A SUBSIDIARY OF
CHAMPION IRON

Kami Mining Project

Champion Kami Partner Inc.

Wabush, NL

Annex 3:Terrestrial Baseline Reports

Environmental Impact Statement

July 2025

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REPORT

Terrain and Soils Baseline Report

Kami Iron Ore Mine Project

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Acronyms and Abbreviations

Acronym or Abbreviation	Description
DEM	Digital Elevation Model
EIS	Environmental Impact Statement
GPS	Global positioning system
LSA	Local study area
RSA	Regional study area
RUSLEFAC	Revised Universal Soil Loss Equation for Application in Canada
SSA	Site study area
SMU	Soil Management Unit
WSP	WSP Canada Inc.

Units of Measure

Acronym or Abbreviation	Description
cm	centimetre
ha	Hectare
km	Kilometre
m	Metre
%	Percent

Executive Summary

The Kami Local Study Area (LSA) overlies rocks from the Paleoproterozoic Era.

Surficial materials in the Kami LSA are dominated by till (moraine) occupying over 75% of the LSA and organic accumulations occupying approximately 14.6% of the LSA. The majority (approximately 98%) of the LSA is mapped as stable terrain (Class I, II, and III), with minor areas (1.2%) mapped as potentially unstable ([Class IV] or 46.5 ha,), and 1.4% mapped as unstable (Class V).

Topography is relatively planar in most areas of the LSA. Inclined and rolling landscapes with slopes between 10% and 20% grade are located on slopes adjacent to lakes and fluvial systems. Steep slopes (up to 97% grade) are associated with bedrock outcrops.

Soils in the Kami LSA are generally well to moderately well drained Brunisols and Podzols. There are some areas of very poorly drained areas associated with Organic soils. Reclamation suitability for soils in the LSA is generally classified as unsuitable due to very low pH values (<3.5) in the Ae horizons or because of very high coarse fragment contents. Mineral soils in the LSA were generally at a moderate risk for wind erosion, very low risk for water erosion, and low risk for soil compaction. Organic soils were not rated for reclamation suitability or erosion and compaction risk as the rating systems are not designed to include Organic soils. Approximately 64.0% of the LSA is considered to be well drained, 0.1% is considered to be very rapidly drained, and 8.1% is mapped as having imperfect to poor drainage where water tables fluctuate, or inundation or seepage is present. Very poor drainage associated with areas of organic accumulation account for 15.5% of the LSA.

Record of Issue

Company	Client Contact	Version	Date Issued	Method of Delivery
WSP Canada Ltd.	Michel Groleau	RevA Draft	March 18, 2024	Electronic
WSP Canada Ltd.	Michel Groleau	Rev 0 Final	April 30, 2024	Electronic
WSP Canada Ltd.	Michel Groleau	Rev 1 Update	February 7, 2025	Electronic

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APPENDICES

1.0 INTRODUCTION

The Kamistiatusset (Kami) Iron Ore Mine Project (the Project) is a proposed iron ore mine in Newfoundland and Labrador. The Project site is located approximately seven kilometres southwest of the Town of Wabush, ten kilometres south of the Town of Labrador City, and five kilometres northeast of Ville de Fermont, Québec (Figure 1-1).

The Project was originally proposed by the Alderon Iron Ore Corporation (Alderon) and underwent a provincial and federal environmental impact assessment from 2011 to 2013, including a comprehensive baseline program that was completed in 2011 and 2012. The Project was released from the provincial and federal EA process in 2014. In 2021, Champion Iron Limited (through its subsidiary 12364042 Canada Inc, herein referred to as Champion) completed the acquisition of the Project from Alderon.

Champion is proposing several improvements to the Project design proposed by Alderon through the previous Environmental Impact Statement (EIS). These proposed improvements include optimizations to the Project's water management strategy and modernization of the proposed ore handling, conveyance, and processing. Champion's objective for the Kami Project is to produce high purity (>67.5%) iron concentrate, which can be used as direct reduction pellet feed for electric arc furnaces in the green steel supply chain.

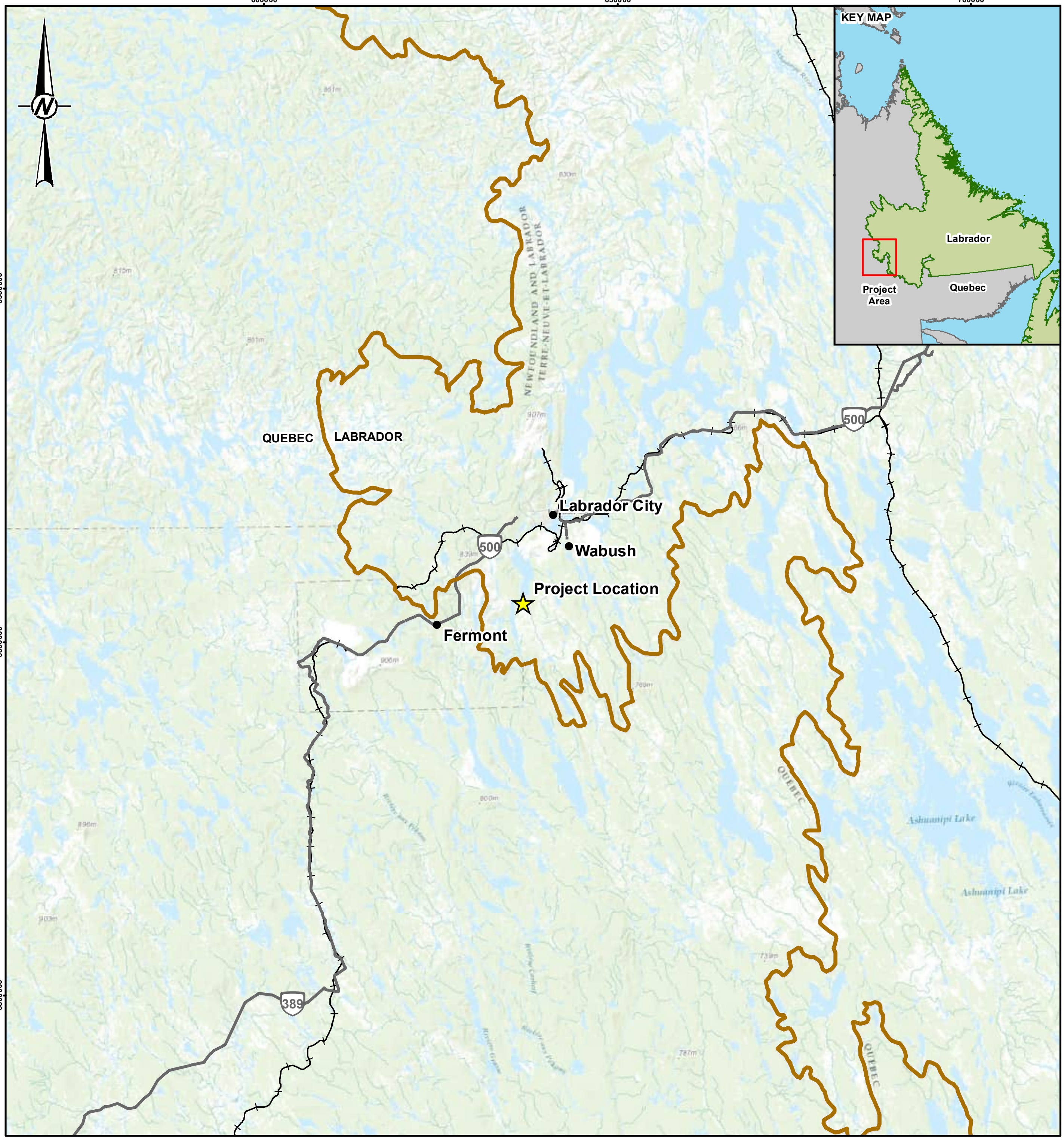
Champion submitted a Project Registration document to the NL Department of Environment and Climate Change (the Department) in April 2024 to restart the EA process for the Project. On June 13, 2024, the Minister issued a Decision Letter to Champion concluding that an EIS would be required for the Project. EIS Guidelines were issued for the Project on December 19, 2024, that includes requirements for baseline studies.

To support the EIS process, Champion has commissioned the services of WSP Canada Inc. (WSP) to complete a comprehensive baseline field program that documents the existing natural and socio-economic environments in the anticipated area of the Project, and this terrain and soils baseline report represents a component of the comprehensive baseline program. The terrain and soils baseline study was undertaken to provide context from which effects soils and terrain could be evaluated and inform the development of mitigation measures and follow-up effect monitoring programs in the EIS. Champion is planning to submit the EIS to the Newfoundland and Labrador Environmental Assessment Division of the Department of Environment and Climate Change in 2025.

1.1 Changes Since the Previous Iteration of the Baseline Report

As a result of the inclusion of permafrost in list of baseline study components outlined in Section 4.3.3: Terrestrial Environment of the Final EIS Guidelines (Government of NL 2024), WSP has updated the terrain and soils baseline report to ensure the requirements related to permafrost are adequately satisfied. This includes undertaking a desktop study on permafrost in the Project area.

See Section 5.4 of this report for further information on the permafrost baseline in the Project area.



LEGEND

- PROJECT LOCATION
- POPULATED PLACE
- HIGHWAY
- RAILROAD
- LABRADOR/QUEBEC BOUNDARY

0 15 30

1:800,000 KILOMETRES

REFERENCE(S)

DIGITAL BASE DATA MAY BE OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. BASES TOPOGRAPHIC MAP FROM ESRI AND IT'S LICENSORS.
PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
PROJECT LOCATION

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
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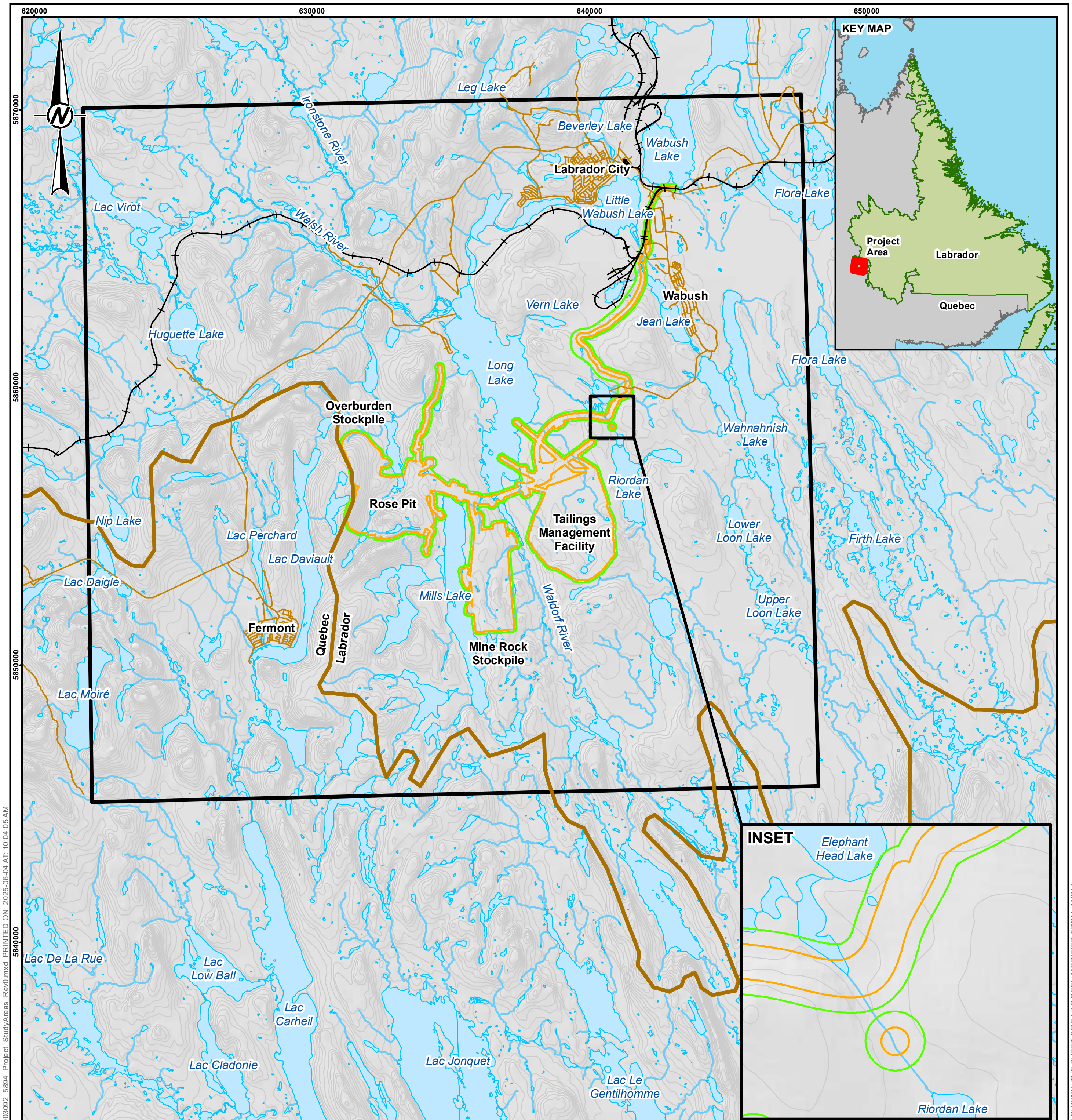
2.0 STUDY AREAS

The baseline conditions for terrain and soils are documented within three defined study areas for the Project. Baseline study areas were defined to delineate the spatial extent in which baseline information and data are collected and compiled with sufficient detail to enable the characterization of existing environmental conditions for terrain and soils within the local and regional vicinity of the Kami Project.

The **Site Study Area** (SSA) is the area of potential direct disturbance (i.e., location of proposed infrastructure) and is the area where most of the direct effects from the proposed Project are likely to occur. It is represented by the proposed Project footprint and is approximately 2,681 hectares (ha). The SSA was based on the Project design information available at the time of planning for the field program (Figure 2-1).

The **Local Study Area** (LSA) includes the SSA plus a 100-meter buffer for a total of approximately 3,869 ha (Figure 2-1). The extent of the LSA was designed to allow for the documentation of existing conditions and to provide context for assessing the combined potential direct and indirect effects of the Project on terrain and soils. The outer boundary of the LSA represents the furthest extent to which Project effects on soils and terrain are likely to occur.

The **Regional Study Area** (RSA) includes the SSA, LSA, and additional areas where cumulative effects of the Project could potentially occur depending on physical and biological conditions and the types and location of other past, present, and reasonably foreseeable projects. The RSA from the 2012 Environmental Impact Statement (EIS) (Alderon 2012) was used, however it is only discussed in terms of background bedrock geology and surficial geology in this report, as no measurable ecological effects on terrain and soils are predicted from direct physical disturbance beyond the LSA.



LEGEND

- CONTOUR (40m INTERVAL)
- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA
- REGIONAL STUDY AREA
- LABRADOR/QUEBEC BOUNDARY
- WATERBODY

0 4 8

1:200,000 KILOMETRES

REFERENCE(S)

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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
KAMI IRON ORE MINE PROJECT STUDY AREAS

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
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PROJECT NO.	CONTROL	REV.	FIGURE
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3.0 RATIONALE AND OBJECTIVES

WSP was retained to collect terrain and soil baseline data in support of the Kami Project Registration. The baseline program was designed to meet the requirements outlines in the 2012 EIS Guidelines (Government of Canada 2012) for the Kami Project, which specified that a description of unique landforms, terrain stability, and a description of soil characteristics to determine their sensitivity to erosion and their suitability for supporting revegetation was required. To meet these requirements, detailed terrain and soil mapping and analysis was completed across the LSA. Field data was also collected to support the baseline assessment (Section 4.2 and 6.2.1). Therefore, the objectives of the terrain and soils baseline program are to:

- Provide an updated baseline desktop study for landform (terrain) and soil characterization within the LSA.
- Provide baseline terrain mapping at a 1:5,000 scale within the SSA, 1:20,00 scale in the LSA and the largest scale, publicly available bedrock and surficial geology mapping within the RSA.
- Provide soil mapping at a 1:5,000 scale in the SSA, 1:20,000 scale in the LSA.
- Provide relevant baseline reporting and summaries on terrain, soil quality, and soil quantity.

4.0 METHODS

4.1 Desktop Analysis

4.1.1 Background Information Sources

Existing data were used to support the characterization of baseline conditions in the SSA, LSA, and RSA. These data were gathered from the Province of Newfoundland and Labrador, from available in-house data at WSP, and published maps and reports from a variety of sources. For the purpose of characterizing the terrain and soil conditions within the SSA, LSA, and RSA, the following reports and maps were included in the compilation and review of existing information:

- Glacial landforms and deposits, Labrador, Newfoundland and eastern Quebec (GSC 1992);
- 1982 Exploration Program in the Labrador City Area. Report on Block No. 72 with appended reports on Blocks No. 51-59, 62, 64-67, 69-71, 73-77 and 83-91 (Labrador Mining and Exploration Company Limited 1982);
- 2013 Geotechnical Site Investigation and Subsurface Details (WorleyParsons, 2014);
- 2012 Site Wide Geotechnical Program – Geotechnical Investigation Field and Laboratory Results (Volume 1) (Stantec 2013a);
- 2012 Site Wide Geotechnical Program – Preliminary Aggregate Source Assessment (Volume 2) (Stantec 2013b); and
- Kami Iron Ore Project: Tailings Management Facility Feasibility Design (Golder, 2018).

4.1.2 Terrain and Soil Mapping

4.1.2.1 Terrain Mapping

Terrain mapping combines terrain, soil, and landscape features to delineate areas with similar topography and soil properties. It subdivides the landscape into relatively homogenous terrain units based on:

- Soil parent materials;
- Overburden thickness/depth to bedrock;
- Underlying surficial material;
- Surface expression (topography);
- Slope;
- Aspect;
- Soil drainage; and
- On-going geomorphological processes.

Detailed preliminary terrain mapping was completed at a 1:5,000 scale for the SSA and LSA using WSP's softcopy mapping tool which incorporates both ArcGIS and PurVIEW software. Digital stereo imagery was purchased from the National Air Photo Library in Ottawa and subsequently merged with the provincial 1:50,000 scale Digital Elevation Model (DEM) to create imagery that could be viewed in 3D (stereo) on a computer monitor using specialised 3D glasses. The softcopy mapping environment allows mappers the ability to zoom down from the initial capture scale of the aerial photographs (e.g., 1:20,000) to scales greater than 1:5,000. The preliminary detailed terrain mapping was completed by terrain scientists with no less than 10 years of mapping experience.

The following data sources were used to complete pre-field mapping:

- 1:40,000 scale black and white aerial photos acquired in 1955 from the National Air Photo Library in Ottawa, Ontario and
- A 1:50,000 scale Digital Elevation Model (DEM) from Natural Resources Canada (NRCan)

In addition to the stereo imagery, WSP used borehole logs and bog probe data from previous investigations (Stantec 2013a; WorleyParsons 2014) to assist with determining the origin, thickness, and texture of the surficial materials.

Final mapping was completed in 2023 and incorporated with recently acquired LiDAR data, and higher resolution ortho photographs:

- 1 m contour data acquired in 2023;
- 10 cm resolution LiDAR data and associated hillshade acquired in 2023; and
- Colour 10 cm resolution orthophotos acquired in 2023.

The mapping framework outlined in Terrain Classification System for British Columbia, Version 2, (Howes and Kenk 1997) was used to classify individual terrain units. Relatively homogenous terrain units (e.g., 100% morainal veneers over bedrock) were delineated where possible, however in some instances, polygons may have a secondary component (i.e., second decile; e.g., 70% morainal veneers over bedrock, 30% bedrock outcrops) to represent distinctly different areas in a polygon too small to delineate at the mapping scale. The summary data in the results section has accounted for all terrain units (including second deciles) assigned to a polygon, and a weighted representation is displayed in the tables.

Each terrain polygon was also rated for terrain stability and was assigned a stability class from the Mapping and Assessing Terrain Stability Guidebook, 2nd edition (B.C. Ministry of Environment 1999). Table 4-1 provides the five-class terrain stability classification system (B.C. Ministry of Environment 1999) that was used to support this attribution. No field work specific to terrain stability was completed to verify the classification system.

Table 4-1: Terrain Stability Classification

Terrain Stability Class	Interpretation
I	No significant stability problems exist.
II	There is very low likelihood of landslides following timber harvesting or road construction; minor slumping is expected along road cuts, especially for 1- or 2-years following construction.
III	Minor stability problems can develop. Timber harvesting should not significantly reduce terrain stability. There is a low likelihood of landslide initiation following timber harvesting. Minor slumping is expected along road cuts, especially for 1- or 2-years following construction. There is a low likelihood of landslide initiation following road construction.
IV	Expected to contain areas with a moderate likelihood of landslide initiation following timber harvesting or road construction.
V	Expected to contain areas with a high likelihood of landslide initiation following timber harvesting or road construction.

Notes: The classification addresses landslides greater than 0.05 ha using conventional forest clearing practices and sidecast road construction. Terrain units classed as I, II, or III may contain minor amounts of Class IV or V terrain. These areas may not have been delineated due to mapping scale and scope of work.
Source: BC Ministry of Environment (1999)

A legend (Appendix A, Figure A-1) and a draft set of 1:10,000 scale figures have been produced and are provided in Appendix A (Figure A-2a to Figure A-2o). Surficial material types have been colour coded based on dominant surficial material and the maps also show the spatial extent of all terrain units, a label for each terrain polygon, and contours.

A typical terrain polygon label is shown in Figure 4-1, followed by a description of the label composition.

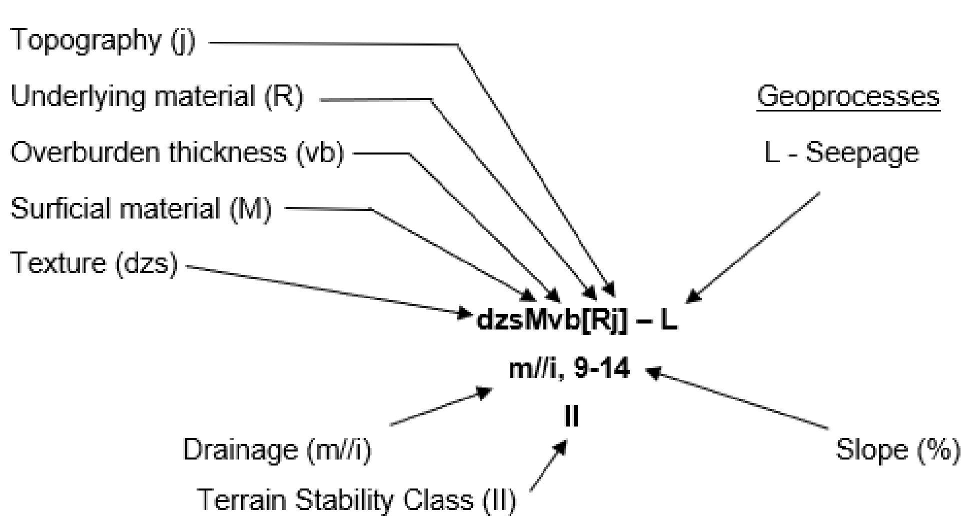


Figure 4-1: Typical Terrain Polygon Label

The example in Figure 4-1 shows the terrain unit is characterized by till (M) veneers (v) (less than 1 m thick) and blankets (b) (between 1 and 3 m in thickness) overlying bedrock (R) that is gently sloping (j). The till is composed of mixed fragments (d) in a silty sand matrix (zs). The surficial sediments are moderately well (m) drained much more (//) than imperfectly (i) drained with slopes of 9% to 14%. Seepage (L) is mapped as a geomorphological process within this unit, and terrain stability has been rated as generally stable (Terrain Stability Class II). Figure A-1 in Appendix A shows the terrain legend used for this assessment.

4.1.2.2 Soil Mapping

Soil mapping is a process that incorporates pedology and geomorphology to describe a landscape in terms of a taxonomy combining soil development with the physical and chemical properties of surficial materials. Soil units were mapped at 1:5,000 scale or larger in the SSA and LSA to characterize soil and provide detail for baseline inventory of soil and reclamation planning. At this scale, the complexity of soil types and landscape features are represented by Soil Map Units (SMUs) which are individual polygons encompassing areas of similar dominant surficial materials, commonly occurring soil types, range of dominant slope gradients, topographic assemblages, and soil drainages. Soil Map Unit naming was developed to reflect variations in each type of parent material, drainage, texture, and soil type.

Soil mapping in the SSA and LSA was generated using the terrain mapping linework and attributes as a base along with field data (Section 4.1.2.1). Soils were mapped as per federal standards (Mapping System Working Group 1981). Each polygon was identified based on surficial materials, surficial material texture, soil development, soil drainage, depth to bedrock, and topography. Each polygon within the LSA was edited, if and where it was appropriate, and then spatially assigned the following in addition to the attributes already assigned during the terrain mapping:

- SMU;
- Reclamation suitability;
- Soil wind erosion risk;
- Soil water erosion risk; and
- Soil compaction risk.

4.1.3 Reclamation Suitability

Soil attributes recorded during the field surveys and from the analytical data were compared to the criteria for evaluating soil reclamation suitability after removal and salvage of surface and subsurface layers and assigned a reclamation suitability class (Table 4-2). Soil suitability for reclamation focuses on chemical and physical characteristics affecting the soil's suitability for reclamation and usefulness for revegetation during reclamation and is referred to as soil quality (Alberta Soils Advisory Committee [ASAC] 1987).

Reclamation suitability was quantitatively determined based on the soil characteristics for each SMU. If multiple calculations were generated based on lab results for the same SMU, the most representative profile was chosen for the assigned ratings. The Soil Quality Criteria Relative to Disturbance and Reclamation (ASAC 1987) was adopted for the Project and adapted based on conditions in the SSA and LSA. Upper lift and lower lift criteria for the Northern Forest Region (ASAC 1987) were used to develop the assigned ratings (Table 4-3 and Table 4-4). The percent of organic carbon criteria from the British Columbia criteria (BC MEMPR 2009) was added to the upper lift rating assignments to provide additional insight to the possible limitations of the SMUs.

The most limiting criteria determines the overall reclamation suitability rating for each SMU. It should be noted a "poor" rating does not necessarily mean the soil cannot be used for reclamation, but when salvaged, would require careful planning and good management (ASAC 1987). Soil rated as "unsuitable" due to one limitation may have been assigned an overall better rating (e.g., poor) as management practices can be utilized to result in a more suitable soil material for reclamation purposes (ASAC 1987). Some map units were not assigned ratings as they are non-soils (rock, water), or are considered disturbed (anthropogenic). This soil quality system is for use in mineral soils only; however, Organic soils should be considered for salvage and used as a soil conditioner (ASAC 1987).

Table 4-2: Soil Suitability Class Descriptions for Criteria Relative to Disturbance and Reclamation

Suitability Class	Description
Good	No soil limitations to slight soil limitations that affect use for plant growth.
Fair	Moderate soil limitations that affect use but can be overcome by proper planning and good management.
Poor	Severe soil limitations that make use questionable; careful planning and very good management are required.
Unsuitable	Limitations of soil chemical or physical properties are so severe that reclamation is not possible or economically feasible

Source: ASAC 1987

Table 4-3: Criteria for Evaluating Suitability of Surface Material (Upper Lift) for Revegetation in the Northern Forest Region

Rating/Property	Good	Fair	Poor	Unsuitable
Reaction (pH)	5.0 to 6.5	4.0 to 5.0, 6.5 to 7.5	3.5 to 4.0, 7.5 to 9.0	<3.5, >9.0
Salinity (EC) [dS/m]	<2	2 to 4	4 to 8	>8
Sodicity (SAR)	<4	4 to 8	8 to 12	>12
Saturation (%)	30 to 60	20 to 30, 60 to 80	15 to 20, 80 to 120	<15, >120
Stoniness/Rockiness (% area)	<30/<20	30 to 50/20 to 40	50 to 80/40 to 70	>80/>70
Texture [(a)]	fSL, vfSL, L, SiL, SL	CL, SCL, SiCL	LS, SiC, C, HC, S	n/a
Moist Consistency	very friable, friable	loose, firm	very firm	extremely firm
CaCO3 Equivalent (%)	<2	2 to 20	20 to 70	>70
% Organic Carbon [(b)]	2 to 30	1 to 2, or >30	<1	-

Source: ASAC (1987) Table 8 – Northern Forest Region. More details are provided in the source document.
a) Texture abbreviations found in Appendix B.
b) Criteria taken from Table 1 (BC MEMPR 2009)
EC = electrical conductivity; dS/m = deciSiemens per metre; SAR = sodium adsorption ratio (sodicity)

Table 4-4: Criteria for Evaluating the Suitability of Subsurface Material (Lower Lift) for Revegetation in the Northern Forest Region

Rating/Property	Good	Fair	Poor	Unsuitable
Reaction (pH)	5.0 to 7.0	4.0 to 5.0, 7.0 to 8.0	3.5 to 4.0, 7.5 to 9.0	<3.5, >9.0
Salinity (EC) [dS/m]	<3	3 to 5	4 to 8	>8
Sodicity (SAR)	<4	4 to 8	8 to 12	>12
Saturation (%)	30 to 60	20 to 30, 60 to 80	15 to 20, 80 to 100	<15, >100
Coarse Fragments (% Vol)	<30/<15	30 to 50/15 to 30	50 to 70/30 to 50	>70/>50
Texture[(a)]	fSL, vfSL, L, SiL, SL	CL, SiC, SiCL	LS, C, HC, S	bedrock
Moist Consistency	very friable, friable, firm	loose, very firm	extremely firm	hard rock
CaCO3 Equivalent (%)	<5	5 to 20	20 to 70	>70

Source: ASAC (1987) Table 9 – Northern Forest Region. More details are provided in the source document.
a) Texture abbreviations found in Appendix B.
EC = electrical conductivity; dS/m = deciSiemens per metre; SAR = sodium adsorption ratio (sodicity)

4.1.4 Wind Erosion Risk

Soil erosion potential refers to the risk of degradation in soil quality or soil loss from erosive forces, typically wind and water (i.e., physical loss of soil or organic matter). The loss of surface soil by erosion my result in a reduction in soil quality and the ability for soil to support vegetation.

Soil erosion was evaluated using rates of erosion risk for dry, exposed mineral soils (i.e., vegetation cover has been removed). Erosion risk is dependent on soil and site characteristics such as soil texture, coarse fragment content, slope gradient, and length of slope. Wind erosion risk ratings are texturally based; therefore, organic soils are not rated but are inherently resistant to wind erosion because of their physical characteristics. It should be noted that wet soils, such as gleysols, or frozen soils are generally not susceptible to wind erosion but a change in a soil's state (e.g., frozen) or moisture regime can alter the risk of erosion. High erosion potential does not necessarily equate with poor quality soil; however, a high erosion potential at a given location increases the risk of soil degradation.

The dominant soil texture assigned to each SMU was used to establish soil sensitivity to wind erosion (wind erosion risk). This was done based primarily on texture and a dimensionless index adapted from Coote and Pettapiece (1989). The criteria for determining wind erosion risk are presented in Table 4-5.

Table 4-5: Criteria for Determining Wind Erosion Risk

Soil Texture	Wind Erosion Risk Class
Very fine sand, sand, coarse sand, loamy sand, gravelly sand	High
Sandy loam, loam, silt loam, sandy clay loam, sandy clay	Moderate
Silt, silty clay loam, clay loam, silty clay, clay, heavy clay	Low

Source: adapted from Coote and Pettapiece (1989)

4.1.5 Water Erosion Risk

The potential water erosion rating was estimated using the Revised Universal Soil Loss Equation for Application in Canada (RUSLEFAC; Wall et al. 2002). The RUSLEFAC equation is an equation that is applicable for Canada and was developed to predict the average soil losses by soil erosion via water. Characteristics of soil and terrain (i.e., topsoil texture, slope length, and gradient) recorded during the field programs were used, where possible, to calculate the estimated soil loss. Estimated soil loss by water erosion (A) was calculated using the RUSLEFAC equation $A = R * K * LS * C * P$, then ranked into one of the five erodibility classes of very low, low, moderate, high, and severe as per Wall et al. (2002). Units comprised of mainly water (N), rock or bedrock (R), or anthropogenic polygons were not assigned ratings.

Inputs considered when estimating soil loss include rainfall and runoff (R), soil erodibility factor (K), slope factor (LS), crop/vegetation and management factor (C), and support or management practices (P). Details are as follows:

- The rainfall and runoff factor (R) was estimated based on a global rainfall erosivity index (Panagos et al. 2017).
- The soil erodibility factor (K) was established using laboratory soil textures (particle size analysis) for the representative mineral soil within a SMU and the soil erodibility values for common surface textures with less than 2% organic matter content (Table K-3 in Wall et al. 2002). For profiles having variable surface and subsurface textures, the most limiting was chosen to take a conservative approach.
- Slope length (L) and slope gradient (S) were assigned based on field data, where present. The median value of the slope length and slope gradient classes were assigned to best represent each polygon. In areas where no field data were available, slope gradient values were established in ArcGIS using a 1 m Digital Elevation Model (DEM) to assign dominant slope gradients in each polygon. Slope length values were assigned based on measuring slope lengths in ArcGIS, extrapolation (the most common slope length recorded for similar map units in the LOD), and professional judgment. These values were used to calculate the LS (slope or topographic factor) value for each polygon. To take a more conservative approach, LS values for existing conditions were determined using Table LS-3 in Wall et al. (2002) to account for disturbed soil conditions, with little or no cover.
- The crop/vegetation and management factor (C) was given the value of 1.
- Management practices (P) factor was given the value of 1.

Water erosion risk in the LSA was assigned spatially, meaning rather than assigning a risk to a soil map unit, ratings were assigned based on the dynamic landscape. The LS factor calculation was determined from a 3 m resolution Digital Elevation Model (DEM) which is generated by a tool (ESRI 2018), and the erosivity data (the R value) was applied from a global rainfall erosivity index (Panagos et al. 2017).

4.1.6 Compaction Risk

Compaction risk is associated with soil physical properties, the moisture content when the soil is disturbed, and the nature of the applied force (Cannon and Landsburg 1990). Compacted soil can have decreased soil porosity which is an important property of soil to control moisture availability to vegetation and can result in greater amounts of surface runoff (Archibald 1997). Soil compaction risk was assigned to soil units based on their texture, coarse fragment content, and drainage. Soil compaction ratings were assigned based on a generalized rating system for compaction risk (Table 6), which was developed using professional judgment and adaption from two compaction systems. Both compaction systems were designed for forestry applications and are soil and moisture based, so are applicable to the SSA and LSA. The matrix considers the combined influences of soil texture, coarse fragment content, and soil drainage. Organic soils were not rated for compaction but are susceptible to compaction due to their low load bearing materials being easy to displace (BC FLNRORD 1999).

Table 4-6: Compaction Risk Matrix

Drainage	Soil Textural Class[a]				
	Fragmental (>70% coarse fragments) and Very Coarse	Moderately Coarse	Medium	Moderately Fine	Fine/Very Fine
	S, LS	SL, fSL	SiL, Si, L	SCL, CL, SiCL, Si	SC, SiC, C, HC
Rapid	Low	Low	Low	Low	Moderate
Well	Low	Low	Low	Moderate	Moderate
Moderately Well	Low	Low	Low	Moderate	Moderate
Imperfect	Low	Low	Moderate	High	High
Poor	Moderate	Moderate	High	High	High
Very Poor (Organic)	Not rated				

Source: Adapted from BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (BC FLNRORD 1999) and Compaction and Rutting Hazard for Soils in Ontario (Archibald et al. 1997)
a) Texture abbreviation definitions are found in Appendix B

4.2 Field Program

4.2.1 Field Investigations

Field surveys were undertaken to verify preliminary mapping by completing inspection points to collect specific soil and terrain data. A combination of detailed and non-detailed site inspections was completed to collect data in the field. Detailed site inspections describe the soil conditions by digging a test pit and recording soil profile data, terrain data, and other localized data. Non-detailed site inspections describe field observations with or without digging a test pit and can provide information to support mapping. Non-detailed inspection sites generally describe available data on surficial materials, slope, and drainage or geomorphological processes existing in an area.

Terrain data collected at each inspection site follows guidelines found in the Field Manual for Describing Terrestrial Ecosystems Second Edition (BC MOFR and BC MOE 2010). Soil field data was collected following the manual for describing soils in the field (Expert Committee on Soil Survey 1982) and the Canadian System of Soil Classification (SCWG 1998).

Inspection sites were chosen based on results of the desktop study, prior to the field survey and accessed by ATV, truck, or on foot, where possible. Field information was recorded on a global positioning system (GPS) enabled iPad. Soil pits were excavated and inspected to a maximum depth of 100 centimetres if mineral soil, and 220 centimetres if organic; however, reaching this depth of excavation with hand tools was limited in some areas due to lithic contact (i.e., shallow bedrock).

The following soil and terrain information was recorded for soil survey inspection sites, where applicable:

- GPS location (easting/northing);
- Slope position, gradient, and aspect;
- Soil surficial (parent) material and texture;
- Surficial material expression;

- Subsurface material and texture;
- Subsurface material expression;
- Geomorphological processes (if applicable);
- Soil horizon designation and thickness, including organic/litter layer;
- Soil horizon structure (if applicable), consistence, colour, texture, and coarse fragment content (%);
- Presence of mottling;
- Seepage and/or water table depth;
- Drainage; and
- Soil subgroup classification.

The soil profiles were described according to the Canadian Soil Information Service (CanSIS; Expert Committee on Soil Survey 1982). Soil horizon information was used to classify soils using the Canadian System of Soil Classification (SCWG 1998) and to determine soil characteristics and reclamation suitability. Classification of soils was completed using field data to the extent possible. The field assessment aimed at collecting data to meet requirements outlined in the 2012 EIS Guidelines and to verify the preliminary terrain and soil mapping (Section 4.1.2). Field data was collected from locations throughout the LSA, including the SSA.

4.2.2 Soil Chemistry

At representative soil sites, mineral soil was collected from each horizon of the soil profiles. A minimum of 10% of soil inspection sites were sampled within the SSA. Samples were collected to provide baseline chemical characterization and data for calculating soil reclamation quality and sensitivity to erosion. Soil samples for the program were delivered to Bureau Veritas for analysis.

The following laboratory analyses were run on representative modal soil profiles:

- pH (pH @ 25°C [1:2 calcium chloride extract]);
- particle size (soil texture – percent gravel, sand, silt, clay) (hydrometer);
- Soil salinity (electrical conductivity);
- Soil sodicity (sodium adsorption ratio);
- total organic carbon;
- Saturation % (water holding capacity);
- total nitrogen (nitrite and nitrate);
- plant available nutrients (available nitrogen, phosphorus, potassium, and sodium; cation exchange capacity; and exchangeable cations);
- saturated paste extractables (sodium adsorption ratio [SAR], calcium [Ca], conductivity saturated paste, Magnesium [Mg], pH in water and saturated paste, potassium [K], % saturation, sodium [Na]);
- theoretical gypsum requirement;

- cation exchange capacity;
- total metals: (aluminium [Al], antimony [Sb], arsenic [As], barium [Ba], beryllium [Be], bismuth [Bi], boron [B], cadmium [Cd[, calcium [Ca], chromium [Cr], cobalt [Co], copper [Cu], iron [Fe], lead [Pb], lithium (Li], magnesium [Mg], manganese [Mn], mercury [Hg], molybdenum [Mo], nickel [Ni], phosphorus [P], potassium [K], selenium [Se], silver [Ag], sodium [Na], strontium [Sr], thallium [Tl], tin [Sn], titanium [Ti], uranium [U], vanadium [V], zinc [Zn], Zirconium [Zr]);

4.3 Data Management and Analysis

Data management, including quality assurance and quality control was completed to minimize potential for data entry and analysis errors, prepare data sets for analysis, and limit sensitive data distribution in accordance to established agreements.

A Quality Assurance / Quality Control program was implemented to verify that data collection, data entry, and data analysis were conducted with a high level of confidence. Quality Assurance / Quality Control of field data and data summary calculations consisted of:

- Reviewing and verifying field data on site, at the end of each day, and at the end of each field shift to maintain data quality and consistency;
- Using tablets to provide consistent use of field codes;
- Transferring and backing-up field data and field photos to online databases and laptops regularly;
- Using systematic data checks on field parameters for consistency and accuracy; and
- Verifying the accuracy of calculations performed to generate summary statistics.

Database checks included verifying values outside of expected ranges for each parameter. Calculations of summary statistics were verified by recalculating minimum and maximum values, evaluating relationships between parameters, querying sample sizes and medians for a subset of the data. Mapping products and data analysis results were reviewed by WSP soil and terrain specialists who were not directly involved in the final products.

The specific tasks for post-field data management and Quality Assurance / Quality Control were as follows:

- Complete daily field summary report;
- Download all photographs and GPS locations to file server; and
- Review GPS coordinates for accuracy;
- Complete office review and Quality Assurance / Quality Control of all field data collected by soil and terrain scientists;
- Review all data forms and field notebooks; and entre all relevant data not already entered into the field tablet into a database.

5.0 BACKGROUND

5.1 Physiography

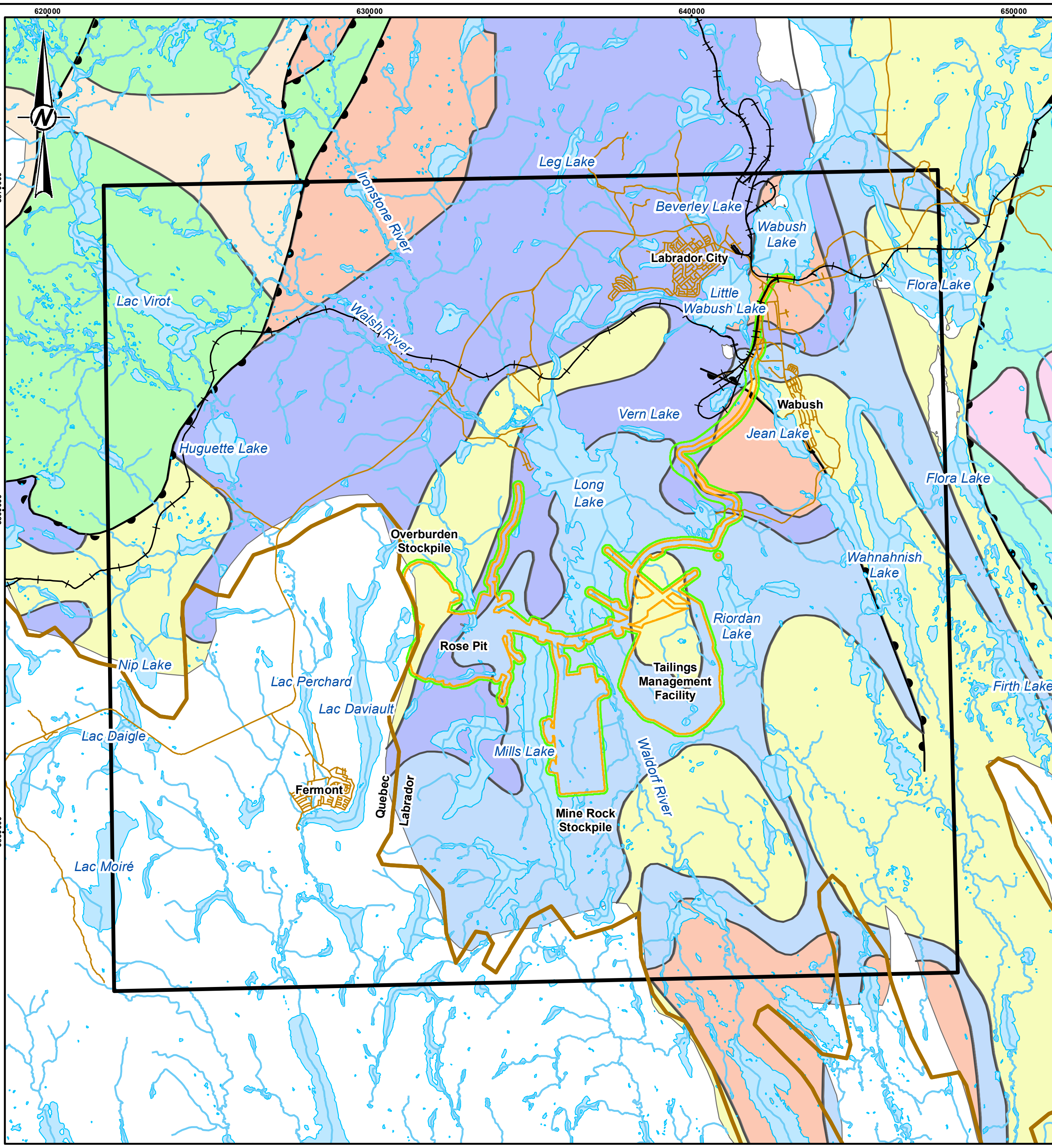
The Kami Project is located in the Lake Plateau division of the James Region subregion which is part of the Canadian Shield Physiographic Region (Bostock 1970a). The Canadian Shield is a generally smooth landscape interrupted by rounded or flat-topped monadnocks and ranges of hills (Bostock 1970b). The smooth horizon is evidence of an old erosion surface with much of the elevation of the Shield between 200 and 300 feet (60 to 90 m) above sea level (Bostock 1970b), but elevation does rise above this towards the central interior of the Shield (Vincent 1989). As a result of glaciation, there are numerous lakes, ponds and swamps throughout the Shield landscape, and the main rivers and streams flow in the direction of general slope of the land surface (Bostock 1970b). Despite the general uniformity of the Shield terrain, there are geological and physiographic differences allowing the landscape to be divided into subregions (e.g., James Region) and divisions (e.g., Lake Plateau). The Lake Plateau is described by Bostock (1970b) as a rolling plain with numerous lakes and isolated hills of bedrock which stand approximately 500 feet (150 m) above the general surface.

Klassen and Thompson (1993) describe the physiography of Central Labrador as reflecting regional variations and structural trends in bedrock geology. They suggest much of Central Labrador is characterised by typical Shield terrain; low relief punctuated by rugged highland plateaus and elongated hills and valleys. The bedrock hills are commonly streamlined by glacial abrasion and areas of extensive drift cover are characterised by poor drainage and numerous lakes, many of which are elongated in the direction of the last ice flow.

5.2 Bedrock Geology

Bedrock geology mapping by Wardle et al. (1997) at a 1:1,000,000 scale indicates the Kami RSA is underlain by dolomite marble, pelitic schist, pelitic phyllite, pelitic gneiss, meta-ironstone, and quartzite from the Mid Paleoproterozoic Era (Figure 5-1).

Golder (2018) describes the Kami Project site as typically underlain by the Wabush-Labrador City sequence of sedimentary iron formation of the Labrador Trough. This sequence is early Precambrian (Lower Proterozoic-Aphebian) in age and was subsequently deformed, faulted, and metamorphosed in the much later Precambrian Grenville Orogen.



LEGEND
- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA
- REGIONAL STUDY AREA
- LABRADOR/QUEBEC BOUNDARY
- WATERBODY

LINEAR GEOLOGIC FEATURES
- CONTACT
- FAULT

BEDROCK GEOLOGY
- EARLY MESOPROTEROZOIC - GABBRO, AMPHIBOLITE
- LATE PALEOPROTEROZOIC - GRANITE, QUARTZ MONZONITE, GRANODIORITE, SYENITE
- MID PALEOPROTEROZOIC - DOLOMITE MARBLE
- MID PALEOPROTEROZOIC - META-IRONSTONE, QUARTZITE
- MID PALEOPROTEROZOIC - PELITIC SCHIST, PELITIC GNEISS
- MID PALEOPROTEROZOIC - PELITIC SCHIST, PELITIC PHYLLITE
- NEOARCHEAN - GRANITOID, GRANITOID GNEISS
- NEOARCHEAN - METATONALITE, TONALITE GNEISS

0 4 8
1:175,000 KILOMETRES

REFERENCE(S)
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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
BEDROCK GEOLOGY IN THE KAMI IRON ORE MINE PROJECT REGIONAL STUDY AREA

CONSULTANT
wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

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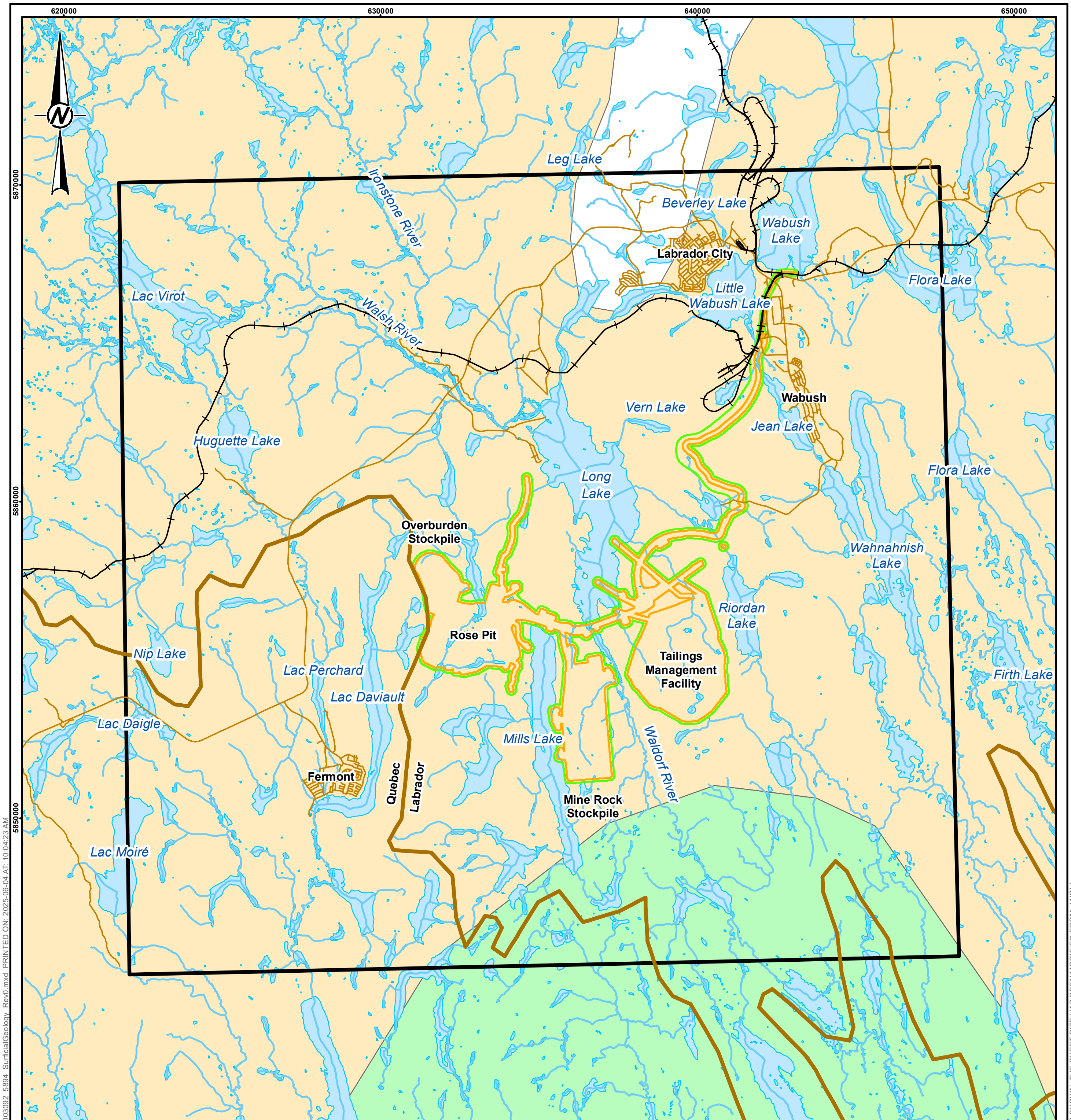
5.3 Surficial Geology

Few Quaternary studies have been completed in Labrador and eastern Quebec and the published information tends to be near communities throughout Labrador (Klassen and Thomson 1993). Surficial geology mapping at a scale of 1:1,000,000 for Labrador was completed by Klassen et al. (1992) by compiling existing surficial geology mapping at scales ranging from 1:100,000 to 1:5,000,000; references are provided by Klassen et al. (1992) Surficial geology of the RSA is displayed on Figure 5-2. More detailed mapping at a scale of 1:50,000 has been published by Kirby et al. (1989) however only the northern part of the Kami Project is covered by this mapping.

Klassen and Thompson (1993) provide a brief summary of the glacial history in central Labrador. Glacially streamlined landforms, eskers and ribbed (Rogen) moraine suggest that during the last glaciation ice was generally flowing from western Labrador southward and eastward across central Labrador to the Labrador coast. This is confirmed by Bird (1982) who identified a regional ice flow direction in the Kami Project area from approximately 315 ± 5° based on the measurements of striations on bedrock surfaces. Klassen and Thompson (1993) provide a description of surficial sediments throughout central Labrador, with glacial till being identified as the dominant surficial material, however a more detailed description of the sediments specific to the Kami Project area are provided by Stantec (2013a). The following is a summary of the surficial sediments identified by Stantec (2013a) in the Kami Project area. The thickness of the overburden throughout the Project area based on the boreholes completed by Stantec (2013a) ranges from 0.5 m to 48.5 m extending to the termination of the borehole or to bedrock.

