276.5	46.4	3.1	66.1	16.6	0.7
318	630961	5859399	257.4	31.2	2.3	202.2	23.9	1.9	54.6	8.0	0.5
319	630451	5858893	301.1	35.1	2.9	258.0	26.5	2.5	54.2	7.3	0.5
320	630263	5858739	313.0	33.6	3.1	268.4	25.5	2.6	46.0	6.9	0.4
NL Regulatory Limit			-	**120**	**60**	-	**50**	-	-	**25**	-

The maximum predicted 24-hour ground level concentrations for TSP, PM_{10} and $PM_{2.5}$ have also been graphically illustrated and are presented in Figures 1.1.5, 1.1.6 and 1.1.7, along with the locations of the discrete receptors (cabins).

As shown in Table 1.1.2 and Figures 1.1.5 to 1.1.7, the additional modelling conducted, based on the refined input data and control measures, has predicted results that are consistent with the results included within the EIS and supporting documentation. The revised results are more accurate in terms of input data, but the overall change from those in the EIS is not a major one. With the implementation of dust control measures, as presented in Table 1.1.2, the quality of life in Fermont, Wabush, and Labrador City is not predicted to be adversely affected by the operation of the Project.

The modelling results represented above are not based on the final mine plan, which continues to evolve, and once final, Alderon will model the particulate emissions based on final design details.

Figure 1.1.5 Maximum Predicted 24-hour Ground Level Concentrations - TSP

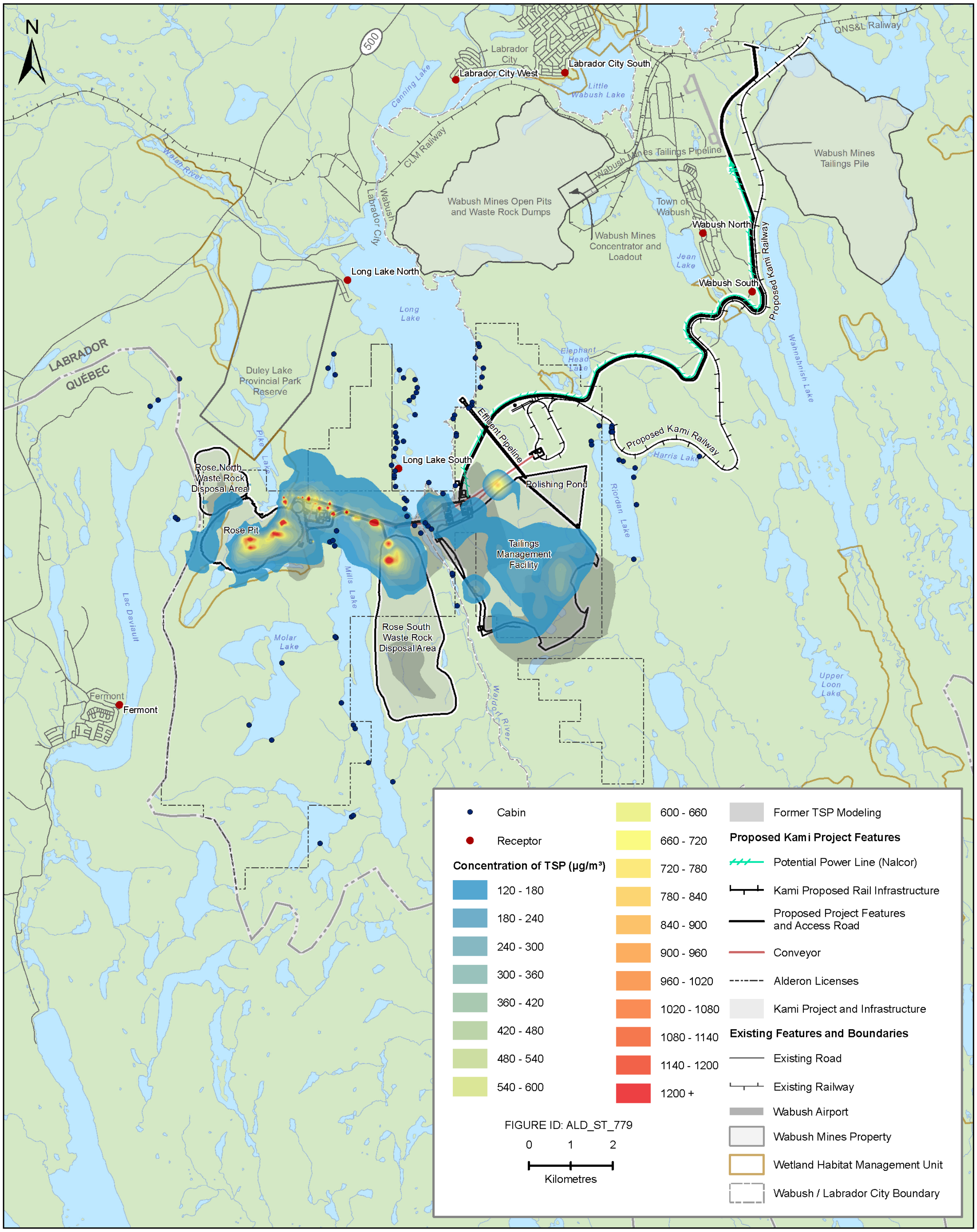


Figure 1.1.6 Maximum Predicted 24-hour Ground Level Concentrations – PM_{10}

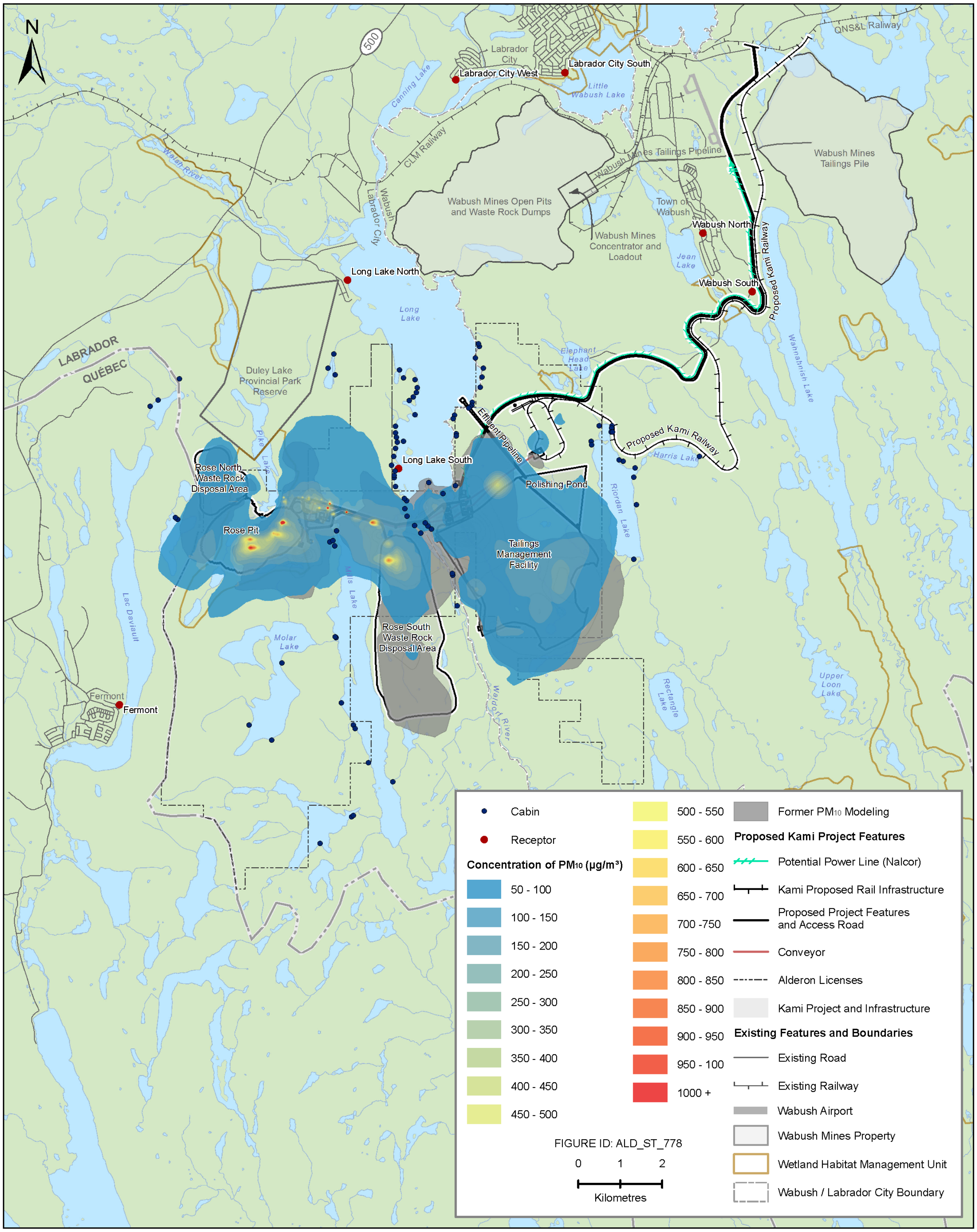
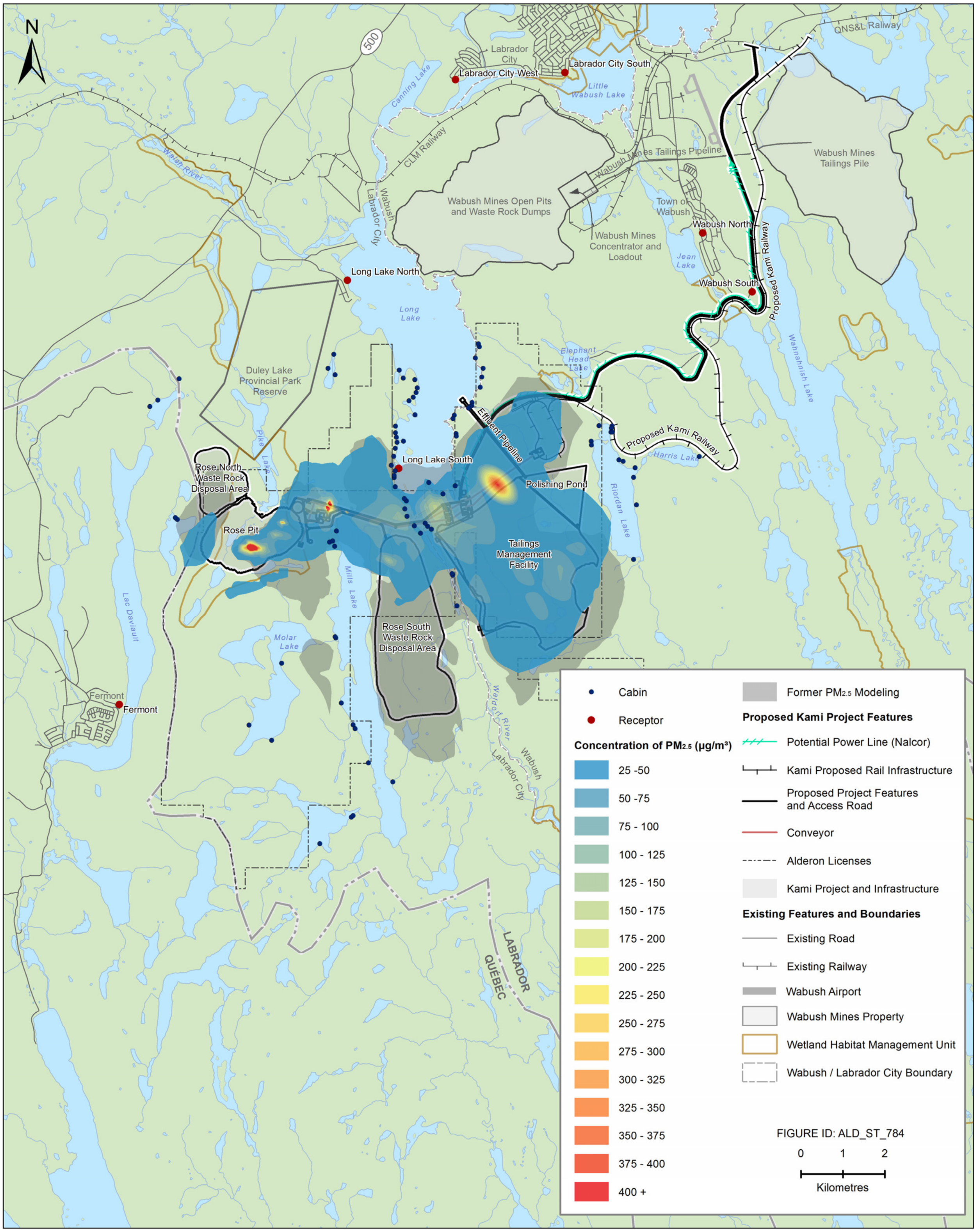


Figure 1.1.7 Maximum Predicted 24-hour Ground Level Concentrations – PM_{25}



1.1.37 Information Request No. EC 37

The Proponent is requested to provide information related to the long-term ARD/ML potential for drainage from waste rock and tailings.

Alderon Response to IR No. EC 37

Historical records of effluent water quality from waste rock and tailings of local iron ore mines that have been monitored for decades do not show any signs of ARD. The site-specific long-term ARD/ML potential is best evaluated through the implementation of kinetic tests – both laboratory and field-based. Results to date for initial humidity cell tests do not show any concerns for ARD/ML (Table 1.1.4). More humidity cells including tailings and barrel tests have recently been started and will be completed prior to mining. As described above, the appropriately-scaled kinetic tests (humidity cells, barrel tests) are being implemented and evaluated to assess worst case scenario weathering of sulphide-mineral containing materials (Mehinek formation) as well as mixtures of PAG/NAG materials in the overburden and waste rock piles. The final mitigation will take into consideration the results of these tests. The Proponent is willing to provide the results of these tests to Environment Canada for review if requested.

Table 1.1.4 Interim Humidity Cell Results

Analyte	Unit	Guidelines		Menihek, graphite-mica schist K64/5			Overburden, ROB11-18 #17 and ROB11-09 #23			Sokoman SIF, K66-14 and K24-8		
		MMER	CCME	Wk#10	Wk#15	Wk#20	Wk#10	Wk#15	Wk#20	Wk#10	Wk#15	Wk#20
Leachate Volume Recovered (mL)	mL	-	6.5-9.0	981	989	983	962	983	954	970	950	992
pH	units	-	-	7.16	6.80	6.52	7.43	7.39	7.05	7.03	6.94	7.12
Sulphate	mg/L	-	-	9.6	11	20	17	12	12	3.7	3.3	2.4
Mercury	mg/L	-	0.000026	0.00003	0.00001	< 0.00001	0.00005	0.00001	< 0.00001	< 0.00001	0.00001	0.00004
Silver	mg/L	-	0.0001	0.00028	0.00012	< 0.00001	0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Aluminum	mg/L	-	0.1	0.012	0.0125	0.0036	0.0029	0.0072	0.0084	0.0073	0.0153	0.008
Arsenic	mg/L	0.5	0.005	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002	0.0005	0.0005	0.0004
Barium	mg/L	-	-	0.0113	0.0132	0.0115	0.0348	0.0286	0.0215	0.0029	0.0022	0.0026
Beryllium	mg/L	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Boron	µg/L	-	-	0.0031	0.003	0.0013	0.0012	0.0019	0.0003	0.0021	0.0026	0.0009
Calcium	mg/L	-	-	4.77	5.61	6.15	9.85	8.31	6.88	2.54	1.8	3.02
Cadmium	mg/L	-	0.00004	< 0.000003	0.000009	0.000009	0.000011	0.000024	0.000008	< 0.000003	0.000015	< 0.000003
Cobalt	mg/L	-	0.004	0.000093	0.000127	0.000095	0.000661	0.000366	0.000339	0.000119	0.000062	0.000301
Chromium	mg/L	-	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Copper	mg/L	0.3	0.0028	< 0.0005	0.0005	< 0.0005	0.0007	0.0006	0.0008	< 0.0005	< 0.0005	< 0.0005
Iron	mg/L	-	0.3	< 0.003	< 0.003	0.019	< 0.003	< 0.003	0.007	< 0.003	0.004	0.01
Potassium	mg/L	-	-	0.875	0.855	0.776	3	2.61	2.14	0.862	0.737	0.604
Magnesium	mg/L	-	-	2.52	2.67	2.76	2.19	1.98	1.73	1.2	0.943	1.1
Manganese	mg/L	-	-	0.0177	0.0323	0.0126	0.248	0.163	0.15	0.00693	0.00427	0.158
Molybdenum	mg/L	-	0.073	0.00099	0.00049	0.00017	0.00086	0.00099	0.001	0.00116	0.00086	0.0005
Sodium	mg/L	-	-	0.03	0.03	0.03	0.07	0.07	0.07	0.06	0.05	0.04
Nickel	mg/L	0.5	0.113	0.0006	0.0011	0.0005	0.0021	0.0013	0.0016	0.0006	0.0003	0.0011
Lead	mg/L	0.2	0.0063	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	0.00003	< 0.00002	0.00003
Selenium	mg/L	-	0.001	0.001	0.001	0.002	0.006	< 0.001	0.003	< 0.001	< 0.001	< 0.001
Silicon	mg/L	-	-	0.26	0.29	0.23	1.04	0.92	0.74	0.32	0.28	0.26
Tin	mg/L	-	-	0.00022	0.00018	0.00022	0.00025	0.00023	0.0003	0.0004	0.00034	0.00023
Thallium	mg/L	-	0.0008	< 0.00002	< 0.00002	< 0.00002	0.00003	0.00004	0.00004	< 0.00002	< 0.00002	< 0.00002
Uranium	mg/L	-	0.015	0.00736	0.00827	0.00254	0.00105	0.000801	0.00068	0.00218	0.00105	0.0018
Vanadium	mg/L	-	-	0.00011	0.00006	< 0.00003	0.00005	0.00004	< 0.00003	0.00003	0.00018	< 0.00003
Zinc	mg/L	0.5	0.03	0.005	0.003	0.004	0.003	0.003	0.003	< 0.002	< 0.002	0.023

Notes:
MMER - *Metal Mining Effluent Regulations* (2002); CCME FAL - Canadian Council of Ministers of the Environment for Freshwater Aquatic Life (1999)
CCME FAL values for Cd, Cu and Ni were calculated based on hardness 125 mg/$CaCO_3$

1.1.38 Information Request No. EC 38

Environment Canada asks that the Proponent provide further details on how they plan to treat the discharge from the pit in order to meet MMER discharge criteria should they encounter ARD/ML during mine operations, closure and post-closure.

Alderon Response to IR No. EC 38

Figure 1.1.1 displays the Final Discharge Points (FDP) and sediment ponds where waste water will be tested and treated, if required before release.

If ongoing water quality modeling and subsequent monitoring of mine effluent during mine development show potential effects from ARD/ML, the Proponent is committed to treating the Pit discharge to meet MMER discharge criteria (EIS Vol.1, Section 15.6.4).

There are many treatment options that can be employed to treat ARD/ML during operations and for the Kami Project, this would likely include an active chemical treatment system at the sedimentation pond location for treatment of open pit dewatering. This would require a lime treatment plant and settling pond for resulting sludges prior to discharge of compliant effluent to the environment. At closure, it is likely that the treatment system would need to be operated until the areas of exposed ARD wall rock are flooded within the open pit lake and the ARD reaction is slowed by water cover. Additional test work, modeling, and analysis will be required to predict the duration of treatment after closure, once it is determined if ARD/ML will be an issue.

1.1.39 Information Request No. EC 39

The various types of surface water analyses have been performed using generally accepted hydrologic and hydraulic engineering methods, and are also generally well documented.

A few minor comments and requests for clarification or further information follow.

The log-Pearson Type III (LPIII) distribution is usually used for flood peaks, since flood data usually has a positive coefficient of skew. Low flow data typically has a negative coefficient of skew. Generally, other distributions may be more appropriate for low flow frequency analyses, although the LPIII does have a case for negative skews. Is there available documentation for the DFLOW software?

It is suggested that the text on page 16-47 that reads as follows requires some clarification as the meaning is a bit unclear: "*This approach accounted for the fact that larger watersheds are more hydraulically efficient and have higher total streamflow coefficients than smaller watersheds*".

Page 16-52, Flood Flow Assessment. Prorating by simply using drainage areas will tend to underestimate flood peaks for smaller drainage areas. This was confirmed by the comparison of results with the work of Rollings (DOEC). Assume we define a parameter, specific mean annual flood (or another t-year event) as the peak flow divided by drainage area. The specific mean annual flood will increase with decreasing drainage area. If one simply prorates on the basis of drainage area, then the specific peak flow (mean annual, etc.) will remain constant for all drainage areas. In other words, if one put this into a linear relationship, i.e., peak flow versus drainage area, the slope would be less than 1.0.

Alderon Response to IR No. EC 39

Low Flow Assessment

DFLOW 3.1 is a Windows-based tool developed by the USEPA (United States Environmental Protection Agency) to estimate user selected stream flows for low flow analysis. DFLOW incorporates the USGS implementation of the log Pearson Type III frequency curve approach and EPA's biologically-based stream design flow technique. The following references describe details of log Pearson Type III method and the use of DFLOW:

- Rossman, L. DFLOW USER'S MANUAL. U.S. Environmental Protection Agency, Washington, D.C., EPA/600/8-90/051 (NTIS PB90225616), 1990.
- Technical Support Document for Water Quality- based Toxics Control, 1991. EPA/505/2-90-001
- Technical Guidance Manual for Performing Waste Load Allocations, Book VI: Design Conditions – Chapter 1: Stream Design Flow for Steady-State Modeling, EPA Publication: 440/4-86-014, September 1986.
- Techniques of Water-Resources Investigations of the United States Geological Survey, Chapter B1- Low-Flow Investigations, USGS, 1972.
- More details can be found by accessing the DFLOW's website at http://water.epa.gov/scitech/datait/models/dflow/index.cfm.

Comment on hydraulic efficiency:

This statement is based on the observation that the total runoff coefficient for larger monitored watersheds used in the assessment and indicated in EIS, Volume 1, Chapter 16, Table 16.15 is much larger than that of smaller watersheds which is illustrated in the natural log relationship between smaller and larger regionally monitored watersheds drainage areas and their daily – monthly flows in Appendix G of Volume 1 of the EIS.

Flood Flow Assessment

There are no Environment Canada Hydrometric Monitoring stations within the RSA or around the RSA with long-term records for smaller watersheds (refer to EIS, Volume 1, Chapter 16, Table 16.15). Therefore, the flood flows in the LSA were estimated by prorating the flood flows estimated at Ashuanipi River using drainage areas. These flood flow estimates are provided for preliminary design purposes. During detailed design, detailed hydrologic modeling using standard hydrologic models (e.g., Visual OTTHYMO, HEC-HMS, or others) will be used to predict the peak flows for particular return period using watershed parameters such as drainage area, soil conditions, vegetation conditions, time of concentration, and climate information (Intensity-Duration-Frequency Curve). The predicted peak flows will be checked against modified index flow method (MIFM) estimates. The predicted peak flows will be used for designing culverts, stormwater ponds or other water conveyance or containment facilities.

1.1.40 Information Request No. EC 40

As seepage from the waste rock disposal area is to be collected in ditches and treated, the impact of this on the quantity of water entering Mills Lake should be determined and included in the analysis.

Alderon Response to IR No. EC 40

The Rose South Waste Rock Disposal Area (595 ha) is bordered by the Waldorf River to the east and Mills Lake to the west. Runoff from approximately 65 percent of the Rose South Waste Rock Disposal Area drains to the Waldorf River via small creeks and overland and approximately 35percent of the Rose South Waste Rock Disposal Area drains to the Mills Lake via overland under existing conditions.

The Rose South Waste Rock Rock Disposal area will be designed for progressive rehabilitation up to final closure using organic / overburden material. The waste rock disposal areas are planned to be completed in sections with clearing and grubbing carried out only on the next sections where waste rock is to be placed. The existing conditions drainage boundaries will be maintained as much as possible during the construction, operation and closure of the Rose South Waste Rock Disposal Area.

The Rose South Waste Rock Disposal Area Water Management Plan is illustrated in Figure 16.40 of Volume 1 of the EIS and includes the following:

- Perimeter ditches – to collect the surface runoff and direct to a sedimentation pond; and
- Sedimentation Pond – to provide water quality treatment by settling suspended sediment from runoff and quantity control for storm events up to 1:100 year.

Four perimeter ditches, PDC1, PDC2, PDC3 and PDC4 are proposed to collect 1:100 year runoff from the Rose South Waste Rock Disposal Area and divert runoff to the three sedimentation ponds as shown in Figure 16.40 of Volume 1 of the EIS.

- PDC1 will collect runoff from a 130 ha drainage area and discharge to sedimentation pond SP1.
- PDC2 will collect runoff from a 260 ha drainage area and discharge to sedimentation pond SP1.
- PDC3 will collect runoff from a 105 ha drainage area and discharge to sedimentation pond SP2.

- PDC4 will collect runoff from a 100 ha drainage area and discharge to sediment pond SP3.

The drainage area to Mills Lake is approximately 205 ha under existing conditions and will be maintained during operational conditions. The runoff coefficient will increase from approximately 0.63 in the existing conditions to 0.75 under operational conditions. This increase in runoff coefficient in the waste rock disposal area arises from several factors, including:

- Removal of vegetation resulting in less evapotranspiration;
- Increase in soil compaction from waste rock and overburden disposal process; and
- Surficial grading resulting in less surface storage.

Table 1.1.5 compares monthly runoff to the Mills Lake from the Rose South Waste Rock Disposal Area under existing and operational conditions.

Table 1.1.5 Comparison of Monthly Runoff to Mill Lake from the Rose South Waste Rock Disposal Area

Month	Runoff Volume (m^3)		% Change
	Existing Condition	Operation Condition	
Oct	99,833	118,849	19
Nov	97,508	116,081	19
Dec	70,387	83,794	19
Jan	64,575	76,875	19
Feb	50,369	59,963	19
Mar	69,999	83,333	19
Apr	67,029	79,796	19
May	69,870	83,179	19
June	107,582	128,074	19
July	149,943	178,504	19
Aug	139,095	165,589	19
Sept	121,918	145,140	19
Annual	**1,108,107**	**1,319,175**	**19**

The expected increase in runoff to Mills Lake from the Rose South Waste Rock Disposal Area is 19 percent under climate normal conditions. Runoff from the Rose South Waste Rock Disposal Area will be discharged to Mills Lake via two sedimentation ponds in a controlled manner. The expected change in the water levels and velocity are minimal due to the size of the Mills Lake and the lake's entire receiving watershed area. However, there will be velocity increases in local zones at sedimentation pond outlets to Mills Lake. Appropriate erosion protection will be provided at sedimentation pond outlets.

1.1.41 Information Request No. EC 41

The proponent should be aware that as part of its commitment to wetlands conservation, the Federal Government has adopted The Federal Policy on Wetland Conservation (FPWC) with its objective to "…*promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future*..." In support of this objective, the Federal Government strives for the goal of No Net Loss of wetland function on federal lands or when federal funding is provided. EC-CWS therefore recommends that the goals of the policy be considered in wetland areas, and EC-CWS recommends that that the hierarchical sequence of mitigation alternatives (avoidance, minimization, and as a last resort, compensation) recommended in FPWC is followed. Avoidance refers to elimination of adverse effects on wetland functions, by altering the siting or modifying the design of a project, and is the preferred option. In the event that avoidance is not possible, the reasons why elimination of adverse effects on wetland functions were not possible should be clearly demonstrated in environmental assessment documents, and EC-CWS should be contacted for advice on next steps to follow for compliance with the FPWC.

A copy of the FPWC can be found at: http://dsp-psd.communication.gc.ca/Collection/CW66-116-1991E.pdf.

EC-CWS recommends using a 30m buffer from the high water mark of any water body (1:100 year Flood Zone) in order to maintain movement corridors for migratory birds.

In order to promote wetland conservation EC-CWS recommends the following:

- Developments on wetlands should be avoided.
- Where development does occur in the vicinity of wetlands, a minimum vegetation buffer zone of 30 m should be maintained around existing wetland areas.
- Hydrologic function of the wetland should be maintained.
- Runoff from development should be directed away from wetlands.

Alderon Response to IR No. EC 41

The *Federal Policy on Wetland Conservation* (Environment Canada 1991) sets forth goals, principles, and strategies which are integrated into the existing federal mandates. Alderon acknowledges the *Federal Policy on Wetland Conservation* and the federal government's goal of "*no net loss*" of wetland function on all federal lands, on all waters, or on any other lands where an environmental assessment under *CEAA* is required. Alderon agrees in principle with the government's objective to "*promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, both now and in the future*". The hierarchy of mitigation options available for wetlands is also recognized, commencing with avoidance of adverse effects, minimization of unavoidable effects, and finally compensation for residual effects that cannot be minimized. Consistent with these goals, Alderon will develop a Wetland

Mitigation and Monitoring Plan as part of the EPP, incorporating this hierarchical progression of mitigation alternatives, where feasible.

In the context of the Project, the total avoidance of direct adverse effects on wetlands in the PDA is not possible due to the location of the ore body. However, a number of mitigative measures will be outlined in the EPP and will serve to minimize effects to wetlands, followed by the evaluation and management of effects and monitoring to assess the effectiveness of these measures. The mitigation and monitoring plan would serve to proactively determine if there are residual adverse effects on wetlands and wetland function as a result of Project construction and operations. Mitigation measures, including those identified by EC-CWS promoting wetland conservation, will be incorporated into the final design of the Project and outlined in the EPP for the Project, and thus applied during both the construction and operation phases.

At the EIS stage, detailed engineering information and as-built information is lacking, therefore a site specific Wetland Mitigation and Monitoring Plan can only be developed in general terms until Project design is completed. Alderon will develop a detailed Wetland Mitigation and Monitoring Plan in consultation with regulatory agencies, participating municipalities, and other stakeholders. The Wetland Mitigation and Monitoring Plan for the Project will be developed in accordance with Newfoundland and Labrador regulations related to wetlands and all conditions of approval for the Project. The Plan will be implemented through the Environmental Management System (EMS) as detailed in the Sustainability Management Framework as prepared for the Project.

A Wetland Mitigation and Monitoring Plan outlines the proposed methods and rationale for collecting consistent and accurate data from the Project mitigation area throughout the monitoring period (term determined on a site-by-site basis). The monitoring plan establishes a process for gauging if and when the site has met the success criteria or performance standards established for the Project. Execution of the monitoring plan provides an interim assessment of the mitigation site and identifies the need to implement corrective measures (adaptive management), such as supplemental plantings, treatment and removal of invasive and non-native species, diversion of surface run off and adjustments to water levels when needed.

An Wetland Mitigation and Monitoring Plan table of contents is provided in Appendix I. The final plan will be developed in conjunction with EC and NLDOEC.

1.1.42 Information Request No. EC 42

The EIS states that 46 ha of wetlands can be rehabilitated, and that 526 ha cannot be rehabilitated. Further detail as to why more wetland hectarage cannot be rehabilitated should be provided, and the rehabilitation of wetlands on-site should be further discussed in the document.

Alderon Response to IR No. EC 42

Owing to the nature of the Project, with an ore body dispersed throughout a significant depth from the bedrock and a requirement for open pit mining operations, Alderon acknowledges that there will be a loss of natural wetlands associated with the social and economic imperatives of developing the Project. However, avoidance and minimization of adverse effects to wetlands and their functions will be practised through development of final Project design and the EPP. Furthermore, wetlands will be rehabilitated where possible and the construction of wetlands will be considered where feasible.

As identified in the EIS (Volume 1, Chapter 17; Section 17.6.2; Table 17.8), development of the Project will result in clearing, filling, dredging or draining of wetlands, excavation of an open pit mine, and the construction of associated mine infrastructure, with resultant adverse effects on approximately 572 ha of wetlands and wetland function. A reasonably reliable and practical indicator of wetland function is wetland area, in part because of its relative ease of measure and close relationship to such functions as biodiversity conservation, habitat provision, improvement and maintenance of water quality, biological productivity and nutrient cycling, flood attenuation, groundwater recharge, and storm protection. By assessing the potential loss of wetland area, assumptions have been made regarding the total loss, alteration or degradation of a wetland's ability to carry out many of its functions, thereby providing an indirect measure of functional effects (Abbruzzese and Leibowitz, 1997). In adopting this approach for the EIS, the assumption has been made that the loss of wetland function will be highest in the areas of highest concentration of surface disturbance (i.e., the Project footprint) and, hence, greatest loss of wetland area.

A directly affected wetland is assumed to be the wetland area directly altered by the physical activities associated with surface disturbance (e.g., drainage, dredging, infilling, leveling, grading), for which wetland habitat (and therefore wetland function) is assumed to be lost, altered or severely degraded. These wetlands are likely to correlate with, or be in close proximity to, the area of direct surface disturbance, and as indicated in the EIS, Volume 1, Section 17.6.2 account for the permanent loss of approximately 526 ha of wetland and temporary alterations or disturbance to 46 ha. With an identified loss of wetlands and wetland function, due to topographic or hydrological pattern changes, or from soil movement (removal of soils and overburden) associated with Project construction, *in situ* reclamation opportunities associated with those wetlands are not considered practical. Rather than undergoing rehabilitation, a portion of those wetlands which will be permanently altered will be offset through compensation. When implementing compensatory wetland mitigation, there is a strong preference for the compensatory wetland to be constructed as near to the development site as possible, though this may not always be possible. Wetlands intercepted by such Project components as conveyors, power lines, access roads, and above ground pipelines will be rehabilitated, where practical. These wetlands are anticipated to maintain a level of wetland connectivity typically associated with linear developments requiring limited surface disturbance, and thus hydrologic function, thereby providing *in situ* opportunities for rehabilitation, accounting for approximately 46 ha of wetlands.

In accordance with the response to IR No. EC 41, the success of applicable mitigation alternatives is based on the ability of the Project to implement effective mitigation measures, as outlined in the EPP. As such, lost, altered, or degraded wetlands and their habitats and processes will be actively rehabilitated (progressive rehabilitation), to the extent that is practical.

Reference:

Abbruzzese, B. and S.G. Leibowitz. 1997. Environmental Auditing: A Synoptic Approach for Assessing Cumulative Impacts to Wetlands. Environmental Management. 21(3): 457-475.

1.1.43 Information Request No. EC 43

Details concerning the corporate stewardship agreement should be provided.

Alderon Response to IR No. EC 43

Alderon is currently in discussions with the Town of Labrador City concerning the negotiation of a Corporate Stewardship Agreement with the Municipality. This is a bilateral agreement between the Municipality and Alderon. Details outlining the conditions and proposed mitigations will be developed through negotiations.

Owing to the nature of the Project, which requires open pit mining operations as a result of the nature of the underlying ore body, Alderon acknowledges that there will be a loss of natural wetlands as a result of developing the Project within the municipal boundaries of Labrador City and Wabush. However, avoidance and minimization of adverse effects to wetlands and their functions will be implemented through development of final Project design and the EPP. Furthermore, wetlands will be rehabilitated where possible and the construction of wetlands will be considered where feasible in the reclamation plans for the Project.

As identified in the EIS (Chapter 17; Section 17.6.2; Table 17.8), development of the Kami Project will result in clearing, filling, dredging or draining of wetlands, excavation of an open pit mine, and the construction of associated mine infrastructure, with resultant adverse effects on approximately 572 ha of wetlands. A reasonably reliable and practical indicator of wetland function is wetland area, in part because of its close relationship to such functions as biodiversity conservation, habitat provision, improvement and maintenance of water quality, biological productivity and nutrient cycling, flood attenuation, groundwater recharge and storm protection. By assessing the potential loss of wetland area, assumptions have been made regarding the total loss, alteration or degradation of a wetland's ability to carry out many of its functions, thereby providing an indirect measure of functional effects (Abbruzzese and Leibowitz, 1997). In adopting this approach for the EIS, the assumption has been made that the loss of wetland function will be highest in the areas of highest concentration of surface disturbance (i.e., the Project footprint) and, hence, greatest loss of wetland area.

A directly affected wetland is a wetland area directly altered by the physical activities associated with Project surface disturbance (e.g., drainage, dredging, infilling, leveling, grading), for which wetland habitat (and therefore wetland function) is assumed to be lost, altered or severely degraded. These wetlands account for the permanent loss of approximately 526 ha of wetland and temporary alterations or disturbance to 46 ha. Any lost, altered or degraded wetlands and their habitats and processes will be actively rehabilitated (progressive rehabilitation), to the extent that is practical. However, due to topographic or hydrological pattern changes, or from soil movement (removal of soils and overburden) associated with Project construction, in situ reclamation opportunities associated with the loss of some wetlands may not be practical. The specific details of such a corporate stewardship agreement are currently under negotation, the agreements will be designed to achieve a balance between the competing goals of wetland protection and sustainable development. The objectives of such corporate stewardship agreements willbe to protect and enhance local wetlands and waterfowl habitat, to encourage environmental awareness and to permit the Kami Project to proceed in a manner consistent with the goals of sustainability, biodiversity and corporate responsibility. Pursuant to a corporate stewardship agreement, Alderon will work directly with the municipalities to identify and implement community conservation initiatives which will enhance existing habitat.

Reference:

Abbruzzese, B. and S.G. Leibowitz. 1997. Environmental Auditing: A Synoptic Approach for Assessing Cumulative Impacts to Wetlands. Environmental Management. 21(3): 457-475.

1.1.44 Information Request No. EC 44

A potential way that the negative impacts to wetlands of the Kami mine could be offset may be to rehabilitate previously disturbed (orphaned) mine sites using the organic soils and plant materials that originate from the Kami mine development site. The experience gained from this work could increase the probability of ecological success of the rehabilitation of the Kami mine site at the end of its 20 year operating cycle. There is a growing body of experience related to rehabilitation of peatlands that have been subject to peat extraction. If hydrological conditions will not allow for the development of wetlands on the Kami mine site, then the rehabilitation of the site to priority ecosystem/habitat types should be pursued.

Alderon Response to IR No. EC 44

Wetlands as self-containing ecosystems can only be restored if they are properly placed on the landscape. In a natural setting, the landscape a wetland occupies mediates the amount of available water, nutrients, and sediments for plant growth, and its development and placement are the result of various combinations of climatic and hydrologic factors that control these inputs (i.e., hydrologic setting (Bedford 1999). Efforts will be made to incorporate these factors into the final closure landscape for the Project, at the end of its 20 year operating cycle, maximizing wetland diversity. The reclaimed landscape is expected to evolve and exhibit successional patterns similar to natural ecosystems, depending on slope, aspect, moisture, and nutrient regimes. Therefore, it is anticipated that hydrological conditions on the final closure landscape, though varied, will provide the potential for a variety of habitats, including wetlands. It should however be acknowledged that techniques for reclaiming some types of wetlands are not well understood.

The technology to reclaim peat-accumulating wetlands (i.e., bogs, fens) for commercial applications in areas of large-scale developments does not currently exist. However, research is on-going and Alderon will pursue opportunities within the region to participate in efforts aimed at the improvement of wetland reclamation / rehabilitation. Where feasible, findings will be incorporated in processes to produce strategies to minimize restrictions for future wetland reclamation / rehabilitation of the mine site at closure. These strategies may include: 1) applying progressive reclamation; 2) incorporating adaptive measures in reclamation planning; and 3) implementation of follow-up monitoring and corrective actions to achieve acceptable performance levels.

Alderon will evaluate options to integrate / coordinate its activities with other operators (e.g., IOC, Cliffs) so that research into wetland reclamation / rehabilitation is initiated and supported.

Reference:

Bedford, B.L. 1999. Cumulative effects on wetland landscapes: links to wetland restoration in the United States and southern Canada. Wetlands. 19(4): 775-788.

1.1.45 Information Request No. EC 45

The size (in hectares) of the LSA should be provided as context within these statements, in order to better assess potential impacts of the project on wetlands.

Alderon Response to IR No. EC 45

The size of the Wetland LSA is approximately 16,100 ha, as outlined in the EIS, Volume 1, Section 17.2.1.1 (i.e., the description of the LSA for the wetland study) and elsewhere in text and tables throughout Section 17 (including in both Section 17.5 (Baseline Conditions) and Section 17.6 (Assessment of Project-related Environmental Effects)).

1.1.46 Information Request No. EC 46

Justification should be given as to why the rail line will be required to impact the indicated wetlands.

Alderon Response to IR No. EC 46

The rail line cannot be re-routed to avoid the referenced wetlands because of design and technical constraints.

The “Railway Alignment Options Evaluation” report (Attachment 1 of Appendix K) presents the original alignment options analysis that was conducted at the Preliminary Economic Assessment (PEA) and Feasibility Study stages of the Project. The report outlines the basis on which the proposed alignment was chosen for inclusion in the PEA of the Kami Mine Project (September 2011), the modifications made to the selected PEA alignment based on further analysis at the Feasibility Study stage and presents the final alignment recommended in the Kami Feasibility Study report (December 2012). Rail route options north and south of the preferred alignment were explored during the routing study.

The option to the north was rejected as it would have a much larger footprint on the local environment. Large excavations would have been required, with an associated larger footprint, and subsequent environmental effects.

The alignment option to the south would have increased the risk of a rail line washout. This alignment would cross the stream connection between Harris Lake and Riordan Lake. In the event that water flow was blocked (e.g., beaver dam, ice dam, bank erosion), any sudden release of built up water could wash out the rail line, and in the worst case, cause a train derailment. This presented too high a risk to the safety of the operation and created a potential to cause damage to the local environment.

The rail route as proposed follows existing terrain contours providing an optimal alignment as compared to the other options, while striking a balance between the ruling vertical grade and the cuts and fills required to build the track. The other options pose higher risks to the operation of the rail, and subsequently to the local environment.

The assessment of alternative rail route options is summarized in Section 2.8 (Alternative Means of carrying Out the Project) of Volume 1 of the EIS. A summary of the results is provided in Table 2.18 of the EIS (Volume 1). As described in Section 2.5.7 of the EIS (Volume 1), the track will be constructed to main line, heavy haul standards in line with QNS&L and American Railway and Maintenance of Way Association (AREMA) design procedures. To reduce the need for unnecessary stops, switching and locomotive change outs, the alignment has been designed to allow for a direct connection with QNS&L.

1.1.47 Information Request No. EC 47

Table 17.10 estimated contributing wetland area for each of the assessed wetland functions by project feature. The approach to understanding impacts to wetland function requires further detail.

Table 17.10 should be updated with the amount (ha) of wetland impacted by each project feature, as well as the area (ha) lost across wetland functions.

Alderon Response to IR No. EC 47

Data on the amount of area (ha) estimated to be directly affected by Project components is provided in Table 17.9 of Volume 1 of the EIS. The amount (ha) of area estimated to contribute to each of the assessed functions and which is likely to be directly affected by the Project was provided in Table 17.10 of the EIS, for both the entire Project and its individual components.

Estimates of direct effects to wetland functions were calculated using information on the area of individual wetland polygons likely to be directly disturbed (i.e., based on the distribution of wetlands and the layout of Project infrastructure) and the functional attributes to which wetlands were assigned. Functional attributes were identified through a multi-tiered assessment that incorporated both field surveys and data collected during desktop analyses. Data were used to evaluate the importance of wetlands for providing a suite of key hydrogeomorphological and wildlife-related functions, including surface water detention, sediment and other particulate retention, streamflow maintenance, groundwater recharge, carbon sequestration and storage, shoreline stabilization, habitat for wildlife (including fish, waterfowl and other waterbirds, and species of conservation concern), and socio-economic values. The identification and evaluation of these key functions follows guidelines outlined in Correlating Enhanced National Wetlands Inventory Data with Wetland Functions or Watershed Assessments: A Rationale for Northeastern U.S. (Tiner 2003), as summarized in NovaWET (Tiner 2009; NSE 2011), but was modified and supplemented with additional information so as to better suit the conditions of the Study Area. Information used for the functional assessment included: data on wetland types; information on wetland landscape position, landform, and water flow pathways (as defined by Tiner 2005); the results of other field programs conducted for the Project, data from detailed functional assessments performed following the NovaWET field methodology (Tiner 2009; NSE 2011), and other information.

Details associated with the approach are provided in the Wetland Baseline Study, available as Appendix I of Volume 1 of the EIS.

References:

NSE (Nova Scotia Environment). 2011. Nova Scotia Wetland Evaluation Technique (Draft Version 3.0).

Tiner, R.W. 2003. Correlating Enhanced National Wetlands Inventory Data with Wetland Functions or Watershed Assessments: A Rationale for Northeastern U.S. Wetlands. US Fish and Wildlife Service, National Wetlands Inventory Program, Region 5, Hadley, MA. 26 pp.

Tiner, R.W. 2005a. Assessing cumulative loss of wetland functions in the Nanticoke River watershed using enhanced National Wetlands Inventory data. Wetlands 25(2): 405-419. Available at: http://library.fws.gov/Wetlands/TINER_WETLANDS25.pdf.

Tiner, R.W. 2009. NovaWAM – for assessing wetland condition and functions. (Version 1.0).

1.1.48 Information Request No. EC 48

It should be noted that peat reclamation has been successfully conducted in New Brunswick and in Québec.

Alderon Response to IR No. EC 48

Alderon are aware of efforts and advances made by the Canadian peat mining industry, the Peatland Ecology Research Group, Laval University (Québec), and others with respect to the reclamation of peat-accumulating wetlands (i.e., bogs, fens). However, unlike peat mining, surface mining of mineral resources typically leaves no remnants of wetlands to recover and will require the complete construction of wetland ecosystems and their associated functions. There is currently no demonstrated success in reclaiming peat-forming wetlands within this context.

Additionally, there continues to exist a poor understanding of nutrient and chemical loadings to wetlands from uplands composed of varying reclamation materials. The issue of nitrogen and phosphorus limitations to vegetation establishment in reclaimed wetlands is also not well known, and there is no clear understanding of the role for fertilization as a strategy for improving initial establishment rates (Harris 2007). As such, the technology to reclaim peatlands (bogs and fens) for commercial applications in areas of large-scale developments does not currently exist.

Reference:

Alberta Environment. 2008. Guideline for wetland establishment on reclaimed oil sands leases (2nd edition). Prepared by Harris, M.L. of Lorax Environmental for the Wetlands and Aquatics Subgroup of the Reclamation Working Group of the Cumulative Environmental Management Association, Fort McMurray, AB. December 2007.

1.1.49 Information Request No. EC 49

Section 17.6.2, Page 17-38, Characterization of Residual Project Environmental Effects

This sentence should either be completed or removed.

Alderon Response to IR No. EC 49

EIS, Volume 1, Section 17.6.2, Page 17-38, Characterization of Residual Project Environmental Effects; the last sentence of the final paragraph is “not likely to be.” is incomplete. The sentence should read:

“In light of the regional abundance and distribution of wetlands and wetland habitats, particularly peatlands, in addition to mitigation to be applied, the substantial alteration or loss of wetlands from within the RSA is not likely.”

1.1.50 Information Request No. EC 50

Quoted from EIS: “…at decommissioning and reclamation, the reclaimed landscape will remain dominated by wetlands…”.

It is noted that 48 ha out of 572 ha of impacted wetlands are planned for rehabilitation. Wetlands will decrease in the local study area by 32 percent.

The statement should be revised to reflect the numbers given above.

Alderon Response to IR No. EC 50

The statement from Section 17.6.2 of Volume 1 of the EIS should read:

“Decommissioning and reclamation of the Project will evolve over time. At closure, the Project will be reclaimed with the intent of achieving land capability similar to that of the pre-existing

condition resulting in a reclaimed landscape that is compatible with the surrounding landscape, including wetlands."

1.1.51 Information Request No. EC 51

It should be noted in the text if these point counts were repeated. If point counts were not repeated, it should be explained why they were not, and what implications the lack of repetition would have upon the analysis.

Alderon Response to IR No. EC 51

The point counts were not repeated. As the land bird breeding season is relatively short in western Labrador, field effort was allocated to increasing the sample size (i.e., total number of point counts) in a variety of habitats throughout the Study Area, versus completing replicates, in the time available. In the area surveyed, few of these species will attempt a second clutch, such that breeding species present would be detected on the first visit. This approach has been discussed previously with Environment Canada St. John's office and has been used for other assessments in the region where the breeding season is relatively short.

1.1.52 Information Request No. EC 52

More details are required regarding the forest song bird surveys (i.e., timing, methodologies, etc). These details should be sent to EC-CWS for review, and should be included in the report.

Alderon Response to IR No. EC 52

The following provides a general overview of the timing and methodology for songbird surveys. A detailed description is provided in Appendix C.

Methods / Timing for Songbirds Surveys

The wildlife surveys for species other than the forest songbirds were conducted between July 25 and August 4. The 2011 breeding forest songbird surveys occurred June 27 through July 1, at a time when migrants had returned to the area, based on the presence of Yellow-bellied Flycatchers (*Empidonax flaviventris*), typically a late arriving migrant. The 2012 breeding songbird surveys occurred July 2 through July 8.

The field crew conducted a series of 10-minute point count surveys at four locations of interest spaced at least 300 m apart, recording each waypoint with a handheld GPS unit. Surveys commenced at dawn (approximately 0515 hours) and, with the exception of one day in 2012, no point counts were initiated after 0900 hours, due to documented declines in the frequency of song later in the morning (Ralph et al. 1993). All birds heard or seen during this period were recorded on a field data sheet by the ornithologist in distance categories of less than 50 m, 50 m to 100 m, and greater than 100 m. Vegetation data, including forest, shrub, and ground cover species, were recorded. Photos of habitat were taken at each point count. Data were organized by birds heard and/or seen during two consecutive 5-minute surveys at each point count. As these surveys rely on auditory cues, poor weather (i.e., precipitation and/or windy conditions) resulted in a delay (or postponement for that day) until conditions improved.

High winds (winds ranking greater than 3 on Beaufort Scale) and heavy rain adversely affect the observers' ability to detect avian species. Bibby et al. (2000) recommend the restriction of point counts to wind conditions of Beaufort 3 and below, with a preference for Beaufort 2 and below if possible, and to avoid counting in precipitation exceeding occasional light drizzle or brief showers.

Targeted dusk surveys for Common Nighthawk (*Chordeiles minor*) will occur in 2013 . Alderon will communicate with Environment Canada to discuss details of the survey such as timing and methodology.

References:

Bibby, C.J., N.D. Burgess, D.A. Hill and S. Mustoe. 2000. Bird Census Techniques, Second Edition. Academic Press.

Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Handbook of field methods for monitoring landbirds. U.S. Dep. Agric. For. Serv. PSW-GTR-144, Albany, CA. 41 pp.

1.1.53 Information Request No. EC 53

The *Migratory Bird Regulations* (MBR) under the *Migratory Birds Convention Act*, 1994 (MBCA), prohibits the harming of migratory birds and the disturbance or destruction of migratory bird nests and eggs. Clearing vegetation during project construction and operation will cause disturbance to migratory birds and inadvertently cause the destruction of their nests and eggs (http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=FA4AC736-1). Many species use trees, as well as brush, deadfalls and other low-lying vegetation for nesting, feeding, shelter and cover. This would apply to songbirds throughout the region, as well as waterfowl in wetland areas. Disturbance of this nature would be most critical during the nesting period. The breeding season for most birds within the project area occurs between May 1st and August 31st in this region, however some species protected under the MBCA do nest outside of this time period.

Environment Canada provides the following recommendations:

1. To avoid engaging in potentially destructive activities (such as vegetation clearing) during key periods in order to reduce the risk of nest destruction, i.e., avoid vegetation clearing between the most critical period, May 1st and July 31st, to accommodate the breeding season.

2. To develop and implement a management plan that includes appropriate preventive measures to minimize the risk of impacts (see "Planning ahead to reduce risks to migratory bird nests", PDF: http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=50C4FE11-801E-4FE3-8019-B2D8537D76CF).

It is the responsibility of the individual or company undertaking the activities to determine these measures. For guidance on how to avoid the incidental take of migratory birds nests and eggs, please refer to the Avoidance Guidelines (Website: http://www.ec.gc.ca/paomitmb/default.asp?lang=En&n=AB36A082-1).

Alderon Response to IR No. EC 53

Consistent with the *Migratory Bird Conservation Act (MBCA)* and *Migratory Bird Regulations (MBR)* (i.e. "avoidance guidelines to reduce incidental take" and "planning ahead to reduce risks to migratory bird nests"), an Avifauna Management Plan will be developed and reviewed by Environment Canada-CWS prior to construction.

The Avifauna Management Plan will identify specific measures that will be undertaken to avoid the harassment of avifauna, nests, and eggs particularly during the 1 May through 31 July period. A draft table of contents for the Avifauna Management Plan is included in Appendix I). Alderon is proposing to develop a Sustainability Management Framework which will include an Environmental Management System (EMS) that will provide detailed management of regulatory and permit requirements and includes environmental protection plans and procedures.

Further to the implementation of an Avifauna Management Plan, the following mitigation measures will be implemented to reduce the inadvertent effects on avifauna (and other wildlife species):

- Minimize the construction footprint to the greatest extent possible;
- Avoid sensitive species and their habitats to the greatest extent possible;
- Rehabilitate access routes that are no longer needed;
- Maintain natural buffers around wetlands and riparian zones;
- Comply with provincial and federal legislation, permits, approvals, and guidelines;
- Conduct invasive species management;
- Conduct progressive rehabilitation;
- Restrict clearing activities to outside of the bird breeding season, to the greatest extent possible;
- Restrict clearing and other activities within 800 m of an active raptor nest, and within 200 m of an inactive nest;
- Limit noise levels to the greatest extent possible;
- Limit lighting to that required for safe operation; and
- Prohibit hunting or harassment of wildlife on Project site.

1.1.54 Information Request No. EC 54

The amount of habitat lost should additionally be represented in hectares.

Alderon Response to IR No. EC 54

Table 1.1.6 indicates the amount of habitat lost in the PDA as a percentage, and in hectares.

Table 1.1.6 Percentage of Habitat Lost in the PDA

ELC HABITAT CLASSIFICATION	%	Area (ha)
Exposed Earth / Anthropogenic	0.6	14.6
Open Water	0.8	19.4
Shallow Open Water with Vegetation	1.2	28.4
Cloud	1.1	26.2
Shadow	0.2	4.7
Alpine Heath	0.2	4.5
Hardwood Forest	1.1	26.4
Hardwood Forest burn/Regen	18.5	442.6
Mixedwood Forest	5.3	126.2
Mixwood Forest burn/Regen	1.9	44.6
Black Spruce-Lichen	2	48.7
Softwood Burn / Regen	19.5	465.7
Black Spruce / Tamarack –Sphagnum Woodland	12.8	305.5
Black Spruce-Labrador Tea-Feathermoss	13.6	325.9
Tamarack/Black Spruce Treed Fen	13.3	316.9
Riparian Thicket	0.03	0.7
Riparian Marsh / Fen	0.02	0.7
Non-Patterned Shrub / Graminoid Fen	6	143
Patterned Shrub Fen	1.9	45
Total	**100**	**2,389.5**

1.1.55 Information Request No. EC 55

It should be explained in the report as to what habitat structural features are being retained to allow for successful wildlife movement across and around the project site.

Alderon Response to IR No. EC 55

The Project will present a physical barrier on the landscape, with the development of an open pit, railway line and other associated infrastructure. This potential physical interference would be most applicable for species of wildlife that regularly occur in and move across the landscape. From a Labrador context, caribou are an important example of a species that undergo such movements, however their distribution does not overlap the Study Area. Additionally, many of the avifauna species that occur in this region have the benefit of flight to access other readily available habitat.

Several species of waterfowl are known to occur in the vicinity of the Project wherever potential habitat such as open water during spring staging (when their distribution would be relatively constricted) or wetland habitat for breeding or during staging in fall (when their distribution would be less constricted). Many of the terrestrial wildlife encountered during surveys (e.g., snowshoe hare, red fox, grouse / ptarmigan) possess relatively small home ranges. Many of these species are known to use edge habitats (e.g. alder sp.) and their presence in the area particularly in the vicinity of existing industrial activity, indicates an adaption to existing disturbances.

The PDA and 500 m adjacent area considered to be the LSA represents approximately 71 km^2. With the exception of Pike Lake and wetland habitat within the PDA, most existing waterfowl habitat in the LSA will remain intact including the Waldorf River, where relatively high numbers of waterfowl were observed during baseline surveys. There is a proposed river crossing (for the access road and conveyor) on this River that should not pose as an impediment to waterfowl or mammals (e.g., beaver) that use this watercourse. Additionally, extensive areas of open freshwater habitat (e.g., Pike Lake North, Jean Lake, Walsh River and outflow from Canning Lake) will remain available to migrating waterfowl within the region. An addendum which provides detail on the identification and evaluation of proposed Project works within and across water has been issued (Appendix D – Waterfowl Survey Report).

While habitat structural features will be lost following construction, it is expected that wildlife movement across and around the PDA will continue, for species that exist in the area and exhibit such movements. Evidence of wildlife co-existing with current recreational and industrial land-use in this region has been documented, including observations of moose and wolf near the proposed Project (Appendix E – Winter Wildlife Survey Report).

Reference:

Stassinu Stantec Limited Partnership. 2012a. Forest Songbird Survey Report Kami Iron Ore Mine and Rail Infrastructure Project. Prepared for Alderon Iron Ore Corp. File No. 121614000.402

1.1.56 Information Request No. EC 56

The four species mentioned above should be identified in this section.

Alderon Response to IR No. EC 56

Section 20.5.1 of Volume 1 of the EIS, the second to last paragraph should read:

"*Rusty Blackbird (Euphagus carolinus) and Olive-sided Flycatcher (Contopus borealis), both species of special concern under SARA and listed as Vulnerable under NLESA, were observed during baseline surveys associated with the ELC. Harlequin Duck (Histrionicus histrionicus),* *also a species of special concern under SARA and listed as Vulnerable under NLESA, has been observed in the Study Area (at the Jean Lake Rapids Management Unit [Wabush 2009]) on at least one occasion in recent years (C. Porter, pers. comm.) and 10 additional observations have been recorded in the western Labrador region between 2000-2009 (G. Parsons, pers. comm.). This species of special concern was not observed during any of the 2011 surveys. There are three documented local records of individual Common Nighthawk (Chordeiles minor), a threatened species under SARA and under NLESA, in each of 2003, 2006 and 2011 (G. Parsons, http://ebird.org/ebird/map/).”*

Section 20.5.2 of Volume 1 of the EIS, should read:

“There were no observations of any vascular plant species listed under Schedule 1 of SARA or pursuant to the NLESA during surveys of the PDA. Observations of fauna species listed under Schedule 1 of SARA or pursuant to the NLESA during the field surveys were of two species, Olive-sided Flycatcher and Rusty Blackbird. Thirteen Rusty Blackbird individuals have been observed over three years (2008, 2010 and 2011) on BBS route 41 (U.S. Department of the Interior 2013). Other avian Species at Risk are considered to have potential to be within the LSA, though they were not directly observed during recent field surveys conducted in support of the Project, including Harlequin Duck and Common Nighthawk. Harlequin Duck observations have been reported in the Study Area, at the Jean Lake Rapids Management Unit (Wabush 2009) on at least one occasion in recent years (C. Porter, pers. comm.), and ten additional observations recorded in the western Labrador region between 2000 and 2009 (G. Parsons, pers. comm.).Individual Common Nighthawk have been documented locally in each of 2003, 2006 and 2011 (G. Parsons, http://ebird.org/ebird/map/). Incidental observations of Common Nighthawk were made between point count locations in the Churchill River Valley in 2006 (Nalcor 2009). Additional surveys for difficult to detect species such as Common Nighthawk will be completed prior to construction with the results incorporated into the Avifauna Management Plan.”

References:

Nalcor Energy 2009. Lower Churchill Hydroelectric Generation Project Environmental Impact Statement. St. John’s, NL.

Parsons, G. Naturalist in Labrador West, Newfoundland and Labrador. Correspondence in 2011-2012.

Town of Wabush. 2009. Habitat Conservation Plan for the Town of Wabush. Prepared with the assistance of the staff of the Eastern Habitat Joint Venture. 57 pp.

1.1.57 Information Request No. EC 57

A habitat description should be added and the likelihood of occurrence should be increased appropriately. Common Nighthawk are usually found in open habitats and more easily detected using targeted, evening surveys, rather than the general songbird surveys outlined in the report.

Alderon Response to IR No. EC 57

Table 20.9 in Section 20.5.3 of Volume 1 of the EIS should read as follows:

- The habitat description for Common Nighthawk should read: *"The breeding range of Common Nighthawk extends into Southwestern Labrador. Breeding habitat includes open areas of Labrador tea and other shrubby areas, logged or burned forest, woodland clearings, and rocky outcrops (Brigham et al. 2011)."*
- Their Occurrence in Relationship to Project should read: *"Three records of this species. Observations of individuals were made in 2003, 2006 and 2011 proximate to the Town of Labrador City and the Trans Labrador Highway (G. Parsons, http://ebird.org/ebird/map/). Incidental observations of Common Nighthawk were made east of the Kami Project during baseline research surveys in the Churchill River Valley in 2006 (Nalcor 2009)."*
- The *Likelihood of Occurrence* should read: "Moderate."

References:

Nalcor Energy 2009. Lower Churchill Hydroelectric Generation Project Environmental Impact Statement. St. John's, NL.

Parsons, G. Naturalist in Labrador West, Newfoundland and Labrador. Correspondence in 2011-2012.

1.1.58 Information Request No. EC 58

Common Nighthawk are usually found in open habitats and more easily detected using targeted, evening surveys, rather than the general songbird surveys outlined in the report. Common Nighthawk should be included in this section.

Alderon Response to IR No. EC 58

Common Nighthawk is discussed in Section 20.5.1 of Volume 1 of the EIS. Three observations of individuals were made in 2003, 2006 and 2011 proximate to the Town of Labrador City and the Trans Labrador Highway (G. Parsons, http://ebird.org/ebird/map/). Incidental observations of Common Nighthawk were made east of the Kami Project during baseline research surveys in the Churchill River Valley in 2006 (Nalcor 2009).

Common Nighthawk breed in southern Labrador and throughout most of North America and a portion of Central America. In eastern Canada, the species breeds in open habitats such as recently logged and burned areas, rocky outcrops, anthropogenic features such as railways, as well as openings in mixed and coniferous forests. Incidental observations of Common Nighthawk were made during baseline surveys in the Churchill River Valley (Nalcor 2009). This species is considered generally common in Nova Scotia and New Brunswick although long-term (Breeding Bird Survey) BBS data shows a significant decline for this species in Canada. This decline is attributable to habitat loss and degradation (Savignac 2007).

Breeding and foraging habitat for Common Nighthawk may be found in the RSA, with approximately 17.6 percent of the PDA being identified as potential suitable Common Nighthawk habitat. Given the suitability of railways and open habitats, it is possible the amount of potential habitat for Common Nighthawk will increase as a result of Project activities. Prior to the start of construction, dedicated surveys for this species will be completed and an Avifauna Management Plan will be prepared that will include consideration of Common Nighthawk and other species of interest. Inclusion of Common Nighthawk does not change the overall significance conclusions made for the Project with respect to residual environmental effects as described in the EIS.

References:

COSEWIC 2007. COSEWIC assessment and status report on the Common Nighthawk (Chordeiles minor) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 25pp. Available at: http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_chordeiles_minor_e.pdf. Accessed: January 2013.

eBird. 2012. Labrador West Observations by G. Parsons. National Audobon Society and Cornell Lab of Ornithology. Accessed: December 2012.

Nalcor Energy 2009. Lower Churchill Hydroelectric Generation Project Environmental Impact Statement. St. John's, NL.

Parsons, G. Naturalist in Labrador West, Newfoundland and Labrador. Correspondence in 2011-2012.

1.1.59 Information Request No. EC 59

Common Nighthawk should be discussed in this section.

Alderon Response to IR No. EC 59

Common Nighthawk is discussed in Section 20.5.1 of Volume 1 of the EIS. Three observations of individuals were made in 2003, 2006 and 2011 proximate to the Town of Labrador City and the Trans Labrador Highway (G. Parsons, http://ebird.org/ebird/map/). Incidental observations of Common Nighthawk were made east of the Kami Project during baseline research surveys in the Churchill River Valley in 2006 (Nalcor 2009).

Common Nighthawk breed in southern Labrador and throughout most of North America and a portion of Central America. In eastern Canada, the species breeds in open habitats such as recently logged and burned areas, rocky outcrops, anthropogenic features such as railways, as well as openings in mixed and coniferous forests. Incidental observations of Common Nighthawk were made during baseline surveys in the Churchill River Valley (Nalcor 2009). This species is considered generally common in Nova Scotia and New Brunswick although long-term (Breeding Bird Survey) BBS data shows a significant decline for this species in Canada. This decline is attributable to habitat loss and degradation (Savignac 2007).

The environmental effects of past and present projects and activities on SAR / SOCC in the RSA are reflected in the characterization of baseline conditions. The IOC Labrador Operations project, Wabush mining project, Bloom Lake rail infrastructure, and urbanization have the potential to result in cumulative effects in combination with those of the Project. Construction of older projects (e.g., IOC Labrador Operations, which has been in operation since 1962, Wabush Mines, which has been in operation since 1965, and historical development of the Towns of Labrador City and Wabush) was not subject to regulatory or policy protection for SAR. There is insufficient information available regarding the existence of this species in the locations of the existing projects prior to their development; however, it is known that the current area of disturbance of these projects totals approximately 130 $km^{2.}$ As such, these projects may have resulted in the loss of individuals or habitat in the RSA. However, breeding and foraging habitat for Common Nighthawk may also be found in the RSA; approximately 17.6 percent of the PDA has been identified as potential suitable Common Nighthawk habitat. Given the suitability of railways and open habitats, it is possible the amount of potential habitat for Common Nighthawk will increase as a result of Project activities. Prior to the start of construction, dedicated surveys for this species will be completed and an Avifauna Management Plan will be prepared that will include consideration of Common Nighthawk and other species of interest. Inclusion of Common Nighthawk does not change the overall significance conclusions made for the Project with respect to cumulative environmental effects as described in the EIS.

References:

COSEWIC 2007. COSEWIC assessment and status report on the Common Nighthawk (Chordeiles minor) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 25pp. Available at: http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_chordeiles_minor_e.pdf. Accessed: January 2013.

Nalcor Energy 2009. Lower Churchill Hydroelectric Generation Project Environmental Impact Statement. St. John's, NL.

Parsons, G. Naturalist in Labrador West, Newfoundland and Labrador. Correspondence in 2011-2012.

1.1.60 Information Request No. EC 60

Other species at risk, such as Common Nighthawk may be affected by the project in addition to the ones listed. This sentence should be reworded.

Alderon Response to IR No. EC 60

Common Nighthawk is discussed in Section 20.5.1 of Volume 1 of the EIS. Three observations of individuals were made in 2003, 2006 and 2011 proximate to the Town of Labrador City and the Trans Labrador Highway (G. Parsons, http://ebird.org/ebird/map/). Incidental observations of Common Nighthawk were made east of the Kami Project during baseline research surveys in the Churchill River Valley in 2006 (Nalcor 2009).

In recognition of the above, the following is added to EIS, Volume 1, Section 20.7, Page 20-55, Characterization of Cumulative Effects on Species at Risk:

"The Common Nighthawk was also recorded in the RSA (G. Parsons, http://ebird.org/ebird/map/), and potential habitat for Common Nighthawk exists within the PDA. There is also moderate possibility of this species occupying the PDA, given there have been regional observations in recent years."

Refer to the Response to IR No. EC-59 for a more detailed discussion of the potential cumulative environmental effects of the Project on this species.

References:

eBird. 2012. Labrador West Observations by G. Parsons. National Audobon Society and Cornell Lab of Ornithology. Accessed: December 2012.

Nalcor Energy 2009. Lower Churchill Hydroelectric Generation Project Environmental Impact Statement. St. John's, NL.

Parsons, G. Naturalist in Labrador West, Newfoundland and Labrador. Correspondence in 2011-2012.

1.1.61 Information Request No. EC 61

A Common Nighthawk analysis should be included in this table, based on sightings within the RSA and the likelihood of their occurrence within the PDA.

Alderon Response to IR No. EC 61

Common Nighthawk is discussed in Section 20.5.1 of Volume 1 of the EIS. Three observations of individuals were made in 2003, 2006 and 2011 proximate to the Town of Labrador City and the Trans Labrador Highway (G. Parsons, http://ebird.org/ebird/map/). Incidental observations of Common Nighthawk were made east of the Kami Project during baseline research surveys in the Churchill River Valley in 2006 (Nalcor 2009).

Common Nighthawk breed in southern Labrador and throughout most of North America and a portion of Central America. In eastern Canada, the species breeds in open habitats such as recently logged and burned areas, rocky outcrops, anthropogenic features such as railways, as well as openings in mixed and coniferous forests. Incidental observations of Common Nighthawk were made during baseline surveys in the Churchill River Valley (Nalcor 2009). This species is considered generally common in Nova Scotia and New Brunswick although long-term (Breeding Bird Survey) BBS data shows a significant decline for this species in Canada. This decline is attributable to habitat loss and degradation (Savignac 2007).

The environmental effects of past and present projects and activities on SAR / SOCC in the RSA are reflected in the characterization of baseline conditions. The IOC Labrador Operations project, Wabush mining project, Bloom Lake rail infrastructure, and urbanization have the potential to result in cumulative effects in combination with those of the Project. Construction of older projects (e.g., IOC Labrador Operations, which has been in operation since 1962, Wabush Mines, which has been in operation since 1965, and historical development of the Towns of Labrador City and Wabush) was not subject to regulatory or policy protection for SAR. There is insufficient information available regarding the existence of this species in the locations of the existing projects prior to their development; however, it is known that the current area of disturbance of these projects totals approximately 130 km$^{2.}$ As such, these projects may have resulted in the loss of individuals or habitat in the RSA. However, breeding and foraging habitat for Common Nighthawk may also be found in the RSA; approximately 40.0 percent (971.6 Ha) of the PDA has been identified as potential suitable Common Nighthawk habitat. Given the suitability of railways and open habitats, it is possible the amount of potential habitat for Common Nighthawk will increase as a result of Project activities. Prior to the start of construction, dedicated surveys for this species will be completed and an Avifauna Management Plan will be prepared that will include consideration of Common Nighthawk and other species of interest. Inclusion of Common Nighthawk does not change the overall significance conclusions made for the Project with respect to cumulative environmental effects as described in the EIS.

References:

COSEWIC 2007. COSEWIC assessment and status report on the Common Nighthawk (Chordeiles minor) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 25pp. Available at: http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_chordeiles_minor_e.pdf. Accessed: January 2013.

eBird. 2012. Labrador West Observations by G. Parsons. National Audobon Society and Cornell Lab of Ornithology. Accessed: December 2012.

Nalcor Energy 2009. Lower Churchill Hydroelectric Generation Project Environmental Impact Statement. St. John's, NL.

Parsons, G. Naturalist in Labrador West, Newfoundland and Labrador. Correspondence in 2011-2012.

1.1.62 Information Request No. EC 62

It is not clear if small game are hunted by the Labrador Innu within the LSA – the paragraph merely references *"…within the PDA or in the immediate vicinity of it…"*

Alderon Response to IR No. EC 62

Although the EIS, Volume 1, Section 22.5.4, Page 22-31 makes specific reference to the Project Development Area (PDA) as this is the area within which potential environmental interactions and effects would be most likely to occur, the referenced information source likewise does not indicate Labrador Innu small game hunting within the Local Study Area (LSA) for this VEC.

1.1.63 Information Request No. EC 63

The reference to 'traditional use" should be replaced by a reference to "use for traditional purposes". Similarly, the proponent's rationale for if and how to consider the NCC's comments should reflect "use for traditional purposes" rather than "traditional use".

Alderon Response to IR No. EC 63

The use of the term "traditional use" is correct and appropriate in the context within which it is used in this section. It is agreed and acknowledged that the VEC name (and *CEAA* terminology) is "The Current Use of Land and Resources *for Traditional Purposes* by Aboriginal Persons" (emphasis added), and the focus of the environmental assessment is on assessing any effects to such current use for traditional purposes. In this section, however, the phrase "traditional use" is used to help define what such a (historic) use is, and in doing so, demonstrating that current NCC land and resource activities in western Labrador may therefore not be considered *current use for "traditional purposes*". If further clarification is required, this sentence (EIS, Volume 1, Chapter 22, Page 22-36) could be re-worded as follows:

"As a "current use of land and resources for traditional purposes" is, however, generally understood to mean current land and resource use activities that reflect those that were exercised by an identifiable Aboriginal community since before European contact or control of a specific area, these current land and resource use activities by NCC members may not be considered traditional in that they are not necessarily a continuation of ancestral activities that took place historically within this area of western Labrador (although they do reflect local knowledge and use of the area)."

1.1.64 Information Request No. EC 64

The relatively open ecotypes (i.e., Labrador tea, shrubby areas, etc.) should be changed from tertiary to secondary habitat classes for Common Nighthawk.

Alderon Response to IR No. EC 64

Appendix Y of the EIS, Table: ELC Ecotype Designations for Wildlife SOCC Likely within the RSA, should read:

Table 1.1.7 ELC Ecotype Designations for Wildlife SOCC Likely within the RSA (Updated Table from Appendix Y of the EIS, Volume 1)

ELC Ecotype	Common Nighthawk
• Alpine Heath	• Secondary
• Hardwood Forest	• Tertiary
• Mixedwood Forest	• Tertiary
• Hardwood Burn/Regeneration	• Primary
• Black Spruce-Labrador Tea-Feathermoss	• Secondary

ELC Ecotype	Common Nighthawk
• Softwood Burn/ Regeneration	• Primary
• Black Spruce/ Lichen	• Primary
• Black Spruce /Tamarack-Sphagnum Woodland	• Tertiary
• Riparian Thicket	• Tertiary
• Riparian Marsh/Fen	• Secondary
• Non-Patterned Shrub Fen	• Secondary
• Tamarack/Black Spruce-Feathermoss (Water Track)	• Tertiary
• Patterned Shrub Fen	• Secondary
• Graminoid Fen	• Secondary
• Open Water	• Secondary
• Shallow Open Water with Vegetation	• Secondary
• Exposed Earth/Anthropogenic	• Primary

Alderon received Environment Canada's comments on the EIS Environment in December 2012. Discussions with the federal department of Fisheries and Oceans (DFO) have been ongoing on many of their requests since the submission of the EIS in order to continue the Fisheries Act Authorization process. In this respect, many of the responses to questions from DFO have been provided to them prior to submission of these responses.

In addition to ongoing discussion regarding authorization, Alderon has met with DFO on several occasions to inform them of additional field programs to collect data on fish populations within the vicinity of the Project, to discuss potential compensation options and sites, and to provide overview of the Project and its EIS to replacement assessment committee members. The most recent meeting was held on November 15, 2012 when all these topics were discussed. Alderon has incorporated input from DFO into the responses below will continue to meet with regulators regarding any further permitting and/or authorization requirements and continues to develop its compensation plan for Fisheries Act authorization.

1.2 Information Requests Received from Environment Canada (Québec)

The following section includes the 19 information requests from Environment Canada and Alderon's response to each of these requests.

1.2.1 Information Request No. QEC 01

L'étude d'impact présentée est, selon nous, incomplète, notamment au sujet de la protection du milieu aquatique. En effet, plusieurs des mesures d'atténuation ou de gestion des impacts semblent encore être en cours d'élaboration. C'est ce que le promoteur avance quand il mentionne que « A Water Management Plan (WMP) is being developed for the Kami Terminal. » (p. 8-3). Le contenu de ce plan est nécessaire pour nous permettre de compléter l'analyse du projet.

Il en va de même du Environmental Protection Plan (EPP), cité à plusieurs endroits dans l'étude d'impact, lequel n'est pas encore disponible. À ce sujet, le promoteur écrit : "An EPP will be developed for the Kami Terminal." (p. 8-5). Le contenu de ce plan devrait être présenté dans l'étude d'impact afin de faire connaître les processus de gestion environnementale prévus au projet.

Alderon Response to IR No. QEC 01

A detailed Environmental Protection Plan (EPP) and follow-up program will be developed by Alderon and submitted to appropriate regulatory agencies for review prior to the initiation of Project activities. The EPP will specify the mitigation measures and procedures to be used on site in sufficient detail to allow contractors and employees to implement these commitments in the field. This detail will become available at the permitting stage when the Project design is sufficiently detailed and finalized to prescribe site-specific environmental protection measures. The EPP and Follow-up Program will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

The Sustainability Management Framework (SMF) is a part of the overall Kami Project management system that includes quality management systems, document control, risk management and Health, Safety and Environment (HSE) systems. The framework is made up of three main systems, the components of which are shown in Appendix J.

1. The Sustainable Project Delivery (SPD) system will provide a high level approach to sustainability management by establishing clear objectives, tracking of key Project commitments, support for engineering and procurement activities and reporting on overall sustainability performance;

2. The Environmental Management System (EMS) will provide detailed management of regulatory and permit requirements and includes environmental protection plans and procedures. The EMS will include environmental monitoring and reporting on specific construction and operational activities. Environmental Management Plans will be developed in consultation with relevant regulatory agencies and stakeholder groups.

3. The Social Responsibility System (SRS) will manage and track the commitments made in various guidance documents and contracts (e.g., benefits agreement) as well as

establish plans for effective Project communications, community liaison and complaints management.

Working closely with the HSE team, the SMF will facilitate the incorporation of sustainability issues into employee orientation, daily tailgate and safety meetings, contractor management, monitoring and incident response procedures.

As part of the EMS, a Water Management Plan will also be developed and implemented to describe how water on site will be diverted, collected, treated, and/or stored so as to minimize adverse environmental effects. As with the EPP, the details require to complete this plan will become available at the permitting stage when the Project design is sufficiently detailed and finalized to prescribe site-specific measures. It will be developed by Alderon and submitted to appropriate regulatory agencies for review prior to the initiation of Project activities.

1.2.2 Information Request No. QEC 02

À plusieurs endroits dans l'étude d'impact, le promoteur réfère à la zone de mélange de l'effluent (effluent mixing zone), notamment aux pages 16-2 et 16-8. Nous aimerions préciser que la Loi sur les pêches (LP) ne permet pas de considérer la dilution dans le milieu. C'est la qualité de l'effluent, au point de rejet, qui doit être considérée aux fins de l'évaluation du respect de la conformité à l'article 36 (3) de la LP. À cette fin, il aurait été intéressant que le promoteur présente les valeurs numériques anticipées à l'effluent pour les paramètres considérés en tenant compte des objectifs de traitement de l'effluent final.

Bien que la « Local study area (LSA) » ait été déterminée en tenant compte de la possibilité d'y mesurer des effets environnementaux avec un niveau raisonnable de précision et de fiabilité, peu d'information est disponible pour confirmer cet énoncé. Par exemple, il n'y a aucune modélisation de la zone de mélange de l'effluent pour confirmer que celle-ci est totalement située à l'intérieur de la LSA.

Le promoteur mentionne que les représentants de l'Administration portuaire de Sept-Îles (APSI) ont avisé ce dernier de l'obligation de respecter la Directive 019 du MDDEFP. Il faudrait informer le promoteur et l'APSI qu'il n'y a pas d'équivalence entre la Directive 019 et la Loi sur les pêches et que toutes les mesures doivent être prises pour respecter cette dernière.

Alderon Response to IR No. QEC 02

The final effluent discharge requirements of Directive 019 are equivalent or more stringent (arsenic, iron) than the authorized limits of deleterious substances under the *Metal Mining Effluent Regulations* (MMER) developed under Section 36 of the *Fisheries Act* with the exception of radium 226, which is not covered by Directive 019 (Table 1.2.1). In both cases, the effluent criteria are applicable to the effluent before its release in the environment (discharge point).

Although not specifically mentioned in the EIS, the authorized limits of deleterious substances under the MMER (part of the *Fisheries Act*) will also be respected as they are covered by

Directive 019; as shown in Table 1.2.1, Directive 019 is more stringent of the relevant parameters than the MMER. The authorized limits for radium 226 will also be considered in the effluent treatment objectives.

The final characteristics of the effluent will be provided once detailed engineering, including treatment process, has been finalized. Effluent characteristics will respect standards that are mentioned above.

Table 1.2.1 Comparison of Effluent Discharge Requirements under Directive 019 and MMER

Parameter	MDDEFP Directive 019		*Metal Mining Effluent Regulations*		
	Maximum Acceptable Monthly Mean Concentration	Maximum Acceptable Concentration	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
Arsenic	0.2 mg/L	0.4 mg/L	0.5 mg/L	0.75 mg/L	1 mg/L
Copper	0.3 mg/L	0.6 mg/L	0.3 mg/L	0.45 mg/L	0.6 mg/L
Cyanide	1 mg/L	2 mg/L	1 mg/L	1.50 mg/L	2 mg/L
Iron	3 mg/L	6 mg/L	-	-	-
Lead	0.2 mg/L	0.4 mg/L	0.2 mg/L	0.3 mg/L	0.4 mg/L
Nickel	0.5 mg/L	1 mg/L	0.5 mg/L	0.75 mg/L	1 mg/L
Zinc	0.5 mg/L	1 mg/L	0.5 mg/L	0.75 mg/L	1 mg/L
TSS	15 mg/L	30 mg/L	15 mg/L	22.5 mg/L	30 mg/L
Radium 226	-	-	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L
pH	pH of the effluent must be equal to or greater than 6.0 but not greater than 9.5.		pH of the effluent must be equal to or greater than 6.0 but not greater than 9.5.		
Thiosalts	Concentration must not create a change of pH in the aquatic environment below 6,0 or greater than 9.5.		No requirements.		
Toxicity	Toxicity must be below the acute lethality level as per tests with rainbow trout and daphnia.		The deleterious substance must not be an acutely lethal effluent (test with rainbow trout).		

1.2.3 Information Request No. QEC 03

- Les risques de contamination potentielle des eaux de surface par les composés azotés à la suite des activités d'explosion des roches ne sont pas assez détaillés.
- De même, des détails sur les mesures qui seront prises afin de protéger le milieu aquatique sont manquants.

- Puisque le promoteur écrit que « […] and cause an increase in ammonia and nitrate concentrations […] » (p. 16-11), il aurait été pertinent de prendre les teneurs de base en nitrates dans les deux ruisseaux qui traversent le site ainsi que dans la baie des Sept-Îles. Selon l'information disponible, seul l'azote ammoniacal (nitrogen ammonia) y a été mesuré lors de l'échantillonnage des conditions existantes.

Alderon Response to IR No. QEC 03

Following the environmental assessment approval, a Blasting Plan will be developed and implemented in compliance with all applicable laws, regulations and industry best practices, and with consideration of safety, environmental and social issues as identified throughout the EIS. Alderon's Blasting Plan will provide detailed information on the blasting techniques, procedures, and monitoring. Any requirement to collect baseline data would also be identified as part of the monitoring component of this plan. The plan will address technical aspects of mine blasting as well as addressing environmental interactions.

As indicated in Section 2 of Volume 2 of the EIS, no Kami Terminal Components or construction activities are proposed to occur within the marine environment. For blasting activity which may occur in the vicinity of marine or freshwater environments and as mentioned in Section 16.4, Volume 2 of the EIS on page 16-11, Alderon will respect DFO Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.These guidelines are specifically designed for the conservation and protection of fish, marine mammals, and fish habitat from impacts arising from the use of explosives. For instance, to prevent the deposition of deleterious substances into waters due to the production of toxic by-products (ammonia) during blasting, Alderon will prohibit the use of ammonium nitrate-fuel oil mixtures, such as suggested in the DFO guidelines.

1.2.4 Information Request No. QEC 04

Au tableau 16.2, le promoteur a bien identifié les principales composantes du projet et l'intensité des interactions anticipées en ce qui concerne les effets environnementaux potentiels.

Au tableau 16.3 :

Le promoteur identifie les paramètres mesurables pour les effets environnementaux suivants : « Total suspended solids (TSS), pH and colour in receiving water bodies ».

- Cette liste nous semble incomplète et devrait au minimum contenir aussi les substances susceptibles d'être relarguées sur la base d'essais de lessivage et de lixiviation des matériaux.

Le promoteur écrit : "If NPR is below 4, there is potential for formation of ARD, which could affect surface water quality."

- Au Québec, les résidus acidogènes sont ceux pour lesquels la concentration en Stot est > 0,3% et dont le potentiel de génération acide a été confirmé par des essais de prévision statiques, en répondant à au moins une des deux conditions suivantes :
  - le potentiel net de neutralisation (PNN) d'acide est inférieur à 20 kg $CaCO_3$/tonne de résidus;
  - le rapport du potentiel de neutralisation d'acide sur le potentiel de génération d'acide (PN/PA) est inférieur à 3.
- Résidus lixiviables : Il s'agit de résidus miniers qui, lorsqu'ils sont mis à l'essai conformément à la méthode d'analyse de lixiviation MA.100-Lix.com.1.1 (TCLP), produisent un lixiviat contenant un contaminant dont la concentration est supérieure aux critères applicables pour la protection des eaux souterraines, sans toutefois produire un lixiviat contenant un contaminant dont la concentration est supérieure aux critères énoncés dans le tableau 1 ci-dessous.

Tableau 1

PARAMÈTRE	CRITÈRE (mg/l)
Arsenic	5,0
Mercure	0,1
Baryum	100
Nitrates + nitrites	1000
Bore	500
Nitrites	100
Cadmium	0,5
Plomb	5,0
Chrome	5,0
Sélénium	1,0
Fluorures totaux	150
Uranium	2,0]

Alderon Response to IR No. QEC 04

Despite the limited number of parameters listed in Table 16.3, a much wider range of parameters were considered to evaluate the potential effects of metal leaching on water quality. The assessment included all metals listed in Table 1 of the question QEC 04, all parameters from the *Metal Mining Effluent Regulations* (Federal), and all trace elements listed by the *Canadian Council of Ministers of the Environment Guidelines for Freshwater Aquatic Life* (CCME). The list of elements considered in the assessment is consistent with standard industry practice (Table 1.2.2). Please refer to the attached certificates of analyses (Appendix L) for the full list of parameters.

In all samples, the concentration of total sulfur was below 0.3 percent and NPR (AR/AP) was significantly greater than 3 (Table 1.2.3). Therefore, the rock is considered to be non-acid generating based on these two criteria used in Québec. The average NNP is 15.3 kg

$CaCO_3$/tonne, which is typical for unaltered gabbro (Jambor 2003). The average NNP is slightly below the 20 kg $CaCO_3$/tonne criterion, but it is still positive, indicating significant surplus of neutralizing material. Based on these criteria, the rock is still classified as non-acid generating.

An analysis of samples of water that was draining quarry walls and stockpiles of crushed rocks are considered to be more representative than artificial leaches like TCLP. The concentrations of trace elements in water from the quarry are orders of magnitude lower than in Table 1 from question QEC 04.

It should be mentioned that the TCLP analytical method involves the use of acetic acid buffered at pH 4.9 or 2.9, which can increase the mobility of metals resulting in significant overestimation of the concentrations in leachate. Acidic conditions are not expected according to ARD predictions based on provincial criteria presented in question QEC 04. Therefore, conditions of TCLP leach are not representative of the anticipated pH environment.

Table 1.2.2 Trace Element Concentrations in Water from the Proposed Terminal Site

Sample ID	Units	Guidelines		Water from quarry		Baseline surface water samples								
		MMER	CCME FAL	SIW-1	SIW-2	SW12-01	SW12-02	SW12-03	SW12-04	SW12-06	DUP-2012-06-12	SW12-07	SW12-08	SW12-09
Total Hardness (CaCO3)	mg/L	-	-	-	-	5	55	54	98	89	76	4600	4500	9
pH	pH units	6.5-9.0	6.5-9.0	**9.46**	8.38	**5.07**	6.93	7.14	7.52	7.54	**5.82**	7.96	8.15	7.75
Sulfate	mg/L	-	-	24.4	19.7	-	-	-	-	-	-	-	-	-
Aluminum (Al)-Dissolved	mg/L	-	0.005	0.0624	0.0652	0.72	0.23	0.39	0.38	0.3	0.31	0.06	0.05	0.76
Antimony (Sb)-Dissolved	mg/L	-	-	<0.00020	<0.00020	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Arsenic (As)-Dissolved	mg/L	0.5	0.005	0.00024	0.00044	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Barium (Ba)-Dissolved	mg/L	-	-	0.00387	0.00721	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Calcium (Ca)-Dissolved	mg/L	-	-	14.5	20.4	1	20	18	28	25	22	310	310	2.1
Cadmium (Cd)-Dissolved	mg/L	-	0.00001	<0.000010	0.000015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)-Dissolved	mg/L	-	0.001	<0.0020	<0.0020	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Cobalt (Co)-Dissolved	mg/L	-	-	<0.00020	<0.00020	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Copper (Cu)-Dissolved	mg/L	0.3	0.002	0.00477	0.00779	0.12	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Iron(Fe)-Dissolved	mg/L	-	0.3	<0.10	<0.10	0.9	0.2	1.4	0.8	0.8	0.7	0.2	<0.1	0.8
Lead (Pb)-Dissolved	mg/L	0.2	0.001	<0.000090	<0.000090	<0.001	<0.001	<0.001	0.004	0.003	0.002	<0.001	<0.001	<0.001
Magnesium (Mg)-Dissolved	mg/L	-	-	4.2	4.6	0.6	1.3	2.5	6.9	6.5	5.4	920	910	0.9
Manganese (Mn)-Dissolved	mg/L	-	-	0.00068	0.0384	0.6	0.059	0.25	0.63	0.7	0.60	0.032	0.018	0.55
Mercury (Hg)-Dissolved	mg/L	0.0001	0.000026	<0.000020	<0.000020	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)-Dissolved	mg/L	-	0.073	0.002	0.00107	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Nickel (Ni)-Dissolved	mg/L	0.5	0.025	0.0041	0.0053	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium (Se)-Dissolved	mg/L	-	0.001	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silicon (Si)-Dissolved	mg/L	-	-	4.33	5.19	-	-	-	-	-	-	-	-	-
Silver (Ag)-Dissolved	mg/L	-	0.0001	<0.00010	<0.00010	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Sodium (Na)-Dissolved	mg/L	-	-	49.2	21.7	4	5.2	19	26	27	27	5200	4900	4.5
Thallium (Tl)-Dissolved	mg/L	-	0.0008	<0.00010	<0.00010	-	-	-	-	-	-	-	-	-
Zinc (Zn)-Dissolved	mg/L	0.5	0.03	<0.0020	<0.0020	0.013	0.009	<0.005	0.015	0.014	0.006	<0.005	<0.005	0.010

Notes:
MMER - Metal Mining Effluent Regulations (2002); CCME FAL - Canadian Council of Ministers of the Environment for Freshwater Aquatic Life (1999)
The lowest CCME FAL values for Cd, Cu and Ni were used assuming soft water

Color Key: Within CCME Guideline | Exceeds CCME Guideline | CCME Guideline below detection limit | **Bold** values do not comply with MMER Guideline

Table 1.2.3 Results of Acid-Base Accounting of Materials Exposed at the Proposed Terminal Site

Sample ID	Sample description	Paste pH	NP	AP	Net NP	NP/AP	Total S	SO4-S	Sulfide-S	C	CO3
Units		pH units	t CaCO3/1000 t			Ratio	wt. %				
S1-1	weathered gabbro	7.43	11	0.31	10.9	36.1	0.033	0.02	0.01	0.405	0.066
S1-2	massive gabbro	9.56	15	0.62	14	23.5	0.035	0.01	0.02	0.058	0.146
S1-3	chloritazed gabbro	9.39	18	0.31	17.6	57.7	0.019	0.02	< 0.01	0.046	0.144
S1-4	micro-graninte dyke	9.36	8.2	0.31	7.89	26.5	< 0.005	< 0.01	< 0.01	0.087	0.272
S1-5	micro-gabbro with sulfides	9.22	25	3.12	22.3	8.14	0.128	0.03	0.1	0.031	0.077
S1-6	Crushed rock 0-1/4"	9.03	22	1.25	21	17.8	0.069	0.03	0.04	0.15	0.504
S1-7	Crushed rock 0-1/4"	9.71	19	0.94	17.8	19.9	0.051	0.02	0.03	0.093	0.306
S1-8	Crushed rock, fines	9.74	18	0.94	17.2	19.3	0.051	0.02	0.03	0.084	0.463
S1-9	Crushed rock, fines	9.66	20	0.94	19	21.2	0.059	0.03	0.03	0.067	0.273
S1-10	massive granite	7.33	5.6	0.31	5.29	18.1	0.023	0.02	< 0.01	0.055	0.037

Notes:
AP (Acid Potential) = % Sulphide Sulphur x 31.25
NP = Neutralization Potential

1.2.5 Information Request No. QEC 05

Compléter cette section de l'étude d'impact en indiquant la localisation des points d'échantillonnage des sédiments et en présentant les résultats.

Alderon Response to IR No. QEC 05

Four sediment samples were collected on July 19th 2012 from anse à la Baleine in baie des Sept-Îles. The sediment sampling locations are indicated on Figure 4.1 of the Soil and Sediment Report located in Appendix F of this Amendment. Sediment sampling procedures followed the requirements contained in the MDDEFP *Guide de caractérisation des terrains*.

Of the four sediment samples collected, two (SED-12-02 and SED-12-04) exhibited concentrations above the Threshold Effect Level (TEL) (Criteria for the Assessment of Sediment Quality in Québec and Application Frameworks: Prevention, Dredging and Remediation (Environment Canada and MDDEFP)); for some metals and hydrocarbons. SED-12-02 shows concentrations of chromium and copper greater than the TEL but less than the Probable Effect Level (PEL). SED-12-04 exhibited concentrations of benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, pyrene and copper greater than the TEL but less than the PEL.

For further details, the Soil and Sediment Study conducted for the Kami Concentrate Storage and Load-Out Facility is presented in Appendix F.

1.2.6 Information Request No. QEC 06

Fournir les détails sur ces travaux de dérivation du ruisseau à la Baleine.

- Quels seront les travaux effectués?
- Sur quelle distance auront lieu les travaux?
- Quels seront les équipements installés?
- Sur quelles bases le promoteur affirme qu'aucun effet n'est anticipé, d'autant plus que dans le tableau 16.6 (Change in surface water drainage patterns), aucune mesure d'atténuation n'est proposée?

Afin de diminuer les impacts des travaux de dérivation, nous recommandons au promoteur de :

- S'assurer du libre écoulement de l'eau du ruisseau.
- S'assurer que toutes les traversées permanentes de cours d'eau permettent le libre passage du poisson. À ce sujet, nous vous référons au guide de Bonnes pratiques pour la conception et l'installation de ponceaux de moins de 25 mètres produit par Pêches et Océans Canada (MPO). Également, nous recommandons au promoteur de s'adresser au MPO afin d'obtenir un avis formel sur la protection de l'habitat du poisson.

- Limiter les apports en matières en suspension au ruisseau. À ce propos, nous recommandons les mesures suivantes, sans s'y limiter :
  - *Lors de la surveillance durant les travaux, il serait souhaitable de porter attention à l'importance de la remise en suspension des sédiments et de prendre des mesures, si jugé nécessaire, afin de s'assurer du respect des recommandations canadiennes pour la qualité des eaux (protection du milieu aquatique) du Conseil canadien des ministres de l'environnement (CCME), étant donné que le ruissellement pourrait entraîner des particules vers le ruisseau à la Baleine et éventuellement vers la baie des Sept-Îles.*
  - *Les recommandations du CCME indiquent que les activités humaines ne devraient pas engendrer une augmentation des sédiments en suspension de plus de 25 mg/L lorsque les concentrations de matières particulaires totales de fond sont de moins de 250 mg/L et lorsque l'exposition est de courte durée. Lorsque les concentrations de fond sont plus élevées que 250 mg/L, les activités humaines ne devraient pas engendrer un dépassement en sédiments en suspension de plus de 10% par rapport à la concentration de matières particulaires totales de fond (CCME, 1994. Recommandations canadiennes pour la qualité des eaux : protection de la vie aquatique - Matières particulaires totales).*
  - *Nous référons le promoteur aux sites Internet suivants :*
    - *Recommandations canadiennes pour la qualité des eaux (protection de la vie aquatique) : http://st-ts.ccme.ca/?lang=fr*
    - *Critères de qualité de l'eau de surface : http://www.MDDEFP.gouv.qc.ca/eau/criteres_eau/index.asp.*

À noter que ces recommandations s'appliquent également aux traverses des cours d'eau prévues lors de l'aménagement de la boucle ferroviaire.

Alderon Response to IR No. QEC 06

As mentioned in Section 18.1, Volume 2 of the EIS, neither ruisseau à la Baleine nor the unnamed stream provide habitat that supports freshwater fish populations. However they both flow into baie des Sept-Îles. As mentioned in Section 16.6.1 (page 16-20) of the EIS, in order to limit the input of suspended solids in the watercourses during the construction phase, including the ruisseau à la Baleine diversion work, the following mitigation measures will be implemented:

- Apply standard and best practices and general environmental protection measures;
- Use of silt fencing downstream of the work area and at the limits of the work zone to reduce the carriage of silt and fines in any water runoff from the area;
- Avoid unnecessary encroachments in the riparian habitat on either side of streams;
- No disposal of debris in the aquatic environment and any debris introduced to be removed as soon as possible;

- No earth-moving or excavation work to be carried out near streams during high water periods or heavy rains;
- Use machinery that is in proper operating condition in order to avoid any oil or fuel leaks;
- Clean, maintain and store work site machinery and vehicles on a site designated for this purpose at a distance of over 30 metres from streams and ensure an on-site supply of absorbent materials in case of accidental spills as well as properly identified sealed recipients for collecting petroleum products and waste materials; and,
- Stabilize slopes as soon as possible using recognized bioengineering techniques that take into account instability, sensitivity to erosion, slope and height of the embankment.
- Flows in both ruisseau à la Baleine and in the unnamed stream will be maintained.

1.2.7 Information Request No. QEC 07

Puisque selon le promoteur une partie importante des terrains qui serviront à l'établissement du terminal a déjà fait l'objet de perturbations par des activités industrielles, il est généralement de mise de procéder à une caractérisation des sols avant le début de la construction des infrastructures. Est-ce qu'une caractérisation du substrat rocheux a été réalisée? Si oui, décrire la méthodologie et en présenter les résultats.

- De même, présenter les résultats des analyses du « ARD/ML testing of geologic materials » réalisées par Stantec en indiquant clairement la provenance des échantillons, leur représentativité par rapport aux matériaux qui seront mobilisés pour la construction du terminal, les méthodes de référence utilisées pour les fins analytiques, etc. Fournir la caractérisation géochimique des matériaux qui seront utilisés de même que la composition du concentré qui sera entreposé sur les aires de stockage prévus.
- Enfin, plus loin le promoteur rapporte des « […] analysis of two water samples taken from pools in the existing quarry […] ». Selon la Directive 019, les essais de lixiviation des métaux sont réalisés sur des échantillons de matériaux selon les conditions établies par la méthode d'analyse lixiviation MA.100-Lix.com.1.1 (TCLP). Les résultats et certificats d'analyse devraient être présentés afin de nous permettre de formuler un avis.

Alderon Response to IR No. QEC 07

The rock substrate was characterized and methodology and results are presented in the EIS, Volume 2, Section 16.6.1, Page 16-20. See additional information hereafter.

Methodology

The approach for the proposed ARD/ML investigation is generally referred to in the MEND Prediction Manual for the Drainage Chemistry from Sulfidic Geological Materials (Price 2009). Ten (10) samples representing different lithologies and materials were collected from the Site on June 18, 2012, by a qualified geochemist. The ARD potential of these samples was determined by Acid-Base Accounting (ABA), which included tests for paste pH, Neutralization Potential, total and sulfate sulfur, and total and carbonate carbon. The ARD potential was also measured in six (6) samples of concentrate and tailings that had been generated from the ore during metallurgical testing. The certificates of analyses including original results, quality checks, and references to analytical methods are presented in Appendix L.

Metal leaching potential was assessed through analysis of two water samples taken from quarry pools. Samples were filed, filtered, and preserved (aliquot for metals only). Water was analyzed for pH, sulfate, and dissolved metals. Process water from the metallurgical testing was also collected, filtered and analyzed for routine parameters and metals. Concentrates also underwent Shake-Flask Extraction (SFE) to measure the potential for metal leaching. Measured parameters were compared to the *Metal Mining Effluent Regulation* (MMER 2002), the Canadian Environment Ministry of the *Environment Guidelines for the Protection of Freshwater Aquatic Life Guidelines* (CCME 2008), and to baseline water chemistry of streams surrounding the Site.

Results and Discussion

The highest concentration of total sulfur was 0.13 wt.% and was associated with the sample of micro-gabbro. Sulfur concentrations in other samples were below 0.07 wt.%. ABA tests indicated that the values of Neutralization Potential (NP) exceeded Acid Potential (AP) in all samples, including sulfide containing micro-gabbro. The NP/AP ratio, or Neutralization Potential Ratio (NPR), is used as a criterion in the recommended guidelines for the prediction of ARD potential in geologic materials (Price 2009). Usually, materials with NPR>2 are considered non-Potentially Acid Generating (non-PAG). In all samples, NPR greatly exceeded this threshold, indicating that all materials included can be classified as non-acid generating. Paste pH of the samples is above 7.3, showing no signs of acidification, similar to water samples collected from pools in the quarry. All evidence indicates that ARD will not likely arise from exposure of rock surfaces and/or later use of crushed materials on the site.

Metal concentrations in quarry pools were significantly below the MMER guidelines (Table 1.2.2). Concentrations of aluminum, copper, and cadmium exceeded the CCME guidelines. Aluminum concentrations in pool samples were at a level of 0.06 mg/L, which was significantly lower than median baseline concentrations of 0.32 mg/L. The highest copper concentrations were 0.008 mg/L, exceeding the CCME guideline (0.002 mg/L) four times. A sample from the baseline dataset had greater concentrations of copper (0.12 mg/L) than in water from the quarry (Table 1.2.2). Cadmium exceeded the CCME guideline marginally (1.5 X) in only one quarry sample. It should be mentioned that this result was also close to the detection limit and could be related to analytical complications. In general, it could be concluded that the concentrations of the elements exceeding the CCME guidelines were within the range of baseline concentrations. Therefore, metal leaching from the rock will not likely cause any significant change in the concentrations of these elements in surface water and sediments.

The samples of Kami concentrate and tailings had NPR values ranging from 7.3 to 34.7, which indicated that tailings and concentrate would not generate ARD (Table 1.2.4). In addition, process water and SFE leachates were alkaline, with the pH ranging from 8.1 to 9.1

(Table 1.2.5). The conclusion is that the concentrate and tailings will be non-acid generating. Metal concentrations in the process water and SFE leachates from tailings and concentrates were significantly below parameters prescribed by the MMER Guidelines.

Table 1.2.4 Acid Base Accounting of Kami Concentrates from Metallurgical Testing

Sample ID		Alderon GC #1	Alderon GC #2	Alderon GC #3	Alderon MC #1	Alderon MC #2	Alderon MC #3
Analysis	**Units**	**Gravity concentrate**			**Magnetic concentrate**		
Paste pH	pH units	8.62	8.56	8.61	8.61	8.56	8.62
Fizz Rate	---	3	3	3	3	3	3
S	%	0.057	0.052	0.056	0.057	0.059	0.056
SO4-S	%	0.01	< 0.01	0.01	0.04	0.03	0.04
Sulfide	%	0.04	0.05	0.04	0.02	0.02	0.02
C	%	0.405	0.238	0.342	0.459	0.464	0.462
CO3	%	0.470	0.163	0.356	1.07	1.11	1.09
NP	t CaCO3/1000 t	19.1	11.4	14.7	20.3	21.5	20.5
AP	t CaCO3/1000 t	1.25	1.56	1.25	0.62	0.62	0.62
Net NP	t CaCO3/1000 t	17.8	9.84	13.4	19.7	20.9	19.9
NPR	ratio	15.3	7.31	11.8	32.7	34.7	33.1
Average NPR ± S.D.	ratio	11.5	±	3.3	33.5	±	0.9

Notes:
NP (Neutralization Potential)
AP (Acid Potential) = % Sulphide Sulphur x 31.25
Net NP (Net Neutralization Potential Ratio) = NP-AP
NPR (Neutralization Potential Ratio) = NP/AP
Samples with a % Sulphide value of <0.01 will be calculated using a 0.01 value
Sulphur analysis performed following BC ARD Guidelines (Price 1997)

Table 1.2.5 Analyses of Process Water and Shake-flask Extractions (SFE)

Analysis	Units	MMER Guideline	CCME FAL Guideline	Alderon Process Water #1		Alderon Process Water #2		Alderon Process Water #3		Alderon GC #1	Alderon GC #2	Alderon GC #3	Alderon MC #1	Alderon MC #2	Alderon MC #3
Routine water chemistry															
TSS	mg/L	15	-	3		**145**		**678**		-	-	-	-	-	-
TDS	mg/L	-	-	200		234		171		-	-	-	-	-	-
pH*	units	-	6.5-9.0	8.12		8.31		8.17		**9.10**	**9.07**	**9.13**	8.8	8.77	8.89
Alkalinity	mg/L as CaCO3	-	-	114		164		118		-	-	-	-	-	-
Conductivi	µS/cm	-	-	286		375		289		-	-	-	-	-	-
NH3+NH4	as N mg/L	-	0.14	< 0.1		0.1		0.1		-	-	-	-	-	-
Cl	mg/L	-	120	22		21		20		-	-	-	-	-	-
SO4	mg/L	-	-	8.7		15.0		8.6		-	-	-	-	-	-
NO2	as N mg/L	-	-	< 0.06		< 0.06		< 0.06		-	-	-	-	-	-
NO3	as N mg/L	-	10	0.23		< 0.05		0.20		-	-	-	-	-	-
Metal scan				Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved
Hg	mg/L	-	0.000026	-	0.00001	-	0.00001	-	0.00002	< 0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
Ag	mg/L	-	0.0001	< 0.00001	< 0.00001	-	0.00008	0.00001	0.00011	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Al	mg/L	-	0.1	0.02	0.04	**0.15**	**0.54**	0.08	**0.76**	**0.16**	**0.16**	**0.16**	0.02	0.01	0.02
As	mg/L	0.5	0.005	0.0004	0.0005	0.0012	0.0019	0.0010	0.0020	0.0008	0.0007	0.0010	0.0002	< 0.0002	0.0002
Ba	mg/L	-	-	0.0807	0.0942	0.177	0.373	0.187	0.688	0.0384	0.0569	0.0597	0.0147	0.0146	0.013
Be	mg/L	-	-	0.00002	0.00005	0.00021	0.00061	0.00016	0.00105	0.0033	0.0027	0.0029	0.0033	0.003	0.0026
B	mg/L	-	-	0.0076	0.0077	0.0287	0.0283	0.0087	0.0096	0.00005	0.00006	0.00005	< 0.00002	< 0.00002	< 0.00002
Ca	mg/L	-	-	42.1	43.6	48.1	55.7	44.7	64.7	7.60	6.97	7.28	12.2	12.7	11.3
Cd	mg/L	-	0.00004	0.000008	0.000016	< 0.000003	**0.000045**	0.000023	**0.000096**	0.000004	< 0.000003	< 0.000003	0.000005	0.000006	0.000006
Co	mg/L	-	0.004	0.0004	0.0007	0.0015	0.0038	0.0015	0.0077	0.0002	0.0002	0.0002	0.000067	0.000073	0.000067
Cr	mg/L	-	0.001	< 0.0005	0.0007	0.0039	0.0095	0.0011	0.0051	< 0.0005	0.0005	< 0.0005	0.0038	0.0037	0.0036
Cu	mg/L	0.3	0.0028	**0.0034**	**0.0043**	**0.0041**	**0.0079**	**0.0040**	**0.0128**	0.0015	0.0017	0.0012	0.0023	0.0024	0.0021
Fe	mg/L	-	0.3	**0.995**	**1.67**	**7.71**	**20.9**	**8.21**	**44.2**	**1.04**	**1.09**	**0.91**	**0.25**	**0.32**	**0.34**
K	mg/L	-	-	1.98	1.98	7.76	8.15	2.18	2.56	0.27	0.21	0.25	0.476	0.447	0.479
Mn	mg/L	-	-	0.45	0.89	3.14	8.13	3.3	20.2	-	-	-	1.75	1.8	1.5
Mg	mg/L	-	-	4.84	5.13	15.7	19.1	6.64	15.2	2.08	1.93	2.07	0.0223	0.0254	0.0232
Mo	mg/L	-	0.073	-	0.0011	-	0.0144	-	0.0005	0.0044	0.0039	0.0040	0.00652	0.00649	0.00566
Na	mg/L	-	-	10.6	10.7	10.3	10.0	9.56	10.1	0.27	0.22	0.21	0.34	0.34	0.29
Ni	mg/L	0.5	0.113	0.0014	0.0016	0.0073	0.0095	0.0022	0.0049	0.0004	0.0004	0.0003	0.0006	0.0006	0.0005
Pb	mg/L	0.2	0.0063	0.00008	0.00063	0.00046	0.00132	0.00046	0.00263	0.00012	0.00011	0.00007	0.00006	0.00007	0.00008
Sb	mg/L	-		< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002	0.0002	0.0002
Se	mg/L	-	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Si	mg/L	-	-	3.27	3.04	14.3	13.6	6.10	10.7	3.46	2.97	3.37	1.49	1.55	1.42
Sn	mg/L	-	-	< 0.00001	0.00008	0.00007	0.00015	0.00005	0.00016	< 0.00001	< 0.00001	0.00002	0.00002	0.00002	0.00002
Tl	mg/L	-	0.0008	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
U	mg/L	-	0.015	0.0008	0.0008	0.0110	0.0113	0.0013	0.0017	0.0003	0.0002	0.0002	0.00203	0.000069	0.000053
V	mg/L	-	-	0.00009	0.00016	0.00069	0.00084	0.00053	0.00144	0.00018	0.00015	0.00018	< 0.00003	< 0.00003	< 0.00003
Zn	mg/L	0.5	0.03	0.003	0.005	0.008	0.014	0.008	**0.032**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001

Notes: MMER - Metal Mining Effluent Regulations (2002); CCME FAL - Canadian Council of Ministers of the Environment for Freshwater Aquatic Life (1999)
CCME FAL values for Cd, Cu and Ni were calculated based on minimum hardness estimated for process water (125 mg/CaCO3)
Excedances of the CCME guidelines are bolded.
* Final pH values were repoted for SFE results

ARD/ML characterization of concentrate was performed and presented in Volume 1, Section 15.6.4, p.15-28.

In summary, the samples of Kami concentrate had NP/AP values ranging from 7.3 to 233, which indicated that the concentrate would not generate ARD using ether Québec's or federal (MEND) guidelines.

Metal concentrations in the process water and SFE leachates from the concentrates were significantly below parameters prescribed by the MMER Guidelines and Table 1 mentioned in the question / information request QEC04.

Based on the evidence presented above, the concentrate and tailings are considered non-acid generating with low metal leaching potential.

An analysis of samples of water that was draining quarry walls and stockpiles of crushed rocks are considered to be more representative than artificial leaches like TCLP. The concentrations of trace elements in water from the quarry are orders of magnitude lower than in Table 1 from question QEC 04.

It should be mentioned that the TCLP analytical method involves the use of acetic acid buffered at pH 4.9 or 2.9, which can increase the mobility of metals resulting in significant overestimation of the concentrations in leachate. Acidic conditions are not expected according to ARD predictions based on provincial criteria presented in question QEC 04. Therefore, conditions of TCLP leach are not representative of the anticipated pH environment.

References:

Canadian Council of Ministers of the Environment (CCME) 1999. *Canadian Environmental Quality Guidelines for the Protection Environmental and Human Health*. Report ISBN 1-896997-34-1. Publication No. 1299 Winnipeg, Manitoba. Updated periodically.

Metal Mining Effluent Regulations under *Fisheries Act 2002*. SOR/2002-222. Department of Justice Canada.

Price, W.A. 2009, Prediction Manual for Drainage Chemistry from Sulfidic Geologic Materials. Report prepared for MEND. Report 1.20.1.

1.2.8 Information Request No. QEC 08

Les renseignements fournis sont insuffisants. Le promoteur doit fournir l'information sur les échantillons, leurs compositions, les renseignements sur les méthodes d'analyse utilisées, les résultats des analyses, etc.

Alderon Response to IR No. QEC 08

Rock Substrate

The rock substrate was characterized and methodology and results are presented in the EIS, Volume 2, Section 16.6.1, pages 16-20. Additional information is presented hereafter.

Methodology

The approach for the proposed ARD/ML investigation is generally referred to in the MEND Prediction Manual for the Drainage Chemistry from Sulfidic Geological Materials (Price 2009). Ten (10) samples representing different lithologies and materials were collected from the site on June 18, 2012, by a qualified geochemist. The ARD potential of these samples was determined by Acid-Base Accounting (ABA), which included tests for paste pH, Neutralization Potential, total and sulfate sulfur, and total and carbonate carbon. The ARD potential was also measured in six (6) samples of concentrate and tailings that had been generated from the ore during metallurgical testing. The certificates of analyses including original results, quality checks, and references to analytical methods are presented in Appendix L.

Metal leaching potential was assessed through analysis of two water samples taken from quarry pools. Samples were filed, filtered, and preserved (aliquot for metals only). Water was analyzed for pH, sulfate, and dissolved metals. Process water from the metallurgical testing was also collected, filtered and analyzed for routine parameters and metals. Concentrates also underwent Shake-Flask Extraction (SFE) to measure the potential for metal leaching. Measured parameters were compared to the *Metal Mining Effluent Regulation* (MMER 2002), the Canadian Environment Ministry of the *Environment Guidelines for the Protection of Freshwater Aquatic Life Guidelines* (CCME 2008), and to baseline water chemistry of streams surrounding the Site.

Results and discussion

The highest concentration of total sulfur was 0.13 wt.% and was associated with the sample of micro-gabbro. Sulfur concentrations in other samples were below 0.07 wt.%. ABA tests indicated that the values of Neutralization Potential (NP) exceeded Acid Potential (AP) in all samples, including sulfide containing micro-gabbro. The NP/AP ratio, or Neutralization Potential Ratio (NPR), is used as a criterion in the recommended guidelines for the prediction of ARD potential in geologic materials (Price 2009). Usually, materials with NPR>2 are considered non-Potentially Acid Generating (non-PAG). In all samples, NPR greatly exceeded this threshold, indicating that all materials included can be classified as non-acid generating. Paste pH of the samples is above 7.3, showing no signs of acidification, similar to water samples collected from pools in the quarry. All evidence indicates that ARD will not likely arise from exposure of rock surfaces and/or later use of crushed materials on the Site.

Metal concentrations in quarry pools were significantly below the MMER guidelines (Table 1.2.2). Concentrations of aluminum, copper, and cadmium exceeded the CCME guidelines. Aluminum concentrations in pool samples were at a level of 0.06 mg/L, which was significantly lower than median baseline concentrations of 0.32 mg/L. The highest copper concentrations were 0.008 mg/L, exceeding the CCME guideline (0.002 mg/L) four times. A sample from the baseline dataset had greater concentrations of copper (0.12 mg/L) than in water from the quarry (Table 1.2.2). Cadmium exceeded the CCME guideline marginally (1.5x) in only one quarry sample. It should be mentioned that this result was also close to the detection limit and could be related to analytical complications. In general, it could be concluded that the concentrations of the elements exceeding the CCME guidelines were within the range of baseline concentrations. Therefore, metal leaching from the rock will not likely cause any significant change in the concentrations of these elements in surface water and sediments.

The samples of Kami concentrate and tailings had NPR values ranging from 7.3 to 34.7, which indicated that tailings and concentrate would not generate ARD (Table 1.2.2). In addition, process water and SFE leachates were alkaline, with the pH ranging from 8.1 to 9.1 (Table 1.2.3). The conclusion is that the concentrate and tailings will be non-acid generating. Metal concentrations in the process water and SFE leachates from tailings and concentrates were significantly below parameters prescribed by the MMER Guidelines.

Kami Ore Concentrate

For ARD/ML characterization of concentrate was performed and presented in Volume 1, Section 15.6.4, p.15-28.

The samples of Kami concentrate had NP/AP values ranging from 7.3 to 34.7, which indicated that the concentrate would not generate ARD using ether Québec's or federal (MEND) guidelines.

Metal concentrations in the process water and SFE leachates from the concentrates were significantly below parameters prescribed by the MMER Guidelines and Table 1 from QEC 04.

Based on the evidence presented above, the concentrate and tailings are considered non-acid generating with low metal leaching potential.

An analysis of samples of water that was draining quarry walls and stockpiles of crushed rocks are considered to be more representative than artificial leaches like TCLP. The concentrations of trace elements in water from the quarry are orders of magnitude lower than in Table 1 (Table 1.2.2).

It should be mentioned that the TCLP analytical method involves the use of acetic acid buffered at pH 4.9 or 2.9, which can increase the mobility of metals resulting in significant overestimation of the concentrations in leachate. Acidic conditions are not expected according to ARD predictions based on provincial criteria presented in question QEC 04. Therefore, conditions of TCLP leach are not representative of the anticipated pH environment.

Taking all of this into account, it is anticipated that metal leaching from the rock will not likely cause any significant change in the concentrations of these elements in surface water and sediments.

1.2.9 Information Request No. QEC 09

- Il est dit que la sélection finale du traitement du système de traitement des eaux rouges est encore à déterminer. Certains détails importants sont manquants et devraient être présentés, par exemple : quel procédé sera retenu, quels produits chimiques seront utilisés, quels sont les autres intrants et extrants, quel sera le bilan des eaux?
- Il est mentionné par le promoteur qu'un bassin de rétention d'une capacité de 25 000 m^3 sera construit pour accumuler les eaux de ruissellement du site et qu'un effluent final de 8 300 m^3/j est prévu. Ces valeurs seront utilisées pour la conception des ouvrages de captage et de traitement des eaux usées. Le promoteur devrait présenter comment il en est arrivé à ces valeurs (précipitations, coefficient de ruissellement selon la nature des surfaces, % d'eau dans le concentré, bilan d'eau du site, etc.).
- Est-ce que le promoteur a envisagé l'option de rejeter l'effluent final dans la baie de Sept-Îles au lieu du ruisseau à la Baleine? Quelles sont les raisons motivant ce choix et quels critères environnementaux ont été utilisés pour retenir le ruisseau comme milieu récepteur de l'effluent?
- Quels sont/seront les débits des deux ruisseaux sur le site, avant et après la mise en service du terminal ?
- Le promoteur n'a pas présenté les résultats de l'étude hydrologique du site proposé pour le projet.
- De même, aucune étude hydrogéologique n'a été réalisée sur le site car le promoteur compte utiliser un « liner » sous la pile de stockage de concentré et dans le bassin de rétention. L'imperméabilité des membranes n'est jamais de 100% et il peut y avoir une dégradation de l'imperméabilité avec le temps. Le promoteur a indiqué que des mesures seraient mise en place pour assurer le suivi de la qualité des eaux souterraines. Est-il possible d'avoir plus de précisions à cet effet (nombre et localisation des puits de surveillance, profondeur des puits, profondeur de la nappe, direction de l'écoulement, etc.).

Alderon Response to IR No. QEC 09

Red Water Treatment

Run off water treatment (to remove any red water) is planned for any rainwater, or snow melt that can potentially be in contact with the iron ore concentrate. Water will be contained by a clay liner and collected with buried drainage piping over the entire concentrate storage yard. This water will flow to a retention pond for treatment. Other potential concentrate spill areas, such as the rotary car dumper, maintenance and adjacent areas will also drain to the retention pond.

Treatment of the storm water will include sedimentation which will occur in the retention pond and, if required, mechanical treatment of the decant water will be done prior to release. The mechanical treatment is currently anticipated to include an enhanced coagulation / settling treatment system which includes pH adjustment, feed of sand as a ballast to improve settling, and settling substrate, a polymer feed, an inclined plate settling chamber, ongoing removal of settled sludge and sand recovery system. The system uses the same mechanical treatment that is in use at a number of similar facilities.

As indicated in Volume 2 of the EIS, page 16-22, the final selection of the appropriate treatment technique depends on the treatability characteristics of the concentrate transfer area drainage and will be determined during the detailed engineering phase of the Kami Terminal. This includes details regarding the water balance and input / output parameters to the proposed system. Available details regarding the treatment concept currently under consideration is found in Volume 2 of the EIS, pages16-22 and 16-23.

Retention Basin Sizing

The storm water management system for the Kami Terminal will be designed to prevent an uncontrolled release of water from the site including diversion of clean storm water around the site to minimize the volume of water that will potentially be in contact with iron ore and design of storm water collection and treatment to meet up to date information and predictions of storm intensity and volumes of precipitation.

The retention pond is sized to receive a run off volume of 1,037 m^3/hr, which is consistent with a 1 in 100 year rain event, over a 24 hour period, for a total volume capacity of 25,000 m^3. The treatment plant has been sized to treat the collected water over a 4-day period, at a flow rate of approximately 4.3 m^3/min. This flow rate is capable of managing high water volumes including a very wet season. In order to exceed the flow conveyance of the system there would need to be a second 1 in 100 year storm event within 4 days of the initial storm.

Selection of Ruisseau à la Baleine

Ruisseau à la Baleine was selected for the final release of treated effluent because it has been shown not to provide fish habitat, and is located within a reasonable proximity to the storm water retention pond. There is no evidence of adverse effects of red water on fish and fish habitat (Canada Gazette 2009). All run off water that could potentially come in contact with the ore concentrate would be collected and treated prior to release.

Stream flows and Hydrological Assessment

There was no hydrologic assessment of the two streams. Stream flows on the unnamed stream will remain the same before and after construction. New culverts will be sized to match existing culverts downstream. Stream flows in ruisseau à la Baleine will be slightly modified since part of the precipitations and snowmelt will be intercepted by the retention pond. Discharge rate from the runoff water treatment system is sized at 4.3 m^3/min, which would allow treatment of water over a 4 day period of 25,000 m^3 collected over 24 hours based on the Environment Canada Intensity-Duration-Frequency curves for a 1 in 100 year storm event. New culverts, if needed at the inlet and outlet of the retention pond, will be sized accordingly. Being that the retention pond will buffer stream flows downstream, the existing culverts will remain adequate.

Groundwater Monitoring

Prior to initiation of Project activities, a detailed compliance monitoring and follow-up program will be developed by Alderon and submitted to appropriate regulatory agencies for review prior to the initiation of Project activities. The follow-up program will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF. The final design of both biophysical and socio-economic follow-up and monitoring programs will, as appropriate, be dependent on consultation with relevant government agencies, communities and stakeholders. Such programs will also be consistent with the terms and conditions of permits and approvals. As a result, proposed follow-up and monitoring programs must be described at this time in a more general manner so as not to pre-suppose the needs or interests of other involved parties.

References:

Canada Gazette. 2009. Regulations Amending the Metal Mining Effluent Regulations. Volume 143 (4). February 18.

1.2.10 Information Request No. QEC 10

Considérant les impacts sur la qualité des sédiments d'activités similaires de transbordement de minerai de fer au Port de Sept-Îles :

- Décrire de quelle façon se dérouleront les activités de transbordement du minerai.
- Quelles mesures seront mise en place pour éviter ou limiter les pertes de minerai?
- Est-ce que des dragages d'entretien autour du quai sont prévus? À quelle fréquence?
- Dans l'éventualité où des sédiments présenteraient de fortes concentrations en fer, de quelle façon ces sédiments seraient gérés ou valorisés?]

Alderon Response to IR No. QEC 10

As mentioned in Volume 2 of the EIS, Section 4.5.1, page 4-20 of, iron ore concentrate will be carried from the concentrate storage and load-out facility at the Kami Terminal to the port common offload point. Handling of ore for shiploading is under the responsibility of the Sept-Îles Port Authority.

Alderon's responsibility is limited to mitigating the effects of its activities up to the common offload point. For instance, to prevent spillage of product, Alderon will build an enclosed conveyor system up to the common offload point.

Information that is sought regarding sea dredging, sediment quality and general management of areas under the responsibility of the Port of Sept-Îles should be by addressed to the Sept-Îles Port Authority.

1.2.11 Information Request No. QEC 11

Au sujet des mesures d'atténuation, le promoteur écrit : "Apply standard and best practices and general environmental protection measures."

- Préciser quelles sont ces meilleures pratiques et mesures générales de protection.

Alderon Response to IR No. QEC 11

Best practices and standard environmental protection measures refers to those measure and practices which have been employed on similar construction sites and terminal operations, are accepted in Québec and Canada, comply with applicable industry standards, guidelines, regulations and conditions of permits and approvals, and have been demonstrated to be effective on similar projects. Table 16.6 of Volume 2 of the EIS provides some examples of these measures, while other specific measures are included in Volume 2 of the EIS on pages 5-4, 8-3, and 8-4. Additional site-specific measures will be further developed and outlined in the Environmental Protection Plan (EPP) once detailed Project design information is available. Prior to initiation of Project activities, the EPP and follow-up program will be developed by Alderon and submitted to appropriate regulatory agencies for review. The EPP and Follow-up Program will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

1.2.12 Information Request No. QEC 12

- La description des impacts cumulatifs est plutôt générale. Il serait intéressant d'exposer le détail des travaux dans le cadre des divers projets présentés et ayant cours dans la zone d'étude, de même que de détailler la façon dont les projets interagiront avec le projet de terminal de Kami.

Alderon Response to IR No. QEC 12

The proposed Kami Terminal would be located in an already industrialized area with few natural habitats. It is located on the lands of the Port Authority of Sept-Îles, adjacent to existing load-out operating facilities (the Pointe-Noire Terminal). The Pointe-Noire Terminal has been in operation for many decades and the region has long been the centre of natural resource exploitation (hydro-electricity generation, mining and shipping). The proposed Kami Terminal will be designed, permitted and constructed in such a manner as to minimize further degradation of the existing environment.

The approach to assessing cumulative effects in relation to the Kami Terminal was a phased approach. It first considers the effects of past and on-going projects and activities as part of the pre-Project environment baseline, and integrally considers and incorporates this baseline (and the resulting current condition of the VEC) into the environmental effects assessment. The likely nature and degree of change from this existing (baseline) environment as a result of the Project's effects in combination with other relevant ongoing and future projects and activities is then assessed (as presented for the Water Resources VEC in Section 16.7 of Volume 2 of the EIS). Finally, it concludes by providing a summary and evaluation of these predicted cumulative effects, using the same effects descriptors and significance definition and approach is used for the Project-specific environmental effects assessment.

For future projects that were considered as part of the cumulative impact assessment of the Kami Terminal, the information provided in Section 16.7 of Volume 2 of the EIS reflects the level of detail currently available. Detailed information on future effluent characteristics, flows, volume of water and concentration of pollutants were not available to Alderon at this point and may only be available once these projects have achieved the permitting stage of their development. Therefore, the approach that was adopted for cumulative effects assessment on Water Resources for the Kami Terminal is based on all future projects coming on line in the foreseeable future including the Kami Terminal having to abide by regulatory water quality standards and criteria. Based on this assumption, no significant cumulative effects have been predicted for Water Resources with a high level of confidence.

In addition, prior to initiation of Project activities, a detailed compliance monitoring and follow-up program will be developed by Alderon and submitted to appropriate regulatory agencies for review prior to the initiation of Project activities. The follow-up program will be developed within the Sustainability Management Framework (SMF) presented in Appendix J and more specifically within the Environmental Management System that is one of three components of the SMF. The final design of both biophysical and socio-economic follow-up and monitoring programs will, as appropriate, be dependent on consultation with relevant government agencies, communities and stakeholders. Such programs will also be consistent with the terms and conditions of permits and approvals.

1.2.13 Information Request No. QEC 13

- Quelles sont ces mesures d'atténuation? Les mesures d'atténuation pour réduire les impacts du projet doivent être détaillées dans l'étude d'impact et non seulement dans le « Environmental Protection Plan » qui n'a pas encore été présenté.

Alderon Response to IR No. QEC 13

Standard erosion control measures are outlined in different parts of Volume 2 of the EIS. In Chapter 5 entitled Avoidance and Mitigation Measures, see measures on page 5-4, in Chapter 8 entitled Environmental Management, see measures on pages 8-3, 8-4 and in Chapter 16 on Water Resources, see pages 16-20 and 16-21.

Alderon has committed to applying best practices and standard environmental protection measures which refers to those measure and practices which have been employed on similar construction sites and terminal operations, are accepted in Québec and Canada, comply with applicable industry standards, guidelines, regulations and conditions of permits and approvals, and have been demonstrated to be effective on similar projects. Prior to initiation of Project activities, Alderon will submit an Environmental Protection Plan (EPP) to appropriate regulatory authorities for review and approval. The EPP will specify the mitigation measures and procedures to be used on site in sufficient detail to allow contractors and employees to implement these commitments in the field. This phased process of EIS development, followed by EPP development, recognizes that detailed Project design information, which is still on-going, is required to fully operationalize the higher-level commitments contained in the EIS. It also allows for regulatory review and approval of these details through the EPP, prior to Project initiation.

The EPP and Follow-up Program will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF. The Sustainability Management Framework is a part of the overall Kami Project management system that includes quality management systems, document control, risk management and Health, Safety and Environment (HSE) systems. The framework is made up of three main systems, the components of which are shown in Appendix J.

1. The Sustainable Project Delivery (SPD) system will provide a high level approach to sustainability management by establishing clear objectives, tracking of key Project commitments, support for engineering and procurement activities and reporting on overall sustainability performance.

2. The Environmental Management System (EMS) will provide detailed management of regulatory and permit requirements and includes environmental protection plans and procedures. The EMS will include environmental monitoring and reporting on specific construction and operational activities. Environmental Management Plans will be developed in consultation with relevant regulatory agencies and stakeholder groups.

3. The Social Responsibility System (SRS) will manage and track the commitments made in various guidance documents and contracts (e.g., benefits agreement) as well as establish plans for effective Project communications, community liaison and complaints management.

Working closely with the HSE team, the SMF will facilitate the incorporation of sustainability issues into employee orientation, daily tailgate and safety meetings, contractor management, monitoring and incident response procedures.

1.2.14 Information Request No. QEC 14

- Le promoteur ne précise pas s'il prévoit évaluer la qualité environnementale des sols excavés. Est-ce qu'une caractérisation des sols en place a déjà été effectuée? Si oui, quels en sont les résultats?
- Dans le cas où le promoteur désire réutiliser les sols excavés (comme mentionné à la page 2-16), leur qualité environnementale devrait être évaluée afin d'assurer une gestion adéquate et ce, particulièrement si des indices de contamination (p.ex. odeurs, débris, etc.) sont relevés.

- Advenant la présence de sols contaminés, nous tenons à souligner que lorsque les sols sont gérés de façon in situ sur des terres fédérales, la qualité des échantillons de sols devrait être comparée aux critères du Conseil canadien des ministres de l'environnement (CCME - Recommandations canadiennes pour la qualité des sols). Pour les sols gérés hors site sur un territoire provincial, ceux-ci doivent respecter le cadre législatif prévu par la province, soit la Politique de protection des sols et de réhabilitation des terrains contaminés du ministère du Développement durable, de l'Environnement et des Parcs (MDDEFP) du Québec.

De manière générale, nous recommandons la mise en œuvre des mesures d'atténuation suivantes, sans s'y limiter, afin d'éviter les effets environnementaux négatifs qui pourraient être engendrés lors de l'excavation, de l'entreposage temporaire et de la gestion des sols :

- Élaborer un plan de gestion pour les différents types de matières résiduelles peu importe leur nature, et non seulement les sols excavés.
- Faire des piles distinctes pour les matériaux, les sols et les déchets selon qu'ils sont dangereux/contaminés ou non.
- Exécuter l'excavation des sols de manière à ce qu'elle produise le moins de poussière possible.
- Entreposer temporairement (sur le site) les sols excavés et les déchets dangereux ou potentiellement contaminés sur des toiles étanches jusqu'à leur évacuation hors du site ou encore les déposer directement dans les contenants étanches prévus pour leur évacuation.
- Empêcher l'infiltration des précipitations dans les sols excavés et les déchets mis en dépôt temporaire en recouvrant ces dépôts de bâches imperméables, durant les périodes d'interruption des travaux et à la fin de chaque jour de travail.
- Transporter les sols contaminés et les déchets dangereux dans des contenants étanches recouverts de bâches appropriées et limiter la vitesse des véhicules afin de minimiser les risques de déversement.
- Décontaminer les équipements qui ont été en contact avec des sols contaminés ou déchets dangereux avant de les utiliser dans des aires non contaminées.

Références

CONSEIL CANADIEN DES MINISTRES DE L'ENVIRONNEMENT. Recommandations canadiennes pour la qualité de l'environnement : Tableau sommaire des recommandations canadiennes pour la qualité de l'environnement. http://st-ts.ccme.ca/?lang=fr

MINISTÈRE DU DÉVELOPPEMENT DURABLE, DE L'ENVIRONNEMENT ET DES PARCS. Politique de protection et de réhabilitation des terrains contaminés. http://www.MDDEFP.gouv.qc.ca/sol/inter.htm

Alderon Response to IR No. QEC 14

A soil quality characterisation study was carried out in July 2012. The study report is presented in Appendix F. Excavated material will be reused on site only if it respects the industrial CCME criteria for the Canadian Soil Quality Guidelines. With the exception of one soil sample out of forty-six, analytical results show concentrations of Polycyclic Aromatic Hydrocarbons (PAH), Total Petroleum Hydrocarbons C_{10}-C_{50} and metals (Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Silver, Tin, Zinc) that are in compliance with the CCME industrial criteria. For one sample, nickel concentration exceeds the applicable industrial criteria. Contaminated soils will be disposed off-site as per the MDDEFP Soil Protection and Rehabilitation of Contaminated Sites Policy.

Prior to initiation of Project activities, the Environmental Protection Plan (EPP), Emergency Response and Spill Response Plan (ERSRP) and follow-up program will be developed by Alderon and submitted to appropriate regulatory agencies for review. During this process, mitigation measures recommended by Environment Canada, or equivalent measures, will be considered and discussed with appropriate regulatory agencies for inclusion within these plans, as appropriate and where feasible. The EPP, ERSRP and Follow-up Program will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

1.2.15 Information Request No. QEC 15

- [Le promoteur ne cite pas, dans sa liste d’infrastructures visées par le projet (p. 2-10), de réservoirs de produits pétroliers sur le site du terminal. Cependant, à la page 4-18, il est écrit : « Fuel will be transported by rail from the Sept-Îles area to the Kami Mine site. 30 000 gallon tank cars will be used to transport fuel”. Par conséquent, dans l’éventualité où des produits pétroliers étaient stockés sur le site du terminal, nous rappelons au promoteur qu’il devra s'assurer d'être en conformité avec le Règlement sur les systèmes de stockage de produits pétroliers et de produits apparentés (RSTOPP). Depuis le 12 juin 2012, tous les systèmes de stockage de produits pétroliers et de produits apparentés sont visés par ce règlement.
- Ainsi, le promoteur devrait s’assurer que :
  - *les renseignements identificatoires concernant les systèmes de stockage, par exemple l’emplacement du système, soient mis à jour, si ces derniers venaient à changer. Nous rappelons que le promoteur dispose d’un délai de 60 jours suivant la modification pour aviser le ministre (article 28 (5)).*
  - *le plan d’urgence soit révisé et mis à jour, au besoin (article 31).*
  - *la date de mise hors service soit consignée dans le cas où une mise hors service temporaire est envisagée (article 43).*

Référence

Pour de plus amples renseignements, consultez le site suivant : http://www.ec.gc.ca/rs-st/Default.asp?lang=Fr&n=EA46E5E0-1 ou communiquez avec M. Patrick Lessard, Agent de promotion de la conformité à Environnement Canada, aux coordonnées suivantes : (514) 283-1005; patrick.lessard@ec.gc.ca.]

Alderon Response to IR No. QEC 15

The list of Project infrastructure in the EIS, Volume 2, Section 2.5.1 does not include petroleum storage facilities as the fuel requirements associated with the Kami mine site (as described in the EIS, Volume 2, page 4-18) will come from a fuel supplier in Sept-Îles, which is located near the IOC Terminal (QNS&L). For this reason, tank cars containing diesel fuel will not transit at the Kami Terminal in Pointe-Noire and there will be no requirement to store, transfer or handle these quantities of diesel fuel on site.

Petroleum substances that will be stored at the Kami Terminal site may include diesel for fueling of mobile equipment, as well as smaller volumes of propane, lubricants, oils and hydraulic fluids for maintenance of equipment on the site. Alderon commits to reviewing and adhering to the requirements under the *Règlement sur les systèmes de stockage de produits pétroliers et de produits apparentés* (RSTOPP) once the requirements for the storage of petroleum products and other chemical are understood through detailed design.

In addition, prior to initiation of Project activities, an Emergency Response and Spill Response Plan (ERSRP) will be developed by Alderon and submitted to appropriate regulatory agencies for review. A draft table of contents for the ERSRP is presented in Appendix I. During this process, mitigation measures recommended by Environment Canada, or equivalent measures, will be considered and discussed with appropriate regulatory agencies for inclusion within this plan, as appropriate and where feasible. The ERSRP will be developed within the Sustainability Management Framework (SMF) (Appendix J), and more specifically within the Environmental Management System that is one of three components of the SMF.

1.2.16 Information Request No. QEC 16

Les tableaux 4.1, 4.2 et 4.3 annoncés sont vides. Il faudra donc soumettre les tableaux dûment complétés.

Alderon Response to IR No. QEC 16

Tables 4.1, 4.2 (Section 4.4) and 4.3 (Section 4.5) that are part of Chapter 4 entitled ‘’Environmental Assessment Methods’’ (Volume 2 of the EIS) are intentionally not populated with data. These tables are intended to show readers the format (examples) of tables to come in each VEC chapter. These types of tables appear in VEC Chapters 14 to 26 populated with specific data (results) pertaining to the subject matter.

1.2.17 Information Request No. QEC 17

Vérifier et corriger, si nécessaire, cette information qui nous paraît contradictoire.

Alderon Response to IR No. QEC 17

There will be no tank cars containing diesel fuel or diesel heating oil transiting through the Kami Terminal. The maximum amount of fuel that could be accidentally spilled at the Kami Terminal is therefore equal to the amount of fuel contained in the locomotive. This is the scenario that has been carried through and assessed in Volume 2 of the EIS for the various VECs.