Soil survey and associated mapping at a 1:12,500 scale completed by the Government of Newfoundland and Labrador (2004) in support of locating suitable land to increase agricultural development opportunities in the region have been published. The surveys completed in 2013 indicate glacial till is deeper and relatively free of stones and boulders in an area southeast of Wabush Lake. More boulder and exceedingly stony till on hummocks and inclines were identified west of Labrador City, and similar boulder and exceedingly stony till material was identified in association with steep terrain and abundant rock outcrops in the Huguette Lake area, north of Fermont, Quebec, and southwest of Labrador City.



LEGEND

EXISTING RAILWAY
ROAD
WATERCOURSE
LOCAL STUDY AREA
SITE STUDY AREA
REGIONAL STUDY AREA
LABRADOR/QUEBEC BOUNDARY
WATERBODY

SURFICIAL GEOLOGY

GLACIAL SEDIMENTS - BLANKET
GLACIAL SEDIMENTS - VENEER

0 4 8

1:175,000 KILOMETRES

REFERENCE(S)

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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SURFICIAL GEOLOGY MAPPING IN THE KAMI IRON ORE MINE PROJECT REGIONAL STUDY AREA

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
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5.4 Permafrost

The Project lies within the isolated patches permafrost zone, where between 0% and 10% of the land area is underlain by permafrost (Heginbottom et al. 1995). In addition, for any areas within this zone where there is permafrost, there is between 0% and less than 10% of ground ice content in the upper 10 m to 20 m of the ground (Heginbottom et al. 1995).

Smith and Burgess (2002) provide a digital database of permafrost thickness in Canada, and within the database one site is located within the Wabush-Labrador City area. The site was initially discussed by Brown (1975) and the following information is from the 1975 publication. Brown (1975) notes that the distribution of permafrost in Quebec and Labrador is more complicated than provinces further west due to the hilly and mountainous relief. Except in areas of higher elevation, Brown (1975) suggests permafrost occurs in scattered islands varying in extent and thickness.

Peat palsas were noted at the summit of Mont-Wright, Quebec, at approximately 762 metres above sea level (masl) (Brown 1975), and located approximately 36 km southwest of Wabush, Labrador. No permafrost was found in the townsites of Wabush and Labrador City at an elevation of approximately 548 masl, however permafrost was noted at an elevation of approximately 762 masl in nearby iron mines and found to depths exceeding 60 m (Brown 1975). The details of the permafrost identified in the iron ore mines were provided to Brown (1975) through personal communication, but no other details are given.

Temperature data collected within Canada between 1948 and 2012 indicates that climate change is occurring within Canada with increases in temperature ranging from up to 3°C warmer in Canada's North to around 1°C warmer on Canada's eastern coast (Government of Canada 2015). Projected increases in mean air temperature over land underlain with permafrost under all emission scenarios will result in permafrost warming and thawing across large areas of Canada (Bush et al. 2019). Permafrost was not identified as a potential issue in the Alderon Kami Iron Ore Project EIS (2012). In addition, it was not identified during the terrain mapping completed by WSP, and frozen soil was not encountered during field investigations. If encountered it is anticipated that permafrost will be localised to specific landforms, such as topographic highs, where mean annual air temperatures are lower than regional.

5.5 Soils

There are very limited detailed soil maps available for the SSA, LSA, and RSA. The Soil Landscapes of Canada Working Group (2010) published a very low-resolution (1:1,000,000 scale) map of the distribution of soil landscapes across Canada. Podzols and Organic soils have been mapped in the general area of the Project (SLCWG 2010).

The closest available detailed soil map available is The Detailed Soil Surveys of Javelin Road, Canning Lake and Huguette Lake areas in Labrador West, Labrador (Government of Newfoundland and Labrador, 2004) which is presented at a scale of 1:12,500. The Canning and Huguette Lake sections of the report are the closest available data to the Project area; these soil surveys were completed approximately eight km northwest of the SSA. The third part of the soil survey, Javelin Road, is approximately four km northeast of the furthest east edge of the proposed rail infrastructure for the Project.

The report indicates that till materials dominate the landscape and are composed of moderately coarse to coarse grained (sandy loam) material. Orthic Gleysols are anticipated on lower slope positions. Orthic Humo-Ferric Podzols of varying depths due to the presence of bedrock can be found in upper slope positions. Gleyed Ferro-Humic Podzols form on mid to lower slopes, and Orthic Ferro-Humic Podzols develop on well stratified and well drained glaciofluvial eskers (Government of Newfoundland and Labrador 2004).

Soil associations portray a sequence of soils approximately the same age, derived from similar parent materials, and occurring under similar climatic conditions, but having unlike characteristics because of variations in relief and drainage (Government of Newfoundland and Labrador 2004). Associations can be divided into soil series which are defined in terms of horizon characteristics, drainage, and depth to bedrock (Government of Newfoundland and Labrador 2004). Three soil associations and seven soil series are described in the Government of Newfoundland and Labrador (2004) report the details of which are summarised below:

- Flora Lake Association:
  - Flora Lake is characterized as a sloping fen composed of dominantly sedge peat with sphagnum and with water at or near the surface for most of the year.
  - Walshes River is wetter than Flora Lake and is described as ribbed fens where open water is high (>70%) and is usually inundated.
- Huguette Lake Association:
  - Huguette Lake soils are characterized by slightly stony, rapidly drained, medium to fine textured, well stratified glaciofluvial esker deposits. A cemented layer between approximately 10 to 35 cm below surface was noted to occur in these soils, limiting vegetative growth.
- Javelin Road Association:
  - Canning Lake soils are characterised by moderately coarse to coarse (sandy loam) glacial till. These soils are poorly drained, and very to exceedingly stony soils are found in poorly drained depressions.
  - Wabush soils are characterised by moderately coarse to coarse (sandy loam) glacial till. These soils are located on mid to lower slopes of undulating to ridged terrain, are imperfectly drained with seepage at 30 cm, and are slightly to exceedingly stony.
  - Javelin Road soils are also characterised by moderately coarse to coarse (sandy loam) glacial till, however they are moderately well drained, slightly to exceedingly stony and located on upper to mid slopes of undulating to ridged terrain.
  - Lake Virot soils are very similar to the Javelin Road soils but bedrock is less than 1 m from the surface. Mapped on ridged terrain these soils are shallow in depth and are very to excessively stony.

6.0 RESULTS

6.1 Terrain

A total of 653 terrain units were delineated within the LSA, resulting in an average polygon size of 5.89 ha. The polygons ranged in size from 0.04 ha (a bedrock outcrop in the south buffer of the proposed mine rock stockpile) to 158.2 ha (a gently sloping, well drained area of till in the proposed overburden stockpile).

6.1.1 Surficial Materials

Appendix A, Figure A-2a to A-2o provides the detailed terrain mapping within the SSA and LSA at a scale of 1:10,000. Each polygon is labelled with a symbol as outlined in Figure 4-1 (Section 4.1.2.1) and the polygons are colour coded based on the dominant surficial material in each polygon. Refer to the associated legend Figure A-1, Appendix A for an explanation of the terrain labels.

Table 6-1 summarizes the surficial materials mapped in the SSA and LSA. Moraine (till) is the dominant surficial material mapped in the LSA (2,064.2 ha, 77.0%), followed by organic deposits (421.4 ha, 15.7%), and glaciofluvial sediments (58.9 ha, 2.2%). The SSA reflects a similar distribution of dominant surficial materials. Minor areas of lacustrine and fluvial materials, bedrock, colluvium, anthropogenic material, and open water have also been mapped in the LSA and SSA (Table 6-1).

Table 6-1: Surficial Materials in the Site Study Area and Local Study Area

Surficial Material	Site Study Area		Local Study Area	
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Anthropogenic (A)	5.4	0.2	69.9	1.8
Colluvium (C)	5.9	0.2	5.9	0.2
Fluvial (F)	18.2	0.7	24.8	0.6
Glaciofluvial (FG)	58.9	2.2	99.2	2.6
Lacustrine (L)	3.3	0.1	12.8	0.3
Moraine (till) (M)	2,064.2	77.0	2,909.6	75.2
Open Water (N)	98.4	3.7	174.7	4.5
Organic (O)	421.4	15.7	564.5	14.6
Bedrock (R)	5.1	0.2	7.1	0.2
Total[(a)]	2,680.9	100	3,868.6	100

a) Numbers may not add up due to rounding.

6.1.1.1 Anthropogenic and Open Water

Areas mapped as anthropogenic are associated with disturbances to natural materials and soils such as roads, existing borrow pits, and urban areas. Open water identifies areas of open water based on available imagery.

6.1.1.2 Colluvium

Colluvium is material that has reached its present position as a result of direct, gravity-induced movement (Howes and Kenk 1997). Colluvium is mapped in one area of the LSA on the west side of the proposed Rose Pit (Figure A-2i, Appendix A) and is associated with what appears to be a minor landslide involving slumping as a slow mass movement.

6.1.1.3 Fluvial

Fluvial materials have been mapped in 24.8 ha (0.6%) of the LSA and 18.2 ha (0.7%) of the SSA (Table 6-1). Fluvial (alluvial) sediments are materials transported and deposited by streams and rivers, and generally consist of gravel and/or sand and/or silt (Howes and Kenk 1997). They are often relatively well sorted and show stratification (Howes and Kenk 1997). Fluvial sediments often vary in texture in association with the speed and energy of water flow. In slower, low energy, depositional environments, finer textures are more common, and in faster, higher energy environments, coarser materials are deposited. In addition, materials usually reflect the surrounding sediment available for transport.

Field data collected by WSP indicates fluvial sediments in the LSA are composed of cobbles. Terrain mapping suggests that fluvial sediments in the LSA are generally veneers overlying till or glacial fluvial plains, one of the more significant areas of fluvial material is at the center of the proposed Tailings Management Facility surrounded by organic materials. Smaller areas of fluvial materials are mapped throughout the LSA in associated with drainages and water movement between lake basins and select organic areas. These fluvial materials are often composed of very various sizes of coarse fragments as the original material have likely had the fine materials of the soil matrix (clay, silt, and sand) washed out (Appendix C, Photo C-4). Drainage within areas mapped as fluvial are commonly poor due to lower depressional slope positions and being prone to inundation and flooding.

6.1.1.4 Glaciofluvial

The detailed mapping by WSP indicates there is approximately 99.2 ha (2.6%) of glaciofluvial sediments in the LSA and 58.8 ha (2.2%) in the SSA (Table 6-1; Appendix A, Figures A-2a to A-2u). Glaciofluvial sediments are materials that exhibit evidence of having been deposited by glacial meltwater streams either directly, in front of, or in contact with glacier ice (Howes and Kenk 1997). Although glaciofluvial sediment can vary in particle size and associated texture due to variations in the speed and energy of water flow in the glacial meltwater streams, it is generally associated with coarser textured sand and gravel, and commonly appropriate for aggregate use. Glaciofluvial material ranges from non-sorted and non-bedded gravel resulting from very rapid aggradation at an ice front, to moderately to well sorted, stratified gravel (Howes and Kenk 1997). Slump structures, and hummocky or irregular terrain may be present and are indicative of collapse of the material due to melting of supporting ice that is buried or partially buried, forming kettles (Howes and Kenk 1997).

In the LSA, all surveyed sites identified as glaciofluvial (K23CB003, K23CB031, K23LM001, and K23LM023) were described as sand (Appendix C, Photos C-2 and C-3) with varying amounts of subrounded mixed fragments (between 2% and 70% by volume). Coarse fragment content generally increased with depth in the soil pits. The terrain mapping suggests the glaciofluvial sediments range in thickness from veneers and blankets overlying till to sediments over 3 m in thickness. The veneers and blankets are mapped on the northwest facing slope that extends to Pike Lake in the northern portion of the proposed Rose Pit and the site road crossing the Waldorf River (Appendix A, Figures A-2h to A-2j). Thicker glaciofluvial materials are found in the northeast corner of the proposed mine rock stockpile adjacent to Long Lake and along the rail line east of Knoll Lake (Appendix A, Figures A--2k and A-2m). The most notable glaciofluvial feature in the SSA is the Waldorf River Esker (Appendix A, Figures A-2k and A-2m), which is located to the south of Long Lake along the western bank of the Waldorf River. Previous provincial surficial geology mapping (Kirby et al. 1989, Klassen et al. 1992, Klassen and Thomson 1993) and site investigations by Stantec (2013a, b) indicate the esker is composed of sand and silt in combination with varying amounts of gravel and cobbles. The boreholes suggest the glaciofluvial sediments are up to 22 m thick on the ridge of the Esker (Stantec 2013a, b). Drainage within areas mapped as glaciofluvial ranges from rapid to areas of imperfect.

6.1.1.5 Lacustrine

Lacustrine sediments have settled from suspension and underwater gravity flows, such as turbidity currents, in bodies of standing fresh water, and include sediments that have accumulated at their margins through wave action (Howes and Kenk 1997). They often consist of stratified fine sand, silt and/or clay deposited by suspension with coarser sediments (e.g., stratified sand and gravel) associated with beaches and other littoral sediments transported and deposited by wave action (Howes and Kenk 1997).

Very minor areas of lacustrine sediments have been mapped in the Project study areas; they account for 12.8 ha (0.3%) of the LSA and 3.3 ha (0.1%) of the SSA (Table 6-1; Appendix A, Figures A-2b and A-2k). They are generally mapped immediately or nearly adjacent to small river systems connecting larger water bodies within the LSA (Appendix C, Photos C-5 and C-6). Field data collected by WSP suggests the lacustrine sediments have a clayey silty sand texture. Limited deposits of thick (i.e., greater than 3 metres) lacustrine materials have been mapped in the LSA based on the borehole data available (Stantec 2013a, b), field verification by WSP identified one area of likely thick (greater than 3 metres) lacustrine material (a plain) adjacent to the south shores of Wabush Lake, and veneers of lacustrine overlying till materials located Northwest of Jean Lake. Drainage within areas mapped as glaciofluvial ranges from moderately well to well.

6.1.1.6 Till (Moraine)

The detailed mapping completed by WSP indicates there is approximately 2,909.6 ha (75.2%) of till within the LSA and approximately 2,064.2 ha (77.0%) in the SSA (Table 6-1), making it the dominant surficial material type within the Project study areas (Appendix A, Figures A-2a to A2o). Till is described as material associated with glacial activity, and can be transported beneath, beside, on, within and in front of a glacier (Howes and Kenk 1997). It has highly variable textural, structural, and topographic characteristics which depend on the source of the material incorporated by the glacier and the mode of deposition (Howes and Kenk 1997).

Based on field data collected by WSP, the till in the LSA and SSA is generally characterised by a sandy silt to silty sand texture, with a range of coarse fragment (clast) content ranging from 0% to 85% and in size from gravel to boulders (Appendix C, Photos C-1, C-12, and C-14). In areas where bedrock was exposed, or near the surface, veneers (between 0.2 metres to 1 metre in thickness) and thin veneers (less than 0.2 metres) of till are mapped overlying undulating bedrock. Blankets of till (between 1 m and 3 m in thickness) have been mapped adjacent to these areas. Elsewhere the till is considered to be thick (greater than 3 m in thickness) and slopes range from planar (0-5% slopes) to moderate (26-49%). Available borehole data from Stantec (2013a,b) also suggests the till is composed of sandy silt material with coarse fragments, and can be up to 30 m thick in some areas (e.g., the proposed Rose Pit and Tailings Management Facility). Drainage within areas mapped as till ranges from rapid in coarser sediments with higher coarse fragment content found in mid, upper, and crest slope positions to poor in lower lying, depressional, level, or lower slope positions prone to flooding, seepage accumulation, or inundation.

6.1.1.7 Organic

In saturated ground conditions, vegetative matter can accumulate, creating organic material (Howes and Kenk 1997). These organic accumulations can vary in thickness, but when thicker than 40 centimetres, they are associated with bogs, fens, and swamps, and are mapped as organic parent material (peatlands). Organic material is abundant in the Project study areas, comprising 564.5 ha (14.6%) of the LSA, and 421.4 ha (15.7%) of the SSA (Table 6-1). The organic soils are commonly located in low lying or planar (level) landscapes (e.g., the proposed Tailings Management Facility). Throughout the LSA, organic soils have been mapped as veneers and blankets overlying till, or as thick organic accumulations more than 3 m in thickness (e.g., just outside the east edge of the Rose Pit). Pockets of organic accumulations with an excessive number of coarse fragments (>70%) have also been identified in the LSA. These organic pockets are found in areas adjacent to water bodies where humic organic material has accumulated between the coarse fragments. These pockets are not terribly common in the SSA and generally restricted to areas of the landscapes that connect two bodies of water such as the river system running through the Rose Pit connecting Pike Lake to the small water bodies in the south of the Pit and the water bodies connecting Long Lake and Mills Lake, north of the north basin proposed sedimentation pond (Appendix C, Photo C-23). Organic deposits are typically associated with very poor drainage, however drainage within polygons mapped as organic vary from very poor to poor as there may be variations in organic thickness, and small inclusions of wet mineral soil in some polygons.

6.1.1.8 Bedrock

Areas of exposed rapidly drained exposed bedrock represent 7.1 ha (0.2%) of the LSA and 5.1 ha (0.2%) of the SSA (Table 6-1; Appendix C, Photos C-20 and C-21). Bedrock is mainly exposed in areas of the LSA that are upland adjacent to thin veneers of till (e.g., the central eastern portion of the proposed mine rock stockpile and the southern portion of the proposed Rose Pit).

6.1.2 Soil Drainage in the Site Study Area and Local Study Area

Table 6-2 summarizes the soil drainage mapped in the SSA and LSA. Approximately 2,473.1 ha (64.0%) of the LSA is considered to be well drained (moderately well, well, and rapidly drained), 5.6 ha (0.1%) is considered to be very rapidly drained, which are areas associated with bedrock, and 311.6 ha (8.1%) is mapped as having imperfect to poor drainage where water tables fluctuate, or inundation or seepage is present. Very poor drainage associated with areas of organic accumulation accounts for 599.1 ha (15.5%) of the LSA. Soil drainage in the LSA is presented in the terrain polygon labels found in Appendix A, Figure A-2.

Table 6-2: Soil Drainage in the Local Study Area and Project Development Area

Drainage	Site Study Area		Local Study Area	
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Very rapid (x)	3.9	0.1	5.6	0.1
Rapid (r)	25.4	0.9	76.0	2.0
Well (w)	1,337.8	49.9	1,868.1	48.3
Moderately well (m)	383.8	14.3	529.0	13.7
Imperfect (i)	212.5	7.9	311.6	8.1
Poor (p)	167.6	6.3	242.4	6.3
Very Poor (v)	448.2	16.7	599.1	15.5
Null (open water or anthropogenic)	101.7	3.8	236.7	6.1
Total[(a)]	2,680.9	100.0	3,868.6	100.0

a) Numbers may not add up due to rounding.

6.1.3 Terrain Stability in the Site Study Area and Local Study Area

Table 6-3 summarizes the terrain stability classes mapped within the SSA and LSA. Approximately 3,814.8 ha (98.6%) of the LSA is considered to be stable (Terrain Stability Class I, II, III and Null), 46.4 ha (1.2%) has been mapped as potentially unstable (Class IV), 7.3 ha (0.2%) as unstable (Class V).

Areas of Potentially unstable (Class IV) and Unstable (Class V) terrain have been mapped as a steep bedrock outcrop (Class V) as well as thin till materials on a very steep slope (Class IV) in the centre of the proposed mine rock stockpile. These two areas are associated with the potential for rockfall and smaller, shallow landslides. A third area identified as a potential failure (slump) on the west side of the proposed Rose Pit has been mapped as unstable as well. Adjacent and south of this potential slump, there is a relatively subdued slope (average of 15% grade) showing features that may be indicative of solifluction or minor slumping, so this slope has been assigned a Class IV stability. Terrain stability classes assigned in the LSA can be found in the terrain polygon labels in Appendix A, Figure A-2.

Table 6-3: Terrain Stability Classes in the Site Study Area and Local Study Area

Terrain Stability Class	Site Study Area		Local Study Area	
	Area (ha)	Area (ha)	Percentage (%)	Percentage (%)
Stable (I)	1,527.3	2,163.4	55.9	57.0
Generally stable (II)	851.8	1,147.0	29.7	31.8
Moderately stable (III)	153.0	267.7	6.9	5.7
Potentially unstable (IV)	39.7	46.5	1.2	1.5
Unstable (V)	7.3	7.3	0.2	0.3
Null (open water or anthropogenic)	101.7	236.7	6.1	3.8
Total[a]	2,680.9	3,868.6	100.0	100.0

a) Numbers may not add up due to rounding.

6.2 Soil

6.2.1 Field Survey

Field surveys in the LSA were completed from September 24th to 30th, 2023. A total of 62 detailed inspection sites were completed with 31 sites completed outside the SSA (Appendix B). An additional 22 ground truthing sites were recorded and used to support final mapping. Soil samples were collected from 12 inspection sites during the field survey and submitted for baseline chemical and physical analyses. Laboratory and chemical analysis results are presented in Section 6.4.3. The survey was focused on the anticipated SSA. The field assessment for the SSA conforms to Survey Intensity Level 3 (SIL 3), with 1 soil inspection site per 45 ha. Detailed terrain, site, and soil horizon data accompanied with an abbreviation key is found in Appendix B.

6.2.2 Soil Mapping and Characteristics

Much of the LSA is characterized by topography that ranges from inclined to undulating with some level areas and minor areas of steeper slopes associated with bedrock outcrops.

Soil in the LSA has developed on very coarse (sand to loamy sand) to moderately coarse (sandy loam to fine sandy loam) till with organic accumulations found in lower, level, or depressional slope positions, or in areas with variable water levels adjacent to water bodies. There are inclusions of gravelly and very coarse (sand) glaciofluvial materials within the LSA, with the most extensive area associated with the Waldorf River Eskers. Lacustrine materials are also found adjacent to lakes, and these materials are moderately fine (loam) textured. Fluvial materials composed of up to 80% coarse fragments and organic materials were commonly found between networks of small lakes common in the LSA.

Soil Map Units (SMUs) within the LSA were assigned based on similarities of materials, soil drainage, topography, and soil development. Fourteen soil map units were developed or adapted from the Detailed soil survey of Javelin Road, Canning Lake, Huguette Lake areas in Labrador West (Government of Newfoundland and Labrador 2004). Three of the SMUs are associated with organic material, and three of the SMUs are water, bedrock, or anthropogenic areas. The remaining eight SMUs describe mineral soil of varying textures and drainages. Details on the characteristics and descriptions of the SMUs are provided in Table 6-4. The distribution of the SMUs within the LSA is displayed in Appendix A, Figure A-3 and Appendix C provides representative photos for each SMU.

Table 6-4: Soil Map Unit Descriptions for the Kami Local Study Area

SMU Symbol	SMU Name	Associated Surficial Material	Associated Terrain Call	Dominant Soil Texture/Coarse Fragments				Soil Types		Dominant Drainage Class	Dominant Slope Gradient	Average Depth to Bedrock	Representative Sampled Sites	Upper Lift Quality Criteria	Lower Lift Quality Criteria	Upper Lift Wind Erosion	Lower Lift Wind Erosion	Upper Lift Compaction	Lower Lift Compaction	Project Development Area		Local Study Area	
				Surface		Subsurface		Major	Significant/ Minor											Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
				Texture	Coarse Fragments	Texture	Coarse Fragments																
CAL	Canning Lake	Till	Mp	SL	0	SL	0	R.G	O.G	Poor	3	>3 m	K23CB020	Fair	Fair	Moderate	Moderate	Moderate	Moderate	165.3	6.2	243.7	6.3
FLO	Flora Lake	Organic/Till	Ov/M	Fibric	N/A	Fibric	N/A	T.F	TY.M, TY.F, T.M	Very Poor	0	>3 m	NA	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	166.8	6.2	245.8	6.4
HUL	Huguette Lake	Glaciofluvial	FG	S	0	S	18	O.FHP	E.DYB, O.DYB	Rapid	11	>3 m	K23LM023	Unsuitable	Unsuitable	High	High	Low	Low	61.0	2.3	107.1	2.8
JAL	Jean Lake	Lacustrine	Lp	L	0	L	0	O.R	R.G	Well to Moderately Well	2	>3 m	K23CB028	Fair	Fair	Moderate	Moderate	Low	Low	3.5	0.1	13.0	0.3
JAV	Javelin Road	Till	Mu	SL	23	SL	32	O.HFP	E.DYB, OT.HP, O.FHP	Well	10	>3 m	K23CB009	Unsuitable	Poor	Moderate	Moderate	Low	Low	709.2	26.5	989.7	25.6
LAB	Labrador	Till	Mj	SL	22	SL	27	E.DYB	GL.R, GL.DYB, GL.FHP, O.HFP	Well to Moderately Well	7	>3 m	K23CB010	Unsuitable	Poor	Moderate	Moderate	Low	Low	698.9	26.1	969.4	25.1
LAV	Lake Virot	Till/Bedrock	Mv/Ru	SL	3	SL	5	O.HFP	E.DYB	Well	5	>100 cm	K23CB011	Unsuitable	Poor	Moderate	Moderate	Low	Low	100.3	3.7	150.2	3.9
MIL	Mills Lake	Organic	Ov	Humic	80	Humic	80	T.H	HU.FO	Very Poor	0	>3 m	K23CB024	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	15.0	0.6	21.2	0.5
R1	Rock	Bedrock	R	N/A	-	N/A	-	-	-	Very Rapid	-	0 m	-	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	3.9	0.1	5.6	0.1
WAB	Wabush	Till	Mp	SL	20	SL	22	GL.FHP	O.HP, R.G	Imperfect	2	>3 m	K23CB018	Poor	Poor	Moderate	Moderate	Low	Low	370.3	13.8	529.0	13.7
WDR	Waldorf River	Fluvial	Fv/Mp	N/A	80	N/A	80	R.G	R	Imperfect to Poor	2	>3 m	K23CB025	Unsuitable	Unsuitable	Not Rated	Not Rated	Low	Low	16.7	0.6	22.4	0.6
WLR	Walshes River	Organic	Ob or Op	Fibric	N/A	Fibric	N/A	TY.F	TY.M	Very Poor	0	>3 m	K23CB002	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	268.3	10.0	334.9	8.7
ZDL	Anthropogenic	Anthropogenic	A	-	-	-	-	-	-	-	-	-	-	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	3.3	0.1	62.0	1.6
ZWA	Water	Open Water	N	-	-	-	-	-	-	Water	0	-	-	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	98.4	3.7	174.7	4.5

Anthropogenic (ZDL), Water (ZWA), and Rock (R1)

These three SMUs represent non-soils. Areas mapped as anthropogenic are associated with disturbances to natural materials and soils such as roads, existing borrow pits, and urban areas. Open water identifies areas of open water based on available imagery. Bedrock is mapped in areas where exposed bedrock outcrops were identified.

Canning Lake (CAL)

The Canning Lake SMU was originally described as an Orthic Gleysol by the Government of Newfoundland and Labrador (2004). Based on field data collected by WSP this SMU has been modified to describe poorly drained Rego Gleysols (Appendix C, Photos C-7 and C-8) with inclusions of Orthic Gleysols and peaty phases (i.e., an organic horizon > 10 cm thick) of both types of gleysol. These soils are mainly formed on moderately coarse (sandy loam) till materials with variable coarse fragment content (10% to 80%). They are generally limited to lower, depressional, or level slope positions with very subdued to level topography. They are commonly found in areas with high water tables or seepage in the profile.

Flora Lake (FLO)

The Flora Lake SMU represents Organic soils and was described as a Typic Fibrisol by the Government of Newfoundland and Labrador (2004). For the purpose of this baseline however this SMU is described as very poorly drained Terric Fibrisols (less than 100 cm of organic material) with some inclusions of Terric Mesisols, Typic Fibrisols, and Typic Mesisols (i.e., greater than 100 cm of organic material) organic soils (Appendix C, Photo C-9). The threshold of 100 cm of organic matter accumulation is distinguished from the Canadian System of Soil Classification (SCWG 1998) and was modified to better integrate the SMUs with terrain mapping units. Soils of this SMU are found in depressions, with the exception of some sloping fen environments where they tend to be upslope of much deeper Organic soils. These soils are free of any coarse fragments.

Huguette Lake (HUL)

The Huguette Lake SMU was used by the Government of Newfoundland and Labrador (2004) to described rapidly drained Orthic Ferro Humic Podzols. Inclusions of Eluviated Dystric Brunisols and Orthic Dystric Brunisols have been added to the SMU for this baseline report. These soils are found on very coarse (sand) textured glaciofluvial materials (Appendix C, Photo C-2 and C-3). These areas are often associated with mid to upper slope positions in high relief environments, when compared to the other SMUs.

Jean Lake (JAL)

The Jean Lake SMU represents units composed of well to moderately well drained Orthic Regosols with some inclusions of Rego Gleysols. These soils are generally moderately fine (silt loam to loam) textured lacustrine materials with little to no coarse fragments with variable thickness. There are however inclusions of shallow lacustrine veneers (less than 1m in depth) overlying moderately coarse (sandy loam) textured till with higher coarse fragment content (Appendix C, Photos C-5 and C-6). These soils are not common and are restricted to three polygons in the entire SSA, specifically they are around adjacent to large water bodies such as Jean Lake and Little Wabush Lake. Soils of these SMUs are expected to become more poorly drained with proximity to adjacent water bodies as the profiles are lower in elevation and the water table is found higher in the profile.

Javelin Road (JAV)

The Javelin Road SMU was used by the Government of Newfoundland and Labrador (2004) to represent units composed of well drained Orthic Humo-Ferric Podzols with some inclusions of Eluviated Dystric Brunisols, Ortstein Humic Podzols, and Orthic Ferro-Humic Podzols (Appendix C, Photo C-10 and C-11). These soils are generally developed on moderately coarse (sandy loam) textured till that can have a very high coarse fragment content (5-70%). These soils are commonly found on mid to upper slope positions, in landscapes of hummocks or ridged slopes.

Labrador (LAB)

The Labrador SMU is used to represent units of well to moderately well drained Eluviated Dystric Brunisols, with some inclusions of Gleyed Regosols, Gleyed Dystric Brunisols, Gleyed Ferro-Humic Podzols, and Orthic Humo-Ferric Podzols. These soils have developed on moderately coarse (sandy loam) textured till materials that can have a very high coarse fragment content (5-100%) which tends to increase with depth (Appendix C, Photos C-12 and C-13). Although similar to the Javelin Road SMU, these soils form on gentle slopes and have inclusions of more poorly drained profiles.

Lake Virot (LAV)

The Lake Virot SMU was used by the Government of Newfoundland and Labrador (2004) to represent units composed of moderately well drained shallow Orthic Humo-Ferric Podzols with some inclusions of Eluviated Dystric Brunisols. These soils are developed on moderately coarse (sandy loam) textured till. This SMU is very similar to the Javelin Road SMU, but bedrock is less than 100 cm from the surface in the Lake Virot profiles, and rock outcrops are common (Appendix C, Photos C-14 and C-15).

Mills Lake (MIL)

The Mills Lake SMU characterises Organic soil units composed of very poorly drained Typic Humisols with some inclusions of Humic Folisols. These soils are generally composed of humic materials with a very high coarse fragment content (>70%) in the form of rounded cobbles and boulders but can also include minor areas of Terric Mesisols with coarse fragments (Appendix C, Photo C-16). They are associated with areas beside rivers or small steam systems connecting other water bodies.

Wabush (WAB)

The Wabush SMU was used by the Government of Newfoundland and Labrador (2004) to represent units composed of imperfectly drained Gleyed Ferro-Humic Podzols with inclusions of Orthic Humic Podzols and Rego Gleysols. Peaty phased soils, which have an organic horizon more than 10 cm thick, are common in this SMU (Appendix C: Photo C-17 and C-18). Wabush soils are composed of moderately coarse (sandy loam) till and generally have a very high coarse fragment content (15-60%) throughout the profile. They are associated with lower slope positions in undulating terrain and commonly have seepage at a depth of less than 30 cm. Wabush soils are distinguished from the Canning Lake SMU as their profiles are more strongly developed and they are generally better drained and/or drier.

Walshes River (WLR)

The Walshes River SMU was used by the Government of Newfoundland and Labrador (2004) to represent units composed of ribbed fen deposits with a high proportion of open water. However, for the purpose of this baseline a more specific description is required. This SMU is characterized by very poorly drained typic fibrisols with inclusions of typic mesisols (Appendix C, Photo C-19). These soils have no coarse fragments and are found in plain environments. This SMU is different from the other Organic SMUs as it has deep organic soils (more than 100 cm of organic material).

Waldorf River (WDR)

The Waldorf River SMU characteries units composed of imperfect to poorly drained rego gleysols. These soils are composed of up to 90% coarse fragments, specifically in the form of rounded cobbles and boulders from fluvial systems (Appendix C: Photo C-4). This SMU varies from the Mills Lake SMU as they have inclusions of active fluvial channels or open water.

6.2.3 Soil Chemistry and Physical Characterisation

Samples were collected at 12 field inspection locations. Of these 12 sites, 36 samples were collected from representative soil types in the LSA and submitted to Bureau Veritas Laboratories for analyses. Chemical lab results from Bureau Veritas Laboratories are provided in Appendix D.

Metals analyses were completed on a limited number of samples using Bureau Veritas Laboratories. Two samples have concentrations of metals higher than the guidelines:

- K23CB001Ae0-8 exceeds the criteria for Chromium (Appendix A, Figure A-3j)
- K23CB028C0-120 exceeds the criteria for Chromium (Appendix A, Figure A-3a)

Appendix E shows these results compared with Canadian Council of Ministers of the Environment (CCME 2023) guidelines and criteria.

6.2.4 Soil Reclamation Suitability

Criteria in Table 4-2 (Section 4.1.3) were used to assign soils a good, fair, poor, or unsuitable class, or rating for use in reclamation.

Based on the soil mapping within the LSA, approximately 2,238.8 ha (57.9%) of the mineral soils were assigned an overall rating of Unsuitable, 550.9 ha (14.2%) are considered Poor, and the remaining 234.6 ha (6.1 %) is Fair (Table 6-5). Spatial extents of reclamation suitability ratings for the upper lift are displayed in Appendix A, Figure A-4. Organic soils were not assigned reclamation suitability ratings as the rating system was not designed to capture organic soils (ASAC 1987).

Of the mineral SMUs, CAL, and JAL were the only SMUs assigned an overall reclamation suitability of fair, WAB was assigned a poor rating, and five (HUL, JAV, LAB, LAV, and WDR) within the LSA were assigned an unsuitable reclamation suitability rating (Table 6-6). Appendix F details the reclamation suitability classification, individual horizon ratings with each criteria, and associated limiting factors of each soil sample submitted for analysis.

The SMUs were rated as unsuitable due to very low pH values (<3.5) in the Ae horizons (HUL, JAV, LAB, and LAV) or because of very high coarse fragment content (WDR). The LAV SMU (well drained O.HFP profile with bedrock within 1 m) was assigned a reclamation suitability of unsuitable due to its profile similarities with JAV (well drained O.HFP with bedrock beyond 1 m). LAV was not sampled as soil properties are capture by the sample collected for the JAV SMU.

While pH did increase with depth it remained low in some SMUs, and combined with high coarse fragment content it was also identified as a limiting factor in the lower lift of many SMUs. Other limiting factors contributing to poor to fair ratings of the other mineral SMUs are coarse textured material, low saturation percentage, consistency, and low organic carbon content. A low saturation percentage and coarser (sandier) textures would reduce water holding capacity due to low porosity which is reflected in the low saturation percentages.

It should be noted that Poor, and even Unsuitable suitability classes do not mean the material cannot be used for reclamation and vegetative regrowth, but that it may require careful planning, good management, and possible soil amendments to change the rating to a more suitable category.

Though pH impacts nutrient availability and 6.5 to 8.0 is considered optimum for availability, not all nutrients are available in the same pH range (Munroe 2018). In addition, the very low pH identified in the SSA is not uncharacteristic or unexpected of the soils (Podzols) common in the SSA. Podzols tend of have lower pH because of vegetation, climate, and parent material, however this does not mean they are incapable of supporting vegetation growth (Sandborn et al. 2011).

Table 6-5: Soil Reclamation Suitability Ratings in the Site Study Area and Local Study Area

Reclamation Suitability Class	Site Study Area		Local Study Area	
	Area (ha)	Area (ha)	Percentage (%)	Percentage (%)
Good	0	0	-	-
Fair	155.0	234.7	6.1	5.8
Poor	384.0	550.9	14.2	14.3
Unsuitable	1,586.1	2,238.8	57.9	59.2
Not Rated[(a)]	450.1	601.9	15.6	16.8
Not Applicable[(a)]	105.7	242.3	6.3	3.9
Total[(b)]	2,680.9	3,868.6	100.0	100.0

a) Rock (R1), water (ZWA), anthropogenic (ZDL) are not applicable and organic (FLO, MIL, WLR) units were not rated.
b) Numbers may not add up due to rounding.

Table 6-6: Reclamation Suitability Ratings and Limitations for Soil Map Units in the Potential Limit of Disturbance

Soil Map Unit Symbol (Representative Site ID)	Reclamation Suitability	
	Rating	Limitation(s)
CAL (K23CB020)	Fair	Low saturation, low organic carbon
FLO[(a)]	Not Rated	Organic
HUL (K23LM023)	Unsuitable	**Low pH,** coarse texture, low organic carbon, high coarse fragment content, consistency
JAL (K23CB030)	Fair	Low saturation, low organic carbon
JAV (K23CB023)	Unsuitable	**Low pH,** coarse texture, low organic carbon, consistency, high coarse fragment content
LAB (K23CB010)	Unsuitable	**Low pH**, coarse texture, low saturation, high coarse fragment content
LAV (K23CB023)[(c)]	Unsuitable	**Low pH,** low saturation, consistency, high coarse fragment content
MIL[(a)]	Not Rated	Organic
R1[(a)]	Not Applicable	Rock
WAB (K23CB018)[(b)]	Poor	Low pH, **texture,** consistency, low organic carbon, coarse fragment content, consistency
WRD[(d)]	Unsuitable	**Very high coarse fragments**
WLR[(a)]	Not Rated	Organic
ZDL[(a)]	Not Applicable	Anthropogenic
ZWA[(a)]	Not Applicable	Water

a) Rock (R1), water (ZWA), anthropogenic (ZDL) are not applicable and organic (FLO, MIL, WLR) units were not rated.
b) Sample mis-labelled during lab analysis, displayed as K23CB017 in lab analysis found in Appendix C
c) SMU not sampled but used similarly representative profile except for soil profile not being within 1 m of bedrock, as described for the LAV SMU
d) Sample not collected as insufficient mineral material typically found at site
Bold indicates the most limiting factor, if not bolded all factors are equally limiting

6.2.5 Soil Wind Erosion Risk

Soil wind erosion risk in the LSA is dominantly Moderate with Moderate ratings assigned to 2,743.9 ha (70.9%) (Table 6-7). Soils of the LSA are dominated by loamy sand, sandy loam or in some cases sand. These soils tend of much larger in particle size and have a higher resistance to movement by wind factor than other finer (heavy clay, clay, and silty clay) soil surface texture classes (Coote and Pettapiece 1989). The spatial distribution of wind erosion risk ratings based on the surface soil representative texture is displayed in Appendix A, on Figure A-5.

Table 6-7: Wind Erosion Risk Ratings in the Site Study Area and Local Study Area

Wind Erosion Risk Class	Site Study Area		Local Study Area	
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Low	0	-	0	-
Moderate	1,949.5	72.7	2,743.9	70.9
High	159.0	5.9	258.1	6.7
Not Rated[(a)]	466.8	17.4	624.3	16.1
Not Applicable[(a)]	105.7	3.9	242.3	6.3
Total[(b)]	2,680.9	100.0	3,868.6	100.0

a) Rock (R1), water (ZWA), anthropogenic (ZDL) are not applicable and organic (FLO, MIL, WLR) units were not rated.
b) Numbers may not add up due to rounding.

6.2.6 Soil Water Erosion Risk

Soil water erosion risk on rated soils in the LSA is dominantly Very Low, with 1,586 ha (41%) rated as Very Low or Low (Table 6-8). Similar to the Soil Wind erosion risk, the coarse textured (SL, LS, or S) soils of the SSA have higher K values, indicating they are only very slightly susceptible to water erosion (Wall et al. 2002). Coarse textured soils also lend to better infiltration, with leads to less runoff and water erosion (Wall et al. 2002). Ratings were not assigned to 22.4% of the LSA because these are areas of open water, rock, organic or anthropogenic materials. Organic soils (FLO, MIL, and WLR) were not rated in Table 6-8 as the water erosion risk calculations are set up for mineral soil, however soils high in organic matter are better able to resist erosion (Government of Alberta 2018), as well as their association with generally level topography lending to water erosion resistivity. The fluvial Waldorf River (WDR) SMU was also not rated as it is described as material that has already had the finer textured material washed (eroded) from it, leaving only coarse fragments which are not susceptible to water erosion. The spatial distribution of water erosion risk ratings for surface soil is displayed in Appendix A, on Figure A-6.

Table 6-8:Water Erosion Risk Ratings in the Site Study Area and Local Study Area

Water Erosion Risk Class	Site Study Area		Local Study Area	
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Very Low	859.8	32.1	1,278.4	33.0
Low	241.0	9.0	308.9	8.0
Moderate	344.7	12.9	482.3	12.5
High	416.8	15.5	519.0	13.4
Severe	246.2	9.2	413.4	10.7
Not rated	572.4	21.4	866.6	22.4
Total[(a)]	2,680.9	100	3,868.6	100

a) Numbers may not add up due to rounding.

6.2.7 Soil Compaction Risk

Soil compaction risk is assigned based mainly on soil texture and soil drainage; 2,783.3 ha (71.9%) of the LSA were assigned a Low risk class for soil compaction (Table 6-9). Soil texture and moisture are some of the most important parameters related to soil compaction. Research indicates that soil compaction increases with increasing clay content, therefore the fact that soils of the LSA have inherently low clay content, being mostly sandy loam, loamy sand, and clay; makes them less susceptible to compaction (Cannon and Landsburg 1990). Areas of Organic soils have not been rated but would likely be at a High risk for compaction as mentioned in Section 4.1.6. Open water, rock, and previously disturbed areas in the LSA were also not rated for compaction risk (“Not rated” in Table 6-9). Appendix A, Figure A-7 shows the spatial extent of compaction risk ratings assigned for surface soil.

Table 6-9: Soil Compaction Risk Ratings in the Site Study Area and Local Study Area

Soil Compaction Risk Class	Site Study Area		Local Study Area	
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)
Low	1,960.8	73.1	2,783.4	71.9
Moderate	163.4	6.1	239.5	6.2
High	0.9	<0.01	1.6	<0.01
Not Rated[(a)]	450.1	16.8	601.9	15.6
Not Applicable[(a)]	105.7	3.9	242.3	6.3
Total[(b)]	2,680.9	100	3,868.6	100

a) Rock (R1), water (ZWA), anthropogenic (ZDL) are not applicable and organic (FLO, MIL, WLR) units were not rated.
b) Numbers may not add up due to rounding.

7.0 KEY FINDINGS AND RECOMMENDATIONS

In summary, the Kami LSA overlies rocks from the Paleoproterozoic Era. Surficial materials are dominated by till (moraine) followed by organic accumulations. The majority of the LSA is mapped as stable terrain, with minor areas mapped as potentially unstable or unstable in association with small areas of rockfall, and a potential landslide and potential solifluction processes on the west side of the proposed Rose Pit. Topography of the LSA is relatively planar with inclined and rolling landscapes found on slopes adjacent to lakes and fluvial systems and steep slopes found in association with bedrock outcrops.

Soils of the LSA are generally Brunisols and Podzols, with some areas of Organic soils. Reclamation suitability for soils is generally classified as unsuitable due to very low pH values (<3.5) in the upper soil horizons or because of very high coarse fragment content. Mineral soils were generally classified to be at a moderate risk for wind erosion, very low risk for water erosion, and low risk for soil compaction. Over half of the LSA is classified as well drained and less than a quarter of the LSA is very poorly drained. The remaining area is mapped as either imperfectly to poorly drained due to fluctuating water tables, inundation, or seepage. A nearly negligible area of the LSA is considered to be very rapidly drained and associated with exposed bedrock.

The key recommendation includes ensuring additional data needs are met with the most up to date Project footprint available. The data presented in this baseline report was collected using an earlier iteration of the Project footprint that was available at the time of mapping and field planning; therefore, the Project area in this report will not align with the Project area presented in the Project Registration. This misalignment presents a gap in data. As the planning and detailed design process continues there may be a need to complete additional mapping and collect additional data within a future iteration of the proposed site area.

Signature Page

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APPENDIX A

Terrain and Soil Figures

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Terrain Symbol Legend

Surficial Material

A	Anthropogenic
AC	Anthropogenic Colluvium
C	Colluvium
D	Weathered Bedrock (in situ)
E	Loess/Eolian
F	Fluvial
FG	Glaciofluvial
I	Ice
L	Lacustrine
LG	Glaciolacustrine
M	Morainal/Till
N	Waterbody
O	Organic
PG	Preglacial Gravels
R	Bedrock

Texture

a	Blocks
b	Boulders
c	Clay
d	Mixed fragments
e	Fibric organic
g	Gravel
h	Humic organic
k	Cobble
m	Mud
p	Pebbles
r	Rubble
s	Sand
u	Mesic organic
x	Angular fragments
y	Shells
z	Silt

Surface Expression

a	Moderate Slope
b	Blanket (1 - 3 m)
c	Cone(s)
d	Depression(s)
f	Fan(s)
h	Hummock(s)
j	Gentle Slope
k	Moderately Steep Slope
m	Rolling
p	Plain (> 3 m)
r	Ridge(s)
s	Steep Slope
t	Terrace(s)
u	Undulating
v	Veneer (0.2 - 1 m)
w	Mantle of Variable Thickness
x	Thin Veneer (< 0.2 m)

Drainage

r	rapid
w	well
m	moderately well
i	imperfect
p	poor
v	very poor
x	very rapid

Qualifiers

A	Active
I	Inactive

Terrain Stability Classification

Terrain Stability Class	Interpretation
I	No significant stability problems exist
II	Very low likelihood of landslide initiation following land clearing or infrastructure development
III	Low likelihood of landslide initiation following land clearing or infrastructure development
IV	Moderate likelihood of landslide initiation following land clearing or infrastructure development (may include areas of existing potentially unstable terrain)
V	High likelihood of landslide initiation following land clearing or infrastructure development (may include areas of existing unstable terrain)

Geomorphological Processes and Subclasses

Group	Geomorpological Process	Code	Associated Subclasses	Subclass Code
Erosional Processes	Deflation	D	-	-
	Karst processes	K	-	-
	Piping	P	-	-
	Gully erosion	V	-	-
	Washing	W	-	-
Fluvial Processes	Irregularly sinuous channel	I	progressive bank erosion	u
			abrupt channel diversion; avulsion	a
			backchannels (undivided)	b
			permanent river-fed backchannels	p
			ephemeral river-fed backchannels	e
			spring-fed backchannels	s
			permanent tributary-fed backchannels	t
			ephemeral tributary-fed backchannels	d
Mass Movement Processes	Snow avalanches	A	major avalanche tracks; active	f
			minor avalanche tracks; active	m
			mixed major and minor tracks; active	w
			old avalanche tracks	o
	Slow mass movements	F	soil creep	c
			rock creep	g
			tension cracks	k
			lateral spread in bedrock	p
			lateral spread in surficial material	j
			earthflow	e
			slump in bedrock	m
			slump in surficial material	u
			slump - earthflow	x
			debris slide	s
			rockslide	r
	Rapid mass movements	R	debris fall	f
			rockfall	b
			debris flow	d
			debris torrent	t
			earthflow	e
			slump in bedrock	m
			slump in surficial material	u
			slump - earthflow	x
			debris slide	s
			rockslide	r
Periglacial Processes	Cryoturbation	C	-	-
	Nivation	N	-	-
	Solifluction	S	-	-
	General periglacial processes	Z	-	-
	Permafrost processes	X	palsas, peat plateaus	p
			thermokarst; subsidence	t
			thermokarst: thermal erosion by water	e
			thaw flow slides	f
			ice-wedge polygons	w
			patterned ground	r
Deglacial Processes	Channeled by meltwater	E	-	-
	Kettled	H	-	-
Hydrologic Processes	Inundation	U	-	-
	Surface seepage	L	-	-
Initiation Zone		"	polygon includes site or zones of instability, such as headscarps of debris slides or earthflows and source areas or rockfall and debris flows.	

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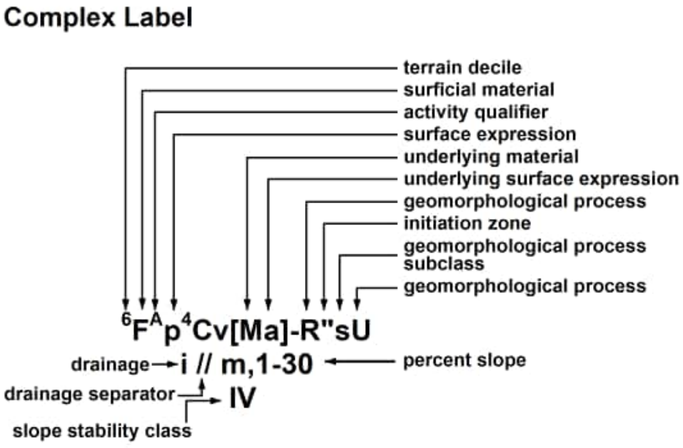

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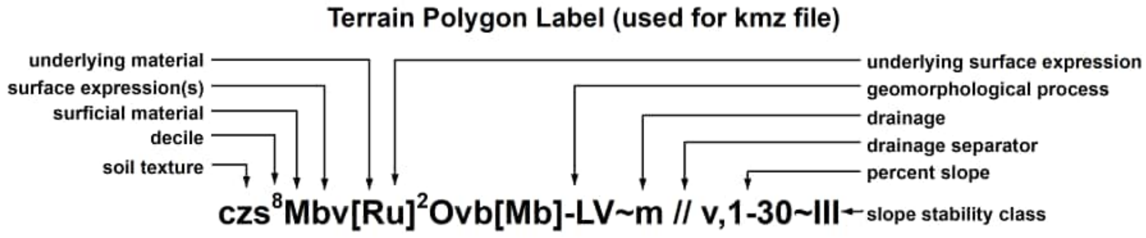

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1. TERRAIN SYMBOL LEGEND ANNOTATED LIST FROM HOWES & KENK (1997).
2. TERRAIN STABILITY CLASSIFICATION ADAPTED FROM APEGBC (2002 AND MINISTRY OF FORESTS (1999)).