Full tank cars will however move along the QNS&L from a fuel supplier (located in Sept-Îles) to the mine site and a loss of these fuel cars was assessed as a worst case accidental event scenario for the Kami Mine Project in Volume 1. In this respect, Alderon recognizes that, during the 24-week heating season, up to nine tank cars with diesel heating oil and fuel could result in the release of 270,000 gallons of product should a worst case train derailment occur. Even with this change in the maximum predicted quantity of fuel that could possibly be spilled, the effects predictions for each VEC remain valid in Volume 1 as predictions were not predicated on a specific quantity of fuel, but rather acknowledged the potential environmental effects of a large-scale release. To minimize the likelihood of such an event, emphasis will be placed on safety and accident prevention and on effective and rapid response procedures to be contained within the Emergency Response and Spill Response Plan (ERSRP). The ERP will be developed by Alderon and submitted to appropriate regulatory agencies for review and will contain specific measures related to train derailment and hydrocarbon spill response. The ERSRP will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

1.2.18 Information Request No. QEC 18

Selon l'information fournie, la quantité d'essence (d'hydrocarbures ou de diesel) risquant d'être déversée selon un « worst case scenario » est plutôt de neuf « tanks » de diesel au lieu de six. En effet, "The frequency of fuel transport is estimated at : three tank cars per week of diesel heating oil […] and six tank cars per week of diesel fuel for mine vehicles."

Alderon Response to IR No. QEC 18

There will be no tank cars containing diesel fuel or diesel heating oil transiting through the Kami Terminal. The maximum amount of fuel that could be accidentally spilled at the Kami Terminal is therefore equal to the amount of fuel contained in the locomotive. This is the scenario that has been carried through and assessed in Volume 2 of the EIS for the various VECs.

Full tank cars will however move along the QNS&L from a fuel supplier (located in Sept-Îles) to the mine site and a loss of these fuel cars was assessed as a worst case accidental event scenario for the Kami Mine Project in Volume 1. In this respect, Alderon recognizes that, during the 24-week heating season, up to nine tank cars with diesel heating oil and fuel could result in the release of 270,000 gallons of product should a worst case train derailment occur. Even with this change in the maximum predicted quantity of fuel that could possibly be spilled, the effects predictions for each VEC remain valid in Volume 1 as predictions were not predicated on a specific quantity of fuel, but rather acknowledged the potential environmental effects of a large-scale release. To minimize the likelihood of such an event, emphasis will be placed on safety and accident prevention and on effective and rapid response procedures to be contained within the Emergency Response and Spill Response Plan (ERSRP). The ERSRP will be developed by Alderon and submitted to appropriate regulatory agencies for review and will contain specific measures related to train derailment and hydrocarbon spill response. The ERSRP will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

1.2.19 Information Request No. QEC 19

En plus des mesures listées aux pages 4-18 et 4-19 de son étude d'impact, nous rappelons au promoteur, afin d'être bien préparé en cas de déraillement et déversement accidentel, d'inclure dans son plan d'urgence détaillé les éléments suivants (sans s'y limiter) :

- L'identification des éléments sensibles du milieu à protéger en cas de déversement du train sur la boucle ferroviaire de 3,5 km (notamment les cours et plans d'eau, les habitats, frayères et regroupements fauniques).
- L'identification des équipements d'intervention disponibles, leurs quantités et leur localisation.
- L'identification du personnel et/ou des entreprises pouvant prendre part à la réponse.
- De prévoir un plan de formation, de préparation et de simulation pour le personnel et/ou les entreprises.
- L'élaboration de missions pré-planifiées afin de protéger les éléments sensibles préalablement identifiés.

Advenant un déversement d'hydrocarbures ou de toutes autres substances nocives, voici nos recommandations :

- Activer rapidement et efficacement le plan d'urgence et prendre tous les moyens nécessaires pour arrêter la fuite et confiner le produit déversé;
- Procéder à la récupération du produit et restaurer les lieux;
- Faire appel au réseau d'alerte d'Environnement Canada (1-866-283-2333) ou d'Environnement Québec (1-866-694-5454) sans délai;
- Identifier rapidement les impacts probables de l'incident et mettre en place les mesures d'atténuation appropriées.

Alderon Response to IR No. QEC 19

The proposed measures and information requirements will be considered in the development of emergency response and spill response plan s as part of the SMF, and will be implemented where feasible.

1.2.20 Information Request No. QEC 20

À notre avis, un déraillement impliquant un déversement potentiel de 270 000 gallons de diesel (dans l'éventualité où les neufs wagons citerne pouvant contenir au total 270 000 gallons de diesel se retrouvent sur le site au même moment) pourrait avoir des impacts majeurs sur l'environnement. Les impacts seraient d'autant plus grands si le produit venait par rejoindre les eaux de la baie de Sept-Îles et îles avoisinantes où l'on retrouve notamment plusieurs zones de fraye et colonies d'oiseaux de mer.

Alderon Response to IR No. QEC 20

There will be no tank cars containing diesel fuel or diesel heating oil transiting through the Kami Terminal. The maximum amount of fuel that could be accidentally spilled at the Kami Terminal is therefore equal to the amount of fuel contained in the locomotive. This is the scenario that has been carried through and assessed in Volume 2 of the EIS for the various VECs.

Full tank cars will however move along the QNS&L from a fuel supplier (located in Sept-Îles) to the mine site and a loss of these fuel cars was assessed as a worst case accidental event scenario for the Kami Mine Project in Volume 1. In this respect, Alderon recognizes that, during the 24-week heating season, up to nine tank cars with diesel heating oil and fuel could result in the release of 270,000 gallons of product should a worst case train derailment occur. Even with this change in the maximum predicted quantity of fuel that could possibly be spilled, the effects predictions for each VEC remain valid in Volume 1 as predictions were not predicated on a specific quantity of fuel, but rather acknowledged the potential environmental effects of a large-scale release. To minimize the likelihood of such an event, emphasis will be placed on safety and accident prevention and on effective and rapid response procedures to be contained within the Emergency Response and Spill Response Plan (ERSRP). The ERSRP will be developed by Alderon and submitted to appropriate regulatory agencies for review and will contain specific measures related to train derailment and hydrocarbon spill response. The ERSRP will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

1.2.21 Information Request No. QEC 21

- Aucun détail n'est donné quant aux substances précises, concentrations et quantités utilisées, de même qu'à la taille des réservoirs. Par conséquent, il faudrait documenter l'information sur les produits pétroliers et matières dangereuses qui seront utilisés et entreposés au terminal Kami.

- À partir de cette information, déterminer si le Règlement sur les urgences environnementales s'applique aux installations visées par le projet. Se référer au Règlement disponible au lien suivant : http://laws.justice.gc.ca/fra/reglements/DORS-2003-307/index.html.
- Élaborer un plan d'urgence dans lequel le nom des personnes et autorités à contacter est inscrit, de même que les mesures à mettre en œuvre en cas de déversement.
- Posséder et savoir utiliser une trousse de mesures d'urgence en cas de déversement accidentel.
- Comme déjà mentionné, en cas de déversement d'hydrocarbures ou de toutes autres substances nocives :
  - *Prendre tous les moyens nécessaires pour arrêter la fuite et confiner le produit déversé;*
  - *Procéder à la récupération du produit et restaurer les lieux;*
  - *Faire appel au réseau d'alerte d'Environnement Canada (1-866-283-2333) ou d'Environnement Québec (1-866-694-5454) sans délai.*

Alderon Response to IR No. QEC 21

Petroleum substances that will be stored at the Kami Terminal site may include diesel for fueling of mobile equipment, as well as smaller volumes of propane, lubricants, oils and hydraulic fluids for maintenance of equipment on the site. Alderon commits to reviewing and adhering to the requirements under the *Règlement sur les systèmes de stockage de produits pétroliers et de produits apparentés* (RSTOPP) once the requirements for the storage of petroleum products and other chemical are understood through detailed design.

Development of detailed ERPs is typically completed in conjunction with detailed design due to the iterative nature of ERSRP and final design. A detailed Emergency Response and Spill Response Plan will be developed by Alderon and submitted to appropriate regulatory agencies for review prior to the initiation of Project activities. The Emergency Response and Spill Response Plan will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

The SMF is a part of the overall Kami Project management system that includes quality management systems, document control, risk management and Health, Safety and Environment (HSE) systems. The framework is made up of three main systems, the components of which are shown in Appendix J.

1. The Sustainable Project Delivery (SPD) system will provide a high level approach to sustainability management by establishing clear objectives, tracking of key Project commitments, support for engineering and procurement activities and reporting on overall sustainability performance.

2. The Environmental Management System (EMS) will provide detailed management of regulatory and permit requirements and includes environmental protection plans and procedures. The EMS will include environmental monitoring and reporting on specific construction and operational activities. Environmental Management Plans will be developed in consultation with relevant regulatory agencies and stakeholder groups.

3. The Social Responsibility System (SRS) will manage and track the commitments made in various guidance documents and contracts (e.g., benefits agreement) as well as establish plans for effective Project communications, community liaison and complaints management.

A preliminary Table of Contents for the ERSRP is provided in Appendix I.

1.2.22 Information Request No. QEC 22

Voici nos recommandations :

Machinerie lourde

Afin d'atténuer les impacts reliés à l'utilisation de la machinerie lourde, nous rappelons au promoteur de :

- Maintenir la machinerie, les équipements et les camions utilisés lors des travaux en parfait état et exempts de fuite d'huile, d'essence ou de tout autre liquide qui risquent de polluer l'environnement.
- Réparer dans les plus brefs délais la machinerie et les véhicules défectueux.
- Ne pas utiliser la machinerie à moins de 30 mètres d'un cours d'eau.

Matières dangereuses

Des produits pétroliers et matières dangereuses seront utilisés et conservés sur le site de la mine. Par conséquent, nous rappelons les principales mesures d'atténuation lors de l'utilisation de produits chimiques :

- Utiliser, entreposer et manipuler les produits dangereux selon les normes et la réglementation en vigueur et selon les directives du fabricant.
- S'assurer d'avoir à sa disposition le matériel nécessaire pour récupérer les produits dangereux en cas de déversement accidentel.
- S'assurer qu'aucune substance polluante n'affecte les cours d'eau.

Alderon Response to IR No. QEC 22

Prior to initiation of Project activities, the Environmental Protection Plan (EPP), Emergency Response and Spill Response Plan (ERSRP) and follow-up program will be developed by

Alderon and submitted to appropriate regulatory agencies for review. During this process, mitigation measures recommended by Environment Canada, or equivalent measures, will be considered and discussed with appropriate regulatory agencies for inclusion within these plans, as appropriate and where feasible. The EPP, ERSRP and Follow-up Program will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF.

1.2.23 Information Request No. QEC 23

Le nouveau terminal augmentera l'achalandage au site, mais ne changera pas sa vocation. Aucun impact significatif important sur les oiseaux migrateurs et les espèces en péril potentiellement présentes n'est anticipé, si les mesures d'atténuation adéquates sont mises en place par le promoteur, notamment d'entreprendre le débroussaillage en dehors de la période de reproduction des oiseaux et éviter le harcèlement de la faune sur le site du terminal.

- Quelle (s) mesure (s) concrète (s) le promoteur prévoit-il mettre en place afin d'éviter le harcèlement d'oiseaux migrateurs, de leurs nids ou de leurs œufs

Alderon Response to IR No. QEC 23

An Avifauna Management Plan will be prepared to mitigate adverse effects on birds with the goal of reducing the risk of incidents and to mitigate unavoidable incidents involving nests. It will be completed prior to construction and be submitted to Environment Canada (Canadian Wildlife Service) for review. It will identify specific measures that will be implemented in order to avoid the harassment of birds, or destruction of their nests and eggs.

An outline of the components of the Avifauna Management Plan for the Sept-Îles site, including expected mitigation measures, can be found in Appendix I.

1.2.24 Information Request No. QEC 24

Selon les experts du Service canadien de la faune, la période de nidification des oiseaux dans la région de Sept-Îles s'étend du 1er mai au 15 août.

Rappelons que certaines activités durant la période de reproduction/nidification peuvent constituer une menace potentielle pour plusieurs espèces d'oiseaux. Ces activités peuvent entraîner, par inadvertance, la destruction de nids et d'œufs d'oiseaux migrateurs. Cette prise accessoire de nids et d'œufs contrevient au Règlement sur les oiseaux migrateurs lequel, selon l'alinéa 6 a), interdit de déranger, de détruire ou de prendre le nid ou les œufs d'un oiseau migrateur. Il n'existe actuellement aucun mécanisme légal autorisant, par le biais d'un permis ou d'une exemption, la prise accessoire de nids ou d'œufs d'oiseaux migrateurs au cours d'activités industrielles ou d'autre nature, et ce, peu importe le moment de l'année. En l'absence d'un système de règlementation autorisant la prise accessoire, le Service canadien de la faune émet les recommandations générales suivantes relativement à l'application de l'actuel Règlement sur les oiseaux migrateurs :

- Éviter d'entreprendre des activités potentiellement destructrices pendant les périodes de nidification afin de réduire le risque de destruction de nids.

Pour se conformer au cadre actuel de gestion du Règlement sur les oiseaux migrateurs, et afin d'éviter la destruction de nids ou d'œufs, les activités potentiellement problématiques, comme le déboisement, devraient être effectuées à l'extérieur de la période de nidification. Il est important de comprendre que les périodes de nidification sont présentées à titre indicatif seulement afin d'aider le Promoteur à déterminer la période où le risque est particulièrement élevé. Il ne s'agit pas d'une période de restriction, tout comme il n'existe pas de période autorisée. Environnement Canada ne peut donc pas garantir la protection contre tout recours en vertu de la Loi de 1994 concernant la conservation des oiseaux migrateurs (LCOM), quelle que soit l'envergure d'une activité donnée, l'importance des répercussions éventuelles sur les populations d'oiseaux, ou la nature des mesures d'atténuation prises.

- Élaborer et mettre en œuvre un plan de gestion visant à réduire le risque d'incidences, et à atténuer toute incidence inévitable sur les nids.

Il est à noter que les éléments d'un plan de gestion doivent être établis au cas par cas. C'est à la personne ou à l'entreprise qui entreprend les activités que revient la responsabilité de déterminer ces mesures.

Alderon Response to IR No. QEC 24

Consistent with the *Migratory Bird Conservation Act* (MBCA) and *Migratory Bird Regulations* (MBR) (i.e., "avoidance guidelines to reduce incidental take" and "planning ahead to reduce risks to migratory bird nests"), an Avifauna Management Plan will be developed and reviewed by Environment Canada-CWS prior to construction. The Reviewer's recommendations will be considered during this process. Further to this, mitigation measures will be implemented to reduce the inadvertent effects on the avifauna (and other wildlife) species, including avoidance of sensitive species and their habitats within feasible extent, and compliance with provincial and federal legislation, permits, approvals, and guidelines.

An outline of the components of the Avifauna Management Plan for the Sept-Îles site, including expected mitigation measures, can be found in Appendix I.

1.2.25 Information Request No. QEC 25

Environnement Canada (les experts du SCF) souhaite consulter ce plan de gestion afin de fournir des commentaires, au besoin.

Alderon Response to QEC 25

Comment acknowledged. Consistent with the *Migratory Bird Conservation Act* (MBCA) and *Migratory Bird Regulations* (MBR) (i.e., "avoidance guidelines to reduce incidental take" and "planning ahead to reduce risks to migratory bird nests"), an Avifauna Management Plan will be developed and submitted for review by Environment Canada-CWS prior to construction. The

Avifauna Management Plan will be developed within the Sustainability Management Framework (SMF) for the Project, and more specifically within the Environmental Management System that is one of three components of the SMF.

1.2.26 Information Request No. QEC 26

Sur la base de l'information dont nous disposons, nous sommes d'accord avec l'affirmation du promoteur voulant qu'aucun milieu humide ne devrait être impacté à la suite de la réalisation de ce projet. En effet, les seuls milieux humides présents dans le secteur ne semblent pas être inclus dans la zone d'influence du projet.

Alderon Response to IR No. QEC 26

No response required.

1.2.27 Information Request No. QEC 27

Il serait pertinent de mentionner au promoteur l'Inventaire national des rejets de polluants (INRP) puisque les propriétaires ou exploitants d'installations qui répondent aux critères sont tenus de produire une déclaration à l'INRP. Pour en savoir davantage au sujet de l'INRP : http://www.ec.gc.ca/inrp-npri/.

Alderon Response to IR No. QEC 27

Alderon is aware of future reporting obligations, and will incorporate them into its environmental management system where feasible.

1.2.28 Information Request No. QEC 28

Un résumé des sources d'émissions a été présenté par le promoteur dans la section 4.6. Il serait possible que deux sources n'aient pas été prises en compte :

- Le chargement du concentré dans les navires : Le promoteur n'a pas pris en compte, dans son étude, des émissions issues des activités de transbordement du concentré dans l'étude puisque ces activités seront contrôlées et gérées par le Port de Sept-Îles. Cependant, cette source ne peut être ignorée car elle est directement liée au projet, bien que la gestion de l'activité soit réalisée par une tierce partie. Les émissions issues du transbordement du concentré devraient être incluses dans la liste des sources d'émissions du projet Kami durant les activités en lien avec les opérations.
- Les émissions issues des cheminées des navires et des remorqueurs pour le chargement du concentré de minerai : Le promoteur ne mentionne pas cette activité et on peut supposer que la raison serait semblable à celle invoquée pour le transbordement du concentré.

À notre avis, ces sources potentielles d'émission devraient être décrites et, le cas échéant, être incluses dans la liste afin de les évaluer et de déterminer leur importance.

Alderon Response to IR No. QEC 28

As noted in Section 2 of Volume 2 of the EIS and as acknowledged by the Reviewer, the scope of the Kami Terminal includes the concentrate unloading, stacking, storage and reclaiming facility and associated rail infrastructure. Emissions from the ships and related to their loading are under the responsibility of the Port Authority, and therefore, were not included in the scope of the study. However, Alderon has committed to participating in the regional air quality consultation committee (Table de concertation sur la qualité de l'air à Sept-Îles) and was invited to join the committee in November 2012. The objectives of the committee are to: (1) facilitate the preparation of a general overview of the air quality in Sept-Îles; (2) identify issues associated with air quality; (3) identify potential solutions, which are mutually satisfactory, to mitigate and address issues identified by the Committee.

The air quality consultation committee includes representatives from the municipality, environmental organizations (Corporation de protection de l'environnement, Comité de défense de l'air et de l'eau, Conseil régional de l'environnement de la Côte-Nord), health agencies (Agence de la santé et des services sociaux de la Côte-Nord and Centre de santé et des services sociaux de Sept-Îles), and industries (Cliffs Mines Wabush, Compagnie minière IOC, Aluminerie Alouette), with the participation of the MDDEFP.

1.2.29 Information Request No. QEC 29

Selon le promoteur, les sources d'émissions issues des véhicules et de la poussière des routes seront négligeables et n'ont donc pas été considérées dans le modèle de dispersion atmosphérique. Il est prévu que la construction du terminal durera deux années, ce qui ne serait pas insignifiant, en termes d'impact, sur la qualité de l'air.

- Le promoteur devrait justifier, en termes quantitatifs, en quoi l'impact serait négligeable (estimation des émissions et efficacité des mesures d'atténuation, etc.).
- Le promoteur devrait présenter une liste des engins présents sur le site de construction ainsi que les moyens qui seront mis en œuvre pour diminuer les émissions de polluants issus de ces sources.

Alderon Response to IR No. QEC 29

The list of equipment that will be used during the construction phase is provided in Table 1.2.6.

Table 1.2.6 List of Equipment to be Used During the Construction Phase

Activity	Duration (Months)	Pick-up	Mobile Man-Lift	Zoom Boom	Excavator	Tanker Truck	Dump Truck	Concrete Truck Mixer	Bulldozer	Drill-Wagon	Compactor	Front-end-Loader	Backhoe-Loader	50t Crane	80t Crane	150t Crane	Asphalt Paver
Land clearing	3	3			2	1	4		2		1	2					
Road Work	8	4			4	1	8		2	2	2	2					1
Storage Yard Preparation	12	3			2		4		2	2	2	2					
Underground Pipe Work	6	2			2		2	4		1			2	1			
Stacker Foundations	4	2			1			4			1		2	1			
Belt Conveyors	12	4	4	2										2	1	1	
Stacker-reclaimer	12	2	2	1									2	1	1	1	
Rail Loop	14	4			1	1	8		2	2	2	2					
Train Car Dumper / Building	10	2	2		2		2	4			1			1	1		
Transfer Buildings	12	2	2	1	1		1	4			1				1	1	
Electrical Power and Controls	12	2	2											1			
Storage Yard Grading	5	1				1	2		2			2					

In order to illustrate the relative importance of road dust associated with the movement of trucks on the property, the calculation tool presented by Environment Canada in the NPRI toolbox was used to evaluate typical emission rates associated with trucks that will be used to carry the blasted rock or fill material on the property, as well as to a typical service vehicle. The tool is based on the methodology suggested by the US EPA (Chapter 13: Miscellaneous Sources, Section 2.2 (USEPA 2006), and takes into account the weight of the vehicle, the silt content of the road, the distance travelled on unpaved roads and the mitigation measures (e.g., road watering, dust suppressant). The calculation was made with the parameters described in the following table, and the resulting emission rates are also presented in Table 1.2.7.

Table 1.2.7 Calculation Parameters for Road Dust Emissions

Parameter	Unit	Service Vehicle (typical vehicle: Ford 250)	Off-highway Truck (typical truck considered: Caterpillar 772)
Weight of Empty Truck	Tonnes	2.6	35
Weight of the Loaded Truck	Tonnes	3.0	85
Average Weight of the Truck	Tonnes	2.8	42.5
Silt Content of the Road (for construction site)	%	8.5	
Mitigation Factor (corresponding to watering of the road more than twice a day)	%	70	
Speed	km/h	20	
$PM_{2.5}$ Emissions Per Vehicle - Uncontrolled	kg/VK	0.024	0.11
$PM_{2.5}$ Emissions Per Vehicle - Mitigated	kg/VK	0.007	0.03
$PM_{2.5}$ Emission Rate - Mitigated	g/sec	0.040	0.18

Although the $PM_{2.5}$ emission rates presented in the above table may not qualify as negligible emissions, they remain lower than the emission rate estimated for the blasting events (0.65 g/sec), which was considered in the atmospheric dispersion modeling study. It is noted that truck traffic is unlikely to occur during the blasting events. On that basis, the addition of emission rates would not be appropriate, and the dispersion calculations made for the blasting events represent a worst case scenario. As mentioned in Volume , Part II, Chapter 14 of the EIS additional mitigation measures will be identified as needed to further control road dust emissions (dust suppressant, speed limitation) during the construction phase.

1.2.30 Information Request No. QEC 30

Il est mentionné à la page 25 du document que 535 000 tonnes de roches seront dynamitées (pour la plateforme d'entreposage) et 275 000 tonnes seront concassées. Selon le promoteur, ces deux activités génèreront plus de contaminants que les autres activités. Il est aussi mentionné, à la page 27, qu'au total 1 259 000 tonnes de roches seront dynamitées.

- Les émissions totales de polluants pour le dynamitage sont-elles basées sur les 535 000 tonnes seulement ou bien sur le total des roches dynamitées (1 259 000 tonnes) ?

Alderon Response to IR No. QEC 30

On page 27 (Section 4.6.1.3, Volume 2, EIS), "*1 259 000 tonnes*" should be replaced with "*1 259 000 m^3*". This transcription error did not affect the calculations.

1.2.31 Information Request No. QEC 31

Tableau 4.12 (page 25) : Selon le texte correspondant, les valeurs des NO_x et CO seraient des quantités émises en tonnes pour une heure d'activité (58 et 116). Cependant, on retrouve ces mêmes valeurs dans le tableau 4.13 exprimées en kg/heure (58 et 116). Préciser les unités des valeurs indiquées au tableau 4.12 (tonne ou kg?).

De même pour le tableau 4.13 (page 26), les valeurs et les unités reportées dans ce tableau pour le total des polluants émis ne semblent pas être cohérentes pour les NO_x et CO (387 kg/h pour le dynamitage, zéro pour le concassage et le total correspondant serait de 58 kg/h, au lieu de 387 kg/h. De même pour le CO : 2,8 kg/h pour le dynamitage, zéro pour le concassage et le total correspondant serait de 116 kg/h, au lieu de 2,8 kg/h).

Par conséquent, les données des tableaux 4.12 et 4.13 mériteraient d'être vérifiées et corrigées, le cas échéant, ou expliquées avec plus de détails. En ce sens, le promoteur devrait présenter les détails des hypothèses et des calculs qui ont mené aux résultats des tableaux 4.12 (maximum hourly emissions) et 4.13 (total emissions), dont le nombre de jours consacrés à la préparation du site, etc.

De plus, le promoteur devrait fournir d'une manière plus claire et pour chacune des activités et chaque polluant concerné, les valeurs qui ont été effectivement utilisées pour la modélisation (en g/s ou autres unités selon les caractéristiques de la source sélectionnée pour le dynamitage). Présenter tous les calculs.

Alderon Response to IR No. QEC 31

Some values or headers were improperly presented in Tables 4.12, 4.13, 4.16 and 4.17. These transcription errors did not affect the calculations used for the dispersion study.

In Table 4.12, it should read "*kg/hr*" in the header, instead of "*t*". This table, as mentioned in the text is for maximum hourly rates. The correct table is as follows:

Table 1.2.8 Estimated Maximum Hourly Emissions During the Construction Phase (Updated EIS Table 4.12, Volume 2)

Source	Category	Pollutants Emitted (kg/hr)					
		TPM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO
Blasting	Fugitive	78	40	2.3	-	58	116
Stone Crushing	Fugitive	0.81	0.36	0.18	-	-	-

In Table 4.13 it should read "*t*" in the header, instead of "*kg/hr*". The sentence just above Table 4.3 should read: "*Table 4.13 gives a summary of total emissions for the construction phase, in relation to each source*". Also in Table 4.13, the total presented at the bottom should be 387 for NO_x and 2.8 for CO. The correct Table 4.13 is as follows:

Table 1.2.9 Kami Terminal's Estimated Total Emissions During the Construction Phase (Updated EIS Table 4.13, Volume 2)

Source	Category	Pollutants Emitted (t)					
		TPM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO
Blasting	Fugitive	1.9	1.0	0.1	-	387	2.8
Stone Crushing	Fugitive	0.7	0.3	0.2	-	-	-
Total		**2.6**	**1.3**	**0.3**	**-**	**387**	**2.8**

In Tables 4.17 and 4.18, the line "*concentrate piling*" is not relevant. It is a duplicate of the line presenting concentrate storage emissions. The total for TPM, PM_{10} and $PM_{2.5}$ should read "*18 to 26*", "*10 to 14*" and "*5 to 6*" respectively as presented below. Revised tables are as follows:

Table 1.2.10 Kami Terminal's Estimated Annual Emissions During the Operation Phase (Updated EIS Table 4.17, Volume 2)

Source	Category	Pollutants Emitted (t/a)					
		TPM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO
Railroad (1)	Mobile	< 0.1	< 0.1	< 0.1	2,8	0.4	< 0.1
Car dumper	Fixed	6.7	4.8	3.5	-	-	-
Stacker	Fugitive	11.8	5.6	1.8	-	-	-
Concentrate storage (2)	Fugitive	0.1 to 7.8	0.05 to 3.9	0.07 to 0.6	-	-	-
Total		**18 to 26**	**10 to 14**	**5 to 6**	**2.8**	**0.4**	**<0.1**

Table 1.2.11 Kami Terminal's Estimated Maximum Hourly Emissions Rate per Source (Updated EIS Table 4.18, Volume 2)

Source	Category	Pollutants Emitted (kg/h)					
		TPM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO
Railroad [(1)]	Mobile	0.1	0.1	0.1	3.9	0.5	0.01
Car dumper	Fixed	4.6	3.3	2.4	-	-	-
Stacker	Fugitive	7.6	3.6	1.1	-	-	-
Concentrate storage	Fugitive	0 to 14.4	0 to 7.2	0 to 0.5	-	-	-

Calculating Blasting Emissions

Data and emission factors:

Total estimated surface where blasting will occur: 120 000 m^2

Total metric tonne of rock to be blasted: 535 000 t

Emission factor for gelatin explosives (AP-42, Table 13.3-1, per tonne of explosive): CO = 52 kg/t, NO_x = 26 kg/t, SO_2 = 1 kg/t (SO_2 factor was initially set at 0 for in this study but 1 kg/t should have been used instead)

Estimated average surface covered by one blast: 5000 m^2/blast

Estimated amount of rock blasted per amount of explosive used: 10 000 kg/kg

TPM emissions from one blast in kg (AP-42 Table 11.9-2): 0.00022 * surface (m^2) ^ 1.5

PM_{10} and $PM_{2.5}$ scaling factors (AP-42 Table 11.9-2): PM_{10}/TPM=0.52, $PM_{2.5}$/TPM=0.03

Calculating emissions per blast (or per hour):

$$CO = \frac{52\,\frac{\text{kg of CO}}{\text{t of explosive}} * 535\,000 \text{ t of rock} * 5000\,\frac{m^2}{\text{blast}}}{10\,000\,\frac{\text{kg of rock}}{\text{kg of explosive}} * 120\,000 \text{ m2}} = 0.116 \text{ t of CO/blast}$$

$$NO_x = \frac{26\,\frac{\text{kg of CO}}{\text{t of explosive}} * 535\,000 \text{ t of rock} * 5000\,\frac{m^2}{\text{blast}}}{10\,000\,\frac{\text{kg of rock}}{\text{kg of explosive}} * 120\,000 \text{ m2}} = 0.058 \text{ t of } NO_x\text{/blast}$$

$$SO_2 = \frac{1\,\frac{\text{kg of CO}}{\text{t of explosive}} * 535\,000 \text{ t of rock} * 5000\,\frac{m^2}{\text{blast}}}{10\,000\,\frac{\text{kg of rock}}{\text{kg of explosive}} * 120\,000 \text{ m}^2} = 0.0022 \text{ t of } SO_2\text{/blast}$$

TPM = 0.00022 * 5000 m^2 ^ 1.5 = 78 kg/blast

PM_{10} = 77.8 kg/blast * 0.52 = 40 kg/blast

$PM_{2.5}$ = 77.8 kg/blast * 0.03 = 2.3 kg/blast

Total emissions:

Emissions produced by one blast can be multiplied by the expected total number of blasts to obtain the total emissions from blasting:

$\frac{120\ 000\ \mathrm{m}^2}{5000\ \mathrm{m}^2/\mathrm{blast}}$ = 24 blasts

CO = 0.116 t of CO/blast * 24 blasts = 2.8 t

NO_x = 0.058 t of NO_x/blast * 24 blasts = 1.4 t

SO_2 = 0.0022 t of SO_2/blast * 24 blasts = 0.054 t

TPM = 0.078 t of TPM/blast * 24 blasts = 1.9 t

PM_{10} = 0.040 t of PM_{10}/blast * 24 blasts = 1.0 t

$PM_{2.5}$ = 0.0023 t of $PM_{2.5}$/blast * 24 blasts = 0.1 t

Calculating stone crushing emissions

Data and emission factors:

Total amount of stone crushed: 275 000 t

Typical stone crushing rate: 300 t/h

Emission factor for stone crushing: TPM = 0.0027 kg/t, PM_{10} = 0.0012 kg/t, $PM_{2.5}$ = 0.0006 kg/t

Hourly emissions rates:

TPM = 0.0027 kg/t * 300 t/h = 0.81 kg/h

PM_{10} = 0.0012 kg/t * 300 t/h = 0.36 kg/h

$PM_{2.5}$ = 0.0006 kg/t * 300 t/h = 0.18 kg/h

Total emissions from stone crushing:

TPM = 0.0027 kg/t * 275 000 t = 0.7 t

PM_{10} = 0.0012 kg/t * 275 000 t = 0.3 t

$PM_{2.5}$ = 0.0006 kg/t * 275 000 t = 0.2 t

1.2.32 Information Request No. QEC 32

Les unités du facteur d’émission pour les TPM sont exprimées en tonne/blast dans le tableau 4.14, alors qu’elles sont présentées en kg/blast dans le tableau 11.9-2 du document de l’US EPA. Le promoteur devrait vérifier les calculs si des unités erronées ont été utilisées.

Le promoteur a sélectionné un facteur d'émission nul pour le SO2 (FESO2 = 0). Selon le tableau référence 13.3-1 de l'US EPA, des valeurs de 1 (avec un intervalle entre 0 et 8) sont présentées pour le facteur d'émission du SO2. Pourquoi le promoteur a-t-il plutôt choisi une valeur nulle? Justifier ce choix.

Alderon Response to IR No. QEC 32

The emission factor shown in Table 4.14 for TPM should read "0.00022*(area in m^2)$^{1.5}$ kg/blast" instead of "0.00022*(area in m^2)$^{1.5}$ t/blast". The error is only in the presentation of the table. The calculations were performed with the right units as detailed in the response to IR No. QEC 31.

The emission factor for SO_2 was initially set to 0 kg/t (negligible) for gelatin type dynamite while the suggested value is 1 kg/t as shown in AP-42, Table 13.3-1. If this suggested value were to be used instead, the resulting emissions would be: 0.0022 t/blast or a total of 0.054 t for all blasting activities.

At 0.054 t, the total estimated amount of SO_2 emitted can be considered negligible. With respect to the atmospheric dispersion, if the 1 kg/t value had been considered, the maximum 4-min GLC that would have been presented in Table 5.1 for the construction scenario is 6.1 ug/m^3, vs the Québec standard of 1050 ug/m^3.

1.2.33 Information Request No. QEC 33

Les sources d'émissions pour les véhicules, les points de transfert, la poussière des routes ont été considérées négligeables par le promoteur pour les activités d'opération et n'ont donc pas été prises en compte dans l'étude.

- Le promoteur devrait appuyer son argumentation par des données quantitatives et plus précises : types et nombre de véhicules impliqués, description de l'ampleur du trafic, types de polluants émis et ordre de grandeur des émissions, etc.

Alderon Response to IR No. QEC 33

Mobile equipment currently expected to be present at the site are 1 to 3 front end loaders and 2 to 4 pick-up trucks / maintenance vehicles. Detailed traffic estimates are not known at this point in time, and the use of this equipment will be intermittent.

In order to illustrate the relative importance of road dust associated with the movement of service vehicles and front end loaders on the property, the calculation tool presented by Environment Canada in the NPRI toolbox was used. The tool is based on the methodology suggested by the US EPA (Chapter 13: Miscellaneous Sources, Section 2.2 (USEPA 2006), and takes into account the weight of the vehicle, the silt content of the road, the distance travelled on unpaved roads and the mitigation measures (road watering, dust suppressant, etc.). The calculation was made with the parameters described in the following table, and the resulting emission rates are also presented in Table 1.2.12.

Table 1.2.12 Calculation Parameters for Road Dust Emissions

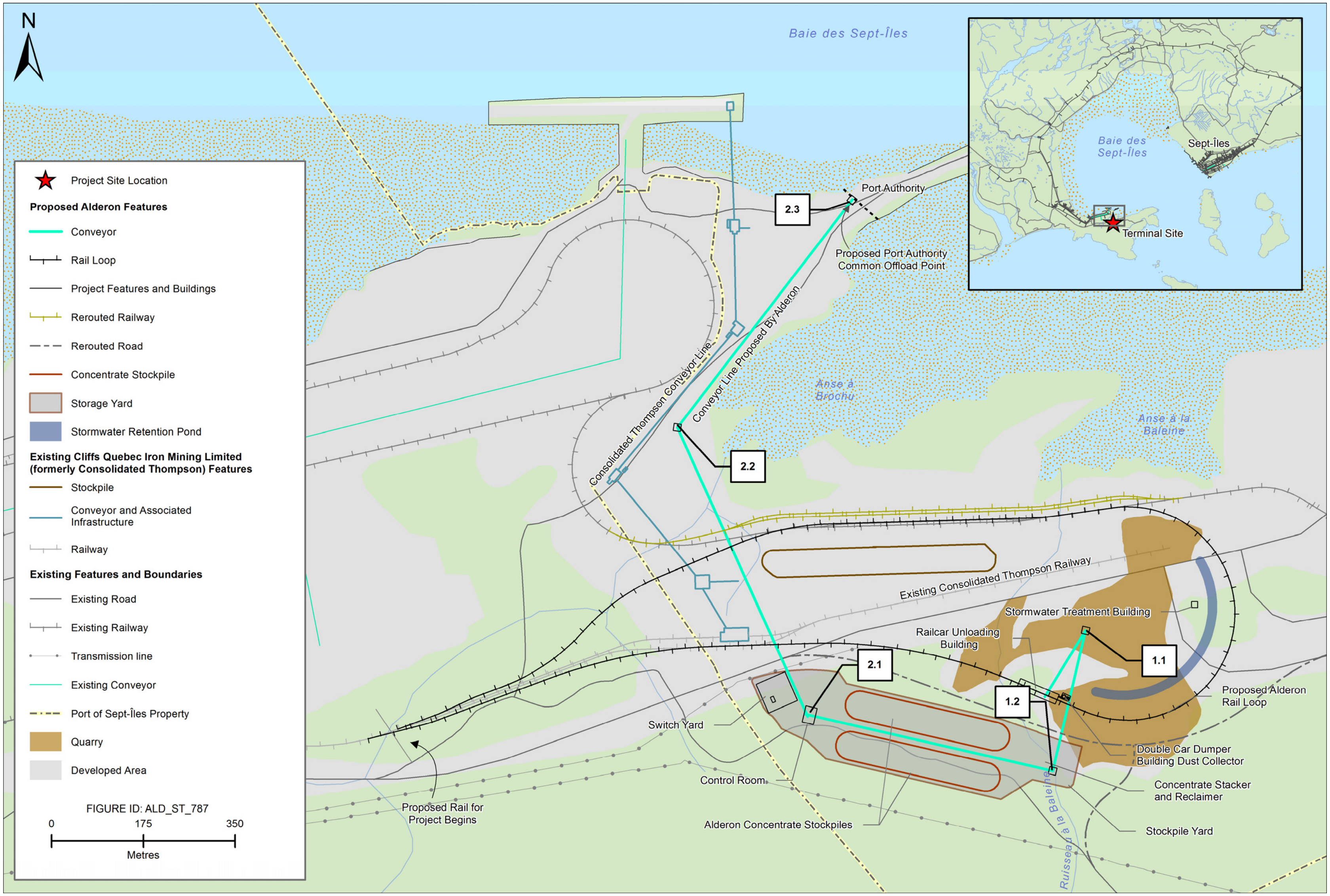
Parameter	Unit	Service Vehicle (typical vehicle: Ford 250)	Front-end loader (typical loader considered: Caterpillar 780)
Weight of Empty vehicle	tonnes	2.6	20
Weight of the Loaded vehicle	tonnes	3.0	31
Average Weight of the vehicle	tonnes	2.8	25.5
Silt Content of the Road (for construction site)	%	8.5	
Mitigation Factor (corresponding to watering of the road more than twice a day)	%	70	
Speed	km/h	20	
$PM_{2.5}$ Emissions Per Vehicle - Uncontrolled	kg/VK	0.024	0.08
$PM_{2.5}$ Emissions Per Vehicle – Mitigated	kg/VK	0.007	0.03
$PM_{2.5}$ Emission Rate - Mitigated	g/sec	0.040	0.14

With respect to the transfer points associated with the concentrate conveying system, there are five points identified on the Figure 1.2.1. Two of the transfer points are related to the transfer of concentrate from the railcar dumper to the storage piles (Points 1.1 and 1.2 on Figure 1.2.1). Three of the transfer points are associated with the transfer of concentrate from the pile to the port common offload point (Points 2.1, 2.2 and 2.3 on Figure 1.2.1).

Emissions from conveyor transfer point were initially excluded from the emission inventory and from the dispersion modeling as they were judged negligible, given the fact that the transfer points and the conveyor will be completely enclosed and that dedicated dust collectors will be installed at each transfer point.

Each transfer point will be equipped with a dedicated dust collector, in order to control emissions resulting from the drop of material within the enclosed conveyor. Detailed design information about these dust collectors is no yet available. In order to estimate a range of typical emissions that may be expected at the outlet of the dust collectors, the emission factors provided in the guidelines AP-42 published by the US EPA were considered. In Chapter 11.19.2 (Crushed Stone Processing and Pulverized Mineral Processing), an emission factor of 0.0015 kg/Mg for TPM is provided for conveyor transfer points (uncontrolled) and 0.00007 kg/Mg (controlled). The "controlled" emission factor appears to reflect the typical efficiency of a cyclone (95 percent). For the Project, the intent is to install high-efficiency dust collectors for the transfer points, with an expected control efficiency of 99.9 percent.

Figure 1.2.1 Location of Transfer Points



Applying these emission factors to the expected railcar unloading rate (10,950 t/hr) or ship loading rate (8 000 t/hr) and annual tonnage (16 million tons), the following emission rates are obtained by considering a control efficiency of 99.9 percent on TPM emissions (Table 1.2.13). The values obtained for a 99.9 percent control efficiency are well below the emission rates estimated for the sources including in the modeling study (0.01 g/sec vs 7.4 g/sec, i.e., 0.14 percent).

Table 1.2.13 Estimated Emissions from Conveyor Transfer Points

Description	Units	Collection efficiency of 99%
TPM emission rate for the sum of five transfer points	g/sec	0.01
Annual TPM emissions for the sum of five transfer points	t/yr	0.12

1.2.34 Information Request No. QEC 34

Le promoteur compare les émissions annuelles estimées du projet de terminal à d'autres projets dans le secteur de Sept-Îles. La comparaison est intéressante, cependant, une comparaison des émissions du projet à d'autres sites œuvrant dans le même domaine serait aussi pertinente. Ainsi, on encourage le promoteur à également comparer les émissions du projet à d'autres du même secteur d'activités et à faire des commentaires, le cas échéant. L'Inventaire national des rejets de polluants (INRP) pourrait contenir des données utiles pour ce faire.

Alderon Response to IR No. QEC 34

A search of the NPRI database was made to identify similar installations for the 2010 reporting year. Although 2011 values became available in November 2012, these were not considered, as the numbers are preliminary and un-reviewed.

Three Canadian iron producers reported emissions to NPRI in 2011. Besides Cliffs and IOC, both located in Sept-Îles, ArcelorMittal Mines Canada ships concentrate and pellets from its Port-Cartier facility. Some fundamental differences however exist, and are summarized below.

The Bloom Lake Iron Ore Limited partnership, formerly known as Consolidated Thompson, did not submit a report to NPRI in 2010. That company operates a shipping terminal which is similar to the Kami Terminal.

Only two other facilities involved with the shipping of processed mineral with outside stockpiling were identified e.g., the National Gypsum Canada facility in Nova Scotia and the QIT Iron and Titanium facility in Havre Saint-Pierre, Québec.

Table 1.2.14 compares TPM, PM_{10} and $PM_{2.5}$ emissions reported by these facilities for 2010, with comments to explain why their activities cannot be considered a truly equivalent to the proposed Kami Terminal.

Table 1.2.14 Particulates Emissions Reported by Other Facilities in 2010

Facility	TPM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Details
ArcelorMittal, Port-Cartier, Qc	1049	461	237	Pellet plant, with two induration furnaces. Receives raw material (additives) and fuel. Ships concentrate and pellets.
Cliffs, Sept-Îles, Qc	770	404	137	Pellet plant, with three induration furnaces. Receives raw material and fuel. Ships only pellets. Maintenance shop for locomotives.
IOC, Sept-Îles, Qc	755	317	49	Ships pellets and concentrate. Receives raw material (additives and solid fuel) for use at Labrador City. Maintenance shop for locomotives.
National Gypsum, Dartmouth, NS	20	7	0.3	Dock site. Product for shipping is gypsum.
QIT Iron and Titanium, Havre-Saint-Pierre, Qc	591	159	16	Mining, crushing and shipping terminal.

1.2.35 Information Request No. QEC 35

Le promoteur mentionne dans le second paragraphe de la section 4.6.2.1.1 (page 33) que la consommation de fuel estimée est de 2,5 litres par kilomètre et par 1000 tonnes de concentré, tandis que dans le tableau 4.19 (page 34), il est indiqué une consommation de 3,5 litres par tonne et par 1000 km.

- Quelles est la valeur et l'unité correspondante utilisées par le promoteur ? Le promoteur devrait fournir la source exacte de la consommation de fuel et corriger l'erreur, le cas échéant.

Alderon Response to IR No. QEC 35

The fuel consumption rate factor presented in Table 4.19 should be 2.5 **l/t/1000km**, as used in calculations. The updated table is as follows:

Table 1.2.15 Emissions from Locomotives (Updated EIS Table 4.19, Appendix G, Volume 2)

Pollutant	Fuel Consumption[1] (l/t/1000km)	Emission Factor [2] (g/l)	Maximum Hourly Emission Rate (g/h/km)	Annual Emissions (t/a/km)
TPM	2.5	1.31	72	0,05
PM_{10}		100 % of TPM	72	0.05
$PM_{2.5}$		100 % of TPM	72	0.05
NO_x		50.41	2 762	2.02

Pollutant	Fuel Consumption[1] (l/t/1000km)	Emission Factor [2] (g/l)	Maximum Hourly Emission Rate (g/h/km)	Annual Emissions (t/a/km)
CO		7.07	387	0.28
SO_2		0.18	10	0.01

1)Source: Estimated conservatively by considering specific data from other similar industries
2)Source: Locomotive Emissions Monitoring Program, 2009, Table 9, Railway Association of Canada

1.2.36 Information Request No. QEC 36

Les renseignements fournis dans la section 4.6.2.1.1 pour les émissions des locomotives ne sont pas suffisants pour vérifier l'approche du promoteur. Le promoteur devrait présenter les détails des hypothèses et des calculs qui ont mené aux résultats du tableau 4.19 (Emissions from locomotives) afin que l'on puisse vérifier, d'une manière objective, les données inscrites dans ce tableau.

Alderon Response to QEC 36

A sample calculation is presented below for particulate matter:

- Estimated amount of concentrate per convoy: 22 000 t/convoy;
- Assuming a maximum rate of one convoy per hour: 22 000 t/convoy = maximum 22 000 t/h; and
- TPM maximum emission rate = 22 000 t/h * 2.5 l/t/1000km * 1.31 g/l = 72 g/km/h.

The same method of calculation can be used for the other pollutants using corresponding emission factors indicated in the table above (Table 1.2.15).

1.2.37 Information Request No. QEC 37

À la page 34, il est mentionné que les récepteurs sont des résidences principalement. Quelle serait la nature des autres types de récepteurs ?

La Figure 4.11 de l'annexe G (page 46) montre 23 récepteurs sans aucune identification. Par ailleurs, les 26 récepteurs, mentionnés dans l'annexe F, sont décrits en termes de numéros avec leurs coordonnées UTM seulement. Quant au texte de l'annexe G, il indique 27 récepteurs.

Ces 23, 26 ou 27 récepteurs sont-ils les « Récepteurs spéciaux » mentionnés dans le texte ? Sinon, parmi les 23, 26 ou 27 récepteurs mentionnés, quels seraient les « Récepteurs spéciaux » (Special Receptors) ? Et pourquoi ceux-ci seraient-ils appelés spéciaux et pas d'autres?

Le promoteur devrait fournir la liste de tous les récepteurs mentionnés dans l'étude et préciser leur nature avec leur description et coordonnées UTM (maisons, écoles ou autres) ; les identifier sur la figure ou dans un tableau récapitulatif.

Alderon Response to IR No. QEC 37

There are 26 special receptors. The term "special receptor" should be deemed equivalent to "specific receptors". Among those receptors there are private residences, schools, one hospital, residences for the elderly, a community center and elevated points / summits.

Table 1.2.16 lists all the specific receptors, the type, name / description, and UTM coordinates. The two following figures (Figure 1.2.2 and Figure 1.2.3) show the location of each specific receptor. Some receptors were not visible in the original map presented in Figure 4.11 (Volume 2, Appendix G).

Table 1.2.16 List of specific receptors

No.	Type	Name/Description	UTM Coordinates	
			X (m)	Y (m)
1	School	CEGEP de Sept-Îles	688805	5567253
2	Hospital	Centre Hospitalier Régional de Sept-Îles	686644	5565193
3	Community center	Centre Récréatif	687128	5565544
4	School	École Boisjoli	683967	5571942
5	School	École Camille-Marcoux	686061	5568469
6	School	École Gamache	686817	5565407
7	School	École Jacques-Cartier	686395	5566997
8	School	École Maisonneuve	688257	5566340
9	School	École Manikanetish	685071	5566410
10	School	École Marie-Immaculé	685882	5566213
11	Private residence	Résidence 01	675049	5558368
12	Private residence	Résidence 02	670695	5556892
13	Private residence	Résidence 03	669341	5563329
14	Private residence	Résidence 04	675391	5565382
15	Private residence	Résidence 05	673754	5566473
16	Private residence	Résidence 06	674663	5567121
17	Private residence	Résidence 07	675556	5566775
18	Private residence	Résidence 08	678067	5569115
19	Private residence	Résidence 09	683014	5572409
20	Private residence	Résidence 10	685145	5565813
21	Private residence	Résidence 11	687285	5564064
22	Private residence	Résidence 12	691313	5564696
23	Residence for the elderly	Résidence des Bâtisseurs	686414	5564740
24	Residence for the elderly	Résidence JR Lafontaine	686141	5566442
25	Elevated point/summit	Sommet topographique 1	665273	5565379
26	Elevated point/summit	Sommet topographique 2	693848	5557622

Figure 1.2.2 Location of Specific Receptors

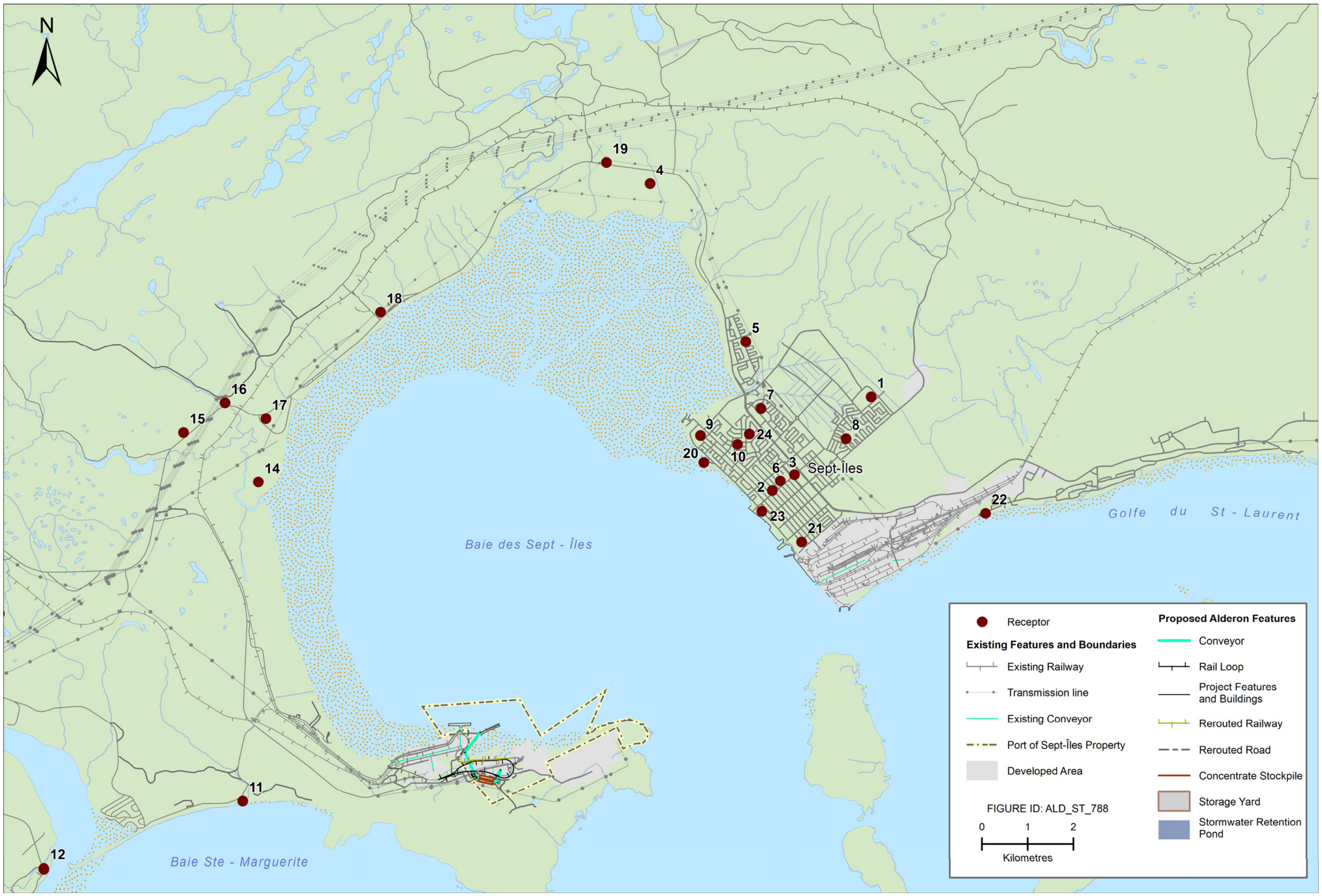
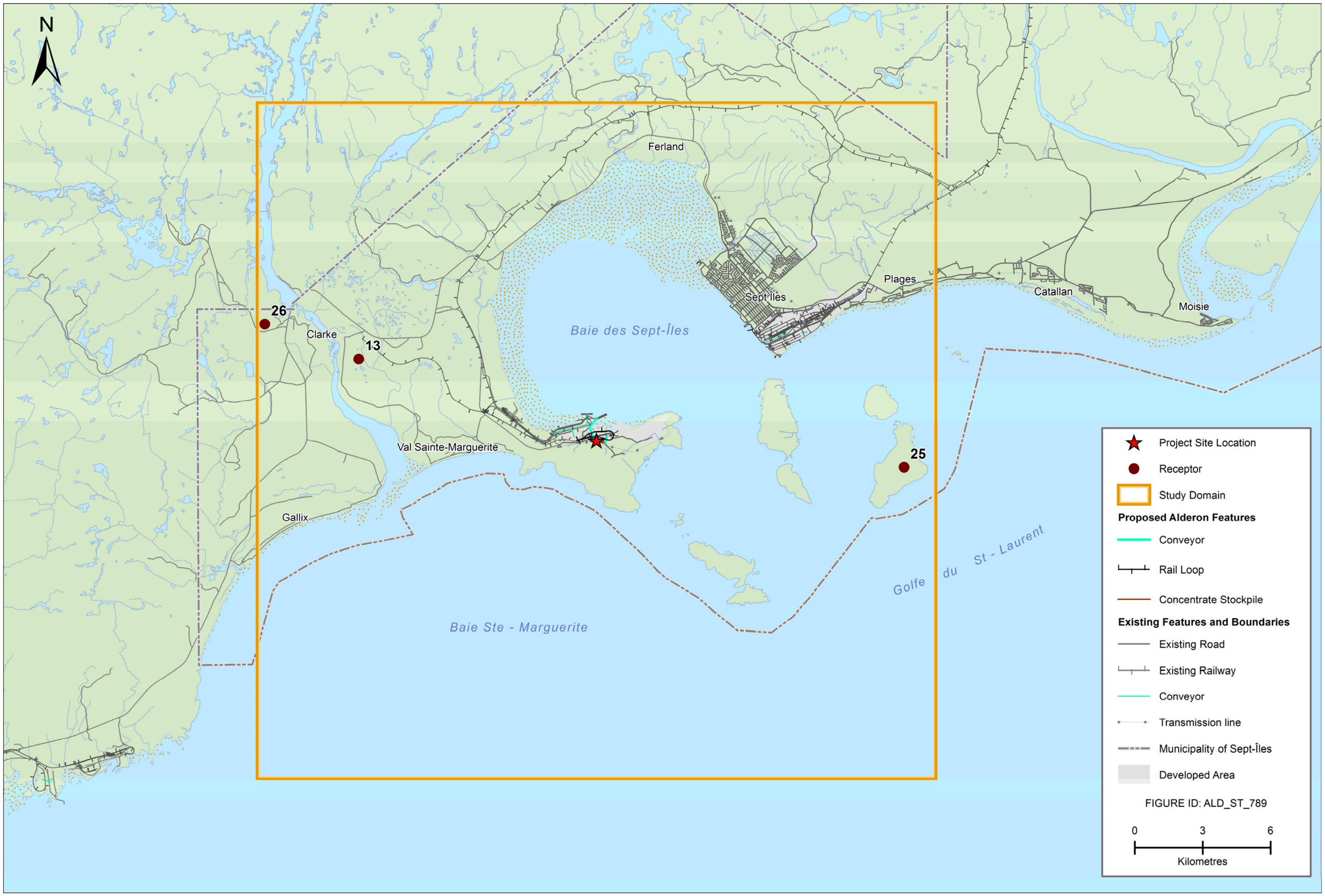


Figure 1.2.3 Location of Specific Receptors



1.2.38 Information Request No. QEC 38

Le bâtiment où se déroulera le déchargement des wagons sera muni d'un système de collection des poussières. Le promoteur a estimé une concentration maximum de 15 mg/m^3 de matières particulaires à la sortie des cheminées.

- Quelles sont les fondements d'une telle hypothèse ?
- Est-ce le type de dépoussiéreur qui sera installé qui permettrait d'atteindre la moitié de la limite permise par la province du Québec ?
- Le promoteur devrait étayer son hypothèse et fournir, le cas échéant, le type de dépoussiéreur envisagé et ses caractéristiques.

Alderon Response to IR No. QEC 38

The provincial limit identified in Québec's Clean Air regulation is 30 mg/m^3. Although the design is not yet finalized, it is common to observe lower concentrations for modern, well designed and well maintained dust collectors. For that reason, the concentration of 15 mg/m^3 (half of the limit) was selected for the purpose of this study.

The rail car unloading structures will include focussed dust collection pick-ups connected to a high efficiency dust collector system that will maintain a negative pressure inside the rail unloading building. The dust collectors will include dry, reverse pulse online cleaning, negative pressure filter units within the main collector housing. The collected dust will be included with the iron ore concentrate as it is loaded onto vessels for shipment. The expected performance of the dust collection system will be sufficient to maintain an outlet concentration below 15 mg per cubic meter.

The detailed design of the high efficiency dust filter has not been completed, but the filter will be similar to the RF filter system supplied by Air-Cure as shown in the brochure available on Air Cure's website (http://www.aircure.com/Literature/RF_Brochure.pdf).

1.2.39 Information Request No. QEC 39

Les piles de concentré sont-elles considérées comme des sources ponctuelles ou des sources volumiques ?

Quelle est la valeur du facteur d'émission obtenu pour chacune des tailles de particules ?

Alderon Response to IR No. QEC 39

The piles of concentrate were modeled as a surface source.

The Aerodynamic Particle Size Multiplier used is 0.5 for PM_{10} and 0.075 for $PM_{2.5}$ as found in AP-42, Chapter 12.2.5.

1.2.40 Information Request No. QEC 40

L'information fournie par le promoteur n'est pas suffisante pour vérifier les données indiquées dans le tableau 4.24. Le promoteur devrait fournir plus de détails.

Les émissions de particules auraient-elles pu être estimées en utilisant les caractéristiques du concentré de minerai de fer qui sera produit au lieu des matériaux cités dans le tableau (charbon et sable) ?

Alderon Response to IR No. QEC 40

The methodology used for estimating erosion emissions from the concentrate pile is based on Chapter 13.2.5 of US EPA AP-42 methodology.

<u>Calculating friction velocity from equation 4 (AP-42 Chapter 13.2.5):</u>

By taking as an example, a day with a maximum speed of 28 km/h

$u^* = 28$ km/h / 3600s/h * 1000m/km * 0.053 = 0.41 m/s

<u>Calculating emissions per unit area from equation 3 (AP-42 Chapter 13.2.5):</u>

When $u^* > u_t$ and where u_t is the threshold friction velocity in m/s

Assuming a daily complete disturbance of the pile

Using a threshold friction velocity of 0.33 m/s, which is equivalent to sand

$P = 58 (u^* - u_t)^2 + 25 (u^* - u_t) = 58 (0.41 – 0.33)^2 + 25 (0.41 – 0.33) = 2.4 \text{ g/m}^2$

<u>Calculating the piles total surface area</u>

With 2 piles, each having the following maximum dimensions: 20 m height, 55 m wide and 440 m long

Estimated maximum pile surface = $2 * 440 * 2 * (20^2 + (55/2)^2)^{0.5} = 60\ 000 \text{ m}^2$

<u>Calculating daily emissions for a day with a maximum wind speed of 28 km/h</u>

2.4 g/m2 * 60 000 m^2 = 144 kg/day = 1.7 g/s

The meteorological data used is summarized in Table 1.2.17.

Table 1.2.17 Summary of Meteorological Data Used (2005-2011)

Type of data used	Frequency of measurements	Source of information	
		Pointe Noire	Sept-Îles Airport
Hourly Wind Speed	Hourly	X	
Rainfall	Daily		X
Snow on ground	Daily		X

The threshold friction velocity depends on the type of material stored and there was no information available regarding the threshold friction velocity of iron ore concentrate. In order to account for the uncertainty associated with using threshold friction velocity of similar but different materials, it was decided to do two scenarios, one as if it was sand and the other as if it was ground coal. Table 1.2.18 gives a summary of available threshold friction velocity and highlight materials selected for modeling.

Table 1.2.18 Friction Velocity for Coal Pile or Deserts

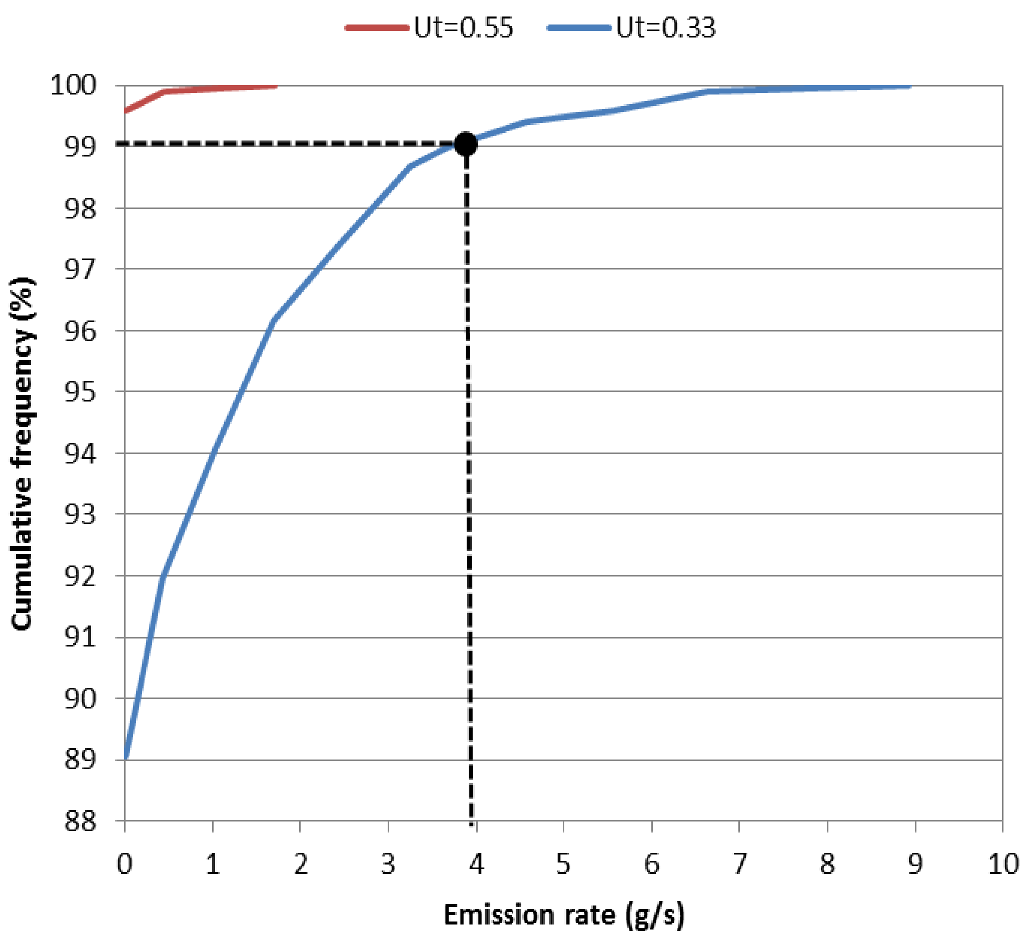
Material	Friction Velocity (m/s)	Reference
Uncrusted coal pile (Western surface coal mine)	1.12	AP42, table 13.2.5-2
Lues reOverburden (Western surface coal mine)	1.02	AP42, table 13.2.5-2
Coal pile	0.64	Mojave desert Air Quality Management District
Scraper tracks on coal pile, (Western surface coal mine) Lightly crusted.	0.62	AP42, table 13.2.5-2
Ground coal (surrounding coal pile)	0.55	AP42, table 13.2.5-2
Fine coal dust on concrete pad (Eastern power plant)	0.54	AP42, table 13.2.5-2
Coal dust	0.52	Mojave desert Air Quality Management District
Scrub desert 0.38	0.38	Mojave desert Air Quality Management District
Disturbed desert	0.33	Mojave desert Air Quality Management District

Given the intermittent nature of this type of emission (varying with meteorological conditions) a probabilistic approach was used in order to select the short term emission rate to be used in the dispersion model. It was decided to use a worst case meteorological condition that occurs one percent of the time (approximately four days per year) as shown in Figure 1.2.4.

Based on this approach, the short term emission rate used for the first scenario was 0 g/sec for TPM. The second scenario was modeled by using a TPM emission rate of 4 g/s.

The emission rates used for daily and annual averaging periods are based on the same AP-42 methodology described above and by using the average emission rate from the pile obtained for the 2005 – 2011 period, as shown in Table 4.24 of the air quality air dispersion modeling study. Again two scenarios were used, one with a threshold friction velocity of 0.55 m/s and a second with 0.33 m/s. With a threshold friction velocity of 0.55 m/s, the long term emission rate used is virtually zero over the 7 years period (average of 100 kg/year or 0.0003 g/s), emission events occurring with a frequency below 1 percent. With the 0.33 friction velocity, the average annual TPM emissions are 7.8 t/a, which is equivalent to 0.24 g/s.

Figure 1.2.4 Emission Rate Cumulative Frequency for a 60 000 m^2 Pile, Based Wind Data from Pointe Noire



1.2.41 Information Request No. QEC 41

Le promoteur devrait fournir plus de détails sur les paramètres de surface utilisés : un résumé des paramètres de surface utilisés (rugosité, albédo et rapport de Bowen) et le type de saisons sélectionnées (deux ou quatre saisons?).

Alderon Response to IR No. QEC 41

Two seasons have been defined for land use properties: summer and winter. Surface parameters used for each land use are shown in Table 1.2.19.

Table 1.2.19 Surface Parameters Used for Each Land Use Category

Summer:	Winter:
LAND USE PROPERTIES AND OUTPUT MAP (NINICAT entries)	LAND USE PROPERTIES AND OUTPUT MAP (NINICAT entries)
---	---
Input Soil Anthropogenic Leaf Output	Input Soil Anthropogenic Leaf Output
Category z0 Albedo Bowen Heat Flux Heat Flux Area Category	Category z0 Albedo Bowen Heat Flux Heat Flux Area Category
ID (m) (0 to 1) Ratio Parmater (W/m**2) Index ID	ID (m) (0 to 1) Ratio Parmater (W/m**2) Index ID
-------- ---- -------- ----- --------- ------------ ----- ---------	-------- ---- -------- ----- --------- ------------ ----- ---------
! X = 11 , 0.5, 0.18, 1.0, 0.20, 0.0, 1.0, 10 ! !END!	! X = 11, 0.41, 0.28, 0.9, 0.19, 0.0, 0.8, 10 ! !END!
! X = 12 , 1.0, 0.18, 1.5, 0.25, 0.0, 0.2, 10 ! !END!	! X = 12, 0.81, 0.28, 1.3, 0.23, 0.0, 0.16, 10 ! !END!
! X = 13 , 1.0, 0.18, 1.5, 0.25, 0.0, 0.2, 10 ! !END!	! X = 13, 0.81, 0.28, 1.3, 0.23, 0.0, 0.16, 10 ! !END!
! X = 14 , 1.0, 0.18, 1.5, 0.25, 0.0, 0.2, 10 ! !END!	! X = 14, 0.81, 0.28, 1.3, 0.23, 0.0, 0.16, 10 ! !END!
! X = 15 , 1.0, 0.18, 1.5, 0.25, 0.0, 0.2, 10 ! !END!	! X = 15, 0.81, 0.28, 1.3, 0.23, 0.0, 0.16, 10 ! !END!
! X = 16 , 1.0, 0.18, 1.5, 0.25, 0.0, 0.2, 10 ! !END!	! X = 16, 0.81, 0.28, 1.3, 0.23, 0.0, 0.16, 10 ! !END!
! X = 17 , 1.0, 0.18, 1.5, 0.25, 0.0, 0.2, 10 ! !END!	! X = 17, 0.81, 0.28, 1.3, 0.23, 0.0, 0.16, 10 ! !END!
! X = 21 , 0.25, 0.15, 1.0, 0.15, 0.0, 3.0, 20 ! !END!	! X = 21, 0.09, 0.59, 0.6, 0.15, 0.0, 0.6, 20 ! !END!
! X = 22 , 0.25, 0.15, 1.0, 0.15, 0.0, 3.0, 20 ! !END!	! X = 22, 0.09, 0.59, 0.6, 0.15, 0.0, 0.6, 20 ! !END!
! X = 23 , 0.25, 0.15, 1.0, 0.15, 0.0, 3.0, 20 ! !END!	! X = 23, 0.09, 0.59, 0.6, 0.15, 0.0, 0.6, 20 ! !END!
! X = 24 , 0.25, 0.15, 1.0, 0.15, 0.0, 3.0, 20 ! !END!	! X = 24, 0.09, 0.59, 0.6, 0.15, 0.0, 0.6, 20 ! !END!
! X = 31 , 0.05, 0.25, 1.0, 0.15, 0.0, 0.5, 30 ! !END!	! X = 31, 0.05, 0.52, 0.7, 0.15, 0.0, 0.2, 30 ! !END!
! X = 32 , 0.05, 0.25, 1.0, 0.15, 0.0, 0.5, 30 ! !END!	! X = 32, 0.05, 0.52, 0.7, 0.15, 0.0, 0.2, 30 ! !END!
! X = 33 , 0.05, 0.25, 1.0, 0.15, 0.0, 0.5, 30 ! !END!	! X = 33, 0.05, 0.52, 0.7, 0.15, 0.0, 0.2, 30 ! !END!
! X = 41 , 1.0, 0.1, 1.0, 0.15, 0.0, 7.0, 40 ! !END!	! X = 41, 0.525, 0.4, 0.75, 0.15, 0.0, 3.5, 40 ! !END!
! X = 42 , 1.0, 0.1, 1.0, 0.15, 0.0, 7.0, 40 ! !END!	! X = 42, 0.905, 0.16, 0.95, 0.15, 0.0, 6.3, 40 ! !END!
! X = 43 , 0.6, 0.2, 0.75, 0.15, 0.0, 7.0, 40 ! !END!	! X = 43, 0.325, 0.45, 0.63, 0.15, 0.0, 3.5, 40 ! !END!
! X = 51 ,0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 51 ! !END!	! X = 51, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 51 ! !END!
! X = 52 ,0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 55 ! !END!	! X = 52, 0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 55 ! !END!
! X = 53 ,0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 55 ! !END!	! X = 53, 0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 55 ! !END!
! X = 54 ,0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 55 ! !END!	! X = 54, 0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 55 ! !END!
! X = 55 ,0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 55 ! !END!	! X = 55, 0.001, 0.1, 0.0, 1.0, 0.0, 0.0, 55 ! !END!
! X = 61 , 1.0, 0.1, 0.5, 0.25, 0.0, 2.0, 61 ! !END!	! X = 61, 0.715, 0.28, 0.5, 0.22, 0.0, 1.4, 61 ! !END!
! X = 62 , 0.2, 0.1, 0.1, 0.25, 0.0, 1.0, 62 ! !END!	! X = 62, 0.11, 0.46, 0.34, 0.19, 0.0, 0.4, 62 ! !END!
! X = 71 , 0.05, 0.3, 1.0, 0.15, 0.0, 0.05, 70 ! !END!	! X = 71, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 70 ! !END!

Summer:	Winter:
! X = 72 , 0.05, 0.3, 1.0, 0.15, 0.0, 0.05, 70 ! !END!	! X = 72, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 70 ! !END!
! X = 73 , 0.05, 0.3, 1.0, 0.15, 0.0, 0.05, 70 ! !END!	! X = 73, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 70 ! !END!
! X = 74 , 0.05, 0.3, 1.0, 0.15, 0.0, 0.05, 70 ! !END!	! X = 74, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 70 ! !END!
! X = 75 , 0.05, 0.3, 1.0, 0.15, 0.0, 0.05, 70 ! !END!	! X = 75, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 70 ! !END!
! X = 76 , 0.05, 0.3, 1.0, 0.15, 0.0, 0.05, 70 ! !END!	! X = 76, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 70 ! !END!
! X = 77 , 0.05, 0.3, 1.0, 0.15, 0.0, 0.05, 70 ! !END!	! X = 77, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 70 ! !END!
! X = 81 , 0.2, 0.3, 0.5, 0.15, 0.0, 0.0, 80 ! !END!	! X = 81, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 80 ! !END!
! X = 82 , 0.2, 0.3, 0.5, 0.15, 0.0, 0.0, 80 ! !END!	! X = 82, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 80 ! !END!
! X = 83 , 0.2, 0.3, 0.5, 0.15, 0.0, 0.0, 80 ! !END!	! X = 83, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 80 ! !END!
! X = 84 , 0.2, 0.3, 0.5, 0.15, 0.0, 0.0, 80 ! !END!	! X = 84, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 80 ! !END!
! X = 85 , 0.2, 0.3, 0.5, 0.15, 0.0, 0.0, 80 ! !END!	! X = 85, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 80 ! !END!
! X = 91 , 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 90 ! !END!	! X = 91, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 90 ! !END!
! X = 92 , 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 90 ! !END!	! X = 92, 0.05, 0.7, 0.5, 0.15, 0.0, 0.0, 90 ! !END!

1.2.42 Information Request No. QEC 42

L'annexe C est utile pour le réviseur, quoiqu'elle soit incomplète en raison du nombre élevé de pages que le promoteur aurait eu à présenter. Nous recommandons au promoteur de plutôt fournir un résumé des données d'entrée sous forme de tableaux récapitulatifs et la présentation des données d'entrée du modèle CALPUFF pour les sources d'émissions seulement (impression des fichiers sans les pages de données « Non-grided (discrete) receptor data »). Ceci aurait pour avantage de diminuer le nombre de pages à imprimer et de faciliter la lecture et la validation des données d'entrée du modèle pour tous les scénarios considérés. Le promoteur devrait fournir toute l'information selon ce format suggéré ou tout autre format, au choix du promoteur.

Note: Alderon Response for QEC 42 and QEC 43 are combined and provided after QEC 43, below.

1.2.43 Information Request No. QEC 43

Selon le promoteur, l'information fournie à la section 4.6 représente les données d'entrée du modèle CALPUFF et d'autres seraient présentées dans l'annexe C. Cependant, certains renseignements sont manquants. Le promoteur devrait fournir plus de détails pour les éléments suivants (voir aussi commentaire No 41).

Sources d'émissions :

Le promoteur devrait présenter chacune des sources d'émissions avec toutes les caractéristiques d'entrée pour le modèle CALPUFF dans un tableau récapitulatif. Par exemple, selon l'annexe A (Subgroup (16b), page 34), il y aurait deux sources volumiques : SRCNAM = V1 et SCRNAM = V2. Il y aurait aussi deux sources ponctuelles : NPT1 = P1 et NPT2 = P2. Quelles sources d'émissions du projet devrait-on attribuer à ces symboles ? On pourrait supposer que P1 et P2 correspondent aux deux cheminés du bâtiment dédié au 'Double Dumper Car Dumper' et que V1 et V2 seraient liées aux deux piles de concentrés. Préciser.

Selon le tableau 4.21, le total des émissions (maximum horaire) de TPM, PM_{10} et $PM_{2.5}$ sont de 1.27 g/s, 0.90 g/s et 0.66 g/s respectivement pour les deux cheminées. En supposant que P1 et P2 (mentionnés à l'annexe C, page 35) correspondent à ces mêmes cheminées, il apparaîtrait que les émissions utilisées dans le modèle seraient de 0.18, 0.12 et 0.33 pour chacune de ces cheminées, soit un total de 0,36 g/s, 0,24 g/s et 0,66 g/s pour les 2 cheminées. À quoi correspondent les valeurs indiquées à l'annexe C pour P1 et P2 qui semblent être différentes de celles présentées au tableau 4.21 (à l'exception de la valeur des $PM_{2.5}$ qui serait de la même valeur, soit 0.66) ? Le promoteur devrait fournir plus de détails pour la compréhension des données utilisées pour la modélisation de tous les scénarios considérés.

Pour chacune des sources d'émissions, les caractéristiques des sources et les taux d'émissions utilisés dans le modèle CALPUFF devraient être clairement identifiés pour chacun des scénarios considérés. Par caractéristiques, on entend le type de source (ponctuelle, volumique, surfacique, leur diamètre, leur hauteur, etc.), leur désignation dans le modèle CALPUFF (ex. NPT1, etc.), leurs coordonnées, leur élévation, les méthodes d'atténuation des émissions (si applicables) et les taux d'émissions effectivement utilisés dans le modèle. L'information pourrait être obtenue, en partie, à partir de l'annexe C, mais il serait important de définir les acronymes utilisés. L'information pourrait être regroupée dans un tableau récapitulatif (voir commentaire No 41).

Grille des points de calculs :

Quel est la résolution du réseau des points de calculs (espacement entre eux dans le domaine d'étude ou espacement des grilles) ? Le promoteur spécifie que l'espacement varie, mais sans spécifier les valeurs des espacements retenus.

Conversion du NO :

Quelle est l'approche utilisée pour estimer les concentrations de NO_2 (conversion totale ou Ozone Limiting Method ou autre) ?

Alderon Response to IR Nos. QEC 42 and QEC 43

Three types of emissions sources (point, area and volume) were modeled in CALPUFF:

- The two identical stacks from the car dumper building were modeled as point sources (P1 & P2);
- The two identical concentrate piles, were modeled as area sources (A1 & A2); and
- One transfer point (loading of new material on the concentrate pile) was modeled as a volume source (V1).

As described in the response to IR No. QEC 40, two scenarios were modeled with different emission rates for the concentrate pile: a first scenario with a negligible emission rate from the pile and a second scenario with a significant emission rate from the same source (Table 1.2.20).

Table 1.2.20 Summary of dispersion modeling runs with CALPUFF

Emissions scenario	Type of Emission Rate Used	
	Maximum Emissions Rate for Short Term Averaging Period (1h)	**Average Emission Rate for Longer Averaging Periods (daily and annual)**
Scenario with negligible emission from the concentrate pile.	Scenario 1.1	Scenario 1.2
Scenario with significant emissions from the concentrate pile.	Scenario 2.1	Scenario 2.2

When reviewing the input files, it was noted that the two stacks associated with the railcar dumper building were not properly located due to a transcription error when entering the data in the input file.

Also, it should be noted that emission rates for the longer averaging periods (24-hr and annual) were considered at the same values as for the hourly rates, while in fact they will be lower considering the fact that unloading of railcars will be done during a limited number of hours each day, and that emissions will then be intermittent.

A summary of emissions rates and parameters used in the CALPUFF model is presented in Table 1.2.21. In that table, Q1, Q2 and Q3 are the emission rates values in g/s (or $g/m^2/s$ for area sources) as used in the model input files:

- Q1=TPM - PM_{10}
- Q2=PM_{10} - $PM_{2.5}$
- Q3=$PM_{2.5}$

P1, P2 and P3 are the emission rates values in g/s (or $g/m^2/s$ for area sources) as used in the model input files:

- P1=TPM-PM_{10}.
- P2=PM_{10}-$PM_{2.5}$.
- P3=$PM_{2.5}$.

The grid resolution varies with distance (from the center of the grid located on the Project site) as follows:

- From 0 to 500 m = 50 m;
- From 500 to 1000 m = 100 m;
- From 1000 to 2000 m = 200 m; and
- From 2000 to 15 000 m = 500 m.

Table 1.2.21 Summary of Sources Parameter as Entered in CALPUFF Input Files

Scenario		Source ID	Stk Height	Eff Height	Base elev	Diam	Vel	Temp	Sig y	Sig z	Q1	Q2	Q3	TPM	PM_{10}	$PM_{2.5}$
			m	m	m	m	m/s	K	m	m	g/s g/m²/s	g/s g/m²/s	g/s g/m²/s	g/s g/m²/s	g/s g/m²/s	g/s g/m²/s
POINT SOURCES																
2.2	cpuff_revisedPile_24Hr	P1	18	---	23,1	2,01	13,5	274	---	---	0,18	0,12	0,33	0,63	0,45	0,33
2.2	cpuff_revisedPile_24Hr	P2	18	---	23,1	2,01	13,5	274	---	---	0,18	0,12	0,33	0,63	0,45	0,33
2.1	cpuff_revisedPile_hourly	P1	18	---	23,1	2,01	13,5	274	---	---	0,18	0,12	0,33	0,63	0,45	0,33
2.1	cpuff_revisedPile_hourly	P2	18	---	23,1	2,01	13,5	274	---	---	0,18	0,12	0,33	0,63	0,45	0,33
1.2	cpuff_noShip_24Hr	P1	18	---	23,1	2,01	13,5	274	---	---	0,03	0,02	0,06	0,11	0,08	0,06
1.2	cpuff_noShip_24Hr	P2	18	---	23,1	2,01	13,5	274	---	---	0,03	0,02	0,06	0,11	0,08	0,06
1.1	cpuff_noShip_hourly	P1	18	---	23,1	2,01	13,5	274	---	---	0,18	0,12	0,33	0,63	0,45	0,33
1.1	cpuff_noShip_hourly	P2	18	---	23,1	2,01	13,5	274	---	---	0,18	0,12	0,33	0,63	0,45	0,33
AREA SOURCES																
2.2	cpuff_revisedPile_24Hr	A1	---	20	55,8	---	---	---	---	2	0,0000021	0,0000018	0,0000003	0,0000042	0,0000021	0,0000003
2.2	cpuff_revisedPile_24Hr	A2	---	20	55,8	---	---	---	---	2	0,0000021	0,0000018	0,0000003	0,0000042	0,0000021	0,0000003
2.1	cpuff_revisedPile_hourly	A1	---	20	55,8	---	---	---	---	2	0,0000337	0,0000305	0,0000025	0,0000667	0,0000330	0,0000025
2.1	cpuff_revisedPile_hourly	A2	---	20	55,8	---	---	---	---	2	0,0000337	0,0000305	0,0000025	0,0000667	0,0000330	0,0000025
1.2	cpuff_noShip_24Hr	A1	---	20	55,8	---	---	---	---	2	0	0	0	0	0	0
1.2	cpuff_noShip_24Hr	A2	---	20	55,8	---	---	---	---	2	0	0	0	0	0	0
1.1	cpuff_noShip_hourly	A1	---	20	55,8	---	---	---	---	2	0	0	0	0	0	0
1.1	cpuff_noShip_hourly	A2	---	20	55,8	---	---	---	---	2	0	0	0	0	0	0

Scenario		Source ID	Stk Height	Eff Height	Base elev	Diam	Vel	Temp	Sig y	Sig z	Q1	Q2	Q3	TPM	PM_{10}	$PM_{2.5}$
			m	m	m	m	m/s	K	m	m	g/s $g/m^2/s$	g/s $g/m^2/s$	g/s $g/m^2/s$	g/s $g/m^2/s$	g/s $g/m^2/s$	g/s $g/m^2/s$
VOLUME SOURCES																
2.2	cpuff_revisedPile_24Hr	V1	---	10	55,8	---	---	---	13,4	1,9	1,12	0,69	0,31	2,12	1,00	0,31
2.1	cpuff_revisedPile_hourly	V1	---	10	55,8	---	---	---	13,4	1,9	1,12	0,69	0,31	2,12	1,00	0,31
1.2	cpuff_noShip_24Hr	V1	---	10	55,8	---	---	---	13,4	1,9	1,12	0,69	0,31	2,12	1,00	0,31
1.1	cpuff_noShip_hourly	V1	---	10	55,8	---	---	---	13,4	1,9	1,12	0,69	0,31	2,12	1,00	0,31

Note: A second volume source (V2) was also positioned at the boat loading location, but was not meant to be included in the modelling scenarios, as activities associated to boat loading were not covered by the scope retained for the study.

Additional runs were initiated for Scenarios 2.1 and 2.2, which correspond to worst case conditions with significant emissions from the concentrate piles, by using the proper location of the two above-mentioned stacks. As a result, Table 5-3 presented in Appendix G of Volume 2 of the EIS may be updated as presented below (Table 1.2.22). To facilitate the comparison, the values presented in the original table are presented within parenthesis. The revised isocontours for these scenarios are provided as Appendix M. The revised isocontours indicate that the maximum concentrations are obtained at the property line, in the south-west direction. Predicted maximum GLCs for 24-hr and annual averaging periods would be significantly lower if the emission rates had been adjusted to take into account the intermittent nature of the railcar unloading operations.

Table 1.2.22 Maximum Ground Level Concentrations with Worst case Emissions from the Concentrate Piles* (Updated EIS Table 5.3, Appendix G, Volume 2)

Contaminant	Averaging Period	Maximum GLC ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Cumulative Max GLC ($\mu g/m^3$)	Applicable Criteria ($\mu g/m^3$)	Percent (%) of Criteria
TSP	1 – hour	1551 (1 533)	-	-	-	-
	24 – hours	282.3 (267)	(90)	372.3 (357)	(120)	310% (298%)
	Annual	41.8 (39)	-	-	-	-
PM_{10}	24 – hours	153.8 (142)	-	-	-	-
$PM_{2.5}$	1 – hour	229 (236)	-	-	-	-
	24 – hours	52.5 (44)	(20)	72.5 (64)	(30)	242% (213%)
	Annual	8 (9)	-	-	-	-

Note: *Former values within parenthesis.

For NO conversion, the method used is the total conversion, which is the most conservative approach.

1.2.44 Information Request No. QEC 44

Le promoteur mentionne que les options du modèle ont été basées sur les options des guides de Terre-Neuve, de l'Ontario et de l'US EPA. Pourquoi ne pas avoir utilisé celles du Québec ?

À la section 4.7.2.6 Model Options, la référence « DRI 1999 » est mentionnée à la fin du 2ème paragraphe (see for example DRI 1999), mais elle n'e semble pas avoir été notée dans les références.

Alderon Response to IR No. QEC 44

There are no detailed or specific requirements about the use of CALPUFF in the Québec Guidelines (Guide de modélisation de la dispersion atmosphérique, published in 2005).

However, CALPUFF is recommended in the guidelines, for complex industrial sites located near important bodies of water, such as the St. Lawrence River east of Québec City.

The DRI 1999 reference may be added in Section 6.0 of Appendix G, among the other sources of information:

- Desert Research Institute (DRI). 1999. Reconciling Urban Dust Emissions Inventory and Ambient Source Contribution Estimates: Summary of Current Knowledge and Needed Research. Prepared by J.G. Watson and J.C. Chow. DRI Document No 6110.4D2.

1.2.45 Information Request No. QEC 45

Le scenario «Kami Terminal» n'inclut pas les émissions issues des locomotives sur la partie à l'intérieur du site. Bien que cette source soit incluse dans le scénario «Rail», elle ne pourrait être dissociée des autres sources de ce secteur. Le promoteur devrait expliquer avec plus de détails pourquoi cette source n'est pas considérée dans ce scénario.

Si les sources de transbordement du concentré et celles issues des navires étaient à inclure, la modélisation devrait être réalisée avec ces nouvelles données.

Le scénario «Construction» devrait inclure les sources des autres activités de construction dans le cas où elles seraient significatives (véhicules, etc.). Voir commentaire No 29.

Le promoteur a considéré la dispersion atmosphérique des polluants à partir de trois scénarios distincts (terminal, construction, rail; page 48 de l'annexe G) afin d'évaluer l'impact du projet sur la qualité de l'air pour quelques récepteurs en particulier. Il semblerait que le promoteur n'ait pas regroupé toutes les sources en un seul scénario pour ainsi évaluer les émissions cumulatives sur l'ensemble des récepteurs. Pourquoi le promoteur n'a-t-il pas envisagé l'étude de ce scénario ?

Alderon Response to IR No. QEC 45

The emissions associated with the movement of the locomotives on the site are considered as being significantly below emissions associated with the hauling of the concentrate.

The loading of ships and the movements of vessels (tug boats, ships) are under the responsibility of the Port Authority, and were not included in the scope of the study. This issue may be better handled through the regional consultative committee on air quality.

As mentioned, three scenarios were modeled separately:

- Site preparation and construction;
- Rail road emissions; and
- Site operation.

Adding results associated with the construction phase and to the operation phase would not be appropriate, considering that they are not occurring at the same time.

There is a limited overlap between emission rates of contaminants from the rail and terminal sources, as modeled railcar emissions mostly consists of gaseous pollutants, with small amounts of particulate matter, while the modeled emissions at the terminal mostly consists of particulate matter. Despite this caveat, it would have been possible to add their contribution.

To illustrate the small overlap of the railroad emissions with terminal emissions, the study considered the highest 24-hr GLC of $PM_{2.5}$ obtained at receptor #17 for the rail scenario, i.e., 1.51 ug/m^3. For that location, the isocontour associated with the terminal emissions (Figure E.2 of Appendix G) reveals a maximum 24-hr GLC of approximately 0.5 ug/m^3. Adding the two concentrations leads to a net concentration of 2 ug/m^3, which is significantly below the air quality standard, even when considering background emissions. (Please note that Figure E.1 in Appendix G was improperly designated as representing the max 24-hr $PM_{2.5}$ GLC, while it instead represents the max 1-hr GLC).

1.2.46 Information Request No. QEC 46

L'annexe F indiquerait des concentrations pour 26 récepteurs spéciaux. Tous les 26 sont-ils des récepteurs spéciaux ? Sinon, quels sont, parmi les 26 récepteurs, les récepteurs spéciaux ? Le tableau 5.4 présente les concentrations des polluants issues des locomotives pour les « récepteurs spéciaux ».

- Quels sont ces « récepteurs spéciaux » et les valeurs correspondantes en ces endroits? Il semblerait, selon le tableau présenté à l'annexe F, que ce soient les concentrations aux récepteurs 16 et/ou 17 qui auraient été rapportées dans le tableau 5.4.
- Que représentent les récepteurs portant les numéros 16 et 17 ? Le promoteur devrait identifier et fournir plus de détails sur ces récepteurs (voir commentaire No 37).

Alderon Response to IR No. QEC 46

There are 26 special receptors. The term "special receptor" should be deemed equivalent to "specific receptors". Among those receptors there are private residences, schools, one hospital, residences for the elderly, a community center and elevated points / summits.

Table 1.2.23 lists all the specific receptors, the type, name / description, and UTM coordinates.

Table 1.2.23 List of Specific Receptors

No.	Type	Name/Description	UTM Coordinates	
			X (m)	Y (m)
1	School	CEGEP de Sept-Îles	688805	5567253
2	Hospital	Centre Hospitalier Régional de Sept-Îles	686644	5565193
3	Community center	Centre Récréatif	687128	5565544

No.	Type	Name/Description	UTM Coordinates	
			X (m)	Y (m)
4	School	École Boisjoli	683967	5571942
5	School	École Camille-Marcoux	686061	5568469
6	School	École Gamache	686817	5565407
7	School	École Jacques-Cartier	686395	5566997
8	School	École Maisonneuve	688257	5566340
9	School	École Manikanetish	685071	5566410
10	School	École Marie-Immaculé	685882	5566213
11	Private residence	Résidence 01	675049	5558368
12	Private residence	Résidence 02	670695	5556892
13	Private residence	Résidence 03	669341	5563329
14	Private residence	Résidence 04	675391	5565382
15	Private residence	Résidence 05	673754	5566473
16	Private residence	Résidence 06	674663	5567121
17	Private residence	Résidence 07	675556	5566775
18	Private residence	Résidence 08	678067	5569115
19	Private residence	Résidence 09	683014	5572409
20	Private residence	Résidence 10	685145	5565813
21	Private residence	Résidence 11	687285	5564064
22	Private residence	Résidence 12	691313	5564696
23	Residence for the elderly	Résidence des Bâtisseurs	686414	5564740
24	Residence for the elderly	Résidence JR Lafontaine	686141	5566442
25	Elevated point/summit	Sommet topographique 1	665273	5565379
26	Elevated point/summit	Sommet topographique 2	693848	5557622

Schedule F of Appendix G of EIS Volume 2 presents the predicted GLCs for each of these 26 receptors.

1.2.47 Information Request No. QEC 47

Selon le promoteur, deux trains de concentré de minerai de fer arriveront au terminal Kami, chaque jour. Les émissions de GES ont été estimées pour le transport de 16 millions de tonnes de concentré entre la mine et le terminal.

- Pourquoi le promoteur n'a-t-il pas considéré les quantités de GES émises durant les activités de transbordement du concentré, alors que les locomotives sont encore sur le site? Seraient-elles assez significatives pour en tenir compte dans l'estimation des GES?
- Par ailleurs, pourquoi le promoteur ne considère-t-il pas les émissions de GES produits par les trains qui iront chercher le concentré à la mine ? Serait-il pertinent d'inclure ces émissions, même si ces trains étaient utilisés pour transporter d'autres marchandises qui ne concerneraient pas le projet ?

Alderon Response to IR No. QEC 47

Emissions associated with the movement of locomotives on the site will be significantly lower than emissions associated with the hauling of loaded railcars in the transit between the mine and the terminal.

With respect to the transportation of empty railcars to the mine site, the average fuel consumption published by the Railway Association of Canada is based strictly on the transported load. The weight of railcars during the transportation of loads, and the occasional movements of empty railcars, appear to be taken into account in the average fuel consumption.

Despite these caveats, and although the Canadian average consumption is perceived as being conservative for the type of railroad operation associated with the Canadian iron sector (loaded trains going in a generally downhill direction, with limited stoppage or slowdown during the transportation), the Canadian average fuel consumption was applied to the distances presented in Table 14.26 of Volume 2, Part II of the EIS to the typical weight of empty railcars, with the assumptions outlined in Table 1.2.24.

Table 1.2.24 Assumption for Calculation of GHG Emissions Associated with the Railroad

Description	Quantity	Units
Fuel consumption	5.5	litres/1000 t/km
GHG Emission Factor	3.01	kg/litre
Distance from the Québec border to the terminal	273	km
Typical weight of an empty railcar (source of information : Rio Tinto Iron Ore website)	20	tons
Number of railcars (at 108 tons per railcar)	148,000	Railcars per year

As a result, an additional 13,400 t of CO_2e is obtained for the movement of empty railcars from the terminal to the mine. This value should be considered as a potential quantity, considering the above-mentioned caveats.

The fact of adding these GHG emissions to the current values are not likely to affect the conclusion presented in Table 14.33 of Volume 2, Part II of the EIS.

1.2.48 Information Request No. QEC 48

Le Programme d'Environnement Canada vise seulement les plus grandes industries émettrices de gaz à effet de serre du Canada. Dans ce cadre, toutes les installations qui émettent l'équivalent de 50 000 tonnes (50 kilotonnes) ou plus de gaz à effet de serre en termes d'unités équivalentes de dioxyde de carbone ($CO_{2éq}$) par année sont tenues de présenter un rapport. Le promoteur ne devrait-il pas considérer changer les catégories en tenant compte de ce nouveau critère et définir la catégorie faible pour des valeurs inférieures à 50 kilotonnes de GES ?

Alderon Response to IR No. QEC 48

Comment acknowledged. While changing the threshold for significant impacts from 100 kt to 50 kt may be appropriate in this instance, it would not change the conclusion presented in Table 14.33 of Volume 2, Part II of the EIS because GHG emissions resulting from the Kami Terminal are not expected to be above the 50 kt threshold.

1.2.49 Information Request No. QEC 49

Le promoteur considère que les émissions de GES durant les phases de construction et de réhabilitation du site seront négligeables et n'ont donc pas été quantifiées. Le promoteur devrait tout de même étayer ces affirmations en quantifiant, au minimum, l'ordre de grandeur des émissions qui pourraient être générées par ces activités.

Alderon Response to IR No. QEC 49

The consumption of diesel is estimated to be in the range of 25 to 30 million liters, as the total for the whole duration of the construction phase. The estimate was prepared by considering each type of equipment that will be present at the site for each construction activity. Table 1.2.25 summarizes the predicted diesel consumption for each type of equipment.

Table 1.2.25 Consumption of diesel during the construction phase

Type of equipment	Consumption of diesel - litres
Pick-up trucks	2,954,902
Mobile Man-Lift (Genie)	525,698
Zoom Boom	680,315
Excavator (CAT 350 L)	2,260,156
Tanker Truck	651,968
Dump Truck (CAT 476)	7,973,081
Concrete Truck Mixer (Kenworth 330)	2,040,944
Bulldozer (CAT D9R)	1,809,018
Drill-Wagon	2,087,329
Compactor (815F Series 2 Soil Compactor	1,260,472
Front-end-Loader (CAT 980 H)	1,558,882
Backhoe-Loader (430F/430F IT Backhoe Loader)	296,349
50t crane (LTM 1050-3.1)	1,212,712
80t Crane (LTM 1090-4.1)	1,090,049
150t Crane (LTM 1160-5.1)	765,354
Asphalt Paver (CAT AP1055E Paver)	231,925
Total	**27,399,154**

This consumption of diesel corresponds to approximately 82 000 metric tons of GHG, as CO_2. With construction being planned over two years, the annual emissions are likely to be under the threshold for significant GHG emission.

1.2.50 Information Request No. QEC 50

The dispersion of particulate matter is modelled according to the winds as observed in Pointe-Noire, from 2005-2011: Pointe-Noire is not representative of the whole area, and the climatology used is based only on 5 years of observations; the dispersion could be more adequately modelled using Sept-Îles winds, as established by climatology (30 years or more), and for different times of the year, since the predominant wind direction and intensity vary throughout the year.

More specifically, at Sept-Îles airport, SW winds stronger than 20 km/h are more significant during the summer months (June-July-August), when they occur just over 3 percent of the time.

Wind speed at weather stations is measured at a standard height of 10 m above ground. We do not know the projected height of the stockpile, but anything higher than 10 m would be subjected to stronger winds, and hence to a higher potential of wind erosion.

Alderon Response to IR No. QEC 50

The CALMET meteorological pre-processor was used to define meteorological conditions at each surface grid points, based on hourly meteorological data available from both Sept-Îles airport and Pointe Noire stations, from 2005 to 2011. Other factors considered by CALMET include the topography and the sea temperature.

The common practice for modelling studies is to use 5 years of meteorological data. This is the recommendations made by the Québec ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (MDDEFP) in its *Guide de la modélisation de la dispersion atmosphérique* published in 2005.

With respect to wind erosion, several conservative assumptions were made in estimating the average emission rate from the concentrate pile, as used in the dispersion model.

- The emission rate used for dispersion modeling was established by considering a wind speed of approximately 33 km/h (9.2 m/s). This wind speed is equivalent to the 99^{th} percentile of wind speed measured at Pointe Noire from 2005 to 2011. The average measured wind speed for that same period is 13 km/h (3.6 m/s).
- The pile maximum surface of 60 000 m^2 was used for calculation.
- The emission rate calculated with that wind velocity was considered constant, in order to evaluate worst case concentrations, even during low wind speed when wind erosion is unlikely and dispersion conditions are unfavourable, or during rainy conditions.

It is expected that the maximum height of the concentrate pile will be approximately 18 to 20 m above ground. Being that the meteorological station is at an elevation of 10 m above ground, this appears as being representative of the average height of the pile.

1.2.51 Information Request No. QEC 51

Even if the bay is protected by the islands, an elevation of sea level due to severe storms and building-up of water from the East is possible; therefore, it would be advisable to provide here the elevation above sea level (ASL) of the installations; the mere mention "above sea level" does not mean it's beyond storm surge reach. Also it would be interesting to know the actual coastal erosion rate of this particular area and the relation with severe storm events.

There is the mention on p. 7-4 of wave related erosion directly on the coast; therefore, storm surges are likely to affect the area under consideration, at least the first few meters ASL.

Alderon Response to IR No. QEC 51

Because of its shape and the presence of offshore islands, baie des Sept-Îles is naturally protected and offers close to ideal conditions from coastal erosion and from wave action. Storm surges are changes in water level caused by atmospheric forcing associated with storms. Set-up from high winds, they will cause water to pile up higher than sea level and can cause significant coastal erosion and flooding especially in low lying areas. On January 20 and 21 of the year 2000 (Bobanovic et al. 2004), the east coast of Canada was hit by a powerful storm that caused significant damage to coastal infrastructure in Prince Edward Island and in New Brunswick. The storm's strong wind and low central pressure generated a storm surge of 1.4 m. The peak sea level in Charlottetown was the highest level recorded since records began in 1911.

The largest reported tidal range at Sept-Îles is 3.3 meters. Even with a significant storm surge such as the one previously indicated, occurring during exceptionally high tides, the Kami Terminal infrastructure would be untouched. The future concentrate storage area is located on land some 20 to 30 m ASL, even the base of the rail infrastructure embankment would be located over 10 m ASL. The overhead enclosed conveyor system would also be untouched. For the same reason, coastal erosion is not expected to affect the Kami Terminal.

Reference:

Bobanovic J., Thompson K.R., Desjardins S., Ritchie H., "Forecasting Storm Surges Along the East Coast of Canada and Northeastern US: The Storm of 21 January 2000, April 2004'', Department of Oceanography, Dalhousie University and Environment Canada, 23 pages.

1.2.52 Information Request No. QEC 52

- The Climate normals are compiled by Environment Canada, more specifically by the Meteorological Service of Canada (MSC).

- The Sept-Iles climate is subarctic **boreal** with a marine influence from the Gulf of St. Lawrence. Gulf waters contribute to a milder winter and a cooler summer. The sea breeze (wind blowing from the St. Lawrence waters, i.e. from the East) during the summer months keeps the temperatures cool over the land.
- The winds are rarely from the South in this area, even during the summer; on an annual basis, S and SW winds occur about 13% of the time on an annual basis, and 20% of the time during the summer months.
- The Sept-Iles area has a snow cover (> 2 cm) about 6 months a year, from Mid-November to Mid-May.
- The average annual precipitation is **1156** mm, and includes rain and snow (water equivalent)…
- The average rain is 757 mm and the average snow is 412 cm.
- P. 14-24, last sentence should read: “The maximum gust speed was measured in January 1960, with a speed of 161 km/h.”
- Figure 2 (p. 7-6): wind rose, from 2005 to 2011→ the wind rose for Sept-Iles airport should cover a much longer period; the wind rose from 1971-2010 is available here: http://www.climat-quebec.qc.ca/home.php?id=roses_vents&mpn=stats&lg=en
- Also it is difficult to compare wind speeds in **km/h** with wind roses in **m/s.**
- The most frequent wind directions (1971-200) of stronger winds (>20 km/h), on an annual basis, are **East** and **N/NW**.
- Pointe-Noire: wind data available from 1997, so why provide a rose wind for 2005-2011 only? This seems a very short period to establish “wind normals”…
- Pointe-Noire weather station is “protected” compared to Sept-Iles weather station: the winds will always be weaker at Pointe-Noire, but are not representative of the winds over the whole area.
- Same comments for pages 14-24; 14-25 (wind roses) as in Chapter 7.
- General comment: Normals for Sept-Iles from 1981-2010 should be released early in 2013.

Alderon Response to IR No. QEC 52

Table 1.2.26 addresses the reviewer’s notes.

Table 1.2.26 Alderon Responses to Reviewer’s Notes

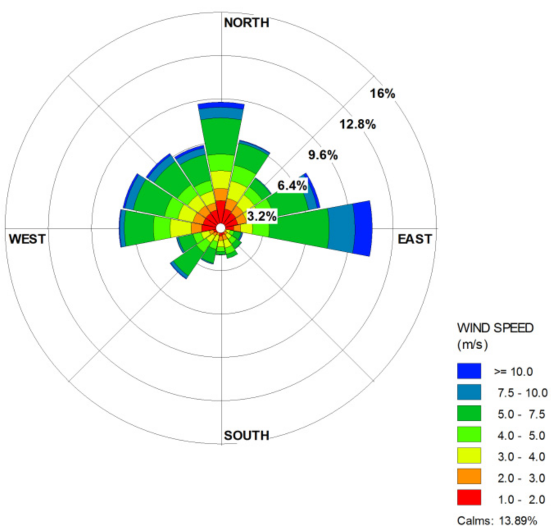
IR No. QEC 52 Specific Comment	Alderon Response
The Climate normals are compiled by Environment Canada, more specifically by the Meteorological Service of Canada (MSC).	The comment is acknowledged.

IR No. QEC 52 Specific Comment	Alderon Response
The Sept-Iles climate is subarctic boreal with a marine influence from the Gulf of St. Lawrence. Gulf waters contribute to a milder winter and a cooler summer. The sea breeze (wind blowing from the St. Lawrence waters, i.e. from the East) during the summer months keeps the temperatures cool over the land.	The comment is acknowledged.
The winds are rarely from the South in this area, even during the summer; on an annual basis, S and SW winds occur about 13% of the time on an annual basis, and 20% of the time during the summer months.	The comment is acknowledged.
The Sept-Iles area has a snow cover (> 2 cm) about 6 months a year, from Mid-November to Mid-May.	The comment is acknowledged.
The average annual precipitation is 1156 mm, and includes rain and snow (water equivalent)…	The comment is acknowledged.
The average rain is 757 mm and the average snow is 412 cm.	The comment is acknowledged.
P. 14-24, last sentence should read: “The maximum gust speed was measured in January 1960, with a speed of 161 km/h.”	The comment is acknowledged.
Figure 2 (p. 7-6): wind rose, from 2005 to 2011→ the wind rose for Sept-Iles airport should cover a much longer period; the wind rose from 1971-2010 is available here: http://www.climat-quebec.qc.ca/home.php?id=roses_vents&mpn=stats&lg=en. Same comments for pages 14-24; 14-25 (wind roses) as in Chapter 7.	Figure 1.2.5 shows the Sept-Îles Airport wind rose obtained from two different time periods. Both wind roses although they do not cover the same time period and do not have the same sub-divisions, show a generally similar pattern, with perhaps a more important portion winds from the north-east in the 1971-2000 wind rose. For Pointe Noire, this comparison was not possible, since wind measurements at that station are only available since 1997.
Also it is difficult to compare wind speeds in km/h with wind roses in m/s.	Wind speeds presented in m/s can be easily converted in km/h by multiplying by 3.6.
The most frequent wind directions (1971-200) of stronger winds (>20 km/h), on an annual basis, are East and N/NW.	In Section 4.5.1 of Appendix G, in the fifth paragraph, the following information may be added: “The most frequent wind directions (1971-2000) of stronger winds (>20 km/h), on an annual basis, are East and North-Northwest. The winds are rarely from the South in this area, even during the summer. South and Southwest winds occur about 13% of the time on an annual basis, and 20% of the time during the summer months.”
Pointe-Noire: wind data available from 1997, so why provide a rose wind for 2005-2011 only? This seems a very short period to establish “wind normals”…	It is common to use approximately 5 years of data. This is recommended by the MDDEFP, in its guidelines related to atmospheric dispersion modelling (Guide de la modélisation de la dispersion atmosphérique, published in 2005.) Also, as mentioned in the response to IR No. QEC 50, the CALMET meteorological pre-processor considered wind conditions at the two local meteorological stations (Pointe-Noire and Sept-Îles airport).

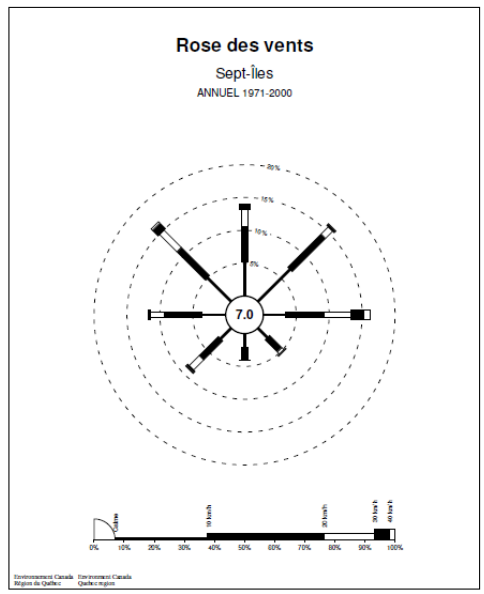
IR No. QEC 52 Specific Comment	Alderon Response
Pointe-Noire weather station is "protected" compared to Sept-Iles weather station: the winds will always be weaker at Pointe-Noire, but are not representative of the winds over the whole area.	As mentioned in the response to IR No. QEC 50, the CALMET meteorological pre-processor was used to define meteorological conditions at each surface grid points, based on hourly meteorological data available from both Sept-Îles airport and Pointe Noire stations, from 2005 to 2011. Other factors considered by CALMET include the topography and the sea temperature.
General comment: Normals for Sept-Iles from 1981-2010 should be released early in 2013.	The comment is acknowledged.

Figure 1.2.5 Comparison of Wind Roses for Sept-Îles, for Two Different Time Periods

Wind rose from 2005 to 2011 (7 year period)



Wind rose from 1971 to 2000 (30 years period)



Source: http://www.climat-Québec.qc.ca/home.php?id=roses_vents&mpn=stats

1.2.53 Information Request No. QEC 53

- The storm water retention pond is designed to contain a 100 year flood event. We suppose it means a 100 year storm (heavy rainfall) event. It could be appropriate to include here the IDF curve used to estimate the recurrence. Is it Sept-Iles IDF curve? Is it an event over 24 hours or 5 minutes? Has the data been updated to include events in the last three decades? An increase in severe storms has been observed in the last decades (for example, from December 13-15, 2010, about 140-160 mm of water were recorded in the area; also in 2010, Earl dropped about 85 mm in less than 12 hours over this area). It would not be surprising if the 100 year storm event would be 150% greater than the old IDF curves show.

- Also, how long is the water contained in the retention pond? Can a series of successive storms be enough to create an overflow, during a very wet season?
- It is stated on p. 13-22, in case of a breach in the retention pond, that the red-water would be released downstream: “It is anticipated that baie des Sept-Iles could rapidly recover”. The bay covers an area of approximately 100 km^2; the mudflats, with an area of 48 km^2, accounts for nearly half of the area of the bay. The deeper zone is on the seaport side of the city. More than two thirds of waters of the bay have a depth of less than ten meters, while the deep zone reaches depths of 80 m.

Given the fact that a great portion of the Bay is under 10 m of water, and that the exchanges with the Gulf of St. Lawrence waters are limited (shape of the Bay, barrier from the islands) and mostly due to tides, the red-water might not get diluted as fast as anticipated: it could affect the provincial aviary protected zones as well as spawning grounds for some fish. We recommend verifying this issue with DFO.

Alderon Response to IR No. QEC 53

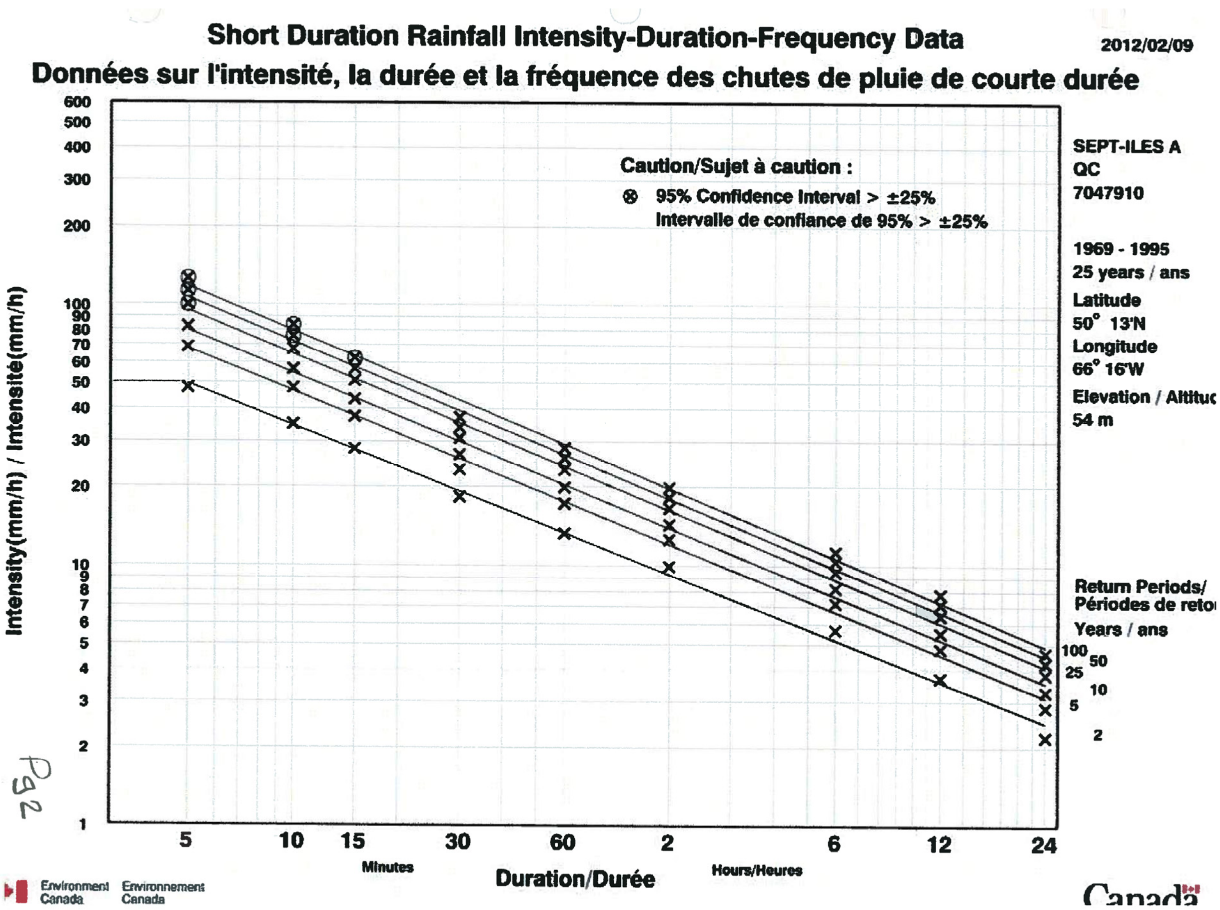
The storm water management system for the Kami Terminal will be designed to prevent an uncontrolled release of water from the site including diversion of clean storm water around the site to minimize the volume of water that will potentially be in contact with iron ore and design of storm water collection and treatment to meet up to date information and predictions of storm intensity and volumes of precipitation.

The retention pond is sized to receive a run off volume of 1,037 m^3/hr, which is consistent with a 1 in 100 year rain event, over a 24 hour period (Figure 1.2.6), for a total volume capacity of 25,000 m^3. The treatment plant has been sized to treat the collected water over a 4-day period, at a flow rate of approximately 4.3 m^3/min. This flow rate is capable of managing high water volumes including a very wet season. In order to exceed the flow conveyance of the system there would need to be a second 1 in 100 year storm event within 4 days of the initial storm.

The final design for the storm water management system for the Kami Terminal will meet up to date information and predictions of storm intensity and volumes of precipitation, including projections of increased storm intensity and duration events due to climate change.

The issue of the impacts of a breach of the retention pond releasing to the baie des Sept-Îles will be verified with DFO as recommended.

Figure 1.2.6 Short Duration Rainfall Intensity-Duration-Frequency Data



1.2.54 Information Request No. QEC 54

If assessed comprehensively, the natural variability in the observed climate record for the region will likely be sufficient to characterize the range of climate variations over the construction and operational phase of the Terminal (next ~20 yrs). However, there is no plan to close the facility following completion of mining operations at the Kami Mine in west Labrador (Volume 2, p.2-24). As such, design of the terminal facility should consider climate change beyond the ~20 yr period (i.e. changes outside the range of observed variability should be considered). Current Global Climate Model (GCM) projections are available out to 2100 which should encompass the potential lifetime of the terminal facility.

Alderon Response to IR No. QEC 54

The final design for the storm water management system for the Kami Terminal will meet up to date information and predictions of storm intensity and volumes of precipitation, including projections of increased storm intensity and duration events due to climate change.

1.2.55 Information Request No. QEC 55

Environment Canada recommends that the proponents provide a more detailed discussion of projected changes in climate for the area with particular focus on projections of precipitation including extremes (winter and summer), possible changes in storminess (frequency, track and intensity) and storm surge, sea level rise and sea ice conditions and their potential impacts on the terminal facility.

To address these effects in the post-operational period, the proponents should consider an ensemble of Global Climate Model (GCM) projections that encompass the possible magnitude of future climate and climate-related changes for the region. They may wish to consult existing publications and reports (e.g. IPCC, 2012 and references therein) or undertake similar analyses themselves. The use of Lines et al. (2005) study, as in Volume I of the Environmental Impact Statement (Kami Mine), is not recommended as it is based on downscaling of a single simulation (GHG + aerosols; an IS92 scenario) from a single Global Climate Model (CGCM1). There have been substantial refinements to both the Canadian global climate model and emission scenarios since the versions used in this study. Furthermore, individual climate models have inherent weaknesses and strengths and as a result give different projections of future changes in the same climate parameters. Each model run represents a possible future with some projecting substantially more or less intense changes in temperature or precipitation for the same area. As such, the approach taken by the proponents does not capture the range of possible future changes for this region (for precipitation in particular for which there is more disagreement between models). To more adequately capture this uncertainty, the proponents should consider more recent projections from a range of models for a number of future emission scenarios. If they require projections at a finer spatial scale than GCMs can provide, they may consider recent results from the Canadian Regional Climate Model (CRCM) developed by the Ouranos group (e.g. http://www.ouranos.ca/media/publication/201_Precipitations2012_webEng.pdf).

Reference:

IPCC, 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

Alderon Response to IR No. QEC 55

Final Engineering design of the Kami Terminal will take into account most recent projections of storm intensity and volume of precipitation for the foreseeable future but within the operation period (20 years). Although it is planned that Alderon will transfer the infrastructure on site to another owner and operator, operations that would be conducted by other users are unknown and may differ significantly from what Alderon is planning on building. It is expected that future users will have to adapt the transferred installations to their needs. These changes will take into account their operational timelines and updated projections on climate conditions.

As for storm surges in the foreseeable future, these are provided in QEC 51.

1.2.56 Information Request No. QEC 56

- Il est difficile de se prononcer sur les activités de suivi présentées, puisque le « EPP » n'a pas été présenté dans l'étude d'impact.
- Le promoteur mentionne à la page 14-75 qu'il participera au programme de la surveillance de la qualité de l'air initié à Sept-Îles, mais n'indique pas d'autres détails. Quel est ce programme ? Le décrire et présenter comment il compte y contribuer.
- Est-ce que des mesures de suivi de la qualité de l'eau sont prévues afin de s'assurer du respect des lois et règlements applicables (p. ex. article 36(3) de la Loi sur les pêches)?
- Demander un suivi des composés azotés dans les ruisseaux et la baie de Sept-Îles?

Alderon Response to IR No. QEC 56

The Sustainability Management Framework is a part of the overall Kami Project management system that includes quality management systems, document control, risk management and Health, Safety and Environment (HSE) systems. The framework is made up of three main systems, the components of which are shown in Appendix J.

1. The Sustainable Project Delivery (SPD) system will provide a high level approach to sustainability management by establishing clear objectives, tracking of key Project commitments, support for engineering and procurement activities and reporting on overall sustainability performance;
2. The Environmental Management System (EMS) will provide detailed management of regulatory and permit requirements and includes environmental protection plans and procedures. The EMS will include environmental monitoring and reporting on specific construction and operational activities. Environmental Management Plans will be developed in consultation with relevant regulatory agencies and stakeholder groups.
3. The Social Responsibility System (SRS) will manage and track the commitments made in various guidance documents and contracts (e.g., benefits agreement) as well as establish plans for effective Project communications, community liaison and complaints management.

Working closely with the HSE team, the SMF will facilitate the incorporation of sustainability issues into employee orientation, daily tailgate and safety meetings, contractor management, monitoring and incident response procedures.

Alderon was invited to join the Sept-Îles air quality consultation committee (Table de concertation sur la qualité de l'air à Sept-Îles) in November 2012, and accepted the invitation. The objectives of the committee are to: (1) facilitate the preparation of a general overview of the air quality in Sept-Îles; (2) identify issues associated with air quality; (3) identify potential solutions, which are mutually satisfactory, to mitigate and address issues identified by the

Committee. The committee includes representatives from the municipality, environmental organizations (Corporation de protection de l'environnement, Comité de défense de l'air et de l'eau, Conseil régional de l'environnement de la Côte-Nord), health agencies (Agence de la santé et des services sociaux de la Côte-Nord and Centre de santé et des services sociaux de Sept-Îles), industries (Cliffs Mines Wabush, Compagnie minière IOC, Aluminerie Alouette), with the participation of the Québec Environmental Ministry (MDDEFP). Mine Arnaud, Proponent of a new mine in the Sept-Îles area, was also invited to join the committee.

Since Alderon will prohibit the use of ammonium nitrate-fuel oil mixtures, there is no need to follow-up on nitrogen compounds in adjoining streams and the bay. As mentioned in Section 16.10, page 16-36 of Volume 2 of the EIS, water quality of the stormwater retention pond discharge will be monitored to ensure compliance with the MDDEFP Directive 019 guidelines, CCME water quality requirements for the protection of aquatic life and Québec surface water criteria for the protection of aquatic life.

References:

Porter, C. Conservation Officer, Newfoundland and Labrador Department of Natural Resources, Wabush, Newfoundland and Labrador. Correspondence in September 2011.

1.2.57 Information Request No. QEC 57

- À ce sujet, lors de la surveillance durant les travaux notamment, il serait souhaitable de porter attention à l'importance de la remise en suspension des sédiments et de prendre des mesures, si jugé nécessaire, afin de s'assurer du respect des recommandations canadiennes pour la qualité des eaux (protection du milieu aquatique – matières particulaires) du Conseil canadien des ministres de l'environnement (CCME). Celles-ci indiquent que les activités humaines ne devraient pas engendrer une augmentation des sédiments en suspension de plus de 25 mg/L lorsque les concentrations de matières particulaires totales de fond sont de moins de 250 mg/L et lorsque l'exposition est de courte durée. Lorsque les concentrations de fond sont plus élevées que 250 mg/L, les activités humaines ne devraient pas engendrer un dépassement en sédiments en suspension de plus de 10% par rapport à la concentration de matières particulaires totales de fond.
- Le promoteur doit également s'assurer que ses installations ou son projet ne contreviennent pas à l'article 36(3) de la Loi sur les pêches qui stipule qu'« il est interdit d'immerger ou de rejeter une substance nocive – ou d'en permettre l'immersion ou le rejet - dans des eaux où vivent des poissons, ou en quelque autre lieu si le risque existe que la substance ou toute autre substance nocive provenant de son immersion ou rejet pénètre dans ces eaux ».
- Enfin, le suivi de la qualité de l'eau des deux ruisseaux sur le site (à la Baleine et sans nom) est-il prévu? Il serait intéressant de suivre leur qualité tout au long de l'exploitation du site afin de s'assurer, notamment, de l'étanchéité des digues des zones d'entreposage du concentré.

Alderon Response to IR No. QEC 57

The final effluent discharge requirements of Directive 019 are equivalent or more stringent (arsenic, iron) than the authorized limits of deleterious substances under the *Metal Mining Effluent Regulations* with the exception of radium 226 which is not covered by Directive 019. In both cases, the effluent criteria are applicable to the effluent before its release in the environment (discharge point).

Prior to initiation of Project activities, a detailed compliance monitoring and follow-up program will be developed by Alderon and submitted to appropriate regulatory agencies for review prior to the initiation of Project activities. The follow-up program will be developed within the Sustainability Management Framework (SMF), and more specifically within the Environmental Management System that is one of three components of the SMF. The final design of both biophysical and socio-economic follow-up and monitoring programs will, as appropriate, be dependent on consultation with relevant government agencies, communities and stakeholders. With respect to water quality, Alderon will monitor water quality of both streams during operation. Further details with respect to this monitoring, including timing and duration will bedeveloped in consultation with the appropriate regulatory authorities.

As mentioned in Volume 2, Section 18.1 of the EIS, neither ruisseau à la Baleine nor the unnamed stream provide habitat that supports freshwater fish populations. However they both flow into baie des Sept-Îles, which supports fish habitats.

As mentioned in Volume 2 Section 16.6.1 (pages 16-20) of the EIS, in order to limit the input of suspended solids in the watercourses during the construction phase, including the ruisseau à la Baleine diversion work, a series of mitigation measures will be implemented. Flows in both ruisseau à la Baleine and in the unnamed stream will be maintained. Alderon will monitor water quality of both streams during operation.

1.3 Information Requests Received from Fisheries and Oceans Canada (DFO)

Alderon received Department of Fisheries and Ocean's comments on the EIS in December 2012. Discussions with the federal Department of Fisheries and Oceans (DFO) have been ongoing on many of their requests since the submission of the EIS in order to continue the *Fisheries Act* Authorization process. In this respect, many of the responses to questions from DFO have been provided to them prior to submission of these responses.

Alderon has met with DFO on an ongoing basis to inform them of additional field programs to collect data on fish populations within the vicinity of the Project, to discuss potential compensation options and sites, and to provide Project updates. Over the course of the EA, the DFO EA committee representative has changed three times. Alderon has worked to ensure that these new committee representatives were updated on the project status and provided with opportunities to discuss EA format and methodology in an effort to maintain continuity. The most recent meeting was held on November 15, 2012 when the DFO Information Requests presented below were discussed. Alderon has incorporated input from DFO into the responses below will continue to meet with regulators regarding any further permitting and/or authorization requirements and continues to develop its compensation plan for *Fisheries Act* authorization.

The following section includes the 19 information requests from DFO and Alderon's response to each of these requests.

1.3.1 Information Request No. DFO 01

The proponent should ensure that language and labelling of diagrams, maps, and tables are consistent. The proponent should ensure that any information pertaining to regulatory information and applicable requirements is correct.

Alderon Response to IR No. DFO 01

The Reviewer's comment is acknowledged, however no specific examples have been provided. Where comments have been made by other Reviewers regarding inconsistent use of language, labeling of diagrams, maps and tables, Alderon has provided clarification or correction as appropriate.

1.3.2 Information Request No. DFO 02

The project description does not clearly indicate the impact to water bodies as a result of the project. It is not until Volume II of the EIS that it is clear that waterbodies will be removed or infilled as a result of the project. It is not explained in The Plain Language Summary that any waterbodies will be impacted as a result of the project. There is one line in the Summary that states *"…effects to fish habitat will be limited to alterations and losses from site preparation and construction activities".* The proposed removal, destruction, or infilling of ponds and streams in order to construct and operate Rose Pit, construct the Tailings Management Facility, and construct and operate Rose South Waste Rock Disposal Area should be clearly stated both in the description of the project (Volume 1, Section 2) as well as in the Plain Language Summary.

Alderon Response to IR No. DFO 02

The general layout of the EIS is to provide Project description information (for example Volume 1, Part I, Chapter 2 provides the Project description for the Labrador component of the Project), followed by more detailed existing environment information within individual VEC assessment chapters (for example Volume 1, Part II, Chapter 18 provides the existing environment description for Freshwater Fish, Fish Habitat and Fisheries). Each VEC chapter includes a detailed description of the existing environment of the area as well as the interactions between it and the Project description.

The key areas and components of the environment that are important for understanding the potential environmental effects of the Project were identified and described in general terms in Volume 1, Part I, Chapter 2, Section 2.4 of the Project Description and in the Plain Language Summary. Also included was a clear indication that detailed information is provided in the appropriate existing environment sections and baseline reports, to avoid unnecessary duplication. Section 2.6.1 (Construction) of the Project Description (Volume 1, Part I, Chapter 2) also identifies what waterbodies will be de-watered and where fish relocation activities will occur during construction. Figures 2.4 and 2.5 in the Project Description chapter indicate the primary concerns generated by the consultation process and the Project layout, respectively.

The Plain Language Summary is provided to describe an overview of the Project in easy to understand language. While the language may be more general than required by the regulators, it was deemed appropriate for the documents intent.

1.3.3 Information Request No. DFO 03

In several chapters of the EIS, there appears to be a lack of understanding of the purpose of a fish habitat compensation plan (FHCP). In the document, a FHCP is described as a plan to avoid impacts to fish and fish habitat (p. 10-111), as well as a plan to address loss of opportunity for recreational fishing (p.13-48). Impacts are avoided through best management practices and mitigation measures. A FHCP does not provide a means to avoid impacts to fish and fish habitat but outlines how a Proponent will create new fish habitat or enhance / restore fish habitat to offset fish habitat that they will harmfully alter, disrupt or destroy. A fish habitat compensation plan is required when impacts to fish and fish habitat cannot be avoided and when DFO decides that a *Fisheries Act* Authorization will be issued.

The proponent has indicated that they will develop a Fish Habitat Compensation Plan in consultation with DFO. However, there is no further information within the EIS that states how the proponent will offset losses to fish and fish habitat that may occur as a result of this project. In addition, on page 18-49 of the EIS, the Proponent notes that Fish Habitat Compensation will provide opportunities for recreational fishing but does not describe how this will be achieved. It is important to note that a Fish Habitat Compensation Strategy and a Fish Habitat Compensation Plan is required should DFO decide to issue an Authorization under the *Fisheries Act*. The Proponent should ensure that the appropriate information is submitted to DFO.

Alderon Response to IR No. DFO 03

The plain language summary is provided as an overall summary that provides the results of the EIS in non-technical terms. While "*avoids impact to fish and fish habitat*" does not reflect the obvious loss of habitat due to the removal of several small ponds and streams, it is less technical than "no likely significant residual effects". As part of the assessment, the Project and existing environment were described (within the appropriate sections of the document), interactions between the Project components and environment were identified, mitigations to reduce the overall residual effect(s); of which, Fish Habitat Compensation Plan is a major mitigation under *CEAA*. The final residual effects were assessed for significance based on the criteria and definitions provided.

There is no description of the FHCP as a plan to avoid impacts to fish and fish habitat on page 10-111 of the EIS. Table 10.24 on page 10-111 replies to concerns related to contamination and fish. Responses relative to the Fish Habitat Compensation Plan specifically are "*potential effects to fish have been assessed and mitigation identified. This assessment determined that fish mortality as a result of the project is not anticipated. Alderon will prepare a Compensation Plan as required under the Fisheries Act. See Section 18.6 for more information*". This is consistent with Alderon's understanding of the purpose of a fish habitat compensation plan (FHCP).

The text on page 13-48 of Volume 1 of the EIS was provided due to the ongoing changes that are occurring to the Fisheries Act where the focus is being shifted from a habitat-based approach to determining compensation requirements to a fishery-based approach. The details of any new approach have yet to be confirmed by DFO; however, the Kami Project is one of the first to be assessed during these changes. As a result, Alderon have increased their data collection within the aquatic environment in order to meet these potential changes. They have also, where appropriate, indicated within the EIS where both habitat and fishery-based requirements of the Fisheries Act would be addressed. For example, the habitat-based compensation options described in the EIS are directed at species within the area that are fished for recreation (Table 10.24 on page 10-111 indicates local concern for brook trout). The statement questioned in DFO's comment is included in the EIS to remind the reader(s) that not only will habitat be enhanced, but the focus will be on fish that use that habitat.

It is understood by Alderon that a Fish Habitat Compensation Strategy and Plan are required by DFO should they decide to issue an Authorization under the Fisheries Act. There is information within the EIS describing the existing fish habitat (Volume 1 Section 18.5) as well as detailed habitat descriptions and calculations of Habitat Equivalent Units (HEU) for all habitat within the area, as per DFO guidelines, in the accompanying baseline study. Chapter 18 also describes the compensation options being pursued by Alderon (pages 18-40 to 18-44) and how they will offset the loss of the small ponds and streams within the Project footprint. The detail is similar to that typically required in a Fish Habitat Compensation Strategy. Regarding the development of a Fish Habitat Compensation Plan, additional field surveys have been conducted in 2012 at locations identified in the EIS. The options have been further discussed with DFO and development is ongoing.

1.3.4 Information Request No. DFO 04

It is indicated in Table 10.21 that there are sections of the ore deposit that contain sulphides with the potential to generate acid rock drainage (ARD). As well, in Section 16.6.2.1, it is reported that a potential environmental effect of the project is the potential for ARD to affect water quality. Although it is reported that the likelihood of ARD is likely low, mitigations to deal with ARD, should it occur, should be stated in the EIS. If ARD does occur, will subaqueous storage be required? What impacts would this have for waterbodies in the area?

Alderon Response to IR No. DFO 04

No subaqueous disposal in artificial (e.g., open pit) or natural waterbodies is currently proposed. Therefore, no impact to the waterbodies in the area is anticipated.

Based on the early phases of static ARD/ML test work completed to date, the results indicate that there is potential for a portion of the waste rock generated from mining to be acid-generating. Additional phases of static (ABA analysis, shake flask tests, and other work) and kinetic (humidity cells, barrel tests, and others) ARD/ML test work are in progress, with additional test work commencing in early 2013, to determine if these waste rock materials will generate acid drainage when mined and exposed, and if yes, to what extent. The ARD/ML test work program, which requires several phases of test work which can take up to several years to complete, is being completed in accordance with industry standards and Natural Resources Canada's Mine Environment Neutral Drainage (MEND) Program.

In the event this portion of the waste rock materials that shows to be potentially acid generating (PAG) based on the early phases of the ARD/ML test work do prove to be acid-generating, testing to date on the other waste rock materials generating from mining indicate that they have the buffering capacity to neutralize any acidic drainage from the acid-generating waste rock. The PAG rock will be properly 'mixed'/deposited within the waste rock dumps in accordance with proper planning and design for waste rock management, any acidic drainage from these materials should be neutralized when the drainage comes in contact with the waste rock materials with buffering potential and there would be no acid drainage released from the dumps. Future humidity cell and barrel cell tests can be conducted to confirm this drainage interaction within the Waste Rock Dumps.

1.3.5 Information Request No. DFO 05

This project description has indicated both an access road and railway spur will be constructed as components of the transportation infrastructure. As such, stream crossings have also been indentified. However, information is missing on the type of structure to be utilized at each crossing (i.e., culverts, clear span bridge, etc), mitigations that will be employed to minimize impacts to fish and fish habitat during construction of the crossings, and the proposed timing of the construction of the crossings, etc.

It has been indicated in the EIS that stream alterations may be required at some of the proposed crossings. However, there is no information provided on the location of these alterations or how they will be completed. This information is needed in order for DFO to complete its review and evaluate the impacts of these stream crossings.

It is important to note that many of the impacts associated with stream crossings can be reduced or eliminated with the use of appropriate mitigations. The proponent should be aware that guidelines and mitigations in relation to stream crossings and alterations can be found in DFO’s “Guidelines for Protection of Freshwater Fish and Fish Habitat in Newfoundland and Labrador”.

Alderon Response to IR No. DFO 05

The development of the crossings has been ongoing regarding engineering and environmental requirements. Included in the environmental considerations is the DFO referenced document “*Guidelines for Protection of Freshwater Fish and Fish Habitat in Newfoundland and Labrador*”. As indicated in a meeting on November 15, 2012, all crossings will have bottomless structures (i.e., culverts with natural substrates or bridges) and all slopes will remain similar to existing.

Additional crossing information has been gathered for each and provided with this submission (Appendix N). Provided below is a brief summary of the approach and results. The information below also provides a reference location within the NWPA submission (Appendix N) where additional information can be found.

The NWPA (Appendix N) submission identifies and describes each of the proposed watercourse crossings and other within/across water components associated with the Project, and evaluates and characterizes each of these against the established criteria for "minor waters" that have been established by Transport Canada. In doing so, Alderon has completed and documented the associated NWPA "self assessment" process, to allow for determinations by Transport Canada around which of these proposed works (if any) will require subsequent approval(s) under the NWPA (AMEC 2012). All watercourses and waterbodies within the vicinity of the Project were identified and evaluated through a desktop analysis incorporating GIS applications as well as baseline field data from the *Fish, Fish Habitat and Fisheries Baseline Study* (August 2012) that was completed by Alderon as part of the Project's environmental assessment, along with additional field data collected in 2012.

High resolution orthophotography and LiDAR imagery for the site were provided by Alderon, upon which the Project site plan was overlaid in a GIS system and used to identify and code all watercourses and waterbodies which overlapped or otherwise interacted with the Project.

Transport Canada's *Minor Waters User Guide* (2010) was followed to assess any and all minor navigable waters within the Project site plan using the five characteristics identified in the guide and following the associated two-stage review process. All watercourses within the site plan were initially categorized as being either crossed (by the proposed road, rail, conveyors and pipelines, of combinations thereof) or as being otherwise affected (altered, diverted or removed) as a result of Project development. In accordance with the Guide, the initial review of watercourses required measurements of average wetted width and water depth during high-water levels. The recent (2011 and 2012) field surveys undertaken by Alderon for various watercourses and waterbodies within the vicinity of the Project were used where available and relevant. Widths of all other discernable watercourses were measured using the GIS applications and the high resolution imagery. Each stream was assessed for various parameters; wetted width, mean water depth, watercourse slope, sinuosity, and location of natural obstacles.

Measurements of all watercourses assessed are presented in the NWPA submission (AMEC 2012).

A total of 10 watercourse crossings associated with the Project's access road that have been identified as requiring culvert(s) or a bridge, as outlined below (Table 1.3.1). Of these, four of the crossings (C70, C35, C28, C2) have been evaluated as meeting the criteria to be considered as minor waters, because either their stream width is less than 1.2 m, their depth is less than 0.6 m or because they have natural obstructions. The remaining six have been identified as potentially not meeting the criteria to be considered "minor" waterways and have detailed crossing design developed. The type of structure to be built for each watercourse crossing is presented in Table 1.3.1. Additional details on the type of structure to be used for these watercourse crossings can be found in the NWPA Application (Appendix N).