NOTE(S)

1. THIS DRAWING MUST BE READ IN CONJUNCTION WITH WSP'S REPORT.

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
TERRAIN LEGEND

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-1

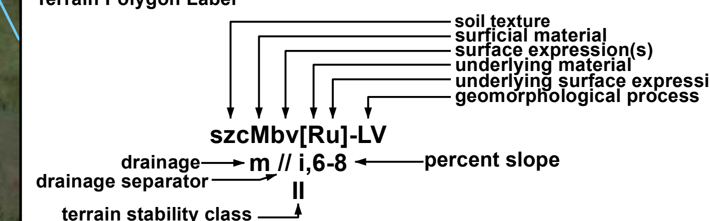
LEGEND

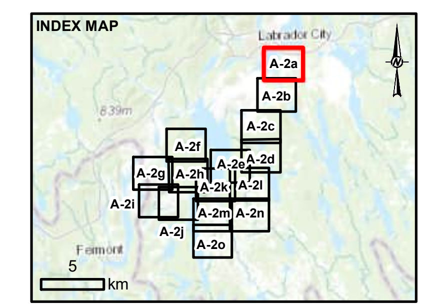
- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

DOMINANT SURFICIAL MATERIAL

- ANTHROPOGENIC (A)
- LACUSTRINE (L)
- MORAINAL (TILL)(M)
- ORGANIC (O)

Terrain Polygon Label





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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
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LEGEND

- DRILL HOLE
- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

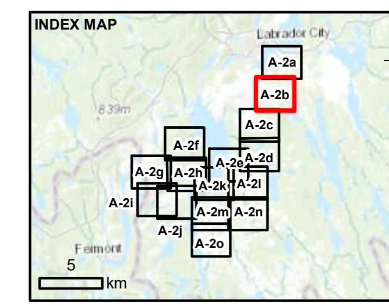
DOMINANT SURFICIAL MATERIAL

- ANTHROPOGENIC (A)
- GLACIOFLUVIAL (FG)
- LACUSTRINE (L)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT
wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
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APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
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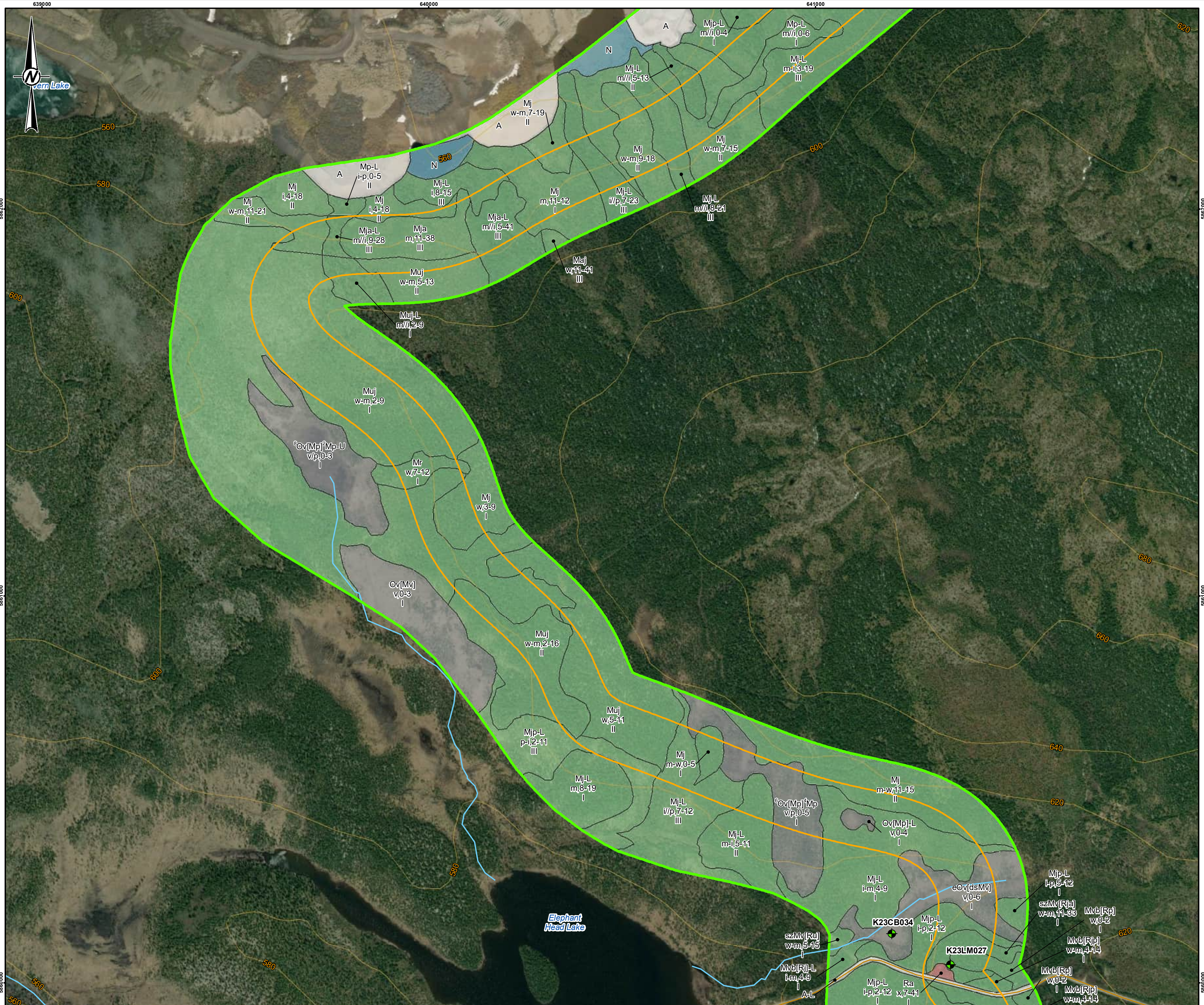


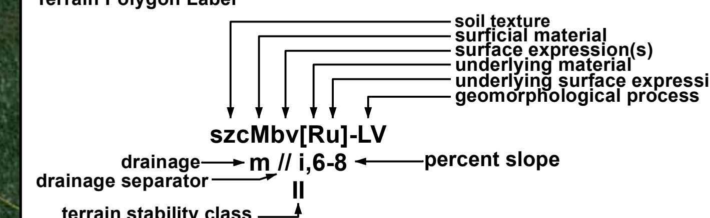
LEGEND

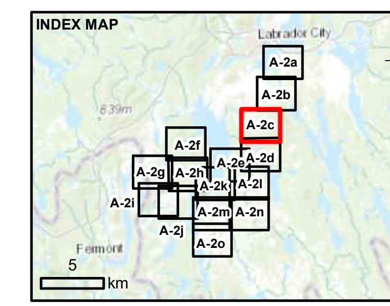
- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

DOMINANT SURFICIAL MATERIAL

- ANTHROPOGENIC (A)
- BEDROCK (R)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label





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CLIENT
CHAMPION IRON MINES

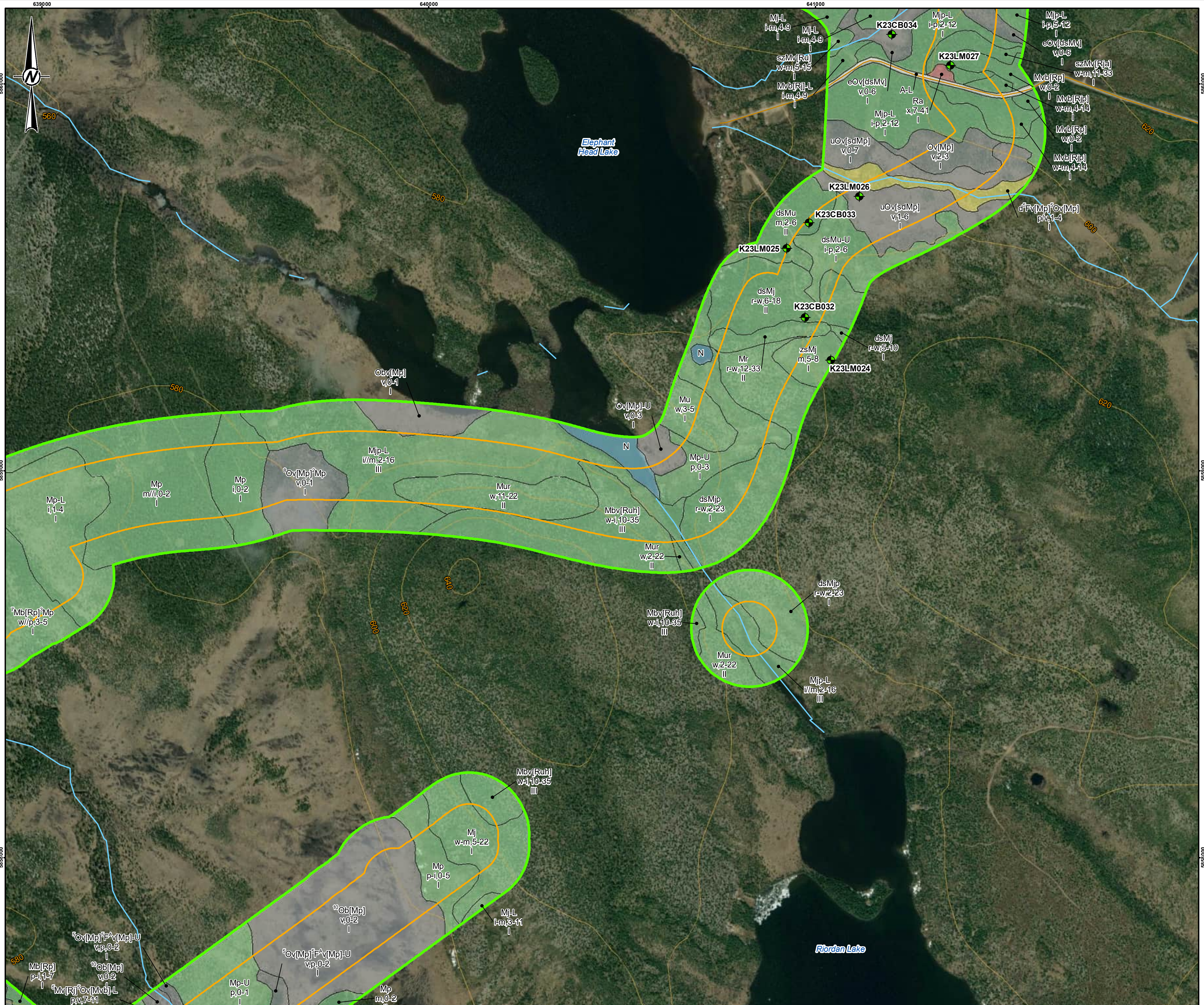
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2c



LEGEND

- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

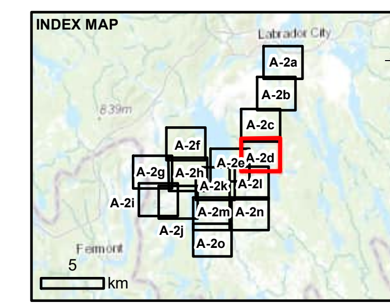
DOMINANT SURFICIAL MATERIAL

- ANTHROPOGENIC (A)
- BEDROCK (R)
- FLUVIAL (F)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



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CLIENT

CHAMPION IRON MINES

PROJECT

KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE

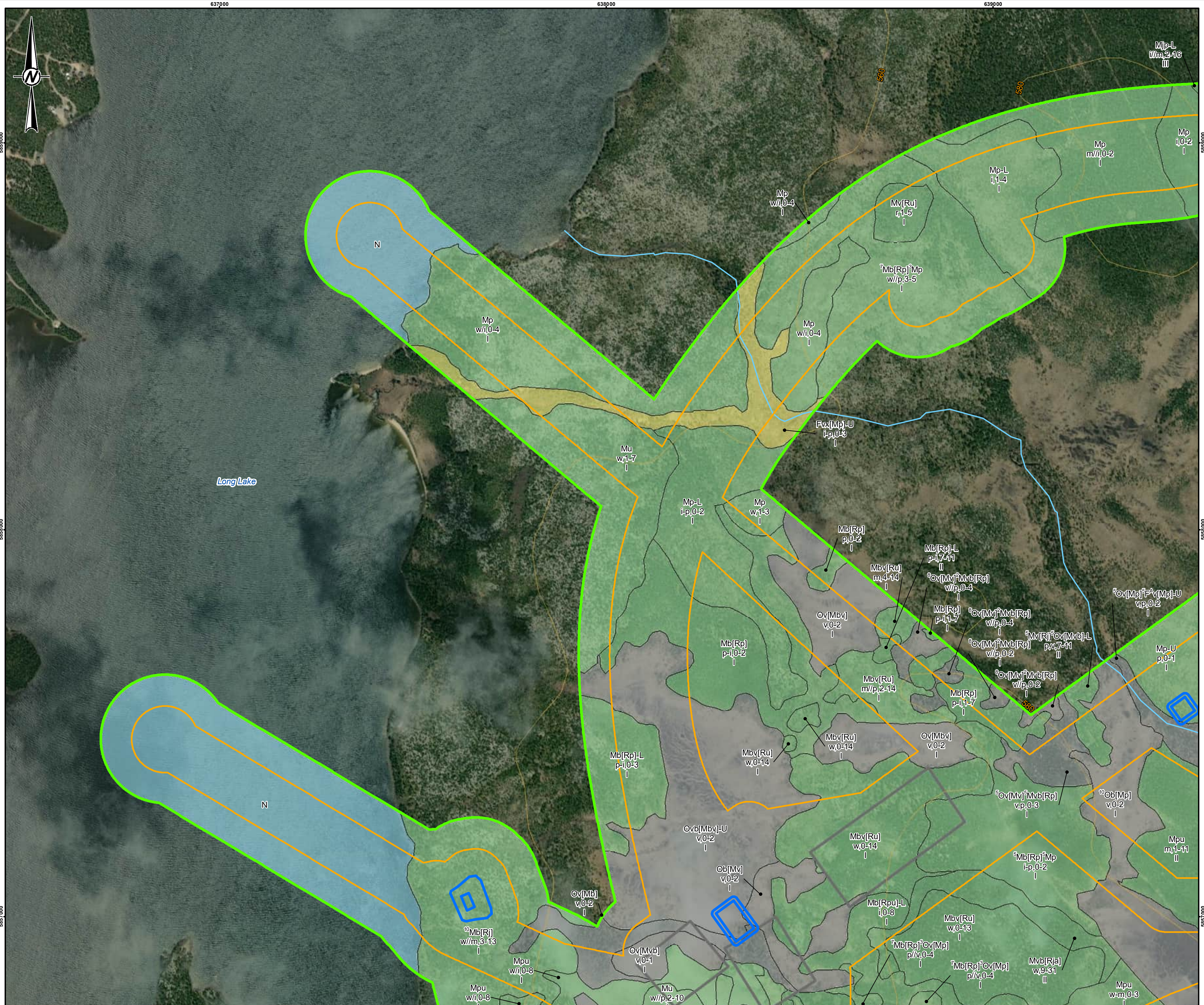
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2d

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA

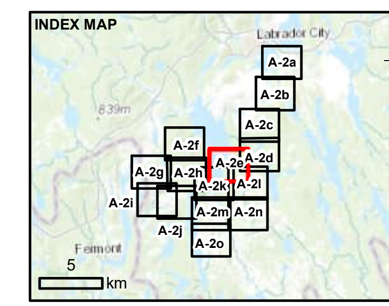
DOMINANT SURFICIAL MATERIAL

- FLUVIAL (F)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture; surficial material; surface expression(s); underlying material; underlying surface expression; geomorphological process; drainage; drainage separator; percent slope; terrain stability class



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CLIENT
CHAMPION IRON MINES

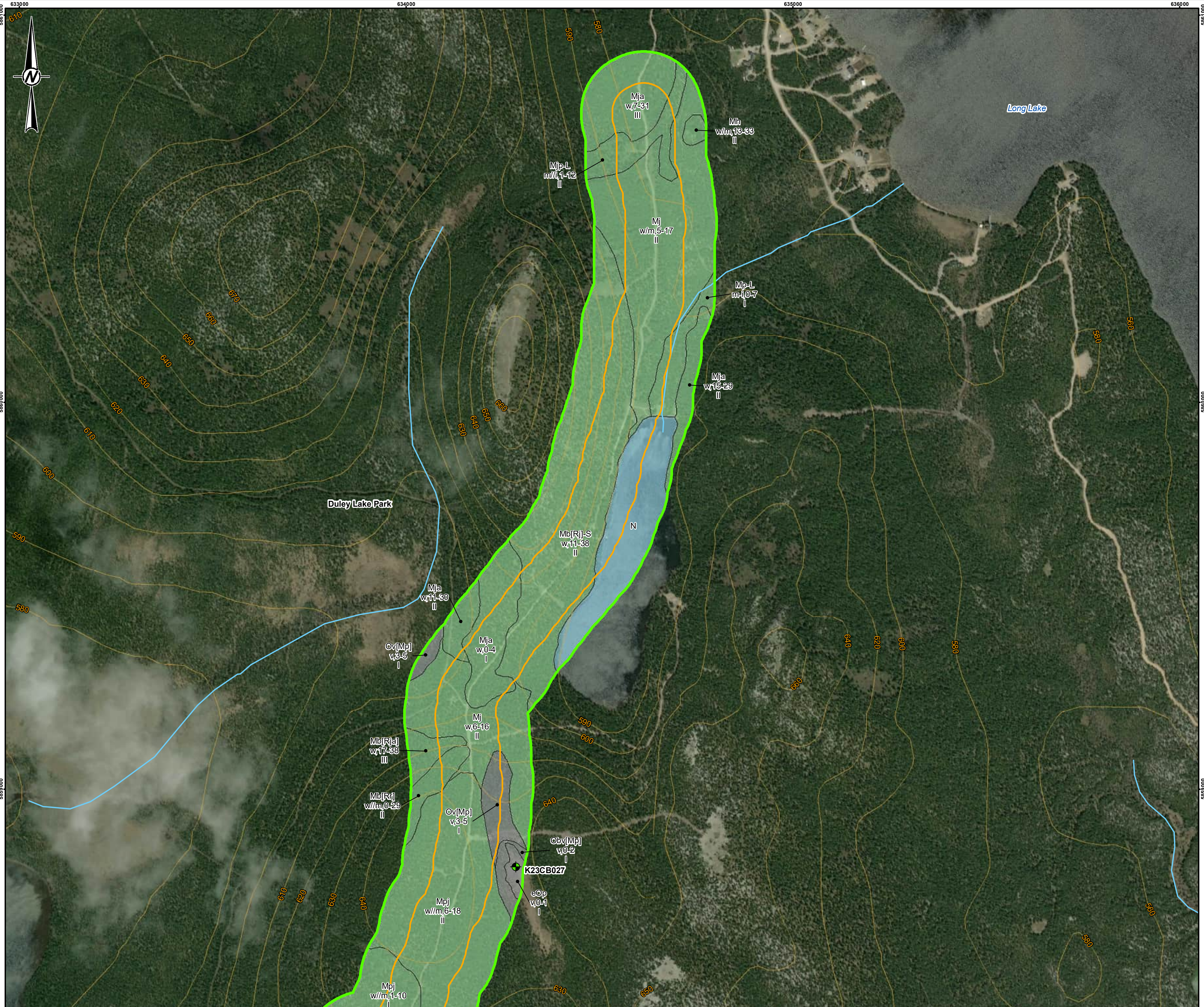
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2e



LEGEND

- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

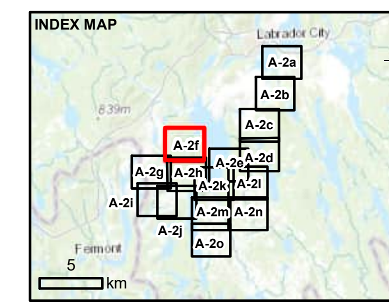
DOMINANT SURFICIAL MATERIAL

- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



0 250 500

1:10,000 METRES

REFERENCE(S)

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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2f

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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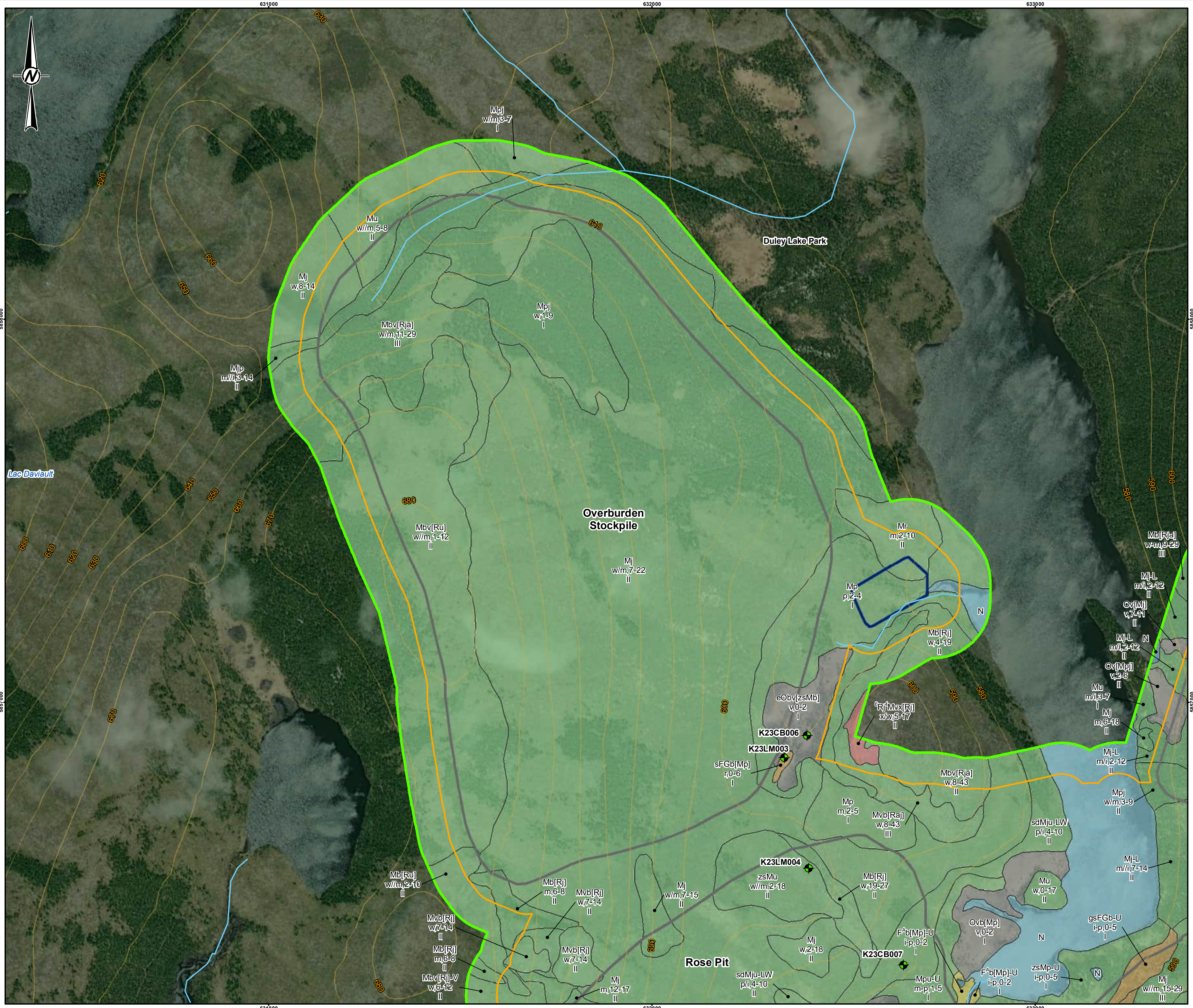


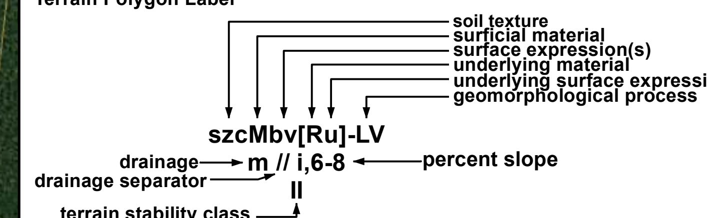
LEGEND

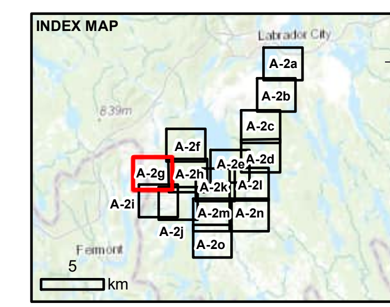
- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROPOSED SEDIMENTATION POND

DOMINANT SURFICIAL MATERIAL

- BEDROCK (R)
- FLUVIAL (F)
- GLACIOFLUVIAL (FG)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label





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1:10,000 METRES

REFERENCE(S)
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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

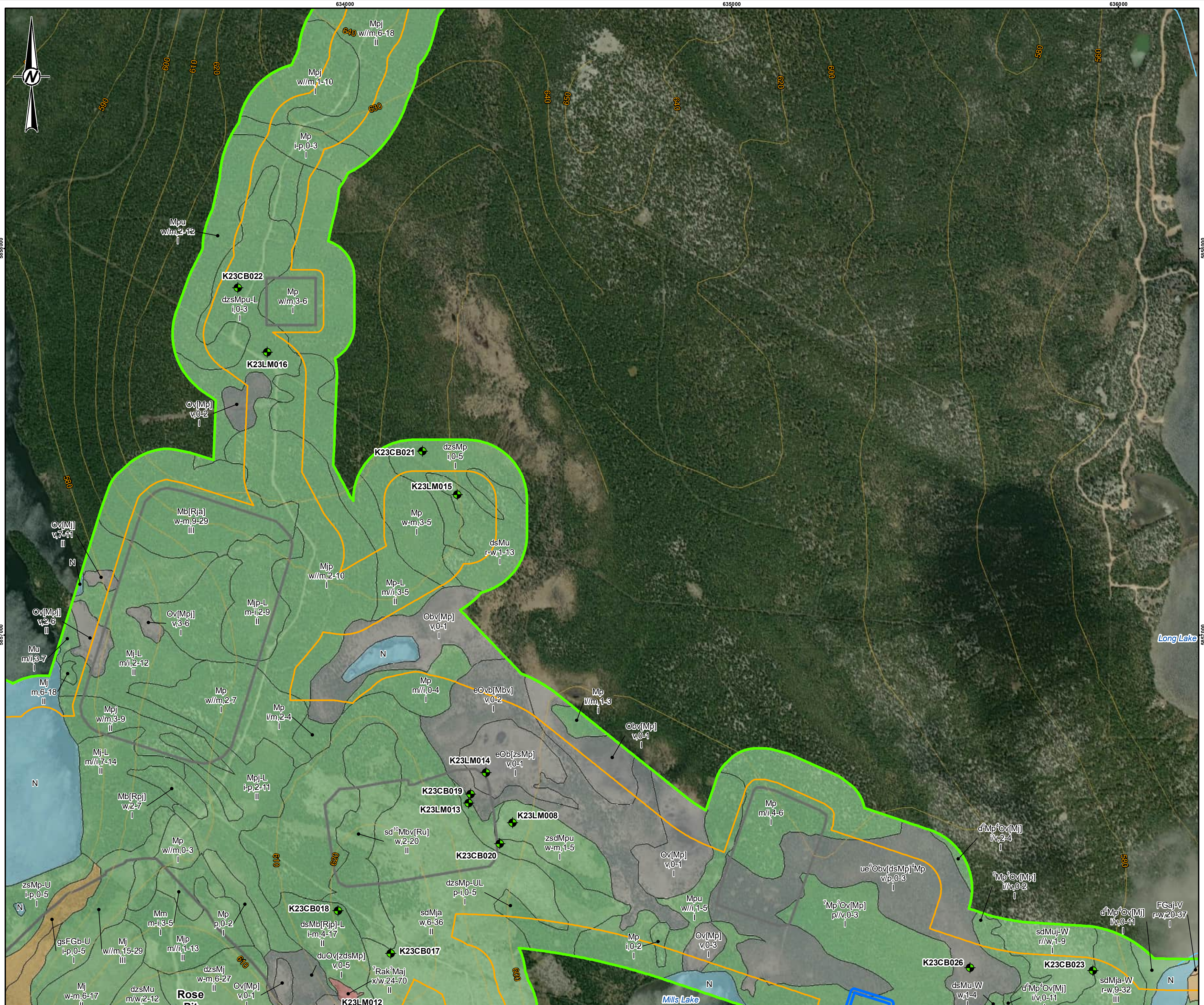
TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2g

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA

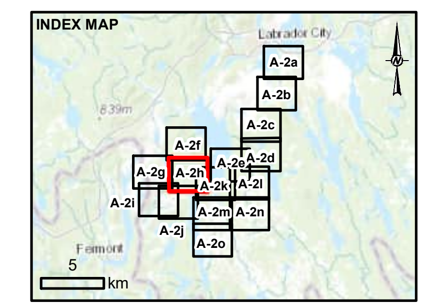
DOMINANT SURFICIAL MATERIAL

- BEDROCK (R)
- GLACIOFLUVIAL (FG)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture; surficial material; surface expression(s); underlying material; underlying surface expression; geomorphological process; drainage; drainage separator; percent slope; terrain stability class



0 250 500
1:10,000 METRES

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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

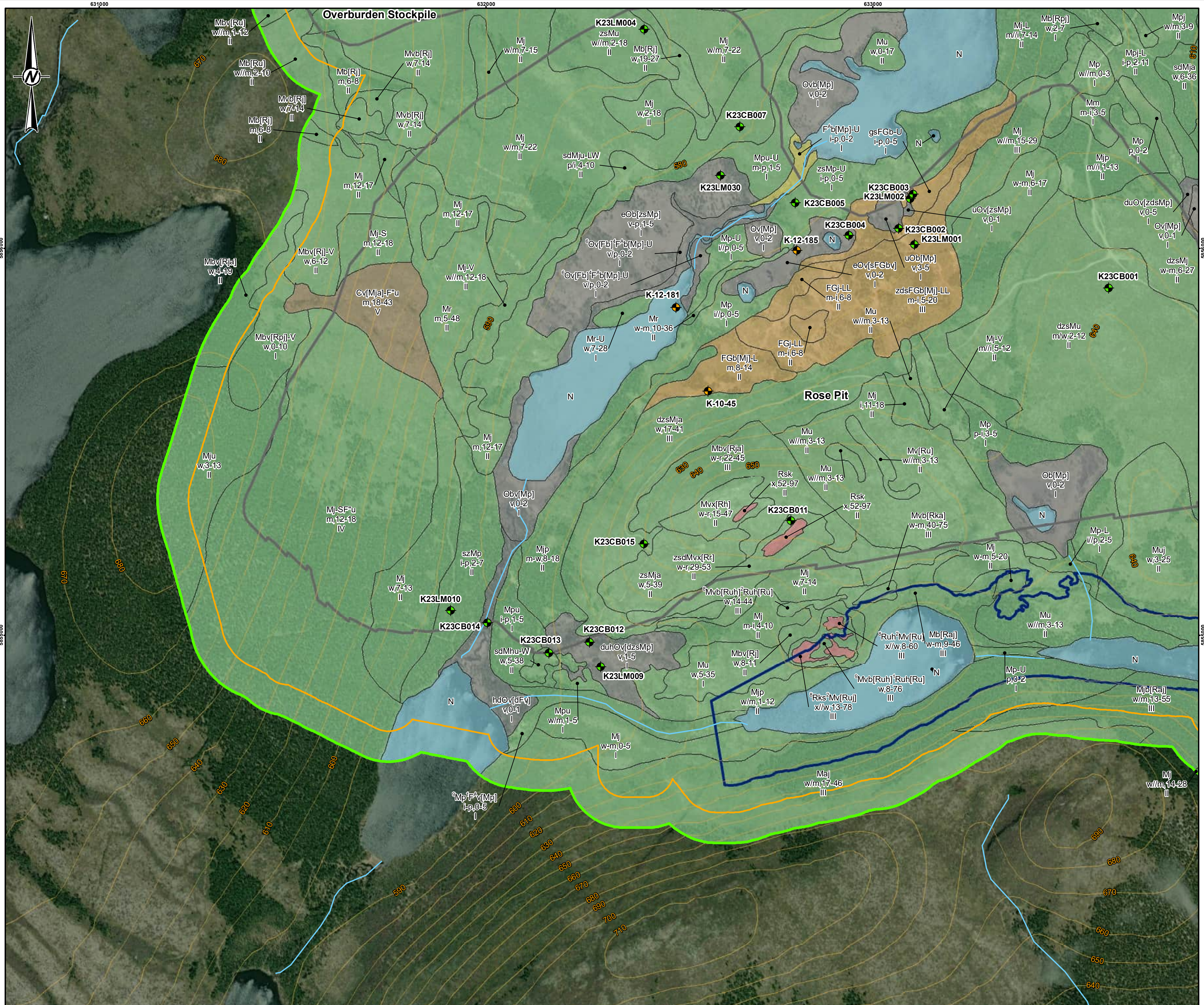
TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2h

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- DRILL HOLE
- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROPOSED SEDIMENTATION POND

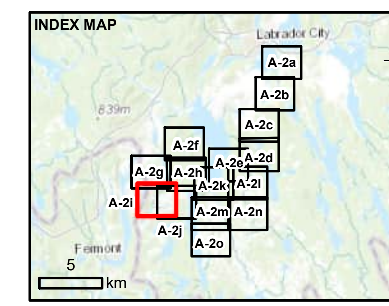
DOMINANT SURFICIAL MATERIAL

- BEDROCK (R)
- COLLUVIUM (C)
- FLUVIAL (F)
- GLACIOFLUVIAL (FG)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture; surficial material; surface expression(s); underlying material; underlying surface expression; geomorphological process; drainage; drainage separator; percent slope; terrain stability class



0 250 500

1:10,000 METRES

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CLIENT
CHAMPION IRON MINES

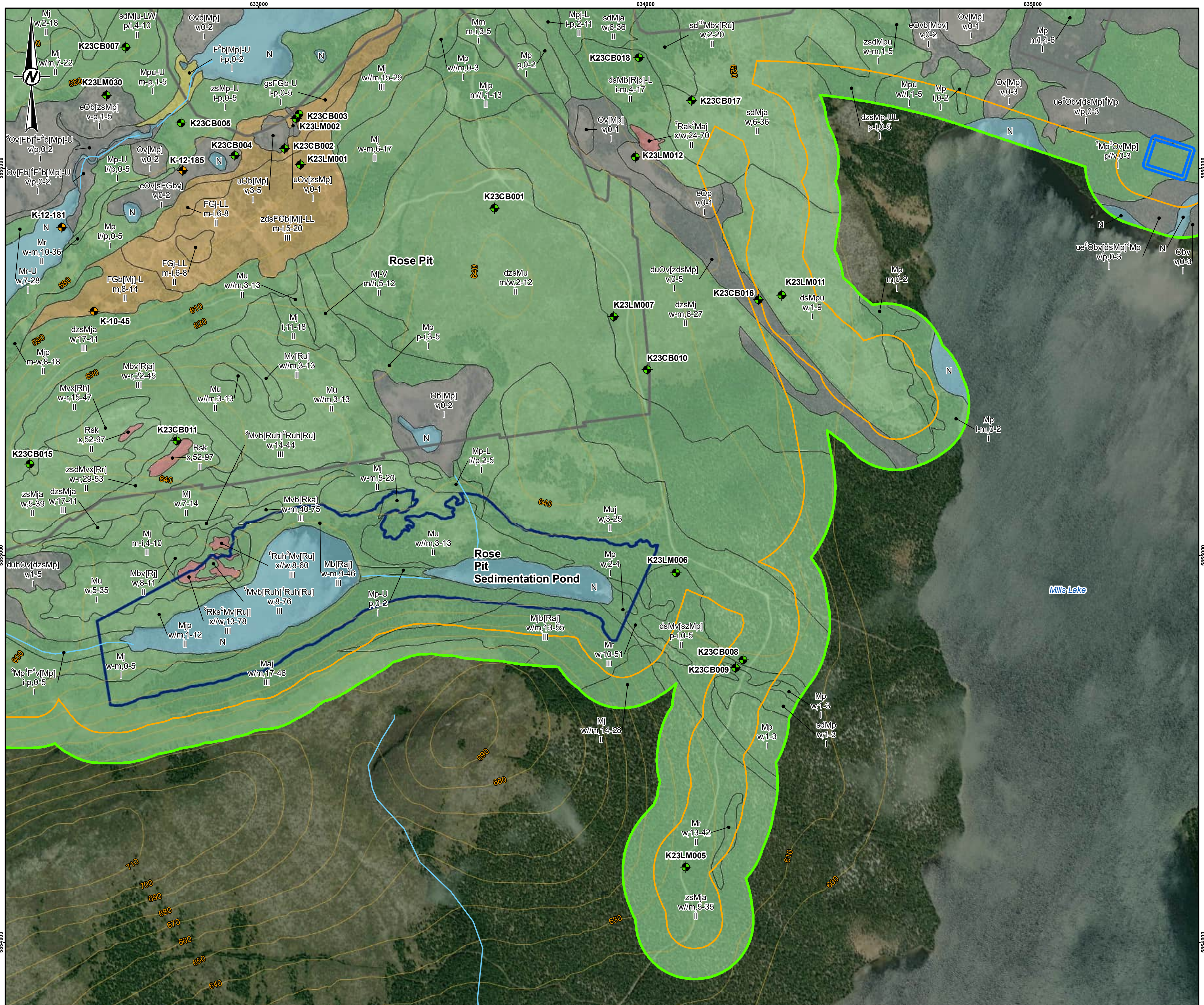
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2i



LEGEND

- DRILL HOLE
- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROPOSED SEDIMENTATION POND

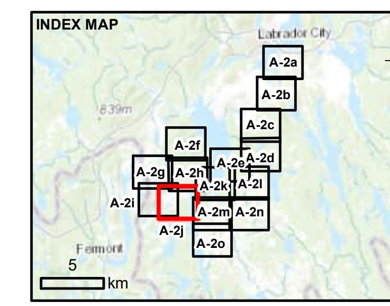
DOMINANT SURFICIAL MATERIAL

- BEDROCK (R)
- FLUVIAL (F)
- GLACIOFLUVIAL (FG)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture; surficial material; surface expression(s); underlying material; underlying surface expression; geomorphological process; drainage; drainage separator; percent slope; terrain stability class



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CLIENT

CHAMPION IRON MINES

PROJECT

KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE

TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2j

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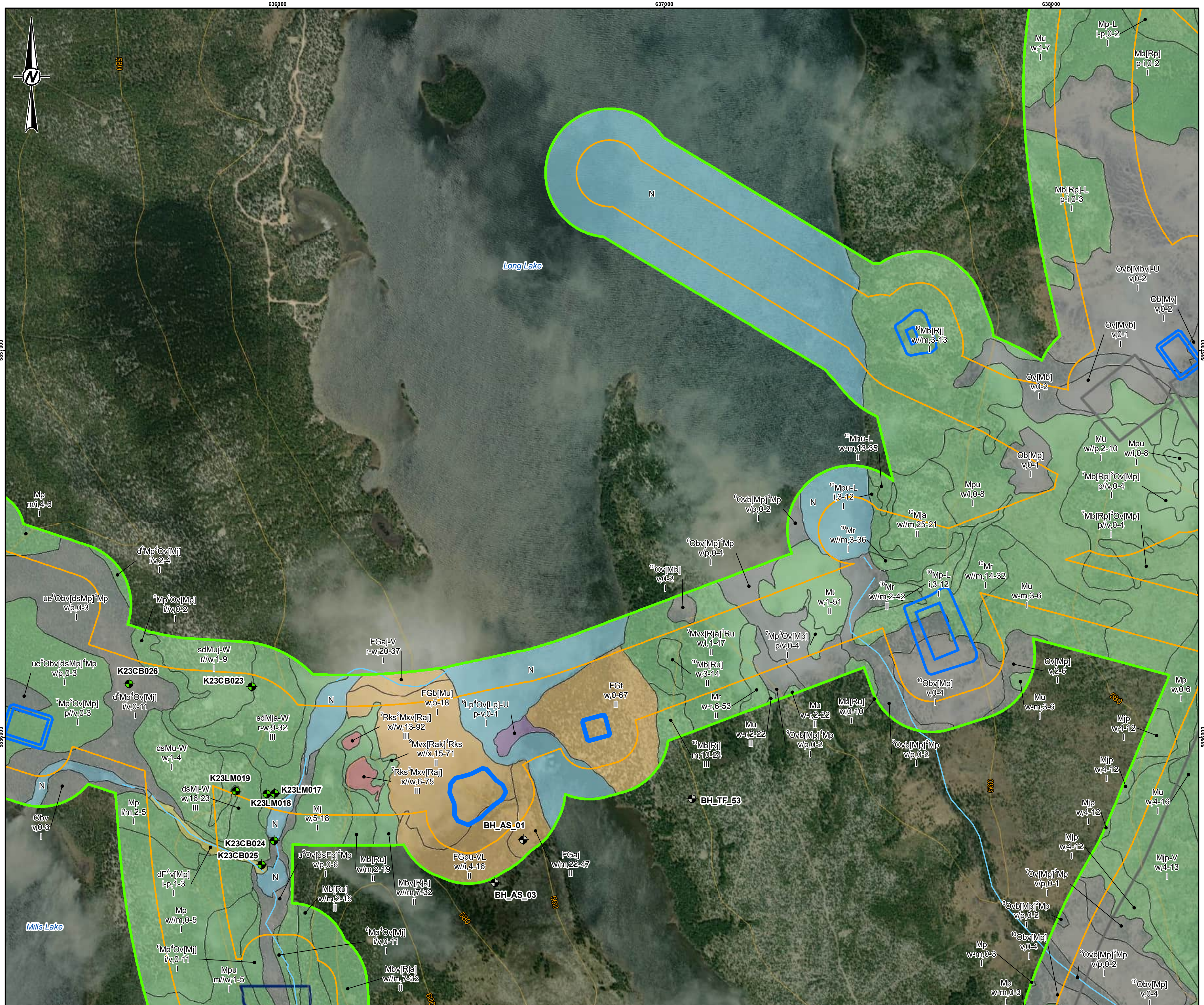


LEGEND

- BORE HOLE
- WSP 2023 INSPECTION SITE
- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROPOSED SEDIMENTATION POND

DOMINANT SURFICIAL MATERIAL

- BEDROCK (R)
- FLUVIAL (F)
- GLACIOFLUVIAL (FG)
- LACUSTRINE (L)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

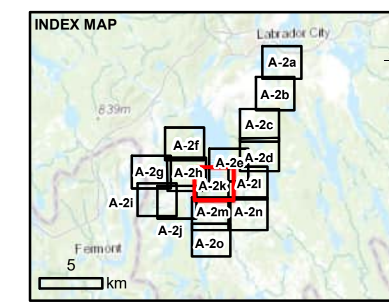
soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process

szcMbv[Ru]-LV

drainage → m // i,6-8 ← percent slope

drainage separator

terrain stability class → II



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PROJECT

KAMI IRON ORE MINE PROJECT, WABUSH, NL

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TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

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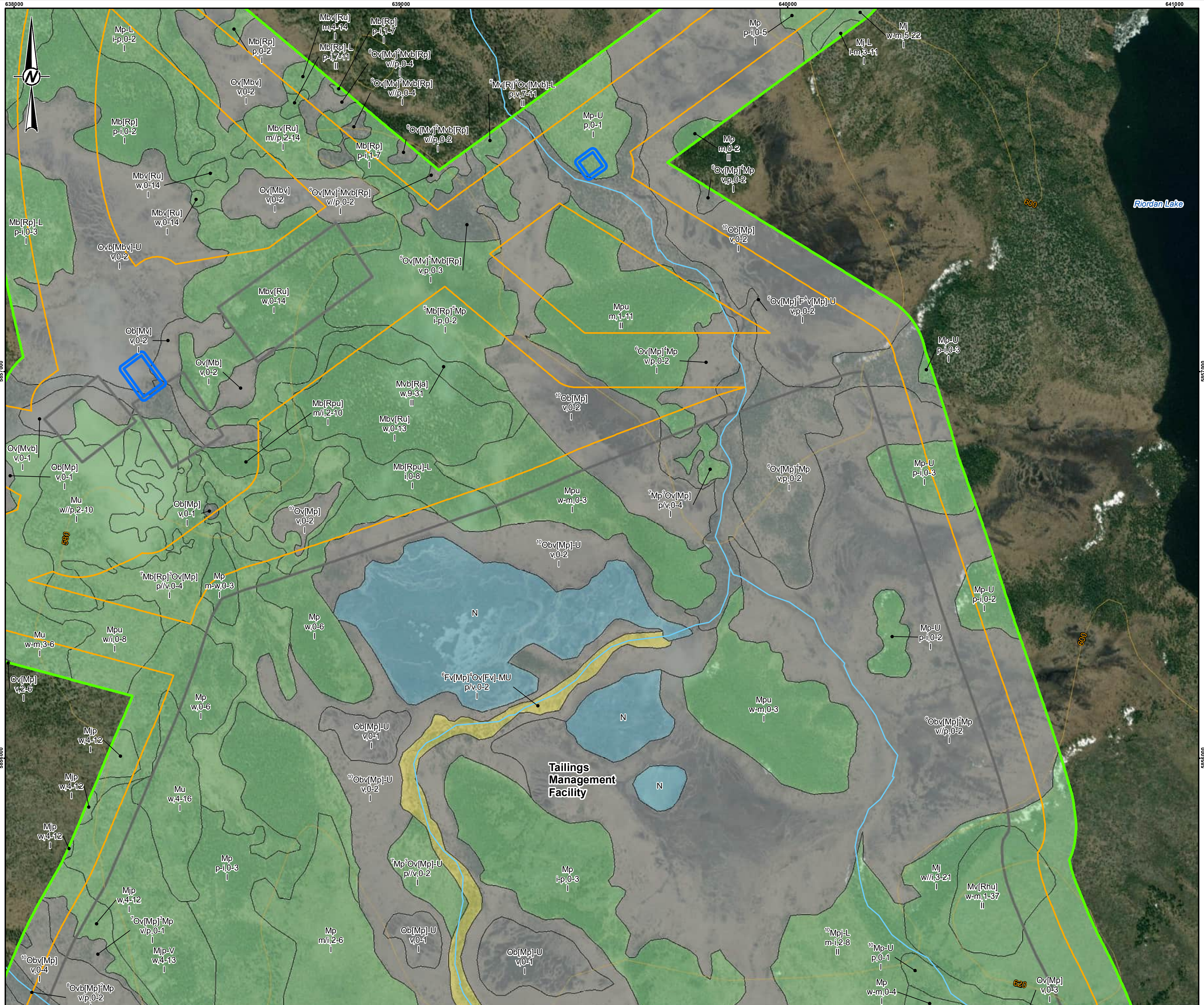
PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2k

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA

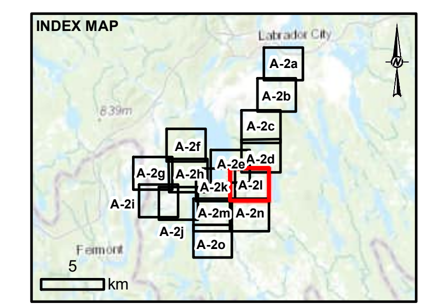
DOMINANT SURFICIAL MATERIAL

- FLUVIAL (F)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



0 250 500

1:10,000 METRES

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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

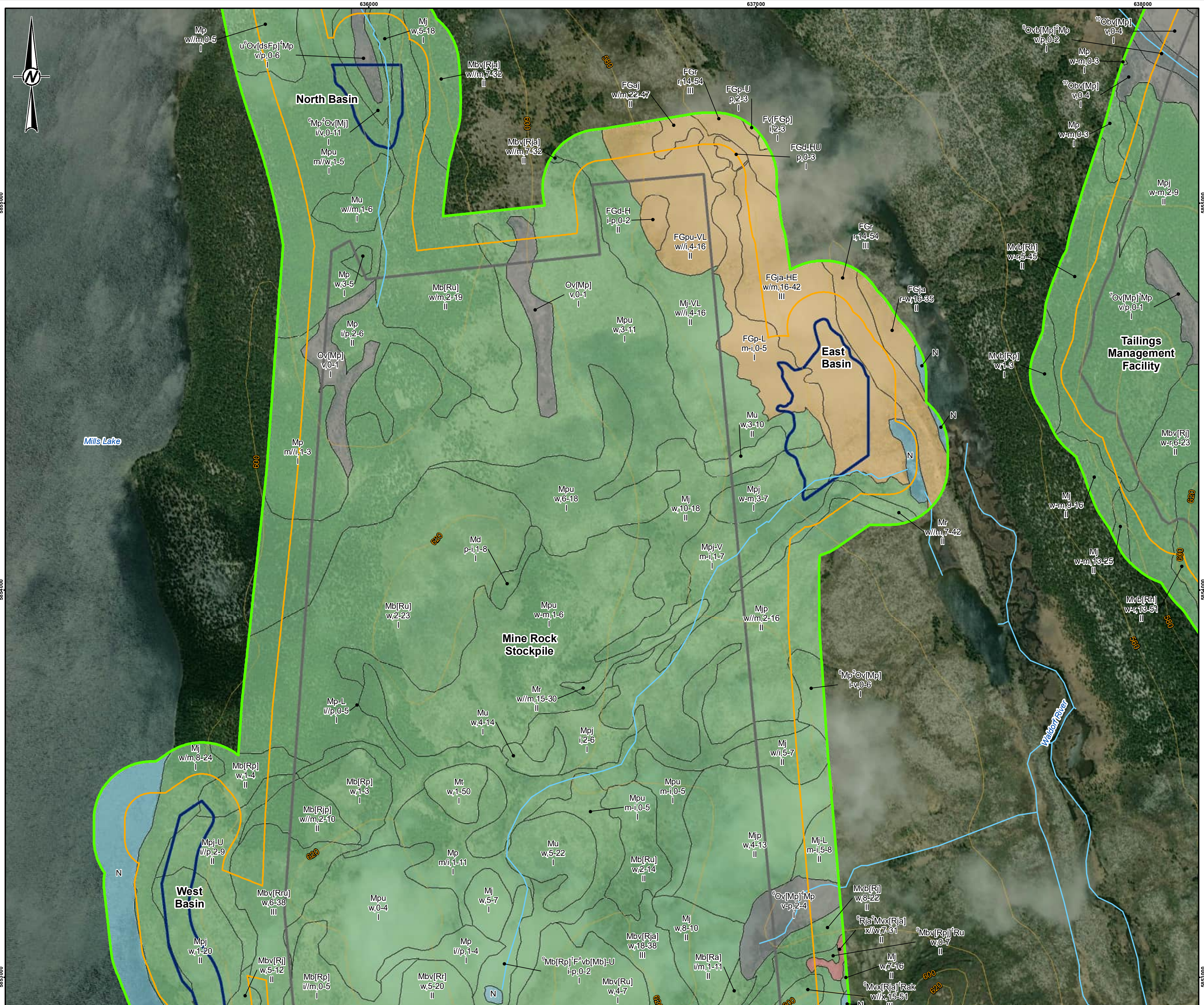
CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2l

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm



LEGEND

- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROPOSED SEDIMENTATION POND

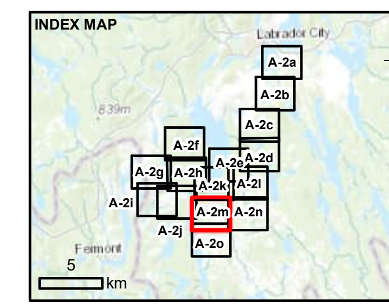
DOMINANT SURFICIAL MATERIAL

- BEDROCK (R)
- FLUVIAL (F)
- GLACIOFLUVIAL (FG)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



0 250 500

1:10,000 METRES

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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

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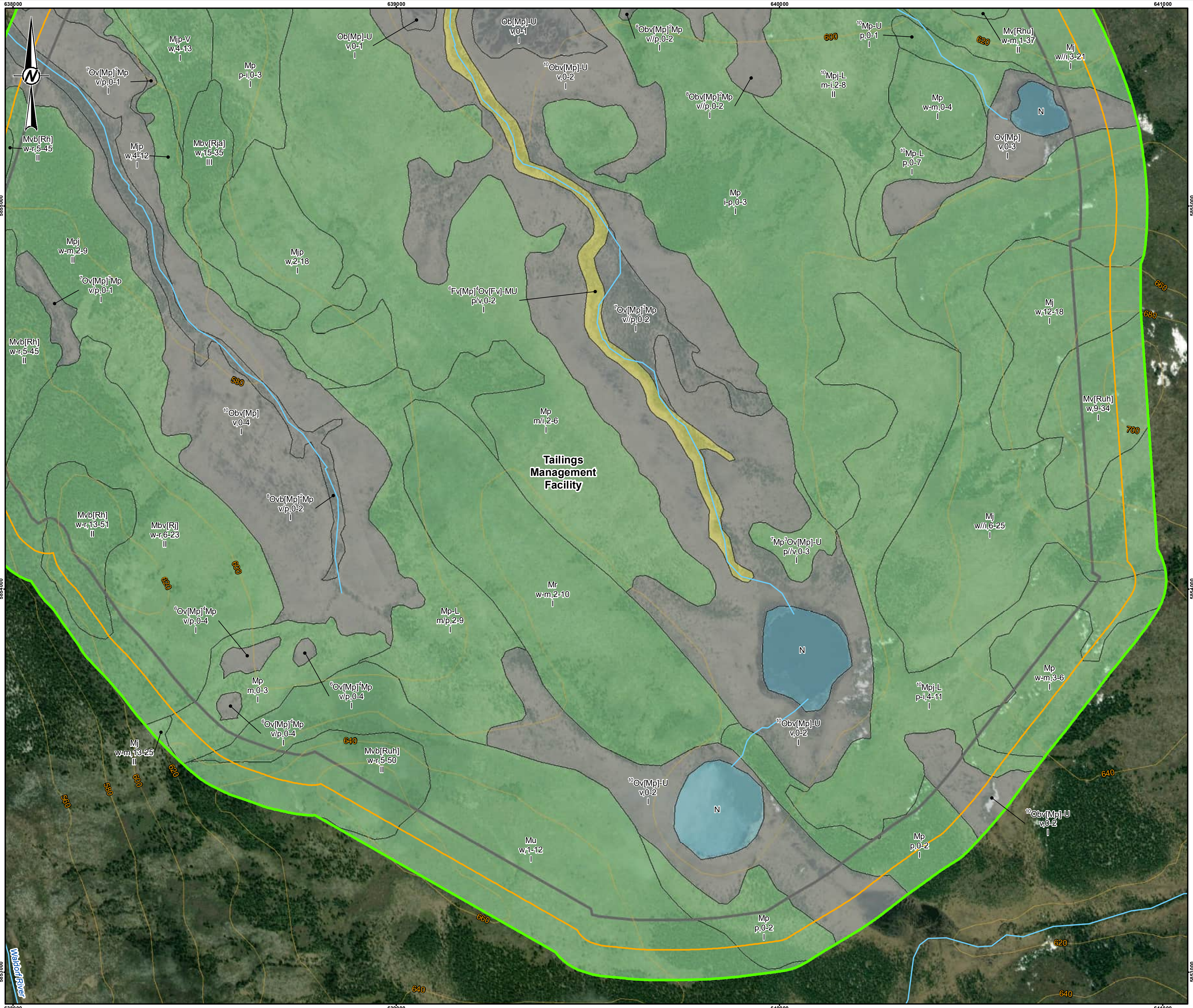
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2m

25mm



LEGEND

- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA

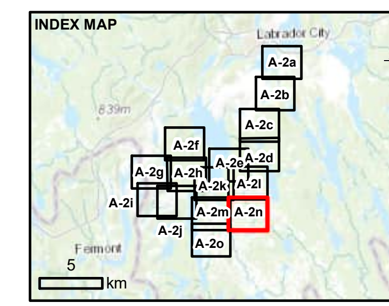
DOMINANT SURFICIAL MATERIAL

- FLUVIAL (F)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



0 250 500

1:10,000 METRES

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CLIENT

CHAMPION IRON MINES

PROJECT

KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE

TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2n

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

LEGEND

- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROPOSED SEDIMENTATION POND

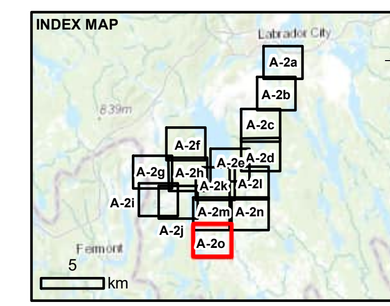
DOMINANT SURFICIAL MATERIAL

- BEDROCK (R)
- MORAINAL (TILL)(M)
- WATERBODY (N)
- ORGANIC (O)

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

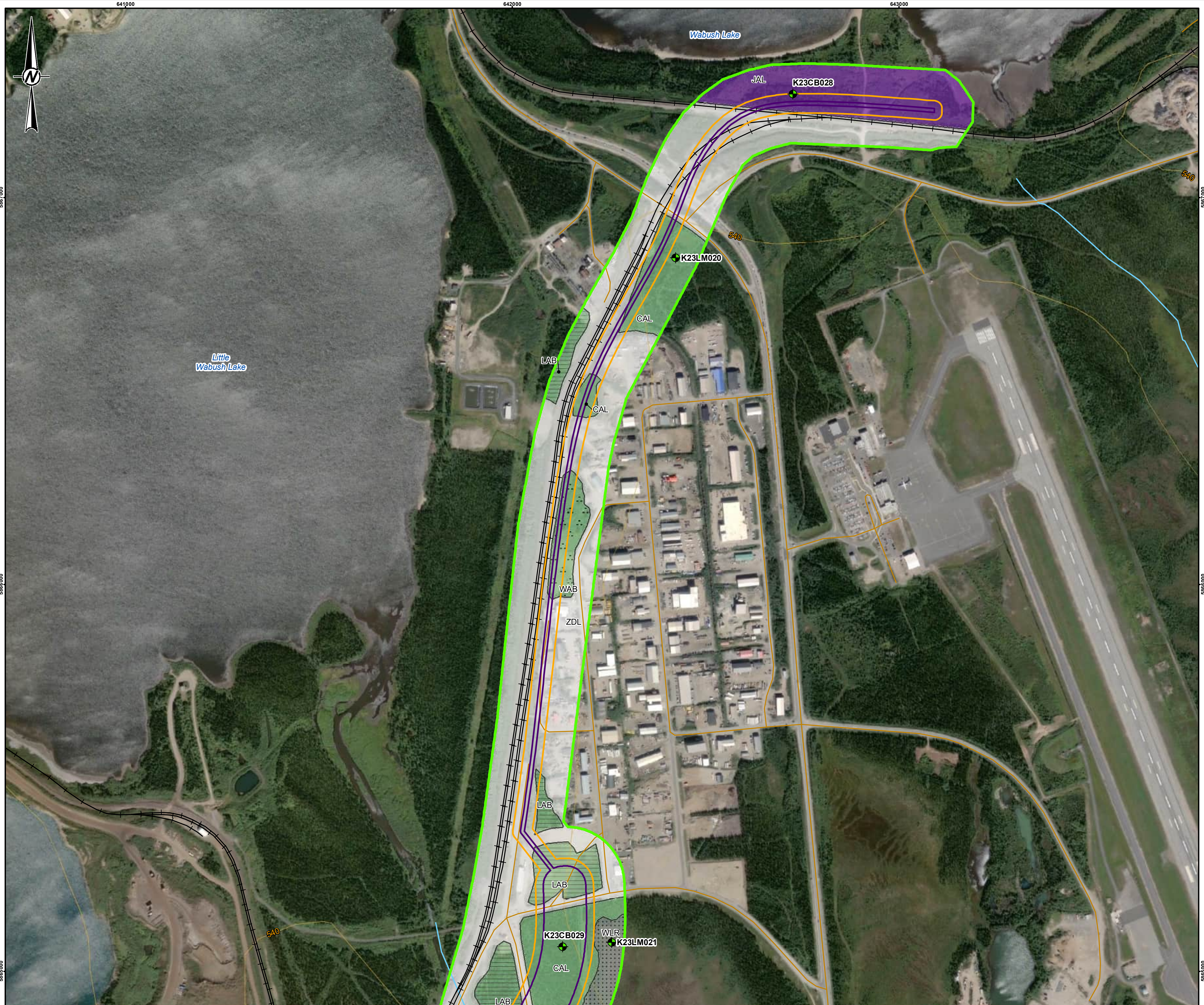
TITLE
TERRAIN MAPPING IN THE KAMI IRON ORE MINE SITE STUDY AREA AND THE LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-2o

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- SOIL SITE
- CONTOUR (40m INTERVAL)
- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

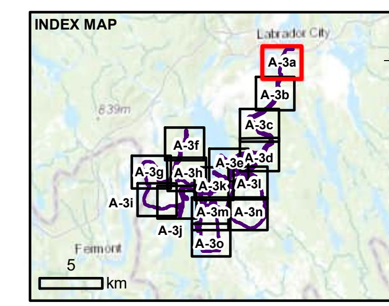
SOIL MAP UNITS

- CAL
- JAL
- LAB
- WAB
- WLR
- ZDL

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



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CLIENT
CHAMPION IRON MINES

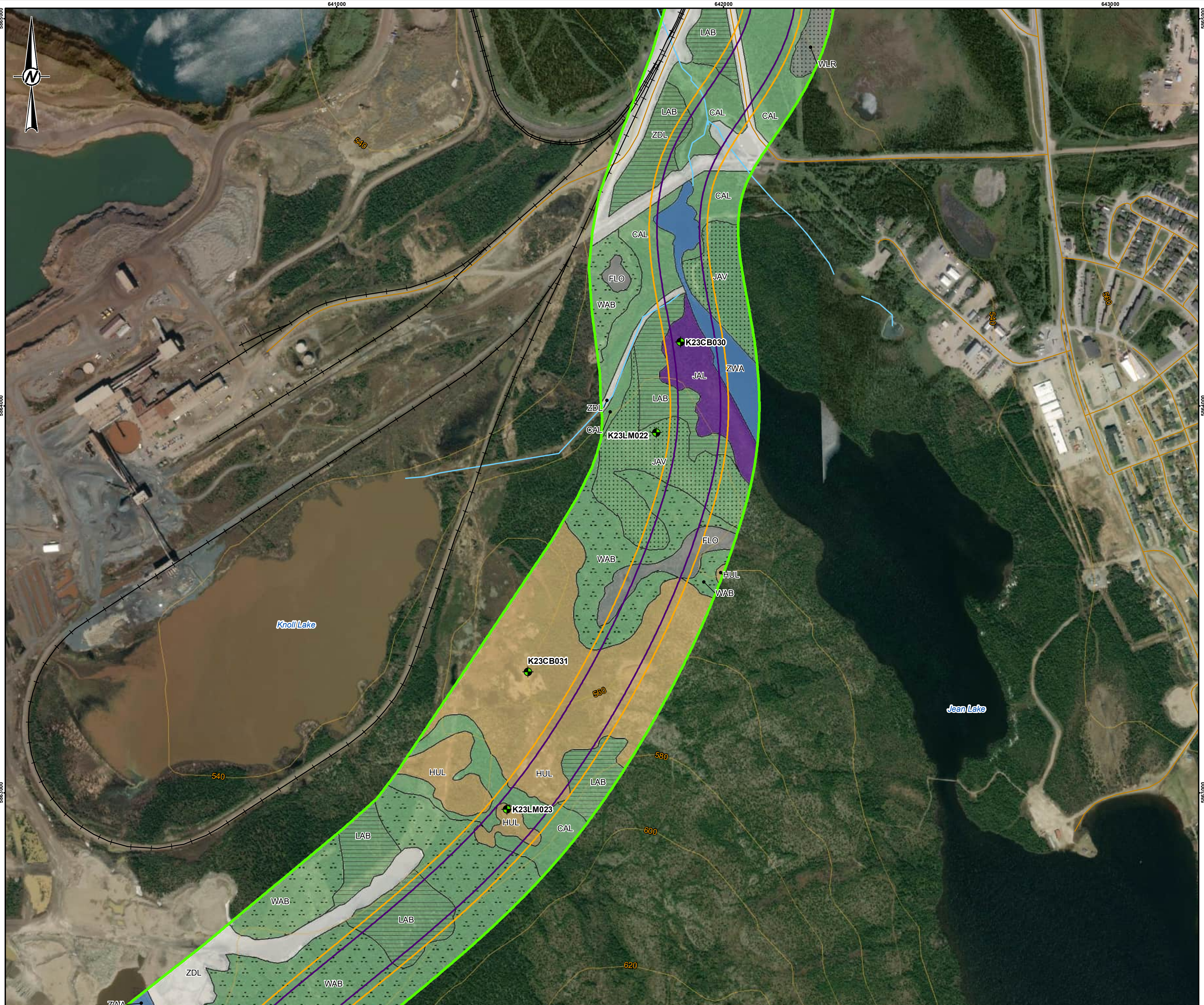
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3a



LEGEND

- SOIL SITE
- CONTOUR (40m INTERVAL)
- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

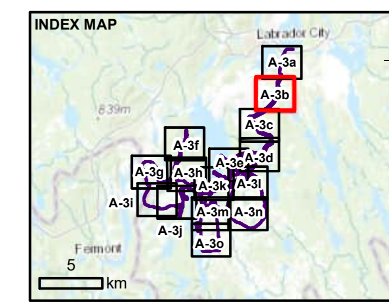
SOIL MAP UNITS

- CAL
- FLO
- HUL
- JAL
- JAV
- LAB
- WAB
- WLR
- ZDL
- ZWA

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



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CLIENT
CHAMPION IRON MINES

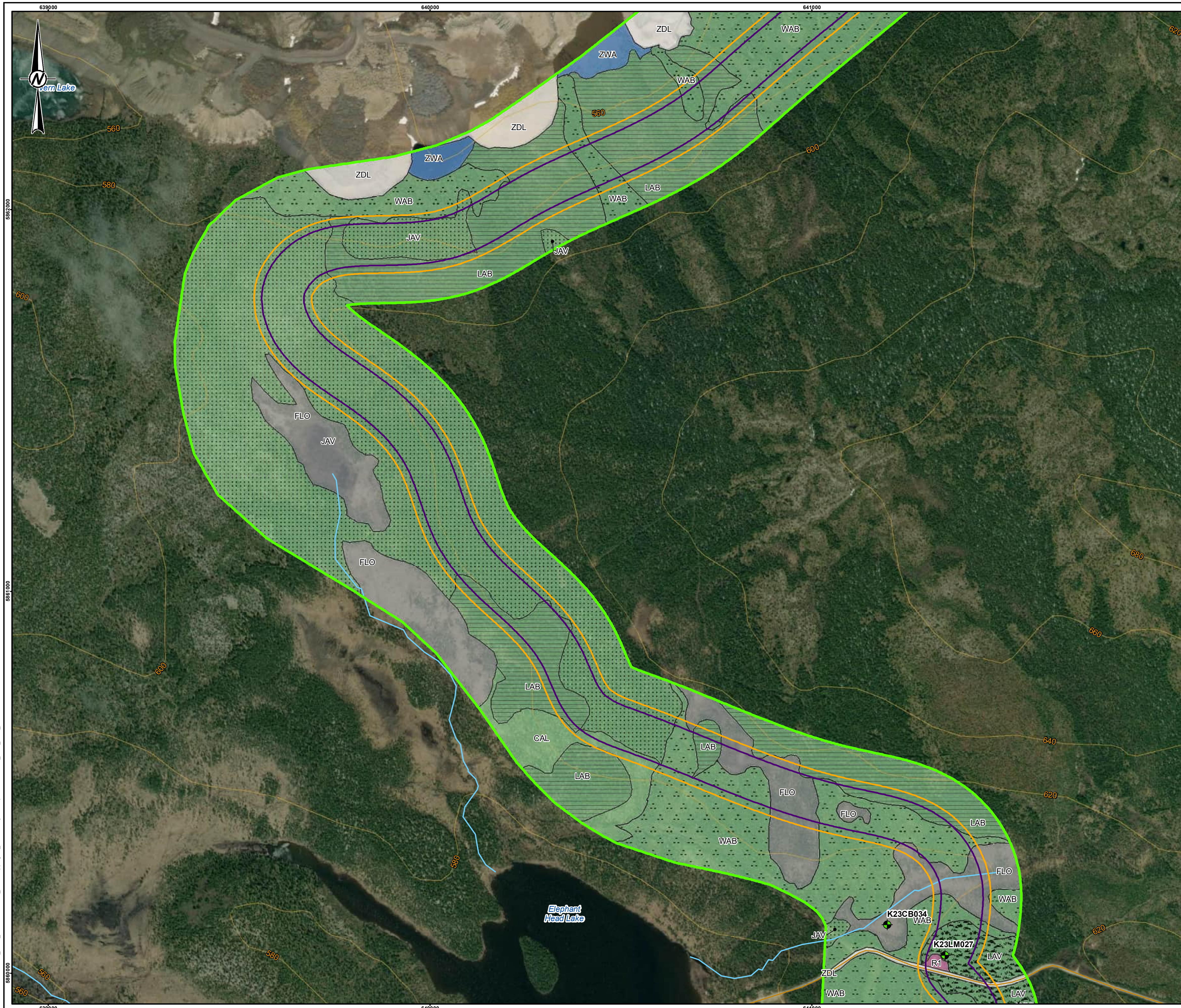
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT
wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3b



LEGEND

- SOIL SITE
- CONTOUR (40m INTERVAL)
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

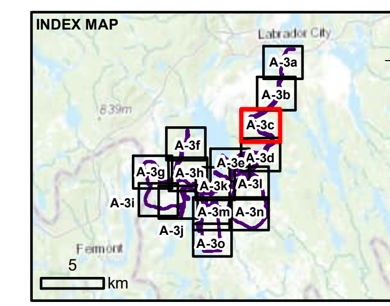
SOIL MAP UNITS

- CAL
- FLO
- JAV
- LAB
- LAV
- R1
- WAB
- ZDL
- ZWA

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

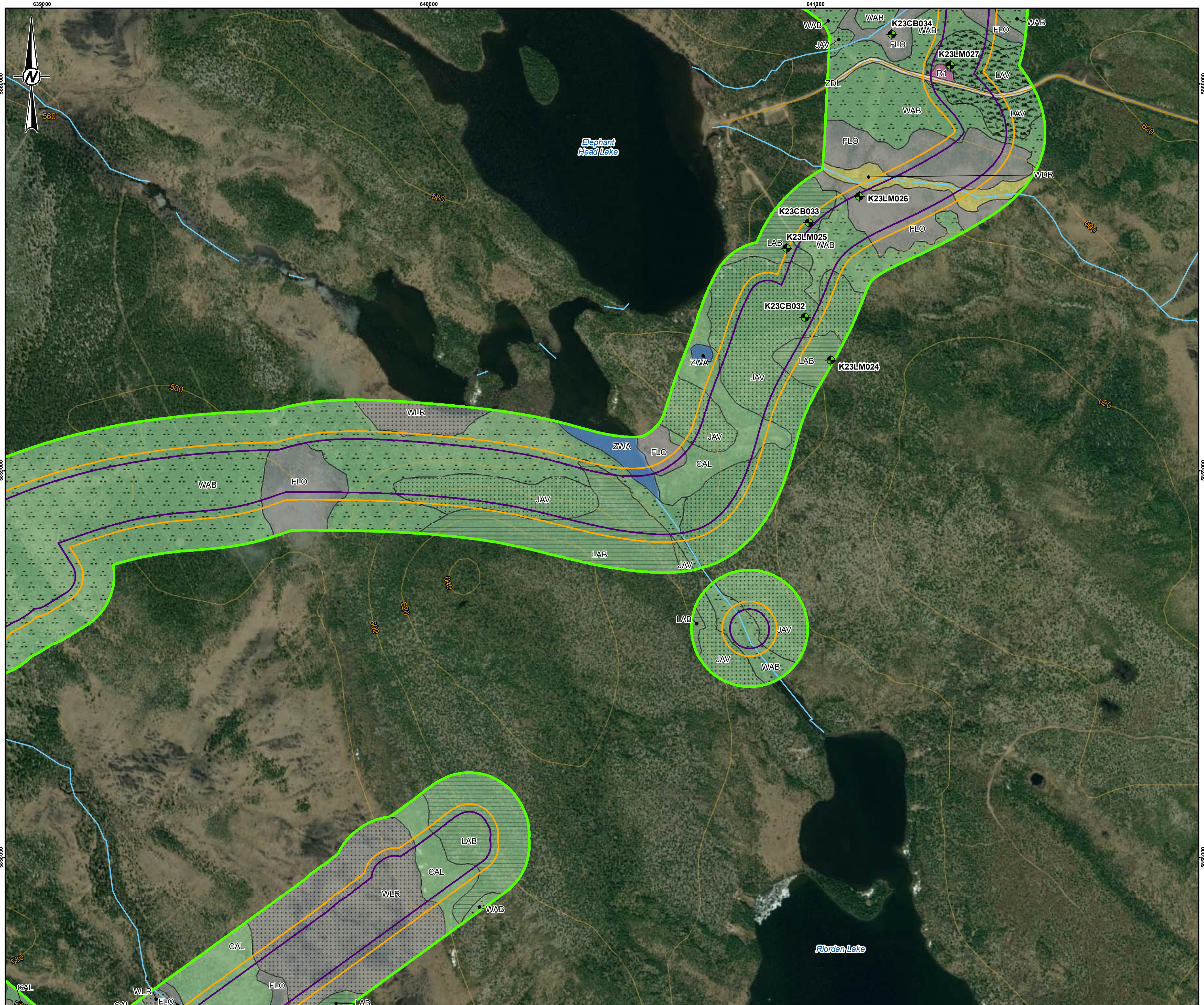
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT
wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3c



LEGEND

- SOIL SITE
- CONTOUR (40m INTERVAL)
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

SOIL MAP UNITS

- CAL
- FLO
- JAV
- LAB
- LAV
- R1
- WAB
- WDR
- WLR
- ZDL
- ZWA

Terrain Polygon Label

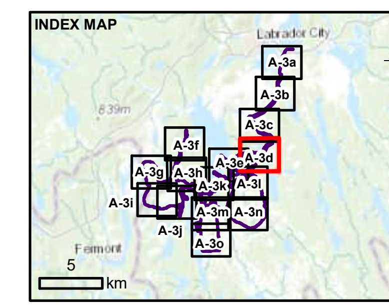
szcMbv[Ru]-LV

m // i,6-8

II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class

INDEX MAP



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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

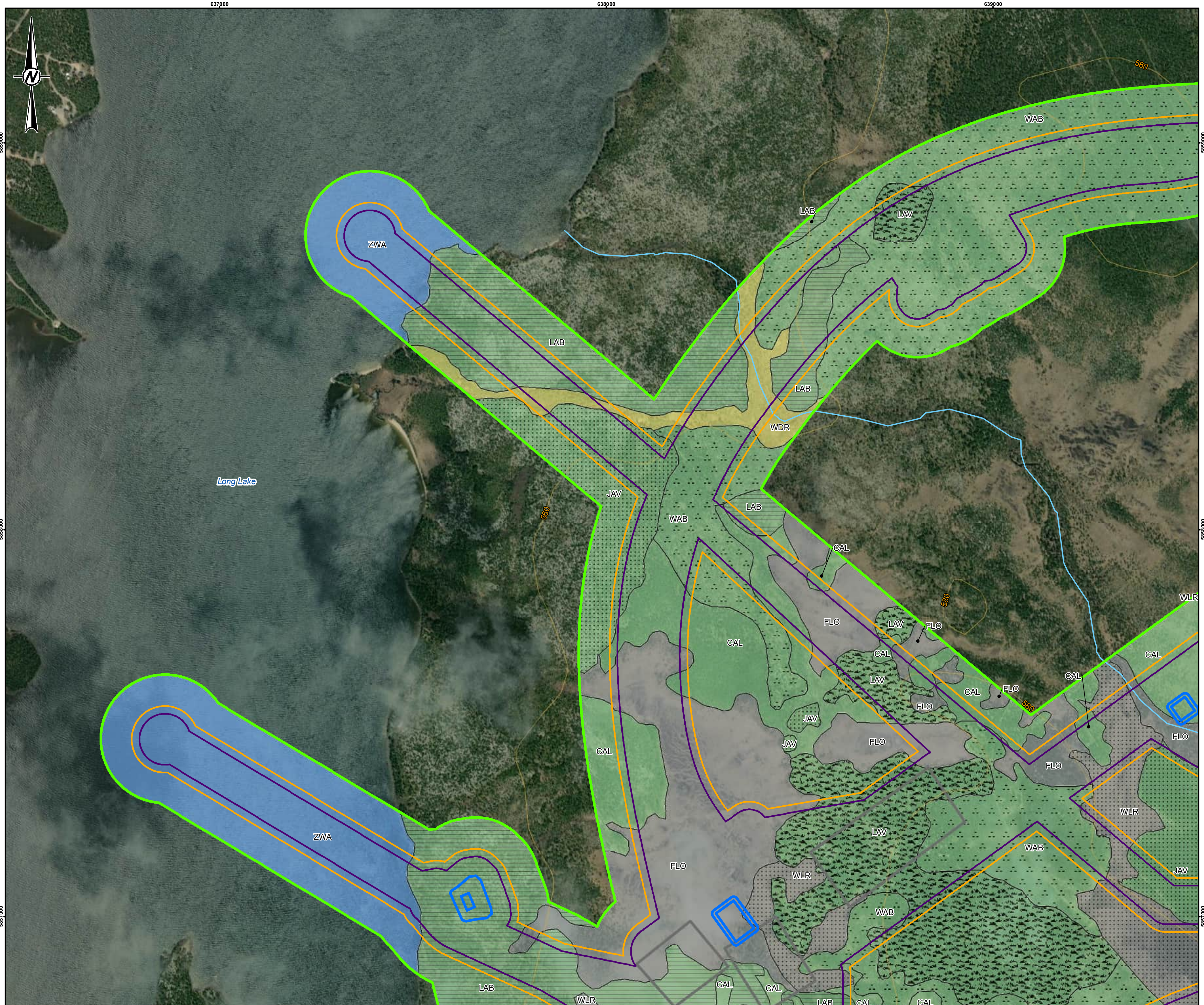
CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3d

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm



LEGEND

- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

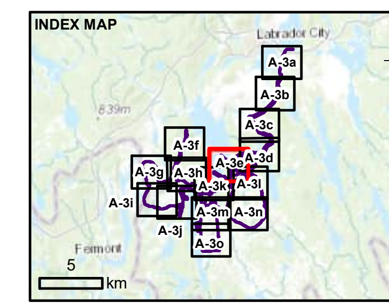
SOIL MAP UNITS

- CAL
- FLO
- JAV
- LAB
- LAV
- WAB
- WDR
- WLR
- ZWA

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

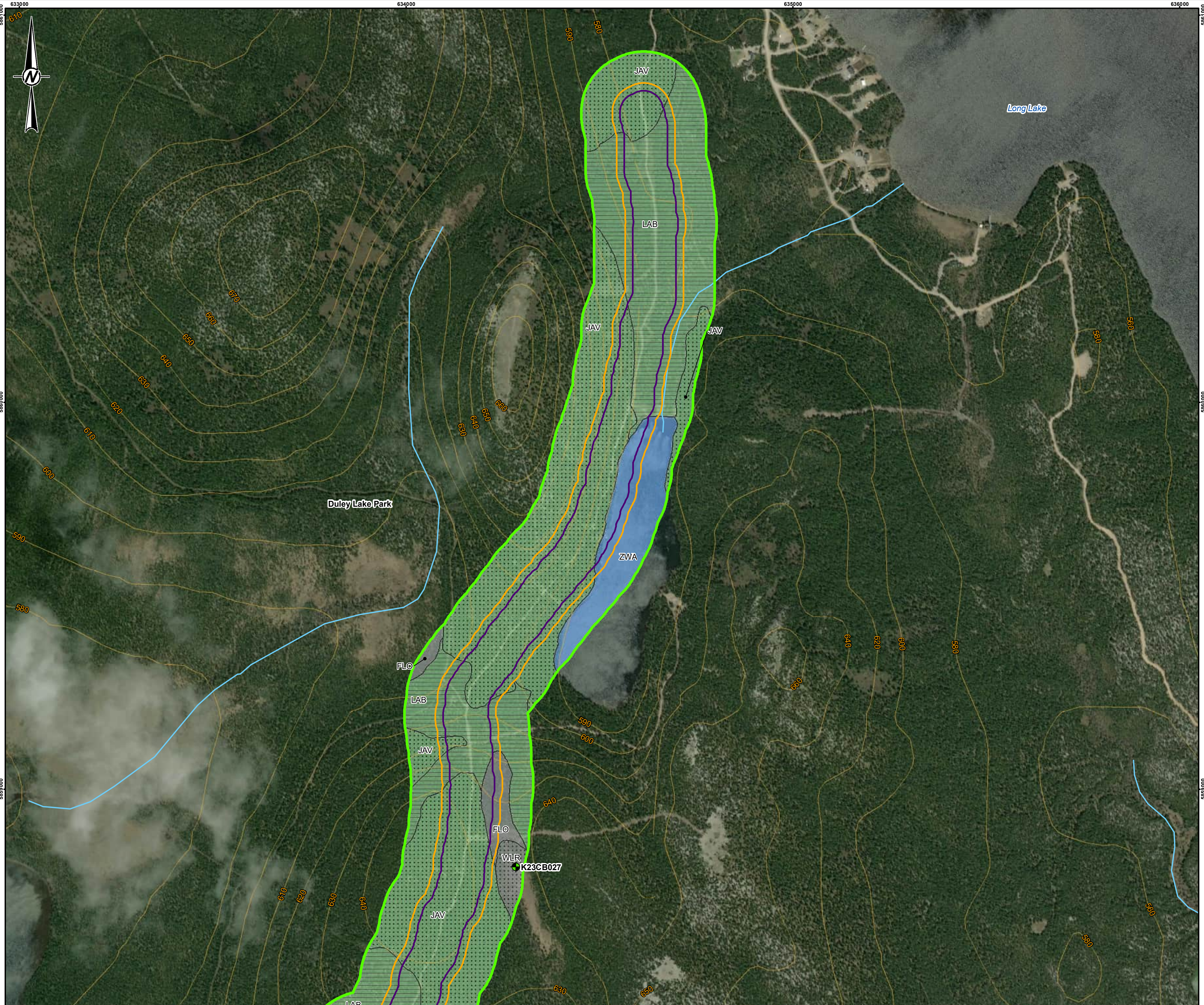
TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3e

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- SOIL SITE
- CONTOUR (40m INTERVAL)
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

SOIL MAP UNITS

- FLO
- JAV
- LAB
- WLR
- ZWA

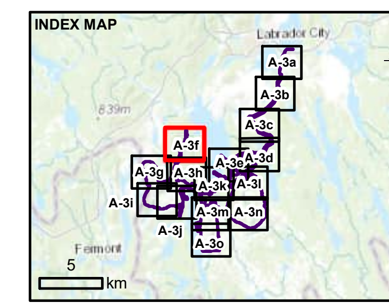
Terrain Polygon Label

szcMbv[Ru]-LV

m // i,6-8

II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3f

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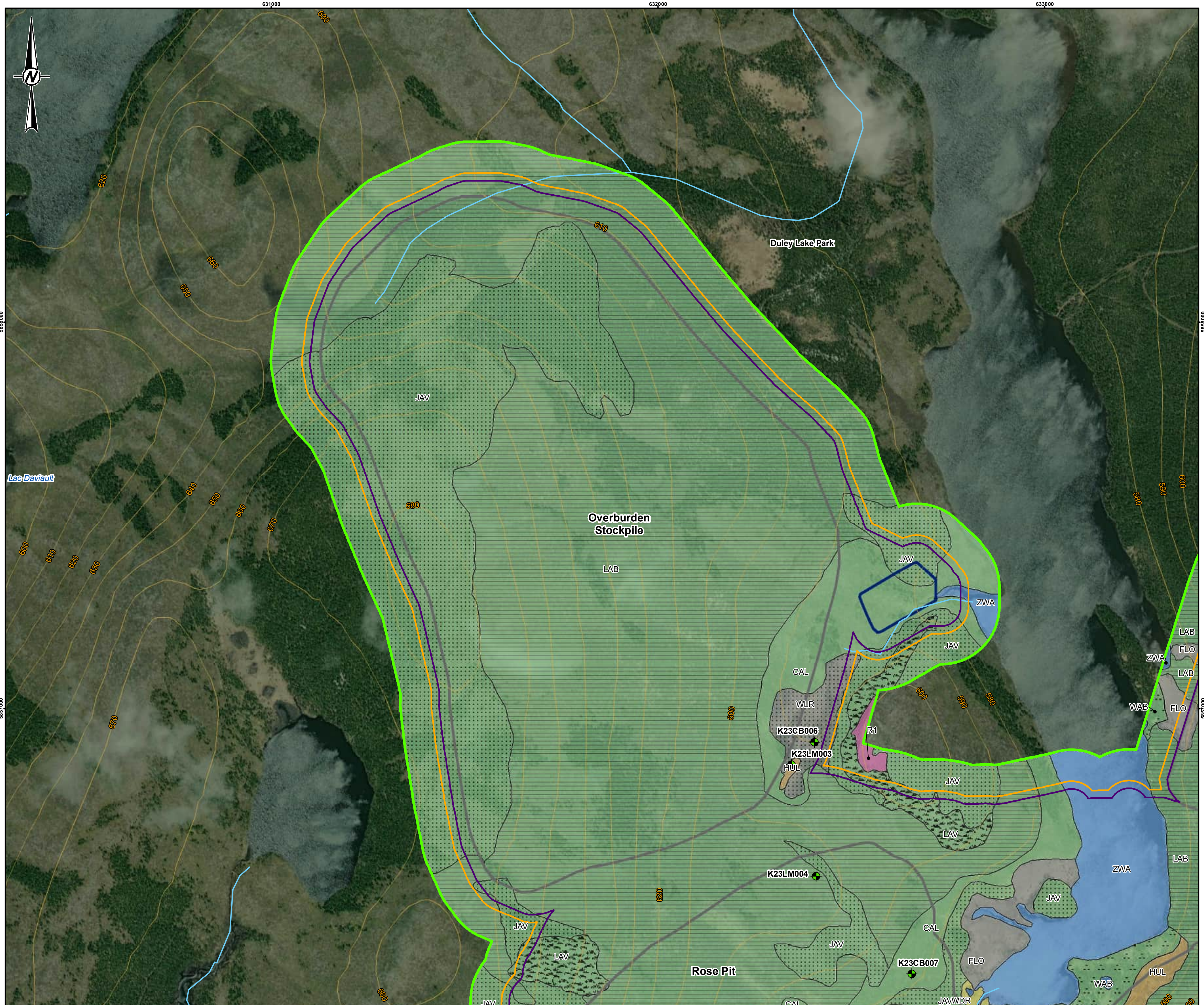


LEGEND

- SOIL SITE
- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT
- PROPOSED SEDIMENTATION POND

SOIL MAP UNITS

- CAL
- FLO
- HUL
- JAV
- LAB
- LAV
- R1
- WAB
- WDR
- WLR
- ZWA

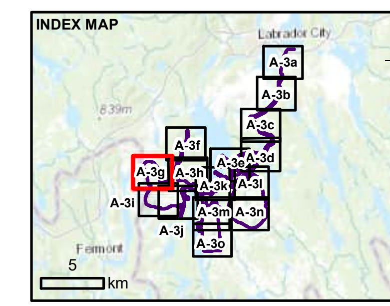
Terrain Polygon Label

szcMbv[Ru]-LV

m // i,6-8

II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3g

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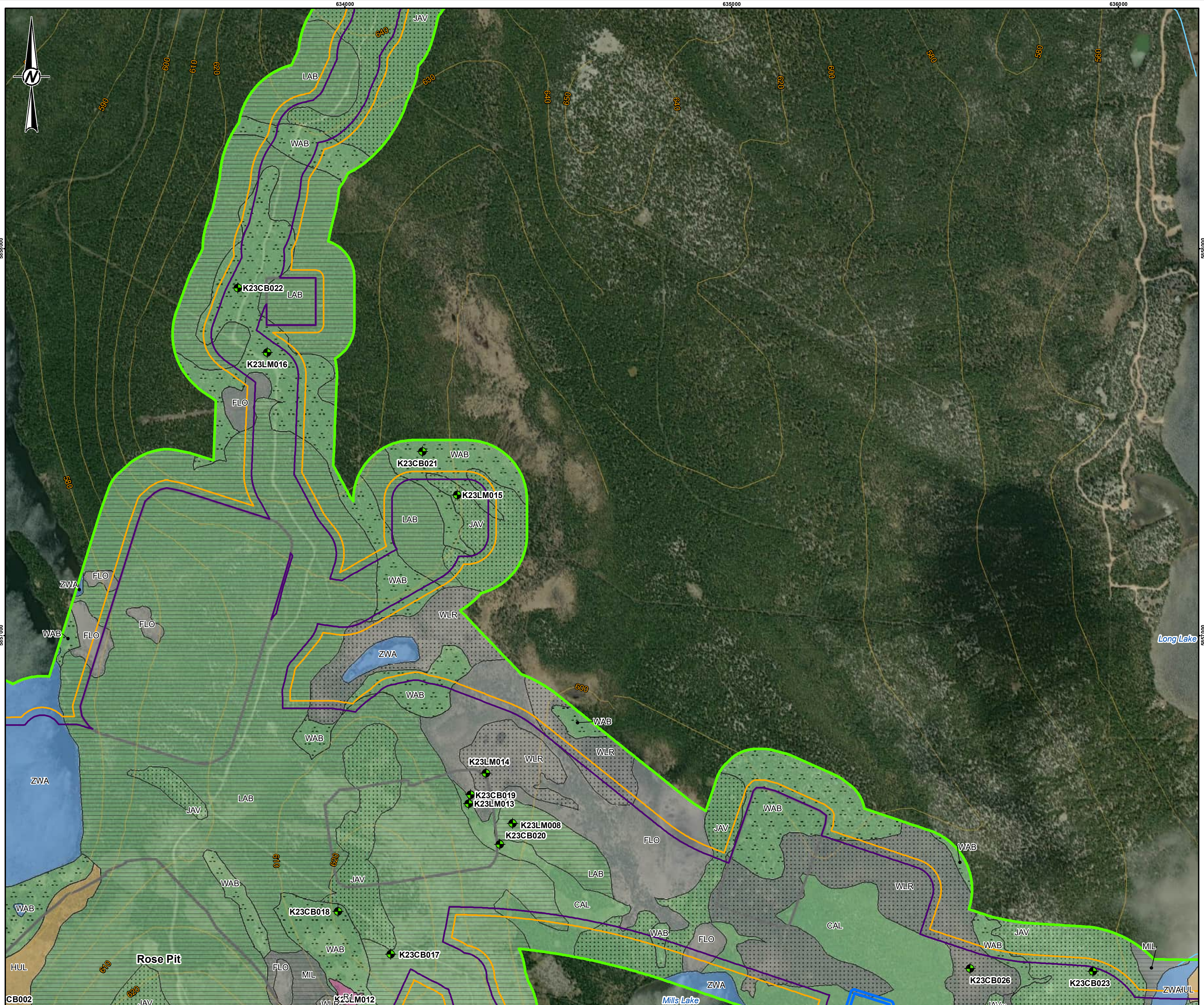


LEGEND

- SOIL SITE
- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

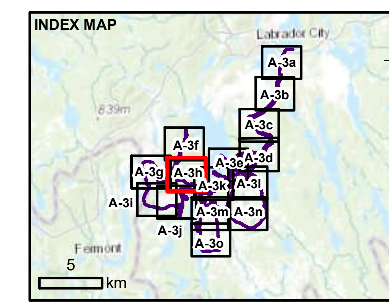
SOIL MAP UNITS

- CAL
- FLO
- HUL
- JAV
- LAB
- LAV
- MIL
- R1
- WAB
- WLR
- ZWA

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



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CLIENT
CHAMPION IRON MINES

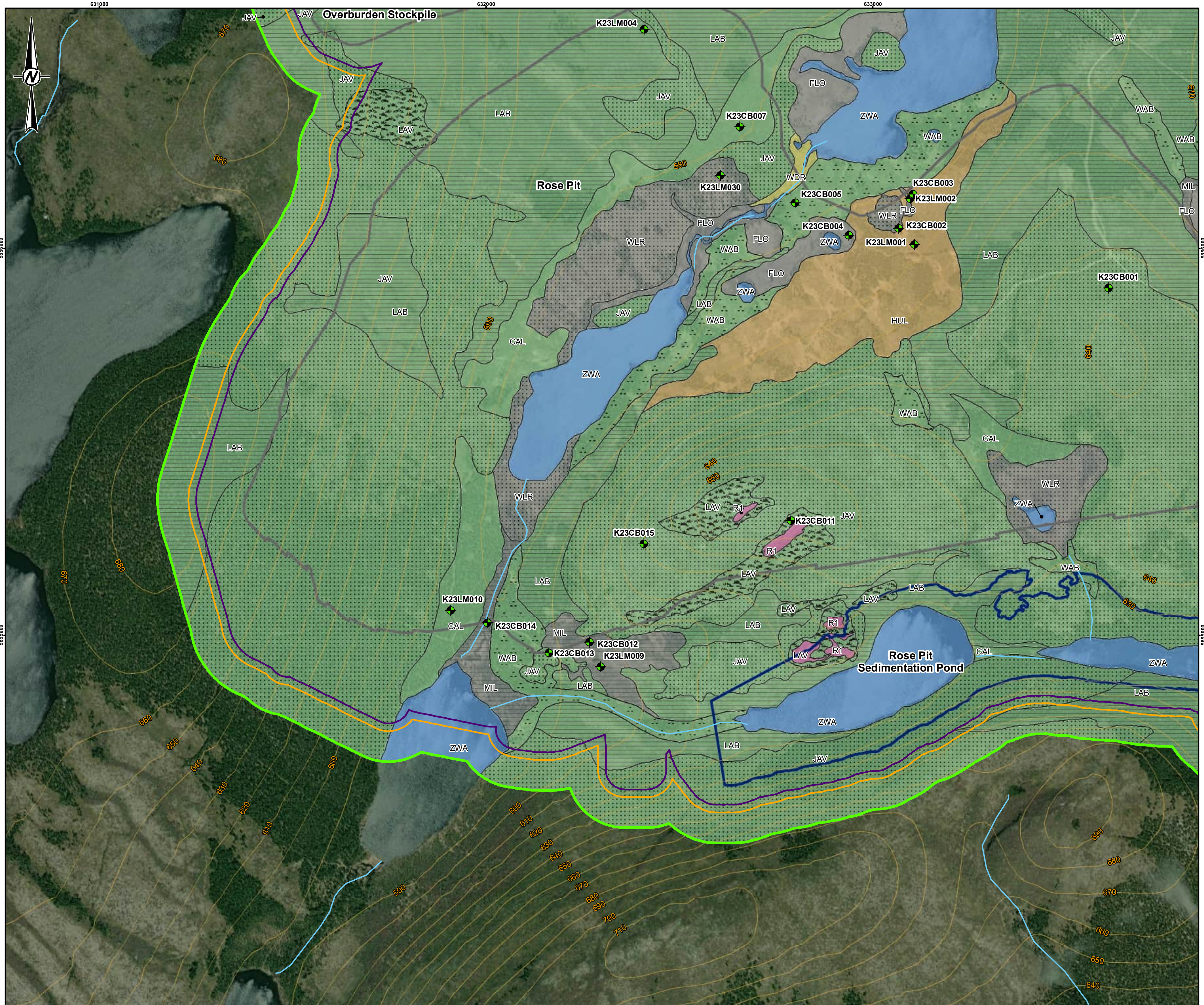
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3h



LEGEND

- SOIL SITE
- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT
- PROPOSED SEDIMENTATION POND

SOIL MAP UNITS

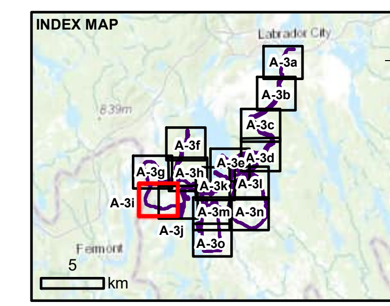
- CAL
- FLO
- HUL
- JAV
- LAB
- LAV
- MIL
- R1
- WAB
- WDR
- WLR
- ZWA

Terrain Polygon Label

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process

szcMbv[Ru]-LV

drainage → m // i,6-8 ← percent slope
drainage separator
II
terrain stability class



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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

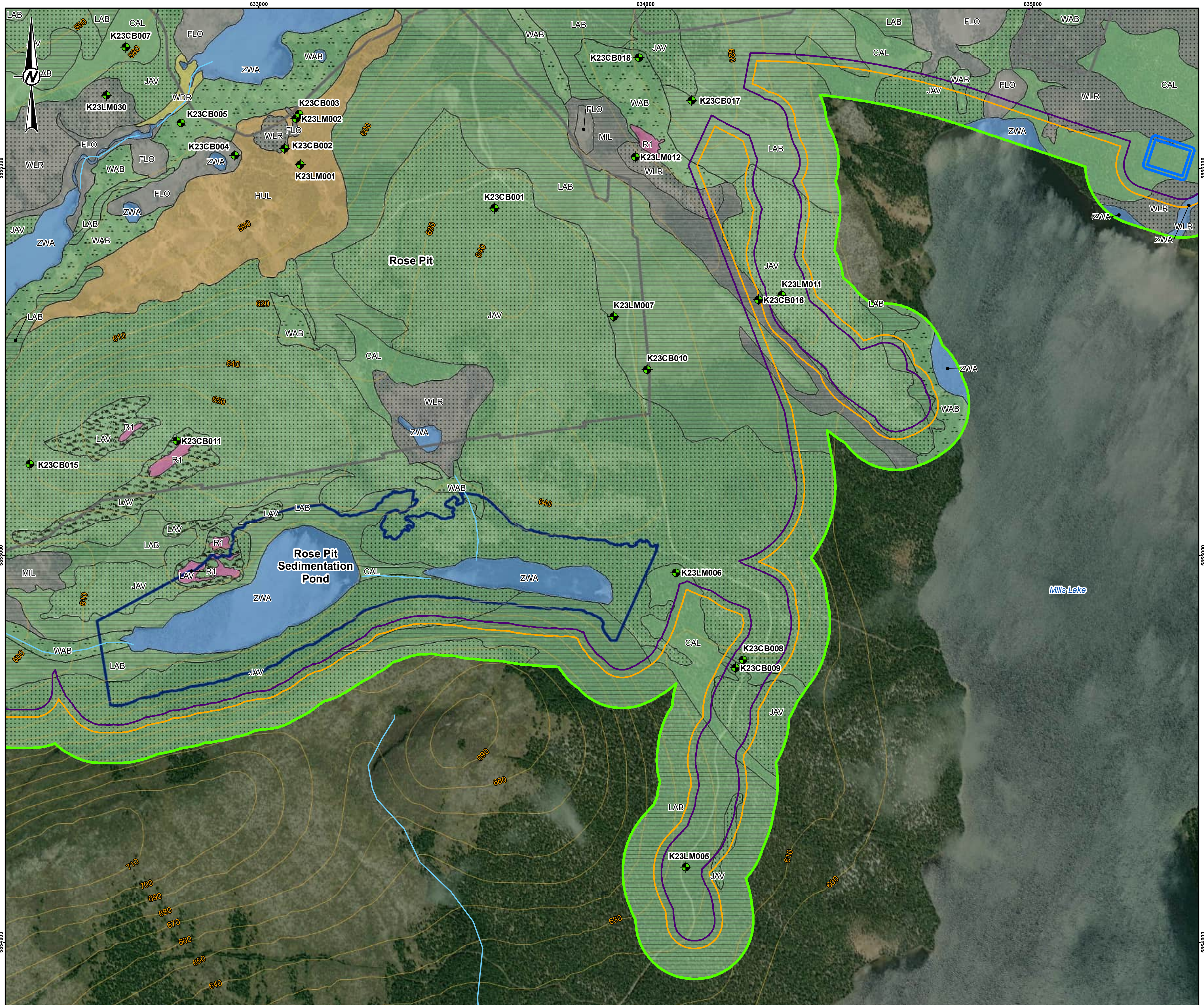
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3i



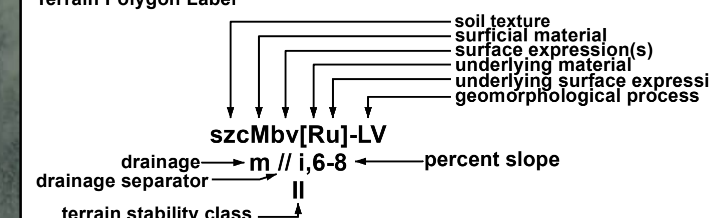
LEGEND

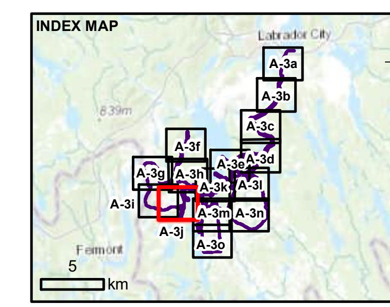
- SOIL SITE
- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT
- PROPOSED SEDIMENTATION POND

SOIL MAP UNITS

- CAL
- FLO
- HUL
- JAV
- LAB
- LAV
- MIL
- R1
- WAB
- WDR
- WLR
- ZWA

Terrain Polygon Label





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1:10,000 METRES

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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

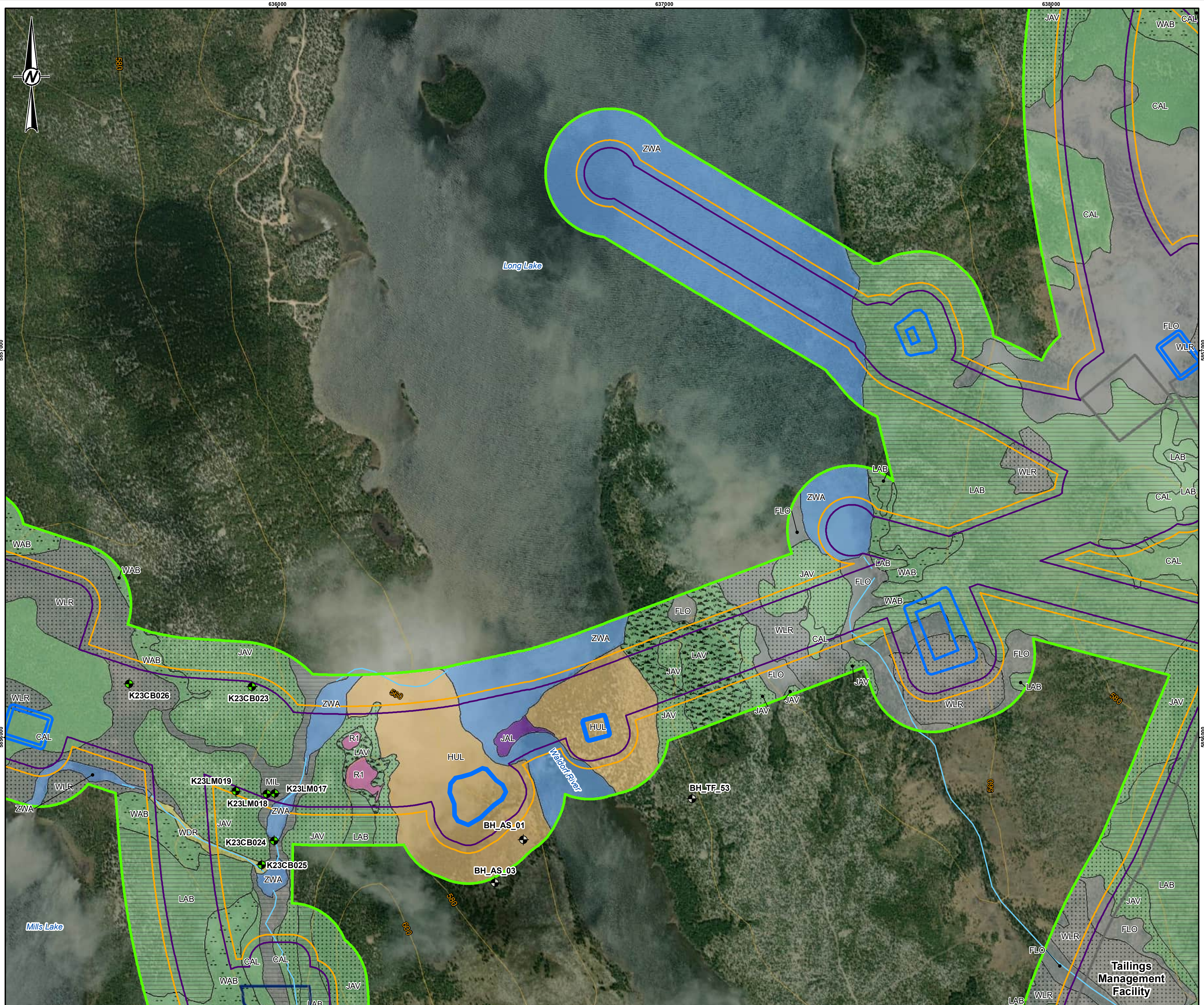
wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3j

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm



LEGEND

- BORE HOLE
- SOIL SITE
- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT
- PROPOSED SEDIMENTATION POND

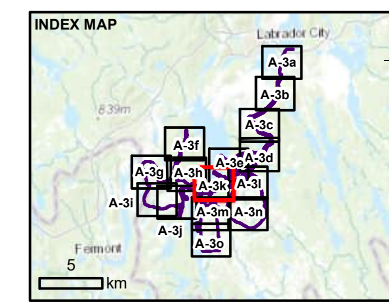
SOIL MAP UNITS

- CAL
- FLO
- HUL
- JAL
- JAV
- LAB
- LAV
- MIL
- R1
- WAB
- WDR
- WLR
- ZWA

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



0 250 500

1:10,000 METRES

REFERENCE(S)