Table 1.3.1 Summary of Watercourse Crossing Including Structure Type

Crossing	Type of Waterbody	Instream Structure	Average Depth (m)*	Wetted Width (m)*	Stream Length (m)	Stream Slope (%)	Sinuosity Ratio	Natural Obstacles	NWPA Section
C2	Stream	Open Bottom Culvert	0.7	2.1	499.2	0.2	-	3	Appendix A
C22	Stream	Single-span Precast Concrete Structure	0.4	15.4	241.8	1.2	-	-	Section 2.1
C28	Stream	Open Bottom Culvert	0.1	0.7	628.3	6.5	-	-	Appendix A
C35	Stream	Open Bottom Culvert	0.2	1.7	697.2	2.3	-	-	Appendix A
C76	River	Multi-span Concrete Arch Structure	0.8	26	-	-	n/a	n/a	Section 2.2
C42	Stream	Single-span Open Bottom Structure	0.2	3.2	518.2	3.2	n/a	n/a	Section 3.1
C55	Stream	Single-span Open Bottom Structure	0.4	3.4	330.8	0.8	n/a	n/a	Section 3.2
C70	Stream	Open Bottom Culvert	0.2	1.1	18.3	-	-	-	Appendix A
C78	River	Single-span Open Bottom Structure	0.3	11.7	98	n/a	n/a	n/a	Section 3.3
C81	Stream	Single-span Open Bottom Structure	-	8.2	357	4.2	n/a	n/a	Section 3.4

1.3.6 Information Request No. DFO 06

Currently stream crossing SC-11, or Loon Pond at Flora Lake Outflow, is an active Fish Habitat Compensation site that is the responsibility of Cliff's Natural Resources. There are several instances throughout the EIS where this crossing is mentioned. However, there is a lack of information on the type of crossing to be installed at this location, the potential impacts that this crossing could have on the existing compensation site, or any mitigations that will be employed to ensure there are no impacts to the fish habitat compensation site. As well, this location is within the property boundaries of Wabush Mines and would require appropriate discussion with the owners of the mine prior to the commencement of any work. It is important to note that DFO would require this missing information as well as the appropriate approvals and/or permission prior to making a decision on the impacts to fish and fish habitat.

Alderon Response to IR No. DFO 06

The crossing SC-11, or Loon Pond at Flora Lake Outflow, has been recognized as an active Fish Habitat Compensation Site and is the responsibility of Cliff's Natural Resources. Cliff's Natural Resources has been contacted regarding the crossing and discussions are ongoing towards obtaining a mutually beneficial design that does not affect the existing compensation and does not cause any additional effects (i.e., any crossing effects will be offset by Fish Habitat Compensation associated with the Kami Project). DFO Freshwater Habitat Section personnel have been kept informed of the design progress.

1.3.7 Information Request No. DFO 07

It has been stated that red water has no adverse effects on fish and fish habitat. The only observed effect stated within the document was that the white coloured flesh of some species of fish can become tinted making it unappealing to some fishers, and it was identified as more of an aesthetic concern than an environmental concern. However, there is a lack of information presented in the EIS that substantiates the conclusion that red water has no adverse impacts on fish and fish habitat. It is also stated within the EIS (p. 16-108), as an example from another mine, that "as a result of releases of red water from the mine, fish, including salmon, in the downstream Pekans and Moise Rivers were tainted and water and sediment quality were degraded". This is contradictory to the statement given above. Additional information should be provided on potential environmental effects along with a rationale to support the conclusion stated in the EIS that red water has no adverse impacts on fish and fish habitat.

Alderon Response to IR No. DFO 07

As described in detail below, Alderon intends to apply mechanical treatment to effluent from the Tailings Management Facility to eliminate the potential for 'red water' issues and therefore any impact to fish.

Tailings effluent discharged from the Process Plant will be pumped to the Tailings Management Facility (TMF) and will flow to retention ponds for sedimentation and treatment. Treatment of the water from the TMF is currently anticipated to be completed via mechanical treatment that involves an enhanced coagulation/settling treatment system which includes pH adjustment, feed of sand (as a ballast to improve settling and settling substrate), polymer feed, inclined plate settling chamber, ongoing removal of settled sludge and sand recovery system similar. The system uses the same mechanical treatment that is in use at a number of similar iron ore facilities.

An important part of the plant operations is based on the re-use of process water. The plant will reclaim water from the TMF, as a primary source of process water supply. Depending on weather conditions and rain fall, it has been forecasted that there will be either a surplus or a deficit of water at the TMF. During the water surplus periods, residual water needs to be removed from the tailings facility to the environment. This excess water needs to meet regulatory quality standards and requirements before it is discharged to the Long Lake. The system of treatment of excess water will be sized based on the detailed design and a detailed water balance for the site but the initial design indicates that the system will need to treat a flow rate 760 m^3/h.

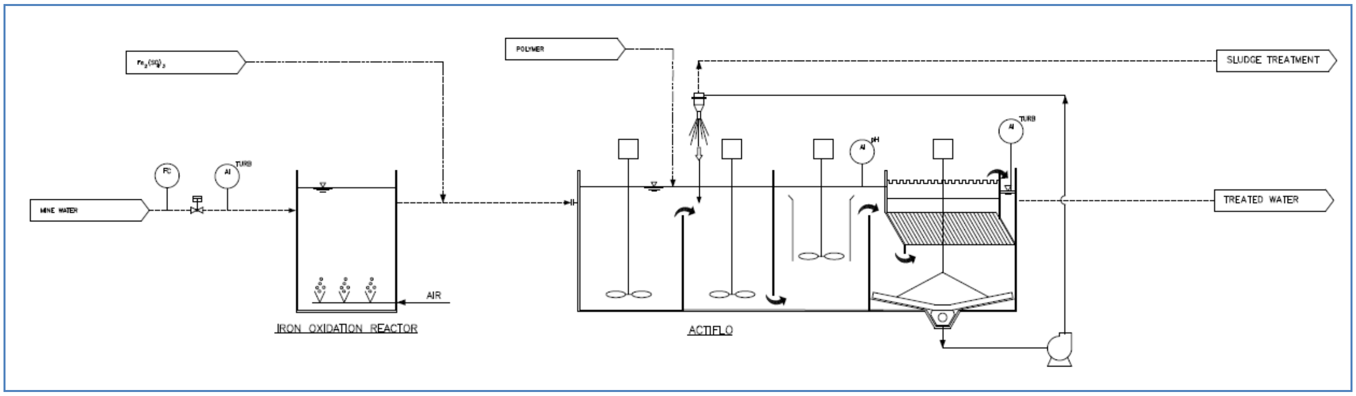
The primary water quality concern for the TMF surplus water discharge is the “red water” condition, which is an aesthetic issue in waste water associated with iron ore mining and processing effluents. There is no evidence of adverse effects of red water on fish and fish habitat (Canada Gazette 2009). The source of “red water“ is the presence of very fine colloidal reddish iron particles (typically ranging from 1 nm to 1 micron) produced when iron dissolves and reacts with water and dissolved oxygen. These suspended particles are iron oxide (Fe_2O_3), oxy-hydroxide (FeO.OH) and hydroxide ($Fe(OH)_3$), characterized by a red discoloration.

The water from the TMF will be treated using Ballasted flocculation or “Mechanical Treatment”, which is a high-rate coagulation-flocculation-sedimentation process applied in the water treatment industry. A simplified Process Flow Diagram (PFD) for the mechanical treatment is shown in Figure 1.3.1 below. The process includes the combined use of a micro sand and a polymer coagulant to get the iron particles to connect together to form a ‘floc’ which is heavier in weight and settles out of the water at an increased rate. The micro sand provides a surface area that enhances flocculation and acts as a “ballast” or “weight”. The resulting floc settles quickly, allowing for higher flow rates, short retention times and the ability to provide treatment under dramatically changing flow rates without impacting final effluent quality.

The ballasted-flocculation process consists of two steps, oxidation and clarification. Water oxidation is conducted in an Oxidation Reactor where air is added to oxidize dissolved ferrous iron (Fe_2+) present in the water to form suspended ferric iron (Fe_3+) hydroxide particles. The water flows from the oxidation stage to a coagulation chamber where a coagulant is added to start the micro-flocculation and then to a Maturation tank where polymeric flocculant and microsand are added to continue floc formation. In this tank, a turbo-mixer creates ideal conditions for the suspended iron particles to combine with the microsand. From the Maturation tank, the fully formed iron sediments enter a settling tank equipped with a lamella clarifier, which provides the rapid and effective removal of the microsand/sludge floc. The clarified water exits the system via a series of collection trough or weirs. The clarified water is monitored for turbidity to provide real-time monitoring of red water conditions and allow adjustments to the process to be completed if the turbidity increases above target discharge set points.

The sand and iron sludge mixture settles to the bottom of the clarifier where scrapers force the sludge into a center cone from which it is continuously withdrawn and pumped to a hydrocyclone where sludge and micro sand are separated by centrifugal force. After separation, the micro sand is returned to the process for re-use and the iron sludge is dewatered and disposed of within the TMF.

Figure 1.3.1 Simplified Process Flow Diagram (PFD)



The proposed mechanical treatment system is not standard practice at older mines but has been used extensively on iron ore and other mines around the world. One potential vendor of this equipment is Veolia Water who have installed over 800 Actiflo treatment plants globally include many in Canada. A selected list of Veolia's Mining Experience in Canada is provided in the Table 1.3.2. For reference, the preliminary expected capacity for the Kami mechanical water treatment system is 760 m^3/h or approximately 18,000 m^3/d.

Table 1.3.2 Veolia Water Selected Mining Experience in Canada

Mine Operator	Location	Capacity (m^3/d)
Niobec Mine	St-Honoré-de-Chicoutimi, QC	14,400
Meadowbank Mining	Meadowbank, NU	50,000
GoldCorp	Red Lake, ON	6,000
GoldCorp II	Red Lake, ON	30,000
Williams Operating Corporation	Marathon, ON	2,000
Trevali Mining Corporation	Bathurst, NB	1,000

References:

Canada Gazette. 2009. Regulations Amending the Metal Mining Effluent Regulations. Volume 143 (4). February 18.

1.3.8 Information Request No. DFO 08

There is insufficient information on how it will be demonstrated that the project will not have any negative effects on water quality downstream of the Project, and in particular within the Beaver Bay and Area 2 (Southern end of Wabush Lake) areas, which are active Fish Habitat

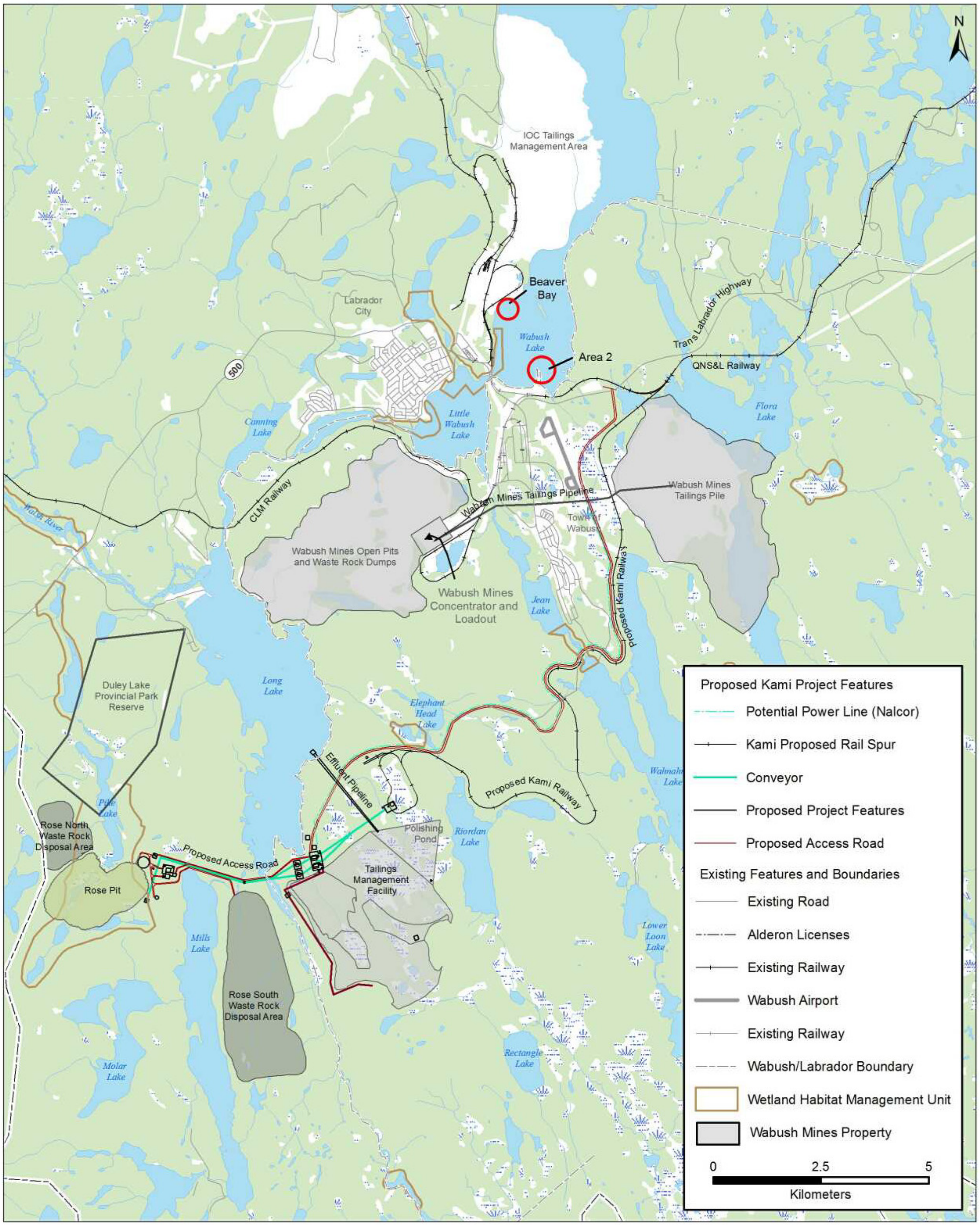
Compensation Sites and the responsibility of the Iron Ore Company of Canada (IOCC). A rationale or explanation should be provided on how the Proponent will demonstrate that the water quality of the fish habitat compensation sites will not be affected by the proposed project.

Alderon Response to IR No. DFO 08

The Kami EIS assessed the significance of residual environmental effects related to the project. The near-Project downstream environment for water and effluent releases is Long Lake. This waterbody is not likely to have significant residual environmental effects related to the Project. As a result, waterbodies farther downstream will not have significant residual environmental effects related to the Project. The location of the identified active Fish Habitat Compensation Sites (Beaver Bay and Area 2) were not provided by DFO in their comments; however, it is believed that they are within the areas identified on the map below (Figure 1.3.2). Both these areas are within the southern portion of Wabush Lake. They are approximately 23 km from the nearest effluent discharge point of the Kami Mine and approximately 2.5 and 8.5 km from the tailings/discharge of the IOC and Cliff's mines, respectively.

EEM and compliance monitoring of effluents will be required for the Project under MMER and provincial regulations to confirm all discharges into Long Lake are within permitable limits. This sampling will provide information on the ongoing effectiveness of the TMF and treatment systems and will allow further mitigations, if ever required, to be developed.

Figure 1.3.2 Site Location Map Showing Beaver Bay and Area 2



CLIENT:

ALDERON IRON ORE CORP.

PROJECT TITLE:

Figure 1 - Site Location Map

1.3.9 Information Request No. DFO 09

The proponent should develop an Environmental Protection Plan (EPP) that outlines the mitigations and contingency plans for all aspects of the construction and operation activities. This EPP should be provided to the appropriate regulatory agencies, including DFO, for review and approval prior to the start of project activities. The EPP should incorporate a monitoring schedule that includes monthly and annual reporting on the effectiveness of the mitigations and contingency plans.

Alderon Response to IR No. DFO 09

The EPP will be prepared as part of the Sustainability Management Framework (SMF), and will include details of a monitoring schedule and reporting requirements. The SMF is a part of the overall Kami Project management system that includes quality management systems, document control, risk management and Health, Safety and Environment (HSE) systems. The framework is made up of three main systems, the components of which are shown in Appendix J.

1. The Sustainable Project Delivery (SPD) system will provide a high level approach to sustainability management by establishing clear objectives, tracking of key Project commitments, support for engineering and procurement activities and reporting on overall sustainability performance.
2. The Environmental Management System (EMS) will provide detailed management of regulatory and permit requirements and includes environmental protection plans and procedures. The EMS will include environmental monitoring and reporting on specific construction and operational activities. Environmental Management Plans will be developed in consultation with relevant regulatory agencies and stakeholder groups.
3. The Social Responsibility System (SRS) will manage and track the commitments made in various guidance documents and contracts (e.g., benefits agreement) as well as establish plans for effective Project communications, community liaison and complaints management.

Working closely with the HSE team, the SMF will facilitate the incorporation of sustainability issues into employee orientation, daily tailgate and safety meetings, contractor management, monitoring and incident response procedures.

1.3.10 Information Request No. DFO 10

It has been indicated within the EIS that sedimentation will occur as a result of the construction and operation of this project. However, there is limited information on what impacts may occur as a result of sedimentation and how it will affect fish, fish habitat, and fisheries. For example, the document states that the open pit will generate TSS from mine dewatering in excess of the prescribed MMER limit by a substantial amount (limit is 15mg/L and pit will generate 300 mg/L). It is also stated that it would be an intermittent activity focused on settling after rainfall and melting events and that groundwater seepage could be managed. However, there is little detail on when these sedimentation events are predicted to occur, the expected frequency, duration or potential impacts to fish, fish habitat and fisheries. There was also no detail provided on how such excess sediment will be managed. This information should be provided and should address, but not be limited to, issues such as high TSS loads, size of sedimentation ponds, and management of sedimentation events.

Alderon Response to IR No. DFO 10

Sedimentation will occur due to precipitation, surface drainage and groundwater drainage coming in contact with different areas of the Kami Project site. As described in Section 16.6 of the EIS, Alderon is committed to managing sedimentation across the entire site using drainage control measures and continuous treatment of all resulting effluent via sedimentation ponds prior to release to the environment. During site preparation and construction, care will be taken to ensure that water collected within excavations and work areas to be pumped into a sedimentation ponds, where required, which will be built in advance of the construction work areas (eg. open pit, TMF)where typical storm water management measures such as ditching and silt fencing may not address the issue of sedimentation. During operation, sedimentation ponds will be located, designed, and operated to ensure the discharge to the environment does not exceed the prescribed MMER limits. Proper management of sediment and effluent will ensure that the fish and fish habitat resources surrounding the mine site will not be affected.

An example raised in this comment is that of the generation of sediment within the drainage collected in the open pit. Drainage will be collected in a sump or sumps at the bottom of the pit and then pumped to the crest of the pit where it will be enter a sedimentation pond as shown on Figure 1.3.3 below. The sump will be designed and constructed to minimize sediment pick-up in the pit. The sedimentation pond will be designed to handle the appropriate groundwater and surface water flows, as further described below, and provide for sufficient settling of sediment to ensure the discharge from the pond meets with the MMER criteria. Some general sedimentation pond design criteria is outlined in Table 1.3.3.

Figure 1.3.3 Final Discharge Points and Sediment Ponds

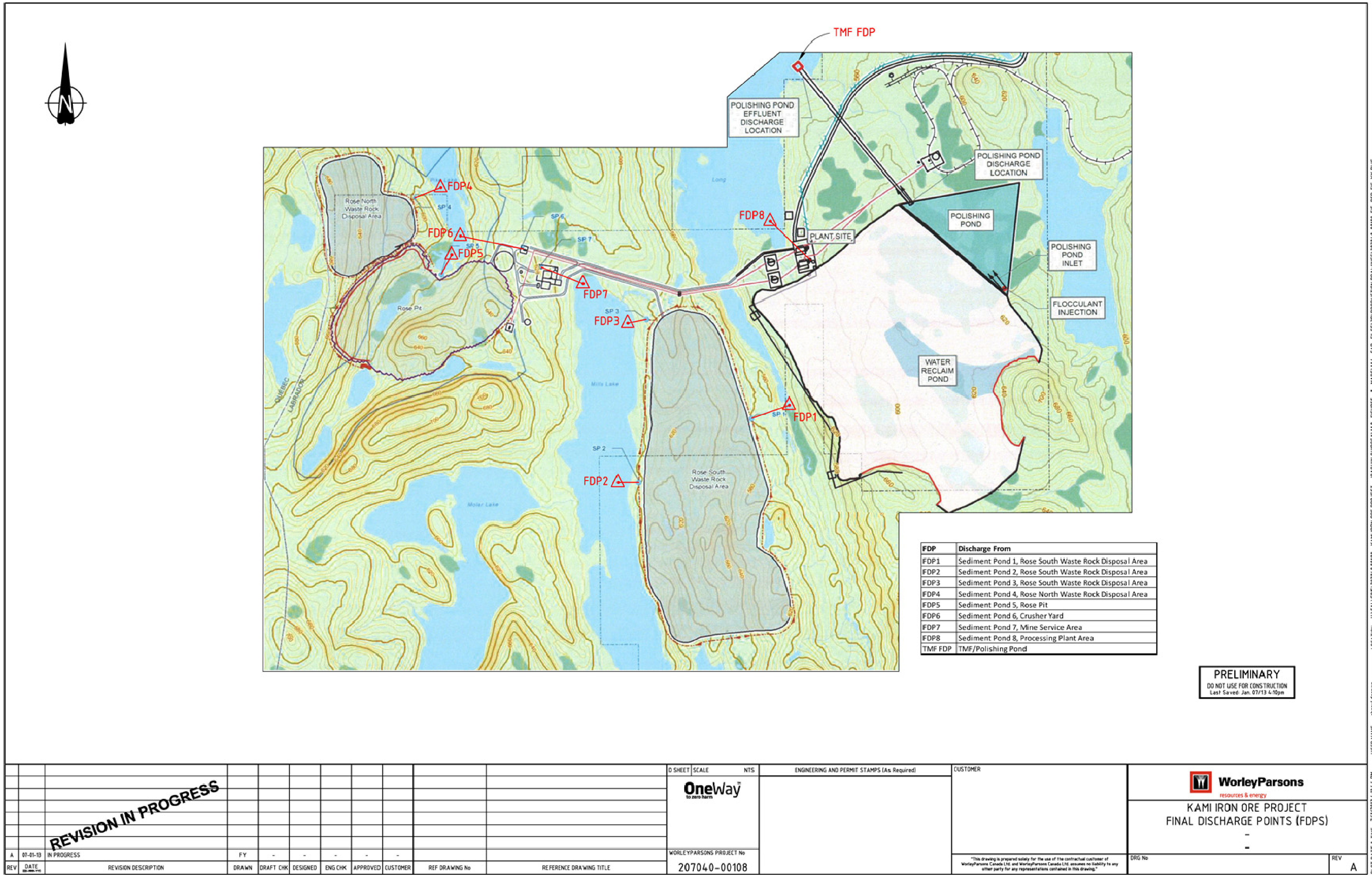


Table 1.3.3 Sedimentation Pond Design Criteria

Design Element	Best Practice
Storage Volume	Able to store the runoff associated with a 100 year 24 hour precipitation event in conjunction with storage areas dedicated for sediment accumulation as well as provisions for ice and freeboard.
Freeboard Allowance	0.5 m above the design High Water Level (HWL)
Flow Conveyance	Discharge flows from the pond should be designed to mimic natural conditions prior to development. Peak flows from the pond should not exceed pre-development peak flows from a similar return event.
Extreme Event Flow Conveyance	Flows over and above the design storage event should be safely conveyed from an overflow spillway. In absence of a design event for the spillway, they should be designed to accommodate and convey safely a flow of 1 m^3/s and provide safe conveyance that limits erosion of downstream receiving channels and waterbodies.
Pond Isolation	In the event that harmful or deleterious elements are detected within the pond, it should have a provision for isolation at the discharge point so that appropriate treatment can take place prior to discharge. The inclusion of a slide gate for manual or automatic isolation is recommended.
Final Discharge Point	The final discharge point should be designed to accommodate safe conveyance of the design discharge flow and shall be equipped with flow measurement and sampling points for regulatory compliance and reporting purposes.
Side Slopes	Side slopes within the pond should be designed for safety of the public and operations personnel. Typically this requires that slopes: - Above the HWL are 4:1 or 5:1 - Below the NWL are 3:1 - Between HWL and NWL are 5:1.
Depth HWL = High Water Level NWL = Normal Water Level	A permanent pool should be provided for water quality treatment (removal of TSS) with a minimum depth of 2 metres. Sediment accumulation zone should be minimum 1 metre. Active zone (between NWL and HWL) should be 2 metres with an integral ice zone.
Water Quality	Ponds should be designed to remove suspended solids such that the final effluent released is below the regulatory standard of 15 mg/L for release.
Length : Width Ratio	Minimum 4:1, preferred 5:1.
Forebay	Ideally, all ponds should be equipped with an initial forebay area for initial settling of larger sediment particles and reduce energy prior to entering the main sedimentation pond.
Overland Escape Route	An overland escape route should be defined for all ponds to identify the spill route in the event that overtopping does occur. Areas downstream that could be affected by the spill should be evaluated for impacts and risks.
Inlet / Outlet Piping	Inlets to the pond should be kept off the bottom of the pond to reduce the potential for re-suspension of deposited sediments. Energy dissipation requirements should be evaluated and incorporated as required based on site conditions. Outlets from the pond should be designed such that the overt of the pipe is below the level of ice to prevent blockage and above the sediment zone.
Outlet Control	Pond discharge control shall provide for safe access for operation and maintenance activities. A method of flow measurement should be installed, along with a manual sluice gate for draining the pond for maintenance purposes. For Peak flow control, an orifice plate can be utilized to maintain the peak flow at the design level when the pond level reaches the HWL.

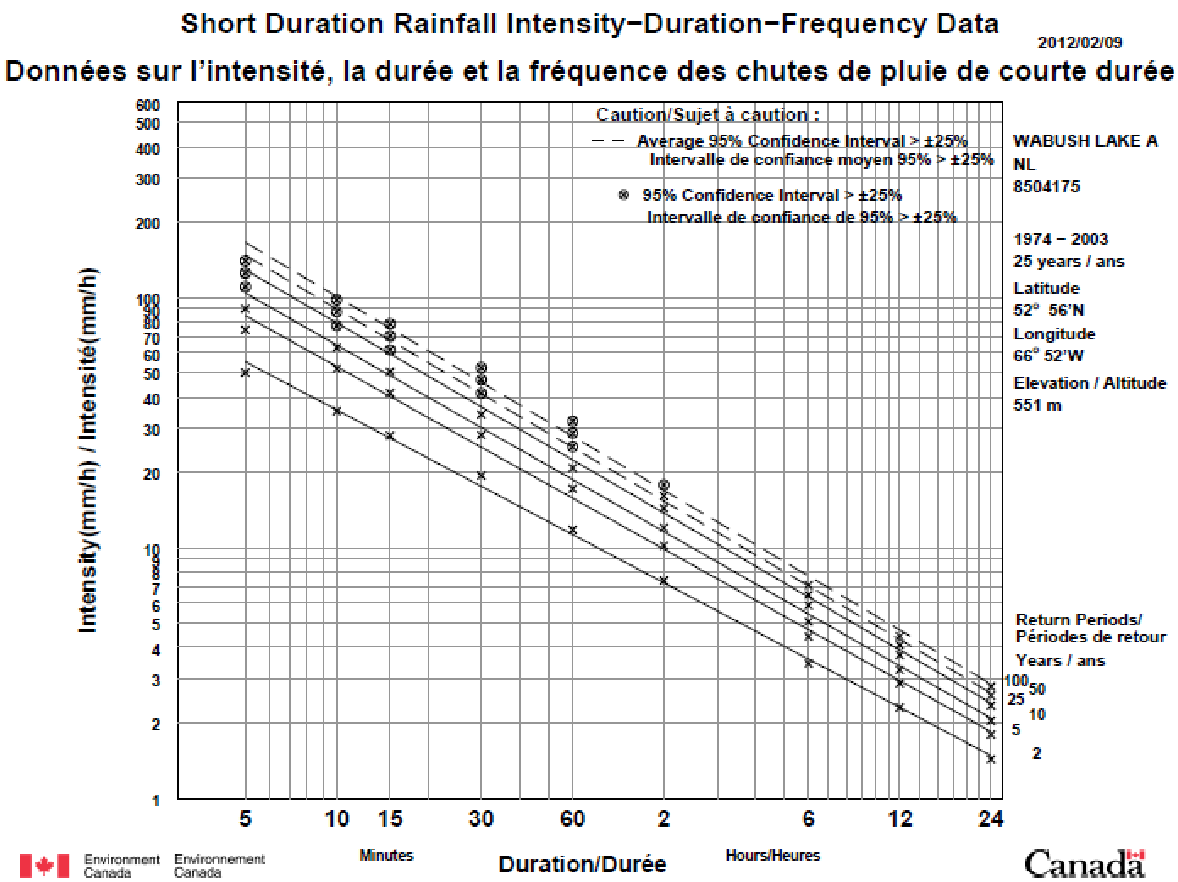
In terms of the expected frequency and duration of high runoff, sedimentation events, the IDF curve below (Figure 1.3.4) shows the rainfall data for Wabush Lake which is close in proximity to the Project site. Typically, sedimentation ponds are designed for a duration of 24 hours which has a lower intensity than shorter duration events but has the overall greatest volume which is typically the concern for storage. Conveyance systems are designed for a shorter return period in order to address conveyance peak flows from highly intense storms.

Depending on the discharge condition, whether continuous or batch, the design criteria for storage and sedimentation ponds varies. In a condition where storage needs to be maintained while there is no or little outflow, the design must rely on a continuous simulation in order to provide enough volume to address back to back events of small magnitude. This is typically accomplished by running the entire precipitation record through the pond and defining the storage requirements through-out the period. The maximum level attained would be equivalent to the storage requirement for a duration equivalent to the period of record (say 30 years). These annualized volumes attained during the analysis are then statistically processed to define the volume requirement to address the desired return period; in this case, 100 years. The typical statistical analysis is completed for a variety of statistical distributions and the one with the largest storage volume requirement and best fit to the recorded data is chosen.

Sediment that builds up in the sedimentation ponds during storm events or normal operations will be monitored and periodically removed to maintain the necessary active volume within the pond to provide sufficient residence time to allow sediment to settle out of the storm water. Details of the frequency of monitoring and levels of sediment that will trigger a clean-out event will be documented in the site Environmental Management Plans.

For additional information and details on the management of site runoff, please refer to Section 16.6 of the EIS.

Figure 1.3.4 Short Duration Rainfall Intensity – Duration – Frequency Data



1.3.11 Information Request No. DFO 11

There is a lack of detail concerning the position and placement of the effluent discharge pipes and the water intake pipes in Long Lake. Information providing details on placement (i.e., suspended in the water column or positioned directly on lake bottom), need for protective covering (i.e., rock berm), and type of fish habitat present in the vicinity of the structures should be submitted to DFO.

Long Lake has been identified as the primary site for water withdrawal for the project. However, it is unclear how water withdrawal will affect water levels in Long Lake and the impacts it will have on the littoral zone in particular. Further information is required.

In addition, with respect to water balance:

- There are inaccuracies associated with the Annual Precipitation Analysis shown in Figure 16.6, p. 16-37. The mean is plotted as having a return period of about 1 year which is inaccurate and the extrapolated curves don't match the data points. This should be re-visited as other important analyses are dependent on these data.

- There appears to be some issue with the information on water balance and in particular Tables 16.11, 16.12 and 16.13 show negative infiltration, recharge and base flow. Also the evapotranspiration values for a "wet" year and a "dry" year are identical for July.

Alderon Response to IR No. DFO 11

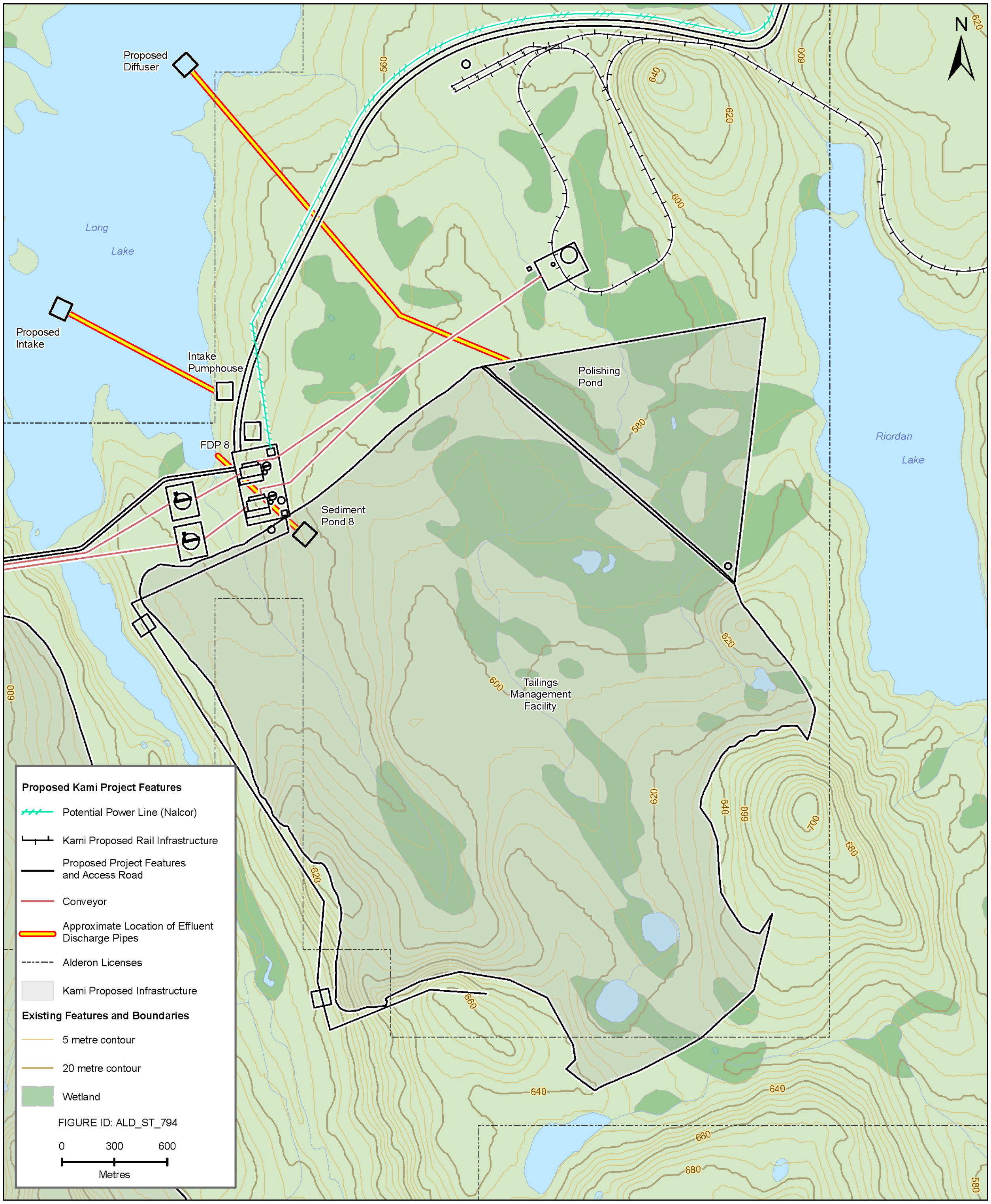
The approximate position of the effluent discharge pipes is shown below in Figure 1.3.5. This placement is preliminary and will be finalized through detailed design.

Long Lake is a large waterbody located to the southwest of Little Wabush Lake. There are several rivers flowing into Long Lake (including the Walsh River), which in turn drains into Little Wabush Lake. While comprehensive habitat quantification was not completed on Long Lake, the western shoreline is primarily composed of sand and fine material, with isolated rocky outcrops, while the eastern shoreline is primarily composed of courser substrates, with isolated sandy areas (mostly around cabins). Based on Secchi depths of nearby waterbodies, it is estimated light conservatively penetrates Long Lake to 3 m water depth. The topography around the lake is relatively steep along the northeast side, and more gradual along the west. Based on topography and bathymetry of nearby lakes, maximum water depth is estimated to be 20 m.

Long Lake is inhabited by nine species of fish, with three species of salmonid (brook trout, lake trout and lake whitefish). Other species include northern pike, burbot, lake chub, longnose sucker, slimy sculpin and white sucker. The Long Lake intake and effluent discharge pipes will be detailed in the next phase of the project when details on the Long Lake bathymetry are acquired. The intent is to place the pipes on the bed of the lake in order to minimize navigability impacts. Depending on the final pipe material specification, this may also require the use of weighting collars to prevent floatation of the pipeline. At the time of the EIS, very limited information was available on the bathymetric conditions within Long Lake. However, it was anticipated that the intake may need to be located approximately 1 km off shore in order to have sufficient water depth. In addition, it would need to be greater than 500m from the effluent diffuser to avoid ingestion of discharged effluent - the location of the diffuser is depicted in Figure 16-34 from Volume 1 of the EIS.

As part of the project a detailed bathymetric survey is intended to be undertaken in the summer of 2013. The information acquired during this period will be used to refine the locations of the intake as well as the diffuser. It is intended that the bathymetry will be acquired using a Biosonics Scientific EchoSounder Unit which is also capable of providing some limited information regarding bed materials and aquatic vegetation. Fish habitat present in the vicinity of the structures will be characterized and submitted to DFO upon final design/layout of the effluent discharge pipes.

Figure 1.3.5 Approximate Location of Effluent Discharge Pipes



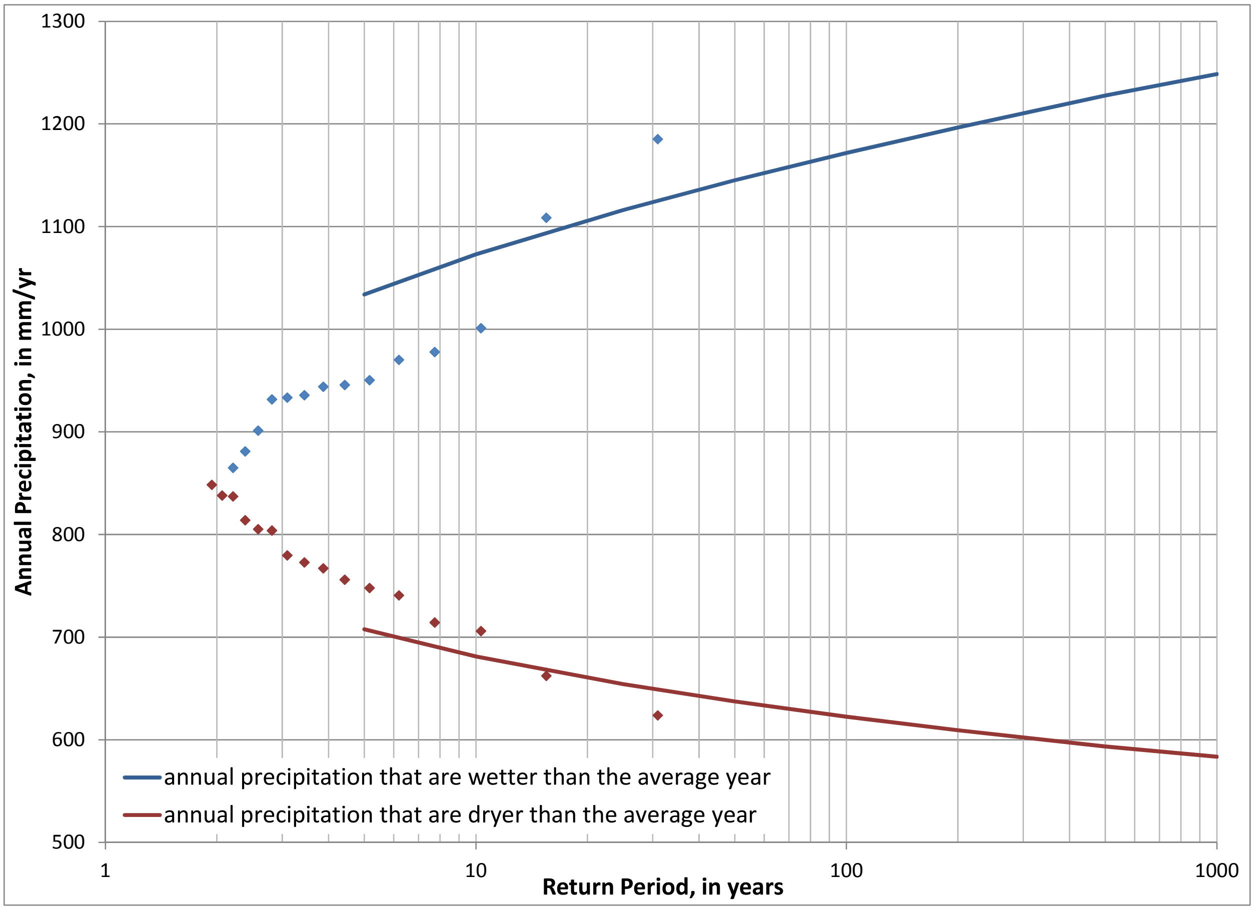
Water Withdrawal from Long Lake

The Project-wide Water Balance assessment presented in Section 16.6.2.1 of Volume 1 of the EIS (pages 16-122 to 16-125) indicates that the primary consumptive water demand of the Project is the tailings slurry water retention. The net consumptive water demand for the Project is estimated at 683 m^3/h (0.190 m^3/s or 0.95 percent reduction in Long Lake mean outflow) and will be within the natural variation of existing flows from Long Lake. Long Lake has a surface area of 1150 ha. Based on an instantaneous water loss from Long Lake, which has a surface area of approximately 1150 ha, the net water withdrawal will have minimal effect on Long Lake water levels, and will be within the range of expected natural water level fluctuation. Long Lake has a very large upstream watershed area of approximately 914 km^2 which routes large volumes of water through the Lake, thereby naturally ameliorating the effects attributable to the planned volumes for water withdrawal.

Annual Precipitation Analysis

Figure 16.6 of Volume 1 of the EIS is revised to show the recurrence interval of the mean annual precipitation. A Log Normal statistical analysis was applied to the wetter and drier year precipitation dataset from the Wabush Airport weather station with the curves representing best-fit from the Log-Normal analysis.

Figure 1.3.6 Annual Precipitation Wetter / Dryer than the Average Year (Updated EIS Figure 16.6, EIS Volume 1)



Water Balance Information

Tables 16.11 to 16.13 of Volume 1 of the EIS have been updated and are provided below. The updates account for the distribution of infiltration throughout the warmer season.

It is acknowledged that the ET values are identical for July in both the wet and dry year monthly water balance tables. Based on the Thornthwaite Monthly Water Budget model results, the Actual ET in July under both the wet and dry year scenarios is at Potential ET and have been confirmed to be 89.8 mm in both cases.

Table 1.3.4 Water Balance Results under the 30-year Climate Normal (Year 1982 to 2011) Conditions (Updated EIS Table 16.11, Volume 1)

Parameters	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Precipitation (mm)	50.0	39.0	54.2	51.9	54.1	83.3	116.1	107.7	94.4	77.3	75.5	54.5	858.1
Evapotranspiration (mm)	2.3	3.2	3.7	8.5	20.0	74.7	89.7	67.5	35.1	8.0	3.1	2.8	318.5
Streamflow (mm)	7.5	3.7	1.9	1.0	81.3	95.3	87.8	78.3	77.9	61.1	29.2	14.6	539.6
Surface Runoff (mm)	6.7	3.4	1.7	0.9	73.1	85.7	79.0	70.4	70.1	54.9	26.3	13.1	485.2
Infiltration (mm)	0	0	0	0	10.1	20.1	13.7	7.9	2.8	0.0	0	0	54.4
Recharge (mm)	0	0	0	0	5.1	10.0	6.8	3.9	1.4	0.0	0	0	27.2
Baseflow (mm)	0	0	0	0	5.1	10.0	6.8	3.9	1.4	0.0	0	0	27.2

Table 1.3.5 Water Balance Results under 1:100 Year Wet Year Conditions (Updated EIS Table 16.12, Volume 1)

Parameters	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Precipitation (mm)	68.3	53.3	74.0	70.9	73.9	114	159	147	129	106	103	74.4	1172
Evapotranspiration (mm)	3.0	4.1	9.8	22.2	45.6	74.5	89.8	67.4	35.0	16.3	6.4	2.8	376.9
Streamflow (mm)	15.5	7.8	3.9	1.9	92.3	112	119	118	121	119	56.3	28.1	794.8
Surface Runoff mm)	12.7	6.4	3.2	1.6	75.8	91.8	98.1	96.9	99.1	97.7	46.2	23.1	652.6
Infiltration (mm)	0	0	0	0	44.5	49.2	27.5	16.1	4.8	0.0	0	0	142.2
Recharge (mm)	0	0	0	0	22.2	24.6	13.7	8.0	2.4	0.0	0	0	71.0
Baseflow (mm)	0	0	0	0	22.2	24.6	13.7	8.0	2.4	0.0	0	0	71.0

Table 1.3.6 Water Balance Results under 1:100 Year Dry Year Conditions (Updated EIS Table 16.13, Volume 1)

Parameters	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Precipitation (mm)	36.3	28.3	39.3	37.7	39.3	60.4	84.3	78.2	68.5	56.1	54.8	39.5	623
Evapotranspiration (mm)	3.0	4.1	9.8	22.2	45.6	74.5	89.8	67.4	35.0	16.3	6.4	2.8	376.9
Streamflow (mm)	15.4	7.8	3.9	1.9	32.1	29.7	23.0	23.2	37.1	42.3	19.5	9.7	245.7
Surface Runoff (mm)	12.7	6.4	3.2	1.6	26.4	24.4	18.9	19.1	30.5	34.8	16.0	8.0	202.0
Infiltration (mm)	0	0	0	0	13.8	16.2	10.3	3.5	0.0	0.0	0	0	43.7
Recharge (mm)	0	0	0	0	6.9	8.1	5.1	1.7	0.0	0.0	0	0	21.8
Baseflow (mm)	0	0	0	0	6.9	8.1	5.1	1.7	0.0	0.0	0	0	21.8

1.3.12 Information Request No. DFO 12

The project interaction rankings for all of Table 18.4 should be reviewed based on the ranking definitions of potential environmental effects provided within the table. A ranking of two is defined as “interaction occurs, resulting effect may exceed acceptable levels without implementation of specified mitigation”. Many of the potential interactions within the table should be ranked as a two based on this definition. A specific example is provided below.

Table 18.4 indicates that there are no interactions of project operations on fish habitat / production, fish health or mortality, or utilization of existing fisheries that cannot be managed by best available control technologies (BACT) (i.e., no interactions ranked as two). This is not accurate. It is stated in the EIS on page 18-41 that “The location of the Project footprint will cause a Fisheries Act authorization”. The Authorization is required when there are impacts that cannot be avoided. The Proponent is proposing to infill RP01 and portions of three streams as a result of construction and operations at Rose Pit; infill three small ponds and portions of two streams as a result of the construction of the Tailings Management Facility; and infill streams as a result of the construction and operation of the Rose South Waste Rock Disposal area. These impacts will not be mitigated by BACT. These interactions should be reassessed in the EIS and the impacts clearly described. Should it be determined that an Authorization under the Fisheries Act is required due to impacts on fish, fish habitat, or fisheries, then the Proponent would be required to offset these impacts.

It should also be noted that some of the rankings in the table are contradicted by statements in the text. For example, there are no project construction or operation interactions with utilization of existing fisheries that are ranked as a two in Table 18.4., indicating there is no impact on fishing utilization. However, on page 18-17, it is stated that “*…fisheries may be affected as a result of lost or altered fish habitat / production by the construction, operation, and decommissioning of the project…*”. Any impacts to fishing utilization should be clearly described and the section should be reviewed to ensure any other contradictory statements are corrected.

Alderon Response to IR No. DFO 12

The interactions ranked as a “2” in Table 18.4 (Volume 1, Chapter 18) are those that require further assessment as non-standard mitigation may be required. An interaction ranked as a “2” requires further assessment as indicated in the footnote at the bottom of Table 18.4.

The ranking of interactions between measurable parameters and activities during Project operations as “0 or 1” is considered accurate. DFO states in its comments that there will be a loss of small ponds and streams associated with the Kami pit, the TMF, and the waste rock disposal areas; all of these locations require that these waterbodies be removed and the areas prepared for use during the construction phase of the project. These habitats have been described and quantified in the EIS and baseline study and the interactions have been assessed in the EIS and discussed with DFO specifically at various meetings and submission documents related to preparation/construction activities. In addition, an Authorization under the Fisheries Act will be required for all HADD determined, regardless of timing relative to construction and operation phases. It is not Alderon’s intention to mislead regulators or stakeholders in the quantity of habitat that will be affected nor the timing of activities and its responsibilities with respect to Fisheries Act requirements. During operations, all water use and discharges associated with operation will be clearly regulated by MMER and provincial regulations and will utilize BACT and any permit/authorization conditions.

As stated in response to IR No. DFO 03, Alderon assessed the potential effects of the Project specific to fisheries in the area as well as habitat-based effects. Volume 1, Chapter 23 describes the existing fisheries in the PDA, LSA, and RSA (for example, Section 23.5.3.1 describes the recreational fishing within the project, LSA, and RSA). It should be noted that there are no Aboriginal or commercial fisheries within the assessment area. Recreational fishing does occur within the LSA and RSA but not within the PDA. In general, interview results indicated that much of the fishing locations are situated reasonably close to existing access roads and travel corridors. Fishing in the RSA is undertaken on many of the large and small waterbodies extending as far north as Lobstick Lake on Smallwood Reservoir, at a number of locations on either side of the Trans Labrador Highway, along virtually all the shoreline of Ashuanipi Lake to the south of Ross Bay Junction and on many unnamed lakes, ponds and rivers south of Wabush (Figures 23.16 and 23.17 in Volume 1, Part II, Chapter 23). While the bulk of the assessment was described in Chapter 23, it was acknowledged in Chapter 18 that the potential interaction between the Project and fisheries exists and the summary of interactions and significance of residual effects determined. In this respect, there could be a ranking of “1” between Open Pit Mining and Change in Utilization of Existing Fisheries in Table 18.4; however, a ranking of “1” would indicate that standard mitigation exists and that no further assessment is required; therefore, the effects predictions would remain unchanged.

Regardless of whether a fishery exists on the ponds within the PDA, particularly those that will be lost as a result of the project, all habitat determined to be included in the HADD (i.e., requiring a Fisheries Act Authorization) will be included in the Fish Habitat Compensation Plan. The compensation options are all located off-site and away from the PDA and hence will enhance nearby waterbodies and streams for increased fishing opportunities.

1.3.13 Information Request No. DFO 13

It is reported in Table 10.24 (p.10-111) in the response column that fish mortality as a result of the project is not anticipated. On the following page, it is reported that there will be minimal destruction of aquatic life as a result of the project. On page 18.2 it is again stated that this assessment determined that fish mortality is not anticipated yet on page 18-9 it is reported that a Section 32 *Fisheries Act* Authorization may be required. It is also stated on page 18-9 that “Additional fisheries concerns related to Sections 20 through 22, 32, and 36 (of the *Fisheries Act*) may occur with respect to specific project components, and will be addressed specifically through design and best available control technologies (BACT)”. Section 32 of the *Fisheries Act* deals with the destruction of fish by means other than fishing and this cannot be addressed by design and BACT. Should the project involve fish mortality, it will require an Authorization under Section 32 of the *Fisheries Act*. Sections 20-22 of the *Fisheries Act* deal with fishways and fish passage (flows) around obstructions. Any obstructions to fish passage or changes to flows that will occur as a result of the project should be stated and any mitigation measures to deal with this should be provided.

The proponent will be required to develop and implement plans to identify, and if necessary, relocate fish stranded in impacted areas. This plan should be reviewed and endorsed by DFO prior to implementation. In addition, the proponent should request a Section 32 authorization from DFO for any incidental mortalities of fish during the dewatering of impacted areas or during the transfer from impacted areas.

Alderon Response to IR No. DFO 13

The Project Description and the summary comment in Table 18.1 on page 18-2 are correct in that fish mortality associated with the Project is not anticipated. Prior to each authorized waterbody and stream being de-watered, a DFO approved fish relocation plan will be implemented so that fish within these areas are relocated. However, past experience with fish relocation recognizes that not all fish, with absolute certainty, can be relocated without the possibility of mortalities related to either inability to catch each and every fish, stress associated with capture and transport, or reduced access during the final stages and relocation activities that preclude further capture due to safety concerns. In this respect, a Section 32 Authorization will be requested from DFO.

1.3.14 Information Request No. DFO 14

Several of the proposed residual environmental effects characteristics in both Table 18.17 and 18.19 should be reviewed. For example, in Table 18.17, it is stated that residual impacts to fish habitat during operations are not applicable (N/A). This should be modified following changes to Table 18.4 described in comment 11 above. In Table 18.19, it is reported that the magnitude of a train derailment or polishing pond dyke breach on existing fisheries is low. What is this based on? A polishing pond breach or train derailment could cause adverse impacts in Long Lake, a known fishing area and the ranking of the magnitude of the impacts should reflect this.

Alderon Response to IR No. DFO 14

Full tank cars will move along the QNS&L from a fuel supplier (located in Sept-Îles) to the mine site. During the 24-week heating season, Alderon recognizes that up to nine tank cars with diesel heating oil and fuel could result in the release of 270,000 gallons of product should a worst case train derailment occur. A train derailment was assessed as having a potential for a significant residual environmental effect for Water Resources (Section 16.8, Volume 1 of the EIS); and Freshwater Fish, Fish Habitat and Fisheries (Section 18.8, Volume 1 of the EIS). The effects predictions remain unchanged.

An increase in the magnitude of each accidental event relative to existing fisheries would not change the predicted significance of residual effects. However, it could be agreed that the magnitude of a potential train derailment or polishing pond breach could be determined to be moderate rather than low, given the definitions of each on page 18-10, particularly if a derailment included fuel and was in very close proximity to a crossing and/or a tailings breach was such that a release would have sufficient volume to flush to Long Lake.

1.3.15 Information Request No. DFO 15

The information in this table regarding federally listed species at risk is incorrect. The four horn sculpin and the American eel are identified as being listed under the *Species at Risk Act* (SARA) however, these species have only been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The only species listed under Schedule 1 of SARA is the banded killifish which is listed as a species of special concern. The information in this table should be corrected.

Alderon Response to IR No. DFO 15

The revisions to Table 18.2 are acknowledged and a revised table is provided below. It should also be noted that none of the species identified in the table are within the identified Project footprint (PDA), LSA or RSA.

Table 1.3.7 Federal and Provincial Listed Freshwater Fish Species at Risk in Newfoundland and Labrador (Updated Table 18.2, EIS Volume 1)

Common Name	Scientific Name	SARA Status[1]	COSEWIC Status[2]	Provincially Listed[3]
American Eel	*Anguilla rostrata*	-	Threatened (May 2012)	Vulnerable (2006)
Banded Killifish	*Fundulus diaphanous*	Schedule 1 - Special Concern	Special Concern (May 2003)	Vulnerable (2003)
Fourhorn Sculpin	*Myoxocephalus quadricornis*	Schedule 3 - Special Concern	Data Deficient	-

Notes:
1. SARA Registry, January 2013. Species at Risk Public Registry according to *Species at Risk Act.*
2. COSEWIC. January 2013. Canadian Wildlife Species at Risk according to *Species at Risk Act.*
3. Department of Environment and Conservation, Newfoundland and Labrador 2012 - *Endangered Speceis Act, 2001.*

1.3.16 Information Request No. DFO 16

In Figure 16.43, the diversion pipe that is proposed to maintain flow from SP-01 and SP-02 downstream to Pike Lake is positioned behind the dam. If the position of the dam in this figure is correct, then it appears that the flow to Pike Lake from the headwaters upstream will not be maintained. The position of the dam and diversion pipe needs to be clarified in the figure and described in the text.

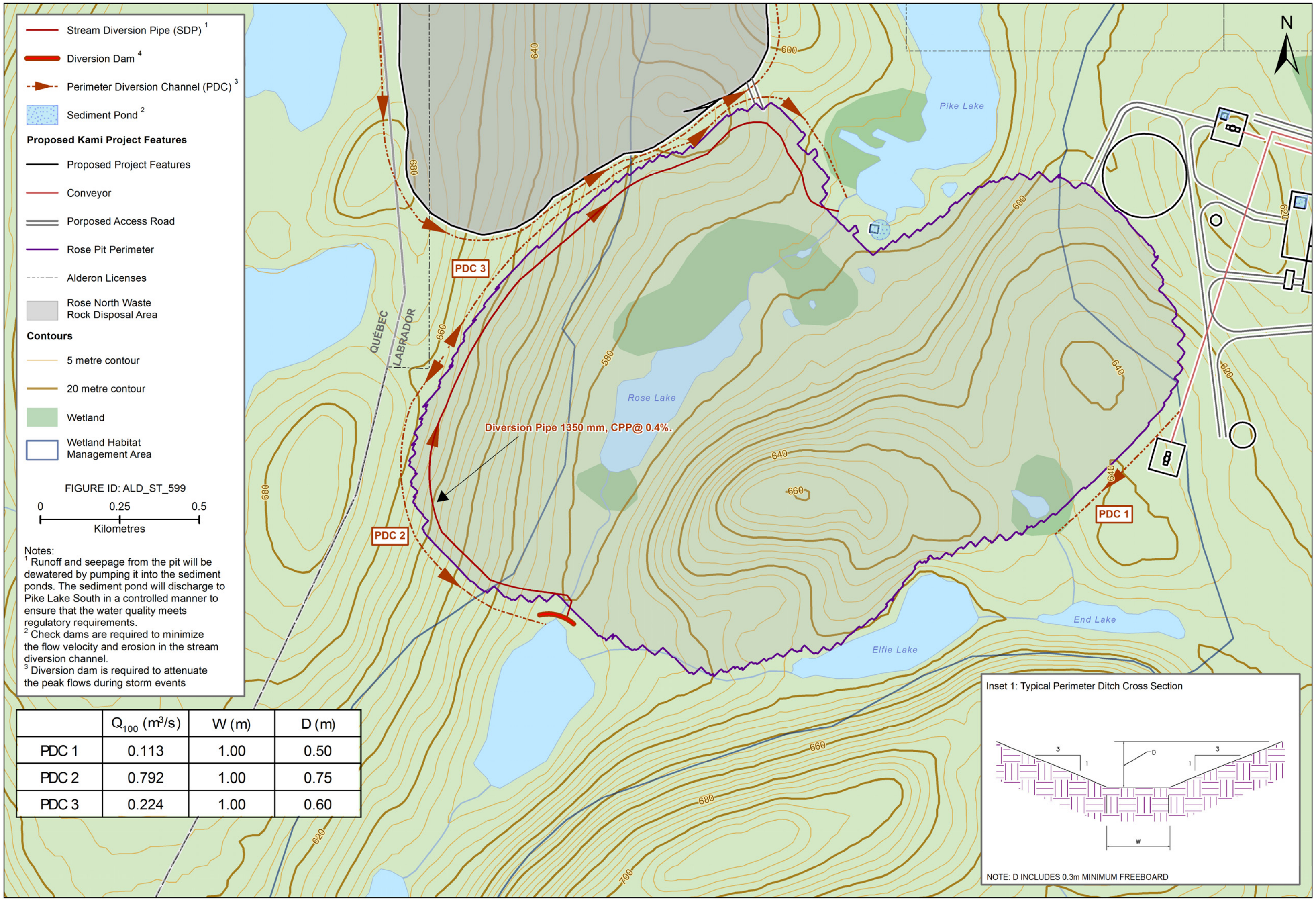
In addition, the purpose of PDC 1 in Figure 16.42 is not clear. It appears to drain into a small stream that runs into End Lake which is not mentioned in the text. The purpose of PDC 1 needs to be identified and described in order to determine the potential impacts to fish and fish habitat.

Alderon Response to IR No. DFO 16

The location of the perimeter diversion channel (diversion pipe) on Figure 16.42 of Volume 1 of the EIS is incorrectly located and has been adjusted; it should be connected to the Diversion Dam as per the updated figure below (Figure 1.3.7). The intent is that base flow from the dam will be conveyed through a pipe in the dam foundation and will be aligned along the top of the Rose Pit cut. The intention of the dam is to prevent extreme flows from entering the pit and attenuate them to a peak flow that can be handled effectively and conveyed around the pit.

The purpose of PDC 1 in Figure 16.42 is to intercept and maintain the existing flow in the natural channel and divert it into End Lake, where it will be conveyed through the lake system and eventually to Pike Lake. The location and alignment of the diversion will be refined during detailed design as it may also be appropriate to divert this flow around the east side of the pit and back into the downstream portion of the same channel.

Figure 1.3.7 Rose Pit Water Management Plan (Revised Figure 16.42 of EIS Volume 1, Part II)



	Q_{100} (m^3/s)	W (m)	D (m)
PDC 1	0.113	1.00	0.50
PDC 2	0.792	1.00	0.75
PDC 3	0.224	1.00	0.60

1.3.17 Information Request No. DFO 17

The EIS has documented the existence of recreational fisheries in the area. However, details are missing on the extent of the fisheries and the level of fishing in the area. The proponent should ensure that this information is provided.

Alderon Response to IR No. DFO 17

An assessment and evaluation of the likely environmental and socio-economic effects and benefits of the Project is provided in the EIS. This includes information on fishing by Aboriginal people (Volume 1, Chapter 22) and recreational fishing by non-Aboriginal people (Volume 1, Chapter 23). Based on research including interviews, there is no evidence of commercial, recreational, or aboriginalfisheries within the Project footprint and it appears that fishing activity is also limited in the surrounding area.

This assessment has also included baseline studies for which key informants, in western Labrador and Fermont were interviewed about regional land use activities. The informant data obtained from questionnaires and mapping exercises were supplemented by discussions with government personnel, including fisheries and wildlife conservation officers who are familiar with the western Labrador region. The information obtained through interviews with residents and government officials was required to describe the extent of recreational fishing in the area, as the Province does not keep local or regional statistics on recreational fisheries for non-salmon species.

Interview topics covered recreational and subsistence activities including hunting, fishing, trapping, boating / water navigation, snowmobile and ATV use, wood harvesting, berry picking, cabin-use, outfitting, bird-watching and geo-caching. Within the Local Study Area, which includes Labrador City, Wabush and Fermont, informants indicated that preferred fishing locations are accessible by road, rail, or trail, often in close proximity to recreational cabins. Preferred fishing locations in the LSA include Long Lake, the Waldorf River area, south along Waldorf River to Swanson and Strawberry Lakes, the Riordan and Harris Lakes areas, and Rectangle, Elephant Head, Jean and Wahnahnish Lakes. In general, informants indicated that they fished at preferred locations throughout the year, typically fishing by boat or from shorelines during ice-free seasons and ice fishing in the winter.

1.3.18 Information Request No. DFO 18

It has been documented in the EIS that there will be impacts to downstream flows as a result of the construction of both Rose Pit and the Tailings Management Facility. While the proponent indicates that effects will be mitigated or will be minimal, it is unclear how appropriate flows will be maintained to ensure there will be no impacts to fish, fish habitat, or fisheries downstream of these project components. The maintenance of appropriate flows is critical for all life stages of fish and to maintain the suitability of fish habitat to support fisheries in the area. Specifically, there is a lack of detail on how appropriate flows will be maintained within the Pike Lake watershed, and the downstream portion of TDA-02 from the Tailings impoundment area and subsequently Long Lake. This information should be provided.

Alderon Response to IR No. DFO 18

It is intended to maintain appropriate flows within the Pike Lake watershed by collection, diversion, and treatment of the water affected by the open pit and finally discharging back to the head of Pike Lake through a sedimentation pond. The detailed design phase of the Project will establish the water balance around the open pit development and the handling of surface water, groundwater, and precipitation events.

It is intended to use an appropriately sized pipe (allowing for all flows including design storm events) to divert the water from upstream of the development area around Rose Pit to maintain water levels in upstream and downstream waterbodies. The diversion will start at a dam across RP13, will continue around the inside perimeter of Rose Pit and then end at RP12 at the South end of Pike Lake. The pipe will be placed on the bedrock or close to the level of the first mine bench. The pipe will be properly protected from construction work and future mining operations to ensure consistent diversion of the water from the dam into Pike Lake to prevent any loss of water quality. Water will be discharged through the sedimentation pond to allow any sediment to be removed prior to discharge into Pike Lake. Figure 1.3.7 illustrates the diversion.

Perimeter ditching will be constructed to redirect surface water that would have normally flowed into the Rose Pit area and divert it into the sedimentation pond. The ditching will be designed to divert the run off generated by a 1:100 year storm event. This perimeter ditch will be appropriately lined with geotextile material and rock to prevent ingress of materials into the ditching from the soil but also to prevent the escape of materials in the surface run off water into the groundwater. The water will be directed to the sedimentation pond then to the downstream watercourse (RP12) to maintain existing flow and water levels in RP12 and Pike Lake at all times.

The downstream portion of TDA-02 will not be maintained and this is considered under the fish and fish habitat compensation requirements for the project.

1.3.19 Information Request No. DFO 19

DFO requires the raw data used in the HADD quantification in order to verify the calculations in Appendix H and conclude its assessment. The Proponent should provide this information to DFO.

Alderon Response to IR No. DFO 19

All raw data related to habitat measurements, fish collection used in the HADD quantification will be provided to DFO. As stated in the baseline study, additional sampling in the PDA was completed in 2012 and all data will be consolidated and submitted.

1.4 Information Requests Received from Health Canada (HC)

Alderon received Health Canada's comments on the EIS in December 2012. During the preparation of responses to the information requests, Alderon requested to meet with Health Canada to provide an overview of Alderon's approach to answer their questions and ask for clarification on their comments, as appropriate. Alderon representatives met with Health Canada on January 7, 2013 and were able to provide an overview of the additional information that was being prepared in response to their information requests. Alderon has incorporated input from Health Canada into the responses below.

The following section includes the 18 information requests from Health Canada and Alderon's response to each of these requests.

1.4.1 Information Request No. HC 01

It is unclear how the proponent could conclude that there would be no adverse human health effects due to changes in air quality as a result Project-related emissions. No non-criteria air contaminants (such as metals, VOCs and PAHs) were measured in ambient air to characterize baseline conditions. In addition, no non-criteria air contaminants were modelled as part of the CALPUFF modelling of ground level concentrations of airborne contaminants (as presented in Appendix F).

Health Canada advises evaluating baseline metals concentrations in dusts, particularly given the proximity of this proposed Project to other operating mines. In addition, given the public concern about future dust emissions, it would be beneficial to characterize current conditions in order to evaluate future Project-related changes. These baseline metals concentrations in dusts could be compared to applicable regulatory criteria, including the Newfoundland and Labrador *Air Pollution Control Regulations* and/or the Ontario Ambient Air Quality Criteria (see HC-4 for citations).

Health Canada also suggests monitoring metals in dusts during Project operations, particularly in the event of public complaints. This monitoring could be used to validate the conclusion of the air quality component of the EIS (i.e. no adverse health effects) and to alleviate public concern about air quality, soil quality, and the possible contamination of country foods. If elevated metals are identified, additional mitigation may be appropriate, including adaptive management, as necessary.

Alderon Response to IR No. HC 01

The baseline monitoring study method for the proposed Project was developed in consultation with the Newfoundland and Labrador Department of Environment and Conservation (NLDOEC), including the list of contaminants to be monitored. Mining is the single largest industry in the area, and other industry is generally service and support for the mining industry. As electricity is very economical, most space heating is electric so there are no power plants and few woodstoves in use. Transportation emissions are well tracked by nitrogen oxides, and these are monitored in the existing urban stations and shown to be at acceptable levels. Other air contaminants that are associated with the combustion of gasoline or diesel fuel can be inferred from the modeled concentrations of NO_x, providing adequate assurance that the concentrations are well below those of concern. Table 1.4.1 below, based on the representative receptors in the community health assessment, shows the estimated annual and 24-hour concentration levels for PAHs, VOCs, and metals identified in Section 25.6.1.2 (pages 25-50) of Volume 1 of the EIS. The PAH and VOC 24-hour concentrations were calculated by multiplying the annual value by the ratio of NO_x 24-hour and annual concentrations. A similar calculation was made to estimate the 1-hour concentrations found in Table 1.17.2. The ratio of NO_x was used since the source of PAH, VOC, and NO_x are all due to combustion gas exhaust, whereas particulates would be confounded by dust emissions (compared to using the TSP ratio). These calculations indicate that emissions from the Project are at least an order of magnitude lower than Newfoundland and Labrador, Ontario, or Québec regulations.

Table 1.4.1 shows a calculation of metal concentration in dusts, assuming that metals in the Total Suspended Particulate (TSP) occur in the 98th percentile of soil tests found in Table 25.5 of the EIS. Based on these results, the metal emissions from dust occurring from the Project will be three to four orders of magnitude lower than applicable Newfoundland and Labrador or Ontario regulations. Table 1.4.1 also includes metals originating from diesel sources, which negligibly increment the total emission of metals by the Project. Tables 1.4.1 and 1.4.2 below also show that NO_x and TSP emissions are generally an order of magnitude closer to applicable standards for VOCs, PAHs or metals. Meeting applicable criteria for NO_x and TSP is a strong indication that standards will also not be exceeded for VOCs, PAHs, or metals.

As part of the Environmental Management System (EMS) within the Sustainability Management Framework for the mine, Alderon is committed to dust composition monitoring (including metals screening) during the construction and operation phase of the Project in order to confirm the ambient concentrations of regulated trace metals at sites selected in co-operation with the NLDOEC. Alderon will complete additional air quality baseline monitoring for metals to identify background levels prior to development of the Kami mine.