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CLIENT

CHAMPION IRON MINES

PROJECT

KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE

SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

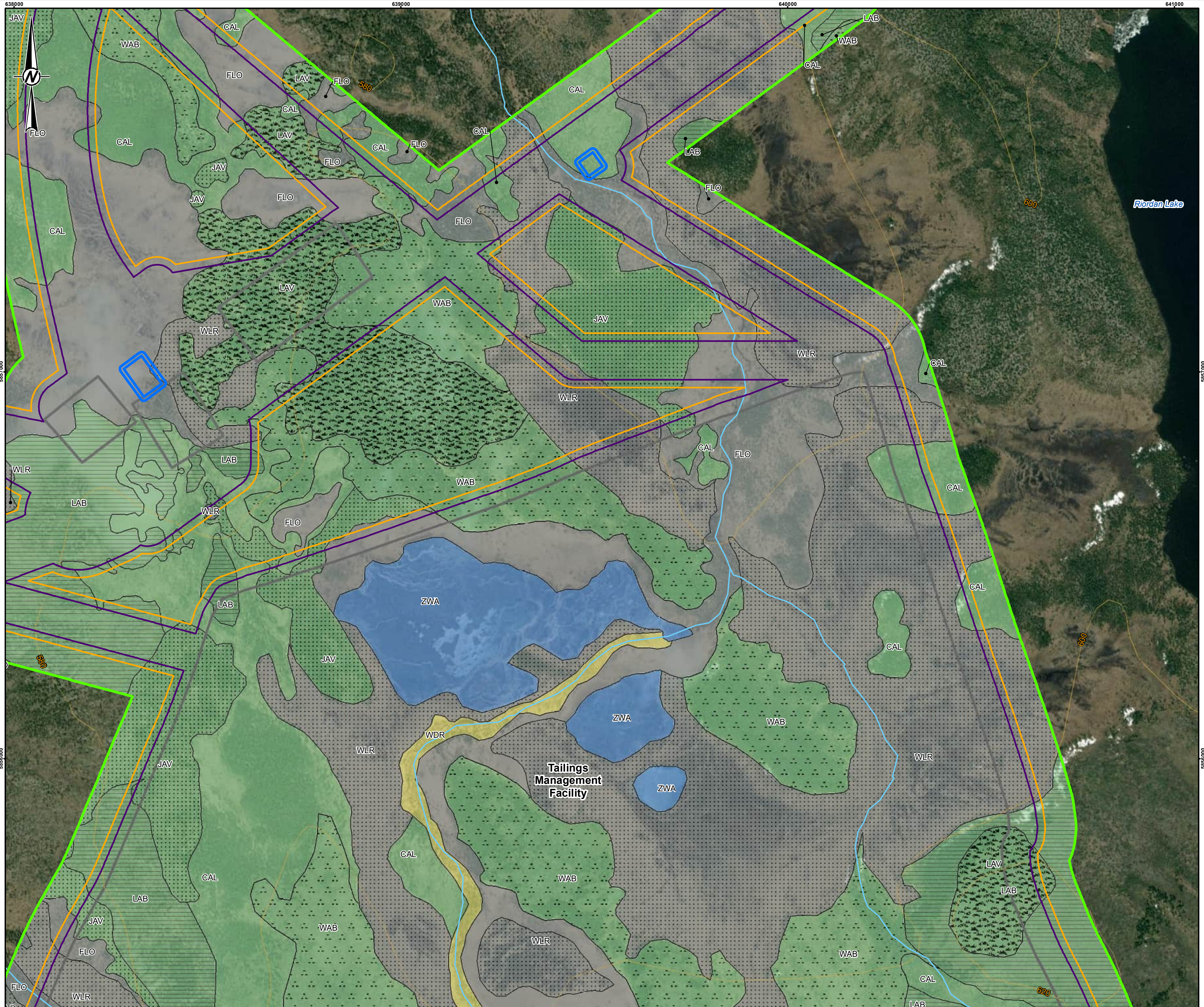
CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3k

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

PATH: I:\CLIENTS\KAMI_IRON_ORE\CA0003092_5894\Mapping\02_Terrain\ProjectFootprint\CA0003092_5894_SMU_Rev0.mxd PRINTED ON: 2025-06-04 AT: 10:00:16 AM



LEGEND

- CONTOUR (40m INTERVAL)
- PROPOSED POND
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

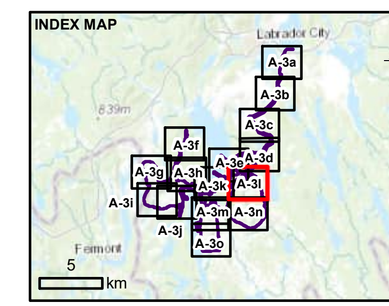
SOIL MAP UNITS

- CAL
- FLO
- JAV
- LAB
- LAV
- WAB
- WDR
- WLR
- ZWA

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



0 250 500
1:10,000 METRES

REFERENCE(S)

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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

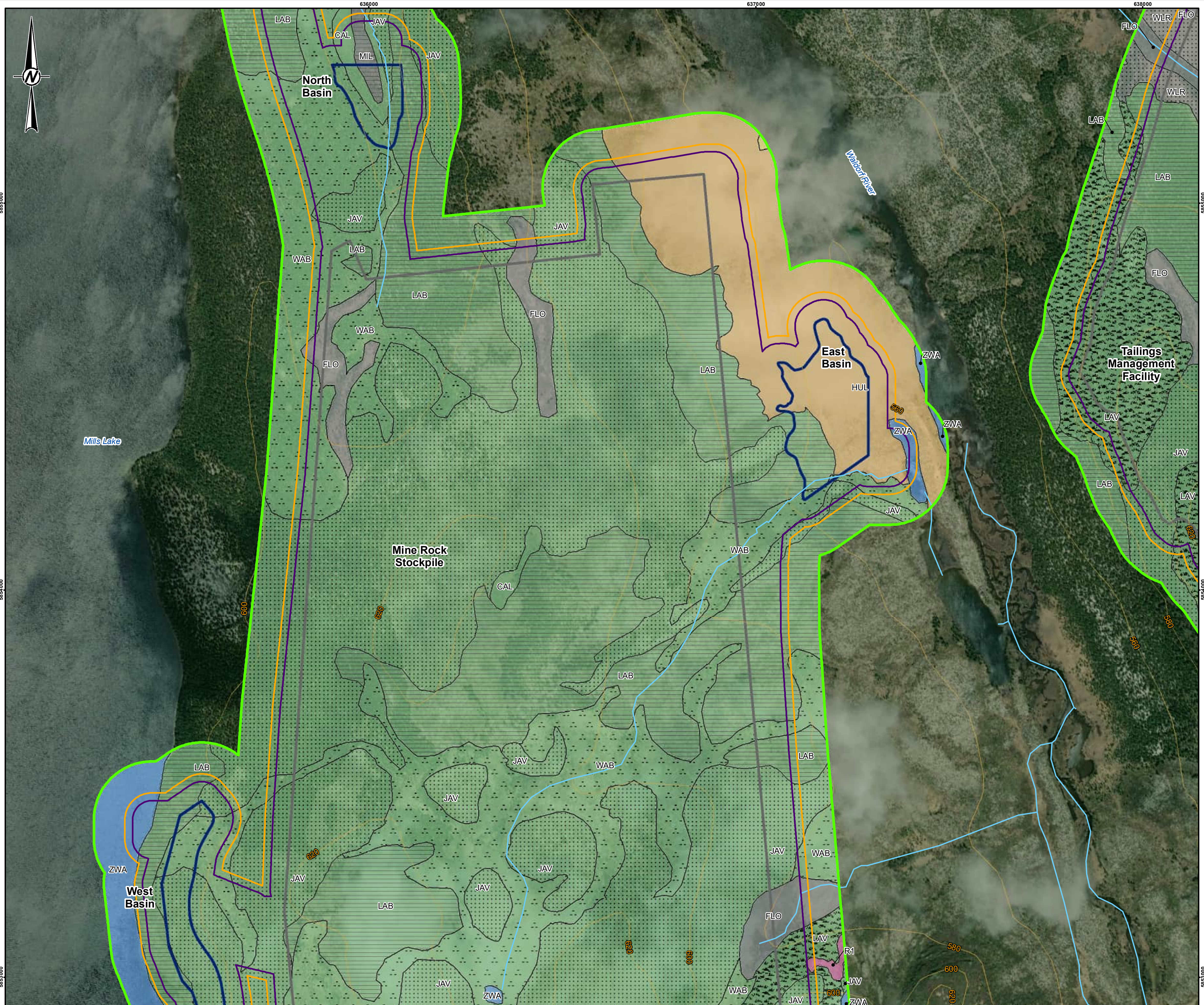
wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3l

25mm

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT
- PROPOSED SEDIMENTATION POND

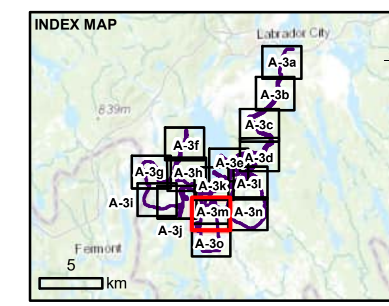
SOIL MAP UNITS

- CAL
- FLO
- HUL
- JAV
- LAB
- LAV
- MIL
- R1
- WAB
- WDR
- WLR
- ZWA

Terrain Polygon Label

szcMbv[Ru]-LV
m // i,6-8
II

- soil texture
- surficial material
- surface expression(s)
- underlying material
- underlying surface expression
- geomorphological process
- drainage
- drainage separator
- percent slope
- terrain stability class



0 250 500
1:10,000 METRES

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PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

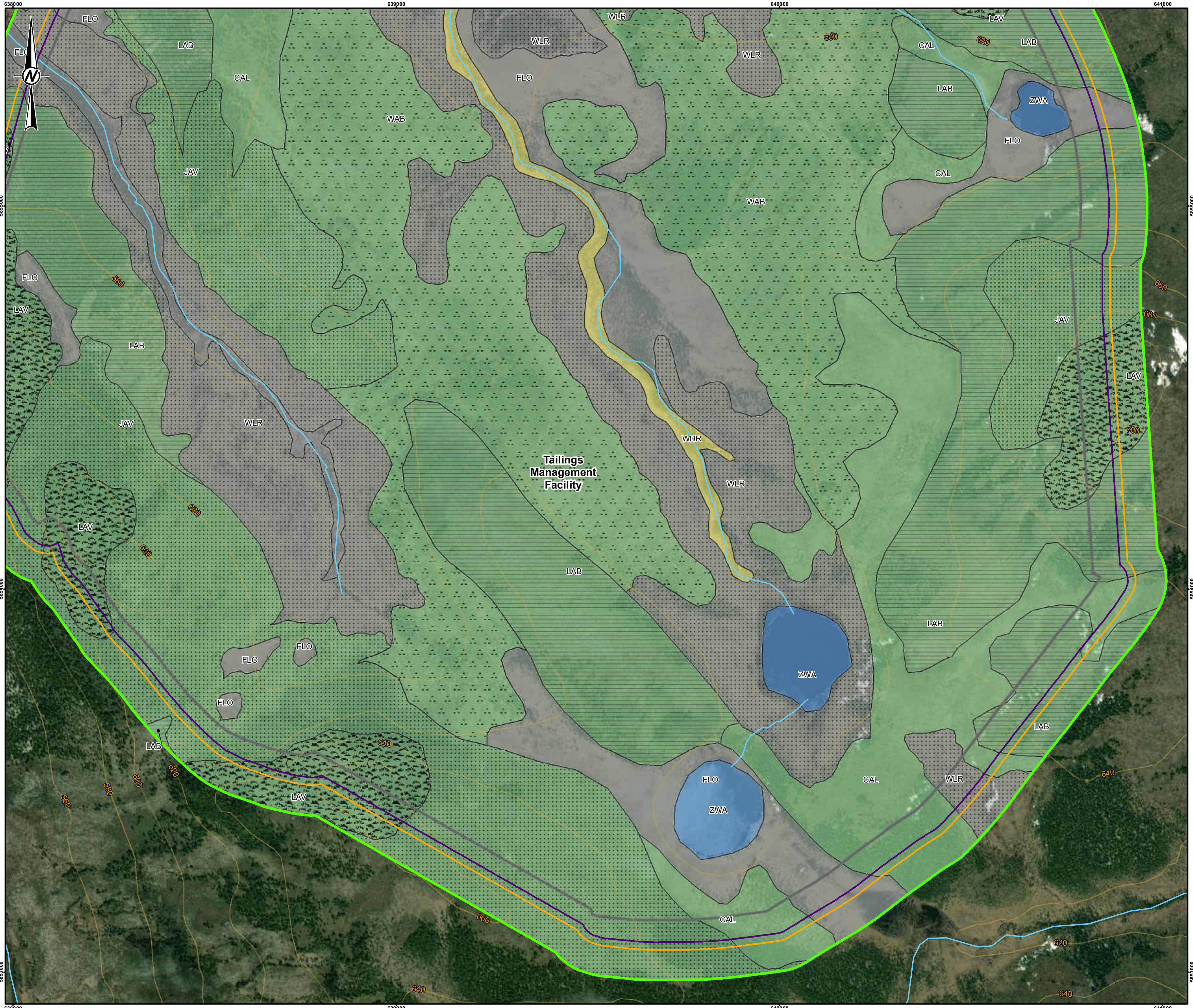
PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3m



LEGEND

- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT

SOIL MAP UNITS

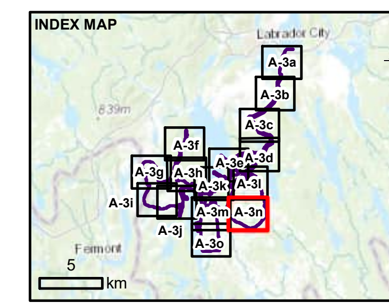
- CAL
- FLO
- JAV
- LAB
- LAV
- WAB
- WDR
- WLR
- ZWA

Terrain Polygon Label

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process

szcMbv[Ru]-LV

drainage → m // i,6-8 ← percent slope
drainage separator →
II
terrain stability class →



0 250 500

1:10,000 METRES

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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3n

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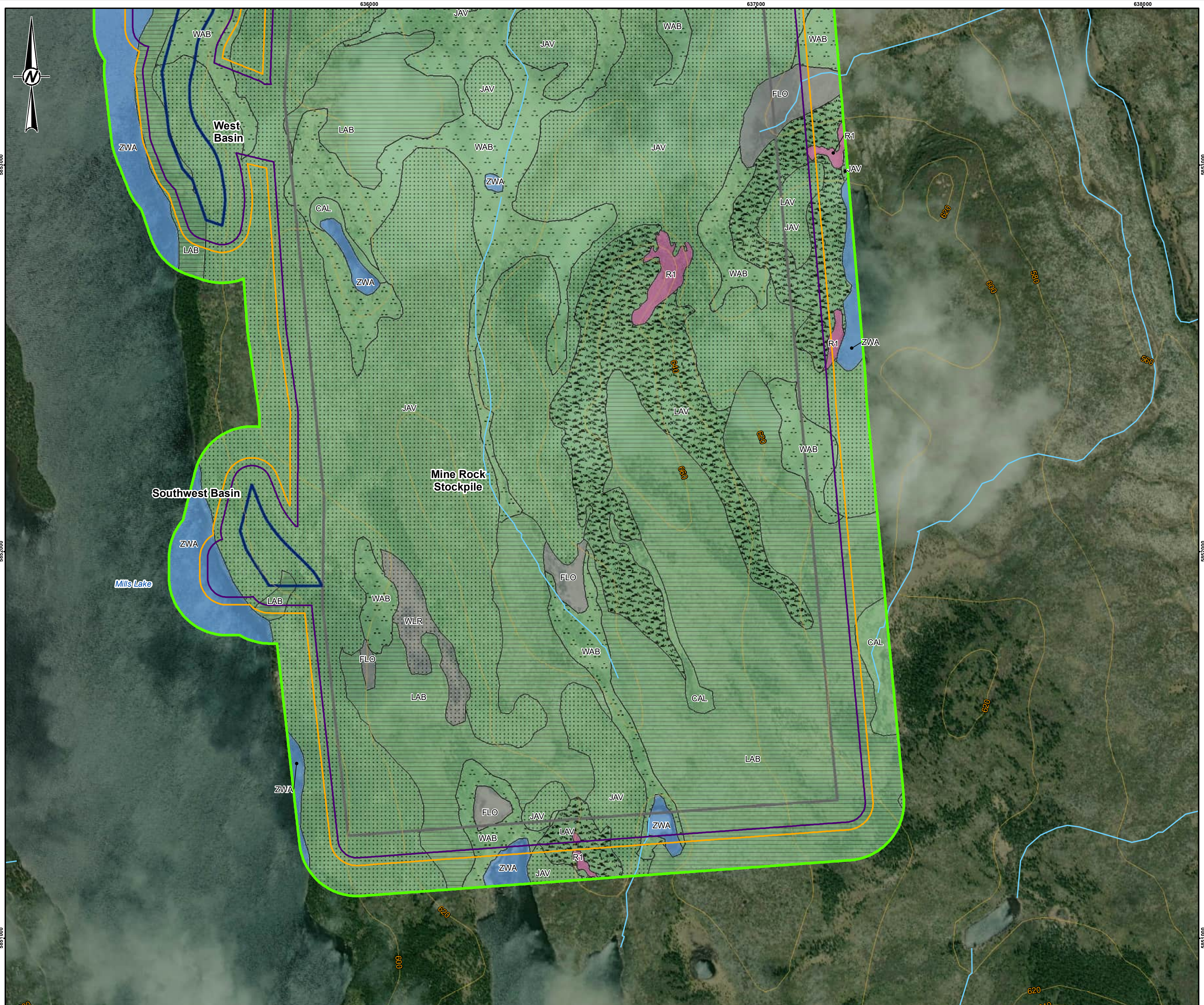


LEGEND

- CONTOUR (40m INTERVAL)
- WATERCOURSE
- PROPOSED INFRASTRUCTURE
- LOCAL STUDY AREA
- SITE STUDY AREA
- PROJECT FOOTPRINT
- PROPOSED SEDIMENTATION POND

SOIL MAP UNITS

- CAL
- FLO
- JAV
- LAB
- LAV
- R1
- WAB
- WLR
- ZWA

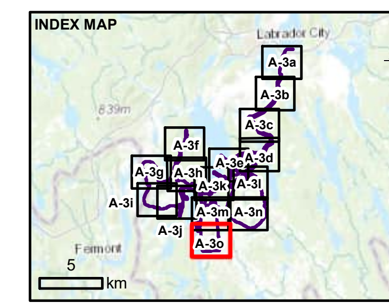
Terrain Polygon Label

szcMbv[Ru]-LV

m // i,6-8

II

soil texture
surficial material
surface expression(s)
underlying material
underlying surface expression
geomorphological process
drainage
drainage separator
percent slope
terrain stability class



0 250 500

1:10,000 METRES

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CLIENT

CHAMPION IRON MINES

PROJECT

KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE

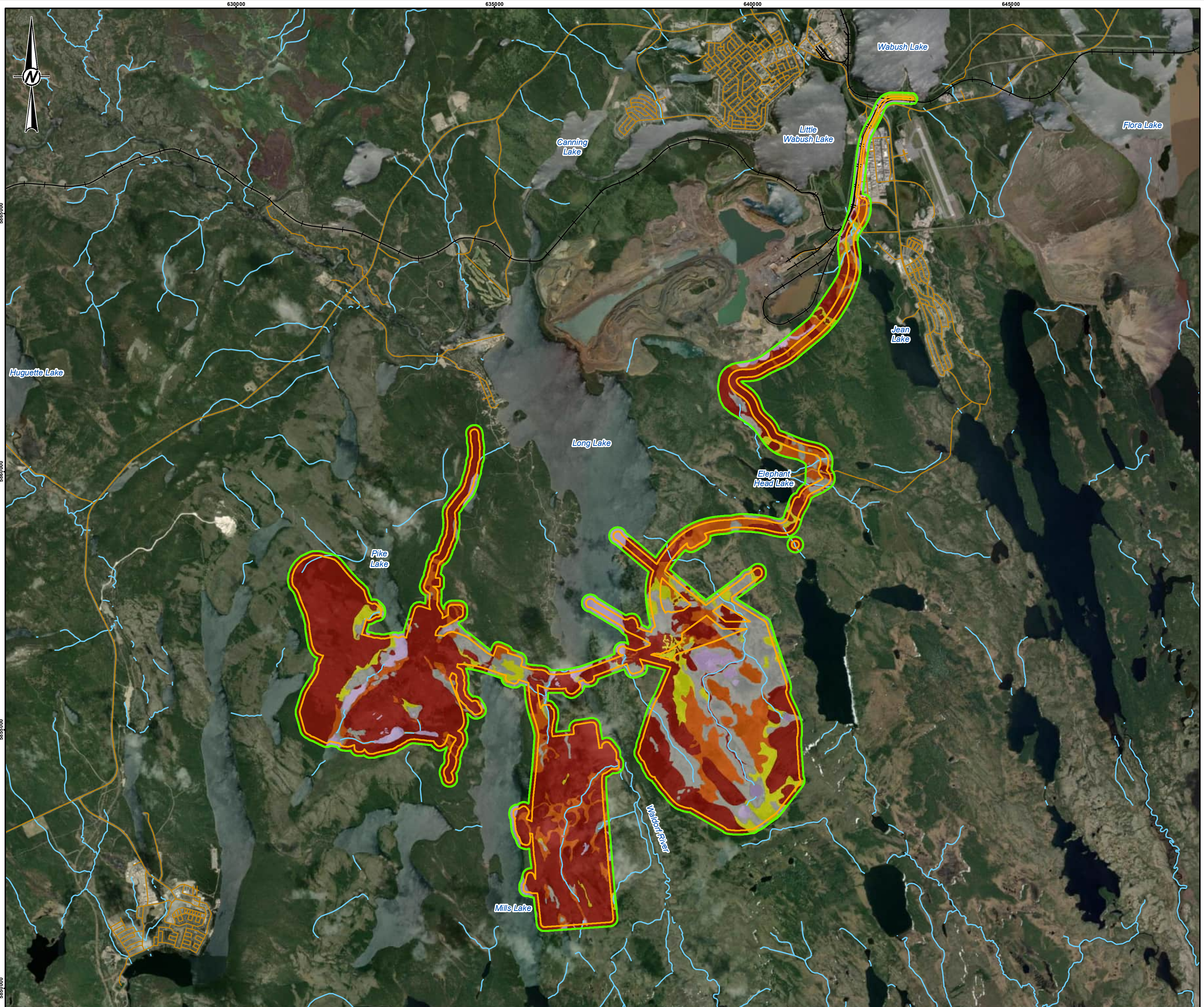
SOIL SURVEY LOCATIONS AND SOIL MAP UNITS IN THE KAMI IRON ORE MINE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-3o



LEGEND

- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

RECLAMTION SUITABILITY RATING

- UNSUITABLE
- POOR
- FAIR
- NOT RATED
- N/A

0 2 4
1:75,000 KILOMETRES

REFERENCE(S)

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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SURFACE SOIL RECLAMATION SUITABILITY RATINGS IN THE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-4

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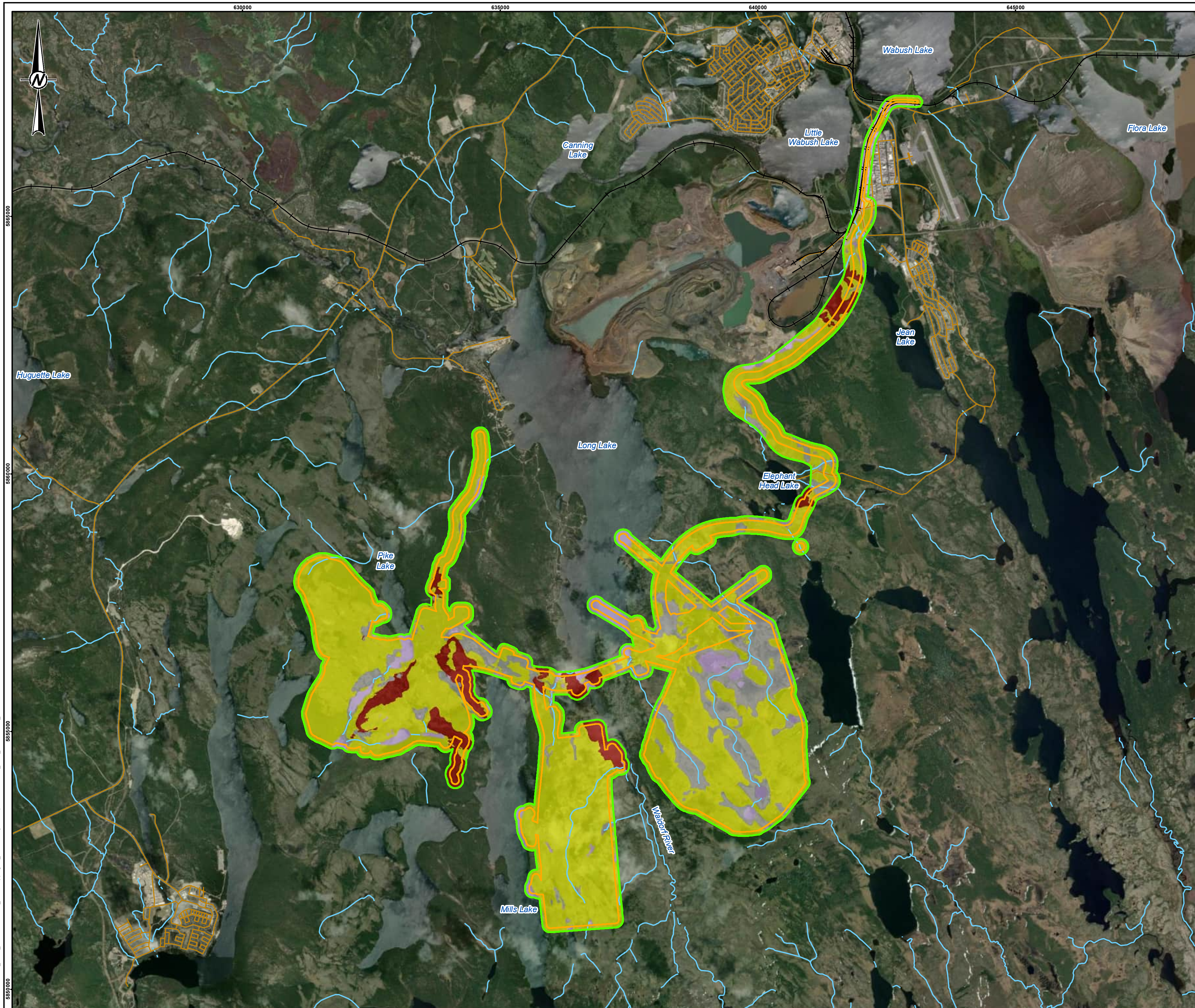
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm
0



LEGEND

- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

WIND EROSION POTENTIAL

- MODERATE
- HIGH
- NOT RATED
- N/A

0 2 4

1:75,000 KILOMETRES

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CLIENT

CHAMPION IRON MINES

PROJECT

KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE

SURFACE SOIL WIND EROSION RISK RATINGS IN THE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-5

PATH: I:\CLIENTS\KAMI_IRON_ORE\CA0003092_5894\Mapping\02_Terrain\ProjectFootprint\CA0003092_5894_WindErosion_Rev0.mxd PRINTED ON: 2025-06-04 AT: 10:02:36 AM

25mm

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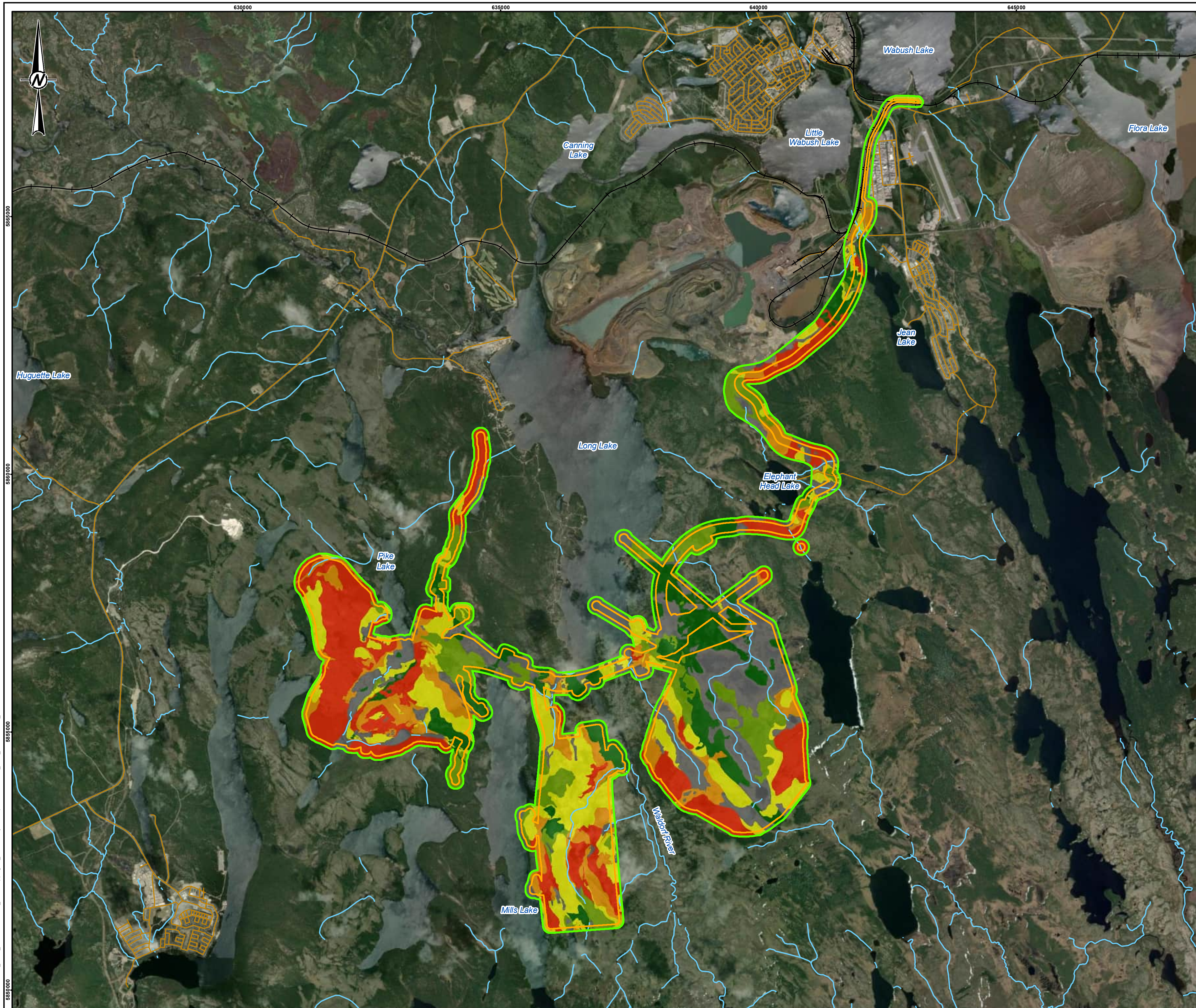

LEGEND

- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

SOIL WATER EROSION POTENTIAL

- VERY LOW (<6 t/ha)
- LOW (6-11 t/ha)
- MODERATE (11-22 t/ha)
- HIGH (22-33 t/ha)
- SEVERE (>33 t/ha)
- NOT RATED

0 2 4
1:75,000 KILOMETRES

REFERENCE(S)
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CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SURFACE SOIL WATER EROSION RISK RATINGS IN THE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-6

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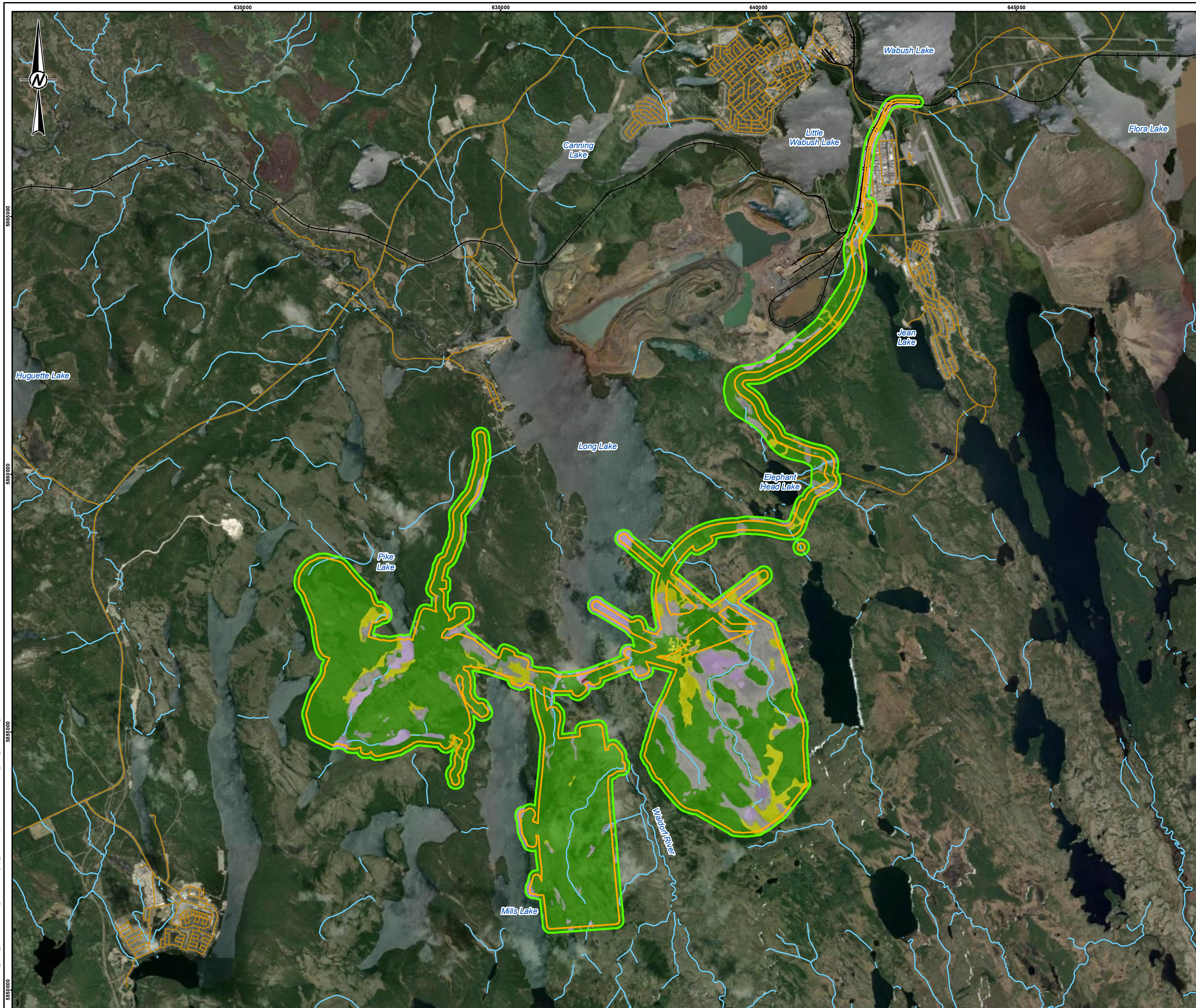

LEGEND

- EXISTING RAILWAY
- ROAD
- WATERCOURSE
- LOCAL STUDY AREA
- SITE STUDY AREA

COMPACTION RATING

- LOW
- MODERATE
- HIGH
- NOT RATED
- N/A

0 2 4
1:75,000 KILOMETRES

REFERENCE(S)

PROJECTION: UTM ZONE 19 DATUM: NAD 83

CLIENT
CHAMPION IRON MINES

PROJECT
KAMI IRON ORE MINE PROJECT, WABUSH, NL

TITLE
SURFACE SOIL COMPACTION RISK RATINGS IN THE SITE STUDY AREA AND LOCAL STUDY AREA

CONSULTANT

wsp

YYYY-MM-DD	2025-06-04
DESIGNED	CB
PREPARED	AB
REVIEWED	CB
APPROVED	AS

PROJECT NO.	CONTROL	REV.	FIGURE
CA0003092.5894	500	0	A-7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm

APPENDIX B

Field Inspection Data and Abbreviation Key

1.0 SOIL AND TERRAIN FIELD SITE DATA

Site Data							Terrain Data								Soil Data						Soil Horizon Data												Comments
Site ID	Easting	Northing	Slope Gradient (%)	Slope Class	Aspect	Slope Position	Surface Expression	Water table / seepage depth (cm from surface)	Surface Material Texture	Surficial Material	Surface Expression	Subsurface Material Texture	Subsurface Material	Subsurface Expression	Geomorphological Processes	Topsoil Thickness (cm)	Upper Subsoil Thickness (cm)	Organic Thickness (cm)	Parent Material	Soil Parent Material Texture	Drainage	Soil Classification	Horizon	Horizon Depth (cm)	Texture	Consistence	Coarse Fragments (%)	Colour	Mottles	Salt Crystals (Presence or Absence)	Effervescense	
K23CB001	633610	5855897	7	4	10	M	H1m	/ 47	dzs	M	u	-	-	-	L	8	20	0	TILL	C5	MW	O.FHP	FH	6-0	-	-	-	-	-	-	-	Seepage present above 50 cm, but feel this is better described as MW drained. Some evidence of coarse subrounded gravels and cobbles in the upper horizons but dominantly gravel
																							Ae	0 - 8	LS	L	10	10YR5/1	-	-	-	
																							Bh	8 - 19	SL	L	5	7.5YR2.5/3	-	-	-	
																							Bfj	19 - 28	SL	L	15	10YR3/3	-	-	-	
																							C	28 - 47	L	VFR	20	7.5YR4/3	-	-	-	
																							Cgj	47 - 120	SL	NST	20	7.5YR4/3	-	-	-	
K23CB002	633066	5856051	2	3		T		/	u	O	b					0	0	130	FNPT		VP	TY.M	Of	0 - 30								Mineral at around 120-130 cm
																							Om	30 - 130								
K23CB003	633104	5856140	5	3		C		/	gs	FG		-	-	-	-	18	12	0	GLFL	C1	W	E.DYB	LF	7 - 0		-	-	-	-	-	-	Sepage of ground water at 85 cm. Ridge immedielty adjacent to organic area.
																							Ae	0 - 11	S	-	-	-	-	-	-	
																							Bm	11 - 23	S	-	-	-	-	-	-	
																							C	23 - 100	S		70	-	-	-	-	
K23CB004	632938	5856033	0			V		/	e	O	v	s	FG	b		0	0	75	FNPT/FLUV		VP	T.F	Of	0 - 75								
																							Cg	75 - 80								
K23CB005	632799	5856117	0	-	-	V		/	zs	M	p	-	-	-	U	0	0	0	TILL		P	R.G	Cg	0 - 15	-	-	-	-	-	-	-	-
K23CB006	632405	5856913	3	3	290	D		/	e	O	b	zs	M	b		0	0	130	FNPT		VP	T.M	Of	0 - 130								
																							Cg	130 - 145	SL	NST	0	2.5Y4/2				
K23CB007	632656	5856313	5	3	20	M	U1h	10 /	sd	M	u	-	-	-	-	10	4	0	TILL	C5	P	O.Gpt	Of	10 - 0	-	-	-	-	-	-	-	Visible surface stone all over area, added C5 as texture
																							Bg	0 - 4	SL	NST	85	7.5YR3/3	-	-	none	
																							Cg	4 - 45	SL	NST	85	2.5Y3/2	-	-	none	
K23CB008	634252	5854730	1	2		V	L1	/	sd	M	p					5	12	0	TILL		W	OT.HP	F	11 - 0	S	VFR		7.5YR4/2				Compacted C horizon, impossible to auger or dig.pH = around 4.2
																							Ae	0 - 5	LS	FR	20	7.5YR4/2				
																							Bhc	5 - 17	LS	FI	50	2.5YR2.5/3				
																							BC	17 - 30	LS	FI	55	10YR3/6			none	
K23CB009	634232	5854709	20	-	-	M	-	/	sd	M	r	-	-	-	-	0		0	TILL		W	O.HFP	F	10 - 0	-	-	-	-	-	-	-	Till feature, upland of site 008. Non detailed site
																							Ae	0 -	-	-	-	-	-	-	-	
																							Bfj	0 -	-	-	-	-	-	-	-	
																							BC	0 -	-	-	-	-	-	-	-	
K23CB010	634003	5855480	7	4	120	M	lUh	/	dzs	M	j					19	8	0	TILL	M4	W	E.DYB	FH	14 - 0								
																							Ae	0 - 5	LS	VFR	5	7.5YR5/2				
																							Bm	5 - 13	SL	FR	10	10YR3/6				
																							BC	13 - 35	FSL	FR	20	2.5Y4/4				
																							C	35 - 100	L	FR	15	2.5Y5/3				
K23CB011	632788	5855296	0	-	-	C	-	/	zsd	M	w	-	-	-	-	14	16	0	TILL		W	E.DYB	LF	4 - 0	-	-	-	-	-	-	-	Bedrock exposed all over the place, a pocket of soils interspferced between rocks
																							Ae	0 - 10	-	-	70	-	-	-	-	
																							B	10 - 26	-	-	70	-	-	-	-	

Site Data							Terrain Data									Soil Data							Soil Horizon Data									
Site ID	Easting	Northing	Slope Gradient (%)	Slope Class	Aspect	Slope Position	Surface Expression	Water table / seepage depth (cm from surface)	Surface Material Texture	Surficial Material	Surface Expression	Subsurface Material Texture	Subsurface Material	Subsurface Expression	Geomorphological Processes	Topsoil Thickness (cm)	Upper Subsoil Thickness (cm)	Organic Thickness (cm)	Parent Material	Soil Parent Material Texture	Drainage	Soil Classification	Horizon	Horizon Depth (cm)	Texture	Consistence	Coarse Fragments (%)	Colour	Mottles	Salt Crystals (Presence or Absence)	Effervescense	Comments
K23CB012	632267	5854981	2	2	-	D	O2	/	hu	O	v	-	M	p	-	0	0	70	FNPT		VP	THU.M	Om	0 - 45	-	-	-	-	-	-	-	Rocks in profile, but no mineral soil - organic has built up around the CFs
																							Oh	45 - 70	-	-	20	-	-	-	-	
K23CB013	632162	5854954	38	7	40	U	-	/	gd	M	a	-	-	-	-	10	11	0	TILL	-	R	E.DYB	FH	5 - 0	-	-	-	-	-	-	-	Assumed till because coarse fragments are subrounded.
																							Ae	0 - 5	S	-	5	10YR4/2	-	-	-	
																							Bm	5 - 16	S	-	50	10YR3/6	-	-	-	
																							C	16 - 75	S	L	50	2.5YR3/4	-	-	-	
K23CB014	632003	5855031	0	1	-	D	-	/	hd	O	v	-	-	-	-	0	0	40	FNPT		VP	T.H	Om	0 - 40	-	-	-	-	-	-	-	Terric Humisol, rock with every step out.
																							R	40 -	-	-	-	-	-	-	-	
K23CB015	632407	5855236	39	7	290	M	-	/	dzs	M	a	-	-	-	-	12	18	0	TILL	-	W	O.HFP	LF	5 - 0	-	-	-	-	-	-	-	-
																							Ae	0 - 7	LS	-	25	7.5YR5/1	-	-	-	
																							Bf	7 - 25	LS	-	20	5YR3/4	-	-	-	
																							BC	25 - 42	LS	-	18	10YR4/6	-	-	-	
																							C	42 - 70	SL	-	10	2.5Y4/4	-	-	-	
K23CB016	634292	5855660	3	3	320	L	-	/	du	O	v	zds	M	d	-	0	0	80	FNPT	L11	VP	T.M	Of	0 - 20	-	-	-	-	-	-	-	Sphg sclor, sphg wor
																							Om	20 - 80	-	-	40		-	-	-	
																							Cg	80 - 85	SL	NST	18	2.5Y3/1	-	-	-	
K23CB017	634119	5856176	6	4	190	M	-	/	sd	M	u	-	-	-	-	11	9	0	TILL	C4	W	O.FHP	LF	4 - 0	-	-	-	-	-	-	-	Lots of enormous rocks in area, bedrock or large boulders at surface? Assume bedrock based on outcrops at base of slope.
																							Ae	0 - 7	LS	L	70	10YR4/3	-	-	-	
																							Bhf	7 - 16	LS	L	75	5YR3/3	-	-	-	
																							BC	16 - 22	LS	L	90	10YR3/6	-	-	-	
K23CB018	633982	5856286	4	3	320	M	IUI	50 /	zds	M	b	-	R	u	L	30	24	0	TILL	C4	I	O.HP	FH	21 - 0	-	-	-	-	-	-	-	-
																							Ae	0 - 9	LS	L	30	10GY5/1	-	-	-	
																							Bh	9 - 33	LS	L	30	7.5YR2.5/2	-	-	-	
																							BCgj	33 - 80	LS	L	30	10YR3/4	-	-	-	
																							Cg	80 - 100	SL	NST	20	2.5Y4/4	-	-	-	
K23CB019	634325	5856587	0		-	T		/	e	O	v	-	M			0	0	100	FNPT	P1	VP	T.F	Of	0 - 100	-	-	-	-	-	-	-	Rocks
K23CB020	634401	5856459	0	1		D		25 /	zs	M	p				U	20	0	0	TILL	M4	P	R.Gpt	Of	20 - 0								-
																							Cg	0 - 80	SL	SST	10	10YR3/6				
K23CB021	634200	5857474	0	1	-	D	-	/ 45	dzs	M	p	-	-	-	-	42	45	0	TILL	C4	I	GLE.DYBpt	Of	34 - 12	-	-	-	-	-	-	-	pH = <4.0
																							Oh	12 - 0	-	-	20	-	-	-	-	
																							Ae	0 - 8	LS	L	15	10YR5/1	-	-	-	
																							Bmgj	12 - 57	SL	NST	35	2.5YR2.5/2	-	-	-	
																							Cg	57 - 100	SiL	NST	25	2.5Y4/4	prominent	-	none	
K23CB022	633723	5857897	2	3	-	M	-	/	dzs	M	p	-	-	-	-	3	42	0	TILL	M4	I	O.HP	F	23 - 0	-	-	-	-	-	-	-	Forested wetland area.
																							Ae	0 - 3	LS	-	20	-	-	-	-	
																							Bh	3 - 45	LS	-	60	7.5YR2.5/3	-	-	-	
																							Cgj	45 - 80	SiL	-	15	2.5Y3/2	-	-	-	

Site Data							Terrain Data									Soil Data					Soil Horizon Data											
Site ID	Easting	Northing	Slope Gradient (%)	Slope Class	Aspect	Slope Position	Surface Expression	Water table / seepage depth (cm from surface)	Surface Material Texture	Surficial Material	Surface Expression	Subsurface Material Texture	Subsurface Material	Subsurface Expression	Geomorphological Processes	Topsoil Thickness (cm)	Upper Subsoil Thickness (cm)	Organic Thickness (cm)	Parent Material	Soil Parent Material Texture	Drainage	Soil Classification	Horizon	Horizon Depth (cm)	Texture	Consistence	Coarse Fragments (%)	Colour	Mottles	Salt Crystals (Presence or Absence)	Effervescense	Comments
K23CB023	635934	5856131	7	4	170	M	-	/	zds	M	j	-	-	-	-	9	11	0	TILL	C4	R	O.HFP	FH	3 - 0	-	-	-	-	-	-	-	-
																							Ae	0 - 6	SL	L	30	10YR6/1	-	-	-	
																							Bf	6 - 17	LS	L	45	5YR3/3	-	-	-	
																							BC	17 - 30	LS	L	30	7.5YR4/6	-	-	-	
																							C	30 - 70	LS	L	70	2.5Y4/3	-	-	-	
K23CB024	635992	5855732	0	1	-	T	-	/	u	O	v	ds	F	-	-	0	0	55	FNPT	P1	VP	T.M	Om	0 - 55	-	-	-	-	-	-	-	Riparian area, more veg over rocks basically.
K23CB025	635960	5855670	2	2	-	V	-	/	d	F	-	-	-	-	-	0	0	0	FLUV		P		R	0 - 20					-	-	-	Non-detailed site
K23CB026	635616	5856138	0	1	-	D	-	/	e	O	b	ds	M	p	-	0	0	75	FNPT/TILL	L11	VP	T.F	Of	0 - 60					-	-	-	-
																							Om	60 - 75					-	-	-	
																							Cg	75 - 120	S	NST	10	2.5Y4/2	-	-	-	
K23CB027	634283	5858798	0	1	-	D	-	/	e	O	p	-	-	-	-	0	0	220	FNPT		VP	TY.F	Of	0 - 220	-	-	-	-	-	-	-	Floating root mat, not safe for standing. Probably open water at some point but so much organic accumulation that's it's filled in.
K23CB028	642726	5867267	1	2	-	V	-	/	sz	L	p	-	-	-	-	10	0	0	LACU	M3	MW	O.R	LFH	10 - 0					-	-	-	Adjacent to lake, the pit is holding water but not saturated all the way through.
																							C	0 - 120	L		0	10YR4/4	-	-	-	
K23CB029	642130	5865063	0	1	-	V	-	105 / 100	dzs	M	p	-	-	-	-	20	0	0	TILL	M4	I	GL.R	FH	20 - 0	-	-	-	-	-	-	-	Seepage.
																							C1	0 - 20	L	FR	7	10YR3/4	distinct	-	-	
																							Cgj2	20 - 43	L	FR	7	10YR3/4	distinct	-	-	
																							C3	43 - 120	L	FR	20	10YR3/4		-	-	
K23CB030	641889	5864164	3	3	-	M	-	/	dsz	L	v	dzs	M	p	-	9	0	0	LACU/TILL	L18	W	O.R	FH	9 - 0	-	-	-	-	-	-	-	Based on the proximity of the lake called Lv. Assuming Lac over Till (based on terrain).
																							C	0 - 36	SiL	FR	2	10YR3/4	-	-	-	
																							IIC	36 - 90	SL	FR	15	10YR3/3	-	-	-	
K23CB031	641494	5863311	0	1	-	V	-	/	s	FG	h	-	-	-	-	0	20	0	GLFL	C1	R	O.DYB	Bm	0 - 20	LS	L	10	10YR3/4	-	-	-	Not sure if anthropogenic or borrow pit. Check LiDAR when available. Dark, fine layers of material in BC and C . Reclaimed or glaciofluvial?
																							BC	20 - 35	LFS	L	15	-	-	-	-	
																							C	35 - 120	S	L	15	-	-	-	-	
K23CB032	640972	5859396	6	4	220	M	-	/	zds	M	j	-	-	-	-	7	7	0	TILL	-	R	OT.HFP	F	11 - 0	-	-	-	-	-	-	-	Almost well to rapid.
																							Ae	0 - 7	LS	L	40	10GY6/1	-	-	-	
																							Bfc	7 - 14	SL		45	5YR3/3	-	-	-	
																							BC	14 - 28	LFS	L	40	10YR3/4	-	-	-	
																							C	28 - 70	LS	L	20	2.5Y4/4	-	-	-	
K23CB033	640982	5859640	2	2	340	M	-	/ 80	dzs	M	u	-	-	-	L	4	14	0	TILL	-	MW	O.DYB	F	14 - 0	-	-	-	-	-	-	-	-
																							Ae	0 - 4	SL	L	15	10YR6/1	-	-	-	
																							Bm	4 - 18	LS	L	20	7.5YR3/3	-	-	-	

Site Data							Terrain Data							Soil Data							Soil Horizon Data											Comments
Site ID	Easting	Northing	Slope Gradient (%)	Slope Class	Aspect	Slope Position	Surface Expression	Water table / seepage depth (cm from surface)	Surface Material Texture	Surficial Material	Surface Expression	Subsurface Material Texture	Subsurface Material	Subsurface Expression	Geomorphological Processes	Topsoil Thickness (cm)	Upper Subsoil Thickness (cm)	Organic Thickness (cm)	Parent Material	Soil Parent Material Texture	Drainage	Soil Classification	Horizon	Horizon Depth (cm)	Texture	Consistence	Coarse Fragments (%)	Colour	Mottles	Salt Crystals (Presence or Absence)	Effervescense	
																							BC	18 - 45	LS	L	40	10YR4/3	-	-	-	
																							C	45 - 70	LS	L	15	2.5Y3/3	-	-	-	
K23CB034	641196	5860126	3	3	70	M	-	/	e	O	v	ds	M			0	0	80	FNPT/TILL	L11	VP	T.M	Of	0 - 80	-	-	-	-	-	-	-	
																							Cg	80 - 100	SL	NST	4535	2.5Y3/3	prominent			
K23LM001	633107	5856010	12	5	70	M	IUh	/	zds	FG	b	-	M	j	L	18	27	0	GLFL	C1	I	E.DYBpt	Of	15 - 0	-	-	-	-	-	-	-	Entire slope is seepage slope. Full of alder but also lari lar, rodo gro, sphag, pice mar. Many areas look like a fen but with wet mineral soil. pH <4.0
																							Ae	0 - 3	LS	L	2	10YR4/1	-	-	-	
																							Bm	3 - 30	SL	VFR	20	7.5YR2.5/3	-	-	-	
																							C1	30 - 45	SiL	FR	0	10YR4/6	-	-	-	
																							C2	45 - 60	LS	FR	20	10YR3/4	-	-	-	
																							Cgj	60 - 120	SL	VFR	5	2.5Y4/3	-	-	-	
K23LM002	633096	5856128	0	1	-	V	O2	/	u	O	b	zs	M	p	-	0	0	140	FNPT		VP	T.M	Om	0 - 140	-	-	-	-	-	-	-	Almost seems terraced.
																							Cg	140 - 160	SL	NST	2	10Y5/1	-	-	-	
K23LM003	632345	5856854	0	-	-	C	-	/	s	FG	b	-	M	p	-	5	45	0	FLUV		R	O.HFP	Ae	0 - 5	LS	-	-	-	-	-	-	Non-detailed site.
																							Bm	5 - 50	-	-	-	-	-	-	-	
																							C	50 - 70	S	-	-	-	-	-	-	
K23LM004	632409	5856566	2	3	350	U	-	/	zs	M	u	-	-	-	-	11	17	0	TILL	C1	W	O.FHP	FH	5 - 0	-	-	-	-	-	-	-	-
																							Ae	0 - 6	SL	VFR	35	10YR7/1	-	-	-	
																							Bh	6 - 14	SL	VFR	50	2.5YR3/4	-	-	-	
																							Bf	14 - 23	LS	VFR	25	7.5YR4/6	-	-	-	
																							BC	23 - 51	LS	VFR	10	10YR5/3	-	-	-	
																							C	51 - 120	LS	VFR	4	10YR4/2	-	-	-	
K23LM005	634103	5854193	15	5	130	M	IUh	/	zsd	M	j	-	-	-	-	10	20	0	TILL	C4	W	E.DYB	F	23 - 0					-	-	-	Step out and auger refusal at step out as well.
																							Ae	0 - 10	LS	VFR	35	10YR5/1	-	-	-	
																							Bm	10 - 30	LS	L	45	10YR3/6	-	-	-	
																							C	30 - 45	LS	VFR	55	10YR4/6			none	
K23LM006	634078	5854955	0	1	-	V	L2	/	ds	M	v	sz	M	p	U	25	0	0	TILL	C4	P	R.Gpt	Of	25 - 0	-	-	-	-	-	-	-	Polygon mapped as well drained but large portion we walked through is low and wet. Standing water with sphagnum, but not organic. Perhaps washed is top horizon till.
																							Cg1	0 - 35	S	NST	25	10YR3/3	-	-	-	
																							Cg2	35 - 75	VFSL	NST	0	10YR4/2	-	-	-	
K23LM007	633917	5855617	10	4	70	M	I3I	/	dzs	M	j	-	-	-	-	12	19	0	TILL	C4	W	E.DYB	FH	8 - 0	-	-	-	-	-	-	-	-
																							Ae	0 - 4	LS	VFR	15	7.5YR5/2	-	-	-	
																							Bm	5 - 24	SL	VFR	25	10YR3/6	-	-	-	
																							C	24 - 100	SL	VFR	15	2.5Y4/3	-	-	-	
K23LM008	634433	5856513	2	2	50	M	U1I	/	zsd	M	u	-	-	-	-	10	12	0	TILL	C4	W	O.HFP	FH	4 - 0	-	-	-	-	-	-	-	Site originally collected as 0014 to 008, but changed in the field due to duplicate.
																							Ae	0 - 6	SL	SL	5	7.5YR6/1	-	-	-	
																							Bf	6 - 18	SL	SL	40	5YR3/4	-	-	-	
																							BC	18 - 35	SL	SL	30	10YR4/6	-	-	-	
																							C	35 - 65	SL	SL	60	2.5Y4/4	-	-	-	