Table 1.4.1 Predicted Maximum 24 hour Ambient Concentration Levels for Regulated VOCs, PAHs and Metals from Kami Mine Operations

Contaminant		Predicted Maximum 24-hour Ambient Concentration (µg/m³)		Regulation			% of Standard	
		Location 1	Location 2	NL	Ontario	Québec	Location 1	Location 2
CAC	NOx	17.75	31.78	200	200	207	8.9%	15.9%
	TSP	41	32	120	120	120	34.2%	26.7%
Ambient Concentration from Diesel Combustion								
VOC	Acrolein	0.006	0.010	-	0.4	-	1.45%	2.59%
	Acetaldehyde	0.036	0.065	-	500	-	0.01%	0.01%
	Benzene	0.042	0.075	-	2.3	10	1.82%	3.26%
	1,3-Butadiene	0.004	0.007	-	10	-	0.04%	0.07%
	Formaldehyde	0.078	0.140	-	65	-	0.12%	0.22%
Metal	Antimony	0.00004	0.00007	-	25	-	0.00%	0.00%
	Arsenic	0.00004	0.00007	0.3	-	-	0.01%	0.02%
	Cadmium	0.00004	0.00007	2	-	-	0.00%	0.00%
	Chromium VI	0.00001	0.00003	-	0.0007	-	2.03%	3.64%
	Manganese	0.00008	0.00015	-	0.4	-	0.02%	0.04%
	Mercury	0.00010	0.00019	2	-	-	0.01%	0.01%
	Nickel	0.00007	0.00012	2	-	-	0.00%	0.01%
PAH	Benzo(a)pyrene	0.00004	0.00007	-	0.005	-	0.83%	1.49%
	Naphthalene	0.04	0.07	-	22.5	-	0.17%	0.31%
Ambient Concentration from Particulate Emissions								
Copper		0.0007	0.0005	50	50	2.5	0.03%	0.02%
Lead		0.0002	0.0002	2	0.5	-	0.05%	0.04%

Contaminant	Predicted Maximum 24-hour Ambient Concentration (µg/m^3)		Regulation			% of Standard	
	Location 1	Location 2	NL	Ontario	Québec	Location 1	Location 2
Vanadium	0.0015	0.0012	2	2	-	0.08%	0.06%
Zinc	0.0011	0.0009	120	120	-	0.00%	0.00%
Arsenic	0.00004	0.00003	0.3	0.3	-	0.01%	0.01%
Cadmium	0.000008	0.000006	2	0.025	-	0.03%	0.03%
Mercury	0.000000	0.000000	2	2	-	0.00%	0.00%
Nickel	0.0007	0.0006	2	0.2	-	0.37%	0.29%

Table 1.4.2 Predicted Maximum 1-hour Ambient Concentration Levels for Regulated VOCs and Metals from Kami Mine Operations

Contaminant		Predicted Maximum 1-hour Ambient Concentration (µg/m^3)		Regulation			% of Standard	
		Location 1	Location 2	NL	Ontario	Québec	Location 1	Location 2
CAC	NOx	62.61	115.15	400	400	414	15.7%	28.8%
	TSP	-	-	-	-	-	-	-
Ambient Concentration from Diesel Combustion								
VOC	Acrolein	0.02	0.04	-	4.5	-	0.45%	0.83%
	Acetaldehyde	0.13	0.24	-	500	-	0.03%	0.05%
Metal	Nickel	0.0002	0.0004	-	-	6	0.00%	0.01%
Ambient Concentration from Particulate Emissions								
Nickel		0.002	0.001	-	-	6	0.03%	0.02%

1.4.2 Information Request No. HC 02

It is unclear whether or not metals concentrations in dusts may currently exceed relevant regulatory criteria (provincial guidelines from Newfoundland and Labrador and Ontario exist for specific metals) given that they were not measured as part of a baseline air quality evaluation. In addition, it is also unclear whether or not future metals concentrations in dusts may exceed applicable regulatory criteria given that they have not been modelled and compared to the applicable criteria, and total particulate matter was predicted to exceed applicable criteria at approximately 20 cabins. Health Canada is requesting clarification as to whether or not elevated metals in dusts may occur at those receptor locations given that particulate matter is predicted to exceed applicable regulatory criteria during Project operations.

In addition, standard mitigative measures are presented in Chapter 14; however, there is no discussion about whether the proposed mitigative measures will be sufficient in order to ensure that the particulate levels (and the metals in these dusts) do not exceed applicable regulatory criteria at these nearby cabins. If regulatory criteria may be exceeded at these cabins even with the proposed mitigation, Health Canada advises that additional mitigative measures be presented, such as work slowdowns during specific atmospheric conditions, complaint-response monitoring and/or compensation in the event of public complaints about air quality.

Alderon Response to IR No. HC 02

The baseline ambient air quality monitoring plan was developed in collaboration with NLDOEC. The baseline soil data from Volume 1, Table 25.5 in the EIS, as well as Table 1.4.3 below showing the estimated 24-hour maximum ambient concentrations of metals released from operation of the Project, indicate that ambient levels of arsenic, cadmium, copper, lead, mercury, nickel, vanadium and zinc are likely to be far below Newfoundland and Labrador regulations. Table 1.4.3 also indicates that TSP emissions are generally an order of magnitude closer to applicable standards for VOCs, PAHs or metals. Therefore, while 20 residences are predicted to experience exceedances in TSP, the corresponding ambient concentration levels of the above eight metals would still be expected to fall well below Newfoundland and Labrador regulations. Alderon will continue to consult and engage with cabin owners that may be in zones affected above guideline and standard limits to address Project effects. During construction and operation of the mine, the Social Responsibility System (SRS) within the Sustainability Management Framework, will establish plans for effective Project communications, community liaison and complaints management.

Table 1.4.3 Predicted Maximum 24-hour Ambient Concentration Levels for Regulated VOCs, PAHs and Metals from Kami Mine Operations

Contaminant		Predicted Maximum 24-hour Ambient Concentration (µg/m^3)		Regulation			% of Standard	
		Location 1	Location 2	NL	Ontario	Québec	Location 1	Location 2
CAC	NO_x	17.75	31.78	200	200	207	8.9%	15.9%
	TSP	41	32	120	120	120	34.2%	26.7%
Ambient Concentration from Diesel Combustion								
VOC	Acrolein	0.006	0.010	-	0.4	-	1.45%	2.59%
	Acetaldehyde	0.036	0.065	-	500	-	0.01%	0.01%
	Benzene	0.042	0.075	-	2.3	10	1.82%	3.26%
	1,3-Butadiene	0.004	0.007	-	10	-	0.04%	0.07%
	Formaldehyde	0.078	0.140	-	65	-	0.12%	0.22%
Metal	Antimony	0.00004	0.00007	-	25	-	0.00%	0.00%
	Arsenic	0.00004	0.00007	0.3	-	-	0.01%	0.02%
	Cadmium	0.00004	0.00007	2	-	-	0.00%	0.00%
	Chromium VI	0.00001	0.00003	-	0.0007	-	2.03%	3.64%
	Manganese	0.00008	0.00015	-	0.4	-	0.02%	0.04%
	Mercury	0.00010	0.00019	2	-	-	0.01%	0.01%
	Nickel	0.00007	0.00012	2	-	-	0.00%	0.01%
PAH	Benzo(a)pyrene	0.00004	0.00007	-	0.005	-	0.83%	1.49%
	Naphthalene	0.04	0.07	-	22.5	-	0.17%	0.31%

Contaminant	Predicted Maximum 24-hour Ambient Concentration (µg/m^3)		Regulation			% of Standard	
	Location 1	Location 2	NL	Ontario	Québec	Location 1	Location 2
Ambient Concentration from Particulate Emissions							
Copper	0.0007	0.0005	50	50	2.5	0.03%	0.02%
Lead	0.0002	0.0002	2	0.5	-	0.05%	0.04%
Vanadium	0.0015	0.0012	2	2	-	0.08%	0.06%
Zinc	0.0011	0.0009	120	120	-	0.00%	0.00%
Arsenic	0.00004	0.00003	0.3	0.3	-	0.01%	0.01%
Cadmium	0.000008	0.000006	2	0.025	-	0.03%	0.03%
Mercury	0.000000	0.000000	2	2	-	0.00%	0.00%
Nickel	0.0007	0.0006	2	0.2	-	0.37%	0.29%

1.4.3 Information Request No. HC 03

HHRA

If the metals evaluated in dusts consists of those presented in Section 14.6.2.1, it is unclear why a different group of metals was selected for evaluation in the human health risk assessment (HHRA) in Chapter 25. In addition, for those metals selected for evaluation in the HHRA, no equations are presented and no explanation is provided as to how these values were calculated. Health Canada advises that there should be a discussion about why the metals presented in Section 14.6.2.1 differ from those evaluated in Chapter 25, and how the values (annual averages) in Table 25.25 were calculated.

Alderon Response to IR No. HC 03

The table of metal percentages presented in Volume 1, Chapter 14 (p.14-53) of the EIS represent the major element chemistry of the Kami ore. The purpose of presenting these percentages in the atmospheric environment discussion is only to note that, based on the predicted total particulate matter ground level air concentrations, each individual metal ground level air concentration would not exceed available regulatory standards, even if dust emissions were 100 percent composed of ore. This provides an upper bound limit on metals emissions in dust. Although Newfoundland and Labrador Regulation 39/04 does not provide air quality standards for iron, it is noted that the Ontario Ministry of the Environment (OMOE) Ambient Air Quality Criteria (AAQC) provide a 24-hour AAQC for ferric oxide of 25 µg/m^3. The $PM_{2.5}$ concentration predicted at Receptor Location 1 (Long Lake south) is 27 µg/m^3. Given an iron content in the ore of 65 percent (Chapter 14, p.14-53), the predicted concentration of iron in inhalable particulate would be less than the OMOE AAQC.

It is also noted that some of the metals presented on p.14-53 are not relevant to the human health risk assessment. Several elements can be classified as major mineral forming elements of low inherent toxicity or essential nutrients of low inherent toxicity. Government agencies often do not develop regulatory criteria for these and other innocuous substances. For example, neither Health Canada (2010), nor the United States Environmental Protection Agency (USEPA) Integrated Risk Information System (IRIS) have toxicity reference values (TRVs) for any of the substances listed below. For the human health risk assessment, it is important to determine whether parameters analyzed in the ore are generally considered hazardous or toxic to humans or wildlife. The following metals listed on p.14-53 are generally ubiquitous in the environment and are generally not considered hazardous to humans or wildlife, although they are commonly analyzed within standard analytical chemistry or trace metal packages:

- Aluminum, calcium, magnesium, and titanium.

Therefore, for the purpose of the human health risk assessment, these metals are considered non-hazardous and are not included in Table 25.25.

While Chapter 14 addresses the potential for metals in dust due to fugitive emissions from ore or overburden soils, the human health risk assessment of potential changes in air quality addresses the potential for air emissions from equipment being used (e.g., vehicle exhausts).The metals presented in Table 25.25 below were selected based on an understanding of those chemicals expected to be emitted from construction activities as a result of the equipment being used (e.g., heavy equipment). The main sources of these air emissions from the Project are: (1) the combustion of fuel in the equipment, which produces emissions of particulate matter (TPM, PM_{10}, $PM_{2.5}$), combustion gases (SO_2, CO, NO_x), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and metals; and (2) burning of No. 2 light fuel oil in boilers. The master List of Compounds Emitted by Mobile Sources provided by the USEPA Mobile Source Air Toxics was consulted to identify chemicals present in diesel exhaust. Based on these sources and on an understanding of contribution to overall risk based on relative abundance and toxicity, the metals identified for air quality are those listed in Table 25.25.

With respect to the method used for the calculation of ground level air concentrations for non-criteria contaminants (metals, VOCs, and PAHs), these were derived by partitioning on the basis of a reference composition of diesel exhaust applied to the NO_X model results. The ratio of chemical of potential concern (COPC) to NO_x is multiplied by the NO_x value to go from µg of NO_x to µg of COPC. The COPC/NO_x ratios are provided in Table 1.4.4.

Table 1.4.4 Ratio of Chemical of Potential Concern to NO_x

COPC	COPC / NO_x
Antimony	2.35E-06
Arsenic	2.35E-06
Cadmium	2.35E-05
Chromium VI	7.99E-07
Manganese	4.70E-06

COPC	COPC / NO_x
Mercury	5.88E-06
Nickel	3.76E-06
Benzo(a)pyrene	2.35E-06
Naphthalene	2.20E-03
Acrolein	3.26E-04
Acetaldehyde	2.04E-03
Formaldehyde	4.41E-03
Benzene	2.36E-03
1,3-Butadiene	2.12E-04

The ratio to NO_x provides a conservative estimate of ground level air concentrations, as the metals and PAH will partly deposit, and the VOCs may react. This method assumes that the COPC are conserved and therefore the source ratio is unchanged with dispersion. This is a commonly accepted technique and is common practice with single sources.

1.4.4 Information Request No. HC 04

If non-criteria air contaminants including metals, VOCs and PAHs are modelled to predict future ground level concentrations, relevant provincial regulatory criteria (Newfoundland and Labrador and Ontario) can be used for comparison in order to evaluate the potential for adverse human health effects from the predicted concentrations.

Alderon Response to IR No. HC 04

A comparison between estimates of 24-hour maximum ambient concentration levels of metals, VOCs and PAHs and Ontario and Newfoundland and Labrador regulations is presented in Table 1.4.5. Current information suggests that, through adherence to particulate and nitrogen dioxide standards, ambient levels of VOCs, PAHs and metals of concern emitted by the Project can be anticipated to be several orders of magnitude below applicable regulations.

Table 1.4.5 Predicted Maximum 24-hour Ambient Concentration Levels for Regulated VOCs, PAHs and Metals from Kami Mine Operations

Contaminant		Predicted Maximum 24-hour Ambient Concentration (µg/m^3)		Regulation			% of Standard	
		Location 1	Location 2	NL	Ontario	Québec	Location 1	Location 2
CAC	NO_x	17.75	31.78	200	200	207	8.9%	15.9%
	TSP	41	32	120	120	120	34.2%	26.7%

Contaminant		Predicted Maximum 24-hour Ambient Concentration (µg/m³)		Regulation			% of Standard	
		Location 1	Location 2	NL	Ontario	Québec	Location 1	Location 2
Ambient Concentration from Diesel Combustion								
VOC	Acrolein	0.006	0.010	-	0.4	-	1.45%	2.59%
	Acetaldehyde	0.036	0.065	-	500	-	0.01%	0.01%
	Benzene	0.042	0.075	-	2.3	10	1.82%	3.26%
	1,3-Butadiene	0.004	0.007	-	10	-	0.04%	0.07%
	Formaldehyde	0.078	0.140	-	65	-	0.12%	0.22%
Metal	Antimony	0.00004	0.00007	-	25	-	0.00%	0.00%
	Arsenic	0.00004	0.00007	0.3	-	-	0.01%	0.02%
	Cadmium	0.00004	0.00007	2	-	-	0.00%	0.00%
	Chromium VI	0.00001	0.00003	-	0.0007	-	2.03%	3.64%
	Manganese	0.00008	0.00015	-	0.4	-	0.02%	0.04%
	Mercury	0.00010	0.00019	2	-	-	0.01%	0.01%
	Nickel	0.00007	0.00012	2	-	-	0.00%	0.01%
PAH	Benzo(a)pyrene	0.00004	0.00007	-	0.005	-	0.83%	1.49%
	Naphthalene	0.04	0.07	-	22.5	-	0.17%	0.31%
Ambient Concentration from Particulate Emissions								
Copper		0.0007	0.0005	50	50	2.5	0.03%	0.02%
Lead		0.0002	0.0002	2	0.5	-	0.05%	0.04%
Vanadium		0.0015	0.0012	2	2	-	0.08%	0.06%
Zinc		0.0011	0.0009	120	120	-	0.00%	0.00%
Arsenic		0.00004	0.00003	0.3	0.3	-	0.01%	0.01%
Cadmium		0.000008	0.000006	2	0.025	-	0.03%	0.03%
Mercury		0.000000	0.000000	2	2	-	0.00%	0.00%
Nickel		0.0007	0.0006	2	0.2	-	0.37%	0.29%

1.4.5 Information Request No. HC 05

Health Canada advises that the appropriate sound level adjustments are applied for specific activities which may result in greater levels of annoyance, as per ISO (2003).

Alderon Response to IR No. HC 05

The % HA (Highly Annoyed) due to the operation of mine equipment plus existing background sound levels, as presented in Volume 1 of the EIS, Tables 14.18, 14.20 and 14.35, were calculated using the following formula:

$$\% \text{ HA} = 100 / [1+(\exp(10.4-0.132*(L_{dn})))]$$

Where L_{dn} is the average day night sound level (including the +10 dB correction for night time sensitivity to noise) for the baseline conditions (in Tables 14.18 and 14.20), the noise levels from the mine (Table 14.35, column 8), and the cumulative noise level (Table 14.35, column 11).

A +10 dB adjustment for a rural setting, as per the International Standards Organization ISO 1996-1:2003 (available at http://www.iso.org/iso/catalogue_detail?csnumber=28633), was not applied in the acoustics analysis, as mining is intrinsic to the communities and the surrounding region, so the residents are accustomed to the presence of mines and the activities are familiar to them. The region was therefore not considered to be one that warranted additional adjustment beyond the nighttime adjustment of +10 dB for the greater expectation of quiet, which has been applied. The area of potentially affected cabins has a density of buildings that is more consistent with a suburb than a wilderness area, with heavy recreational vehicle use in summer and winter conditions; therefore, it was concluded that the adjustment was not applicable.

Blasting noise limits are set by municipalities, and all blasts at mines in the area are routinely monitored for compliance. The Blasting Plan that will be developed will be designed for compliance with the set limits. All blasts will be accompanied by public notification to help avoid startle effects. Blasting is routine in this region; although anecdotal information suggests that some rare blasts have exceeded sound limits, most routine blasts are similar to distant thunder rather than the explosive bang that persons unfamiliar with the situation might anticipate.

1.4.6 Information Request No. HC 06

Health Canada advises that vegetative barriers and certain other types of barriers may not reduce noise levels substantially, and thus, additional mitigation may be warranted in order to reduce noise levels at the nearest receptors.

Alderon Response to IR No. HC 06

Vegetation serves as a multi-purpose barrier for potential adverse effects. It is extremely important in terms of aesthetics, plays a role in reducing wind speed and consequent erosion of particulate material, and can be very effective in reducing the effect of the transmission of site lighting beyond the property boundaries. It is acknowledged that the noise reduction associated with a tree line is relatively low. Other mitigations such as the use of mufflers on construction equipment, enclosed conveyor motors, and adherence to equipment maintenance programs will address noise effects. Alderon will continue to consult and engage with cabin owners to address Project effects.

1.4.7 Information Request No. HC 07

As presented in the **EIS Guidelines**, Health Canada advises that a quantitative analysis of expected construction-related noise levels be undertaken. In addition, Health Canada advises that additional mitigative measures, such as those presented in the New South Wales Construction Noise Guideline (provided on the following pages), be considered in order to ensure that construction noise levels do not exceed acceptable criteria.

Alderon Response to IR No. HC 07

In assessing the quantity and magnitude of noise sources during the construction and operation phases of the proposed Project, it was determined that the noise emissions of the operational phase of the Project would be greater than noise emissions from the construction phase. As in any large project involving construction and operational phases, the equipment, sequencing, and the number of parallel tasks are less well defined in the construction phase, and the sound level estimates are accordingly less precise. It is evident that the two phases have distinct similarities in terms of earth moving, site preparation, and the corresponding use of heavy diesel equipment across the mine area, but that the construction phase would be less equipment intensive. Modeling results presented in the EIS, Volume 1, pages 14-64 to 14-68, demonstrate that noise emissions from the operation of the mine are predicted to be not significant. Since noise emissions are expected to be greater during operations than during construction, the modeling predictions of mine operations can be viewed as an overestimate of anticipated noise emissions during the construction phase. This would imply quantitatively that the construction noise emissions are also not significant. Mitigation measures presented in the New South Wales Construction Noise Guideline (found on the New South Wales Environmental Protection Agency website: http://www.environment.nsw.gov.au/resources/noise/09265cng.pdf*)* provide relevant and useful guidance for components of the Project near potentially affected persons; this resource will be considered for inclusion in the Environmental Management System (EMS). Noise mitigation measures which could be implemented in the EMS include the use of alternative technologies for piling, limiting impulsive noise (e.g., piling or blasting) to day light hours, roadway designs which minimize the use of reversing alarms, and frequent and consistent consultation with nearby residences. Existing industrial activity in the region, including mines near Wabush and Labrador City, implies that rural residents do not currently experience a "quiet rural environment". The absolute Ldn limit of 57 dBA would therefore not apply in this circumstance. For those residences in which the %HA change surpasses 6.5 percent, consultation will take place with those residents to develop acceptable mitigation measures.

1.4.8 Information Request No. HC 08

Based on the definition of significance for noise as presented in the report, approximately 20 cabins will experience a significant adverse residual environmental effect. Although the proponent commits to implementing mitigative measures to reduce effects on cabins, no specific mitigation measures targeted at these cabins are presented, other than the general mitigation measures presented in Table 14.39.

Health Canada advises that there should be a discussion about the relevance of the significance criterion in relation to these 20 cabins and there should also be additional justification that the proposed mitigation presented in Chapter 14 will sufficiently reduce noise acceptable levels at these receptor locations. If this cannot be justified, additional mitigation may be required.

Alderon Response to IR No. HC 08

As noted by the Reviewer, some cabins are likely to be adversely affected by noise levels, and there are some cabins close to the processing areas that will be adversely affected by air quality issues. Alderon recognizes this and has a dedicated team in place that is continuing to consult and engage with cabin owners to address Project effects. Potential exposure of these cabins to air and noise emissions is a direct function of the equipment location and separation from the cabins. As the detailed mine plan evolves, optimization of material handling, geotechnical considerations, and design improvements will be introduced. Alderon has commenced negotiations with cabin owners to address Project effects.

1.4.9 Information Request No. HC 09

Since a significant adverse environmental effect on surface water is considered to be where water quality does not meet the GCDWQ, and since there are known surface water users of Long Lake and other nearby lakes, Health Canada advises that baseline water quality samples and future surface water quality samples should be compared to the GCDWQ (including those substances with only a GCDWQ guideline such as chromium and barium) in addition to the CWQA, MMER and WQMA.

Alderon Response to IR No. HC 09

Comment acknowledged. Future surface water quality sampling will be compared to the GCDWQ. Tables 16.19 to 16.22 from Chapter 16 of Volume 1 are updated below with a new column for the GCDWQ. Both pH and colour exceedances of the GCDWQ were observed. Baseline water quality has turbidity exceeding the GCDWQ treated effluent criteria. Baseline maximum iron and manganese concentrations exceed the GCDWQ aesthetic objectives.

As indicated under "Existing Water Uses, Effects and Constraints" (page 16-72, Volume 1 of the EIS) key local surface water effluent discharge constraints are considered to include:

Avoidance of the near-shore zone in the effluent mixing zone and the adoption of a near-shore buffer zone to avoid domestic water takings. The protected water supply area guidance on buffer areas from water supply intakes (150 m buffer) can be applied in this instance. As the domestic surface water intakes are near-shore, the use of the 150 m shoreline buffer is applied as a physical constraint;

Table1.4.6 Summary Regulatory Criteria and Reference Water Quality in Western Labrador (Updated EIS Table 16.19, Volume 1)

Parameter	Regulatory Criteria and Reference Water Quality					
	Units	GCDWQ[2]	CWQG	MMER[1]		WQMA
				(Max Monthly Mean)	(Max Grab)	
Alkalinity	mg/L					4.0332 – 6.5461
Colour	TCU	AO: ≤ 15	Narrative			18.5 – 27.7 (RU)
Conductivity	µS/cm					8.9 – 515.9
DO	mg/L		6.5 – 9.5 (cold water–life stage)			1.68 – 3.60
pH	pH	6.5 – 8.5	6.5 - 9			6.51 – 6.61
Turbidity	NTU	Treated water <0.1 at all times. Where not achievable; ≤ 0.3, ≤ 1.0, ≤ 0.1	Narrative			0.0 – 1.98 (JTU)
Temperature	Deg C	AO: ≤ 15	Narrative			3.7 – 5.1
TSS	mg/L		Narrative	15	30	
Calcium	mg/L	None required				0.81 – 1.69
Chloride	mg/L	AO: ≤ 250				0.15 – 30.12
Fluoride	mg/L	1.5	0.120 (inorganic F)			0.025
Magnesium	mg/L	None required				0.23 – 1.43
Potassium	mg/L					0.0 – 0.80
Sodium	mg/L	AO: ≤ 200				0.0 – 10.55
Sulphate	mg/L	AO: ≤ 500				0.41 – 6.38
Cyanide	mg/L	0.2	0.005 (as free CN)	1	2	
DOC	mg/L		2000			4.4 – 4.5
Total Ammonia - N	Mg/L	None required	T°C and pH dependent			0.136 – 0.150
Un-ionized Ammonia	µg/L		19			
Nitrite	mg/L	3.2	0.06			
Nitrate	mg/L	45	13			
Phosphorus	µg/L		< 4 - >100 (trophic status)			7.27 – 11.36
Aluminum	µg/L	OG < 100 (conventional treatment); < 200 (other treatment)	5 if pH <6.5, 100 if pH > 6.5			35 - 82

Parameter	Regulatory Criteria and Reference Water Quality					
	Units	GCDWQ[2]	CWQG	MMER[1] (Max Monthly Mean)	MMER[1] (Max Grab)	WQMA
Arsenic	µg/L	10 ALARA	5	500	1000	0.05 – 0.08
Boron	µg/L	5000	1500 (Long Term)			
Cadmium	µg/L	5	Hardness adjusted			0.103 – 0.117
Copper	µg/L	AO: ≤ 1000	Hardness adjusted, a minimum of 2 µg/l regardless of water hardness (Demayo and Taylor, 1981)	300	600	4.35 – 4.93
Iron	µg/L	AO: ≤ 300	300			61.8 – 185.9
Lead	µg/L	10	Hardness adjusted, a minimum of 1 µg/L regardless of water hardness (CCREM, 1987: Table 3-10)	200	400	0.34 – 0.42
Mercury	µg/L	1.0	0.026			0.087 – 0.103
Molybdenum	µg/L		73			0.05 – 0.062
Nickel	µg/L		Hardness adjusted, a minimum of 25 µg/L regardless of water hardness (IJC, 1976)	500	1000	0.23 – 0.36
Selenium	µg/L	10	1			0.05 – 0.057
Silver	µg/L	None required	0.1			
Thallium	µg/L		0.8			
Uranium	µg/L	20	33 (short term), 15 (long term)			
Zinc	µg/L	AO: ≤ 500	30	500	1000	3.4 – 3.8
$Radium_{226}$	Bq/L	0.5		0.37	1.11	

Notes:

1 The MMER provides three effluent water quality limits including the maximum authorized monthly mean concentration, maximum authorized concentration in a composite sample and maximum authorized concentration in a grab sample. The Maximum Authorized Monthly Mean Concentration will be the MMER effluent criteria carried forward in Project effects assessments.

2 GCDWQ values are Maximum Allowable Concentration (MAC) or Other Value. Other Value abbreviations include AO – Aesthetic Objective, OG – operational guidance value, and ALARA – as low as reasonably achievable

Table 1.4.7 Summary of General Constituents for Routine Monitoring and April Field Samples (Updated EIS Table 16.20, Volume 1)

Parameter	Units	GCDWQ Guideline	CWQG Guideline	Min	Mean	Max	75th
General Constituents							
Anion Sum	me/L			0.55	1.09	2.32	1.41
Bicarb. Alkalinity (calc. as CaCO3)	mg/L			27	51	110	64
Calculated TDS	mg/L	AO: ≤ 500		34.0	58.1	116.0	75.8
Carb. Alkalinity (calc. as CaCO3)	mg/L			0.5	0.5	1.2	0.5
Cation Sum	me/L			0.630	1.064	2.220	1.280
Hardness (CaCO3)	mg/L	None required		29	50	110	59
Ion Balance (% Difference)	%			0.54	3.26	8.33	4.66
Langelier I0.5ex (@ 20C)	N/A			-3.28	-0.97	0.15	-0.54
Langelier Index (@ 4C)	N/A			-3.53	-1.22	-0.10	-0.79
Saturation pH (@ 20C)	N/A			7.91	8.61	9.03	8.87
Saturation pH (@ 4C)	N/A			8.16	8.86	9.28	9.12
pH	pH	6.5 8.5	6.5-9	5.64	7.58	8.06	7.81
Acidity	mg/L			2.5	3.5	12.0	4.4
Total Alkalinity (Total as CaCO3)	mg/L			27	50	110	60
Dissolved Chloride (Cl)	mg/L			0.5	0.7	2.2	0.5
Color	TCU	AO: ≤ 15	Narrative[1]	8	14	44	14
Strong Acid Dissoc. Cyanide (CN)	mg/L	0.2	0.005 (as free CN)	0.0010	0.0010	0.0010	0.0010
Total Dissolved Solids	mg/L	AO: ≤ 500		27	55	110	68
Dissolved Fluoride (F-)	mg/L	1.5	0.120 (inorganic F)	0.05	0.05	0.11	0.05

Parameter	Units	GCDWQ Guideline	CWQG Guideline	Min	Mean	Max	75th
Reactive Silica (SiO_2)	mg/L			3.2	5.1	9.4	6.4
Total Suspended Solids	mg/L		Narrative[2]	0.5	1.3	5.2	1.7
Dissolved Sulphate (SO_4)	mg/L			1.0	3.0	5.8	3.9
Turbidity	NTU	Treated water <0.1 at all times. Where not achievable; ≤ 0.3, ≤ 1.0, ≤ 0.1[4]	Narrative[3]	0.05	0.41	1.30	0.58
Conductivity	uS/cm			56	101	210	130

Notes:

1 True Color - The mean absorbance of filtered water samples at 456 nm shall not be significantly higher than the seasonally adjusted expected value for the system under consideration.

2 Total Suspended Solids for Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d).

3 Turbidity for clear flow - Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-h period). Maximum average increase of 2 NTUs from background levels for a longer term exposure (e.g., 30-d period).

4 For chemically-assisted filtration, slow sand or diatomaceous earth filtration, and membrane filtration, respectively.

Table 1.4.8 Summary of Nutrients for Routine Monitoring and April Field Samples (Updated EIS Table 16.21, Volume 1)

Parameter	Units	GCDWQ Guideline	CWQG Guideline	Min	Mean	Max	75th
Nutrients							
Nitrate + Nitrite	mg/L			0.03	0.06	0.27	0.08
Nitrate (N)	mg/L	45	13.0	0.025	0.062	0.270	0.086
Nitrite (N)	mg/L	3.2	0.1	0.005	0.005	0.005	0.005
Nitrogen (Ammonia Nitrogen)	mg/L		See Table[1]	0.025	0.038	0.160	0.025
Dissolved Organic Carbon (C)	mg/L			1.500	4.873	20.000	5.225
Total Organic Carbon (C)	mg/L			1	4	20	4
Orthophosphate (P)	mg/L			0.01	0.01	0.01	0.01
Total Phosphorus	mg/L		See notes[2]	0.00	0.01	0.02	0.01

Notes:

1 http://st-ts.ccme.ca/?lang=en&factsheet=5#aql_fresh_concentration.

2 Ultra-oligotrophic <4, oligotrophic 4-10, mesotrophic 10-20, meso-eutrophic 20-35, eutrophic 35-100, hyper-eutrophic >100.

Table 1.4.9 Summary of Water Quality Metals for Routine Monitoring and April Field Samples (Updated EIS Table 16.22, Volume 1)

Parameter	Units	GCDWQ Guideline	CWQG Guideline	Min	Mean	Max	75th%
Metals							
Dissolved Mercury (Hg)	µg/L	1.0	0.026	0.01	0.01	0.07	0.01
Dissolved (Al)	µg/L			3	13	80	14
Total Aluminum (Al)	µg/L	OG: < 100 (conventional treatment), < 200 (other treatment)	5 if pH <6.5, 100 if pH > 6.5	2.5	22.7	73.6	19.9
Total Antimony (Sb)	µg/L	6.0		0.5	0.5	0.5	0.5
Total Arsenic (As)	µg/L	10.0 ALARA	5.000	0.500	0.500	0.500	0.500
Total Barium (Ba)	µg/L	1000		9	15	31	18
Total Beryllium (Be)	µg/L			0.50	0.50	0.50	0.50
Total Bismuth (Bi)	µg/L			1.00	1.00	1.00	1.00
Total Boron (B)	µg/L	5000	1500	25	25	25	25
Total Cadmium (Cd)	µg/L	5.0	See note[1]	0.0085	0.01626	0.056	0.0085
Total Calcium (Ca)	µg/L	None required		6860	12307.6	25300	14500
Total Chromium (Cr)	µg/L	50		0.5	0.5	0.5	0.5
Total Cobalt (Co)	µg/L			0.2	0.2	0.2	0.2
Total (Cu)	µg/L	AO: ≤ 1000	See note[2]	1	1.056	2.4	1
Total Iron (Fe)	µg/L	AO: ≤ 300	300	25	111.76	493	140
Total Lead (Pb)	µg/L	10	See note[3]	0.25	0.2876	0.84	0.25
Total Magnesium (Mg)	µg/L	None required		2580	5620.8	13000	7080
Total Manganese (Mn)	µg/L	AO: ≤ 50		1	32.84	185	45
Total Molybdenum (Mo)	µg/L		73	1	1	1	1
Total Nickel (Ni)	µg/L		See note[4]	1	1	1	1
Total Potassium (K)	µg/L			849	1302.08	2690	1410
Total Selenium (Se)	µg/L	10	1	0.5	0.5	0.5	0.5
Total Silicon (Si)	µg/L			1560	2529.6	4940	3410
Total Silver (Ag)	µg/L	None required	0.1	0.05	0.05	0.05	0.05
Total Sodium (Na)	µg/L	AO: ≤ 200, 000		538	999.52	3040	946
Total Strontium (Sr)	µg/L	5 (Bq/L)		12.4	17.892	29.9	22.5
Total Sulphur (S)	µg/L			2500	2500	2500	2500

Parameter	Units	GCDWQ Guideline	CWQG Guideline	Min	Mean	Max	75^{th}%
Total Tellurium (Te)	µg/L			1	1	1	1
Total Thallium (Tl)	µg/L		0.8	0.05	0.05	0.05	0.05
Total Tin (Sn)	µg/L			1	1	1	1
Total Titanium (Ti)	µg/L			1	1.232	4.1	1
Total Uranium (U)	µg/L	20		0.05	0.2072	0.96	0.22
Total Vanadium (V)	µg/L			1	1	1	1
Total Zinc (Zn)	µg/L	AO: ≤ 500	30	2.5	5.952	30.7	5.2
$Radium_{226}$	Bq/L	0.5		0.0025	0.00629	0.02	0.007

Notes:

1 http://st-ts.ccme.ca/?lang=en&factsheet=20#aql_fresh_concentration.

2 Minimum 2 µg/L and see equation at http://st-ts.ccme.ca/?lang=en&factsheet=71#aql_fresh_concentration.

3 Minimum 1 µg/L and see equation at http://st-ts.ccme.ca/?lang=en&factsheet=124#aql_fresh_concentration.

4 Minimum 25 µg/L and see equation at http://st-ts.ccme.ca/?lang=en&factsheet=139#aql_fresh_concentration.

1.4.10 Information Request No. HC 10

In addition to the baseline parameters evaluated, Health Canada suggests that baseline levels of bacteria in surface water be collected, such as total coliforms and fecal coliforms in Long Lake, to confirm the presence / absence of these bacteria. This would provide the proponent with an understanding of current coliform counts and assist the proponent during project operations if their sanitary sewage is discharged into Long Lake and surface water users identify coliform bacteria in their water supplies.

In addition, Health Canada advises that there be a discussion about whether or not discharging sanitary waste from the site using criteria from Schedule A of Regulation 65/03 (which has an acceptable discharge rate of 1000 fecal coliforms/100 mL and 5000 total coliforms/100 mL) may result in an exceedance of the GCDWQ for coliforms in surface water users' drinking water supplies in Long Lake. If an exceedance of the GCDWQ is possible, additional mitigative measures may be required in order to protect human health against ingestion of bacteria in surface water.

Finally, although not specifically identified in the EIS Guidelines as an applicable regulatory standard or guideline, Health Canada has also published the Third Edition of the Guidelines for Recreational Water Quality, which was prepared by the Federal-Provincial-Territorial Working Group on Recreational Water Quality of the Federal-Provincial-Territorial Committee on Health and the Environment (Health Canada, 2012). This document presents acceptable levels of contaminants in water used for recreational purposes, including Escherichia coli, which is considered to be the most appropriate indicator of faecal contamination in fresh recreational waters (<200 e-coli /100 mL as mean of 5 samples or <400 e-coli /100 mL for one sample).

Alderon Response to IR No. HC 10

Alderon will complete additional water sampling for total and fecal colliforms in Long Lake to identify background levels prior to development of the Project as recommended.

It is currently planned that waste water from washrooms, showers, and kitchens at the plant buildings will be collected, treated, and discharged along with the process water from the Processing Plant. The detailed engineering design of the treatment and discharge system will address the Guidelines for both Canadian Drinking Water Quality and Recreational Water Quality. The combined effluent will be treated and will meet the water discharge criterion prior to release.

1.4.11 Information Request No. HC 11

Water Exceedances

It is unclear what constitutes a repeated exceedance of an environmental quality objective, guideline or standard. In addition, it is also unclear what constitutes an “associated and measureable” increase in the incidence of human (physical) health issues within the LSA. Repeated exceedances, or even a single exceedance of some guideline values may result in adverse health effects. For example, if drinking water contains coliform bacteria (The GCDWQ recommends no coliform bacteria be present), and people consume it untreated, they may become ill. Repeated exceedances of the GCDWC could therefore result in recurrences of illness for those consuming untreated surface water from Long Lake (if sanitary sewage from the roject is discharged into Long Lake). Likewise, long-term exposure to some contaminants even at levels at or below guideline values, such as arsenic in drinking water, may result in adverse health effects. Health Canada would like clarification as to what is considered to be an acceptable number of exceedances of environmental quality objectives (i.e. define ‘repeatedly’), and these should be based on the toxicological properties of the individual substances and expected human exposure pathways.

The test for significance also includes “associated and measurable” increases in the incidence of human health issues within the LSA. As presented in Section 25.10, the proponent has not proposed any health-specific monitoring programs. Instead, the monitoring is considered to be the responsibility of other organizations and agencies, including the federal and provincial government departments. Given that the proponent is not collecting health-related data, it is unclear how the proponent will determine if there are measurable changes in health and whether these changes are associated with project activities. Health Canada advises that the proponent identify the relevant organizations and agencies that collect data on human health and provide a discussion about how these organizations will be engaged during the project in order to evaluate changes to human health. Health Canada also asks for clarification as to what the proponent defines as ‘measurable’ changes to human health.

Alderon Response to IR No. HC 11

Health Canada has requested clarification on the definition of significant adverse residual environmental effect on physical health. As presented in Section 25.3.1.1 of Volume 1 of the EIS, the definition is in two parts and is defined as an effect that:

1. Degrades the quality of the ambient air, water, or soil such that the maximum Project-related concentration being assessed repeatedly exceeds the respective environmental quality objective, guideline or standard; and

2. Results in an associated and measurable change (increase) in the incidence of human health (physical) issues within the LSA.

In practice, the definition of "repeatedly" only factors into the discussion of changes to air quality. Changes to soil, vegetation, or water quality are predicted to be continuous during the life of the Project and are assessed with respect to the second criterion – whether or not these changes are measurable.

For air quality, predictions are made within specified time averaging periods (1 hour, 24 hour, or annual) depending on the COPC and results are reported as the maximum value for the time period. All exposure ratios and hazard quotients (HQs) are less than one except for a marginal exceedance of the maximum 24-hour $PM_{2.5}$ standard at Receptor Location 1 on Long Lake South. However, exceedance of the maximum 24-hour $PM_{2.5}$ value alone does not constitute an adverse effect. The maximum 24-hour concentration can potentially overstate risks and further analysis of the dispersion modeling results was conducted to examine frequency of exceedance. Review of all predicted 24-hour concentrations indicates that there is only a single exceedance (one day) in one year at Receptor Location 1. While other locations closer to the south end of Long Lake may have more frequent exceedances (refer to Chapter 14 of Volume 1, Figure 14.8), Alderon will implement mitigation measures to reduce the effects of the Project on other activities such as use of cabins. Alderon is consulting with and engaging with cabin owners to address Project effects.

With respect to the second criterion (measurable change), this is intended to apply directly to the measures of physical health adopted in the EIS, namely changes to soil, water, and vegetation quality rather than to actual health outcomes. If the Project does not produce measurable changes to the underlying environmental media that could affect physical health (through various exposure pathways) then there would be no change expected to physical health as a result of the Project. As detailed in Chapter 25 of Volume 1, the Project is predicted to result in no measurable change (i.e., sample results would be statistically indistinguishable using standard laboratory analytical methods) to soil, vegetation, or water quality (beyond a limited mixing zone) hence no associated adverse effects upon the physical health of humans within the LSA are expected to occur.

1.4.12 Information Request No. HC 12

Health Canada advises that the predicted air quality results be compared to 20% of the ASCHH values, as proscribed in the Guidance on Human Health Risk Assessment on Air Quality (HHRAAIR). In addition, for locations (such as nearby cabins on Long Lake) that may be exposed to project-related contaminants (including metals) from air and surface water and potentially from country foods such as berries, the values in Table 25.25 may not be appropriate to evaluate potential health effects. Justification should be provided for the use of these ASCHH values where multiple exposure pathways to a substance may exist.

Alderon Response to IR No. HC 12

The inhalation toxicity reference values (TRVs) for arsenic, cadmium, chromium VI, nickel, benzo(a)pyrene, naphthalene, and benzene in Table 25.25 are sourced from the document *Federal Contaminated Site Risk Assessment in Canada Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors, Version 2.0, September 2010.* Prepared by: Contaminated Sites Division, Safe Environments Directorate (dated September 2010 but publicly released in August 2012). The reference to May 2009 in the footnotes to Table 25.25 of Volume 1 of the EIS is a typographical error and will be corrected. Except for naphthalene, all of the above noted Health Canada TRVs are based on the potential for carcinogenic effects. The underlying assumption of regulatory risk assessment for compounds with known or assumed potential carcinogenic effects is that no threshold dose exists. In other words, it is assumed that a finite level of risk is associated with any dose above zero, but at very low doses the probability of an adverse effect is also very low. Because there are no exposures that do not have some level of associated risk, regulators have had to define a level of carcinogenic risk that is considered acceptable, tolerable, or essentially negligible. Given the conservatism associated with the derivation of cancer unit risk factors and the negligible impact of a 1 in 100,000 incremental risk level for contaminated site exposures, a cancer risk level of 1 in 100,000 (10^{-5}) is recommended by Health Canada. This risk level is an incremental risk associated with the exposure being assessed and is independent of any other sources. Therefore, it is not recommended practice to modify the Health Canada carcinogenic TRVs to a percentage of the incremental risk.

For naphthalene, the Health Canada TRV is based on non-carcinogenic health effects. Twenty percent of the naphthalene TRV is 0.6 $\mu g/m^3$ which remains significantly higher than the annual average concentrations predicted at Receptor Locations 1 and 2 (0.0052 $\mu g/m^3$ and 0.003 $\mu g/m^3$, respectively). Therefore, the predicted concentrations represent <0.2% of the TRV.

1.4.13 Information Request No. HC 13

No equations were provided in order to evaluate the values and assumptions used in deriving the following:

1) Water quality criteria for fish in Table 25.26, including fish consumption rate assumptions and literature references for the bioconcentration factors used;

2) Incremental increase in soil COPC concentrations in Table 25.27, including assumptions related to mixing of deposited dust; and

3) Incremental increase in plant COPC concentrations in Table 25.28, including assumptions about loss of deposited material due to wind and water erosion.

In order to evaluate the potential health effects associated with exposure to contaminants in a variety of media, Health Canada would be interested in reviewing sample equations along with a discussion of the assumptions used in calculating these predicted values.

Alderon Response to IR No. HC 13

Health Canada has requested sample equations giving the calculations for soil, water, and vegetation quality along with a discussion of the assumptions used in the calculations. Each environmental media is addressed below.

Soil Quality

Detailed emission inventories of Project-related COPC emissions were prepared to assess the residual Project environmental effects on a change in soil quality during Project operation and maintenance (Volume 1,Chapter 14, Table 14.29). Deposition modeling was carried out using CALPUFF, version 6.4, for the same two discrete receptor locations used for the air quality assessment. The total dust fall rates at these locations were calculated to be 1.62 g/m^2/year and 1.30 g/m^2/year for Receptor Location 1 and Receptor Location 2, respectively. The metals content of the dust was determined by reference to Kami ore geochemistry and assuming that all dust is generated from the ore. This overestimates metals content as only a portion of dust generated would originate from ore with higher metals content. Incremental soil concentrations due to dust deposition are calculated according to the following equation:

$$C_S = F_{COPC} \times \left(\left((ML \times DF) \div L_D \div \rho\right) \times 10^3\right)$$

Where:

C_s	=	Incremental soil concentration due to dust fall (mg-COPC/kg-soil)
F_{COPC}	=	Fraction of COPC in dust (unitless)
ML	=	17, Mine life (years)
DF	=	Dust fall rate (g/m^2/year)
L_D	=	0.1, leaching depth or mixing zone of COPC in the surface soil (m)
ρ	=	1,500, soil bulk density (kg/m^3) (assumed)
10^3	=	conversion factor (mg/g)

Key assumptions in this calculation are:

- In order to calculate the potential deposition over the life of the mine, the maximum dust fall rate during year 5 was assumed to occur continuously for the entire 17 year mine life;
- Metals mix within the top 0 – 10 cm of surface soil. This is the biologically active layer considered to be of prime concern for metals accumulation and subsequent uptake and therefore for the evaluation of physical health;
- There are no losses of metals from this surface layer from natural processes such as leaching, runoff, and erosion; and
- Soil concentrations are calculated for two cabin locations proximate to the Project with higher dust fall rates than would be experienced at greater distances.

Based on the metal content of the Kami ore and the above assumptions related to mixing of dust deposited in the surface soil layers, the incremental increases in soil metals concentrations due to dust fall from the Project are negligible.

Example Calculation: Barium, Receptor Location 1

Soil concentrations due to dust deposition are calculated according to the following equation:

$$C_S = F_{COPC} \times \left(\left((ML \times DF) \div L_D \div \rho\right) \times 10^3\right)$$

Where:

C_s	=	Incremental soil concentration due to dust fall (mg-barium/kg-soil)
F_{COPC}	=	0.000277, Fraction of barium in dust (g/g)
ML	=	17, Mine life (years)
DF	=	1.62, Dust fall rate (g/m^2/year)
L_D	=	0.1, leaching depth or mixing zone of COPC in the surface soil (m)
ρ	=	1,500, soil bulk density (kg/m^3)
10^3	=	conversion factor (mg/g)

Soil concentration = 0.000277 x (((17 x 1.62) / 0.1 / 1500) x 1000)

= 0.0508 mg/kg

The percentage change to baseline soil quality is calculated as follows:

$$\%\ Change\ in\ soil\ quality = \left(\frac{Soil\ concentration\ \left({}^{mg}/_{kg}\right)}{Baseline\ concentration\ \left({}^{mg}/_{kg}\right)}\right) \times 100$$

% Change in soil quality = $\frac{0.0508}{560}$ x 100

= 0.009%

Vegetation Quality

In addition to direct effects on soil quality, dust deposition also has the potential to affect vegetation with subsequent physical health effects via ingestion of the vegetation (e.g., berries) and/or wild game that feeds on the vegetation. Plant concentrations may be affected by uptake from soil and/or by direct dust deposition on above-ground plant surfaces. Soil concentrations are not expected to measurably change due to the Project hence soil-to-plant uptake would also not be changed by the Project. However, changes to plant tissue concentrations may arise due to dust fall on plant surfaces. The degree of exposure will be dependent on the extent of deposition during the growing season, the types of plants harvested, consumption rates within a family, and preparation methods (e.g., washing and cooking). To estimate concentrations within plant tissue the dust deposition rates above were assumed to be constant during the growing season. These rates were used as the input parameter for the following equation (US EPA, 2005):

$$C_{plant} = \frac{D \times R_p \times [1 - exp(-kp \times tp)] \times [1 - WC]}{Y_p \times kp}$$

Where:

C_{plant}	=	metal concentration in plant tissue, mg/kg wet weight
D	=	dust fall rate (mg/m^2 year)
R_p	=	0.39, interception fraction of the edible portion of the plant (unitless)
kp	=	18, plant surface loss coefficient (yr^{-1})
tp	=	0.16, length of plant exposure to deposition per harvest (yr)
WC	=	0.85, dry weight to wet weight conversion factor (unitless)
Y_p	=	2.24, yield or standing crop biomass of the edible portion of the plant (kg dw/m^2)

This is a standard equation that accounts for the surface area of the plant exposed to deposition and the loss of deposited material due to mechanisms such as wind and water erosion. The predicted metal concentration in plants due to dust fall from the Project are negligible.

Example Calculation: Barium, Receptor Location 1

$$Barium\ dust\ fall\left(\frac{mg}{m^2 yr}\right) = \left(F_{Ba}\left(\frac{g}{g}\right) \times 10^3\left(\frac{mg}{g}\right)\right) \times DF\left(\frac{g}{m^2 year}\right)$$

Where:

F_{Ba}	=	Fraction barium in dust (0.000277)
DF	=	total dust fall (1.62)

Barium dust fall	=	0.000277 x 1000 x 1.62
	=	0.449

To estimate concentrations within plant tissue the dust deposition rates were assumed to be constant during the growing season and were used as the input parameter for the following equation (US EPA, 2005):

$$C_{plant} = \frac{D \times R_p \times [1 - exp(-kp \times tp)] \times [1 - WC]}{Y_p \times kp}$$

Where:

C_{plant}	=	metal concentration in plant tissue, mg/kg wet weight
D	=	0.449, barium dust fall rate (mg/m^2 year)
R_p	=	0.39, interception fraction of the edible portion of the plant (unitless)
kp	=	18, plant surface loss coefficient (yr^{-1})
tp	=	0.16, length of plant exposure to deposition per harvest (yr)
WC	=	0.85, dry weight to wet weight conversion factor (unitless)
Y_p	=	2.24, yield or standing crop biomass of the edible portion of the plant (kg dw/m^2)

$$\text{Barium in vegetation} = \frac{0.449 \times 0.39 \times (1 - exp(-18 \times 0.16)) \times (1 - 0.85)}{2.24 \times 18}$$

$$= 0.000615 \text{ mg/kg-ww}$$

Water Quality

The Cornell Mixing (CORMIX™) Model was used to simulate the mixing zone of combined mine process and sanitary effluent discharges into Long Lake. The predicted mixing zone boundaries corresponding to various average dilution factors are presented on Figures 16.36 and 16.37 in Chapter 16 of Volume 1 of the EIS, for the selected diffuser design under open-water and ice-cover conditions for a discharge of 50,000 m^3/d. For physical health, the water quality criteria to be satisfied at the mixing zone boundary are selected as:

1. Guidelines for Canadian Drinking Water Quality (GCDWQ); and
2. Surface water concentrations protective of uptake of COPC into fish, calculated for this EIS as described below.

GCDWQ

The GCDWQ for the COPC identified for water quality are presented in Table 1.4.10 below along with the combined process mine water and sanitary effluent concentration assumed at end of pipe and the required dilution of effluent to achieve the GCDWQ. The required dilution factor to achieve GCDWQ varies between <1 up to a maximum of 25 depending on constituents. Therefore, the mixing zone boundary also varies with constituents. Hence, the mixing zone boundary was defined as a boundary where the dilution factor is 25. At the mixing zone boundary, effluent water quality will meet the GCDWQ.

Table 1.4.10 GCDWQ and Required Effluent Dilution

COPC	Effluent Water Quality at End of Pipe[a] (mg/L)	GCDWQ (mg/L)	Required Dilution for GCDWQ at Mixing Zone Boundary
Arsenic	0.25	0.01	25
Barium	2.25	1	2.25
Cadmium	0.0021	0.005	<1
Chromium VI	0.025	0.05	<1
Chromium III	0.5	0.05	10
Copper	0.15	≤1	<1
Lead	0.1	0.01	10
Mercury	0.0025	0.001	2.5
Nickel	0.25	0.3[b]	<1
Selenium	0.005	0.01	<1
Silver	0.015	0.071[b]	<1
Zinc	0.25	≤5	<1

Notes:

[a] Effluent objectives assumed to achieve ½ MMER limits.

[b] US EPA Regional Screening Level (RSL).

Fish Consumption

To assess potential physical health effects via fish consumption from Long Lake a similar process is followed to define the required dilution of the effluent discharge to meet water quality criteria protective of COPC uptake into fish. For this assessment, it is assumed that the actual typical effluent quality will range up to ½ of the MMER and *NL Environmental Control Water and Sewage Regulations* Schedule A limits. The process is described in steps below:

Step 1 – Fish Consumption Rate: An average fish consumption rate is calculated by multiplying an assumed meal portion size by the number of fish meals consumed per week. The daily fish intake rate is assumed to be 56 g/day sourced from Health Canada (2010a) and the number of fish meals per week (1 meal/week) is based on Kuhnlein *et. al.* (2000). Therefore the average daily fish consumption rate is calculated to be 8 g/day.

Step 2 – Fish Hazard Quotient: The average daily consumption rate (kg-ww fish / day) is converted to a chronic daily intake (CDI) (mg-COPC / kg-bw day) as follows:

$$Chronic\ Daily\ Intake = \frac{\left(C_{fish} \times Fish\ Consumption\ Rate\right)}{Body\ Weight}$$

Where:

Chronic Daily Intake	=	mg_{COPC} / kg bw day
C_{fish}	=	mg_{COPC} / kg-ww fish
Fish consumption rate	=	kg-ww fish / day
Body weight	=	kg-bw

The assumed fish concentration (C_{fish}) is adjusted such that the CDI equals 20 percent of the tolerable daily intake (TDI), yielding a hazard quotient associated with fish consumption of 0.2. This concentration represents a safe fish concentration for recreational fishing in Long Lake.

For three COPC (arsenic, lead, and mercury) that are regulated by the Canadian Food Inspection Agency (CFIA) the above calculation is not required and the *Canadian Guidelines for Chemical Contaminants and Toxins in Fish and Fish Products* published by the CFIA in the Fish Products Standards and Methods Manual are adopted directly.

Step 3 – Surface Water Concentration: a corresponding surface water concentration is calculated from the fish concentration by dividing the fish concentration by a bioconcentration factor (BCF) sourced from US EPA (1999), as follows:

$$C_w = {}^{C_{fish}}\!/_{BCF}$$

Where:

C_w	=	surface water concentration (mg/L)
C_{fish}	=	fish concentration (mg-COPC/kg-ww)
BCF	=	bioconcentration factor (L/kg-ww)

The required dilution factors to achieve the calculated C_w vary between <1 up to a maximum of 56 depending on constituents. Therefore, the mixing zone boundary also varies with constituents. Hence, the mixing zone boundary was defined as a boundary where the dilution factor is 56. At the mixing zone boundary, effluent water quality will meet the criteria protective of uptake into fish and fish consumption.

$$C_S = F_{COPC} \times \left(\left((ML \times DF) \div L_D \div \rho\right) \times 10^3\right) \%\ Change\ in\ soil\ quality$$

$$= \left(\frac{Soil\ concentration\ \left({}^{mg}/_{kg}\right)}{Baseline\ concentration\ \left({}^{mg}/_{kg}\right)}\right) \times 100 Barium\ dust\ fall \left(\frac{mg}{m^2 yr}\right)$$

$$= \left(F_{Ba}\left(\frac{g}{g}\right) \times 10^3 \left(\frac{mg}{g}\right)\right) \times DF \left(\frac{g}{m^2 year}\right) C_{plant}$$

$$= \frac{D \times R_p \times [1 - exp(-kp \times tp)] \times [1 - WC]}{Y_p \times kp}$$

Example Calculation: Barium

$$Fish\ Consumption\ Rate\ \left({}^{kg - ww}/_{day}\right) = \frac{Fish\ Portion\ \left({}^{kg - ww}/_{meal}\right) \times Fish\ Meals \left({}^{meals}/_{week}\right)}{7\ \left({}^{days}/_{week}\right)}$$

Fish consumption rate = $\frac{0.056 \times 1}{7}$

= 0.008 kg-ww / day

$$Chronic\ Daily\ Intake = \frac{\left(C_{fish} \times Fish\ Consumption\ Rate\right)}{Body\ Weight}$$

Where:

Chronic Daily Intake	=	mg_{COPC} / kg bw day
C_{fish}	=	84, mg_{COPC} / kg-ww fish
Fish consumption rate	=	0.008, kg-ww fish / day
Body weight	=	16.5, kg-bw

Chronic daily intake = $\frac{84 \times 0.008}{16.5}$

= 0.0407 mg-barium / kg-bw day

The assumed fish concentration (C_{fish}) is adjusted such that the CDI equals 20 percent of the tolerable daily intake (0.2 mg/kg-day), yielding a hazard quotient associated with fish consumption of 0.2.

A corresponding surface water concentration is calculated from the fish concentration by dividing the fish concentration by a bioconcentration factor (BCF) sourced from US EPA (1999), as follows:

$$C_w = {}^{C_{fish}}/_{BCF}$$

Where:

C_w	=	surface water concentration (mg/L)
C_{fish}	=	84, fish concentration (mg-COPC/kg-ww)
BCF	=	633, bioconcentration factor (L/kg-ww)

$$\text{Surface water concentration} = \frac{84}{633}$$

$$= 0.133 \text{ mg/L}$$

The required effluent dilution to achieve the target surface water concentration is based on the assumed effluent concentration and the above surface water concentration, as follows:

$$Required\ Dilution = {}^{Discharge\ concentration\ \left({}^{mg}/_{L}\right)}\Big/_{Surface\ water\ concentration\ \left({}^{mg}/_{L}\right)}$$

$$\text{Required dilution} = \frac{2.25}{0.133}$$

$$= 17$$

1.4.14 Information Request No. HC 14

According to Health Canada (2010), the purpose of a risk assessment "is to quantify the degree of potential human health risk posed by the presence of contamination at a subject site". This requires a multi-media exposure assessment to evaluate the potential health effects of exposure to chemicals in all relevant exposure pathways; including dermal contact/ingestion of soil, inhalation of vapours/dusts (and contaminants in dusts), dermal contact/ingestion of surface water, and ingestion of potentially contaminated country foods (such as fish, small game and berries/vegetation). By evaluating individual exposure pathways separately, the potential health risk associated with exposure to project-related contaminants may be underestimated.

In order to evaluate total potential health risk from all project-related activities, Health Canada advises that all relevant exposure pathways should be evaluated together for the most sensitive human receptor that may be present (e.g., nearby cabin owner who would be expected to inhale project-related air emissions, would have direct contact with contaminated soil, uses surface water from Long Lake for drinking water and recreational purposes, consumes nearby terrestrial country foods, and consumes fish from Long Lake).

Reference:

Health Canada. 2010 (updated in 2012). Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0. Prepared by the Contaminated Sites Division, Safe Environments Directorate.

Alderon Response to IR No. HC 14

Health Canada suggest the completion of a multi-media human health risk assessment in order to evaluate total potential health risk from all project-related activities.

The primary objective of the physical health assessment is to assess those health risks that are related to emissions of airborne and/or waterborne contaminants from Project activities potentially affecting neighbouring land and water resources.

Air quality is assessed in the context of potential Project-related criteria air contaminants (CACs) and their ground-level concentrations, as well as potential emissions of non-criteria air contaminants. The potential for dust emissions to deposit in the surrounding environment and negatively affect physical health is assessed through a comparison of predicted increases in contaminant concentrations in soil and/or vegetation to current baseline conditions. Air dispersion modeling was completed to predict total dust fall rates at cabin locations on Long Lake South and on Riordan Lake, close to and down-wind of the Project boundaries. Standard risk assessment methods were used to determine the predicted change in soil and vegetation quality due to dust fall over the mine life of 17 years. Water quality is assessed in the context of potential Project-related discharges from the proposed diffuser outfall in Long Lake South. The key conclusions of the physical health assessment are summarized below:

- Air emissions result in predicted ground level air concentrations that are below regulatory standards and/or applicable TRVs, except for a marginal exceedance of the maximum 24-hour $PM_{2.5}$ standard at Receptor Location 1 on Long Lake South. There is only a single 24 hour exceedance in one year at Receptor Location 1. Dispersion model results for the more distant communities of Fermont, Wabush, and Labrador City show that Project emissions will not result in any exceedances of air quality standards within these communities.

- Dust deposition to soil over the entire operating period makes no measurable difference to background soil concentrations of the different COPC under the worst case scenario.

- Dust deposition to plants over the entire operating period results in non-detectable incremental plant COPC concentrations.

- Effluent discharge through the diffuser to Long Lake South returns to acceptable concentrations within 10 m of the diffuser outfall.

Based on these findings, the Project emissions are predicted to result in no increased health risk and no further health risk assessment is required.

1.4.15 Information Request No. HC 15

The EIS indicates that cabin owners closest to the Project site may experience elevated levels of particulate matter, and berry picking is known to occur in the PDA and the LSA, particularly adjacent to cabins. Thus, it is possible that dust accumulation (including metals) on vegetation within the PDA/LSA may occur and these may be consumed by local terrestrial mammals and/or nearby cabin owners. It is not necessarily appropriate to assume that because there are other areas available for country foods collection that people will pursue their chosen activities outside the area affected by elevated dust levels.

In order to evaluate the changes the project may have on country foods, Health Canada advises that baseline samples of edible vegetation (such as ripe berries), and small mammals (based on types of mammals expected to be consumed) should be collected from the area expected to be most impacted by Project-related dust (e.g., near the ~20 cabins on the south shore of Long Lake), and analysed for metals (on a wet-weight basis). In addition, edible fish species in Long Lake should also be evaluated for baseline metals on a wet-weight basis. These baseline conditions can then be compared to samples collected during project operations in order to validate the conclusion of the EIS that there would be no impact on country foods. Collecting baseline samples of country foods can also assist the proponent in the event of public complaints/concern about change in the quality and taste of these country foods.

Alderon Response to IR No. HC 15

Health Canada expresses some concerns related to country foods indicating that elevated metals levels may accumulate on vegetation within the PDA/LAS. Health Canada recommends completion of a baseline monitoring program.

For the purposes of the physical health assessment, two locations, in close proximity to the Project fence line (and therefore maximally exposed to dust deposition) were selected for evaluation:

- Receptor Location 1: E: 635960; N: 5857470. Southwest shore of Long Lake South, proximal to the Project conveyors, process plant, and load out facilities; and
- Receptor Location 2: E: 641590; N: 5856650. Riordan Lake, proximal to and downwind of the TMF.

Both of these locations have been identified as areas used for cabins, hunting, fishing, berry picking, and other recreational land uses. Project emission estimates were based on full production rate of 16 million tonnes of concentrate per year. This includes operation of both process lines, and represents the equipment inventory during year five with the greatest number of mining equipment in operation at one time. Further, the physical health assessment assumes that operation occurred 24 hours a day, seven days a week and that this maximum emission scenario is continuous throughout the 17 year mine life. This combination of receptor locations and emissions estimates result in a worst case estimate of potential physical health effects and minimizes the potential for a location not assessed to be associated with any greater physical health risks.

As noted in Alderon's response to IR No. HC 14, the Project emissions are not predicted to result in increased health risk and a baseline sampling of country foods is not required as part of Project approvals. Nevertheless, the long term benefit of documenting baseline conditions of country foods such as berries, small mammals, and fish is recognized and, as noted by Health Canada, may assist in the event of public complaints/concerns about change in the quality and taste of these country foods in the future. Alderon will initiate a country food baseline sampling program in 2013.

1.4.16 Information Request No. HC 16

(Please note that Health Canada does not evaluate modelling inputs or procedures and instead relies upon other federal and provincial experts in this area who are involved in the EIS process to ensure that modelling has been carried out via accepted procedures and that modelling results reflect expected airborne levels of COPC as accurately as possible. Any errors or omissions in the modelling results render HC comments invalid).

Given that there are significant increases in predicted NO_2 concentrations and ground level particulate matter (including total suspended particulate and $PM_{2.5}$), Health Canada advises that additional mitigative measures and/or follow-up monitoring be implemented.

Health Canada is in the process of publishing a guidance document entitled “Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality” which provides a discussion of specific mitigation measures and monitoring for air quality. Once published, it will be made available to the proponent.

Alderon Response to IR No. HC 16

As part of Alderon’s Sustainable Management Framework for the Kami project, an Environmental Management System (EMS) will be completed upon completion of the final design of the Project. The EMS will implement industry best practices in mitigation and monitoring of ambient air quality. Alderon will review and incorporate into the EMS any applicable guidance from the “Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality” upon publication.

1.4.17 Information Request No. HC 17

Health Canada points out that Keeping Clean Areas Clean (KCAC) and Continuous Improvement (CI) are basic principles of CWS. All projects should attempt to minimize air quality degradation to the greatest extent possible through state-of-the-art design and operation, regardless of set guidelines and standards. $PM_{2.5}$ is a non-threshold COPC, therefore mitigative efforts are recommended.

Alderon Response to IR No. HC 17

Alderon’s forthcoming Sustainability Management Framework and relevant procedures will incorporate industry best practices in their monitoring and mitigation procedures to minimize adverse effects from the Project on ambient air quality. Measures to mitigate air emissions are outlined in Section 14.6.2.1 (page 14-44), and include the use of dust suppressants, covered conveyors, water sprays, and dust collection systems where practical.

Air quality monitoring has already been initiated at several locations near the proposed mine as part of the Newfoundland and Labrador Department of Environment and Conservation (NLDOEC) Air Quality Monitoring (AQM) program. The AQM program is a network of monitoring stations near sensitive receptors in the province which are installed by industry in consultation with NLDOEC. The NLDOEC annually issues a report detailing the state of ambient air quality at each monitoring location, and documents any procedural changes or technical issues encountered at each monitoring station. The AQM program is an initiative of the NLDOEC for continuous improvement of ambient air quality in the province, and Alderon anticipates to fully participate in the AQM program.

1.4.18 Information Request No. HC 18

Health Canada advises that operational monitoring of ambient air quality should include an evaluation of particle composition in order to verify that the assumption of particle composition made in the EIS (p .14-53) is reflective of the particle composition being emitted from the proposed Project.

Alderon Response to IR No. HC 18

Ambient air quality monitoring will be a component of Alderon's Environmental Management System, within the Sustability Management Framework, and will be conducted in consultation with the Newfoundland and Labrador Department of Environment and Conservation's established Air Quality Monitoring program, which currently reports ambient concentrations of TSP, PM_{10} and $PM_{2.5}$ for many locations in the province. Alderon will incorporate particle size distribution or partitioning within its monitoring framework where appropriate as determined in consultation with the regulator, and will undertake chemical analysis (metals) of representative samples in consultation with the regulator during program design.

1.5 Information Requests Received from Natural Resources Canada (NRCan)

Alderon received Natural Resources Canada's (NRCan) comments on the EIS in December 2012. During the preparation of responses to the information requests, Alderon requested to meet with NRCan to provide an overview of Alderon's approach to answer their questions and ask for clarification on their comments, as appropriate. Alderon met with NRCan representatives on January 8, 2013 and were able to provide an overview of the additional information that was being prepared in response to their information requests. During this meeting, the parties agreed that a follow-up meeting with NRCan's experts was required in order to ensure Alderon had a clear understanding of the additional information requested. Over the course of preparing the responses, NRCan informed Alderon that their experts were not available to meet and at the time of writing this document, the parties have not met. Alderon has incorporated input from NRCan, to the extent possible, into the responses below.

The following section includes the 13 information requests from NRCan and Alderon's response to each of these requests.

1.5.1 Information Request No. NRCan 01 (Labrador)

The proponent is, therefore, requested to undertake supplementary acid-base accounting analysis (ABA analysis) to delineate and subtract the contribution of graphite carbon from the measured total inorganic carbon contents and obtain realistic carbonate values and, hence, carbonate NPs for all lithological units at the Kami mine and Pointe-Noire terminal sites.

a) NRCan recommends that the Proponent provide results of supplementary ABA analysis to delineate and subtract graphite carbon from the measured total inorganic carbon content. Provide updated carbonate NPs for all lithological units at the Kami mine and Pointe-Noire terminal sites.

Alderon Response to IR No. NRCan 01 (Labrador)

The assessment of ARD/ML for the Project is based on a phased approach, such that preliminary results could be used to inform a second, more robust and focused study designed to meet the information required for the EIS and detailed design. The second phase of the ARD/ML assessment is underway and results will provide further insight and confirmation of the potential for ARD/ML associated with the project.

The second phase of ARD/ML assessment includes:

- Additional static testing: ABA analyses have been conducted on 50 samples of overburden and 300 samples representing waste rock and ore to support classification of different lithologies observed at the proposed Kami mine site. Samples containing visible graphite were also analyzed for graphite carbon (all were from the Menihek Formation).
- Kinetic testing: Ten humidity cells are being selected based on the results of the second phase static tests. Kinetic testing will also include carbonate-depleted cells to evaluate non-carbonate NP. Three barrel tests will be initiated in the spring of 2013 and continued for several years in order to evaluate lab-to-field scale-up factors. Materials selected for kinetic tests are being characterized for mineralogy and grain-size distribution analysis.

As discussed above, the Proponent measured graphite carbon as part of the second phase of ARD/ML assessment at a certified laboratory. Measured graphite carbon was subtracted from the total inorganic carbon content and updated Carbonate Neutralization Potential (NP) for graphite containing rocks of the Menihek formation have been provided (Table 1.5.1). Other rocks and lithologies did not show visible graphite, and therefore were not analyzed for graphite carbon. Neutralization Potential in all samples was defined using the Modified Sobek NP procedure (Sobek NP) and additionally calculated from carbonate measured by pyrolysis (Carbonate NP) at SGS laboratories according to standard analytical methods (Sobek et al. 1978, Price 2009).

The results indicate that the average and median carbonate NPs are on the order of 2-4 times higher than the respective statistics from the Modified Sobek NP in graphitic rocks of the

Menihek Formation, as are median NPR ratios. Therefore, application of the Sobek NP and Sobek NPR for the classification graphitic rocks of Menihek formation was considered to be more conservative approach are more conservative than using the values derived from analyses of carbon species. The approach taken (with respect to calculation of NPR) for other Formations is outlined further in the extended response to NRCan 02, below.

References:

Sobek, A., Schuller, Freeman, W.J. and Smith, R. (1978), Field and Laboratory Methods Applicable to Overburdens and Minesoil, (West Virginia Univ., Morgantown College of Agriculture and Forestry): EPA report no. EPA-600/2-78-054 p.47-50.

Price, W. (2009). Prediction Manual for Drainage Chemistry from Sulfidic Geologic Materials. Report prepared for MEND. Report 1.20.1.

Table 1.5.1 Acid-base Accounting Results for Samples from the Menihek Formation with Visible Graphite

Sample ID	Paste pH	S	S sulfate	Sulphide	C total	CO3	C graphite	AP	NP_{Sobek}	$NP_{Carbonate}$	NNP_{Sobek}	NPR_{Sobek}	$NPR_{Carbonate}$	$NP_{Carbonate}/NP_{Sobek}$
	units	wt.%						t CaCO3/1000 t						
K-11-171 74-74.5	8.50	1.02	0.10	0.92	2.14	11.1	2.11	28.8	7	3	-21.8	0.24	0.09	0.36
K-11-133 160-160.5	9.98	0.501	0.09	0.41	2.04	10.4	1.96	12.8	9	7	-4.01	0.69	0.52	0.76
K-11-133 130-130.5	8.31	8.51	2.01	6.50	15.5	78.0	15.3	203	21	17	-182	0.10	0.08	0.79
K-10-38 59-60	9.85	0.568	0.15	0.42	0.852	4.33	0.69	13.1	13	14	-0.42	0.99	1.03	1.04
K-10-35 42.1-42.9	9.51	0.950	0.35	0.60	2.35	12.3	2.26	18.8	6	8	-12.6	0.32	0.40	1.23
K-10-38 291-292	8.83	0.832	0.20	0.63	2.22	10.8	1.94	19.7	16	23	-3.89	0.81	1.18	1.46
K-11-166 63.5-64.1	5.49	1.27	0.28	0.99	1.45	7.39	1.35	30.9	5	8	-25.6	0.17	0.27	1.57
K-11-170 30-30.5	6.51	0.733	0.11	0.62	1.19	5.95	1.05	19.4	5	12	-14.0	0.28	0.60	2.16
K-10-38 90-91	9.65	1.33	0.60	0.73	2.60	13.1	2.38	22.8	8	18	-14.9	0.35	0.80	2.32
K-10-35 14-15	5.11	1.74	0.28	1.46	3.62	18.0	3.41	45.6	6	18	-39.9	0.13	0.38	3.07
K-10-55 457-458	9.56	1.97	0.79	1.18	5.14	25.2	4.80	36.9	7	28	-30.4	0.18	0.77	4.36
K-10-29 59-60	9.43	1.90	0.82	1.08	7.92	38.3	7.46	33.8	9	38	-25.0	0.26	1.13	4.41
K-11-171 90-90.4	8.08	2.54	0.12	2.42	10.6	53.8	10.2	75.6	7	33	-68.2	0.10	0.44	4.50
K-10-38 305-306	8.98	2.99	1.25	1.74	6.46	32.4	6.06	54.4	7	33	-47.3	0.13	0.61	4.69
K-11-170 75.1-75.7	7.36	0.970	0.18	0.79	4.28	20.9	3.94	24.7	6	28	-18.7	0.24	1.15	4.72
K-11-170 45.5-46	4.67	5.77	< 0.01	5.88	7.35	35.7	6.91	184	7	37	-176	0.04	0.20	5.02
K-10-29 37.2-38	8.73	1.99	0.89	1.10	6.91	33.9	6.52	34.4	6	33	-28.9	0.16	0.94	5.91
K-11-170 59.1-59.6	6.85	2.23	0.57	1.66	6.03	28.2	5.55	51.9	7	40	-45.4	0.13	0.77	6.15
K-10-38 105-106	6.03	4.73	0.68	4.05	10.2	47.8	9.44	127	9	63	-118	0.07	0.50	7.45
K-11-171 94-94.5	7.51	0.910	0.02	0.89	7.25	35.8	6.58	27.8	7	56	-21.2	0.24	2.01	8.46
K-11-166 92.3-93	5.29	6.13	1.90	4.23	20.7	100	19.6	132	10	92	-122	0.08	0.69	9.17
K-10-55 471-472	9.80	0.416	0.27	0.15	1.97	9.72	1.74	4.69	15	19	10.3	3.20	4.09	1.28
K-11-133 159-159.5	9.06	0.126	0.06	0.07	5.86	27.7	0.72	2.19	328	428	325	150	195.59	1.31
Median	8.50	1.33	0.28	0.99	5.1	25.2	3.9	30.9	7.3	28.3	-25.0	0.24	0.69	3.07
Average	7.94	2.23	0.55	1.71	6.0	29.5	5.4	53.4	23.3	47.8	-30.1	6.90	9.32	3.72

Notes:
AP (Acid Potential) = % Sulphide Sulphur x 31.25
NP Sobek = measured modified Sobek Neutralization Potential; NP Carbonte (Carbonate Neutralization Potential) = (C total -C graphite) *83.3
NNP_{Sobek} (Sobek Net Neutralization Potential) = NP_{Sobek}-AP; $NNP_{Carbonate}$ (Carbonate Net Neutralization Potential) = $NP_{Carbonate}$-AP.
NNR_{Sobek} (Sobek Neutralization Ratio) = NP_{Sobek}/AP; $NPR_{Carbonate}$ (Carbonate Neutralization Neutralization Ratio) = $NP_{Carbonate}$/AP.

1.5.2 Information Request No. NRCan 02 (Labrador)

a) Generally, the total NP includes both carbonate and silicate based available alkalinities. While the carbonate minerals provide direct acid consumption and neutralization to pHs of about 4, the acid consumption capabilities of the silicate minerals are best realized under more acidic conditions of pH <4, where many metals like Cu, Ni and Zn are already mobilized. Thus, the PAG/NAG classification scheme should only be based on total available carbonate NPRcarb and NPRcarb NRCan requests that the Proponent provide updated PAG/NAG classifications based on total available carbonate NPcarb and NPRcarb.

b) For long-term acid generation potential evaluations, the PAG/NAG classification boundary should also be raised to NPRcarb = 3 to include dissolution and loss of carbonate minerals in the weathering process and during the period of low or no acid generation.

c) Based on the above NPRcarb of 3, the amounts of PAG/NAG materials, including overburden, waste rock and tailings, produced at the Kami mine and Pointe-Noire terminal sites should be re-evaluated.

d) NRCan requests that the Proponent provide maps and cross-sections with ARD/ML sample locations for the Kami mine and Pointe-Noire terminal site in order to relate the ARD/ML assessment (static/kinetic sample locations and results) to the geology and development plans, as per the EIS guidelines (Section 4.17.3.1).

e) NRCan requests that the Proponent include the ARD/ML reports and maps as part of the Appendices for the final copy of the EIS.

Alderon Response to IR No. NRCan 02 (Labrador)

a) The Proponent conducted additional sampling and analytical work in order to increase confidence in ARD classification. The Proponent updated the classification based on median Carbonate NP and NPR values for the concentrates, tailings, ore, overburden, and waste rock from the Wishart, Katsao and Denault formations of the proposed Rose Pit and rock generated at Pointe-Noire terminal (Tables 1.5.2, 1.5.3, 1.5.4). Carbonate NP and NPR in waste rock of the Menihek and Sokoman formations were higher than the respective Modified Sobek NP and NPR values (Table 1.5.4). Therefore, median Modified Sobek NP values were used for these formations providing a higher level of conservatism. The NPR values used for the classification and calculations are highlighted in the Table 1.5.4. Based on these values, only waste rock from the Menihek (NPR_{Sobek}=0.7) and Katsao formations (NPR_{carb}=1.1) is currently classified as Potentially Acid Generating (PAG) material. Other materials have median NPR values >10 and contain less than 10 percent of PAG samples, and as such are considered as Non-Acid generating Rock (NAG). It can be concluded that the updated Phase 2 ARD classification based in the static sampling did not change significantly from the conclusions made during the Phase 1 assessment. Exceptions to this however, are the classification of waste rock from the Katsao Formation as potentially acid generating (samples for this Formation had not been assessed in Phase 1) and classification of the overburden (discussed in more detail in the response to NRCan 03).

Total Net Neutralization Potential (TNNP) of waste rock was updated based on median Carbonate NNP for the Wishart, Katsao and Denault and Modified Sobek NNP values for the Menihek and Sokoman formations. The additional level of conservatism was added by accounting for unavailable Sobek NP. For each formation, unavailable Sobek NP was estimated as the average value of NP for samples with a pH value < 5, and was subtracted from the mean NNP values (Table 1.5.5). Mass-balance calculations indicated that the total buffering capacity of NAG units (Sokoman, Whishart and Denault) is at least 5 times greater that the total acid generating potential of PAG units (deficit of TNNP in Menihek and Katsao). Therefore acidic drainage is not expected if materials in the waste rock pile are well-mixed/encapsulated. It can be concluded that the updated geochemical classification and mass-balance calculations did not change ARD-related effects and mitigations originally presented in the EIS.

The Proponent agrees that the large majority of neutralization potential will likely result from dissolution of carbonate minerals at near-neutral pH values. However, literature has shown that silicate minerals are able to buffer mine waste under conditions of near - neutral pH and low acid generation rates (Mattson, 2009; Miller et al., 2010). Further assessment of buffering capacity due to silicate minerals will be tested using “carbonate depleted” humidity cells starting in January 2013. This test work will support updated assessment and classifications of the waste materials.

b) The Proponent acknowledges the concerns underlying NRCan’s request for additional conservatism (i.e. to increase the NPR ratio to a value of 3 from a value of 2). However, the Proponent does not consider that this level of conservatism is warranted for the project. EIS Guidelines, Section 4.17.3.1, recommends the use of NPR criteria for the classification from the MEND Manual (Price, 2009). The manual states “samples with an NPR greater than 2 are non-PAG”. The manual does not prescribe the increase of NPR boundary for long-term acid generation potential.

c) Although the Proponent does not believe that Project results to date support the modification of NPR ratio from a value of 2 to 3, results, including those available to date from the Phase 2 ARD/ML assessment, were evaluated using the higher NPR ratio. Resulting $NPR_{carbonate}$ ratios were greater than 4.7 for all materials classified as NAG, including: overburden, waste rock, ore, tailings and concentrate produced at the Kami mine and Pointe-Noire terminal sites (Tables 1.5.2, 1.5.4). Thus, the amount of PAG/NAG materials are not affected by an increase in the boundary of NPRcarbonate to a value of 3. As a result, the Proponent does not see a strong reason for reclassification of the waste materials.

d) The geological maps and cross-sections showing ARD/ML sample locations and the boundary of the open pit are presented on Figures 1.5.1 to 1.5.3 included below. An extensive search in the archives of the Québec Geological Survey indicated that there is no detailed map available at the Pointe-Noire terminal site. The existing 1:50,000 map shows that the regional study area of EIS is underlain by gabbro-anorthosite/gabbro.

e) The Phase I ARD/ML report is included as an attachment to this response. The Phase II ARD/ML report will be finalized by fall/2013 in order to incorporate preliminary results of the humidity cell testing started in January. The Proponent will provide this report to NRCan for review upon request. Maps and cross-sections with ARD/ML sample locations are presented on Figures 1.5.1 to 1.5.3. The additional test work results and any related mitigation and/or design modifications to the Project required will be addressed in the detailed engineering and permitting phase of the Project at which time Regulators will have further opportunity to review and comment on the proposed measures.

References:

Price, W. (2009). Prediction Manual for Drainage Chemistry from Sulfidic Geologic Materials. Report prepared for MEND. Report 1.20.1

Matson. 2009. Assessing the Availability and Source of Non-carbonate Neutralization Potentialby Pre-treatment of Kinetic Test Samples. Proceedings 8th International Conference Acid Rock Drainage (ICARD). June 2009. Skellefteå. Sweden.

Miller, S.D. Stewart, S.W. Rusdinar, Y. Schuman. et al. 2010. Methods for Estimation of Long-Term Non-Carbonate Neutralization of Acid Rock Drainage. Science of the Total Environment 408, pp. 2129-2135.

Table 1.5.2 Results of Acid-Base Accounting of Materials Exposed at the Terminal Site

Sample ID	Sample description	Paste pH	NP_{Sobek}	$NP_{Carbonate}$	AP	NPR_{Sobek}	$NPR_{Carbonate}$	Total S	SO4-S	Sulfide-S	C	CO3
Units		pH units	t CaCO3/1000 t			Ratio		wt. %				
S1-1	weathered gabbro	7.43	11	1.1	0.31	36.1	3.5	0.033	0.02	0.01	0.405	0.066
S1-2	massive gabbro	9.56	15	2.4	0.62	23.5	3.9	0.035	0.01	0.02	0.058	0.146
S1-3	chloritazed gabbro	9.39	18	2.4	0.31	57.7	7.7	0.019	0.02	< 0.01	0.046	0.144
S1-4	micro-graninte dyke	9.36	8.2	4.5	0.31	26.5	14.6	< 0.005	< 0.01	< 0.01	0.087	0.272
S1-5	micro-gabbro with sulfides	9.22	25	1.3	3.12	8.14	0.4	0.128	0.03	0.1	0.031	0.077
S1-6	Crushed rock 0-1/4"	9.03	22	8.4	1.25	17.8	6.7	0.069	0.03	0.04	0.15	0.504
S1-7	Crushed rock 0-1/4"	9.71	19	5.1	0.94	19.9	5.4	0.051	0.02	0.03	0.093	0.306
S1-8	Crushed rock, fines	9.74	18	7.7	0.94	19.3	8.2	0.051	0.02	0.03	0.084	0.463
S1-9	Crushed rock, fines	9.66	20	4.6	0.94	21.2	4.8	0.059	0.03	0.03	0.067	0.273
S1-10	massive granite	7.33	5.6	0.6	0.31	18.1	2.0	0.023	0.02	< 0.01	0.055	0.037
Median		9.38	18.00	3.48	0.78	20.6	5.1	0.05	0.02	0.03	0.08	0.21

Notes:

AP (Acid Potential) = % Sulphide Sulphur x 31.25

NP_{Sobek} = Modified Sobek Neutralization Potential; $NP_{Carbonte}$ (Carbonate Neutralization Potential) = CO3 *16.7

NNP_{Sobek} (Sobek Net Neutralization Potential) = NP_{Sobek}-AP; $NNP_{Carbonate}$ (Carbonate Net Neutralization Potential) = $NP_{Carbonate}$-AP

NNR_{Sobek} (Sobek Neutralization Ratio) = NP_{Sobek}/AP; $NPR_{Carbonate}$ (Carbonate Neutralization Neutralization Ratio) = $NP_{Carbonate}$/AP

Table 1.5.3 Acid-Base Accounting of Kami Tailings and Concentrates from Metallurgical Testing

Sample ID		Alderon GC #1	Alderon GC #2	Alderon GC #3	Alderon GT #1	Alderon GT #2	Alderon GT #3	Alderon MC #1	Alderon MC #2	Alderon MC #3	Alderon MT #1	Alderon MT #2	Alderon MT #3
Analysis	Units	Gravity concentrate			Gravity tailings			Magnetic concentrate			Magnetic concentrate		
Paste pH	pH units	8.62	8.56	8.61	8.70	8.71	8.87	8.61	8.56	8.62	8.46	8.63	8.54
Fizz Rate	---	3	3	3	4	4	4	3	3	3	4	4	4
S	%	0.057	0.052	0.056	0.046	0.027	0.025	0.057	0.059	0.056	0.034	0.034	0.035
Sulfate-S	%	0.01	< 0.01	0.01	0.01	0.01	0.01	0.04	0.03	0.04	< 0.01	0.02	0.01
Sulfide	%	0.04	0.05	0.04	0.03	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.02
C	%	0.405	0.238	0.342	1.09	1.21	1.20	0.459	0.464	0.462	0.793	0.786	0.792
CO3	%	0.470	0.163	0.356	3.08	3.93	4.55	1.07	1.11	1.09	2.60	2.42	2.56
NP_{Sobek}	t CaCO3/1000 t	19.1	11.4	14.7	64.9	72.2	71.0	20.3	21.5	20.5	43.6	44.0	44.0
$NP_{Carbonate}$	t CaCO3/1000 t	7.8	2.7	5.9	51.3	65.5	75.8	17.8	18.5	18.2	43.3	40.3	42.7
AP	t CaCO3/1000 t	1.25	1.56	1.25	0.94	0.31	0.31	0.62	0.62	0.62	0.94	0.62	0.62
Net NP_{Sobek}	t CaCO3/1000 t	17.8	9.84	13.4	64.0	71.9	70.7	19.7	20.9	19.9	42.7	43.4	43.4
Net $NP_{Carbonate}$	t CaCO3/1000 t	6.6	1.2	4.7	50.4	65.2	75.5	17.2	17.9	17.5	42.4	39.7	42.0
NPR_{Sobek}	ratio	15.3	7.31	11.8	69.0	233	229	32.7	34.7	33.1	46.4	71.0	71.0
$NPR_{Carbonate}$	ratio	6.3	1.7	4.7	54.6	211.3	244.6	28.8	29.8	29.3	46.1	65.1	68.8
Median NPR_{Sobek}	ratio	11.8			229.0			33.1			71.0		
Median $NPR_{Carbonate}$	ratio	4.7			211.3			29.3			65.1		

Notes:

AP (Acid Potential) = % Sulphide Sulphur x 31.25

NP_{Sobek} = Modified Sobek Neutralization Potential; $NP_{Carbonte}$ (Carbonate Neutralization Potential) = CO3 *16.7

NNP_{Sobek} (Sobek Net Neutralization Potential) = NP_{Sobek}-AP; $NNP_{Carbonate}$ (Carbonate Net Neutralization Potential) = $NP_{Carbonate}$-AP

NNR_{Sobek} (Sobek Neutralization Ratio) = NP_{Sobek}/AP; $NPR_{Carbonate}$ (Carbonate Neutralization Neutralization Ratio) = $NP_{Carbonate}$/AP

Table 1.5.4 Summary of ABA Statistics for Lithological Units of Kami Project

Parameter	Paste pH	NP_{Sobek}	NP_{Carb}	AP	NPP_{sobek}	NPP_{carb}	NPR_{sobek}	NPR_{Carb}	S_{Total}	$S_{Sulphate}$	$S_{Sulphide}$	C_{Total}	CO_3
	pH units	t CaCO3/1000 t					Ratio		wt. %				
Overburden, 62 samples. Estimated unavailable Sobek NP is 5.4 t CaCO3/1000 t.													
n above DL[1]	62	62	62	62	62	62	62	62	59	44	33	62	62
Min	3.93	-16.0	0.7	0.31	-32	-8	-1.3	0.4	0.01	0.01	0.01	0.03	0.04
25th, %ile	8.42	8.3	1.6	0.31	7.8	1.3	20	4.8	0.01	0.02	0.01	0.07	0.10
Median	9.06	12	7	0.31	12	6	28	12	0.02	0.02	0.02	0.14	0.40
75th, %ile	9.35	15	10	0.62	15	10	39	24	0.04	0.02	0.06	0.32	0.61
Max	10.15	50	190	39.4	48	162	118	141	1.49	0.24	1.26	41.4	11.4
Sokoman Ore, 31 sample. Assumed unavailable NP is 6.9 t CaCO3/1000 t.													
n above DL[1]	31	31	31	31	31	31	31	31	29	23	8	31	31
Min	7.45	2.6	0.32	0.31	2	0.01	1.9	1.0	0.01	0.01	0.07	0.02	0.02
25th, %ile	8.40	24	22	0.31	21	5	11	7	0.01	0.01	0.08	0.63	1.29
Median	8.72	68	68	0.31	67	68	136	96	0.02	0.02	0.09	1.14	4.09
75th, %ile	9.12	126	155	2.19	123	154	250	259	0.11	0.05	0.16	2.10	9.27
Max	9.27	195	323	31.7	195	319	630	726	1.13	0.11	1.01	4.5	19.4
Sokoman Waste, 87 samples, Estimated unavailable Sobek NP is 6.9 t CaCO3/1000 t.													
n above DL[1]	87	87	87	87	87	87	87	87	85	81	61	87	87
Min	5.25	1.9	0.4	0.31	-178	-192	0.1	0.02	0.01	0.01	0.01	0.03	0.03
25th, %ile	8.22	23	102	0.31	17	83	8	12	0.02	0.02	0.05	1.43	6.12
Median	8.54	117	177	2.19	109	171	42	72	0.11	0.04	0.16	2.81	10.6
75th, %ile	8.93	229	293	7.19	228	291	239	421	0.49	0.17	0.46	4.59	17.6
Max	9.96	899	718	196	899	718	2880	2317	8.05	2.24	6.26	15.3	43.1
Menihek Waste, 128 samples. Estimated unavailable Sobek NP is 4.0 t CaCO3/1000 t.													
n above DL[1]	128	128	128	128	128	128	128	128	128	125	126	128	128
Min	4.45	1.5	0.5	0.31	-186	-47	0.02	0.15	0.01	0.01	0.01	0.02	0.03
25th, %ile	7.82	7	75	6.8	-24	63	0.24	5	0.38	0.09	0.2	1.2	4.5
Median	8.79	10	176	19.3	-4	155	0.7	9	0.84	0.19	0.6	2	11

Parameter	Paste pH	NP_{Sobek}	NP_{Carb}	AP	NPP_{sobek}	NPP_{carb}	NPR_{sobek}	NPR_{Carb}	S_{Total}	$S_{Sulphate}$	$S_{Sulphide}$	C_{Total}	CO_3
	pH units	t CaCO3/1000 t					Ratio		wt. %				
75th, %ile	9.27	21	366	36.5	10	325	3	20	1.73	0.41	1.17	5	22
Max	10.13	462	1767	203.0	451	1583	633	871	8.51	5.75	6.50	22	106
Wishart Waste, 86 samples. Assumed unavailable Sobek NP is 6.9 t CaCO3/1000 t.													
n above DL[1]	86	86	86	86	86	86	86	86	68	53	31	86	86
Min	6.71	2	0.4	0.31	-11	-17	0.4	0.1	0.01	0.01	0.01	0.02	0.03
25th, %ile	8.27	4	2	0.31	3	1.2	9	4	0.01	0.01	0.02	0.05	0.10
Median	9.04	13	10	0.31	11	8	15	10	0.02	0.03	0.05	0.19	0.60
75th, %ile	9.43	50	50	0.7	42	43	82	77	0.07	0.07	0.27	0.74	2.98
Max	9.80	458	368	64	458	368	1480	1188	3	0.98	2.05	5.49	22.1
Katsao Waste, 37 samples. Assumed unavailable Sobek NP is 6.9 t CaCO3/1000 t.													
n above DL[1]	37	37	37	37	37	37	37	37	35	31	25	37	34
Min	7.01	3	0.1	0.31	-6	-13	0.6	0.01	0.01	0.01	0.01	0.01	0.01
25th, %ile	8.70	5	0.33	0.31	3	-2.5	2	0.16	0.02	0.01	0.03	0.02	0.02
Median	9.44	7.7	0.7	0.94	5	0.02	7	1.1	0.05	0.03	0.1	0.05	0.06
75th, %ile	9.80	9	2	5.3	6	2	13	3	0.24	0.09	0.21	0.09	0.14
Max	10.24	26	37	13	15	31	32	21	1	0.28	0.42	0.45	2.2
Denault Waste, 8 samples. Assumed unavailable Sobek NP is 6.9 t CaCO3/1000 t.													
n above DL[3]	8	8	8	8	8	8	8	8	0	0	1	8	8
Min	9.34	599	483.3	0.31	598	483	1930	1559	< 0.005	< 0.01	< 0.01	8	29
25th, %ile	9.41	742	505	0.31	742	505	2395	1629	< 0.005	< 0.01	< 0.01	9	30
Median	9.47	861	663	0.31	861	663	2780	2140	< 0.005	< 0.01	< 0.01	10	40
75th, %ile	9.55	1000	868	0.3	1003	868	3228	2801	< 0.005	< 0.01	< 0.01	11	52
Max	9.63	1033	955	0	1030	955	3330	3081	< 0.005	< 0.01	0.01	12	57

Parameter	Paste pH	NP_{Sobek}	NP_{Carb}	AP	NPP_{sobek}	NPP_{carb}	NPR_{sobek}	NPR_{Carb}	S_{Total}	$S_{Sulphate}$	$S_{Sulphide}$	C_{Total}	CO_3
	pH units	t CaCO3/1000 t					Ratio		wt. %				

Notes:

NP_{Sobek} = Modified Sobek Neutralization Potential; NP_{Carb} (Carbonate Neutralization Potential) = CO3 *16.7

AP (Acid Potential) = % Sulphide Sulphur x 31.25

NNP_{Sobek} (Sobek Net Neutralization Potential) = NP_{Sobek}-AP; NNP_{Carb} (Carbonate Net Neutralization Potential) = NP_{Carb}-AP

NNR_{Sobek} (Sobek Neutralization Ratio) = NP_{Sobek}/AP; NPR_{Carb} (Carbonate Neutralization Neutralization Ratio) = NP_{Carb}/AP

[1] number of samples vith values above the detection limit

See details of analytical methods in Certificates of Analyses

Table 1.5.5 Tonnages and Total Net Neutralization Potential (TNNP) Estimated for Each Bedrock Lithological Unit at Different Elevation Segments Within the Proposed Rose Central (RC) and North Rose (NR) Open Pits

Formation	Unit	Median NNP	Unavailible NP	unit TNNP	600-650m	550-600m	500-550m	450-500m	400-450m	350-400m	300-350m	250-300m	200-250m	150-200m	100-150m	Total
		$CaCO_3$ kg/tonne			Mass, tonnes											
Katsao	Katsao	0.02	6.9	-6.9	3,594,378	12,739,033	16,225,004	12,080,252	8,175,179	4,768,563	1,966,229	556,642	24,704	0	0	60,129,984
Wishart	NR Wishart	8	6.9	1.1	1,771,177	4,800,305	12,215,021	10,466,790	9,054,271	7,956,213	6,149,609	3,602,986	1,247,299	55,261	0	57,318,932
Wishart	RC Wishart	8	6.9	1.1	14,892,109	38,415,890	41,842,950	41,450,210	36,317,690	28,484,410	23,147,719	12,056,311	2,716,362	24,939	0	239,348,590
Sokoman	NR Ore	68	6.9	61.1	690,828	10,129,200	61,051,200	65,008,350	59,308,950	53,895,900	49,938,750	45,481,350	39,174,750	29,962,905	8,289,660	422,931,843
Sokoman	RC Ore	68	6.9	61.1	4,792,050	34,582,800	49,034,850	52,374,450	53,319,750	54,924,000	49,993,950	40,699,650	33,348,735	22,897,995	3,580,410	399,548,640
Denault	RC Marble	663	6.9	656.1	135,439	1,584,517	3,623,452	5,992,012	7,065,092	5,687,880	418,557	0	0	0	0	24,506,948
Menihek	Waste Menihek	-4	4	-8	21,310,441	77,651,410	89,299,260	67,443,960	35,464,310	15,541,639	7,319,448	4,530,612	2,460,563	812,275	0	321,833,918
Sokoman	Waste Sokoman	109	6.9	78	11,820,123	11,820,123	11,820,123	11,820,123	11,820,123	11,820,123	11,820,123	11,820,123	11,820,123	11,820,123	11,820,123	11,820,123
				Total Waste	**53,523,666**	**170,961,250**	**212,120,672**	**181,864,099**	**145,337,702**	**110,602,170**	**79,979,226**	**53,509,041**	**27,810,824**	**8,202,013**	**129,046**	**1,044,039,708**
					Total Net Neutralization Potential, tonnes of $CaCO_3$											
Katsao	Katsao	0.02	6.9	-6.9	-24,729	-87,645	-111,628	-83,112	-56,245	-32,808	-13,528	-3,830	-170	0	0	-413,694
Wishart	NR Wishart	8	6.9	1.1	1,948	5,280	13,437	11,513	9,960	8,752	6,765	3,963	1,372	61	0	63,051
Wishart	RC Wishart	8	6.9	1.1	16,381	42,257	46,027	45,595	39,949	31,333	25,462	13,262	2,988	27	0	263,283
Sokoman	NR Ore	68	6.9	61.1	42,210	618,894	3,730,228	3,972,010	3,623,777	3,293,039	3,051,258	2,778,910	2,393,577	1,830,733	506,498	25,841,136
Sokoman	RC Ore	68	6.9	61.1	292,794	2,113,009	2,996,029	3,200,079	3,257,837	3,355,856	3,054,630	2,486,749	2,037,608	1,399,067	218,763	24,412,422
Denault	RC Marble	663	6.9	656.1	88,861	1,039,601	2,377,347	3,931,359	4,635,407	3,731,818	274,615	0	0	0	0	16,079,009
Menihek	Waste Menihek	-4	4	-8	-170,484	-621,211	-714,394	-539,552	-283,714	-124,333	-58,556	-36,245	-19,685	-6,498	0	-2,574,671
Sokoman	Waste Sokoman	109	6.9	78	921,970	921,970	921,970	921,970	921,970	921,970	921,970	921,970	921,970	921,970	921,970	921,970
				Total Waste	**833,948**	**1,300,253**	**2,532,758**	**4,287,774**	**5,267,326**	**4,536,731**	**1,156,728**	**899,120**	**906,475**	**915,560**	**921,970**	**14,338,947**

Notes:

[1] - See text for details

RC Waste FW silicate IF is almost all silicate face of Sokoman

Waste Sokoman are between the RC Ore and NR Ore and contains an undefined mix of silicate, and carbonate faces

Wireframe mass totals slightly lower than pit volume due to some small gaps in wireframes

Figure 1.5.1 Bedrock Geology of Rose Pit

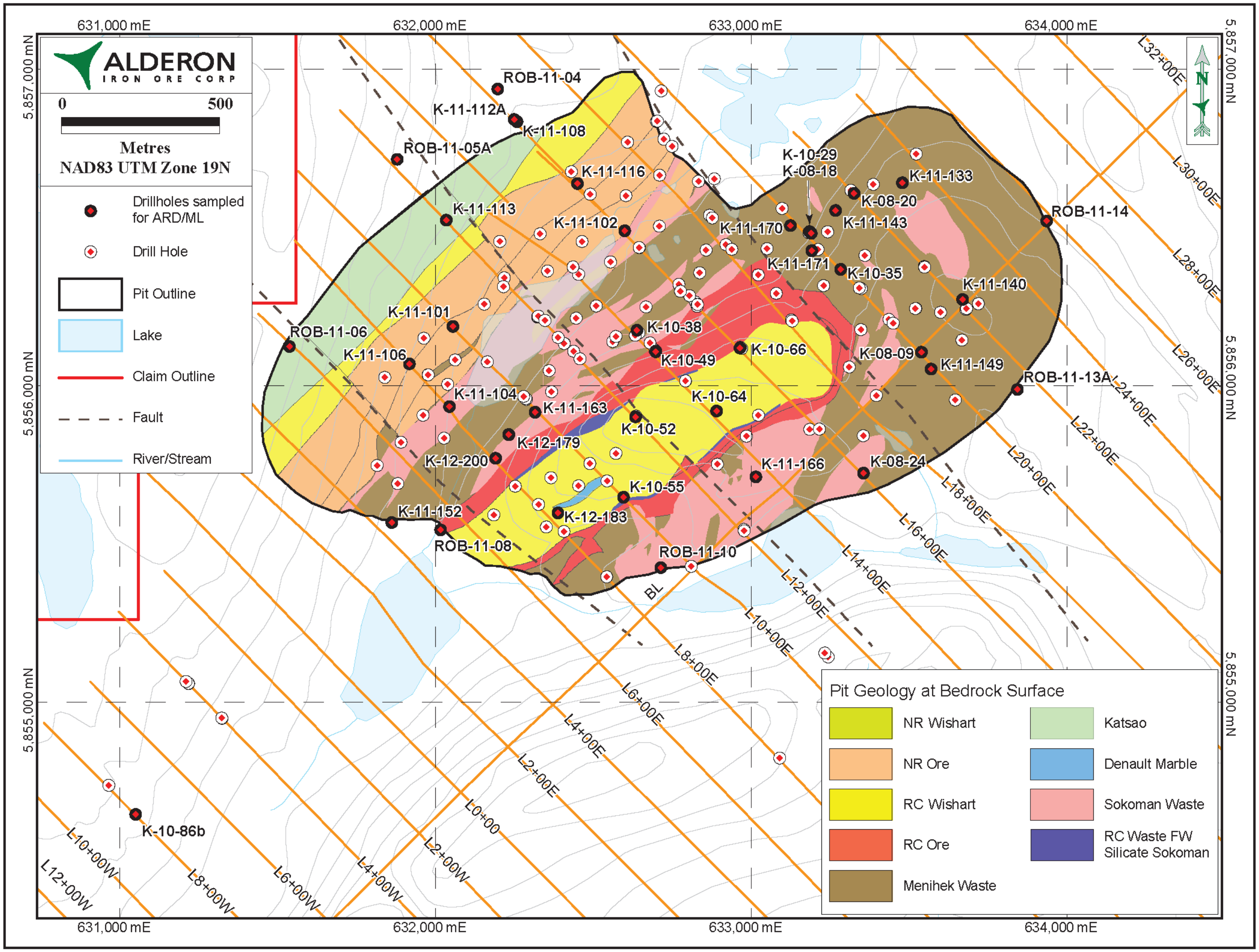


Figure 1.5.2 Cross-section along line L20E looking north-east

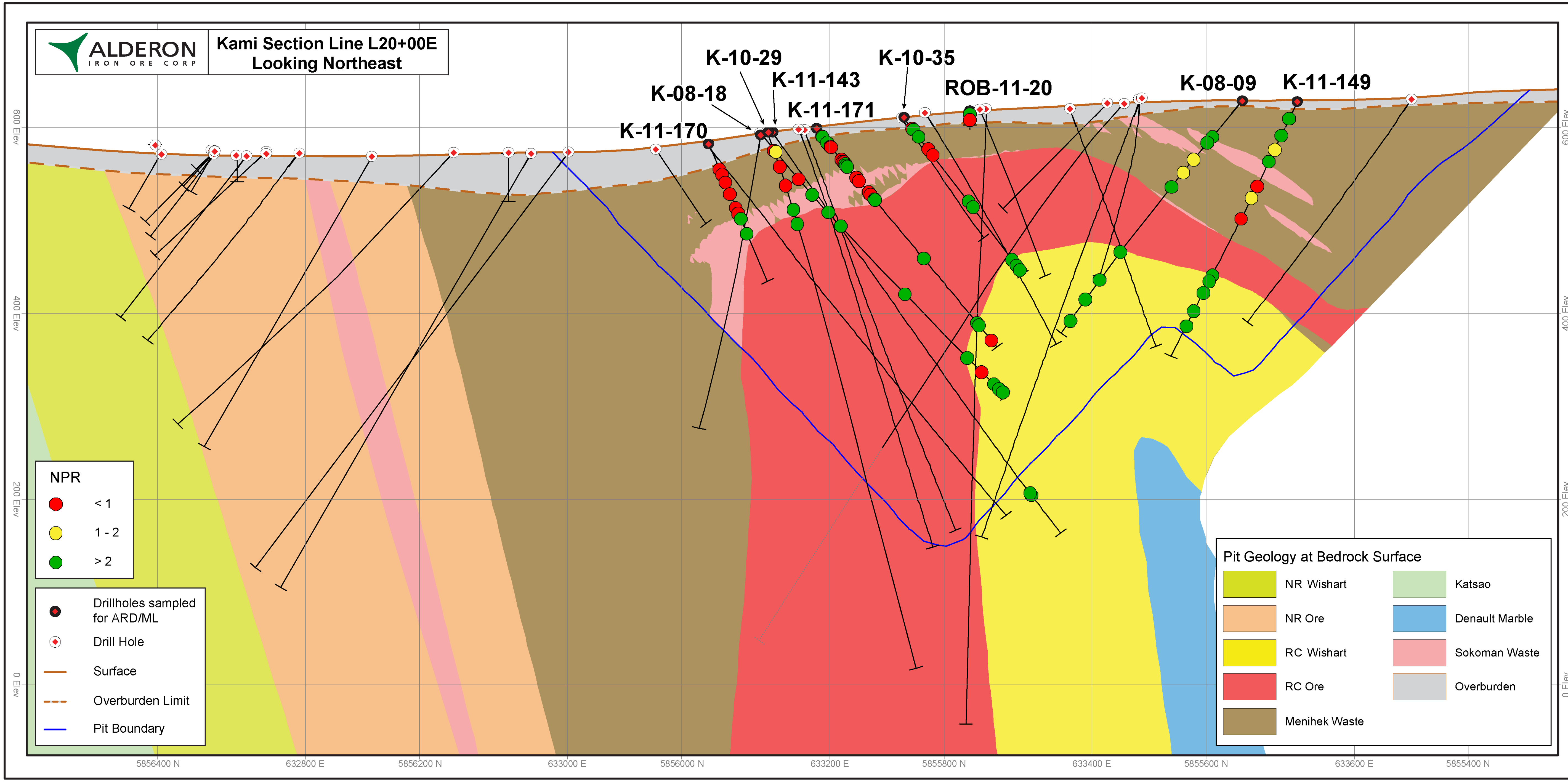
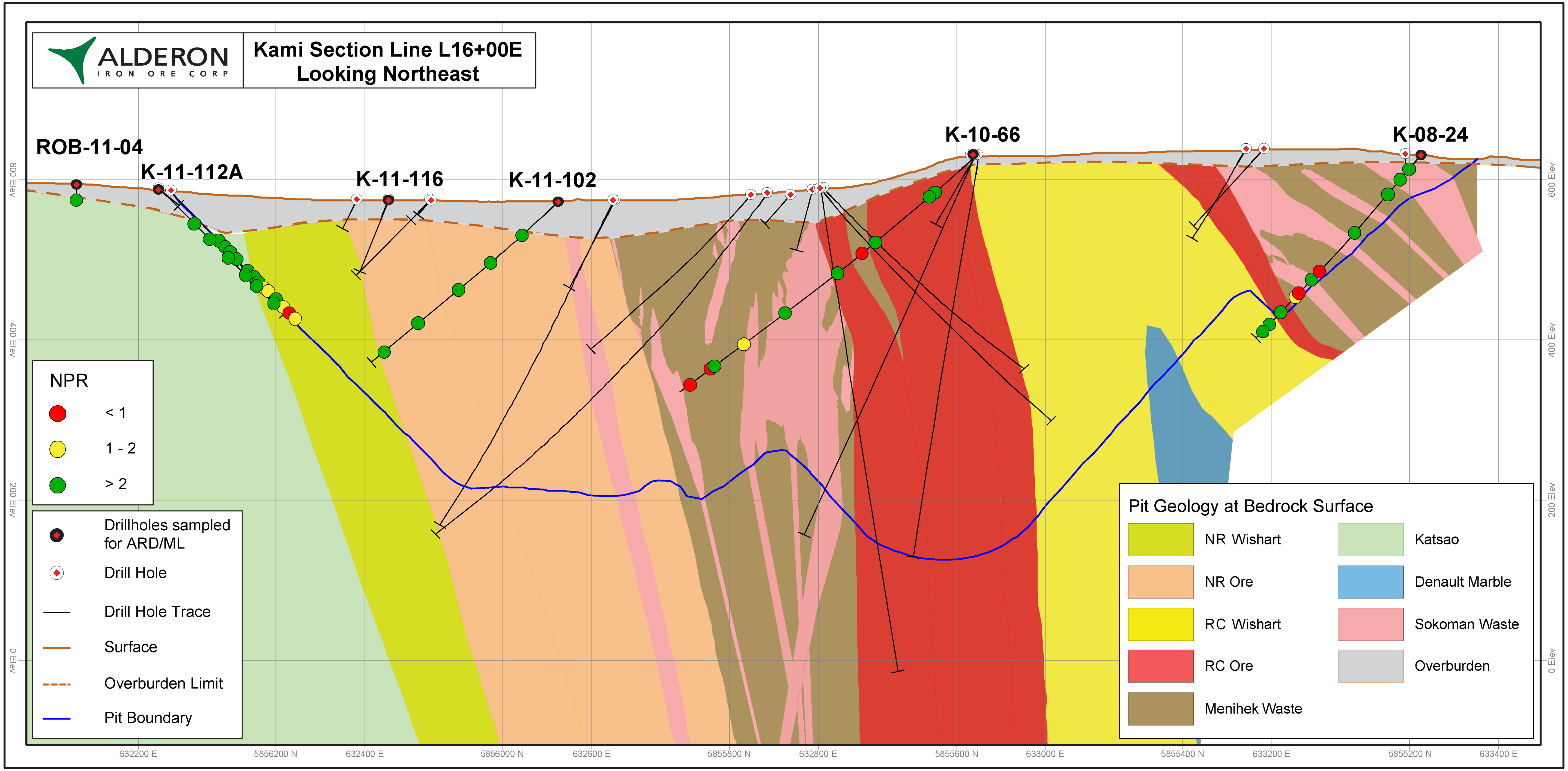


Figure 1.5.3 Cross-section along line L16E looking north-east



1.5.3 Information Request No. NRCan 03 (Labrador)

a) NRCan requests that the Proponent provide an estimate of the amount of PAG materials in the overburden stock pile and its conceptual development and management plan to ensure thorough mixing of PAG/NAG materials to mitigate any potential acid generation in the long-term.

b) Similarly, the development and management plans of the proposed two waste rock piles should also be provided detailing their development strategy for ensuring thorough mixing of various PAG/NAG waste rock lithological units to prevent ARD/ML in the long-term.

c) Generally, the precipitation infiltration and flow in waste rock and overburden piles follow preferential paths of low resistance, resulting in short circuiting and channeling, which in the long-term may be conduits for ARD/ML. NRCan requests that the Proponent confirm the likelihood of such a scenario developing at the Kami mine site waste units and how it would be mitigated.

d) Thorough mixing of PAG/NAG materials in both overburden and waste rock piles is a crucial component of the Kami Project development, and in NRCan's opinion, it should be substantiated by undertaking both humidity cell and column leaching investigations for various waste units produced at the site. The studies should also include individual and anticipated well mixed overburden and lithological units. In addition, NRCan requests that the Proponent provide results of humidity cell and column leaching investigations for various waste units produced at the site including individual and anticipated thoroughly mixed overburden and lithological units.

Alderon Response to IR No. NRCan 03 (Labrador)

a) Twelve samples of the overburden were analyzed during the first phase of ARD/ML assessment. During the second phase of ARD/ML assessment, an additional 50 samples were tested (Table 1.5.6). Combined results indicate that overburden has very low risk of acid generation based on the following:

- Median for Carbonate NPR is 12;
- 90 percent of samples have Carbonate NPR>3, and
- Concentration of sulfur is below the detection limit (0.01 wt.%) in 47 percent of samples.

Overburden is currently classified as NAG material and therefore does not require special handling. Nevertheless, delineation and characterization of zones containing PAG overburden will be an on-going task. The additional test work results and any related mitigation and/or design modifications to the Project required will be addressed in the detailed engineering and permitting phase of the Project at which time regulators will have further opportunity to review and comment on the proposed measures.

b) Response to this question is incorporated with the response to sub-question c), immediately below.

c) A mixing plan and loading and hauling strategy will be developed based on a more detailed assessment of PAG/NAG materials through kinetic testing (currently ongoing) and the mine outline (as defined in the Geologic Block Model). The Proponent acknowledges the need for a waste rock disposal strategy that will manage both the potential for ARD/ML in the long-term and the potential for preferential channeling of infiltrating water in association with the waste rock piles. Management measures include:

   - segregation of any PAG materials from the Menihek and Katsao Formations; placement of the materials in an internal zone or zones (platforms) within the waste rock disposal areas, isolated within acid-consuming carbonate rock which will serve to neutralize acidic drainage (i.e. create a bed of acid neutralizing material and place PAG materials on this bed);
   - placement of a compacted low permeability cover material on the surface of each waste rock platform, with the platforms being graded to direct surface water to the sides of the waste rock disposal pile, rather than allowing it to infiltrate; and
   - pre-placement of rock drains in drainage courses entering the waste rock disposal sites from adjacent ground. The rock drains would comprise relatively durable NAG rock and be formed along the base of the waste rock disposal piles to maintain clean water flows in the buried channels and designed to minimize subsurface seepage into the zones of PAG waste rock.

d) Three humidity cells, representing major waste units such as overburden and the Menihek and Sokoman formations , are currently at about 20 weeks of the testing cycle now (Table 1.5.7). The current leachate results from these tests do not exceed the MMER guidelines, but the final conclusions on these tests will be established after 40 weeks. Additional humidity cells and three (3) barrel tests with mixtures of PAG/NAG materials, to be specified on the basis of results of the static tests, have recently been planned and will be completed prior to removal of overburden and mining. The final mitigation of ARD/ML issues will take into consideration the results of these tests.

The Proponent will provide the results of kinetic tests to NRCan for review upon request. The additional test work results and any related mitigation and/or design modifications to the Project required will be addressed in the detailed engineering and permitting phase of the Project at which time regulators will have further opportunity to review and comment on the proposed measures.

Table 1.5.6 Interim Humidity Cell Results

Analyte	Unit	Guidelines		Menihek, graphite-mica schist K64/5			Overburden, ROB11-18 #17 and ROB11-09 #23			Sokoman SIF, K66-14 and K24-8		
		MMER	CCME	Wk#10	Wk#15	Wk#20	Wk#10	Wk#15	Wk#20	Wk#10	Wk#15	Wk#20
Leachate Volume Recovered (mL)	mL	-	6.5-9.0	981	989	983	962	983	954	970	950	992
pH	units	-	-	7.16	6.80	6.52	7.43	7.39	7.05	7.03	6.94	7.12
Sulphate	mg/L	-	-	9.6	11	20	17	12	12	3.7	3.3	2.4
Mercury	mg/L	-	0.000026	0.00003	0.00001	< 0.00001	0.00005	0.00001	< 0.00001	< 0.00001	0.00001	0.00004
Silver	mg/L	-	0.0001	0.00028	0.00012	< 0.00001	0.00001	0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Aluminum	mg/L	-	0.1	0.012	0.0125	0.0036	0.0029	0.0072	0.0084	0.0073	0.0153	0.008
Arsenic	mg/L	0.5	0.005	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002	0.0005	0.0005	0.0004
Barium	mg/L	-	-	0.0113	0.0132	0.0115	0.0348	0.0286	0.0215	0.0029	0.0022	0.0026
Beryllium	mg/L	-	-	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Boron	µg/L	-	-	0.0031	0.003	0.0013	0.0012	0.0019	0.0003	0.0021	0.0026	0.0009
Calcium	mg/L	-	-	4.77	5.61	6.15	9.85	8.31	6.88	2.54	1.8	3.02
Cadmium	mg/L	-	0.00004	< 0.000003	0.000009	0.000009	0.000011	0.000024	0.000008	< 0.000003	0.000015	< 0.000003
Cobalt	mg/L	-	0.004	0.000093	0.000127	0.000095	0.000661	0.000366	0.000339	0.000119	0.000062	0.000301
Chromium	mg/L	-	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Copper	mg/L	0.3	0.0028	< 0.0005	0.0005	< 0.0005	0.0007	0.0006	0.0008	< 0.0005	< 0.0005	< 0.0005
Iron	mg/L	-	0.3	< 0.003	< 0.003	0.019	< 0.003	< 0.003	0.007	< 0.003	0.004	0.01
Potassium	mg/L	-	-	0.875	0.855	0.776	3	2.61	2.14	0.862	0.737	0.604
Magnesium	mg/L	-	-	2.52	2.67	2.76	2.19	1.98	1.73	1.2	0.943	1.1
Manganese	mg/L	-	-	0.0177	0.0323	0.0126	0.248	0.163	0.15	0.00693	0.00427	0.158
Molybdenum	mg/L	-	0.073	0.00099	0.00049	0.00017	0.00086	0.00099	0.001	0.00116	0.00086	0.0005
Sodium	mg/L	-	-	0.03	0.03	0.03	0.07	0.07	0.07	0.06	0.05	0.04
Nickel	mg/L	0.5	0.113	0.0006	0.0011	0.0005	0.0021	0.0013	0.0016	0.0006	0.0003	0.0011
Lead	mg/L	0.2	0.0063	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00002	0.00003	< 0.00002	0.00003
Selenium	mg/L	-	0.001	0.001	0.001	0.002	0.006	< 0.001	0.003	< 0.001	< 0.001	< 0.001
Silicon	mg/L	-	-	0.26	0.29	0.23	1.04	0.92	0.74	0.32	0.28	0.26
Tin	mg/L	-	-	0.00022	0.00018	0.00022	0.00025	0.00023	0.0003	0.0004	0.00034	0.00023
Thallium	mg/L	-	0.0008	< 0.00002	< 0.00002	< 0.00002	0.00003	0.00004	0.00004	< 0.00002	< 0.00002	< 0.00002
Uranium	mg/L	-	0.015	0.00736	0.00827	0.00254	0.00105	0.000801	0.00068	0.00218	0.00105	0.0018
Vanadium	mg/L	-	-	0.00011	0.00006	< 0.00003	0.00005	0.00004	< 0.00003	0.00003	0.00018	< 0.00003
Zinc	mg/L	0.5	0.03	0.005	0.003	0.004	0.003	0.003	0.003	< 0.002	< 0.002	0.023

Notes: MMER - *Metal Mining Effluent Regulations* (2002); CCME FAL - Canadian Council of Ministers of the Environment for Freshwater Aquatic Life (1999)
CCME FAL values for Cd, Cu and Ni were calculated based on hardness 125 mg/CaCO3

1.5.4 Information Request No. NRCan 04 (Labrador)

Although, the Shake Flask Extraction (SFE) tests provide valuable information on the metal leaching potentials of various waste units at the Kami site, the leachates that are produced are fairly dilute due to the nature of the test itself where the test solids are leached with DI water with a solid to liquid ratio of 1:3 by weight. In a realistic scenario, the solid to liquid ratios in waste rock and overburden piles as well as in tailings are expected to be on the order of approximately 1:0.1 to 0.15 by weight (10 to 15 percent moisture content by wt) corresponding to concentrations of actual leachates by factors of approximately 20 to 30 in comparison to those obtained in the SFE tests. Thus, the MMER regulatory compliance of the SFE leachates should not be considered as representatives of the actual surface and pore water leachates that would be produced at the site.

a) NRCan requests that the Proponent undertake additional laboratory column and field leaching tests for both short and long-term water quality predictions at the site. Provide results of additional laboratory column and field leaching tests for both short and long-term water quality predictions at the site. In addition, NRCan recommends that the proponent provide maps and cross-sections showing sample locations in order to relate ARD/ML assessment to geology and development plans.

Alderon Response to IR No. NRCan 04 (Labrador)

The Proponent compared SFE to the MMER guidelines to screen potential contaminates of concern. The Proponent agrees that the final water quality predictions will be based on kinetic tests. Details on on-going laboratory column and field leaching testing are outlined in the Response to NRCan 03d. The recent leachates generated from the tests comply with MMER guidelines and do not suggest concern with respect to ARD or metal leaching (Table 1.5.6 and Response to NRCan 03d). If testing indicates potential ARD/ML concerns, it can be managed through material and water management as indicated in NRCan 03. The maps and cross-sections with ARD/ML sample locations are presented on Figures 1.5.1 to 1.5.3.

1.5.5 Information Request No. NRCan 05 (Labrador)

a) In NRCan's opinion, the proponent should re-evaluate the ARD potential of various rock units of the proposed open pit based on NPRcarb of 3 for PAG/NAG classification boundary as described in NRCan-2. The effect of weathering of the exposed Menihek formation pit wall on the post decommissioning and closure pit water quality should also be re-evaluated as this formation has been classified as PAG.

Alderon Response to IR No. NRCan 05 (Labrador)

The Proponent acknowledges the concerns underlying NRCan’s request for additional conservatism (i.e. to increase the NPR ratio to a value of 3 from a value of 2). However, the Proponent does not consider that this level of conservatism is warranted for the project. The EIS Guidelines, Section 4.17.3.1, recommends the use of NPR criteria for the classification from the MEND Manual (Price, 2009). The manual states “samples with an NPR greater than 2 are non-PAG”. The manual does not prescribe the increase of NPR boundary for long-term acid generation potential.

Although the Proponent does not believe that Project results to date support the modification of NPR ratio from a value of 2 to 3, results, including those available to date from the Phase 2 ARD/ML assessment, were evaluated using the higher NPR ratio. Resulting $NPR_{carbonate}$ ratios were greater than 4.7 for all materials classified as NAG, including: overburden, waste rock, ore, tailings and concentrate produced at the Kami mine and Pointe-Noire terminal sites (Tables 1.5.2, 1.5.4, above). Thus, the amount of PAG/NAG materials are not affected by an increase in the boundary of NPRcarbonate to a value of 3. As a result, the Proponent does not see a strong reason for reclassification of the waste materials.

The modeling of pit lake water quality is an on-going task, which will be completed by fall of 2013. If water quality modeling and subsequent monitoring show potential effects from ARD/ML, the Proponent is committed to treating the Pit discharge to meet MMER discharge criteria (EIS Volume1, Section 15.6.4).

1.5.6 Information Request No. NRCan 06 (Labrador)

In the context of the guidelines, the inclusion of sound surficial and bedrock geology information supplemented by maps, cross-sections and figures is required. Yet the EIS (Annex G) presents a surficial geology map at a scale and precision that are inappropriate for the purpose of the EIS. The text and borehole data indicate the presence of up to 52 m meters of surficial sediments (mainly till) but there is no local surficial geology map, nor drift thickness map, nor cross-sections that may help the hydrogeological assessment. The map does not show the Waldorf River valley esker, a feature that is mentioned several times in the text.

Moreover the bedrock geologic information provided does not allow a full assessment of geological conditions at the mine site and in its vicinity. On one hand, the EIS (vol.1,chap 15) presents a local geological map that is somewhat at variance with the 'Property' geologic map shown in Appendix G (Figure 7.2). On the other hand, the EIS documents do not provide cross-sections that are essential to assess the surface or subsurface distribution of geological units and features (such as faults, folds, fractures and joints). These elements are critical for the hydrogeological assessment of the project, particularly in view of the fact that the rock units that will be excavated include carbonates that may have been subject to some dissolution, particularly along fractures.

a) As per the EIS Guidelines, NRCan recommends that detailed surficial and bedrock geology information supplemented by maps, cross-sections and figures are included in the revised EIS documents concerning the Kami Iron Ore Mine project in western Labrador.

Alderon Response to IR No. NRCan 06 (Labrador)

The text, maps, and cross-sections provided in this response below, provide additional surficial and bedrock geology for the region, property, and deposit area. An appropriately detailed, updated property geology map will be provided to NRCan in digital format and the same maps and figures will be provided in the updated ML/ARD reports described in the responses to NRCan Information Requests (Nos. 1 through 5) on ML/ARD, above. Further, additional details regarding geological, geotechnical, and hydrogeological conditions across the site related to Project infrastructure impacts such as pit slope stability, foundation and cut / fill slope stability, and potential hazards will be addressed during detailed engineering design and provided for review by regulators during the permitting stage of the Project.

KAMI GEOLOGICAL SETTING AND MINERALIZATION

Regional Geology

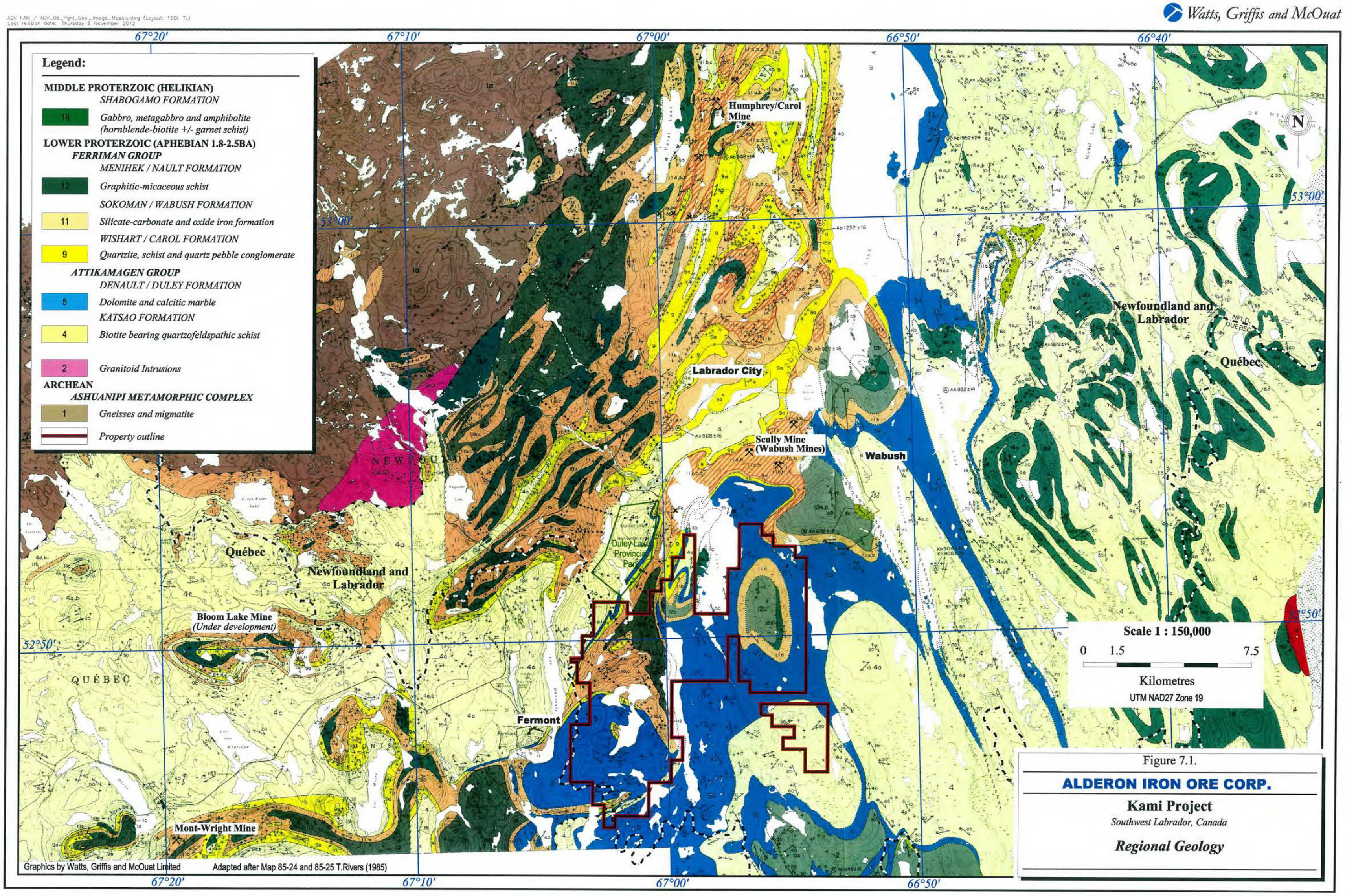
The Kami Property is situated in the highly metamorphosed and deformed metasedimentary sequence of the Grenville Province, Gagnon Terrane of the Labrador Trough ("Trough"), adjacent to and underlain by Archean basement gneiss (Figure 1.5.4). The Trough, otherwise known as the Labrador-Québec Fold Belt, extends for more than 1,200 km along the eastern and southeastern margin of the Superior Craton from Ungava Bay to Lac Manicouagan, Québec. The belt is about 100 km wide in its central part and narrows considerably to the north and south. The Trough itself is a component of the Circum-Superior Belt that surrounds the Archean Superior Craton which includes the iron deposits of Minnesota and Michigan. Iron formation deposits occur throughout the Labrador Trough over much of its length.

The Trough is comprised of a sequence of Proterozoic sedimentary rocks, including iron formation, volcanic rocks and mafic intrusions. The southern part of the Trough is crossed by the Grenville Front, which is the northern limit of the metamorphic fold-thrust belt in which Late Archean basement and Early Proterozoic platformal formations were thrust north-westwards across the southern portion of the southern margin of the North American Craton during the 1,100 Ma Grenville Orogeny. Trough rocks in the Grenville Province are highly metamorphosed and complexly folded. Iron deposits in the Gagnon Terrane, (the Grenville part of the Trough); include those on the Property and Lac Jeannine, Fire Lake, Mont-Wright, Mont-Reed, and Bloom Lake in the Manicouagan-Fermont area, and the Luce, Humphrey and Scully deposits in the Wabush-Labrador City area. The metamorphism ranges from greenschist through upper amphibolite into granulite metamorphic facies from the margins to the orogenic centre of the Grenville Province. The high-grade metamorphism of the Grenville Province is responsible for recrystallization of iron oxides, iron carbonates and iron silicates with quartz in The Sokoman iron formation, producing crystalline meta-taconites that are of improved quality for concentration and processing.

North of the Grenville Front, the Trough rocks in the Churchill Province have been only subject to greenschist or sub-greenschist grade metamorphism and the principal iron formation unit is known as the Sokoman Formation. The Sokoman Formation is underlain by the Wishart Formation (quartzite) and the Attikamagen Group including the Denault Formation (dolomite) and the Dolly/Fleming Formations (shale). In the Grenville part of the Trough, where the Property is located, these same Proterozoic units can be identified, but are more metamorphosed and deformed. The recent synthesis by Clark and Wares (2005) develops modern lithotectonic and metallogenic models of the Trough north of the Grenville Front.

The most comprehensive mapping of this area was done by T. Rivers as part of his Labrador Trough mapping program of the mid-1980s. Several maps of the area were produced, with the most applicable to this area being Maps 85-25 and 85-24 (1:100,000) covering National Topographic System Sheet 23B/14. Figure 1.5.4 is based mainly on River's work.

Figure 1.5.4 Property Geology



River's mapping was done before the numerous forest fires in the mid-1990s burned off large tracts of forest, thereby exposing more outcrop and glacial deposits than was available during the field work done in the early 1980s. Since River's work is essentially correct at the regional scale, Alderon did not modify this map in the context of its property-scale data. Hence there will be some discrepancies between River's and Alderon's data and interpretations in the finer details, as is to be expected.

The regional stratigraphy is summarized in Table 1.5.7.

Table 1.5.7 Summary of Regional Stratigraphy

Description	
Middle Proterozoic – Helikian	
Shabogamo Mafic Intrusives -Gabbro, Diabase	
Monzonite-granodiorite	
Intrusive Contact	
Paleoproterozoic – Aphebian (1.88-1.75 Ga)	
Ferriman Group	
Menihek Formation	Graphitic, chloritic and micaceous schist
Diachronous contact	
Sokoman Formation (iron formation)	Quartz, magnetite-hematite-silicate-carbonate iron formation
Unconformity	
Wishart Formation	Quartzite, quartz-muscovite± biotite schist
Unconformity – transitional contact	
Attikamagen Group	
Denault Formation	Meta-dolomite and calcite marble
Unconformity	
Katsao Formation (Fleming/Dolly Formations)	Quartz-biotite-feldspar schist and gneiss
Unconformity	
Archean	
Ashuanipi Complex	Granitic and granodioritic gneiss and mafic intrusives

Property Geology

General

The Property is underlain by folded, metamorphosed sequences of the Ferriman Group and includes (from oldest to youngest): Denault (Duley) Formation dolomitic marble (reefal carbonate) and Wishart Formation quartzite (sandstone) as the footwall to the Sokoman Formation. The Sokoman Formation includes iron oxide, iron carbonate, and iron silicate facies and hosts the iron oxide deposits. The overlying Menihek Formation resulted from clastic pelitic sediments derived from emerging highlands into a deep-sea basin and marks the end of the chemical sedimentation of the Sokoman Formation. The Property Geology is shown in Figure 1.5.5. Figure 1.5.6 shows the details of the Rose Deposit pit geology projected to bedrock subsurface that is completely covered by overburden.

Metabasalt dykes and sill, now metamorphosed to biotite-garnet-amphibole (HBG gneiss), cut through all formations. The pre-Grenville versions have dated as coeval with the formation of the Menihek Fm turbidite/pelitic mudstone deposition and are located mainly just below the Sokoman-Menihek Fm contact. These are not the Middle Proterozoic Shabogamo intrusives.

Altius' exploration was focused on three parts of the Property known as the Mills Lake, Rose Lake and the Mart Lake areas. Alderon's 2010 to 2012 drilling was focused on the Rose Lake and Mills Lake areas. On some parts of the Property, the Sokoman is directly underlain by Denault Formation dolomite and the Wishart Formation quartzite is missing or is very thin, as seen beneath the Mills Lake Deposit. In other places, both the dolomite and quartzite units are present, as seen beneath the Rose Deposit.

Alderon interprets the Property to include two iron oxide hosting basins juxtaposed by thrust faulting. The principal basin, here named the "Wabush Basin", contains the Rose iron oxide deposits on the Property. Its trend continues NNE from the Rose Lake area, 9 km to the Wabush Mine and SSW to the north of the town of Wabush, where it appears to become very thin. The second basin, called the "Mills Lake Basin", lies south of the Elfie Lake Thrust Fault and extends SSE, obliquely parallel with the western shore of Mills Lake. Each basin has characteristic lithological assemblages and iron formation variants. Alderon proposes to develop the Rose deposit initially.

The portion of the Property east of the western shore of Mills Lake is dominated by gently dipping (15°-20°E) Denault Formation marble with quartz bands paralleling crude foliation. This block is interpreted as being thrust from the east onto the two basin complexes above with the bounding fault beneath Mills Lake. The marble outcrops across the 8 km width of licenses 017926M and 0179948M with consistent east dips. The thickness exposed suggests that several thrust faults may have repeated the Denault Formation stratigraphy. On River's (1985) maps, this is shown as an infolded syncline of Sokoman Formation, but recent mapping and shallow drilling by Alderon found Denault marble and minor Menihek Formation but no iron formation. Another area on license 017926M, interpreted by Rivers (1985), as a syncline with Sokoman and Menihek formations in its core, did not show any airborne magnetic or gravity anomalies, and recent Alderon mapping found only Menihek schist and Denault dolomite marble.