Site Data							Terrain Data							Soil Data							Soil Horizon Data											
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K23LM009	632296	5854918	2	2	5	V	L1	/	h	O	v	zs	M	p	L	0	0	75	FNPT	-	VP	T.H	Oh	0 - 75	-	-	20	-	-	-	-	Willow at site.
																							Cg	75 - 85	LS	NST	15	10YR3/2	-	-	-	
K23LM010	631908	5855064	4	3	70	M	IUI	/	dsz	M	p					13	0	0	TILL		P	R.G	FH	13 - 0	-	-	-	-	-	-	-	From creek to here is relatively wet with lots of surface stone. Haven't seen much slope. Didn't feel very wet at site, but had mottling and quite reduced colours, plus it was late September so this could be wetter for a good portion of the season.
																							C	0 - 6	SiL	VFR	10	10YR5/3	-	-	-	
																							Cgj	6 - 35	SiL	FR	5	2.5Y4/2	distinct	-	-	
																							Cg	35 - 80	SiL	VFR	20	5GY4/1	-	-	-	
K23LM011	634352	5855672	3	3	260	M	U1h	/	zds	M	p					10	23	0	TILL	C4	W	O.HFP	FH	5 - 0	-	-	-	-	-	-	-	Burned forest area, local let us know that deadfall was harvested following fire.
																							Ae	0 - 5	SL		20	7.5YR4/2	-	-	-	
																							Bf	5 - 28	LS	L	25	5YR3/4	-	-	-	
																							BC	28 - 43	LS	L		10YR3/6	-	-	-	
																							C	43 - 70	LS	L	10	2.5Y4/4	-	-	-	
K23LM012	633973	5856029	0	1		V	O1	/	e	O	p	-	-	-	-	0	0	220	FNPT	P1	VP	TY.F	Of	0 - 220	-	-	-	-	-	-	-	Floating. Lots of likely saturated layers or layers of water
K23LM013	634320	5856565	5	-	-	L	-	48 / 48	zds	M	p	-	-	-	U	33	0	0	TILL	C5	P	R.Gpt	Of	33-7	-	-	-	-	-	-	-	Sampled
																							Om	7-0	-	-	-	-	-	-	-	
																							Cg1	0 - 33	SL	L	15	10YR3/3	-	-	-	
																							Cg2	33 - 60	LS	NST	20	2.5Y3/3	-	-	-	
K23LM014	634365	5856644	0	1	-	V	-	/	e	O	b	zs	M	p		0	0	145	FNPT/TILL	L11	VP	T.F	Of	0 - 145	-	-	-	-	-	-	-	-
																							Cg	145 - 160	SL	NST	10	2.5Y4/4	-	-	-	
K23LM015	634290	5857362	13	5	250	M	H1m	/	ds	M	u	-	-	-	-	13	18	0	TILL	C4	R	E.DYB	FH	8 - 0	-	-	-	-	-	-	-	Layers of finer sand in C horizon but coarse fragments seem too angular for FG so called coarse till. For example, there is a 9 cm layer at the top of the C horizon that is fine sand and has no coarse fragments.
																							Ae	0 - 5	SL	L	5	7.5YR6/2	-	-	-	
																							Bm	5 - 23	SL	VFR	25	7.5YR3/4	-	-	-	
																							BC	23 - 30	LVFS	VFR	30	2.5Y4/4	-	-	-	
																							C	30 - 100	S	L	10	2.5Y5/2	-	-	-	
K23LM016	633800	5857730	0	1	-	V	L1	/ 25	zs	M	p	-	-	-	L	39	26	0	TILL	M4	I	O.HP	FH	20 - 0	-	-	-	-	-	-	-	pH relatively high - about 6.6/6.7.
																							Ae	0 - 19	LS	L	15	10YR5/2	-	-	-	
																							Bh	19 - 45	LS	NST	15	7.5YR2.5/3	-	-	-	
																							Cg	45 - 85	SiL	NST	5	2.5Y4/4	-	-	-	

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K23LM017	635994	5855855	3	2	100	L	U1l	/	d	M	p	-	-	-	-	0	0	0	TILL	-	I	-	R	0 - 50	-	-	100	-	-	-	-	Three step outs and seems to be feather moss covering boulders. Called non soil due to no mineral soil found and no organic under feather moss layer
K23LM018	635973	5855854	6	4	-	L	-	/	h	O	v	-	M	j	-	0	0	60	FOPT	L11	VP	HU.FO	Oh	0 - 60	-	-	-	-	-	-	-	Rocks under organic
																							R	60 - 70	-	-	-	-	-	-	-	
K23LM019	635893	5855860	4	3	120	L	U1h	/	dzs	M	u	-	-	-	-	9	13	0	TILL	C4	W	E.DYB	FH	3 - 0					-	-	-	pH <4.0.
																							Ae	0 - 6	SL	VFR	2	10YR5/1	-	-	-	
																							Bm	6 - 19	LS	L	3	7.5YR4/6	-	-	-	
																							BC	19 - 30	LS	L		2.5Y5/4	-	-	-	
																							C	30 - 80	LS	L	20	2.5Y5/2	-	-	-	
K23LM020	642423	5866843	0	-	-	V	-	/	dsz	M	p	-	-	-	U	7	0	0	TILL	M4	P	R.Gpt	Of	7 - 0	-	-	-	-	-	-	-	Very wet. Upper soil is saturated slop. Could be Ah. Water likely sitting on finer, more compacted till at 30 cm which is prominently mottled.
																							Cg1	0 - 30	SL	NST	0	10YR3/3	-	-	-	
																							Cg2	30 - 75	SL	FR	15	10YR4/2	prominent	-	-	
K23LM021	642257	5865075	0	-	-	V	-	/	e	O	b	-	M	p	-	0	0	120	FNPT		VP	T.F	Of	0 - 120	-	-	-	-	-	-	-	Encountered rocks and sandy mineral soil in 2/3 step outs.
K23LM022	641826	5863930	0	2	-	V	-	/	zsd	M	u	-	-	-	-	12	16	0	TILL	C4	R	E.DYB	FH	5 - 0	-	-	-	-	-	-	-	pH = 4.5. Dystric confirmed
																							Ae	0 - 7	S	L	15	10YR5/1	-	-	-	
																							Bm	7 - 23	LS	L	20	7.5YR3/4	-	-	-	
																							C	23 - 80	LS	L	30	10YR3/3	-	-	-	
K23LM023	641440	5862957	28	6	350	M	H1h	/	s	FG	a	-	-	-	-	15	44	0	GLFL		R	O.FHP	FH	5 - 0	-	-	-	-	-	-	-	-
																							Ae	0 - 10	S	L		10YR5/1	-	-	-	
																							Bfj	10 - 18	S	L	1	10YR4/4	-	-	-	
																							Bh	18 - 54	S	L	2	5YR2.5/2	-	-	-	
																							C	54 - 120	S	L	2	10YR4/6	-	-	-	

Site Data								Terrain Data							Soil Data							Soil Horizon Data										
Site ID	Easting	Northing	Slope Gradient (%)	Slope Class	Aspect	Slope Position	Surface Expression	Water table / seepage depth (cm from surface)	Surface Material Texture	Surficial Material	Surface Expression	Subsurface Material Texture	Subsurface Material	Subsurface Expression	Geomorphological Processes	Topsoil Thickness (cm)	Upper Subsoil Thickness (cm)	Organic Thickness (cm)	Parent Material	Soil Parent Material Texture	Drainage	Soil Classification	Horizon	Horizon Depth (cm)	Texture	Consistence	Coarse Fragments (%)	Colour	Mottles	Salt Crystals (Presence or Absence)	Effervescense	Comments
K23LM024	641039	5859285	7	4	300	M	IUh	/ 80	zs	M	j	-	-	-	L	0	0	0	TILL	C4	MW	O.R	H	20 - 0	-	-	-	-	-	-	-	Site seems wetter with bog birch and salix making up most of the shrubs. Not much profile development, it any. Soil gets finer with depth (more silt at depth). No reduced colors, high water table, or gleying in profile. Humus layer varies greatly in thickness (12-35 cm). Two step outs and still not developed. Pockets of sand and loamy sand in profile
																							C	0 - 100	SL	VFR	2	10YR3/3	-	-	-	
K23LM025	640925	5859574	3	3	320	M	I1I	/ 70	zds	M	-	-	-	-	L	21	18	0	TILL	C4	MW	E.DYB	FH	14 - 0	-	-	-	-	-	-	-	Seepage at 80 cm so does not affect soil classification. Soil profile generally well drained but bumped to moderately well due to seepage and wet soil at depth
																							Ae	0 - 7	SL	VFR	5	10YR6/1	-	-	-	
																							Bm	7 - 25	LS	L	10	7.5YR4/3	-	-	-	
																							BC	25 - 50	LS	L	20	10YR3/4	-	-	-	
																							C	50 - 90	LS	L	20	10YR4/	-	-	-	
K23LM026	641113	5859708	3	3	359	M	I1I	/	u	O	v	sd	M	p	-	0	0	75	FNPT/TILL	L11	VP	T.M	Of	0 - 20	-	-	-	-	-	-	-	Sloping fen. Doesn't look like there have been any trees cut down. No signs of burn.
																							Om	20 - 75	-	-	-	-	-	-	-	
																							Cg	75 - 80	LS		70	-	-	-	-	
K23LM027	641349	5860047	11	4	250	M	IUh	/	sz	M	v	-	R	u	-	15	9	0	TILL	C5	W	E.DYB	FH	9 - 0	-	-	-	-	-	-	-	-
																							Ae	0 - 6	SL	VFR	3	10YR5/1	-	-	-	
																							Bm	6 - 15	SL	VFR	5	7.5YR3/4	-	-	-	
																							C	15 - 30	SL	VFR	8	10YR3/4	-	-	-	
																							R	30 - 31	-	-	-	-	-	-	-	
K23LM030	632605	5856188	0	1	-	V	O1	/	e	O	b	zs	M	p	-	0	0	170	FNPT		VP	TY.F	Of	0 - 150	-	-	-	-	-	-	-	-
																							Om	150 - 170	-	-	-	-	-	-	-	
																							Cg	170 - 185	SiL	NST	0	5GY5/1	-	-	-	

2.0 SOIL ABBREVIATION KEY

Table I-1: Soil Phases

Suffix Applied as Subgroup Modifier	Description
pt	Peaty – an organic horizon (> 17% organic carbon) which is > 10 cm thick

Table I-2: Surface Expression[a]

Surface Expression Code	Description
H1h	Hummocky – high relief
H1m	Hummocky – moderate relief
I1l	Inclined plain – low relief
I3l	Inclined plain – moderate relief
IUl	Inclined Undulating – low relief
IUh	Inclined Undulating – high relief
L1	Level plain
L2	Level and closed basin (depression with raised edges)
O1	Organic – level, flat, horizontal or plateau
O2	Organic - basin
U1h	Undulating – high relief
U1l	Undulating – low relief

a) AGRASID Version 3.0 Soil Landscapes User's Manual (CAESA 2001).

Table I-3: Soil Subgroup Classification[a]

Soil Subgroup Code	Description
E.DYB	Eluviated Dystric Brunisol
GL.DYB	Gleyed Dystric Brunisol
GL.R	Gleyed Regosol
GLE.DYB	Gleyed Eluviated Dystric Brunisol
HU.FO	Humic Folisol
O.DYB	Orthic Dystric Brunisol
O.FHP	Orthic Ferro Humic Podzol
O.G	Orthic Gleysol
O.HP	Orthic Humic Podzol
O.HFP	Orthic Humo-Ferric Podzol
O.R	Orthic Regosol
OT.HFP	Ortstein Ferro-Humic Podzol
OT.HP	Ortstein Humic Podzol
R.G	Rego Gleysol
T.F	Terric Fibrisol
T.H	Terric Humisol
T.M	Terric Mesisol

Table I-3: Soil Subgroup Classification[a]

Soil Subgroup Code	Description
THU.M	Terric Mesic Organic Cryosol
TY.F	Typic Fibrisol
TY.M	Typic Mesisol

a) Canadian System of Soil Classification (SCWG 1998).

Table I-4: Parent Materials[a]

Parent Material Code	Description
ANTH	Anthropogenic
FLUV	Fluvial
FNPT	Fen peat (Sedge Peat)
FNPT/FLUV	Fen peat over Fluvial
FNPT/TILL	Fen peat over Till
FOPT	Forest Peat (Bog Peat)
GLFL	Glaciofluvial
LACU	Lacustrine
LACU/TILL	Lacustrine over Till
TILL	Till (Morainal)

a) Alberta Soil Names File (Generation 4) User’s Handbook (ASIC 2016).

Table I-5: Parent Material Type[a]

Parent Material Type Code	Description
C1	Gravel or gravelly coarse textured (S, LS, SL, FSL) materials (includes cobbly and stony variations)
C4	Very coarse textured (S, LS) till
C5	Moderately coarse textured (SL, FSL) till
L11	Undifferentiated peat over coarse textured (S, LS, SL, FSL) undifferentiated materials
L18	Medium textured (L, SiL, VFSL, SCL, CL, SiCL) over coarse textured (S, LS, SL, FSL) undifferentiated materials
M3	Moderately fine textured (CL, SCL, SiCL) sediments deposited by water
M4	Medium textured (L, CL) till
P1	Sphagnum (bog) peat

a) Alberta Soil Names File (Generation 4) User’s Handbook (ASIC 2016).

Table I-6: Slope Class[a]

Slope Class Code	Description [%]
1	0 to 0.5 (level)
2	0.5 to 2 (nearly level)
3	2 to 5 (very gentle slopes)
4	5 to 9 (gentle slopes)
5	9 to 15 (moderate slopes)
6	15 to 30 (strong slopes)
7	30 to 45 (very strong slopes)

a) Slope classes from the Canadian System of Soil Classification (SCWG 1998).

Table I-7: Drainage Classes[a]

Drainage Class Code	Drainage Description
I	Imperfectly
M	Moderately Well
P	Poorly
R	Rapidly
VP	Very Poorly
W	Well
X	Very Rapid

a) Manual for Describing Soils in the Field: 1982 Revised (Expert Committee on Soil Survey 1982).

Table I-8: Slope Position[a]

Slope Position Code	Description
C	Crest
D	Depression
L	Lower
M	Middle
T	Toe
U	Upper
V	Level

a) Manual for Describing Soils in the Field: 1982 Revised (Expert Committee on Soil Survey 1982).

Table I-9: Soil Texture[a]

Slope Texture Code	Description
C	Clay
CL	Clay Loam
fSL	Fine Sandy Loam
HC	Heavy Clay
L	Loam
LFS	Lomay Fine Sand
LS	Loamy Sand
LVFS	Loamy Very Fine Sand
S	Sand
SC	Sandy Clay
SCL	Sandy Clay Loam
Si	Silt
SiC	Silty Clay
SiCL	Silty Clay Loam
SiL	Silty Loam
SL	Sandy Loam
VFSL	Very Fine Sandy Loam

a) Manual for Describing Soils in the Field: 1982 Revised (Expert Committee on Soil Survey 1982).

Table I-10: Soil Consistence[a]

Slope Consistence Code	Description
FI	Firm
FR	Friable
L	Loose
NST	Non-sticky
SST	Slightly sticky
ST	Sticky
SL	Structureless
VFR	Very friable

a) Manual for Describing Soils in the Field: 1982 Revised (Expert Committee on Soil Survey 1982).

Table I-11: Horizon Suffixes[(a)]

Horizon Suffix Code	Description
Mineral Horizons	
e	eluviated – downward loss of clay, iron, aluminum and/or organic matter
g	gleyed – presence of mottling or gray colors indicating permanent or periodic reduction by water
f	iron – enriched with amorphous material, principally Al and Fe combined with om
c	Cemented – ortstien, placic, and duric horizon of Podzolic soils
h	humic - enriched with organic matter
j	modifier of suffixes indicating failure to meet specified limits of other suffixes
m	slightly modified by hydrolysis, oxidation, and/or solution
Organic Horizons	
f	fibric
h	humic
m	mesic

a) Canadian System of Soil Classification (SCWG 1998).

3.0 REFERENCES

ASIC (Alberta Soil Information Centre). 2016. Alberta Soil Names File (Generation 4) User's Handbook. M.D. Bock (ed.). Agriculture and Agri-Food Canada, Science and Technology Branch, Edmonton, AB. 166 pp.

CAESA (Canada – Alberta Environmentally Sustainable Agriculture Agreement). 2001. AGRASID Version 3.0: Soil Landscapes User's Manual. https://www.alberta.ca/caesa-land-system-users-manual.aspx#toc-6.

Expert Committee on Soil Survey. 1982. The Canada Soil Information System (CanSIS): Manual for Describing Soils in the Field, 1982 Revised. Land Resource Research Institute, Research Branch, Agriculture Canada, Ottawa. LRRI Contribution no 82-52. 166 pp.

SCWG (Soil Classification Working Group). 1998. The Canadian System of Soil Classification, 3rd ed. Agriculture and Agri-Food Canada Publication 1646, 187 pp.

APPENDIX C

Photos

Photo C-1: Example of mixed fragments in till (morainal) material.

Photo C-2: Orthic Ferro Humic Podzol (O.FHP) profile at plot K23LM023. Glaciofluvial material, associated with Huguette Lake (HUL) SMU. 29 September 2023

Photo C-3: Orthic Ferro Humic Podzol (O.FHP) pit profile at plot K23LM023. Glaciofluvial material, associated with Huguette Lake (HUL) SMU. 29 September 2023

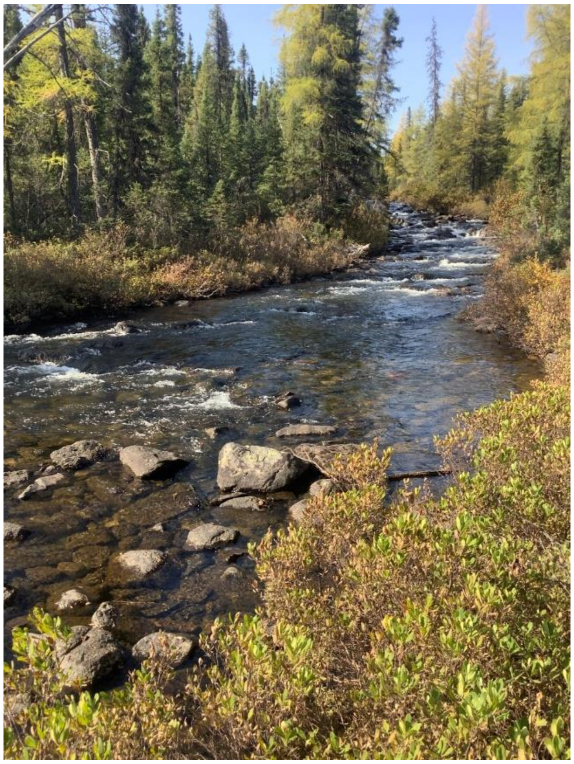

Photo C-4: Example of typical fluvial material from K23CB025. Example of Waldorf River (WDR) SMU. 28 September 2023

Photo C-5: Orthic Regosol (O.R) pit profile at plot K23CB030. Lacustrine material over till, example of material for Jean Lake (JAL) SMU. 29 September 2023

Photo C-6: Orthic Regosol (O.R) material at plot K23CB030. Lacustrine material over till, example of material for Jean Lake (JAL) SMU. 29 September 2023

Photo C-7: Rego Gleysol (R.G) profile at plot K23LM013. Organic accumulation till mineral materials. Example of material profile for Canning Lake (CAL) SMU. 27 September 2023

Photo C-8: Rego Gleysol (R.G) soil pit profile at plot K23LM013. Organic accumulation over till mineral materials. Example of material profile for Canning Lake (CAL) SMU. 27 September 2023

Photo C-9: Terric Fibrisol (T.F) material profile at plot K23CB026. Example of fibric organic material and underlying till material associated with Flora Lake (FLO) SMU. 28 September 2023

Photo C-10: Orthic Humo Ferric Podzol (O.HFP) pit profile at plot K23CB023. Till material, example of material for Javelin Road (JAV) SMU. 28 September 2023

Photo C-11: Example of coarse fragments from plot K23CB023. Till material, example of material for Javelin Road (JAV) SMU. 28 September 2023

Photo C-12: Eluviated Dystric Brunisol (E.DYB) pit profile at plot K23LM023. Till material, example of material for Labrador (LAB) SMU. 26 September 2023

Photo C-13: Example of coarse fragments from plot K23LM010. Till material, example of material for Labrador (LAB) SMU. 26 September 2023

Photo C-14: Eluviated Dystric Brunisol (E.DYB) material profile at plot K23CB011. Shallow till material over bedrock, example of material for Lake Virot (LAV) SMU. 26 September 2023

Photo C-15: Example of bedrock exposure at plot K23CB011. Shallow till material over bedrock, example of material for Lake Virot (LAV) SMU. 26 September 2023

Photo C-16: Terric Mesisol (T.M) material profile at plot K23CB024. Mesic organic material and coarse fragments, example of material for Mills Lake (MIL) SMU. 28 September 2023

Photo C-17: Orthic Humic Podzol (O.HP) material profile at plot K23CB022. Till material, example of material for Wabush (WAB) SMU. 27 September 2023

Photo C-18: Orthic Humic Podzol (O.HP) pit profile at plot K23CB022. Till material, example of material for Wabush (WAB) SMU. 27 September 2023

Photo C-19: Typic Fibrisol (TY.F) material at plot K23CB027. Fibric organic material, example of material for Walshes River (WLR) SMU. 29 September 2023

Photo C-20: Example of terrain material mapped as exposed bedrock (R1), from K23CB011. 26 September 2023

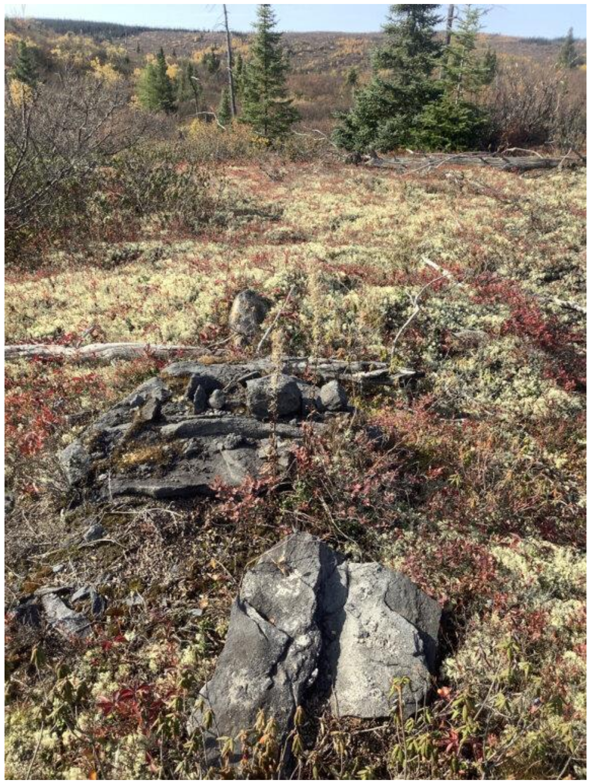

Photo C-21: Example of terrain material mapped as exposed bedrock (R1).

APPENDIX D

Laboratory Analysis Results

Your P.O. #: CA0003092.5894/500
Your Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your C.O.C. #: 1 of 1

Attention: Christiane Brouwer

WSP Canada Inc.
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Report Date: 2023/11/09
Report #: R3424439
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C383989
Received: 2023/10/03, 10:49

Sample Matrix: Soil
Samples Received: 36

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Boron (Hot Water Soluble) (1)	9	2023/10/30	2023/10/30	AB SOP-00034 / AB SOP-00042	EPA 6010d R5 m
Cation/EC Ratio (1)	4	N/A	2023/10/31		Auto Calc
Cation/EC Ratio (1)	13	N/A	2023/11/01		Auto Calc
Cation/EC Ratio (1)	19	N/A	2023/11/02		Auto Calc
Calcium Carbonate Equivalent (1)	36	N/A	2023/11/08	AB SOP-00019	Carter 2nd ed 20.2 m
Cation Exchange Capacity (1, 2)	9	2023/10/18	2023/10/30		Auto Calc
Chloride (Soluble) (1)	4	2023/10/30	2023/10/30	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Chloride (Soluble) (1)	13	2023/10/31	2023/10/31	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Chloride (Soluble) (1)	19	2023/10/31	2023/11/01	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Hexavalent Chromium (1, 3)	2	2023/10/24	2023/10/24	AB SOP-00063	SM 24 3500-Cr B m
Hexavalent Chromium (1, 3)	7	2023/10/26	2023/10/26	AB SOP-00063	SM 24 3500-Cr B m
Conductivity @25C (Soluble) (1)	4	2023/10/30	2023/10/30	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Conductivity @25C (Soluble) (1)	32	2023/10/31	2023/11/01	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Elements by ICPMS - Soils (1)	8	2023/10/26	2023/10/27	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Soils (1)	1	2023/10/27	2023/10/27	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Sum of Cations, Anions (1)	4	N/A	2023/10/31		Auto Calc
Sum of Cations, Anions (1)	13	N/A	2023/11/01		Auto Calc
Sum of Cations, Anions (1)	19	N/A	2023/11/02		Auto Calc
Potassium (Available) (1)	15	2023/11/03	2023/11/04	CAL SOP-00153 / AB SOP-00042	EPA 6010d R5 m
Potassium (Available) (1)	2	2023/11/08	2023/11/08	CAL SOP-00153 / AB SOP-00042	EPA 6010d R5 m
Moisture (1)	11	N/A	2023/10/24	AB SOP-00002	CCME PHC-CWS m
Moisture (1)	10	N/A	2023/10/26	AB SOP-00002	CCME PHC-CWS m
Moisture (1)	13	N/A	2023/10/27	AB SOP-00002	CCME PHC-CWS m

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Your P.O. #: CA0003092.5894/500
Your Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your C.O.C. #: 1 of 1

Attention: Christiane Brouwer

WSP Canada Inc.
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Report Date: 2023/11/09
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CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C383989
Received: 2023/10/03, 10:49

Sample Matrix: Soil
Samples Received: 36

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Available NO3 (N) (1)	17	2023/10/18	2023/11/05		Auto Calc
Phosphorus (Available by ICP) (1)	17	2023/11/03	2023/11/04	CAL SOP-00152 / AB SOP-00042	EPA 6010d R5 m
pH @25C (1:2 Calcium Chloride Extract) (1)	4	2023/10/31	2023/10/31	AB SOP-00033 / AB SOP-00006	SM 24 4500 H+B m
pH @25C (1:2 Calcium Chloride Extract) (1)	32	2023/11/01	2023/11/01	AB SOP-00033 / AB SOP-00006	SM 24 4500 H+B m
Sodium Adsorption Ratio (1)	4	N/A	2023/10/31		Auto Calc
Sodium Adsorption Ratio (1)	13	N/A	2023/11/01		Auto Calc
Sodium Adsorption Ratio (1)	19	N/A	2023/11/02		Auto Calc
Soluble Ions (1)	4	2023/10/30	2023/10/31	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Ions (1)	32	2023/10/31	2023/11/01	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Sulphur (Available) (1)	2	2023/10/29	2023/10/31	AB SOP-00029 / AB SOP-00042	EPA 6010d R5 m
Sulphur (Available) (1)	15	2023/11/03	2023/11/04	AB SOP-00029 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste (1)	4	2023/10/30	2023/10/30	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Paste (1)	32	2023/10/31	2023/10/31	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Ions Calculation (1)	11	N/A	2023/10/24		Auto Calc
Soluble Ions Calculation (1)	10	N/A	2023/10/26		Auto Calc
Soluble Ions Calculation (1)	13	N/A	2023/10/27		Auto Calc
Soluble Ions Calculation (1)	1	N/A	2023/10/29		Auto Calc
Soluble Ions Calculation (1)	1	N/A	2023/10/30		Auto Calc
Total Organic Carbon LECO Method (1)	2	N/A	2023/10/26	CAL SOP-00243	LECO 203-821-498 m
Total Organic Carbon LECO Method (1)	10	N/A	2023/10/27	CAL SOP-00243	LECO 203-821-498 m
Total Organic Carbon LECO Method (1)	2	N/A	2023/10/30	CAL SOP-00243	LECO 203-821-498 m
Texture by Hydrometer (1)	20	N/A	2023/10/29	AB SOP-00030	Carter 2nd ed 55.3 m
Texture by Hydrometer (1)	16	N/A	2023/10/30	AB SOP-00030	Carter 2nd ed 55.3 m
Texture Class (1)	20	N/A	2023/10/29		Auto Calc
Texture Class (1)	16	N/A	2023/10/30		Auto Calc
Theoretical Gypsum Requirement (1, 4)	4	N/A	2023/10/31		Auto Calc

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Your P.O. #: CA0003092.5894/500
Your Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your C.O.C. #: 1 of 1

Attention: Christiane Brouwer

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Report Date: 2023/11/09
Report #: R3424439
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C383989
Received: 2023/10/03, 10:49

Sample Matrix: Soil
Samples Received: 36

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Theoretical Gypsum Requirement (1, 4)	13	N/A	2023/11/01		Auto Calc
Theoretical Gypsum Requirement (1, 4)	19	N/A	2023/11/02		Auto Calc

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) Sample(s) analyzed using accredited methodologies and have been subjected to Bureau Veritas's standard validation process for the submitted matrix however this is not accredited for this matrix.
(3) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(4) TGR calculation is based on a theoretical SAR of 4. Salt Contamination and Assessment and remediation guideline 2001 recommended SAR is ranging 4-8. TGR is reported in tonnes/ha.

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Your P.O. #: CA0003092.5894/500
Your Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your C.O.C. #: 1 of 1

Attention: Christiane Brouwer

WSP Canada Inc.
16820-107 AVE
EDMONTON, AB
CANADA T5P 4C3

Report Date: 2023/11/09
Report #: R3424439
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C383989
Received: 2023/10/03, 10:49

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Melissa McIntosh, Customer Solutions Representative
Email: melissa.mcintosh@bureauveritas.com
Phone# (780) 577-7100
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Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CBZ802		CBZ803		CBZ804		
Sampling Date		2023/09/25		2023/09/25		2023/09/25		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23CB001AE0-8**	**RDL**	**K23CB001BF8-19**	**RDL**	**K23CB001BFJ19-28**	**RDL**	**QC Batch**
Calculated Parameters								
Anion Sum	meq/L	0.16	N/A	0.0000	N/A	0.0000	N/A	B159229
Cation Sum	meq/L	0.83	N/A	0.39	N/A	0.28	N/A	B159229
Cation/EC Ratio	N/A	14	0.10	10	0.10	11	0.10	B159104
Calculated Calcium (Ca)	mg/kg	<0.82	0.82	<0.49	0.49	<0.35	0.35	B159247
Calculated Magnesium (Mg)	mg/kg	<0.55	0.55	<0.32	0.32	<0.23	0.23	B159247
Calculated Sodium (Na)	mg/kg	4.9	1.4	2.4	0.81	1.3	0.59	B159247
Calculated Potassium (K)	mg/kg	<0.71	0.71	<0.42	0.42	<0.31	0.31	B159247
Calculated Chloride (Cl)	mg/kg	<5.5	5.5	<3.2	3.2	<2.3	2.3	B159247
Calculated Sulphate (SO4)	mg/kg	4.1	2.7	<1.6	1.6	<1.2	1.2	B159247
Soluble Parameters								
Soluble Chloride (Cl)	mg/L	<10	10	<10	10	<10	10	B179775
Soluble Conductivity	dS/m	0.058	0.020	0.039	0.020	0.026	0.020	B180158
Soluble (CaCl2) pH	pH	3.36	N/A	4.13	N/A	4.41	N/A	B172589
Sodium Adsorption Ratio	N/A	NC	0.10	NC	0.10	NC	0.10	B159242
Soluble Calcium (Ca)	mg/L	<1.5	1.5	<1.5	1.5	<1.5	1.5	B179706
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	B179706
Soluble Sodium (Na)	mg/L	8.9	2.5	7.3	2.5	5.6	2.5	B179706
Soluble Potassium (K)	mg/L	<1.3	1.3	<1.3	1.3	<1.3	1.3	B179706
Saturation %	%	55	N/A	32	N/A	23	N/A	B172586
Soluble Sulphate (SO4)	mg/L	7.5	5.0	<5.0	5.0	<5.0	5.0	B179706
Theoretical Gypsum Requirement	tonnes/ha	NC (1)	0.20	NC (1)	0.20	NC (1)	0.20	B159268

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) NC = Not Calculable as Calcium and Magnesium were not detected.

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CBZ805			CBZ806		
Sampling Date		2023/09/25			2023/09/25		
COC Number		1 of 1			1 of 1		
	UNITS	**K23CB001C28-47**	**RDL**	**QC Batch**	**K23CB001CGJ47-120**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	meq/L	0.0000	N/A	B159229	0.11	N/A	B159229
Cation Sum	meq/L	0.27	N/A	B159229	0.40	N/A	B159229
Cation/EC Ratio	N/A	9.8	0.10	B159104	9.3	0.10	B159104
Calculated Calcium (Ca)	mg/kg	<0.33	0.33	B159247	0.31	0.28	B159247
Calculated Magnesium (Mg)	mg/kg	<0.22	0.22	B159247	<0.19	0.19	B159247
Calculated Sodium (Na)	mg/kg	1.3	0.55	B159247	1.3	0.47	B159247
Calculated Potassium (K)	mg/kg	<0.29	0.29	B159247	<0.24	0.24	B159247
Calculated Chloride (Cl)	mg/kg	<2.2	2.2	B159247	<1.9	1.9	B159247
Calculated Sulphate (SO4)	mg/kg	<1.1	1.1	B159247	0.95	0.94	B159247
Soluble Parameters							
Soluble Chloride (Cl)	mg/L	<10	10	B179061	<10	10	B179775
Soluble Conductivity	dS/m	0.028	0.020	B179745	0.043	0.020	B180158
Soluble (CaCl2) pH	pH	4.59	N/A	B172604	4.86	N/A	B172589
Sodium Adsorption Ratio	N/A	NC	0.10	B159242	1.5	0.10	B159242
Soluble Calcium (Ca)	mg/L	<1.5	1.5	B179305	1.7	1.5	B179706
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	B179305	<1.0	1.0	B179706
Soluble Sodium (Na)	mg/L	5.7	2.5	B179305	6.9	2.5	B179706
Soluble Potassium (K)	mg/L	<1.3	1.3	B179305	<1.3	1.3	B179706
Saturation %	%	22	N/A	B172600	19	N/A	B172586
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	B179305	5.1	5.0	B179706
Theoretical Gypsum Requirement	tonnes/ha	NC (1)	0.20	B159268	<0.20	0.20	B159268

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Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CBZ807			CBZ808		
Sampling Date		2023/09/26			2023/09/26		
COC Number		1 of 1			1 of 1		
	UNITS	**K23CB010AE0-5**	**RDL**	**QC Batch**	**K23CB010BM5-13**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	meq/L	0.32	N/A	B159229	0.0000	N/A	B159229
Cation Sum	meq/L	1.3	N/A	B159229	0.50	N/A	B159229
Cation/EC Ratio	N/A	15	0.10	B159104	11	0.10	B159104
Calculated Calcium (Ca)	mg/kg	0.63	0.61	B159250	<0.50	0.50	B159250
Calculated Magnesium (Mg)	mg/kg	<0.41	0.41	B159250	<0.33	0.33	B159250
Calculated Sodium (Na)	mg/kg	5.2	1.0	B159250	3.4	0.83	B159250
Calculated Potassium (K)	mg/kg	<0.53	0.53	B159250	<0.43	0.43	B159250
Calculated Chloride (Cl)	mg/kg	<4.1	4.1	B159250	<3.3	3.3	B159250
Calculated Sulphate (SO4)	mg/kg	6.2	2.0	B159250	<1.7	1.7	B159250
Soluble Parameters							
Soluble Chloride (Cl)	mg/L	<10	10	B179061	<10	10	B179061
Soluble Conductivity	dS/m	0.082	0.020	B179745	0.045	0.020	B179745
Soluble (CaCl2) pH	pH	3.20	N/A	B172604	4.25	N/A	B172604
Sodium Adsorption Ratio	N/A	2.8	0.10	B159242	NC	0.10	B159242
Soluble Calcium (Ca)	mg/L	1.5	1.5	B179305	<1.5	1.5	B179305
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	B179305	<1.0	1.0	B179305
Soluble Sodium (Na)	mg/L	13	2.5	B179305	10	2.5	B179305
Soluble Potassium (K)	mg/L	<1.3	1.3	B179305	<1.3	1.3	B179305
Saturation %	%	41	N/A	B172600	33	N/A	B172600
Soluble Sulphate (SO4)	mg/L	15	5.0	B179305	<5.0	5.0	B179305
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B159268	NC (1)	0.20	B159269

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Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CBZ809			CBZ810		
Sampling Date		2023/09/26			2023/09/26		
COC Number		1 of 1			1 of 1		
	UNITS	**K23CB010BC13-35**	**RDL**	**QC Batch**	**K23CB010C35-100**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	meq/L	0.0000	N/A	B159229	0.0000	N/A	B159233
Cation Sum	meq/L	0.36	N/A	B159229	0.34	N/A	B159233
Cation/EC Ratio	N/A	11	0.10	B159104	7.7	0.10	B159104
Calculated Calcium (Ca)	mg/kg	<0.41	0.41	B159250	<0.26	0.26	B159250
Calculated Magnesium (Mg)	mg/kg	<0.27	0.27	B159250	<0.17	0.17	B159250
Calculated Sodium (Na)	mg/kg	2.0	0.68	B159250	1.3	0.43	B159250
Calculated Potassium (K)	mg/kg	<0.35	0.35	B159250	<0.23	0.23	B159250
Calculated Chloride (Cl)	mg/kg	<2.7	2.7	B159250	<1.7	1.7	B159250
Calculated Sulphate (SO4)	mg/kg	<1.4	1.4	B159250	<0.87	0.87	B159250
Soluble Parameters							
Soluble Chloride (Cl)	mg/L	<10	10	B179061	<10	10	B179061
Soluble Conductivity	dS/m	0.032	0.020	B179745	0.044	0.020	B179854
Soluble (CaCl2) pH	pH	4.42	N/A	B172604	4.98	N/A	B172604
Sodium Adsorption Ratio	N/A	NC	0.10	B159244	NC	0.10	B159244
Soluble Calcium (Ca)	mg/L	<1.5	1.5	B179305	<1.5	1.5	B179305
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	B179305	<1.0	1.0	B179305
Soluble Sodium (Na)	mg/L	7.4	2.5	B179305	7.6	2.5	B179305
Soluble Potassium (K)	mg/L	<1.3	1.3	B179305	<1.3	1.3	B179305
Saturation %	%	27	N/A	B172600	17	N/A	B172600
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	B179305	<5.0	5.0	B179305
Theoretical Gypsum Requirement	tonnes/ha	NC (1)	0.20	B159269	NC (1)	0.20	B159269

RDL = Reportable Detection Limit
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Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CBZ811			CBZ812		
Sampling Date		2023/09/27			2023/09/27		
COC Number		1 of 1			1 of 1		
	UNITS	**K23LM013CG10-33**	**RDL**	**QC Batch**	**K23LM013CG233-60**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	meq/L	0.23	N/A	B159233	0.12	N/A	B159233
Cation Sum	meq/L	1.3	N/A	B159233	0.62	N/A	B159233
Cation/EC Ratio	N/A	12	0.10	B159104	10	0.10	B159104
Calculated Calcium (Ca)	mg/kg	4.1	0.72	B159250	1.5	0.41	B159250
Calculated Magnesium (Mg)	mg/kg	1.2	0.48	B159250	0.43	0.27	B159250
Calculated Sodium (Na)	mg/kg	7.3	1.2	B159250	1.3	0.68	B159250
Calculated Potassium (K)	mg/kg	<0.62	0.62	B159250	<0.35	0.35	B159250
Calculated Chloride (Cl)	mg/kg	<4.8	4.8	B159250	<2.7	2.7	B159250
Calculated Sulphate (SO4)	mg/kg	5.3	2.4	B159250	1.5	1.4	B159250
Soluble Parameters							
Soluble Chloride (Cl)	mg/L	<10	10	B179775	<10	10	B179061
Soluble Conductivity	dS/m	0.11	0.020	B180158	0.060	0.020	B179745
Soluble (CaCl2) pH	pH	5.40	N/A	B172589	5.43	N/A	B172604
Sodium Adsorption Ratio	N/A	1.2	0.10	B159244	0.47	0.10	B159244
Soluble Calcium (Ca)	mg/L	8.6	1.5	B179706	5.4	1.5	B179305
Soluble Magnesium (Mg)	mg/L	2.5	1.0	B179706	1.6	1.0	B179305
Soluble Sodium (Na)	mg/L	15	2.5	B179706	4.9	2.5	B179305
Soluble Potassium (K)	mg/L	<1.3	1.3	B179706	<1.3	1.3	B179305
Saturation %	%	48	N/A	B172586	27	N/A	B172600
Soluble Sulphate (SO4)	mg/L	11	5.0	B179706	5.6	5.0	B179305
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B159269	<0.20	0.20	B159269

RDL = Reportable Detection Limit
N/A = Not Applicable

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Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CCA014		CCA015			CCA016		
Sampling Date		2023/09/27		2023/09/27			2023/09/27		
COC Number		1 of 1		1 of 1			1 of 1		
	UNITS	**K23LM015AE0-5**	**RDL**	**K23LM015BM5-23**	**RDL**	**QC Batch**	**K23LM015BC23-30**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	meq/L	0.29	N/A	0.0000	N/A	B159233	0.0000	N/A	B159233
Cation Sum	meq/L	1.4	N/A	0.16	N/A	B159233	0.16	N/A	B159233
Cation/EC Ratio	N/A	17	0.10	NC	0.10	B159104	NC	0.10	B159104
Calculated Calcium (Ca)	mg/kg	1.3	0.85	<0.58	0.58	B159250	<0.48	0.48	B159250
Calculated Magnesium (Mg)	mg/kg	<0.57	0.57	<0.39	0.39	B159250	<0.32	0.32	B159250
Calculated Sodium (Na)	mg/kg	6.6	1.4	1.2	0.97	B159250	1.1	0.80	B159250
Calculated Potassium (K)	mg/kg	0.88	0.73	<0.50	0.50	B159250	<0.41	0.41	B159250
Calculated Chloride (Cl)	mg/kg	<5.7	5.7	<3.9	3.9	B159250	<3.2	3.2	B159250
Calculated Sulphate (SO4)	mg/kg	7.9	2.8	<1.9	1.9	B159250	<1.6	1.6	B159250
Soluble Parameters									
Soluble Chloride (Cl)	mg/L	<10	10	<10	10	B179775	<10	10	B179061
Soluble Conductivity	dS/m	0.086	0.020	<0.020	0.020	B180158	<0.020	0.020	B179745
Soluble (CaCl2) pH	pH	3.11	N/A	4.65	N/A	B172589	4.78	N/A	B172604
Sodium Adsorption Ratio	N/A	2.2	0.10	NC	0.10	B159244	NC	0.10	B159244
Soluble Calcium (Ca)	mg/L	2.2	1.5	<1.5	1.5	B179706	<1.5	1.5	B179305
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	<1.0	1.0	B179706	<1.0	1.0	B179305
Soluble Sodium (Na)	mg/L	12	2.5	3.2	2.5	B179706	3.4	2.5	B179305
Soluble Potassium (K)	mg/L	1.6	1.3	<1.3	1.3	B179706	<1.3	1.3	B179305
Saturation %	%	56	N/A	39	N/A	B172586	32	N/A	B172600
Soluble Sulphate (SO4)	mg/L	14	5.0	<5.0	5.0	B179706	<5.0	5.0	B179305
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	NC (1)	0.20	B159269	NC (1)	0.20	B159269

RDL = Reportable Detection Limit
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Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CCA017		CCA018		CCA023		
Sampling Date		2023/09/27		2023/09/27		2023/09/28		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23LM015C30-100**	**RDL**	**K23CB020CG0-80**	**RDL**	**K23CB023AE0-6**	**RDL**	**QC Batch**
Calculated Parameters								
Anion Sum	meq/L	0.0000	N/A	0.25	N/A	0.14	N/A	B159233
Cation Sum	meq/L	0.15	N/A	0.57	N/A	0.88	N/A	B159233
Cation/EC Ratio	N/A	NC	0.10	9.8	0.10	15	0.10	B159104
Calculated Calcium (Ca)	mg/kg	<0.39	0.39	<0.37	0.37	<0.59	0.59	B159250
Calculated Magnesium (Mg)	mg/kg	<0.26	0.26	<0.25	0.25	<0.39	0.39	B159250
Calculated Sodium (Na)	mg/kg	0.75	0.64	3.2	0.62	4.6	0.98	B159250
Calculated Potassium (K)	mg/kg	<0.33	0.33	<0.32	0.32	<0.51	0.51	B159250
Calculated Chloride (Cl)	mg/kg	<2.6	2.6	<2.5	2.5	<3.9	3.9	B159250
Calculated Sulphate (SO4)	mg/kg	<1.3	1.3	2.9	1.2	2.7	2.0	B159250
Soluble Parameters								
Soluble Chloride (Cl)	mg/L	<10	10	<10	10	<10	10	B179775
Soluble Conductivity	dS/m	<0.020	0.020	0.058	0.020	0.059	0.020	B180158
Soluble (CaCl2) pH	pH	4.72	N/A	5.09	N/A	3.44	N/A	B172589
Sodium Adsorption Ratio	N/A	NC	0.10	NC	0.10	NC	0.10	B159244
Soluble Calcium (Ca)	mg/L	<1.5	1.5	<1.5	1.5	<1.5	1.5	B179706
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	B179706
Soluble Sodium (Na)	mg/L	2.9	2.5	13	2.5	12	2.5	B179706
Soluble Potassium (K)	mg/L	<1.3	1.3	<1.3	1.3	<1.3	1.3	B179706
Saturation %	%	26	N/A	25	N/A	39	N/A	B172586
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	12	5.0	6.9	5.0	B179706
Theoretical Gypsum Requirement	tonnes/ha	NC (1)	0.20	NC (1)	0.20	NC (1)	0.20	B159269

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(1) NC = Not Calculable as Calcium and Magnesium were not detected.

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CCA024			CCA025		
Sampling Date		2023/09/28			2023/09/28		
COC Number		1 of 1			1 of 1		
	UNITS	**K23CB023BF6-17**	**RDL**	**QC Batch**	**K23CB023BC17-30**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	meq/L	0.0000	N/A	B159233	0.0000	N/A	B159233
Cation Sum	meq/L	0.16	N/A	B159233	0.0060	N/A	B159233
Cation/EC Ratio	N/A	NC	0.10	B159104	NC	0.10	B159214
Calculated Calcium (Ca)	mg/kg	<0.57	0.57	B159250	<0.49	0.49	B159250
Calculated Magnesium (Mg)	mg/kg	<0.38	0.38	B159250	<0.32	0.32	B159250
Calculated Sodium (Na)	mg/kg	1.1	0.95	B159250	<0.81	0.81	B159250
Calculated Potassium (K)	mg/kg	<0.50	0.50	B159250	<0.42	0.42	B159250
Calculated Chloride (Cl)	mg/kg	<3.8	3.8	B159250	<3.2	3.2	B159250
Calculated Sulphate (SO4)	mg/kg	<1.9	1.9	B159250	<1.6	1.6	B159250
Soluble Parameters							
Soluble Chloride (Cl)	mg/L	<10	10	B179775	<10	10	B179061
Soluble Conductivity	dS/m	<0.020	0.020	B180158	<0.020	0.020	B179745
Soluble (CaCl2) pH	pH	4.49	N/A	B172589	5.20	N/A	B172604
Sodium Adsorption Ratio	N/A	NC	0.10	B159244	NC	0.10	B159244
Soluble Calcium (Ca)	mg/L	<1.5	1.5	B179706	<1.5	1.5	B179305
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	B179706	<1.0	1.0	B179305
Soluble Sodium (Na)	mg/L	2.9	2.5	B179706	<2.5	2.5	B179305
Soluble Potassium (K)	mg/L	<1.3	1.3	B179706	<1.3	1.3	B179305
Saturation %	%	38	N/A	B172586	32	N/A	B172600
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	B179706	<5.0	5.0	B179305
Theoretical Gypsum Requirement	tonnes/ha	NC (1)	0.20	B159269	NC (1)	0.20	B159269

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) NC = Not Calculable as Calcium and Magnesium were not detected.

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CCA121			CCA019		CCA020		
Sampling Date		2023/09/28			2023/09/27		2023/09/27		
COC Number		1 of 1			1 of 1		1 of 1		
	UNITS	**K23CB023C30-70**	**RDL**	**QC Batch**	**K23CB017AE0-9**	**RDL**	**K23CB017BMGJ9-33**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	meq/L	0.0000	N/A	B159233	0.21	N/A	0.11	N/A	B159233
Cation Sum	meq/L	0.20	N/A	B159233	0.86	N/A	0.65	N/A	B159233
Cation/EC Ratio	N/A	9.1	0.10	B159216	13	0.10	11	0.10	B159104
Calculated Calcium (Ca)	mg/kg	<0.32	0.32	B159250	<0.45	0.45	<0.42	0.42	B159250
Calculated Magnesium (Mg)	mg/kg	<0.21	0.21	B159250	<0.30	0.30	<0.28	0.28	B159250
Calculated Sodium (Na)	mg/kg	0.92	0.53	B159250	4.1	0.75	3.1	0.70	B159250
Calculated Potassium (K)	mg/kg	<0.28	0.28	B159250	<0.39	0.39	<0.36	0.36	B159250
Calculated Chloride (Cl)	mg/kg	<2.1	2.1	B159250	<3.0	3.0	<2.8	2.8	B159250
Calculated Sulphate (SO4)	mg/kg	<1.1	1.1	B159250	3.0	1.5	1.5	1.4	B159250
Soluble Parameters									
Soluble Chloride (Cl)	mg/L	<10	10	B179775	<10	10	<10	10	B179775
Soluble Conductivity	dS/m	0.022	0.020	B180158	0.069	0.020	0.057	0.020	B180158
Soluble (CaCl2) pH	pH	5.03	N/A	B172589	3.57	N/A	3.76	N/A	B172589
Sodium Adsorption Ratio	N/A	NC	0.10	B159244	NC	0.10	NC	0.10	B159244
Soluble Calcium (Ca)	mg/L	<1.5	1.5	B179706	<1.5	1.5	<1.5	1.5	B179706
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	B179706	<1.0	1.0	<1.0	1.0	B179706
Soluble Sodium (Na)	mg/L	4.3	2.5	B179706	14	2.5	11	2.5	B179706
Soluble Potassium (K)	mg/L	<1.3	1.3	B179706	<1.3	1.3	<1.3	1.3	B179706
Saturation %	%	21	N/A	B172586	30	N/A	28	N/A	B172586
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	B179706	10	5.0	5.4	5.0	B179706
Theoretical Gypsum Requirement	tonnes/ha	NC (1)	0.20	B159269	NC (1)	0.20	NC (1)	0.20	B159269

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) NC = Not Calculable as Calcium and Magnesium were not detected.

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
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Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CCA021		CCA022			CCA122		
Sampling Date		2023/09/27		2023/09/27			2023/09/29		
COC Number		1 of 1		1 of 1			1 of 1		
	UNITS	**K23CB017BCGJ33-80**	**RDL**	**K23CB017CG80-100**	**RDL**	**QC Batch**	**K23CB028C0-120**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	meq/L	0.0000	N/A	0.0000	N/A	B159233	0.23	N/A	B159233
Cation Sum	meq/L	0.51	N/A	0.28	N/A	B159233	0.95	N/A	B159233
Cation/EC Ratio	N/A	12	0.10	9.4	0.10	B159104	11	0.10	B159216
Calculated Calcium (Ca)	mg/kg	<0.37	0.37	<0.30	0.30	B159250	0.88	0.43	B159250
Calculated Magnesium (Mg)	mg/kg	<0.25	0.25	<0.20	0.20	B159250	0.69	0.29	B159250
Calculated Sodium (Na)	mg/kg	2.3	0.61	1.2	0.50	B159250	3.9	0.72	B159250
Calculated Potassium (K)	mg/kg	<0.32	0.32	<0.26	0.26	B159250	<0.37	0.37	B159250
Calculated Chloride (Cl)	mg/kg	<2.5	2.5	<2.0	2.0	B159250	<2.9	2.9	B159250
Calculated Sulphate (SO4)	mg/kg	<1.2	1.2	<1.0	1.0	B159250	3.2	1.4	B159250
Soluble Parameters									
Soluble Chloride (Cl)	mg/L	<10	10	<10	10	B179061	<10	10	B177198
Soluble Conductivity	dS/m	0.042	0.020	0.029	0.020	B179745	0.084	0.020	B177200
Soluble (CaCl2) pH	pH	3.98	N/A	4.59	N/A	B172604	5.78	N/A	B173622
Sodium Adsorption Ratio	N/A	NC	0.10	NC	0.10	B159244	1.4	0.10	B159244
Soluble Calcium (Ca)	mg/L	<1.5	1.5	<1.5	1.5	B179305	3.1	1.5	B177109
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	<1.0	1.0	B179305	2.4	1.0	B177109
Soluble Sodium (Na)	mg/L	9.2	2.5	5.8	2.5	B179305	14	2.5	B177109
Soluble Potassium (K)	mg/L	<1.3	1.3	<1.3	1.3	B179305	<1.3	1.3	B177109
Saturation %	%	25	N/A	20	N/A	B172600	29	N/A	B173597
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	<5.0	5.0	B179305	11	5.0	B177109
Theoretical Gypsum Requirement	tonnes/ha	NC (1)	0.20	NC (1)	0.20	B159269	<0.20	0.20	B159269

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) NC = Not Calculable as Calcium and Magnesium were not detected.

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
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Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CCA127		CCA128		CCA129		
Sampling Date		2023/09/29		2023/09/29		2023/09/29		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23LM023AE0-10**	**RDL**	**K23LM023BM10-18**	**RDL**	**K23LM023BH18-54**	**RDL**	**QC Batch**
Calculated Parameters								
Anion Sum	meq/L	0.17	N/A	0.0000	N/A	0.0000	N/A	B159233
Cation Sum	meq/L	0.84	N/A	0.27	N/A	0.035	N/A	B159233
Cation/EC Ratio	N/A	18	0.10	11	0.10	NC	0.10	B159216
Calculated Calcium (Ca)	mg/kg	0.62	0.57	<0.57	0.57	<0.59	0.59	B159250
Calculated Magnesium (Mg)	mg/kg	<0.38	0.38	<0.38	0.38	<0.39	0.39	B159250
Calculated Sodium (Na)	mg/kg	1.7	0.96	1.4	0.95	<0.98	0.98	B159250
Calculated Potassium (K)	mg/kg	<0.50	0.50	<0.50	0.50	<0.51	0.51	B159250
Calculated Chloride (Cl)	mg/kg	<3.8	3.8	<3.8	3.8	<3.9	3.9	B159250
Calculated Sulphate (SO4)	mg/kg	3.2	1.9	<1.9	1.9	<2.0	2.0	B159250
Soluble Parameters								
Soluble Chloride (Cl)	mg/L	<10	10	<10	10	<10	10	B179775
Soluble Conductivity	dS/m	0.048	0.020	0.025	0.020	<0.020	0.020	B180158
Soluble (CaCl2) pH	pH	3.25	N/A	3.96	N/A	4.46	N/A	B172589
Sodium Adsorption Ratio	N/A	0.95	0.10	NC	0.10	NC	0.10	B159244
Soluble Calcium (Ca)	mg/L	1.6	1.5	<1.5	1.5	<1.5	1.5	B179706
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	B179706
Soluble Sodium (Na)	mg/L	4.4	2.5	3.7	2.5	<2.5	2.5	B179706
Soluble Potassium (K)	mg/L	<1.3	1.3	<1.3	1.3	<1.3	1.3	B179706
Saturation %	%	38	N/A	38	N/A	39	N/A	B172586
Soluble Sulphate (SO4)	mg/L	8.3	5.0	<5.0	5.0	<5.0	5.0	B179706
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	NC (1)	0.20	NC (1)	0.20	B159269

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) NC = Not Calculable as Calcium and Magnesium were not detected.

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
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Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CCA130			CCA123		CCA124		
Sampling Date		2023/09/29			2023/09/29		2023/09/29		
COC Number		1 of 1			1 of 1		1 of 1		
	UNITS	**K23LM023C54-120**	**RDL**	**QC Batch**	**K23LM020CG10-30**	**RDL**	**K23LM020CG230-75**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	meq/L	0.0000	N/A	B159233	2.4	N/A	1.6	N/A	B159233
Cation Sum	meq/L	0.15	N/A	B159233	4.4	N/A	2.6	N/A	B159233
Cation/EC Ratio	N/A	6.1	0.10	B159216	10	0.10	10	0.10	B159216
Calculated Calcium (Ca)	mg/kg	<0.47	0.47	B159255	20	0.93	5.1	0.55	B159250
Calculated Magnesium (Mg)	mg/kg	<0.31	0.31	B159255	6.1	0.62	2.2	0.37	B159250
Calculated Sodium (Na)	mg/kg	0.93	0.78	B159255	26	1.6	11	0.92	B159250
Calculated Potassium (K)	mg/kg	<0.40	0.40	B159255	2.4	0.81	0.72	0.48	B159250
Calculated Chloride (Cl)	mg/kg	<3.1	3.1	B159255	42	6.2	13	3.7	B159250
Calculated Sulphate (SO4)	mg/kg	<1.6	1.6	B159255	14	3.1	11	1.8	B159250
Soluble Parameters									
Soluble Chloride (Cl)	mg/L	<10	10	B179775	67	10	35	10	B177198
Soluble Conductivity	dS/m	0.024	0.020	B180158	0.43	0.020	0.25	0.020	B177200
Soluble (CaCl2) pH	pH	4.76	N/A	B172589	6.53	N/A	6.22	N/A	B173622
Sodium Adsorption Ratio	N/A	NC	0.10	B159244	1.7	0.10	1.7	0.10	B159244
Soluble Calcium (Ca)	mg/L	<1.5	1.5	B179706	33	1.5	14	1.5	B177109
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	B179706	9.8	1.0	5.9	1.0	B177109
Soluble Sodium (Na)	mg/L	3.0	2.5	B179706	42	2.5	31	2.5	B177109
Soluble Potassium (K)	mg/L	<1.3	1.3	B179706	3.9	1.3	1.9	1.3	B177109
Saturation %	%	31	N/A	B172586	62	N/A	37	N/A	B173597
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	B179706	22	5.0	29	5.0	B177109
Theoretical Gypsum Requirement	tonnes/ha	NC (1)	0.20	B159269	<0.20	0.20	<0.20	0.20	B159269

RDL = Reportable Detection Limit
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(1) NC = Not Calculable as Calcium and Magnesium were not detected.

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Bureau Veritas Job #: C383989
Report Date: 2023/11/09

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Client Project #: CA0003092.5894/TASK 500
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Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CCA125			CCA126		
Sampling Date		2023/09/29			2023/09/29		
COC Number		1 of 1			1 of 1		
	UNITS	**K23CB030C0-36**	**RDL**	**QC Batch**	**K23CB030IIC36-100**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	meq/L	0.0000	N/A	B159233	0.0000	N/A	B159233
Cation Sum	meq/L	0.43	N/A	B159233	0.39	N/A	B159233
Cation/EC Ratio	N/A	10	0.10	B159216	10	0.10	B159216
Calculated Calcium (Ca)	mg/kg	<0.59	0.59	B159250	<0.34	0.34	B159250
Calculated Magnesium (Mg)	mg/kg	0.45	0.39	B159250	<0.22	0.22	B159250
Calculated Sodium (Na)	mg/kg	2.5	0.98	B159250	1.9	0.56	B159250
Calculated Potassium (K)	mg/kg	<0.51	0.51	B159250	<0.29	0.29	B159250
Calculated Chloride (Cl)	mg/kg	<3.9	3.9	B159250	<2.2	2.2	B159250
Calculated Sulphate (SO4)	mg/kg	<2.0	2.0	B159250	<1.1	1.1	B159250
Soluble Parameters							
Soluble Chloride (Cl)	mg/L	<10	10	B177198	<10	10	B179061
Soluble Conductivity	dS/m	0.042	0.020	B177200	0.039	0.020	B179745
Soluble (CaCl2) pH	pH	4.23	N/A	B173622	4.87	N/A	B172604
Sodium Adsorption Ratio	N/A	1.3	0.10	B159244	NC	0.10	B159244
Soluble Calcium (Ca)	mg/L	<1.5	1.5	B177109	<1.5	1.5	B179305
Soluble Magnesium (Mg)	mg/L	1.2	1.0	B177109	<1.0	1.0	B179305
Soluble Sodium (Na)	mg/L	6.4	2.5	B177109	8.7	2.5	B179305
Soluble Potassium (K)	mg/L	<1.3	1.3	B177109	<1.3	1.3	B179305
Saturation %	%	39	N/A	B173597	22	N/A	B172600
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	B177109	<5.0	5.0	B179305
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B159269	NC (1)	0.20	B159269

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) NC = Not Calculable as Calcium and Magnesium were not detected.

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

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Sampler Initials: CB

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		CBZ932			CBZ933		CBZ934		
Sampling Date		2023/09/29			2023/09/29		2023/09/29		
COC Number		1 of 1			1 of 1		1 of 1		
	UNITS	**K23CB031BM0-20**	**RDL**	**QC Batch**	**K23CB031BC20-35**	**RDL**	**K23CB031C35-120**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	meq/L	0.0000	N/A	B159233	0.0000	N/A	0.0000	N/A	B159233
Cation Sum	meq/L	0.27	N/A	B159233	0.21	N/A	0.28	N/A	B159233
Cation/EC Ratio	N/A	11	0.10	B159104	9.6	0.10	9.3	0.10	B159104
Calculated Calcium (Ca)	mg/kg	<0.43	0.43	B159250	<0.46	0.46	<0.41	0.41	B159250
Calculated Magnesium (Mg)	mg/kg	<0.29	0.29	B159250	<0.31	0.31	<0.27	0.27	B159250
Calculated Sodium (Na)	mg/kg	1.8	0.72	B159250	1.5	0.77	1.8	0.68	B159250
Calculated Potassium (K)	mg/kg	<0.38	0.38	B159250	<0.40	0.40	<0.36	0.36	B159250
Calculated Chloride (Cl)	mg/kg	<2.9	2.9	B159250	<3.1	3.1	<2.7	2.7	B159250
Calculated Sulphate (SO4)	mg/kg	<1.4	1.4	B159250	<1.5	1.5	<1.4	1.4	B159250
Soluble Parameters									
Soluble Chloride (Cl)	mg/L	<10	10	B179775	<10	10	<10	10	B179061
Soluble Conductivity	dS/m	0.025	0.020	B180158	0.022	0.020	0.031	0.020	B179745
Soluble (CaCl2) pH	pH	5.11	N/A	B172589	5.97 (1)	N/A	6.11	N/A	B172604
Sodium Adsorption Ratio	N/A	NC	0.10	B159244	NC	0.10	NC	0.10	B159244
Soluble Calcium (Ca)	mg/L	<1.5	1.5	B179706	<1.5	1.5	<1.5	1.5	B179305
Soluble Magnesium (Mg)	mg/L	<1.0	1.0	B179706	<1.0	1.0	<1.0	1.0	B179305
Soluble Sodium (Na)	mg/L	6.1	2.5	B179706	4.8	2.5	6.5	2.5	B179305
Soluble Potassium (K)	mg/L	<1.3	1.3	B179706	<1.3	1.3	<1.3	1.3	B179305
Saturation %	%	29	N/A	B172586	31	N/A	27	N/A	B172600
Soluble Sulphate (SO4)	mg/L	<5.0	5.0	B179706	<5.0	5.0	<5.0	5.0	B179305
Theoretical Gypsum Requirement	tonnes/ha	NC (2)	0.20	B159269	NC (2)	0.20	NC (2)	0.20	B159269

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Duplicate exceeds acceptance criteria due to sample non homogeneity.
(2) NC = Not Calculable as Calcium and Magnesium were not detected.

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
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Sampler Initials: CB

NPKS (AVAILABLE)

Bureau Veritas ID		CBZ802	CBZ803	CBZ804	CBZ811		
Sampling Date		2023/09/25	2023/09/25	2023/09/25	2023/09/27		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23CB001AE0-8**	**K23CB001BF8-19**	**K23CB001BFJ19-28**	**K23LM013CG10-33**	**RDL**	**QC Batch**
Calculated Parameters							
Available (NH4F) Nitrate (N)	mg/kg	<4.0	<4.0	<4.0	<4.0	4.0	B159237
Nutrients							
Available (NH4F) Phosphorus (P)	mg/kg	4.8	16	5.9	2.9	1.0	B185001
Available (NH4OAc) Potassium (K)	mg/kg	10	6.9	<2.0	8.7	2.0	B184961
Available (CaCl2) Sulphur (S)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	B184966
RDL = Reportable Detection Limit							

Bureau Veritas ID		CCA014	CCA015	CCA018	CCA023	CCA024		
Sampling Date		2023/09/27	2023/09/27	2023/09/27	2023/09/28	2023/09/28		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23LM015AE0-5**	**K23LM015BM5-23**	**K23CB020CG0-80**	**K23CB023AE0-6**	**K23CB023BF6-17**	**RDL**	**QC Batch**
Calculated Parameters								
Available (NH4F) Nitrate (N)	mg/kg	<4.0	<4.0	11	<4.0	<4.0	4.0	B159237
Nutrients								
Available (NH4F) Phosphorus (P)	mg/kg	3.3	5.0	2.8	6.0	6.5	1.0	B185001
Available (NH4OAc) Potassium (K)	mg/kg	16	12	7.9	5.6	3.4	2.0	B184961
Available (CaCl2) Sulphur (S)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	B184966
RDL = Reportable Detection Limit								

Bureau Veritas ID		CCA019	CCA020	CCA127	CCA128		
Sampling Date		2023/09/27	2023/09/27	2023/09/29	2023/09/29		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23CB017AE0-9**	**K23CB017BMGJ9-33**	**K23LM023AE0-10**	**K23LM023BM10-18**	**RDL**	**QC Batch**
Calculated Parameters							
Available (NH4F) Nitrate (N)	mg/kg	<4.0	<4.0	<4.0	<4.0	4.0	B159237
Nutrients							
Available (NH4F) Phosphorus (P)	mg/kg	6.3	5.8	3.6	7.4	1.0	B185001
Available (NH4OAc) Potassium (K)	mg/kg	<2.0	4.1	2.3	<2.0	2.0	B184961
Available (CaCl2) Sulphur (S)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	B184966
RDL = Reportable Detection Limit							

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NPKS (AVAILABLE)

Bureau Veritas ID		CCA129		CCA123	CCA125		
Sampling Date		2023/09/29		2023/09/29	2023/09/29		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	**K23LM023BH18-54**	**QC Batch**	**K23LM020CG10-30**	**K23CB030C0-36**	**RDL**	**QC Batch**
Calculated Parameters							
Available (NH4F) Nitrate (N)	mg/kg	<4.0	B159237	<4.0	<4.0	4.0	B159237
Nutrients							
Available (NH4F) Phosphorus (P)	mg/kg	8.4	B185001	<1.0	2.3	1.0	B185010
Available (NH4OAc) Potassium (K)	mg/kg	<2.0	B184961	41	32	2.0	B184944
Available (CaCl2) Sulphur (S)	mg/kg	<2.0	B184966	3.9	<2.0	2.0	B175753
RDL = Reportable Detection Limit							

Bureau Veritas ID		CBZ932		
Sampling Date		2023/09/29		
COC Number		1 of 1		
	UNITS	**K23CB031BM0-20**	**RDL**	**QC Batch**
Calculated Parameters				
Available (NH4F) Nitrate (N)	mg/kg	<4.0	4.0	B159237
Nutrients				
Available (NH4F) Phosphorus (P)	mg/kg	4.2	1.0	B185001
Available (NH4OAc) Potassium (K)	mg/kg	3.4	2.0	B184961
Available (CaCl2) Sulphur (S)	mg/kg	<2.0	2.0	B184966
RDL = Reportable Detection Limit				

CCME REGULATED METALS - SOILS (SOIL)

Bureau Veritas ID		CBZ802	CBZ806			CCA014		
Sampling Date		2023/09/25	2023/09/25			2023/09/27		
COC Number		1 of 1	1 of 1			1 of 1		
	UNITS	**K23CB001AE0-8**	**K23CB001CGJ47-120**	**RDL**	**QC Batch**	**K23LM015AE0-5**	**RDL**	**QC Batch**
Elements								
Soluble (Hot water) Boron (B)	mg/kg	<0.10	<0.10	0.10	B173288	<0.30	0.30	B173288
Hex. Chromium (Cr 6+)	mg/kg	<0.080	<0.080	0.080	B168250	<0.080	0.080	B172489
Total Antimony (Sb)	mg/kg	<0.50	<0.50	0.50	B172824	<0.50	0.50	B172824
Total Arsenic (As)	mg/kg	<1.0	<1.0	1.0	B172824	<1.0	1.0	B172824
Total Barium (Ba)	mg/kg	140	45	1.0	B172824	11	1.0	B172824
Total Beryllium (Be)	mg/kg	<0.40	<0.40	0.40	B172824	<0.40	0.40	B172824
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	0.050	B172824	<0.050	0.050	B172824
Total Chromium (Cr)	mg/kg	96	37	1.0	B172824	8.8	1.0	B172824
Total Cobalt (Co)	mg/kg	8.6	5.7	0.50	B172824	0.91	0.50	B172824
Total Copper (Cu)	mg/kg	1.5	10	1.0	B172824	<1.0	1.0	B172824
Total Lead (Pb)	mg/kg	2.2	3.0	0.50	B172824	4.3	0.50	B172824
Total Mercury (Hg)	mg/kg	<0.050	<0.050	0.050	B172824	<0.050	0.050	B172824
Total Molybdenum (Mo)	mg/kg	<0.40	<0.40	0.40	B172824	<0.40	0.40	B172824
Total Nickel (Ni)	mg/kg	36	15	1.0	B172824	1.7	1.0	B172824
Total Selenium (Se)	mg/kg	<0.50	<0.50	0.50	B172824	<0.50	0.50	B172824
Total Silver (Ag)	mg/kg	<0.20	<0.20	0.20	B172824	<0.20	0.20	B172824
Total Thallium (Tl)	mg/kg	0.23	0.11	0.10	B172824	<0.10	0.10	B172824
Total Tin (Sn)	mg/kg	<1.0	<1.0	1.0	B172824	<1.0	1.0	B172824
Total Uranium (U)	mg/kg	0.43	0.34	0.20	B172824	<0.20	0.20	B172824
Total Vanadium (V)	mg/kg	51	20	1.0	B172824	16	1.0	B172824
Total Zinc (Zn)	mg/kg	33	14	10	B172824	<10	10	B172824
RDL = Reportable Detection Limit								

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
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Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

CCME REGULATED METALS - SOILS (SOIL)

Bureau Veritas ID		CCA017	CCA023	CCA121		CCA122		
Sampling Date		2023/09/27	2023/09/28	2023/09/28		2023/09/29		
COC Number		1 of 1	1 of 1	1 of 1		1 of 1		
	UNITS	**K23LM015C30-100**	**K23CB023AE0-6**	**K23CB023C30-70**	**QC Batch**	**K23CB028C0-120**	**RDL**	**QC Batch**
Elements								
Soluble (Hot water) Boron (B)	mg/kg	<0.10	<0.10	<0.10	B173288	<0.10	0.10	B174216
Hex. Chromium (Cr 6+)	mg/kg	<0.080	<0.080	<0.080	B172489	<0.080	0.080	B172489
Total Antimony (Sb)	mg/kg	<0.50	<0.50	<0.50	B172824	<0.50	0.50	B173997
Total Arsenic (As)	mg/kg	<1.0	<1.0	1.1	B172824	3.2	1.0	B173997
Total Barium (Ba)	mg/kg	33	5.6	30	B172824	110	1.0	B173997
Total Beryllium (Be)	mg/kg	<0.40	<0.40	<0.40	B172824	0.44	0.40	B173997
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	<0.050	B172824	0.10	0.050	B173997
Total Chromium (Cr)	mg/kg	24	4.3	25	B172824	77	1.0	B173997
Total Cobalt (Co)	mg/kg	4.4	<0.50	6.7	B172824	15	0.50	B173997
Total Copper (Cu)	mg/kg	7.8	<1.0	10	B172824	18	1.0	B173997
Total Lead (Pb)	mg/kg	3.6	3.0	4.0	B172824	9.1	0.50	B173997
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	B172824	<0.050	0.050	B173997
Total Molybdenum (Mo)	mg/kg	<0.40	<0.40	<0.40	B172824	1.8	0.40	B173997
Total Nickel (Ni)	mg/kg	10	<1.0	10	B172824	32	1.0	B173997
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	B172824	<0.50	0.50	B173997
Total Silver (Ag)	mg/kg	<0.20	<0.20	<0.20	B172824	<0.20	0.20	B173997
Total Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	B172824	0.28	0.10	B173997
Total Tin (Sn)	mg/kg	<1.0	<1.0	<1.0	B172824	<1.0	1.0	B173997
Total Uranium (U)	mg/kg	0.25	<0.20	0.28	B172824	1.2	0.20	B173997
Total Vanadium (V)	mg/kg	12	6.5	15	B172824	49	1.0	B173997
Total Zinc (Zn)	mg/kg	12	<10	11	B172824	47	10	B173997
RDL = Reportable Detection Limit								

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Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
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CCME REGULATED METALS - SOILS (SOIL)

Bureau Veritas ID		CCA127	CCA130		
Sampling Date		2023/09/29	2023/09/29		
COC Number		1 of 1	1 of 1		
	UNITS	**K23LM023AE0-10**	**K23LM023C54-120**	**RDL**	**QC Batch**
Elements					
Soluble (Hot water) Boron (B)	mg/kg	<0.10	<0.10	0.10	B173288
Hex. Chromium (Cr 6+)	mg/kg	<0.080	<0.080	0.080	B172489
Total Antimony (Sb)	mg/kg	<0.50	<0.50	0.50	B172824
Total Arsenic (As)	mg/kg	<1.0	<1.0	1.0	B172824
Total Barium (Ba)	mg/kg	5.2	19	1.0	B172824
Total Beryllium (Be)	mg/kg	<0.40	<0.40	0.40	B172824
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	0.050	B172824
Total Chromium (Cr)	mg/kg	2.1	10	1.0	B172824
Total Cobalt (Co)	mg/kg	1.2	3.6	0.50	B172824
Total Copper (Cu)	mg/kg	1.4	4.2	1.0	B172824
Total Lead (Pb)	mg/kg	0.59	2.2	0.50	B172824
Total Mercury (Hg)	mg/kg	<0.050	<0.050	0.050	B172824
Total Molybdenum (Mo)	mg/kg	0.45	0.61	0.40	B172824
Total Nickel (Ni)	mg/kg	1.3	7.9	1.0	B172824
Total Selenium (Se)	mg/kg	<0.50	<0.50	0.50	B172824
Total Silver (Ag)	mg/kg	<0.20	<0.20	0.20	B172824
Total Thallium (Tl)	mg/kg	<0.10	<0.10	0.10	B172824
Total Tin (Sn)	mg/kg	<1.0	<1.0	1.0	B172824
Total Uranium (U)	mg/kg	<0.20	0.27	0.20	B172824
Total Vanadium (V)	mg/kg	10	7.7	1.0	B172824
Total Zinc (Zn)	mg/kg	<10	14	10	B172824
RDL = Reportable Detection Limit					

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RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		CBZ802	CBZ803	CBZ804	CBZ805		
Sampling Date		2023/09/25	2023/09/25	2023/09/25	2023/09/25		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23CB001AE0-8**	**K23CB001BF8-19**	**K23CB001BFJ19-28**	**K23CB001C28-47**	**RDL**	**QC Batch**
Elements							
Cation exchange capacity	cmol+/Kg	<10	N/A	N/A	N/A	10	B158518
Soil Properties							
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	<0.60	0.60	B182890

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CBZ806	CBZ807	CBZ808	CBZ809		
Sampling Date		2023/09/25	2023/09/26	2023/09/26	2023/09/26		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23CB001CGJ47-120**	**K23CB010AE0-5**	**K23CB010BM5-13**	**K23CB010BC13-35**	**RDL**	**QC Batch**
Soil Properties							
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	<0.60	0.60	B182890

RDL = Reportable Detection Limit

Bureau Veritas ID		CBZ810	CBZ811	CBZ812	CCA014		
Sampling Date		2023/09/26	2023/09/27	2023/09/27	2023/09/27		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23CB010C35-100**	**K23LM013CG10-33**	**K23LM013CG233-60**	**K23LM015AE0-5**	**RDL**	**QC Batch**
Elements							
Cation exchange capacity	cmol+/Kg	N/A	15	N/A	<10	10	B158518
Soil Properties							
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	<0.60	0.60	B182890

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CCA015		CCA016	CCA017	CCA018		
Sampling Date		2023/09/27		2023/09/27	2023/09/27	2023/09/27		
COC Number		1 of 1		1 of 1	1 of 1	1 of 1		
	UNITS	**K23LM015BM5-23**	**QC Batch**	**K23LM015BC23-30**	**K23LM015C30-100**	**K23CB020CG0-80**	**RDL**	**QC Batch**
Elements								
Cation exchange capacity	cmol+/Kg	N/A	B158518	N/A	N/A	<10	10	B158518
Soil Properties								
Calcium Carbonate Equivalent	%	<0.60	B182890	<0.60	<0.60	<0.60	0.60	B182895

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		CCA023	CCA024	CCA025	CCA121	CCA019		
Sampling Date		2023/09/28	2023/09/28	2023/09/28	2023/09/28	2023/09/27		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23CB023AE0-6**	**K23CB023BF6-17**	**K23CB023BC17-30**	**K23CB023C30-70**	**K23CB017AE0-9**	**RDL**	**QC Batch**
Elements								
Cation exchange capacity	cmol+/Kg	<10	N/A	N/A	N/A	<10	10	B158518
Soil Properties								
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	<0.60	<0.60	0.60	B182895

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CCA020	CCA021	CCA022	CCA122		
Sampling Date		2023/09/27	2023/09/27	2023/09/27	2023/09/29		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23CB017BMGJ9-33**	**K23CB017BCGJ33-80**	**K23CB017CG80-100**	**K23CB028C0-120**	**RDL**	**QC Batch**
Soil Properties							
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	<0.60	0.60	B182895

RDL = Reportable Detection Limit

Bureau Veritas ID		CCA127	CCA128	CCA129	CCA130		
Sampling Date		2023/09/29	2023/09/29	2023/09/29	2023/09/29		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23LM023AE0-10**	**K23LM023BM10-18**	**K23LM023BH18-54**	**K23LM023C54-120**	**RDL**	**QC Batch**
Elements							
Cation exchange capacity	cmol+/Kg	<10	N/A	N/A	N/A	10	B158518
Soil Properties							
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	<0.60	0.60	B182895

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CCA123	CCA124	CCA125	CCA126		
Sampling Date		2023/09/29	2023/09/29	2023/09/29	2023/09/29		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23LM020CG10-30**	**K23LM020CG230-75**	**K23CB030C0-36**	**K23CB030IIC36-100**	**RDL**	**QC Batch**
Elements							
Cation exchange capacity	cmol+/Kg	15	N/A	<10	N/A	10	B158518
Soil Properties							
Calcium Carbonate Equivalent	%	0.72	<0.60	<0.60	<0.60	0.60	B182895

RDL = Reportable Detection Limit
N/A = Not Applicable

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		CBZ932	CBZ933	CBZ934		
Sampling Date		2023/09/29	2023/09/29	2023/09/29		
COC Number		1 of 1	1 of 1	1 of 1		
	UNITS	**K23CB031BM0-20**	**K23CB031BC20-35**	**K23CB031C35-120**	**RDL**	**QC Batch**
Soil Properties						
Calcium Carbonate Equivalent	%	<0.60	<0.60	<0.60	0.60	B182890
RDL = Reportable Detection Limit						

BUREAU VERITAS

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

PHYSICAL TESTING (SOIL)

Bureau Veritas ID		CBZ802		CBZ803	CBZ804		
Sampling Date		2023/09/25		2023/09/25	2023/09/25		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	**K23CB001AE0-8**	**QC Batch**	**K23CB001BF8-19**	**K23CB001BFJ19-28**	**RDL**	**QC Batch**
Physical Properties							
% sand by hydrometer	%	80	B175329	71	56	2.0	B175438
% silt by hydrometer	%	15	B175329	21	34	2.0	B175438
Clay Content	%	5.6	B175329	7.4	9.5	2.0	B175438
Texture	N/A	LOAMY SAND	B158560	SANDY LOAM	SANDY LOAM	N/A	B158560
Moisture	%	13	B168082	15	14	0.30	B168082

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CBZ805		CBZ806		CBZ807		
Sampling Date		2023/09/25		2023/09/25		2023/09/26		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23CB001C28-47**	**QC Batch**	**K23CB001CGJ47-120**	**QC Batch**	**K23CB010AE0-5**	**RDL**	**QC Batch**
Physical Properties								
% sand by hydrometer	%	51	B176202	63	B175329	85	2.0	B176202
% silt by hydrometer	%	40	B176202	32	B175329	7.2	2.0	B176202
Clay Content	%	8.9	B176202	4.8	B175329	7.4	2.0	B176202
Texture	N/A	LOAM	B158560	SANDY LOAM	B158560	LOAMY SAND	N/A	B158560
Moisture	%	9.5	B168082	7.8	B168082	16	0.30	B168082

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CBZ808		CBZ809	CBZ810		
Sampling Date		2023/09/26		2023/09/26	2023/09/26		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	**K23CB010BM5-13**	**QC Batch**	**K23CB010BC13-35**	**K23CB010C35-100**	**RDL**	**QC Batch**
Physical Properties							
% sand by hydrometer	%	60	B175438	54	53	2.0	B176202
% silt by hydrometer	%	30	B175438	34	34	2.0	B176202
Clay Content	%	10	B175438	12	13	2.0	B176202
Texture	N/A	SANDY LOAM	B158560	SANDY LOAM	LOAM	N/A	B158560
Moisture	%	15	B168082	13	9.5	0.30	B168082

RDL = Reportable Detection Limit
N/A = Not Applicable

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Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

PHYSICAL TESTING (SOIL)

Bureau Veritas ID		CBZ811		CBZ812		CCA014		
Sampling Date		2023/09/27		2023/09/27		2023/09/27		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23LM013CG10-33**	**QC Batch**	**K23LM013CG233-60**	**QC Batch**	**K23LM015AE0-5**	**RDL**	**QC Batch**
Physical Properties								
% sand by hydrometer	%	76	B175873	81	B176202	70	2.0	B175177
% silt by hydrometer	%	17	B175873	17	B176202	24	2.0	B175177
Clay Content	%	6.9	B175873	2.2	B176202	5.6	2.0	B175177
Texture	N/A	SANDY LOAM	B158560	LOAMY SAND	B158560	SANDY LOAM	N/A	B158560
Moisture	%	29	B168082	14	B168082	20	0.30	B172107

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CCA015	CCA016		CCA017		
Sampling Date		2023/09/27	2023/09/27		2023/09/27		
COC Number		1 of 1	1 of 1		1 of 1		
	UNITS	**K23LM015BM5-23**	**K23LM015BC23-30**	**QC Batch**	**K23LM015C30-100**	**RDL**	**QC Batch**
Physical Properties							
% sand by hydrometer	%	67	65	B175438	78	2.0	B175329
% silt by hydrometer	%	26	28	B175438	20	2.0	B175329
Clay Content	%	7.1	7.7	B175438	2.1	2.0	B175329
Texture	N/A	SANDY LOAM	SANDY LOAM	B158560	LOAMY SAND	N/A	B158560
Moisture	%	16	13	B172107	7.7	0.30	B172107

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CCA018		CCA023		CCA024		
Sampling Date		2023/09/27		2023/09/28		2023/09/28		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23CB020CG0-80**	**QC Batch**	**K23CB023AE0-6**	**QC Batch**	**K23CB023BF6-17**	**RDL**	**QC Batch**
Physical Properties								
% sand by hydrometer	%	62	B176202	72	B175329	83	2.0	B176202
% silt by hydrometer	%	33	B176202	24	B175329	15	2.0	B176202
Clay Content	%	4.9	B176202	4.8	B175329	2.2	2.0	B176202
Texture	N/A	SANDY LOAM	B159261	SANDY LOAM	B159264	LOAMY SAND	N/A	B159264
Moisture	%	14	B172107	14	B172107	11	0.30	B172107

RDL = Reportable Detection Limit
N/A = Not Applicable

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WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

PHYSICAL TESTING (SOIL)

Bureau Veritas ID		CCA025		CCA121		CCA019		
Sampling Date		2023/09/28		2023/09/28		2023/09/27		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23CB023BC17-30**	**QC Batch**	**K23CB023C30-70**	**QC Batch**	**K23CB017AE0-9**	**RDL**	**QC Batch**
Physical Properties								
% sand by hydrometer	%	82	B175438	77	B175177	75	2.0	B176202
% silt by hydrometer	%	10	B175438	20	B175177	20	2.0	B176202
Clay Content	%	7.9	B175438	2.4	B175177	4.3	2.0	B176202
Texture	N/A	LOAMY SAND	B159264	LOAMY SAND	B159264	LOAMY SAND	N/A	B159264
Moisture	%	11	B172627	7.3	B171930	17	0.30	B172107

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CCA020		CCA021	CCA022		
Sampling Date		2023/09/27		2023/09/27	2023/09/27		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	**K23CB017BMGJ9-33**	**QC Batch**	**K23CB017BCGJ33-80**	**K23CB017CG80-100**	**RDL**	**QC Batch**
Physical Properties							
% sand by hydrometer	%	78	B175177	78	74	2.0	B175438
% silt by hydrometer	%	18	B175177	14	19	2.0	B175438
Clay Content	%	4.8	B175177	7.6	6.7	2.0	B175438
Texture	N/A	LOAMY SAND	B159264	LOAMY SAND	SANDY LOAM	N/A	B159264
Moisture	%	18	B172107	15	15	0.30	B172107

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CCA122		CCA127		CCA128		
Sampling Date		2023/09/29		2023/09/29		2023/09/29		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23CB028C0-120**	**QC Batch**	**K23LM023AE0-10**	**QC Batch**	**K23LM023BM10-18**	**RDL**	**QC Batch**
Physical Properties								
% sand by hydrometer	%	41	B176202	88	B175329	92	2.0	B176202
% silt by hydrometer	%	40	B176202	6.8	B175329	3.4	2.0	B176202
Clay Content	%	19	B176202	4.8	B175329	4.4	2.0	B176202
Texture	N/A	LOAM	B159264	SAND	B159264	SAND	N/A	B159264
Moisture	%	15	B171930	11	B171930	9.0	0.30	B171930

RDL = Reportable Detection Limit
N/A = Not Applicable

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PHYSICAL TESTING (SOIL)

Bureau Veritas ID		CCA129		CCA130		CCA123		
Sampling Date		2023/09/29		2023/09/29		2023/09/29		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23LM023BH18-54**	**QC Batch**	**K23LM023C54-120**	**QC Batch**	**K23LM020CG10-30**	**RDL**	**QC Batch**
Physical Properties								
% sand by hydrometer	%	92	B175438	95	B175329	54	2.0	B176202
% silt by hydrometer	%	3.5	B175438	2.9	B175329	36	2.0	B176202
Clay Content	%	4.9	B175438	2.2	B175329	10	2.0	B176202
Texture	N/A	SAND	B159264	SAND	B159264	SANDY LOAM	N/A	B159264
Moisture	%	9.1	B171930	4.6	B171930	45	0.30	B171930

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CCA124		CCA125	CCA126		
Sampling Date		2023/09/29		2023/09/29	2023/09/29		
COC Number		1 of 1		1 of 1	1 of 1		
	UNITS	**K23LM020CG230-75**	**QC Batch**	**K23CB030C0-36**	**K23CB030IIC36-100**	**RDL**	**QC Batch**
Physical Properties							
% sand by hydrometer	%	53	B175873	26	70	2.0	B176202
% silt by hydrometer	%	29	B175873	52	18	2.0	B176202
Clay Content	%	17	B175873	23	12	2.0	B176202
Texture	N/A	SANDY LOAM	B159264	SILT LOAM	SANDY LOAM	N/A	B159264
Moisture	%	22	B171930	19	11	0.30	B171930

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas ID		CBZ932		CBZ933		CBZ934		
Sampling Date		2023/09/29		2023/09/29		2023/09/29		
COC Number		1 of 1		1 of 1		1 of 1		
	UNITS	**K23CB031BM0-20**	**QC Batch**	**K23CB031BC20-35**	**QC Batch**	**K23CB031C35-120**	**RDL**	**QC Batch**
Physical Properties								
% sand by hydrometer	%	93	B175177	87	B176202	95	2.0	B175438
% silt by hydrometer	%	4.5	B175177	11	B176202	<2.0	2.0	B175438
Clay Content	%	2.4	B175177	2.2	B176202	4.8	2.0	B175438
Texture	N/A	SAND	B158560	SAND	B158560	SAND	N/A	B158560
Moisture	%	5.3	B172107	N/A	N/A	N/A	0.30	N/A

RDL = Reportable Detection Limit
N/A = Not Applicable

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MISCELLANEOUS (SOIL)

Bureau Veritas ID		CBZ802		CBZ803	CBZ811		CCA014		
Sampling Date		2023/09/25		2023/09/25	2023/09/27		2023/09/27		
COC Number		1 of 1		1 of 1	1 of 1		1 of 1		
	UNITS	**K23CB001AE0-8**	**QC Batch**	**K23CB001BF8-19**	**K23LM013CG10-33**	**QC Batch**	**K23LM015AE0-5**	**RDL**	**QC Batch**
Misc. Inorganics									
Total Organic Carbon (C)	%	0.64	B172755	1.7	2.4	B169509	1.5	0.050	B172755
RDL = Reportable Detection Limit									

Bureau Veritas ID		CCA015	CCA018	CCA023	CCA024	CCA019		
Sampling Date		2023/09/27	2023/09/27	2023/09/28	2023/09/28	2023/09/27		
COC Number		1 of 1	1 of 1	1 of 1	1 of 1	1 of 1		
	UNITS	**K23LM015BM5-23**	**K23CB020CG0-80**	**K23CB023AE0-6**	**K23CB023BF6-17**	**K23CB017AE0-9**	**RDL**	**QC Batch**
Misc. Inorganics								
Total Organic Carbon (C)	%	1.4	0.67	0.59	1.3	0.61	0.050	B172755
RDL = Reportable Detection Limit								

Bureau Veritas ID		CCA020	CCA127		CCA123	CCA125		
Sampling Date		2023/09/27	2023/09/29		2023/09/29	2023/09/29		
COC Number		1 of 1	1 of 1		1 of 1	1 of 1		
	UNITS	**K23CB017BMGJ9-33**	**K23LM023AE0-10**	**QC Batch**	**K23LM020CG10-30**	**K23CB030C0-36**	**RDL**	**QC Batch**
Misc. Inorganics								
Total Organic Carbon (C)	%	0.70	0.49	B172755	3.3	0.37	0.050	B175910
RDL = Reportable Detection Limit								

Bureau Veritas ID		CBZ932		
Sampling Date		2023/09/29		
COC Number		1 of 1		
	UNITS	**K23CB031BM0-20**	**RDL**	**QC Batch**
Misc. Inorganics				
Total Organic Carbon (C)	%	0.24	0.050	B172755
RDL = Reportable Detection Limit				

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GENERAL COMMENTS

Sample CBZ802 [K23CB001AE0-8] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CBZ803 [K23CB001BF8-19] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CBZ804 [K23CB001BFJ19-28] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CBZ811 [K23LM013CG10-33] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CBZ932 [K23CB031BM0-20] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA014 [K23LM015AE0-5] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA015 [K23LM015BM5-23] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA018 [K23CB020CG0-80] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA019 [K23CB017AE0-9] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA020 [K23CB017BMGJ9-33] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA023 [K23CB023AE0-6] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA024 [K23CB023BF6-17] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA123 [K23LM020CG10-30] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA125 [K23CB030C0-36] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA127 [K23LM023AE0-10] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA128 [K23LM023BM10-18] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

Sample CCA129 [K23LM023BH18-54] : Sample was analyzed past method specified hold time for Available NO2 (N); NO2 (N) + NO3 (N).

CCME REGULATED METALS - SOILS (SOIL) Comments

Sample CCA014 [K23LM015AE0-5] Boron (Hot Water Soluble): Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B168082	BAS	Method Blank	Moisture	2023/10/24	<0.30		%	
B168082	BAS	RPD [CBZ807-01]	Moisture	2023/10/24	2.6		%	20
B168250	JTH	Matrix Spike	Hex. Chromium (Cr 6+)	2023/10/24		93	%	75 - 125
B168250	JTH	Spiked Blank	Hex. Chromium (Cr 6+)	2023/10/24		102	%	80 - 120
B168250	JTH	Method Blank	Hex. Chromium (Cr 6+)	2023/10/24	<0.080		mg/kg	
B168250	JTH	RPD	Hex. Chromium (Cr 6+)	2023/10/24	NC		%	35
B169509	PL	QC Standard	Total Organic Carbon (C)	2023/10/26		87	%	75 - 125
B169509	PL	Spiked Blank	Total Organic Carbon (C)	2023/10/26		93	%	80 - 120
B169509	PL	Method Blank	Total Organic Carbon (C)	2023/10/26	<0.050		%	
B169509	PL	RPD	Total Organic Carbon (C)	2023/10/26	8.7		%	35
B171930	BAS	Method Blank	Moisture	2023/10/26	<0.30		%	
B171930	BAS	RPD [CCA121-01]	Moisture	2023/10/26	1.4		%	20
B172107	TLP	Method Blank	Moisture	2023/10/27	<0.30		%	
B172107	TLP	RPD [CCA018-01]	Moisture	2023/10/27	8.8		%	20
B172489	JTH	Matrix Spike	Hex. Chromium (Cr 6+)	2023/10/26		98	%	75 - 125
B172489	JTH	Spiked Blank	Hex. Chromium (Cr 6+)	2023/10/26		105	%	80 - 120
B172489	JTH	Method Blank	Hex. Chromium (Cr 6+)	2023/10/26	<0.080		mg/kg	
B172489	JTH	RPD	Hex. Chromium (Cr 6+)	2023/10/27	NC		%	35
B172586	DPL	QC Standard	Saturation %	2023/10/31		102	%	75 - 125
B172586	DPL	RPD [CBZ806-01]	Saturation %	2023/10/31	1.6		%	12
B172589	HAP	QC Standard	Soluble (CaCl2) pH	2023/11/01		98	%	97 - 103
B172589	HAP	Spiked Blank	Soluble (CaCl2) pH	2023/11/01		101	%	97 - 103
B172589	HAP	RPD [CBZ806-01]	Soluble (CaCl2) pH	2023/11/01	1.9		%	N/A
B172600	DPL	QC Standard	Saturation %	2023/10/31		101	%	75 - 125
B172600	DPL	RPD [CBZ933-01]	Saturation %	2023/10/31	0.55		%	12
B172604	HAP	QC Standard	Soluble (CaCl2) pH	2023/11/01		98	%	97 - 103
B172604	HAP	Spiked Blank	Soluble (CaCl2) pH	2023/11/01		101	%	97 - 103
B172604	HAP	RPD [CBZ933-01]	Soluble (CaCl2) pH	2023/11/01	4.2		%	N/A
B172627	BAS	Method Blank	Moisture	2023/10/27	<0.30		%	
B172627	BAS	RPD	Moisture	2023/10/27	1.1		%	20
B172755	PL	QC Standard	Total Organic Carbon (C)	2023/10/27		102	%	75 - 125
B172755	PL	Spiked Blank	Total Organic Carbon (C)	2023/10/27		97	%	80 - 120
B172755	PL	Method Blank	Total Organic Carbon (C)	2023/10/27	<0.050		%	
B172755	PL	RPD	Total Organic Carbon (C)	2023/10/27	27		%	35
B172824	KH2	Matrix Spike [CBZ806-01]	Total Antimony (Sb)	2023/10/27		90	%	75 - 125
			Total Arsenic (As)	2023/10/27		82	%	75 - 125
			Total Barium (Ba)	2023/10/27		125	%	75 - 125
			Total Beryllium (Be)	2023/10/27		87	%	75 - 125
			Total Cadmium (Cd)	2023/10/27		87	%	75 - 125
			Total Chromium (Cr)	2023/10/27		94	%	75 - 125
			Total Cobalt (Co)	2023/10/27		87	%	75 - 125
			Total Copper (Cu)	2023/10/27		86	%	75 - 125
			Total Lead (Pb)	2023/10/27		90	%	75 - 125
			Total Mercury (Hg)	2023/10/27		85	%	75 - 125
			Total Molybdenum (Mo)	2023/10/27		93	%	75 - 125
			Total Nickel (Ni)	2023/10/27		91	%	75 - 125
			Total Selenium (Se)	2023/10/27		82	%	75 - 125
			Total Silver (Ag)	2023/10/27		88	%	75 - 125
			Total Thallium (Tl)	2023/10/27		92	%	75 - 125
			Total Tin (Sn)	2023/10/27		92	%	75 - 125
			Total Uranium (U)	2023/10/27		87	%	75 - 125
			Total Vanadium (V)	2023/10/27		90	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Zinc (Zn)	2023/10/27		82	%	75 - 125
B172824	KH2	QC Standard	Total Antimony (Sb)	2023/10/27		100	%	14 - 183
			Total Arsenic (As)	2023/10/27		102	%	53 - 147
			Total Barium (Ba)	2023/10/27		97	%	80 - 119
			Total Cadmium (Cd)	2023/10/27		98	%	71 - 129
			Total Chromium (Cr)	2023/10/27		100	%	59 - 141
			Total Cobalt (Co)	2023/10/27		99	%	58 - 142
			Total Copper (Cu)	2023/10/27		111	%	83 - 117
			Total Lead (Pb)	2023/10/27		106	%	79 - 121
			Total Molybdenum (Mo)	2023/10/27		104	%	67 - 134
			Total Nickel (Ni)	2023/10/27		105	%	78 - 122
			Total Silver (Ag)	2023/10/27		108	%	46 - 154
			Total Tin (Sn)	2023/10/27		98	%	67 - 133
			Total Uranium (U)	2023/10/27		93	%	77 - 123
			Total Vanadium (V)	2023/10/27		104	%	79 - 121
			Total Zinc (Zn)	2023/10/27		96	%	79 - 122
B172824	KH2	Spiked Blank	Total Antimony (Sb)	2023/10/27		89	%	80 - 120
			Total Arsenic (As)	2023/10/27		87	%	80 - 120
			Total Barium (Ba)	2023/10/27		88	%	80 - 120
			Total Beryllium (Be)	2023/10/27		87	%	80 - 120
			Total Cadmium (Cd)	2023/10/27		88	%	80 - 120
			Total Chromium (Cr)	2023/10/27		91	%	80 - 120
			Total Cobalt (Co)	2023/10/27		91	%	80 - 120
			Total Copper (Cu)	2023/10/27		90	%	80 - 120
			Total Lead (Pb)	2023/10/27		88	%	80 - 120
			Total Mercury (Hg)	2023/10/27		94	%	80 - 120
			Total Molybdenum (Mo)	2023/10/27		91	%	80 - 120
			Total Nickel (Ni)	2023/10/27		90	%	80 - 120
			Total Selenium (Se)	2023/10/27		86	%	80 - 120
			Total Silver (Ag)	2023/10/27		90	%	80 - 120
			Total Thallium (Tl)	2023/10/27		87	%	80 - 120
			Total Tin (Sn)	2023/10/27		90	%	80 - 120
			Total Uranium (U)	2023/10/27		94	%	80 - 120
			Total Vanadium (V)	2023/10/27		90	%	80 - 120
			Total Zinc (Zn)	2023/10/27		84	%	80 - 120
B172824	KH2	Method Blank	Total Antimony (Sb)	2023/10/27	<0.50		mg/kg	
			Total Arsenic (As)	2023/10/27	<1.0		mg/kg	
			Total Barium (Ba)	2023/10/27	<1.0		mg/kg	
			Total Beryllium (Be)	2023/10/27	<0.40		mg/kg	
			Total Cadmium (Cd)	2023/10/27	<0.050		mg/kg	
			Total Chromium (Cr)	2023/10/27	<1.0		mg/kg	
			Total Cobalt (Co)	2023/10/27	<0.50		mg/kg	
			Total Copper (Cu)	2023/10/27	<1.0		mg/kg	
			Total Lead (Pb)	2023/10/27	<0.50		mg/kg	
			Total Mercury (Hg)	2023/10/27	<0.050		mg/kg	
			Total Molybdenum (Mo)	2023/10/27	<0.40		mg/kg	
			Total Nickel (Ni)	2023/10/27	<1.0		mg/kg	
			Total Selenium (Se)	2023/10/27	<0.50		mg/kg	
			Total Silver (Ag)	2023/10/27	<0.20		mg/kg	
			Total Thallium (Tl)	2023/10/27	<0.10		mg/kg	
			Total Tin (Sn)	2023/10/27	<1.0		mg/kg	
			Total Uranium (U)	2023/10/27	<0.20		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Vanadium (V)	2023/10/27	<1.0		mg/kg	
			Total Zinc (Zn)	2023/10/27	<10		mg/kg	
B172824	KH2	RPD [CBZ806-01]	Total Antimony (Sb)	2023/10/27	NC		%	30
			Total Arsenic (As)	2023/10/27	NC		%	30
			Total Barium (Ba)	2023/10/27	3.1		%	35
			Total Beryllium (Be)	2023/10/27	NC		%	30
			Total Cadmium (Cd)	2023/10/27	NC		%	30
			Total Chromium (Cr)	2023/10/27	8.2		%	30
			Total Cobalt (Co)	2023/10/27	1.1		%	30
			Total Copper (Cu)	2023/10/27	0.15		%	30
			Total Lead (Pb)	2023/10/27	1.5		%	35
			Total Mercury (Hg)	2023/10/27	NC		%	35
			Total Molybdenum (Mo)	2023/10/27	NC		%	35
			Total Nickel (Ni)	2023/10/27	0.32		%	30
			Total Selenium (Se)	2023/10/27	NC		%	30
			Total Silver (Ag)	2023/10/27	NC		%	35
			Total Thallium (Tl)	2023/10/27	1.5		%	30
			Total Tin (Sn)	2023/10/27	NC		%	35
			Total Uranium (U)	2023/10/27	3.8		%	30
			Total Vanadium (V)	2023/10/27	5.2		%	30
			Total Zinc (Zn)	2023/10/27	6.4		%	30
B173288	VSC	Matrix Spike	Soluble (Hot water) Boron (B)	2023/10/30		102	%	75 - 125
B173288	VSC	Spiked Blank	Soluble (Hot water) Boron (B)	2023/10/30		98	%	80 - 120
B173288	VSC	Method Blank	Soluble (Hot water) Boron (B)	2023/10/30	<0.10		mg/kg	
B173288	VSC	RPD	Soluble (Hot water) Boron (B)	2023/10/30	6.5		%	35
B173597	DPL	QC Standard	Saturation %	2023/10/30		103	%	75 - 125
B173597	DPL	RPD	Saturation %	2023/10/30	2.7		%	12
			Saturation %	2023/10/30	1.4		%	12
B173622	HAP	QC Standard	Soluble (CaCl2) pH	2023/10/31		99	%	97 - 103
B173622	HAP	Spiked Blank	Soluble (CaCl2) pH	2023/10/31		100	%	97 - 103
B173622	HAP	RPD	Soluble (CaCl2) pH	2023/10/31	1.8		%	N/A
B173997	JAB	Matrix Spike	Total Antimony (Sb)	2023/10/27		99	%	75 - 125
			Total Arsenic (As)	2023/10/27		105	%	75 - 125
			Total Barium (Ba)	2023/10/27		NC	%	75 - 125
			Total Beryllium (Be)	2023/10/27		101	%	75 - 125
			Total Cadmium (Cd)	2023/10/27		104	%	75 - 125
			Total Chromium (Cr)	2023/10/27		111	%	75 - 125
			Total Cobalt (Co)	2023/10/27		99	%	75 - 125
			Total Copper (Cu)	2023/10/27		96	%	75 - 125
			Total Lead (Pb)	2023/10/27		100	%	75 - 125
			Total Mercury (Hg)	2023/10/27		97	%	75 - 125
			Total Molybdenum (Mo)	2023/10/27		105	%	75 - 125
			Total Nickel (Ni)	2023/10/27		98	%	75 - 125
			Total Selenium (Se)	2023/10/27		106	%	75 - 125
			Total Silver (Ag)	2023/10/27		99	%	75 - 125
			Total Thallium (Tl)	2023/10/27		103	%	75 - 125
			Total Tin (Sn)	2023/10/27		107	%	75 - 125
			Total Uranium (U)	2023/10/27		95	%	75 - 125
			Total Vanadium (V)	2023/10/27		135 (1)	%	75 - 125
			Total Zinc (Zn)	2023/10/27		106	%	75 - 125
B173997	JAB	QC Standard	Total Antimony (Sb)	2023/10/27		114	%	14 - 183
			Total Arsenic (As)	2023/10/27		124	%	53 - 147