Figure 1.5.5 Property Geology

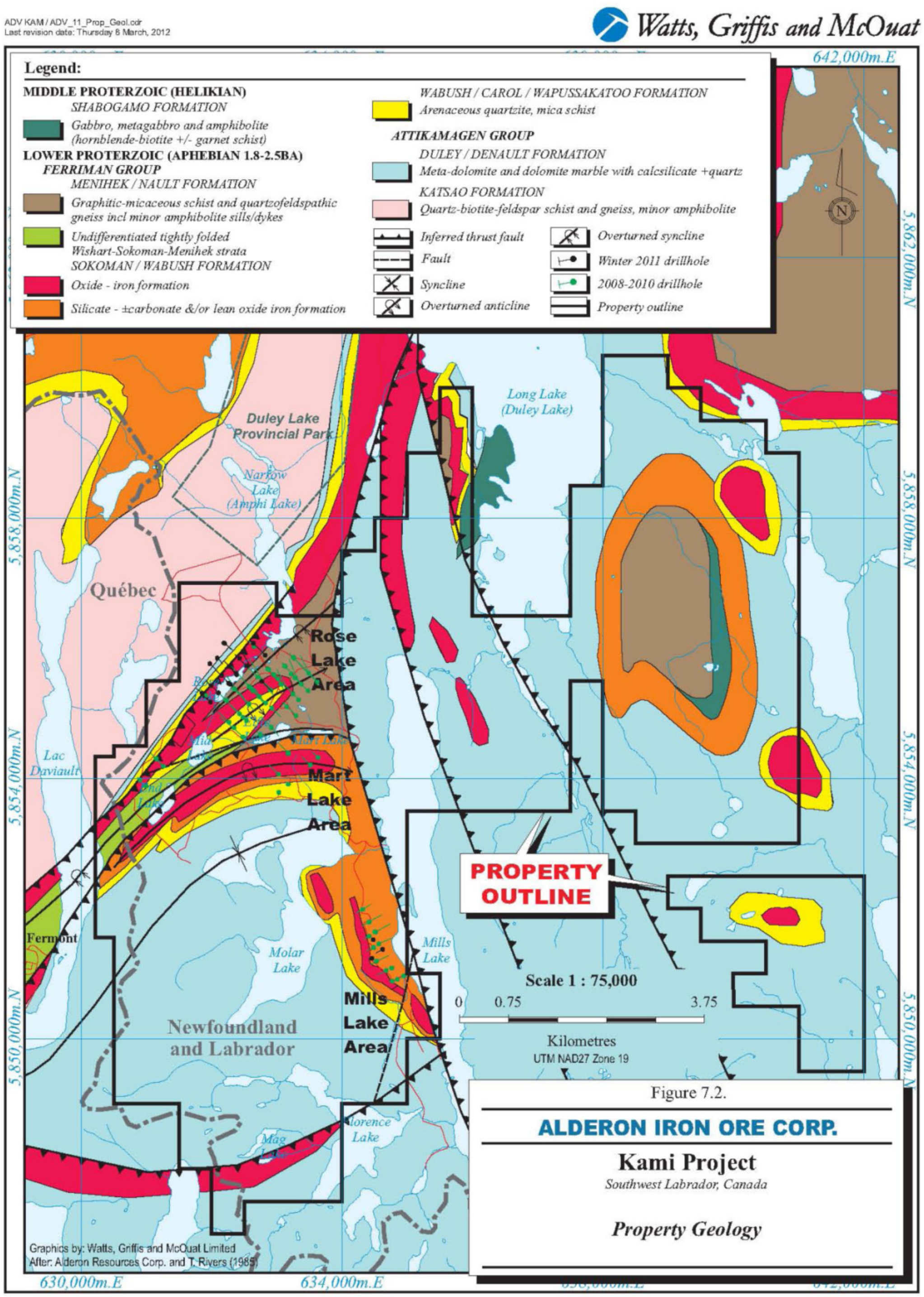
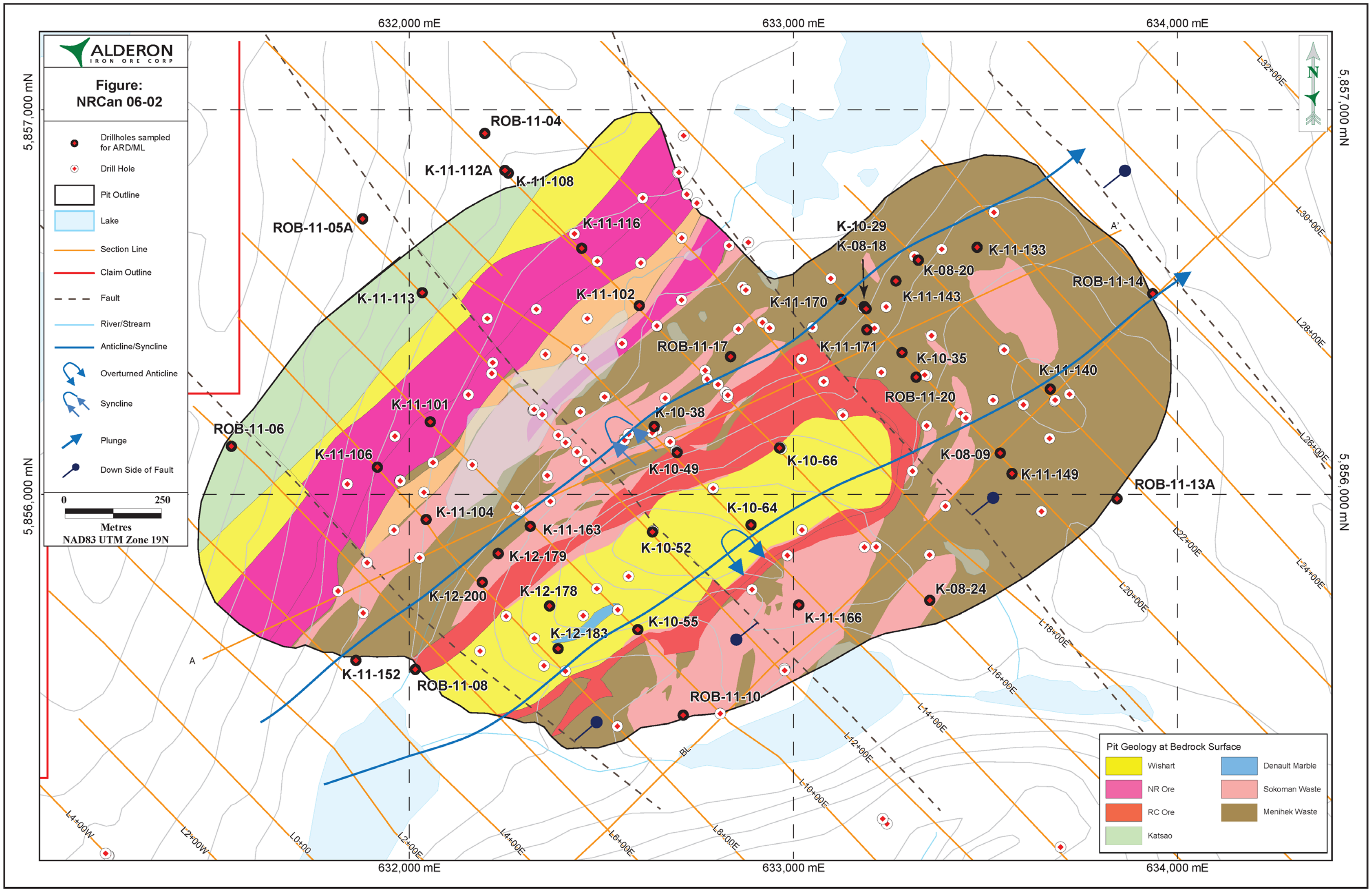


Figure 1.5.6 Pit Geology at Bedrock Surface



Structure

The region has undergone a series of structural events that affect the form and hydrology of the deposits, some of which have not been referenced in the public literature. The oldest are those inherited from the original deposition and deformation of the Labrador Trough formations around 1.88 GA with subsequent post-depositional folding and faulting and metamorphism. These elements were effectively overprinted by the intense Grenville Orogeny of ca. 1.1 GA. The structures we see today date from the Grenville Orogeny and younger events. The significant structural events that affect the current distribution of the rocks include two periods of deformation and five faulting events.

The oldest and most widespread event is the D_1 deformation that formed from early to peak activity of the Grenville Orogeny during the maximum metamorphism at ~1.1-1.0 GA. The folding is ductile open to overturned nappe folds with ductile thrust fault displacement (F_1) from the south-southeast. This event controls the generally East-northeast alignment of the iron formation in the Gagnon Terrane. The prominent S_1 schistosity was formed during this period.

Figure 1.5.7 and Figure 1.5.8 show the dominant D_1 folding of the Rose Deposit. Additional sections through the open pit area are presented in Appendix P.

The second major deformation (D_2) formed during the waning phase(s) of the Grenville orogeny by compression from the east-northeast to east as the Churchill Terrane was pushed onto the eastern margin of the Gagnon Terrane. D_2 folding is typically tighter (short amplitude) and more upright than D_1 There also appears to be some transpressional horizontal displacement associated with it as well. This even has deformed the eastern part of the IOCC deposits. The D_2 folds become more localized into linear zones west of Labrador City and the zones decrease to the west into the Gagnon Terrane. Probably ductile thrust faulting (F_2) was associated with D_2 as well. The D_2 event rotated the S_1 but did not form a well-defined S_2. Recent petrographic studies have proposed S_2 but the field evidence for it is not very robust.

The property is dominated by D_1 folding just east of the pit limit of the Rose deposit. D_2 deformation dominates east of the line from the eastern shore of Pike Lake south and parallel with the western shore of Mills Lake. The folding ranges from moderate to shallow open folds with the most open folds as a shallow syncline to the east beneath the proposed engineering works.

Figure 1.5.7 Kami Section Line L20+00E Looking Northeast

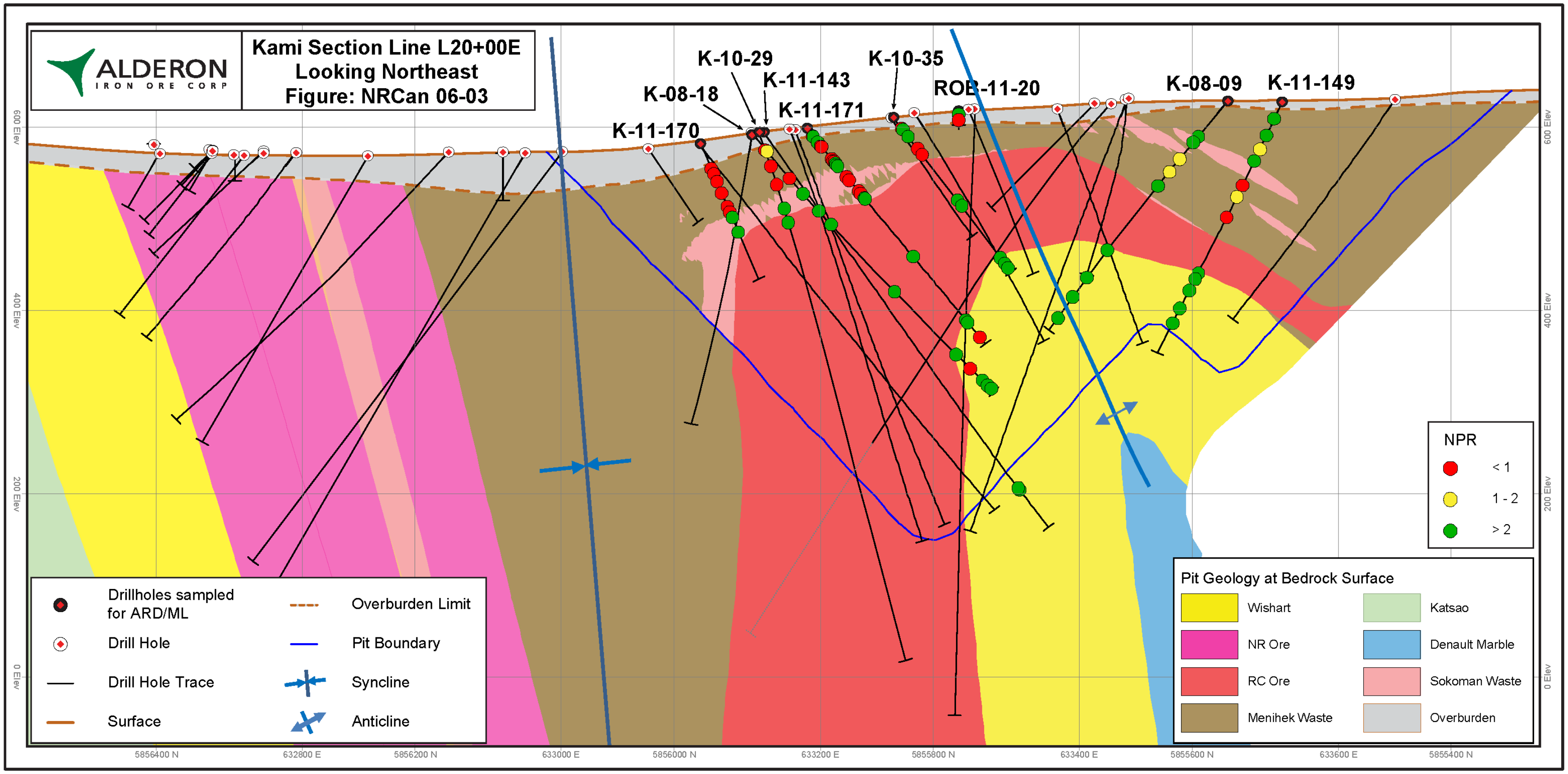
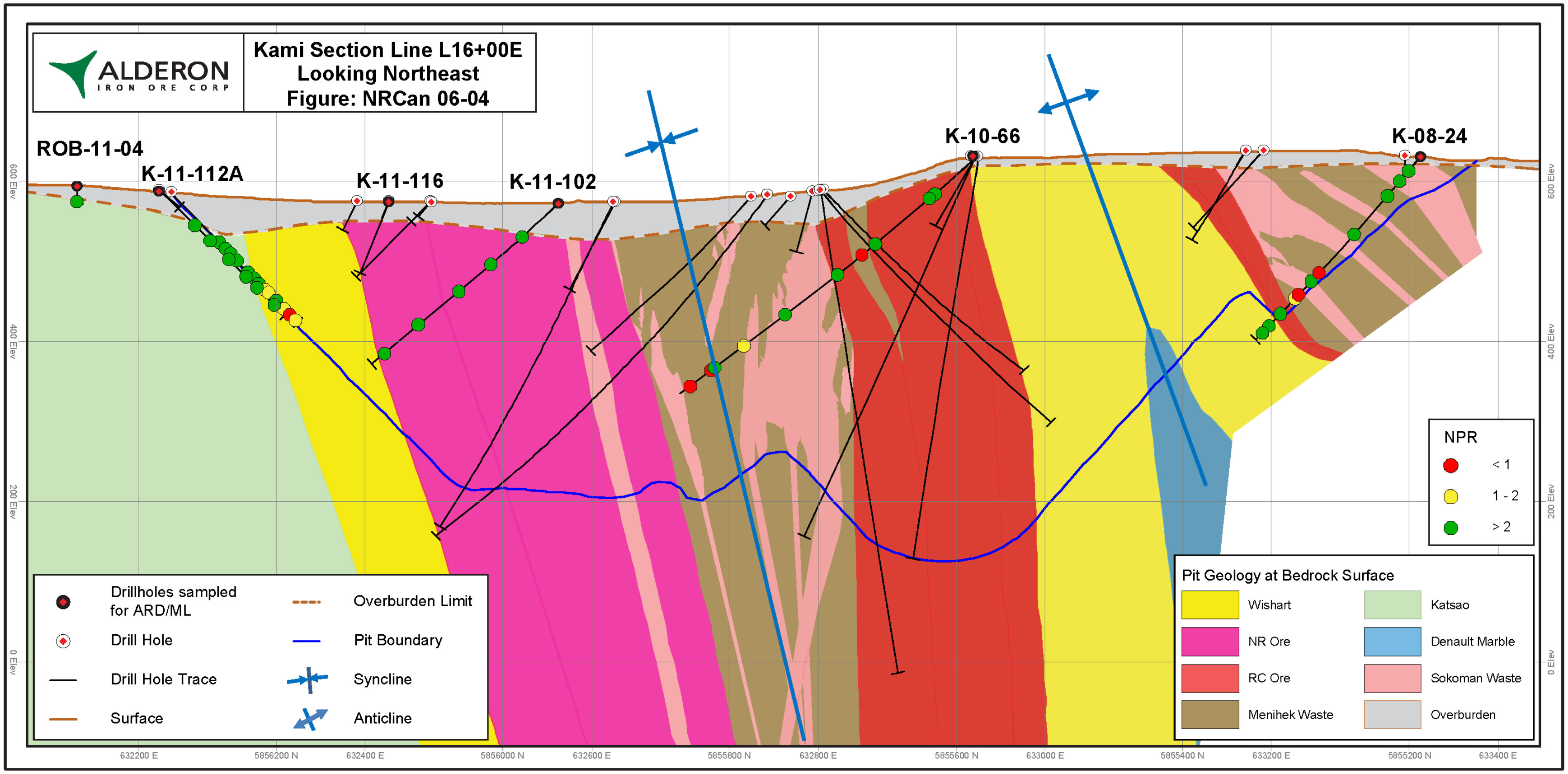


Figure 1.5.8 Kami Section Line L16+00E Looking Northeast



The F_1 and F_2 faults are sealed and are not groundwater conduits.

F_3 faults are assigned to late, brittle open-space probable thrust faults that are marked by clay and sandy gouge fillings. These appear to be reactivated along mainly F_1 faults and parallel to them. The nature of the event forming them is not certain.

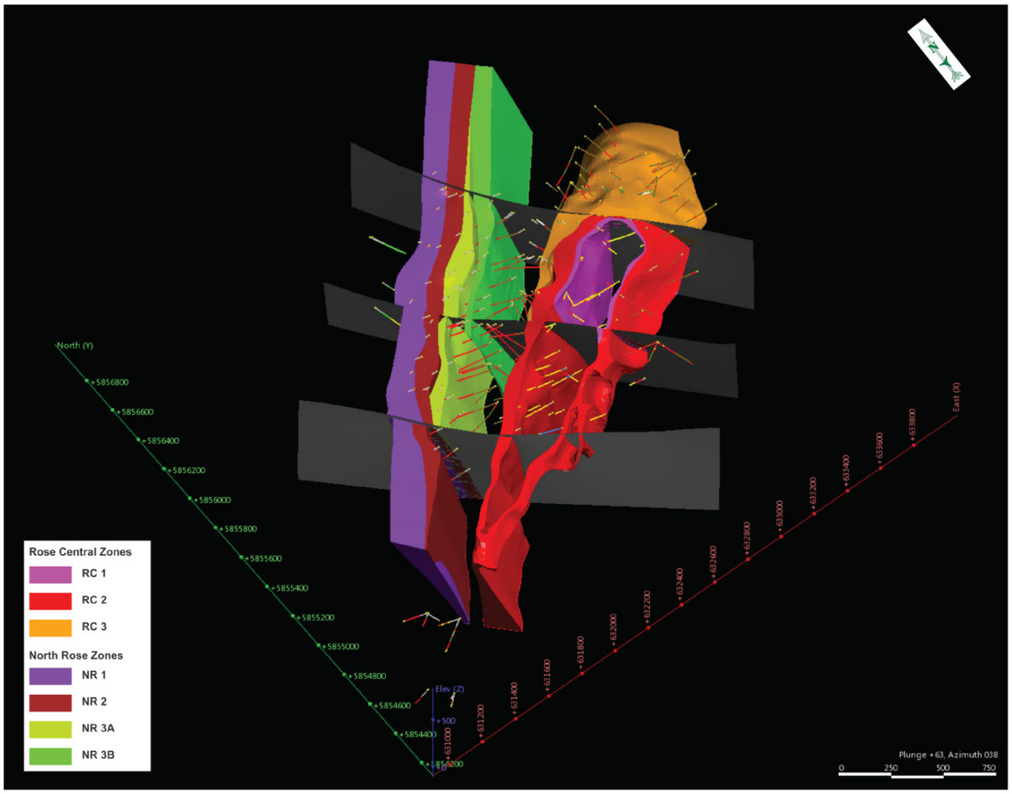
F_4 faults are similar to F_3 in that they are open space probable thrust faults. They appear to be more associated with the D_2 eastern thrust faults and can be seen west of the IOCC mine near Emma Lake. They are inferred to occur on the Kami property southeast of the Rose deposit and east of Mills Lake, but there are no known outcrop examples. The age(s) of the F_3 and F_4 faults are post-Grenville, and pre-F_5.

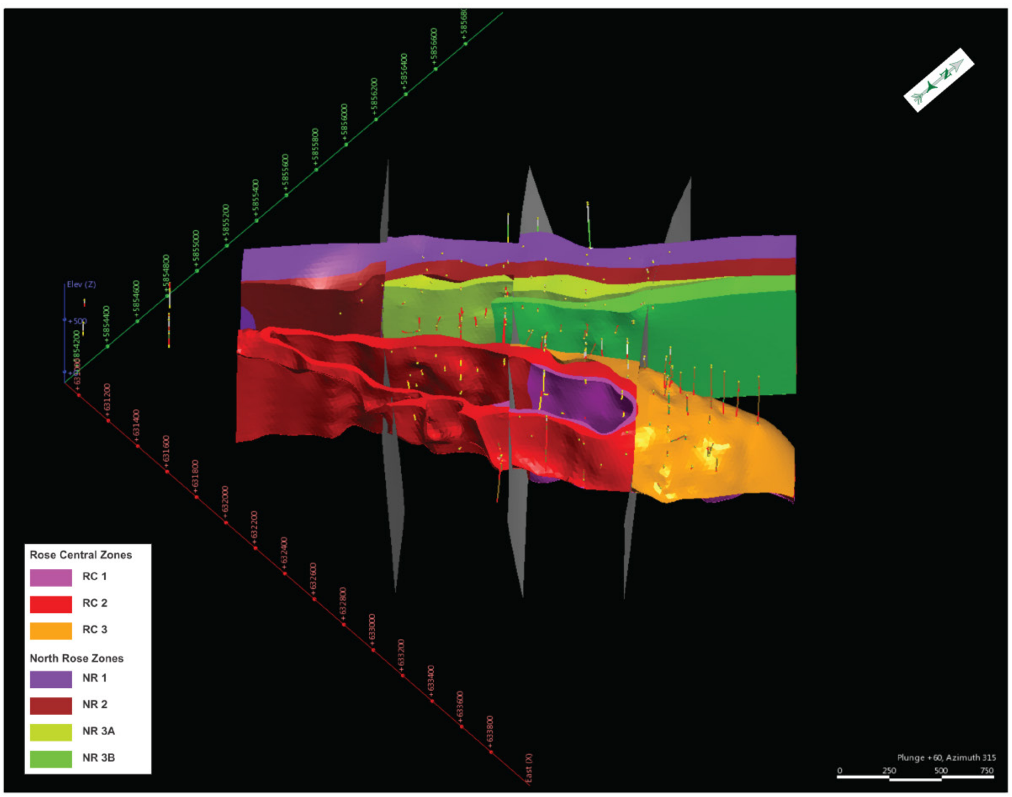
F_5 faults are steep, normal displacement faults that trend northwest and generally have the northeast side down dropped 20-180 m with very little horizontal displacement. They cross the general fold trends with a consistent direction and have many faults spaced 60-250 m apart across the area from at least 25 km west of the Fire Lake Mine in Quebec through Wabush NL. The scale of displacement is small relative to the earlier faults and they have not been documented in the literature. They affect the topography by controlling lake and stream directions. Because their alignment is close to the principal glacial direction, they may not have been noted. (The glacial direction is more northerly.) Evidence for their existence has been fault displacements within several iron deposits (Peppler Lake and Lamêlee QC, Kami and Lac Virot, NL) and frequently marks the limits or radical changes in Sokoman Fm facies. In the Rose deposit, at least three and possibly five, faults displace the folded iron formation from 50 to 100 vertical meters. The western margin of the Mills Lake deposit is defined by an F_5 fault.

The age of the F_5 is likely related to plate tectonics extension. F_5 is the only known extensional fault set in the region.

The perspective view of Figure 1.5.9 shows the effect of the F_5 faulting on the deposit geometry, which will affect the mine development.

Figure 1.5.9 Rose Central Zones





Mineralization

Mineralization of economic interest on the Property is oxide facies iron formation. The oxide iron formation ("OIF") consists mainly of semi-massive bands, or layers, and disseminations of magnetite and/or specular hematite in recrystallized chert and interlayered with bands (beds) of chert with iron carbonates and iron silicates. Where magnetite or hematite represent minor component (<10% Fe in oxide) of the rock, the rock is low iron formation (“LMIF”, “LHIF”, etc.). Where silicate or carbonate becomes more prevalent than magnetite and/or hematite, then the rock is silicate iron formation ("SIF") and or silicate-carbonate iron formation and its variants. SIF consists mainly of amphibole and chert, often associated with carbonate and contains magnetite or hematite in minor amounts. The dominant amphibole in the Sokoman Fm is grunerite (Fe-Mg amphibole). Where Fe-carbonate becomes more prevalent, the rock is named silicate-carbonate or carbonate-silicate iron formation, but in practice, many variations exist between the OIF and silicate-carbonate iron formation composition end members. SIF and its variants and lean iron formation are also often interbedded with OIF.

The OIF on the Property is mostly magnetite-rich and some sub-members contain increased amounts of hematite. Hematite appears to be more prominent in Rose North mineralization than at either Rose Central or Mills Lake, but all zones contain mixtures of magnetite and hematite. At both Rose North and Rose Central and at Mills Lake, a bright pink rhodonite, which is a manganese silicate, is associated with hematite-rich OIF facies. Manganese may also occur as a minor element in Fe-amphiboles.

Weathering

The iron deposits in the region have all been affected to some degree by deep humid weathering, likely the equivalent of the profound global Cretaceous weathering that formed the so-called Direct Shipping Ore (“DSO”) deposits around Schefferville, QC. Fossil evidence there indicates approximately 100 million years age. The weathering can penetrate to depths over 500 vertical metres at the Rose deposit, probably one of the deepest weathering penetrations noted in the iron belt. Likely the distribution of weathering depth regionally may be related to variable uplift that has been eroded by post-Cretaceous glaciers.

The weathering affects the Rose North limb from surface and continues below the base of the drilling at approximately -450 vertical m below surface. The weathering affects all rock types variably. Alderon’s interpretation, based on mineralogical and textural evidence, is that it appears to have two stages. The earlier stage appears to be neutral to slightly alkaline with low oxidation levels. This is expressed in the iron deposits by:

1. Recrystallization of specular hematite to larger subhedral and euhedral crystals almost a magnitude larger than the original meta-taconite specular hematite;
2. Leaching of quartz and carbonate from the non-oxide matrix;

3. Destruction of Mn-silicate and carbonate minerals in the meta-taconite to Mn-oxides (psilomelane and pyrolusite) observed in several holes; and
4. Destruction of Fe-silicates.

Two deeper drill intersections under the North Rose limb show the transition from fresh metataconite to the Stage 1 weathering. Rhodonite changes rapidly to Mn-oxides, while the original specular hematite is recrystallised and the gangue quartz becomes more porous. The host lithologies of non-Sokoman formations, including Menihek schist and Wishart quartzite, are typically changed to soft rock with the original textures preserved by saprolite weathering, in the schist and extensive leaching of quartz in the quartzite, leaving a quartz-muscovite-calcite powder or porous rock. The iron in the micas is not oxidized. This pattern was observed in the drilling SW of the main Rose deposit with all units as well as in the Wishart quartzite and Katsao paragneiss in the footwall of the Rose North deposit.

The second stage of weathering is superimposed on the first and is more intense closer to the surface. It is characterized by the onset of veins and fractures filled with hydrous oxides merging to larger replacements of the original iron formation with Fe-hydroxide minerals such as limonite and goethite with minor earthy red hematite. The manganese oxides remain as powdery psilomelane and minor crystalline pyrolusite in leached vugs.

The early stage weathering forms thin replacements along fracture and fault surfaces aligned with the later NW-trending extensional faults that cut all units. The fault fillings are mainly a dark green “chlorite” type mineral that has not been identified. Adjacent to the fractures, iron silicate is changed to the same “chlorite”, while carbonate grains are less affected. The fractures occasionally change along strike over a few meters to open space fillings that can contain fresh pyrite crystals, fine psilomelane powder, and calcite (but not quartz); limonite-goethite are scarce in these places.

Controls on the weathering patterns appear to be the reticulate pattern of older thrust faults parallel with the trend of the deposits crosscut by the secondary and younger NW faults. The two likely provided a connected system for deeper groundwater inflows at the root of the weathering zone. The locus of the faults has been obscured by the progressive weathering, especially the Stage 2 oxidation that destroys evidence of the faults themselves. The NW faults away from the deep oxidation are generally healed with only Stage 1 mineralogy.

The weathering may affect the metallurgy characteristics of the iron deposit by increasing the Fe grade by the loss of matrix, increasing porosity, reducing density and hardness, and creating Mn-oxides that can interfere with the extraction process.

Rose Deposit

The Rose Deposit represents different components of a series of gently plunging NNE-SSW upright to slightly overturned anticlines and synclines with parasitic smaller-scale folding. The Rose syncline appears to be dismembered by thrust faulting parallel to the D_1 deformation from the SSE. The lateral extent of the southeast limb is limited, while the NW limb forms the long linear trend shown by the airborne magnetic and gravity anomalies and Rivers', (1985) maps. This fold system continues NNE from the western end of the Rose North deposit toward Long (Duley) Lake. The Wabush Mine deposit lies northeast of the lake where the structure opens into a broad open syncline truncated by a northerly-trending late normal fault just west of Wabush town.

The stratigraphy in the Rose area ranges from the Archean granite gneiss, north of the Rose syncline, up to the Menihek Formation mica schist (see Figures 1.5.5, 1.5.7, and 1.5.8). The contact between the Archean basement and the Denault marble is not exposed, nor has it been drilled to date. The Rose anticline exposes the Wishart Formation quartzite and drillholes also pass into Denault marble in the anticline core and also a thin Wishart unit abruptly passing down into Denault marble below the Mills Lake deposit. The contact relationship between the two units appears gradational to abrupt with increasing quartz at the base of the Wishart. The Wishart includes muscovite + biotite-rich schist and variations in quartzite textures. It appears more variable than the large quartzite exposures near Labrador City.

The upper contact of the Wishart Formation is abrupt. The base of the overlying iron formation often starts with a narrow layer of Fe-silicate–rich iron formation. Alderon's exploration team correlates this member with the Ruth Member of the Sokoman Fm as observed near Schefferville. Locally this is called the Basal Iron Silicate Unit (Wabush Mines terminology). The thickness of this subunit ranges 0 to 20 m.

The Sokoman Formation in the Rose Lake area includes three iron-oxide-rich stratigraphic domains or zones separated by two thin low-grade units. This is similar to the sequence observed at the Wabush Mine. At Rose Lake, the low-grade units, composed of quartz, Fe-carbonate plus Fe-silicates and minor Fe oxides, are thinner and more erratically distributed than at the Wabush Mine. The three oxide divisions or domains in a gross sense are mineralogically distinct and were used as the basis for geo-metallurgical domains and for the subsequent mineral resource estimate.

The uppermost part of the Sokoman is principally non-oxide facies. The thin magnetite layers that are present have the same level of Mn in magnetite bands as are typical of the RC-3 zone. The contact with the overlying Menihek Formation is a diachronous transition of interlayered Sokoman chemical sediments and Menihek flysch mud. The contact may locally be tightly folded or faulted by post-metamorphic movement parallel with the foliation, but many of the contacts between the two formations are delicately preserved and appear to be "one-way", not folded stratigraphy. It is probable that all three contact controls are in play.

Mills Deposit

The Mills Deposit lies in the "Mills Lake Basin" that is now interpreted to connect with the Mont-Wright deposit. It is dominated by the D_2 east dipping deformation. The deposit is a monocline dipping under Mills Lake. The eastern edge of the deposit is interpreted from geophysical data to be a major north-south thrust fault that elevates the older Denault Fm marble above the younger Sokoman Fm. The western margin is delimited by an F_5 fault with Cretaceous oxidation.

The deposit has three layers: a lower magnetite-rich unit, a thinner hematite + rhodonite zone, and an upper high-magnetite horizon. The proportions of the three units are 50:10:40 from bottom to top.

This deposit may be developed in the future.

1.5.7 Information Request No. NRCan 07 (Labrador)

a) A careful numerical or analytic estimation of the drawdown cone should be carried out because this drawdown estimate is of major importance. NRCan recommends that a long-term pumping test be performed at least in one of the two wells drilled down to 300 m, using many of the boreholes/wells as observation wells. These observation wells should be selected so as to obtain a good spatial coverage 1) in all directions and 2) at a large distance (2 km) to properly estimate the drawdown cone. Measurements of the water level of Lakes Gleeson and Daviault should also be carried out during pumping tests. The flow rate should be chosen so as to cause a large drawdown at the well, keeping in mind that the objective is to predict the dewatering effect of the 400 m-deep open pit.

b) NRCan recommends that accurate estimates of hydraulic conductivity (K) in the vicinity of Rose Pit be calculated.

c) It is recommended that the cross-section of Appendix A (of Appendix G) be improved so as to integrate geological formations, as well as existing wells and boreholes. Its location should be shown on one of the maps.

d) Slug tests performed need to be re-analysed,because only straight lines, not curves, can be analyzed with the Bouwer and Rice (1976) method. Butler (1998) suggests a way for analysing these data: first normalize observed data, and then use data around a certain value. This method is summarized on the AqteSolv website: http://www.agtesolv.com/slug-tests/recommended-normalizedhead-ranges.htm. The K values might decrease slightly. The slug test in borehole BH-GE-06 should not be interpreted, as there is not enough data.

As mentioned earlier, the two lakes that are to the north and south of Rose pit (hydraulically connected to the one in the center) might be affected or dry up if they are not dammed.

Reference:

Butler,J.J.,Jr.,1998. *The Design, Performance, and Analysis of Slug Tests,* Lewis Publishers,New York, 252p

Alderon Response to NRCan 07

Exploration and geotechnical boreholes have been drilled in the area. The two deep bedrock boreholes (RBR-12-01 and RBR-12-02) are 208 m and 300 m long inclined (60^{o}) exploration boreholes and are 96 mm in diameter (HQ). The two deep boreholes were drilled to investigate structural features such as fault systems and weathering zones that were identified from exploration borehole logging and core recovery and discussed in the structural geology response to NRCan 06.

The two deep boreholes were hydraulically tested using straddle packers which tested up to 14 overlapping zones in RB-12-01 and 23 zones in RB-12-02. The straddle packer was capable of isolating test zones up to 13.8 m in length. Results of the packer testing are provided in Appendix Q. A conceptual cross section showing the proposed drawdown from the pit was developed on the basis of the available hydrogeological information.

Additional geological, geotechnical, and hydrogeological information has been obtained in the Rose Pit and other areas of the Project. The additional data includes:

- 11 additional rising head response tests performed on overburden or the till-overburden interface zone in the vicinity of Rose Pit;
- Block geologic model showing inferred orientation of faults based on core logs and core recovery;
- Falling head permeameter analysis of selected overburden materials; and
- Additional estimates of overburden hydraulic conductivity based on grain size distribution from sieve / hydrometer analysis.

A detailed response to the information requested above is provided in Appendix Q.

1.5.8 Information Request No. NRCan 08 (Labrador)

a) NRCan requests that the Proponent clarify how the different coefficients were estimated (e.g., "The infiltration factor for the Kami Property was calculated to be 0.5. This value represents a topographical factor of 0.1 for an average slope of 0.0987 m/m, a soil factor of 0.2 for silty clay and a vegetation factor of 0.2, representing open pasture grassland and woodland cover types."). The Thorntwaite method is only used for the estimation of potential evapotranspiration. In addition, it is unclear why the proponent indicates that infiltration is equal to the sum of recharge (50%) and baseflow (50%). Please clarify if the intended estimate was for "subsurface runoff" instead of "baseflow", because this would otherwise imply that recharge cannot discharge eventually.

   And, it is said on the contrary in the text (EIS p. 16-41): "It is important to note that all water recharging aquifers eventually cycle back to the surface as groundwater discharge providing baseflow to local streams and lakes." NRCan requests that the Proponent please clarify.

b) In addition,low-flows should represent a lower limit for recharge. The commonly used "7-day low- flow" value was estimated for 8 different watersheds using values of Table 16.14 for the catchment area and figures from Appendix J (of Appendix G) for low flows. For a return period of 2 years (7Q2), values around 280 or 300 mm/y were found in all cases, and around 250 mm/y for 7Q10. This is quite far from the estimated 54 mm/y (or rather 27 mm/y for recharge) of Table 16.11. It is said in Chapter 16 (p. 16-39) that "*Numerical results were then validated with previous studies (Hare 1965; Findlay 1969; Rollings 1997; Stassinu Stantec 2011).*" NRCan requests that the Proponent clarify whether these studies were carried out in similar geological and meteorological environments, and how the values from the cited studies validated.

c) Examples of recharge values presented on p. 42 of Appendix G are likely not representative of the Wabush area ("On a regional scale, groundwater recharge based on base flow analysis and modeling elsewhere is expected to be in the range of 10 to 15% or mean annual P (e.g., 12-17% in Nova Scotia, Kennedy et al, 2010, 15% in Atlantic Region,Brown,1975)."). For instance,New Brunswick and Nova Scotia receive significantly more rain and these reports refer to flat-lying sedimentary formations of the Maritimes Basin (not the Canadian Shield). NRCan requests that the Proponent provide updated groundwater recharge values or a rationalization for using the recharge values provided in the EIS.

Alderon Response to IR No. NRCan 08 (Labrador)

a) As explained in p.16-39 of Volume 1 of the EIS, the USGS Thornthwaite Monthly Water Balance Model was used to develop the environmental water balance. The Water Balance Model is referenced in Chapter 16 by USGS, 2012, (Thornthwaite 1948; Mather 1969, 1978, 1979; McCabe and Wolock 1999). The Thornthwaite monthly water balance uses an accounting procedure to analyze the allocation of water among various components of the hydrologic system. Inputs to the model are monthly temperature and precipitation. Outputs include monthly potential and actual evapotranspiration, soil moisture storage, snow storage, surplus, and run off. The Thornthwaite monthly water balance is used for more than estimation of potential evaporation.

   Infiltration factors used in the application of the Thornthwaite monthly water balance model to discretize infiltration into recharge and baseflow (perhaps better described as interflow or “subsurface run off”). Infiltration factors are derived from MOE, 1995 – Hydrogeological Technical Information Requirements for Land Development Applications; MOE, 2003 – Stormwater Management Planning and Design Manual; Thornthwaite, W. and J. R. Mather, 1957. The Water Balance, Publications in Climatology, Vol. X, No. 3, Drexel Institute of Technology, Centerton, NJ, and Black, P. E, 1996. Thornthwaite Water Budget, Software Manual, Professional Version. To be clear, net infiltration that does not cycle back to the surface and get released as evapotranspiration, will either recharge aquifers or route to waterbodies as interflow. In both cases, over the long term, all the net infiltration will be discharged to waterbodies via groundwater discharge/baseflow.

b) Estimates of specific return period low flows were calculated using regional extrapolation from gauged station results. Low flows are sourced from groundwater discharge, interflow and release of surface water from waterbody storage. As the Reviewer points out, if the low flows are propagated out to annual estimates they produce approximate run off coefficients of 25 percent which are much lower than observed in locally and regional gauged watersheds. The results of the environmental water balance exercise were validated by analysis of regional gauged streamflow records (HYDAT stations) and Rollings (1997 – The Hydrology of Labrador) with respect to total streamflow and lake evaporation estimates. The work of Findlay, B.F. 1967 (Precipitation in Northern Québec and Labrador: An Evaluation of Measurement Techniques. Canada Department of Transport, Meterological Branch) was used to validate precipitation, run off and evaporation/evapotranspiration and water balance estimates. The work of Hare, F.K. 1965 (Recent Climatological Research in Labrador Ungava. Cashiers de geographie du Québec, 10(19): 5-12) was used validate evaporation and evapotranspiration values. All these studies are relevant to the study area having been concluded in Labrador and northern Québec with similar physiographical and meteorological environments.

c) Alderon is not aware of any specific modeling done in the Wabush-Labrador city area, a range of estimates for other areas of Atlantic Canada underlain by fractured crystalline bedrock (e.g., slate, greywacke, granite, gneiss, schist, etc.) have been used. These are compared with the water balance generated for Kami in the Hydrology sections.

Based on water balance modeling (Section 5.2.4.4 of the Water Resources Baseline Study), total groundwater recharge (infiltration) in the vicinity of the Project was estimated to range from 7 percent (dry year) to 12.1 percent (wet year), average 6.3 percent of total precipitation. Recharge would be expected to locally occur between during the thaw periods (April through October), with minor recharge from active streams and lakes during winter. Evapotranspiration may locally exceed recharge during the summer months (June through August). Of this total recharge potential, about half would be expected to discharge to the surface water system as base flow throughout the year (e.g., effective recharge or base-flow), and about half could be lost as evapotranspiration and shallow interflow, primarily during the short summer months.

Examples of total recharge (infiltration) estimates (as percent total precipitation) for fractured crystalline terrain in NS, NB and NL include:

- 10 to 15 percent - NSE default for assessment of subdivisons on Meguma Terrain;
- 15 percent - Atlantic Region (Brown 1967);
- 7.5 to 17 percent - NLGSC Moncton basin Study (Rivard et al., 2003);
- 11 to 20 percent - sandstone bedrock, NLGSC Annapolis Valley (Rivard et al., 2006);
- 4.0 to 7.5 percent - Crystalline highlands, NLGSC Annapolis Valley (Rivard et al., 2006);
- 8 to 10 percent Fall River Growth Area, (Jacques Whitford 2008);
- 14 to 16 percent (mean 14 percent), Kennedy et al. (2010) for fractured rocks;

- 7.5 percent (urban) to 15 percent (wooded) - Jacques Whitford-NAWE (2008) Groundwater Flow Modeling and Well Capture Delineation Quispamsis NB, Sep. 29, 2008; and
- 10 to 20 percent (Waterloo Hydrogeologic 2001).

A better estimation of likely open pit mine inflows and recharge rates could be developed through a review of historical pit dewatering records, monitoring and modeling works done for other mines in similar logical terrain I the Labrador City and Wabush area. Further evaluation through groundwater modeling of the Kami area can be performed once more detailed hydraulic conductivity data is available for overburden, bedrock and stream/lake bottom sediments.

1.5.9 Information Request No. NRCan 09 (Labrador)

a) It seems that many data were not available at the time of writing of this report. For instance, it is said on p. 13 of Appendix G that stage 2 work in 2012 will add 450 test locations. NRCan will review this information as it becomes available as it is expected to assist in further refining the hydrogeological model. NRCan requests that the Proponent provide the results of the 450 test locations in addition to associated maps and figures once this information becomes available.

b) NRCan requests that the location of the two recent RBR wells (RBR-1201and RBR-12-02) be provided (coordinates do not appear in tables and they are not shown on any maps). These wells are very important,since they are the only deep wells available. Similarly, logs for the ROB-12 series wells appear in Appendix C (of Appendix G), but do not appear in tables of Appendix B nor in maps. NRCan requests that the location for the ROB-12 series wells be provided.

c) NRCan recommends that a map showing the total surficial sediment thickness be provided since it appears to be highly variable, as well as a piezometric map, using colour classes (grey isocontours are more difficult to read). Maps for both the Rose Pit and entire study area could be produced. These maps should be discussed within the EIS.

d) NRCan requests that the Proponent explain why a pH=8 is called neutral (e.g. on p. 41 of Appendix B of Appendix G)? And a pH=8.05 acidic (e.g., p. 47 of Appendix B of Appendix G), since neutral is usually equal to pH=7.0.

e) NRCan requests that the Proponent please explain why the slope of BH-GE-18 is steeper than the all the others.

f) With respect to hydraulic conductivity, please clarify what information the statement on p. 16-31 ("*There is a general decrease in K with depth in the overburden.*") is based on.

g) In Table B1 of Appendix G it appears as though several Easting and Northing coordinates have been switched. NRCan recommends that this be corrected.

Alderon Response to IR No. NRCan 09 (Labrador)

a) Additional geotechnical drilling was completed throughout the site during the Fall of 2012 (completed in November 2012) in support of the engineering feasibility study for site infrastructure. Approximately 329 boreholes were completed across the site with selected boreholes completed with a stand pipe or monitor well. The information obtained from this investigation has not yet been compiled or reported. No detailed hydraulic testing has been completed in these boreholes.

b) The location of boreholes RBR-12-01 and RBR-12-02 are shown on attached Figure A2-1 Borehole Location Plane which was in the Kami Iron Ore Project Pit Slope Design report. In addition Table B1 Summary of Groundwater Monitoring Well Construction Details has been updated to include the coordinates and other relative information for these boreholes.

c) A figure showing the estimated overburden thickness surrounding the proposed open pit was included in the Kami Iron Ore Project Pit Slope Design report (see attached). In addition, Figure B-2 Groundwater Flow_Final (attached) shows the inferred recharge and discharge areas and groundwater flow directions in the area surrounding the proposed pit.

d) This is based on a standard system to describe the physical properties of water samples (color, turbidity, hardness, alkalinity, TDS and visual/olfactory properties), followed by major ion domination, and then description of higher than background or guidelines dissolved parameters. The pH is not the only parameter used in the assessment of water aggressiveness, and may actually be the least useful. The terminology alkaline, neutral and acidic is based on a combination of pH, alkalinity and Langelier Calcite saturation index at 4-5 degrees C (LI). For example, rain and surface water with hardness < 30, TDS < 30 mg/L, pH < 7, alkalinity < 30 or so and LI < -2 is classified as a dilute, "clear, very soft, naturally acidic, sodium-chloride type.

e) These responses are based on recovery of pumped wells, therefore the shape of the curve is interpreted to be related to response delay due to fracture filling between 5 and 25 minutes, then slow recovery of the well for the remaining 90-100 minutes; this test will be re-evaluated using other methods.

f) This is based on information presented in Table 1.5.8 that shows generally lower K values for the deepest boreholes drilled to, or slightly into the till-bedrock interface (mean depth 29.6 m, geometric mean K 1.5E-07), compared to shallower holes (mean depth 12.5 m, geometric mean K 1.0E-06 m/s). This would be expected in relatively uniform glacial deposits that are over-consolidated by glacier ice. Note that the deep holes are dominated by overburden; with minimal extension into bedrock.

g) Table B1, Summary of Groundwater Monitoring Well Construction Details has been updated and corrected (Table 1.5.8).

Table 1.5.8 Summary of Groundwater Monitoring Well Construction Details (Updated EIS Table B1 of Appendix G, Volume 1)

Borehole ID	Northing (m)	Easting (m)	Borehole Location[2]	Screened Unit [1]	Date Completed	Depth (BH) (m)	Depth (MW) (m)[3]	Elev Grade (m)	Elev TOC (m)	PVC Stick-up (m)	Water Level (mbtoc)	Water Level (mbg)	Screen		Sand Pack		Bedrock Depth (mbg)	K[4] (m/s)
													from (m)	to (m)	from (m)	to (m)		
BH-GE-01	5856263.6	634018.1	West Plant	Bedrock	5-Sep-11	4.62	4.62	618.74	619.60	0.86	3.91	3.05	3.05	4.62	2.83	4.62	0.8	-
BH-GE-02	5855948.7	634452.5	West Plant	overburden	6-Sep-11	15.38	15.38	592.46	593.58	1.12	0.18	-0.94	12.15	15.20	3.00	15.35	-	-
BH-GE-03	5855693.5	634478.4	West Plant	overburden	8-Sep-11	15.47	15.47	591.41	592.32	0.91	0.26	-0.65	12.20	15.50	6.35	15.50	-	6.78E-07
BH-GE-04	5855687.5	636104.2	Access Rd	till/rock	9-Sep-11	11.78	11.78	563.90	564.81	0.91	5.56	4.65	8.73	11.78	2.74	11.78	8.68	-
BH-GE-05	5855745.5	636475.6	Access Rd	till/rock	11-Sep-11	16.58	15.58	542.21	543.10	0.89	4.06	3.17	13.53	16.58	2.44	16.58	13.5	-
BH-GE-06	5855836.4	636599.7	Access Rd	overburden	12-Sep-11	15.84	15.25	540.26	541.17	0.91	2.9	1.99	12.20	15.84	3.05	15.84	-	2.60E-05
BH-GE-07	5855987.9	637423.3	East Plant	till/rock	13-Sep-11	10.89	10.89	542.76	543.65	0.89	0.81	-0.08	7.85	10.89	3.05	10.89	7.85	-
BH-GE-08	5856097.4	637653.9	East Plant	till/rock	14-Sep-11	8.23	8.23	548.04	548.95	0.91	3.54	2.63	5.18	8.23	3.20	8.23	5.13	-
BH-GE-09	5856142.0	637871.8	East Plant	overburden	16-Sep-11	9.37	9.25	564.44	565.43	0.99	0.55	-0.44	6.10	9.37	3.35	9.37	-	7.26E-07
BH-GE-10A	5855873.3	637906.2	East Plant	overburden	17-Sep-11	9.19	9.15	559.71	560.88	1.17	0.05	-1.12	6.10	9.19	2.44	9.19	-	2.55E-07
BH-GE-10B	5855873.3	637906.2	East Plant	bedrock	14-Nov-11	16.53	16.55	-	-	-	-	-	-	-	-	-	12.26	-
BH-GE-11	5855824.8	637706.1	East Plant	overburden	15-Nov-11	9.14	9.14	550.24	551.28	1.04	-1.02	-2.06	6.10	9.14	2.74	9.14	-	-
BH-GE-11B	5855824.8	637706.1	East Plant	till/rock	1-Dec-11	53.00	53.00	-		-	-	-	-	-	-	-	48.4	-
BH-GE-12	5855639.7	637590.9	East Plant	overburden	18-Sep-11	12.42	12.20	553.51	554.53	1.02	-0.92	-1.94	4.57	12.42	2.74	12.42	-	-
BH-GE-13	5855287.6	637932.5	TMF	overburden	19-Sep-11	10.79	10.70	557.22	558.29	1.07	0.76	-0.31	4.57	10.81	2.74	10.81	-	-
BH-GE-14	5854150.1	638729.8	TMF	overburden	20-Sep-11	11.12	10.70	577.06	578.15	1.09	0.1	-0.99	4.57	11.12	2.44	11.12	-	-
BH-GE-15	5854985.4	640865.7	TMF	overburden	21-Sep-11	9.75	9.15	607.58	608.70	1.12	0.92	-0.2	4.57	9.75	2.95	9.75	-	-
BH-GE-16	5856702.0	638669.0	RR	bedrock	21-Sep-11	4.57	4.57	583.41	584.63	1.22	0.87	-0.35	2.44	4.57	1.67	4.57	0.9	-
BH-GE-17	5857312.9	640508.6	RR	till/rock	24-Sep-11	9.32	9.20	590.45	591.67	1.22	-0.35	-1.57	4.65	9.32	3.05	9.32	7.02	-
BH-GE-18	5858717.6	639760.4	RR	overburden	25-Sep-11	13.36	12.20	582.96	584.03	1.07	0.65	-0.42	3.05	12.20	2.44	12.20	-	2.41E-07
BH-GE-19	5858712.5	640502.7	RR	till/rock	28-Sep-11	10.67	10.67	573.26	574.20	0.94	0.15	-0.79	6.10	10.67	2.74	10.67	6.1	-
BH-GE-20	5858778.6	640562.7	RR	overburden	27-Sep-11	12.42	12.20	570.81	571.83	1.02	-1.00	-2.02	4.57	12.20	3.05	12.20	-	-
ROB-11-01A	5855909.0	632922.6	Rose Pit perimeter	bedrock	6-Oct-11	50.90	50.80	571.16	572.05	0.89	-0.60	-1.49	47.30	50.80	47.20	50.80	47.00	-
ROB-11-01B	5855909.2	632922.0	Rose Pit perimeter	overburden	9-Oct-11	46.60	46.60	571.16	572.12	0.96	-0.60	-1.56	3.96	46.53	3.05	46.53	-	-
ROB-11-02	5856168.6	632768.9	Rose Pit perimeter	till/rock	23-Feb-12	25.90	25.90	569.00	569.91	0.91	0.58	-0.33	4.57	25.90	3.05	25.90	21.43	9.49E-08
ROB-11-03	5856168.6	632768.9	Rose Pit perimeter	till/rock	9-Feb-12	23.60	23.60	569.00	570.12	1.12	-0.82	-1.94	3.82	23.60	2.74	23.60	20.11	-
ROB-11-04	5856280.0	632626.8	Rose Pit perimeter	till/rock	6-Apr-12	24.40	21.30	576.07	-	?	?	?	3.15	21.30	2.45	21.30	20.5	-
ROB-11-05A	5856176.8	632137.6	Rose Pit perimeter	bedrock	10-Mar-12	19.58	19.58	595.10	596.01	0.91	1.91	0.995	16.70	19.58	16.50	19.58	19.5	-
ROB-11-05B	5856176.8	632137.6	Rose Pit perimeter	overburden	15-Mar-12	13.72	13.72	595.10	595.10		1.63	1.63	4.70	13.72	3.10	13.72	-	1.16E-06
ROB-11-06	5855363.8	631477.2	Rose Pit perimeter	till/rock	28-Feb-12	13.72	13.72	653.32	654.46	1.14	12.14	11.00	4.57	13.72	2.44	13.72	9.96	-
ROB-11-07	5854799.2	631669.65	Rose Pit perimeter	till/rock	3-Apr-12	60.05	60.05	600.33	-	1.01	-	-	4.11	58.98	3.05	60.05	52.42	-
ROB-11-08A	5854776.0	631997.0	Rose Pit perimeter	till/rock	28-Oct-11	29.00	28.60	579.20	580.65	1.45	0.00	-1.45	6.71	28.55	6.80	29.00	22.86	-
ROB-11-08B	5854777.0	631998.0	Rose Pit perimeter	Overburden	11-Nov-11	9.10	9.10	579.20	580.11	0.91	-0.91	-1.82	6.10	9.04	2.15	9.04	-	-
ROB-11-09	5854709.0	632194.0	Rose Pit perimeter	till/rock	5-Nov-11	30.50	30.50	589.70	590.59	0.89	-0.90	-1.79	24.38	30.50	3.10	30.50	25.90	-

Borehole ID	Northing (m)	Easting (m)	Borehole Location[2]	Screened Unit [1]	Date Completed	Depth (BH) (m)	Depth (MW) (m)[3]	Elev Grade (m)	Elev TOC (m)	PVC Stick-up (m)	Water Level (mbtoc)	Water Level (mbg)	Screen		Sand Pack		Bedrock Depth (mbg)	K[4] (m/s)
													from (m)	to (m)	from (m)	to (m)		
ROB-11-10	5854664.0	632653.0	Rose Pit perimeter	till/rock	18-Oct-11	7.60	7.60	617.29	618.36	1.07	4.29	3.22	1.52	7.52	0.91	7.60	3.58	-
ROB-11-11	5854769.9	632918.0	Rose Pit perimeter	till/rock	19-Oct-11	5.80	5.80	618.39	619.53	1.14	0.85	-0.29	2.77	5.80	2.20	5.80	1.75	-
ROB-11-12	5854944.1	633248.9	Rose Pit perimeter	till/rock	21-Oct-11	7.50	7.50	631.15	632.19	1.04	0.15	-0.89	1.37	7.37	0.90	7.37	3.92	-
ROB-11-13A	5855229.5	633783.7	Rose Pit perimeter	till/rock	18-Mar-12	15.24	15.24	633.20	633.20				12.30	15.24	11.60	15.24	11.28	-
ROB-11-13B	5855229.5	633786.7	Rose Pit perimeter	overburden	24-Mar-12	10.67	10.67	633.20	633.20				1.60	10.67	1.40	10.67	-	1.92E-06
ROB-11-14	5855758.7	633875.6	Rose Pit perimeter	till/rock	25-Mar-12	9.14	9.15	605.80	605.80				3.15	9.14	2.40	9.14	4.82	-
ROB-11-15	5856144.5	633477.5	Rose Pit perimeter	till/rock	8-Apr-12	8.98	8.98	598.60	599.54	0.94	-	-	3.05	8.98	2.82	8.98	4.30	-
ROB-11-16	5856090.6	633217.9	Rose Pit perimeter	till/rock	25-Oct-11	16.50	16.50	571.24	572.31	1.07	-0.55	-1.62	4.32	16.41	3.05	16.41	12.20	-
ROB-11-17	5855590.8	632777.5	Rose Pit interior	till/rock	13-Oct-11	47.90	47.90	580.75	581.71	0.96	1.10	0.14	5.18	47.75	4.57	47.75	43.30	3.17E-08
ROB-11-18	5855668.2	632197.9	Rose Pit interior	till/rock	16-Oct-11	30.50	30.50	575.17	576.29	1.12	0.00	-1.12	3.05	30.38	2.44	30.38	26.50	-
ROB-11-19	5855373.0	632349.0	Rose Pit interior	till/rock	9-Apr-12	14.95	14.95	574.40	574.40				2.90	14.95	2.10	14.95	9.30	-
ROB-11-20	5855553.0	633250.0	Rose Pit interior	till/rock	23-Oct-11	15.10	15.10	612.00	613.06	1.06	2.49	1.43	3.05	15.01	1.51	15.01	10.20	1.16E-06
RBR-12-01	5855885.2	632773.6	Rose Pit interior	bedrock	6-Mar-12	224.00	--	573.20	--	--	-0.80	--	--	--	--	--	33.05	1.51E-06
RBR-12-02	5855010.4	632131.2	Rose Pit Interior	bedrock	17-Mar-12	300.00	--	581.30	--	--	2.90	--	--	--	--	--	16.40	

1.5.10 Information Request No. NRCan 10 (Labrador)

a) Table 1.2 should include Newfoundland and Labrador Department of Municipal Affairs, Land Use Planning and Newfoundland and Labrador Department of Transportation and Works, Highway Design and Construction under the section pertaining to the involvement of the government of Newfoundland and Labrador in the Environmental Assessment Committee. Note that there are two instances of the Newfoundland and Labrador Department of Advanced Education and Skills, Labour Market Development Division in Table 1.2.

b) Table 1.2 should include Natural Resources Canada within the section pertaining to the Government of Canada's involvement in the Environmental Assessment Committee.

Alderon Response to IR No. NRCan 10 (Labrador)

a) Table 1.2 of Volume 1 is revised (Table 1.5.9) to include Newfoundland and Labrador Department of Municipal Affairs, Land Use Planning and Newfoundland and Labrador Department of Transportation and Works, Highway Design and Construction.

b) Table 1.2 of Volume 1 is revised to include Natural Resources Canada.

Table 1.5.9 Environmental Assessment Committee (Updated EIS Table 1.2, Volume 1)

Government	Government Department
Newfoundland and Labrador Government	Newfoundland and Labrador Department of Environment and Conservation, Environmental Assessment Division
	Newfoundland and Labrador Department of Environment and Conservation, Pollution Prevention Division
	Newfoundland and Labrador Department of Environment and Conservation, Water Resources Division
	Newfoundland and Labrador Department of Environment and Conservation, Wildlife Division
	Newfoundland and Labrador Department of Environment and Conservation, Land Management Division
	Women's Policy Office
	Newfoundland and Labrador Department of Tourism, Culture and Recreation, Provincial Archaeology Office
	Newfoundland and Labrador Department of Advanced Education and Skills, Skills Development Division
	Newfoundland and Labrador Department of Advanced Education and Skills, Labour Market Development Division
	Newfoundland and Labrador Department of Advanced Education and Skills, Labour Market Development Division
	Newfoundland and Labrador Department of Natural Resources, Mines Branch
	Intergovernmental and Aboriginal Affairs Secretariat, Aboriginal Affairs Branch

Government	Government Department
	Labrador-Grenfell Regional Health Authority
	Newfoundland and Labrador Department of Municipal Affairs, Land Use Planning
	Newfoundland and Labrador Department of Transportation and Works, Highway Design and Construction
Government of Canada	Environment Canada
	Fisheries and Oceans Canada
	Transport Canada
	Canadian Environmental Assessment Agency
	Canadian Transportation Agency
	Health Canada
	Natural Resources Canada

1.5.11 Information Request No. NRCan 11 (Labrador)

a) For the text describing the tailings that is found in the brackets, the EIS should state: (as coarse and fine fractions).

Alderon Response to IR No. NRCan 11 (Labrador)

The second sentence on page 2-20 of the EIS (Volume 1) should read: "This results in the production of approximately 26.4 Mtpa of tailings (as coarse and fine fractions)".

1.5.12 Information Request No. NRCan 01 (Québec)

The proponent is, therefore, requested to undertake supplementary acid-base accounting analysis (ABA analysis) to delineate and subtract the contribution of graphite carbon from the measured total inorganic carbon contents and obtain realistic carbonate values and, hence, carbonate NPs for all lithological units at the Kami mine and Pointe-Noire terminal sites.

1. a) NRCan recommends that the Proponent provide results of supplementary ABA analysis to delineate and subtract graphite carbon from the measured total inorganic carbon content. Provide updated carbonate NPs for all lithological units at the Kami mine and Pointe-Noire terminal sites.

Alderon Response to IR No. NRCan 01 (Québec)

Alderon asserts that supplementary ABA analysis for graphitic carbon is not necessary because there was no evidence of graphite in rocks obtained from the terminal site.

1.5.13 Information Request No. NRCan 02 (Québec)

a) Generally, the total NP includes both carbonate and silicate based available alkalinities. While the carbonate minerals provide direct acid consumption and neutralization to pHs of about 4, the acid consumption capabilities of the silicate minerals are best realized under more acidic conditions of pH < 4, where many metals like Cu, Ni and Zn are already mobilized. Thus, the PAG/NAG classification scheme should only be based on total available carbonate NPcarb and NPRcarb. NRCan requests that the Proponent provide updated PAG/NAG classifications based on total available carbonate NPcarb and NPRcarb.

b) For long-term acid generation potential evaluations, the PAG/NAG classification boundary should also be raised to NPRcarb = 3 to include dissolution and loss of carbonate minerals in the weathering process and during the period of low or no acid generation.

c) Based on the above NPRcarb of 3, the amounts of PAG/NAG materials, including overburden, waste rock and tailings, produced at the Kami mine and Pointe-Noire terminal sites should be re-evaluated.

d) NRCan requests that the Proponent provide maps and cross-sections with ARD/ML sample locations for the Kami mine and Pointe-Noire terminal site in order to relate the ARD/ML assessment (static/kinetic sample locations and results) to the geology and development plans, as per the EIS guidelines (Section 4.17.3.1).

e) NRCan requests that the Proponent include the ARD/ML reports and maps as part of the Appendices for the final copy of the EIS.

Alderon Response to IR No. NRCan 02 (Québec)

a) For all samples, neutralization potential was defined using the Modified Sobek NP procedure (Sobek NP) and calculated from carbonate measured by pyrolysis (Carbonate NP) in SGS laboratory, according to standard analytical methods (Sobek et al. 1978, Price 2009).

Updated classifications based on median Carbonate NP and NPR values for the concentrates and rock generated at Pointe-Noire terminal are provided below(Table 1.5.2 and 1.5.3). The median Carbonate NPR values for these materials are above 2, indicating that these materials can be classified as Non–Acid Generating (NAG). Only one sample of twelve samples had NPR>1 in an approximately 0.5 m wide dyke. Blending of the dyke material with hosted rock produces a NAG mixture with carbonate NPR values > 4.8, according to analyses of samples of crushed rock collected from quarry stockpiles (Table 1.5.2). The updated classification indicates that there is no risk of ARD at the proposed Pointe-Noire Terminal site.

a) For long-term acid generation potential evaluations, the PAG/NAG classification boundary should also be raised to NPRcarb = 3 to include dissolution and loss of carbonate minerals in the weathering process and during the period of low or no acid generation.

b) The Proponent acknowledges the concerns underlying NRCan's request for additional conservatism (i.e. to increase the NPR ratio to a value of 3 from a value of 2). However, the Proponent does not feel that this level of conservatism is warranted for the Project. Section 4.17.3.1of the EIS Guidelines recommends the use of NPR criteria from the

MEND Manual (Price, 2009) for the classification. The manual states "samples with an NPR greater than 2 are non-PAG". The manual does not prescribe the increase of the NPR boundary for long-term acid generation potential.

Although the Proponent does not support the modification of NPR ratio from a value of 2 to 3, the results were evaluated using the higher NPR ratio. The resulting median $NPR_{carbonate}$ ratios were greater than 4.7 for concentrates produced at the Kami mine and rocks from the proposed Terminal Site (Tables 1.5.2, 1.5.3). The sample of granite from the proposed Terminal Area has $NPR_{carbonate}$ > 2 and can be re-classified as NAG. Two of twelve samples could be reclassified as PAG, as result of PAG/NAG boundary increase to value of 3. Theoretically, the PAG/NAG rock ratio increased from 1/12 to 1/6 as a result of reclassification. The updated PAG/NAG ratio still indicates that the majority of the rock is NAG, which has potential to buffer PAG based on following evidence:

- median carbonate NPR;
- NPR values of crushed rock samples representing "site-scale" mixtures; and,
- slightly alkaline pH of water samples collected form the rock quarry currently present in the proposed site.

Therefore, no ARD/ML issues are expected at the proposed Pointe-Noire Terminal Site.

c) An extensive search in the archives of Québec Geological Survey indicated that there is no detailed map available for the Pointe-Noire terminal site. The existing 1:50,000 map shows that the regional study area of EIS is underlined by gabbro-anorthosite/gabbro.

d) An extensive search in the archives of Québec Geological Survey indicated that there is no detailed map available for the Pointe-Noire terminal site. The existing 1:50,000 map shows that the regional study area of EIS is underlined by gabbro-anorthosite/gabbro.

References:

Sobek, A., Schuller, Freeman, W.J. and Smith, R. (1978), Field and Laboratory Methods Applicable to Overburdens and Minesoil, (West Virginia Univ., Morgantown College of Agriculture and Forestry): EPA report no. EPA-600/2-78-054 p.47-50.

Price, W. (2009). Prediction Manual for Drainage Chemistry from Sulfidic Geologic Materials. Report prepared for MEND. Report 1.20.1

1.6 Information Requests Received from Transport Canada (TC)

Alderon received Transport Canada's comments on the EIS Environment in December 2012. Discussions with the Transport Canada have been ongoing since the submission of the EIS in order to advance the Navigable Waters Protection Act application. In their last meeting held on November 21, 2012, Transport Canada provided an overview of their comments on the EIS and Alderon has incorporated input from Transport Canada into the responses below.

The following section includes the six information requests from Transport Canada and Alderon's response to each of these requests.

1.6.1 Information Request No. TC 01

In addition to the proposed signage, the Proponent will be responsible to abide by any stipulated condition listed on any issued *Navigable Waters Protection Act* (NWPA) approval and/or the criteria listed on the *Minor Works and Waters Orders* of the NWPA.

Alderon Response to IR No. TC 01

Alderon understands and acknowledges the requirement.

1.6.2 Information Request No. TC 02

All works associated with the watercourse alteration (i.e., dam, water diversion pipeline, intakes, and discharges) may require review and approval under the NWPA. The Proponent is advised to submit an Application for Work Approval to:

Navigable Waters Protection Program
Transport Canada – Marine Safety
P.O. Box 1013
Dartmouth, NS B2Y 4K2
P: (902) 426-2726
F: (902) 426-7585
E: nwpdar@tc.gc.ca

The application should include a description of the impacts to downstream flows and/or water levels. Transport Canada is aware that the Projects Water Management Plan and the dewatering rate for Rose Pit at operation is 433 m^3/h.

Alderon Response to IR No. TC 02

Applications have been provided to the Navigable Waters Protection Program (NWPP) for works associated with watercourse alterations (Appendix N). Alderon received confirmation of receipt of the application and confirmation from the NWPP on December 4, 2012 that it was sufficiently complete to commence the review.

1.6.3 Information Request No. TC 03

The Proponent is advised to assess the above mentioned works to be installed in, on, over, under, through, or across waterways against the Minor Works and Waters Order.

The Proponent is advised to submit a completed "Request for Work Approval" for all works installed in, on, over, under, through, or across a navigable waterway that do not meet the criteria outlined in the Minor Works and Waters Orders. Completed requests can be submitted to:

Navigable Waters Protection Program
Transport Canada – Marine Safety
P.O. Box 1013
Dartmouth, NS B2Y 4K2
P: (902) 426-2726
F: (902) 426-7585
E: nwpdar@tc.gc.ca

The Minor Works and Waters Order, "Request for Work Approval" application, and other relevant information are available from the following website: http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-menu-1978.htm.

Alderon Response to IR No. TC 03

Applications have been provided to the Navigable Waters Protection Program (NWPP) for works associated with watercourse alterations (Appendix N). Alderon received confirmation of receipt of the application and confirmation from the NWPP on December 4, 2012 that it was sufficiently complete to commence the review.

1.6.4 Information Request No. TC 04

Page 20-45 of the EIS states, "All petroleum products will be transported / handled in accordance with the Provincial Transportation of Dangerous Goods Act." The proponent is advised of the applicability of the *Federal Transportation of Dangerous Goods Act and Regulations*.

Transport Canada administers the federal *Transportation of Dangerous Goods Act* (TDGA) which is applicable to all modes of transportation. The movement of regulated dangerous goods (including fuel) to, from, and within project areas must be conducted in compliance with the TDGA. Compliance with the applicable regulations under the *Transportation of Dangerous Goods Act* and *Regulations* is mandatory.

Transport Canada would like to advise the proponent of CANUTEC which is the Canadian Transport Emergency Centre operated by Transport Canada to assist emergency response personnel in handling dangerous goods emergencies. This national bilingual advisory centre is specialized in interpreting technical information, providing advice, and emergency response. CANUTEC offers 24-hour emergency telephone service at 1-613-996-6666 or *666 on a cellular phone.

Alderon Response to IR No. TC 04

Alderon acknowledges the requirements under the Transportation of Dangerous Goods Act and of the CANUTEC emergency response contact.

1.6.5 Information Request No. TC 05

As indicated within the EIS, the proposed railway will be constructed within the applicable engineering standards therefore no approvals under the Federal Railway Safety Act are required. This EIS identifies several commitments from the proponent to construct, operate, and maintain the railway using the following standards and rules:

- American Railway Engineering and Maintenance of Way Association;
- QNS&L Track Standards;
- Canadian Rail Operating Rules (TC document TC O 0-93); and
- Track Safety Rules (TC document TC E-54).

Transport Canada has a MOU in place with the Province of Newfoundland and Labrador to provide oversight of provincial railways once they become operational.

Alderon Response to IR No. TC 05

The rail operation standards and rules applicable to the rail component of the Project are noted.

1.6.6 Information Request No. TC 06

Transport Canada owns and operates the Wabush Airport. Page 2-47 indicates that Project personnel and/or freight may be transported through Wabush Airport via chartered flights. The Proponent is encouraged to work closely with Airport Management when scheduling chartered flights to avoid conflicts with regular scheduled traffic.

Transport Canada operates Wabush airport in accordance with the *Canadian Aviation Regulations*. There are no requirements to have aircraft rescue and fire-fighting services on site at an airport with fewer than 180,000 boarded and deplaned passengers per year. The Wabush Airport meets these regulations and operates in a very safe manner.

In accordance with the *Canadian Aviation Regulations*, Transport Canada requires all certified airports, regardless of size, to prepare and submit for approval an emergency response and spill response plan. The emergency plan at Wabush Airport calls for on-site airport personnel to respond to aircraft incidents in coordination with emergency responders such as police, fire and ambulance services provided by the Towns of Wabush and Labrador City.

The level of emergency response service in the Wabush Airport's current emergency response and spill response Plan is consistent with other airports in the country and meets all guidelines and regulations.

Alderon Response to IR No. TC 06

As stated in the EIS, air traffic had increased in 2010 to / from the Wabush Airport by 28 percent over the previous year. Air cargo has decreased as road access has improved to the region (Volume 1, Section 24.5.11.1 of the EIS). As a result of the passenger increases, infrastructure improvements (terminal roof restoration, improved parking) were made to the Wabush Airport. A new Wabush Airport Master Plan is currently being developed which will guide Transport Canada as to future upgrades. Alderon will liaise with local authorities in order to provide them with the necessary information for planning and managing expected traffic volumes and access issues.