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Bureau Veritas Job #: C383989
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WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Barium (Ba)	2023/10/27		103	%	80 - 119
			Total Cadmium (Cd)	2023/10/27		108	%	71 - 129
			Total Chromium (Cr)	2023/10/27		100	%	59 - 141
			Total Cobalt (Co)	2023/10/27		100	%	58 - 142
			Total Copper (Cu)	2023/10/27		116	%	83 - 117
			Total Lead (Pb)	2023/10/27		115	%	79 - 121
			Total Molybdenum (Mo)	2023/10/27		110	%	67 - 134
			Total Nickel (Ni)	2023/10/27		108	%	78 - 122
			Total Silver (Ag)	2023/10/27		114	%	46 - 154
			Total Tin (Sn)	2023/10/27		111	%	67 - 133
			Total Uranium (U)	2023/10/27		91	%	77 - 123
			Total Vanadium (V)	2023/10/27		107	%	79 - 121
			Total Zinc (Zn)	2023/10/27		113	%	79 - 122
B173997	JAB	Spiked Blank	Total Antimony (Sb)	2023/10/27		100	%	80 - 120
			Total Arsenic (As)	2023/10/27		104	%	80 - 120
			Total Barium (Ba)	2023/10/27		96	%	80 - 120
			Total Beryllium (Be)	2023/10/27		101	%	80 - 120
			Total Cadmium (Cd)	2023/10/27		100	%	80 - 120
			Total Chromium (Cr)	2023/10/27		99	%	80 - 120
			Total Cobalt (Co)	2023/10/27		99	%	80 - 120
			Total Copper (Cu)	2023/10/27		101	%	80 - 120
			Total Lead (Pb)	2023/10/27		101	%	80 - 120
			Total Mercury (Hg)	2023/10/27		105	%	80 - 120
			Total Molybdenum (Mo)	2023/10/27		98	%	80 - 120
			Total Nickel (Ni)	2023/10/27		99	%	80 - 120
			Total Selenium (Se)	2023/10/27		108	%	80 - 120
			Total Silver (Ag)	2023/10/27		97	%	80 - 120
			Total Thallium (Tl)	2023/10/27		103	%	80 - 120
			Total Tin (Sn)	2023/10/27		99	%	80 - 120
			Total Uranium (U)	2023/10/27		100	%	80 - 120
			Total Vanadium (V)	2023/10/27		99	%	80 - 120
			Total Zinc (Zn)	2023/10/27		105	%	80 - 120
B173997	JAB	Method Blank	Total Antimony (Sb)	2023/10/27	<0.50		mg/kg	
			Total Arsenic (As)	2023/10/27	<1.0		mg/kg	
			Total Barium (Ba)	2023/10/27	<1.0		mg/kg	
			Total Beryllium (Be)	2023/10/27	<0.40		mg/kg	
			Total Cadmium (Cd)	2023/10/27	<0.050		mg/kg	
			Total Chromium (Cr)	2023/10/27	<1.0		mg/kg	
			Total Cobalt (Co)	2023/10/27	<0.50		mg/kg	
			Total Copper (Cu)	2023/10/27	<1.0		mg/kg	
			Total Lead (Pb)	2023/10/27	<0.50		mg/kg	
			Total Mercury (Hg)	2023/10/27	<0.050		mg/kg	
			Total Molybdenum (Mo)	2023/10/27	<0.40		mg/kg	
			Total Nickel (Ni)	2023/10/27	<1.0		mg/kg	
			Total Selenium (Se)	2023/10/27	<0.50		mg/kg	
			Total Silver (Ag)	2023/10/27	<0.20		mg/kg	
			Total Thallium (Tl)	2023/10/27	<0.10		mg/kg	
			Total Tin (Sn)	2023/10/27	<1.0		mg/kg	
			Total Uranium (U)	2023/10/27	<0.20		mg/kg	
			Total Vanadium (V)	2023/10/27	<1.0		mg/kg	
			Total Zinc (Zn)	2023/10/27	<10		mg/kg	
B173997	JAB	RPD	Total Antimony (Sb)	2023/10/27	NC		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Arsenic (As)	2023/10/27	3.4		%	30
			Total Barium (Ba)	2023/10/27	3.1		%	35
			Total Beryllium (Be)	2023/10/27	5.4		%	30
			Total Cadmium (Cd)	2023/10/27	1.7		%	30
			Total Chromium (Cr)	2023/10/27	3.8		%	30
			Total Cobalt (Co)	2023/10/27	0.57		%	30
			Total Copper (Cu)	2023/10/27	3.4		%	30
			Total Lead (Pb)	2023/10/27	2.1		%	35
			Total Mercury (Hg)	2023/10/27	NC		%	35
			Total Molybdenum (Mo)	2023/10/27	4.4		%	35
			Total Nickel (Ni)	2023/10/27	5.0		%	30
			Total Selenium (Se)	2023/10/27	NC		%	30
			Total Silver (Ag)	2023/10/27	NC		%	35
			Total Thallium (Tl)	2023/10/27	4.1		%	30
			Total Tin (Sn)	2023/10/27	NC		%	35
			Total Uranium (U)	2023/10/27	1.1		%	30
			Total Vanadium (V)	2023/10/27	3.1		%	30
			Total Zinc (Zn)	2023/10/27	4.0		%	30
B174216	VSC	Matrix Spike	Soluble (Hot water) Boron (B)	2023/10/30		101	%	75 - 125
B174216	VSC	Spiked Blank	Soluble (Hot water) Boron (B)	2023/10/30		98	%	80 - 120
B174216	VSC	Method Blank	Soluble (Hot water) Boron (B)	2023/10/30	<0.10		mg/kg	
B174216	VSC	RPD	Soluble (Hot water) Boron (B)	2023/10/30	10		%	35
B175177	RDL	QC Standard	% sand by hydrometer	2023/10/29		99	%	75 - 125
			% silt by hydrometer	2023/10/29		105	%	75 - 125
			Clay Content	2023/10/29		97	%	75 - 125
B175177	RDL	RPD	% sand by hydrometer	2023/10/29	7.0		%	30
			% silt by hydrometer	2023/10/29	6.7		%	30
			Clay Content	2023/10/29	0.49		%	30
B175329	RDL	QC Standard	% sand by hydrometer	2023/10/29		102	%	75 - 125
			% silt by hydrometer	2023/10/29		124	%	75 - 125
			Clay Content	2023/10/29		80	%	75 - 125
B175329	RDL	RPD	% sand by hydrometer	2023/10/29	0.59		%	30
			% silt by hydrometer	2023/10/29	4.3		%	30
			Clay Content	2023/10/29	3.5		%	30
B175438	RDL	QC Standard	% sand by hydrometer	2023/10/29		94	%	75 - 125
			% silt by hydrometer	2023/10/29		95	%	75 - 125
			Clay Content	2023/10/29		110	%	75 - 125
B175438	RDL	RPD	% sand by hydrometer	2023/10/29	1.3		%	30
			% silt by hydrometer	2023/10/29	12		%	30
			Clay Content	2023/10/29	7.3		%	30
B175753	HQV	Matrix Spike	Available (CaCl2) Sulphur (S)	2023/10/31		97	%	75 - 125
B175753	HQV	QC Standard	Available (CaCl2) Sulphur (S)	2023/10/31		103	%	75 - 125
B175753	HQV	Spiked Blank	Available (CaCl2) Sulphur (S)	2023/10/31		98	%	80 - 120
B175753	HQV	Method Blank	Available (CaCl2) Sulphur (S)	2023/10/31	<2.0		mg/kg	
B175753	HQV	RPD	Available (CaCl2) Sulphur (S)	2023/10/31	13		%	35
B175873	RDL	QC Standard	% sand by hydrometer	2023/10/30		100	%	75 - 125
			% silt by hydrometer	2023/10/30		98	%	75 - 125
			Clay Content	2023/10/30		102	%	75 - 125
B175873	RDL	RPD	% sand by hydrometer	2023/10/30	5.1		%	30
			% silt by hydrometer	2023/10/30	0.042		%	30
			Clay Content	2023/10/30	2.9		%	30
B175910	PL	QC Standard	Total Organic Carbon (C)	2023/10/30		100	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B175910	PL	Spiked Blank	Total Organic Carbon (C)	2023/10/30		102	%	80 - 120
B175910	PL	Method Blank	Total Organic Carbon (C)	2023/10/30	<0.050		%	
B175910	PL	RPD [CCA125-01]	Total Organic Carbon (C)	2023/10/30	23		%	35
B176202	RDL	QC Standard	% sand by hydrometer	2023/10/30		101	%	75 - 125
			% silt by hydrometer	2023/10/30		94	%	75 - 125
			Clay Content	2023/10/30		104	%	75 - 125
B176202	RDL	RPD [CBZ933-01]	% sand by hydrometer	2023/10/30	1.1		%	30
			% silt by hydrometer	2023/10/30	0.45		%	30
			Clay Content	2023/10/30	NC		%	30
B177109	PL	Matrix Spike	Soluble Calcium (Ca)	2023/10/31		103	%	75 - 125
			Soluble Magnesium (Mg)	2023/10/31		104	%	75 - 125
			Soluble Sodium (Na)	2023/10/31		97	%	75 - 125
			Soluble Potassium (K)	2023/10/31		100	%	75 - 125
B177109	PL	QC Standard	Soluble Calcium (Ca)	2023/10/31		111	%	75 - 125
			Soluble Magnesium (Mg)	2023/10/31		109	%	75 - 125
			Soluble Sodium (Na)	2023/10/31		105	%	75 - 125
			Soluble Potassium (K)	2023/10/31		122	%	75 - 125
			Soluble Sulphate (SO4)	2023/10/31		100	%	75 - 125
B177109	PL	Spiked Blank	Soluble Calcium (Ca)	2023/10/31		107	%	80 - 120
			Soluble Magnesium (Mg)	2023/10/31		107	%	80 - 120
			Soluble Sodium (Na)	2023/10/31		101	%	80 - 120
			Soluble Potassium (K)	2023/10/31		103	%	80 - 120
B177109	PL	Method Blank	Soluble Calcium (Ca)	2023/10/31	<1.5		mg/L	
			Soluble Magnesium (Mg)	2023/10/31	<1.0		mg/L	
			Soluble Sodium (Na)	2023/10/31	<2.5		mg/L	
			Soluble Potassium (K)	2023/10/31	<1.3		mg/L	
			Soluble Sulphate (SO4)	2023/10/31	<5.0		mg/L	
B177109	PL	RPD	Soluble Calcium (Ca)	2023/10/31	3.3		%	30
			Soluble Magnesium (Mg)	2023/10/31	3.6		%	30
			Soluble Sodium (Na)	2023/10/31	6.6		%	30
			Soluble Potassium (K)	2023/10/31	7.0		%	30
			Soluble Sulphate (SO4)	2023/10/31	0.17		%	30
B177198	EBO	Matrix Spike	Soluble Chloride (Cl)	2023/10/30		102	%	75 - 125
B177198	EBO	QC Standard	Soluble Chloride (Cl)	2023/10/30		95	%	75 - 125
B177198	EBO	Spiked Blank	Soluble Chloride (Cl)	2023/10/30		102	%	80 - 120
B177198	EBO	Method Blank	Soluble Chloride (Cl)	2023/10/30	<10		mg/L	
B177198	EBO	RPD	Soluble Chloride (Cl)	2023/10/30	NC		%	30
B177200	EBO	QC Standard	Soluble Conductivity	2023/10/30		95	%	75 - 125
B177200	EBO	Spiked Blank	Soluble Conductivity	2023/10/30		97	%	90 - 110
B177200	EBO	Method Blank	Soluble Conductivity	2023/10/30	<0.020		dS/m	
B177200	EBO	RPD	Soluble Conductivity	2023/10/30	0		%	20
B179061	ZI	Matrix Spike [CBZ933-01]	Soluble Chloride (Cl)	2023/10/31		99	%	75 - 125
B179061	ZI	QC Standard	Soluble Chloride (Cl)	2023/10/31		88	%	75 - 125
B179061	ZI	Spiked Blank	Soluble Chloride (Cl)	2023/10/31		101	%	80 - 120
B179061	ZI	Method Blank	Soluble Chloride (Cl)	2023/10/31	<10		mg/L	
B179061	ZI	RPD [CBZ933-01]	Soluble Chloride (Cl)	2023/10/31	NC		%	30
B179305	PL	Matrix Spike [CBZ933-01]	Soluble Calcium (Ca)	2023/11/01		102	%	75 - 125
			Soluble Magnesium (Mg)	2023/11/01		101	%	75 - 125
			Soluble Sodium (Na)	2023/11/01		98	%	75 - 125
			Soluble Potassium (K)	2023/11/01		100	%	75 - 125
B179305	PL	QC Standard	Soluble Calcium (Ca)	2023/11/01		94	%	75 - 125
			Soluble Magnesium (Mg)	2023/11/01		92	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Soluble Sodium (Na)	2023/11/01		97	%	75 - 125
			Soluble Potassium (K)	2023/11/01		113	%	75 - 125
			Soluble Sulphate (SO4)	2023/11/01		94	%	75 - 125
B179305	PL	Spiked Blank	Soluble Calcium (Ca)	2023/11/01		101	%	80 - 120
			Soluble Magnesium (Mg)	2023/11/01		101	%	80 - 120
			Soluble Sodium (Na)	2023/11/01		98	%	80 - 120
			Soluble Potassium (K)	2023/11/01		99	%	80 - 120
B179305	PL	Method Blank	Soluble Calcium (Ca)	2023/11/01	<1.5		mg/L	
			Soluble Magnesium (Mg)	2023/11/01	<1.0		mg/L	
			Soluble Sodium (Na)	2023/11/01	<2.5		mg/L	
			Soluble Potassium (K)	2023/11/01	<1.3		mg/L	
			Soluble Sulphate (SO4)	2023/11/01	<5.0		mg/L	
B179305	PL	RPD [CBZ933-01]	Soluble Calcium (Ca)	2023/11/01	NC		%	30
			Soluble Magnesium (Mg)	2023/11/01	NC		%	30
			Soluble Sodium (Na)	2023/11/01	8.1		%	30
			Soluble Potassium (K)	2023/11/01	NC		%	30
			Soluble Sulphate (SO4)	2023/11/01	NC		%	30
B179706	PL	Matrix Spike [CBZ806-01]	Soluble Calcium (Ca)	2023/11/01		97	%	75 - 125
			Soluble Magnesium (Mg)	2023/11/01		101	%	75 - 125
			Soluble Sodium (Na)	2023/11/01		100	%	75 - 125
			Soluble Potassium (K)	2023/11/01		100	%	75 - 125
B179706	PL	QC Standard	Soluble Calcium (Ca)	2023/11/01		106	%	75 - 125
			Soluble Magnesium (Mg)	2023/11/01		109	%	75 - 125
			Soluble Sodium (Na)	2023/11/01		114	%	75 - 125
			Soluble Potassium (K)	2023/11/01		115	%	75 - 125
			Soluble Sulphate (SO4)	2023/11/01		108	%	75 - 125
B179706	PL	Spiked Blank	Soluble Calcium (Ca)	2023/11/01		97	%	80 - 120
			Soluble Magnesium (Mg)	2023/11/01		100	%	80 - 120
			Soluble Sodium (Na)	2023/11/01		98	%	80 - 120
			Soluble Potassium (K)	2023/11/01		99	%	80 - 120
B179706	PL	Method Blank	Soluble Calcium (Ca)	2023/11/01	<1.5		mg/L	
			Soluble Magnesium (Mg)	2023/11/01	<1.0		mg/L	
			Soluble Sodium (Na)	2023/11/01	<2.5		mg/L	
			Soluble Potassium (K)	2023/11/01	<1.3		mg/L	
			Soluble Sulphate (SO4)	2023/11/01	<5.0		mg/L	
B179706	PL	RPD [CBZ806-01]	Soluble Calcium (Ca)	2023/11/01	2.7		%	30
			Soluble Magnesium (Mg)	2023/11/01	NC		%	30
			Soluble Sodium (Na)	2023/11/01	6.0		%	30
			Soluble Potassium (K)	2023/11/01	NC		%	30
			Soluble Sulphate (SO4)	2023/11/01	1.0		%	30
B179745	EBO	QC Standard	Soluble Conductivity	2023/11/01		91	%	75 - 125
B179745	EBO	Spiked Blank	Soluble Conductivity	2023/11/01		98	%	90 - 110
B179745	EBO	Method Blank	Soluble Conductivity	2023/11/01	<0.020		dS/m	
B179745	EBO	RPD [CBZ933-01]	Soluble Conductivity	2023/11/01	NC		%	20
B179775	ZI	Matrix Spike [CBZ806-01]	Soluble Chloride (Cl)	2023/11/01		102	%	75 - 125
B179775	ZI	QC Standard	Soluble Chloride (Cl)	2023/11/01		98	%	75 - 125
B179775	ZI	Spiked Blank	Soluble Chloride (Cl)	2023/11/01		101	%	80 - 120
B179775	ZI	Method Blank	Soluble Chloride (Cl)	2023/11/01	<10		mg/L	
B179775	ZI	RPD [CBZ806-01]	Soluble Chloride (Cl)	2023/11/01	NC		%	30
B179854	EBO	QC Standard	Soluble Conductivity	2023/11/01		98	%	75 - 125
B179854	EBO	Spiked Blank	Soluble Conductivity	2023/11/01		101	%	90 - 110
B179854	EBO	Method Blank	Soluble Conductivity	2023/11/01	<0.020		dS/m	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B180158	EBO	QC Standard	Soluble Conductivity	2023/11/01		101	%	75 - 125
B180158	EBO	Spiked Blank	Soluble Conductivity	2023/11/01		98	%	90 - 110
B180158	EBO	Method Blank	Soluble Conductivity	2023/11/01	<0.020		dS/m	
B180158	EBO	RPD [CBZ806-01]	Soluble Conductivity	2023/11/01	6.1		%	20
B182890	EH2	QC Standard	Calcium Carbonate Equivalent	2023/11/08		104	%	75 - 125
B182890	EH2	Spiked Blank	Calcium Carbonate Equivalent	2023/11/08		104	%	80 - 120
B182890	EH2	Method Blank	Calcium Carbonate Equivalent	2023/11/08	<0.60		%	
B182890	EH2	RPD	Calcium Carbonate Equivalent	2023/11/08	16		%	35
B182895	EH2	QC Standard	Calcium Carbonate Equivalent	2023/11/08		104	%	75 - 125
B182895	EH2	Spiked Blank	Calcium Carbonate Equivalent	2023/11/08		102	%	80 - 120
B182895	EH2	Method Blank	Calcium Carbonate Equivalent	2023/11/08	<0.60		%	
B182895	EH2	RPD [CCA016-01]	Calcium Carbonate Equivalent	2023/11/08	NC		%	35
B184944	KKC	Matrix Spike [CCA125-01]	Available (NH4OAc) Potassium (K)	2023/11/08		100	%	75 - 125
B184944	KKC	Spiked Blank	Available (NH4OAc) Potassium (K)	2023/11/08		96	%	80 - 120
B184944	KKC	Method Blank	Available (NH4OAc) Potassium (K)	2023/11/08	<2.0		mg/kg	
B184944	KKC	RPD [CCA125-01]	Available (NH4OAc) Potassium (K)	2023/11/08	1.7		%	35
B184961	HQV	Matrix Spike [CCA023-01]	Available (NH4OAc) Potassium (K)	2023/11/04		94	%	75 - 125
B184961	HQV	Spiked Blank	Available (NH4OAc) Potassium (K)	2023/11/04		94	%	80 - 120
B184961	HQV	Method Blank	Available (NH4OAc) Potassium (K)	2023/11/04	<2.0		mg/kg	
B184961	HQV	RPD [CCA023-01]	Available (NH4OAc) Potassium (K)	2023/11/04	NC		%	35
B184966	HQV	Matrix Spike [CCA023-01]	Available (CaCl2) Sulphur (S)	2023/11/04		94	%	75 - 125
B184966	HQV	QC Standard	Available (CaCl2) Sulphur (S)	2023/11/04		99	%	75 - 125
B184966	HQV	Spiked Blank	Available (CaCl2) Sulphur (S)	2023/11/04		95	%	80 - 120
B184966	HQV	Method Blank	Available (CaCl2) Sulphur (S)	2023/11/04	<2.0		mg/kg	
B184966	HQV	RPD [CCA023-01]	Available (CaCl2) Sulphur (S)	2023/11/04	NC		%	35
B185001	HQV	Matrix Spike [CCA023-01]	Available (NH4F) Phosphorus (P)	2023/11/04		98	%	75 - 125
B185001	HQV	Spiked Blank	Available (NH4F) Phosphorus (P)	2023/11/04		93	%	80 - 120
B185001	HQV	Method Blank	Available (NH4F) Phosphorus (P)	2023/11/04	<1.0		mg/kg	
B185001	HQV	RPD [CCA023-01]	Available (NH4F) Phosphorus (P)	2023/11/04	0.11		%	35
B185010	HQV	Matrix Spike [CCA125-01]	Available (NH4F) Phosphorus (P)	2023/11/04		95	%	75 - 125
B185010	HQV	Spiked Blank	Available (NH4F) Phosphorus (P)	2023/11/04		95	%	80 - 120
B185010	HQV	Method Blank	Available (NH4F) Phosphorus (P)	2023/11/04	<1.0		mg/kg	
B185010	HQV	RPD [CCA125-01]	Available (NH4F) Phosphorus (P)	2023/11/04	3.1		%	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas Job #: C383989
Report Date: 2023/11/09

WSP Canada Inc.
Client Project #: CA0003092.5894/TASK 500
Site Location: KAMI, LABRADOR
Your P.O. #: CA0003092.5894/500
Sampler Initials: CB

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Maria Magdalena Florescu, Ph.D., P.Chem., QP, Inorganics Manager

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

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Calgary, AB: 4000 19th St. NE, T2E 6P8 Toll Free (800) 386-7247
Edmonton, AB: 9331-48 St. T6B 2R4 Toll Free (800) 386-7247
Winnipeg, MB: D-675 Berry St. R3H 1A7 Toll Free (866) 800-6208

* eCOC to Resubmitted

CHAIN OF CUSTODY RECORD

ENV COC - 00013v2

Page 1 of

Invoice Information — Invoice to (requires report)		Report Information (if differs from invoice)		Project Information	
Company:	WSP	Company:		Quotation #:	
Contact Name:	Christine Brauer	Contact Name:		P.O. #/ AFE#:	03-Oct-23 10:49
Street Address:		Street Address:		Project #:	Melissa McIntosh
City: / Prov: / Postal Code:		City: / Prov: / Postal Code:		Site #:	C383989
Phone:	587 532 9780	Phone:		Site Location:	
Email:	christiane.brouwer@wsp.com	Email:		Site Location Province:	003 ins-bay
Copies:		Copies:		Sampled By:	

LAB USE ONLY - PLACE STICKER HERE

383989

Rush Confirmation #:

Regulatory Criteria

AT1 — CCME — Drinking Water - Canada — Drinking Water - Manitoba

Saskatchewan — Drinking Water - Alberta — Other

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

#	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX F1	5 VOCs	6 BTEX F1-F2	7 BTEX F1-F4	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17	18	19	20	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE
1	✓K23CB001 Ae 0-8	23	09	25																									
2	✓K23CB001 Bf 8-19	23	09	25																									
3	✓K23CB001 Bf, 19-28	23	09	25																									
4	✓K23CB001 ~~Cg~~ Cg 28-47	23	09	25																									
5	✓K23CB001 Cg, 47-120	23	09	25																									
6	✓K23CB010 Ae 0-5	23	09	26																									
7	✓K23CB010 Bm 5-13	23	09	26																									
8	✓K23CB010 BC 13-35	23	09	26																									
9	✓K23CB010 C 35-100	23	09	26																									
10	~~K23CB009 Bfc 5-17~~	~~23~~	~~09~~	~~26~~																									
11	✓K23LM013 Cg1 0-33			27																									
12	✓K23LM013 Cg2 33-60			27																									

Regular Turnaround Time (TAT)

5 to 7 Day — 10 Day

Rush Turnaround Time (TAT)
Surcharges apply

Same Day — 1 Day

2 Day — 3 Day

4 Day

Date Required: YY MM DD

Comments

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C 1	2	3
Seal present		✓	4	4	4
Seal intact		✓			
Cooling media present		✓			

LAB USE ONLY	Yes	No	°C 1	2	3
Seal present	✓		20	20	20
Seal intact	✓				
Cooling media present		✓			

LAB USE ONLY	Yes	No	°C 1	2	3	Temperature reading by:
Seal present	✓		21	21	20	
Seal intact	✓					
Cooling media present		✓				

	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special instructions
1							[signature]	23	10	03	10	49	
2							@ ATRAVER Gin	2023	10	04	09	00	

eCOC: W73809

Expected TAT:	Standard TAT
Expected Arrival:	2023/10/17 10:00
Submitted By:	
Submitted To:	Calgary ENV: 4000 19th St NE

Invoice Information

Attn: ACCOUNTS PAYABLE
WSP Canada Inc.
16820-107 AVE
EDMONTON , AB , T5P 4C3
Email to:
capayablesinvoice@wsp.com

Report Information

Attn: Christiane Brouwer
WSP Canada Inc.
16820-107 AVE
EDMONTON , AB , T5P 4C3
Email to:
christiane.brouwer@wsp.com

Project Information

Quote #:	C21799, C20106
PO/AFE#:	CA0003092.5894/500
Project #:	CA0003092.5894/Task 500
Site Location:	Kami, Labrador

Analytical Summary

A: Standard TAT

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	CCME Regulated Metals - Soils	NPKS (AVAILABLE)	SOIL SALINITY 4	Calcium Carbonate Equivalent	Cation Exchange Capacity	Moisture	Texture by Hydrometer	Texture Class	Total Organic Carbon LECO Method	Set Number
K23CB001Ae0-8	1	2023/09/25	SOIL	1	A	A	A	A	A	A	A	A	A	1
K23CB001Bf8-19	2	2023/09/25	SOIL	1		A	A	A		A	A	A	A	2
K23CB001Bfj19-28	3	2023/09/25	SOIL	1		A	A	A		A	A	A		3
K23CB001C28-47	4	2023/09/25	SOIL	1			A	A		A	A	A		4
K23CB001Cgj47-120	5	2023/09/25	SOIL	1	A		A	A		A	A	A		5
K23CB010Ae0-5	6	2023/09/26	SOIL	1			A	A		A	A	A		4
K23CB010Bm5-13	7	2023/09/26	SOIL	1			A	A		A	A	A		4
K23CB010BC13-35	8	2023/09/26	SOIL	1			A	A		A	A	A		4
K23CB010C35-100	9	2023/09/26	SOIL	1			A	A		A	A	A		4
K23LM013Cg10-33	10	2023/09/27	SOIL	1		A	A	A	A	A	A	A	A	6
K23LM013Cg233-60	11	2023/09/27	SOIL	1			A	A		A	A	A		4
K23LM015Ae0-5	12	2023/09/27	SOIL	1	A	A	A	A	A	A	A	A	A	1
K23LM015Bm5-23	13	2023/09/27	SOIL	1		A	A	A		A	A	A	A	2
K23LM015BC23-30	14	2023/09/27	SOIL	1			A	A		A	A	A		4
K23LM015C30-100	15	2023/09/27	SOIL	1	A		A	A		A	A	A		5
K23CB020Cg0-80	16	2023/09/27	SOIL	1		A	A	A	A	A	A	A	A	6
K23CB023Ae0-6	17	2023/09/28	SOIL	1	A	A	A	A	A	A	A	A	A	1
K23CB023Bf6-17	18	2023/09/28	SOIL	1		A	A	A		A	A	A	A	2
K23CB023BC17-30	19	2023/09/28	SOIL	1			A	A		A	A	A		4
K23CB023C30-70	20	2023/09/28	SOIL	1	A		A	A		A	A	A		5
K23CB017Ae0-9	21	2023/09/29	SOIL	1		A	A	A	A	A	A	A	A	6
K23CB017Bmgj9-33	22	2023/09/29	SOIL	1		A	A	A		A	A	A	A	2
K23CB017BCgj33-80	23	2023/09/29	SOIL	1			A	A		A	A	A		4
K23CB017Cg80-100	24	2023/09/29	SOIL	1			A	A		A	A	A		4
K23CB028C0-120	25	2023/09/29	SOIL	1	A		A	A		A	A	A		5
K23LM023Ae0-10	26	2023/09/29	SOIL	1	A	A	A	A	A	A	A	A	A	1
K23LM023Bm10-18	27	2023/09/29	SOIL	1		A	A	A		A	A	A		3
K23LM023Bh18-54	28	2023/09/29	SOIL	1		A	A	A		A	A	A		3
K23LM023C54-120	29	2023/09/29	SOIL	1	A		A	A		A	A	A		5
K23LM020Cg10-30	30	2023/09/29	SOIL	1		A	A	A	A	A	A	A	A	6
K23LM020Cg230-75	31	2023/09/29	SOIL	1			A	A		A	A	A		4
K23CB030C0-36	32	2023/09/29	SOIL	1		A	A	A	A	A	A	A	A	6
K23CB030IIC36-100	33	2023/09/29	SOIL	1			A	A		A	A	A		4

eCOC: W73809

Expected TAT:	Standard TAT
Expected Arrival:	2023/10/17 10:00
Submitted By:	
Submitted To:	Calgary ENV: 4000 19th St NE

A: Standard TAT

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	CCME Regulated Metals - Soils	NPKS (AVAILABLE)	SOIL SALINITY 4	Calcium Carbonate Equivalent	Cation Exchange Capacity	Moisture	Texture by Hydrometer	Texture Class	Total Organic Carbon LECO Method	Set Number
K23CB031Bm0-20	34	2023/09/29	SOIL	1		A	A	A			A	A	A	7
K23CB031BC20-35	35	2023/09/29	SOIL	1			A	A			A	A		8
K23CB031C35-120	36	2023/09/29	SOIL	1			A	A			A	A		8

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Submission Information

# of Samples: 36

Sample Set Listing

Set 1 (4 samples)	Set 2 (4 samples)	Set 3 (3 samples)	Set 4 (12 samples)	Set 5 (5 samples)	Set 6 (5 samples)	Set 7 (1 sample)	Set 8 (2 samples)
K23CB001Ae0-8	K23CB001Bf8-19	K23CB001Bfj19-28	K23CB001C28-47	K23CB001Cgj47-120	K23LM013Cg10-33	K23CB031Bm0-20	K23CB031BC20-35
K23LM015Ae0-5	K23LM015Bm5-23	K23LM023Bm10-18	K23CB010Ae0-5	K23LM015C30-100	K23CB020Cg0-80		K23CB031C35-120
K23CB023Ae0-6	K23CB023Bf6-17	K23LM023Bh18-54	K23CB010Bm5-13	K23CB023C30-70	K23CB017Ae0-9		
K23LM023Ae0-10	K23CB017Bmgj9-33		K23CB010BC13-35	K23CB028C0-120	K23LM020Cg10-30		
			K23CB010C35-100	K23LM023C54-120	K23CB030C0-36		
			K23LM013Cg233-60				
			K23LM015BC23-30				
			K23CB023BC17-30				
			K23CB017BCgj33-80				
			K23CB017Cg80-100				
			K23LM020Cg230-75				
			K23CB030IIC36-100				

APPENDIX E

Soil Metal Concentrations

Analysis	Units	K23CB001AE0-8	K23CB001CGJ47-120	K23CB001CGJ47-120 Lab-Dup	K23LM015AE0-5	K23LM015C30-100	K23CB023AE0-6	K23CB023C30-70	K23CB028C0-120	K23LM023AE0-10	K23LM023C54-120	CCME Soil Quality Guidelines[a]
Soluble (Hot water) Boron (B)	mg/kg	<0.10	<0.10	N/A	<0.30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	2
Total Antimony (Sb)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	20
Total Arsenic (As)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	3.2	<1.0	<1.0	12
Total Barium (Ba)	mg/kg	140	45	47	11	33	5.6	30	110	5.2	19	500
Total Beryllium (Be)	mg/kg	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.44	<0.40	<0.40	4
Total Cadmium (Cd)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.10	<0.050	<0.050	10
Total Chromium (Cr)	mg/kg	96	37	40	8.8	24	4.3	25	77	2.1	10	64
Total Cobalt (Co)	mg/kg	8.6	5.7	5.8	0.91	4.4	<0.50	6.7	15	1.2	3.6	50
Total Copper (Cu)	mg/kg	1.5	10	10	<1.0	7.8	<1.0	10	18	1.4	4.2	63
Total Hex. Chromium (Cr 6+)	mg/kg	<0.080	<0.080	N/A	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080	0.4
Total Lead (Pb)	mg/kg	2.2	3.0	3.0	4.3	3.6	3.0	4.0	9.1	0.59	2.2	140
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	7
Total Molybdenum (Mo)	mg/kg	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	1.8	0.45	0.61	10
Total Nickel (Ni)	mg/kg	36	15	15	1.7	10	<1.0	10	32	1.3	7.9	45
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1
Total Silver (Ag)	mg/kg	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	20
Total Thallium (Tl)	mg/kg	0.23	0.11	0.11	<0.10	<0.10	<0.10	<0.10	0.28	<0.10	<0.10	1
Total Tin (Sn)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	50
Total Uranium (U)	mg/kg	0.43	0.34	0.35	<0.20	0.25	<0.20	0.28	1.2	<0.20	0.27	23
Total Vanadium (V)	mg/kg	51	20	21	16	12	6.5	15	49	10	7.7	130
Total Zinc (Zn)	mg/kg	33	14	15	<10	12	<10	11	47	<10	14	250

a) All guidelines are set at agricultural levels.

Red cell = Exceeds CCME Soil Quality Guidelines.

APPENDIX F

Soil Suitability for Reclamation Calculations

Sample ID	Soil Map Unit	Horizon	Depth (cm)	pH	EC (dS/m)	SAR	Saturation (%)	Texture	CaCO3 Equivalent (%)	% Organic Carbon	Moist Consistency	Coarse Fragment Content (%)	Rating	Final Overall Rating	Limiting Factors
K23CB001AE0-8	JAV	Ae	0-8	3.36	0.06	0	55.0	LOAMY SAND	<0.60	0.64	Loose	10	Unsuitable	Unsuitable	Very low pH, coarse texture, low organic carbon, consistency
K23CB001BF8-19		Bf	8-19	4.13	0.039	0	32.0	SANDY LOAM	0.6	1.7	Loose	5	Poor		Low pH, low organic carbon, consistency
K23CB001BFJ19-28		Bfj	19-28	4.41	0.026	0	23.0	SANDY LOAM	0.6		Loose	15	Poor		Low pH, low saturation, consistency, coarse fragment content
K23CB001C28-47		C	28-47	4.59	0.028	0	22.0	LOAM	0.6		Very Friable	20	Fair		Low pH, Low saturation
K23CB001CGJ47-120		Cgj	47-120	4.86	0.043	1.5	19	SANDY LOAM	0.6		Very Friable	20	Poor		Low pH, Low saturation, high coarse fragment content
K23CB010AE0-5	LAB	Ae	0-5	3.2	0.082	2.8	41.0	LOAMY SAND	<0.60		Very Friable	5	Unsuitable	Unsuitable	Very low pH, coarse texture, low organic carbon, consistency
K23CB010BM5-13		Bm	5-13	4.25	0.045	0	33.0	SANDY LOAM	0.6		Friable	10	Poor		Low pH
K23CB010BC13-35		BC	13-35	4.42	0.032	0	27	SANDY LOAM	0.6		Friable	20	Poor		Low pH, Low saturation, high coarse fragment content
K23CB010C35-100		C	35-100	4.98	0.044	0	17.0	LOAM	0.6		Friable	15	Poor		Low pH, Low saturation
K23CB018AE0-9	WAB	Ae	0-9	3.57	0.069	0	30.0	LOAMY SAND	<0.60	0.61	Loose	30	Poor	Poor	Low pH, coarse texture, low organic carbon, consistency , high coarse fragment content
K23CB018BMGJ9-33		Bmgj	9-33	3.76	0.057	0	28.0	LOAMY SAND	0.6	0.7	Loose	30	Poor		Low pH, low saturation, coarse texture, low organic carbon, consistency , high coarse fragment content
K23CB018BCGJ33-80		BCgj	33-80	3.98	0.042	0	25.0	LOAMY SAND	0.6		Loose	30	Poor		Low pH, low saturation, coarse texture, consistency, high coarse fragment content
K23CB018CG80-100		Cg	80-100	4.59	0.029	0	20.0	SANDY LOAM	0.6		Loose	20	Fair		Low pH, low saturation, consistency, high coarse fragment content
K23CB020CG0-80	CAL	Cg	0-80	5.09	0.058	0	25.0	SANDY LOAM	<0.60	0.67	Very Friable	10	Fair	Fair	Low saturation, low organic carbon
K23CB023AE0-6	JAV	Ae	0-6	3.44	0.059	0	39	SANDY LOAM	<0.60	0.59	Loose	30	Unsuitable	Unsuitable	Very low pH, Low organic carbon, consistency, coarse fragment content
K23CB023BF6-17		Bfj	6-17	4.49	0.02	0	38	LOAMY SAND	0.6	1.3	Loose	45	Poor		Low pH, corase texture, low organic carbon, consistency, coarse fragment content
K23CB023BC17-30		BC	17-30	5.2	0.02	0	32	LOAMY SAND	0.6		Loose	30	Poor		Coarse texture, consistency, high coarse fragment content
K23CB023C30-70		C	30-100	5.03	0.022	0	21.0	LOAMY SAND	0.6		Loose	70	Unsuitable		Low saturation, coarse texture, consistency, high coarse fragment content
K23CB028C0-120	JAL	Cg	0-120	5.78	0.084	1.4	29.0	LOAM	<0.60		Loose	0	Fair	Fair	Low saturation, consistency
K23CB030C0-36	JAL	C	0-36	4.23	0.042	1.3	39.0	SILT LOAM	<0.60	0.37	Friable	1	Poor	Poor	Low pH, low organic carbon,
K23CB030IIC36-100		IIC	36-100	4.87	0.39	0	22.0	SANDY LOAM	0.6		Friable	15	Fair		Low pH, Low saturation, high coarse fragment content
K23CB031BM0-20	HUL	Bm	0-20	5.11	0.025	0	29	SAND	0.6	0.24	Loose	10	Poor	Poor	Low saturation, coarse texture, low organic carbon, consistency
K23CB031BC20-35		BC	20-35	5.97	0.22	0	31.0	SAND	0.6		Loose	15	Poor		Coarse texture, high coarse fragments, consistency

Sample ID	Soil Map Unit	Horizon	Depth (cm)	pH	EC (dS/m)	SAR	Saturation (%)	Texture	CaCO3 Equivalent (%)	% Organic Carbon	Moist Consistency	Coarse Fragment Content (%)	Rating	Final Overall Rating	Limiting Factors
K23CB031C35-120		C	35-120	6.11	0.031	0	27.0	SAND	0.6		Loose	15	Poor		low saturation, coarse texture, consistency, high coarse fragment content
K23LM013CG10-33	CAL	Cg1	0-33	5.4	0.110	1.1	48.0	SANDY LOAM	<0.60	2.4	Loose	15	Fair	Poor	Low organic carbon, consistency
K23LM013CG233-60		Cgj	33-60	5.43	0.06	0.47	27.0	LOAMY SAND	0.6		Loose	20	Poor		Low saturation, coarse texture, high coarse fragment content, consistency
K23LM015AE0-5	LAB	Ae	0-5	3.11	0.09	2.2	56.0	SANDY LOAM	<0.60	1.5	Loose	5	Unsuitable	Unsuitable	Very low pH, low organic carbon, consistency
K23LM015BM5-23		Bm	5-23	4.65	0.02	0	39.0	SANDY LOAM	0.6	0.64	Very Friable	25	Poor		Low pH, high coarse fragment content, low organic carbon
K23LM015BC23-30		BC	23-30	4.78	0.02	0	32.0	SANDY LOAM	0.6		Very Friable	30	Poor		Low pH, high coarse fragment content, low organic carbon
K23LM015C30-100		C	30-100	4.72	0.02	0	26.0	LOAMY SAND	0.6		Loose	10	Poor		Low pH, low saturation, coarse texture, consistency, high coarse fragment content
K23LM020CG10-30	CAL	Cg	10-30	6.53	0.430	1.7	62.0	SANDY LOAM	<0.8	3.3	Very Friable	0	Fair	Fair	High saturation, low organic carbon,
K23LM020CG230-75		Cg2	30-75	6.22	0.25	1.7	37.0	SANDY LOAM	0.6		Loose	15	Fair		Consistency, coarse fragment content
K23LM023AE0-10	HUL	Ae	0-10	3.25	0.048	0.95	38.0	SAND	<0.60	0.49	Loose	0	Unsuitable	Unsuitable	Very low pH, coarse texture, low organic carbon, consistency
K23LM023BM10-18		Bm	10-18	3.96	0.025	0	38	SAND	0.6		Loose	1	Poor		Low pH, coarse texture, consistency
K23LM023BH18-54		Bh	18-54	4.46	0.02	0	39.0	SAND	0.6		Loose	2	Poor		Low pH, coarse texture, consistency
K23LM023C54-120		C	54-120	4.76	0.024	0	31.0	SAND	0.6		Loose	2	Poor		Low pH, coarse texture, consistency

Colour Ratings Legend:

Good
Fair
Poor
Unsuitable

Note: Reclamation suitability ratings are only displayed for sites with sampled data for analysis

wsp.com

REPORT

Vegetation Baseline Report Addendum

Kami Iron Ore Mine Project

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April 2025

Study Limitations

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APPENDICES

1.0 INTRODUCTION

The Kamistiatusset (Kami) Iron Ore Mine Project (the Project) is a proposed iron ore mine in Newfoundland and Labrador. The Project site is located approximately seven kilometres southwest of the Town of Wabush, ten kilometres south of the Town of Labrador City, and five kilometres northeast of Ville de Fermont, Québec (Figure 1-1).

The Project was originally proposed by the Alderon Iron Ore Corporation (Alderon) and underwent a provincial and federal environmental impact assessment from 2011 to 2013, including a comprehensive baseline program that was completed in 2011 and 2012. The Project was released from the provincial and federal EA process in 2014. In 2021, Champion Iron Limited (through its subsidiary 12364042 Canada Inc, herein referred to as Champion) completed the acquisition of the Project from Alderon.

Champion is proposing several improvements to the Project design proposed by Alderon through the previous Environmental Impact Statement (EIS). These proposed improvements include optimizations to the Project's water management strategy and modernization of the proposed ore handling, conveyance, and processing. Champion's objective for the Kami Project is to produce high purity (>67.5%) iron concentrate, which can be used as direct reduction pellet feed for electric arc furnaces in the green steel supply chain.

Champion submitted a Project Registration document to the NL Department of Environment and Climate Change (the Department) in April 2024 to restart the EA process for the Project. On June 13, 2024, the Minister issued a Decision Letter to Champion concluding that an EIS would be required for the Project. EIS Guidelines were issued for the Project on December 19, 2024, that includes requirements for baseline studies.

To support the EIS process, Champion has commissioned the services of WSP Canada Inc. (WSP) to complete a comprehensive baseline field program that documents the existing natural and socio-economic environments in the anticipated area of the Project, and this report is an addendum to the Initial Baseline Vegetation and Wetland report completed by WSP Canada Inc. (WSP) in early 2024. This addendum includes information on an Ecological Land Classification verification exercise completed by WSP in 2024/2025 and an assessment of the presence of Species at Risk (Federal and Provincial). In addition, an assessment of Species of Conservation Concern (SOCC) which were ranked S1 to S2S3, SH, SNR or do not have an S-ranking for Labrador is included to align with Final Environmental Impact Statement (EIS) Guidelines for the Kami Iron Ore Mine Project (Government of Newfoundland and Labrador 2024).

Specifically, survey data and species record searches were reviewed to determine the potential occurrence of Species at Risk (SAR) and/or SOCC within the identified S-rank ranges with the region and within proximity to project components. Species record searches included recent searches completed by Atlantic Canada Conservation Data Centre (ACCDC) for WSP and historical searches completed by Stassinu Stantec Limited Partnership (Stassinu Stantec). Data reviews for the occurrence of SAR and SOCC were completed for Vegetation and Wetland Surveys by WSP Canada Inc. in 2023; Borehole Rare Plant Surveys completed by Sikumiut Environmental Management Ltd. (SEM) in 2024; and historic Stassinu Stantec rare plant field surveys (2011-2012). The Stassinu Stantec data searches and surveys were completed as part of a previous successful Environmental Assessment process (Environmental Impact Statement) for the Kami Project while under ownership by the Alderon Iron Ore Corp. which was released from environmental assessment on January 10, 2014. The Borehole Rare Plant Surveys were completed as part of a condition of acquiring permits for a borehole drilling program. The recent ACCDC searches, and field programs completed by WSP Canada Inc.

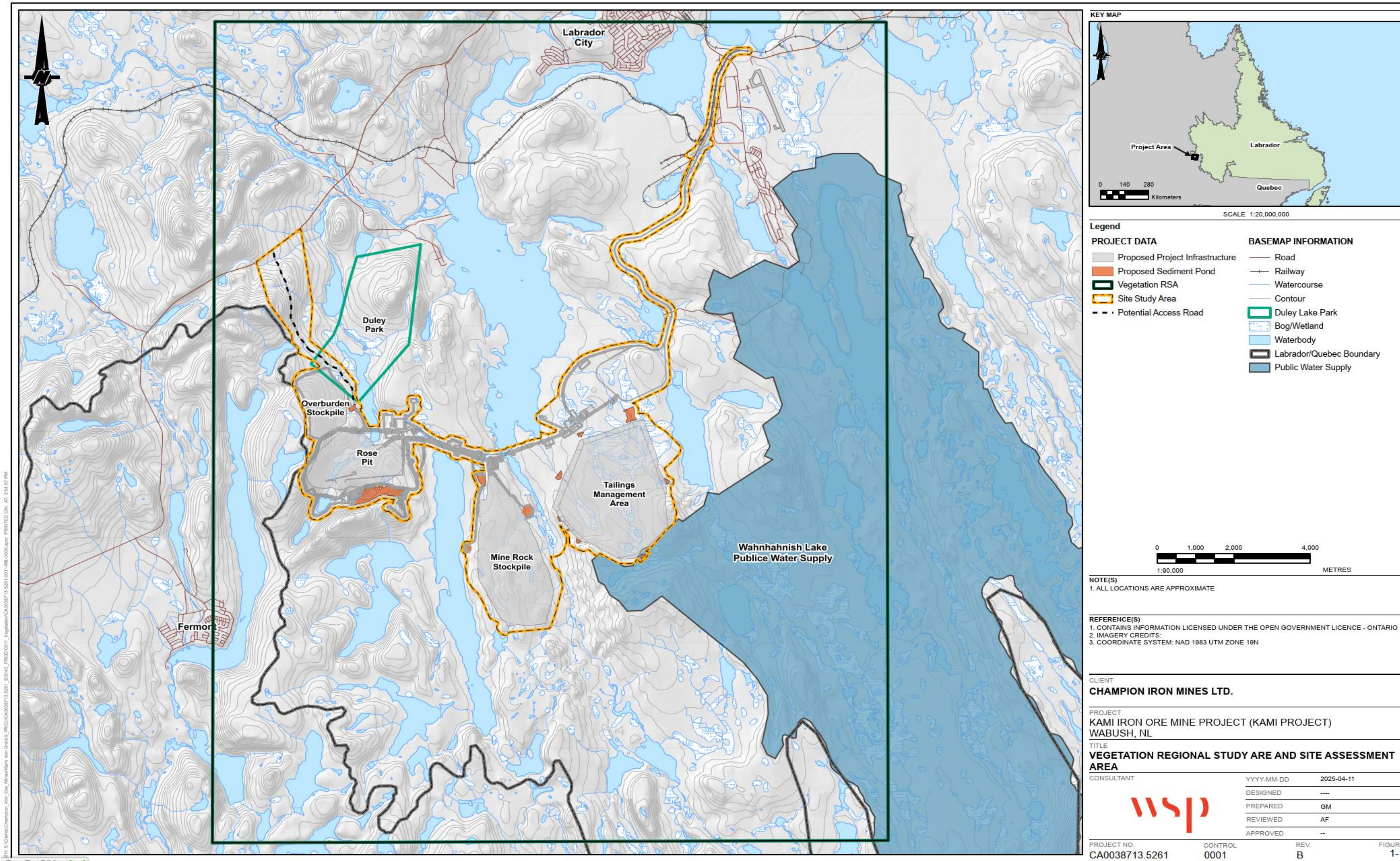

Figure 1-1: Project Location and Site Layout

were completed as part of a baseline program for the current Environmental Assessment process (Environmental Impact Statement) for the Kami project.

The project components and layout have been described in detail elsewhere and therefore, are not included in this addendum. However, to provide spatial context of the project, Figure 1-1 provides the general layout of project components.

2.0 ECOLOGICAL LAND CLASSIFICATION

Ecological Land Classification (ELC) is an effective way to identify like habitats over a wide area using remote imaging and Geographic Information System (GIS) processing and analysis. Field verification surveys are used to verify the characteristics and general species composition of the various identified habitat types to create an ELC that can be used to assess the effects of a project on the various habitats present over a variety of scales. To better understand the natural environment within the Site Study Area (SSA) and Regional Study Area (RSA), an ELC was generated by Stassinu Stantec for Alderon as part of a previous environmental Assessment (EA) process. To verify that the habitat types and boundaries remained valid since 2011, a verification exercise was completed in 2025.

This verification exercise entailed the generation of a new ELC using the same general boundaries as the previous Stassinu Stantec ELC. Habitat extents generated by the new ELC were compared to the previous ELC to determine how, habitats may have changed since initially assessed and to provide an updated ELC for the present assessment.

2.1 Ecological Land Classification Assessment Areas

2.1.1 Site Assessment Area

The site study area (SSA) is defined as the area that may experience direct effects of the project. This area includes the physical footprint of the project and areas within proximity of the physical footprint that may be directly affected by the project. For the purposes of this report the SSA is defined as the project footprint plus a 100 m buffer as outlined in Figure 1.

2.1.2 Regional Study Area

The RSA is a larger study area than the SSA which includes the SSA but also takes in a larger more regional area to be assessed. The use of a more regional assessment area ensures that the habitat variability is captured but also provides context for the habitats observed within the SSA. This approach makes it possible to determine if there are unique habitats within the SSA or if they are also common within the larger RSA. Similarly, the extent of habitat types can be compared at a local and regional level (e.g., if there is an abundance of a specific habitat within the RSA then the removal of that habitat type for project development should not adversely affect the habitat at a regional level). The RSA for this study has been defined as the area identified within the Stassinu Stantec (2012 a) ELC. This approach allows for comparison between initial baseline studies from 2012 and the 2023 baseline studies.

2.2 Objectives

The objectives of this report include the following:

- To update the distribution of habitat classifications using current imagery and methods.
- Provide comparisons between the current distribution of habitat classifications and the historic Stassinu-Stantec ELC.

- Evaluate the level of change between assessment years to determine if there have been significant changes in habitat within the area.
- To validate the previous habitat distributions with respect to current conditions to confirm that the previous assessment remains valid.

2.3 Methodology

An updated ELC was completed using a combination of moderate and high-resolution satellite imagery, and ground-truth data (collected during the summer of 2023). In this case, object-based image analysis and an advanced machine learning algorithm were utilized to classify the study area into 18 distinct ecological classes. A description of the methodology is further explained in the following sections.

2.3.1 Ground Truth Data

Ground-truth data was collected during field surveys conducted during the summer of 2023. For each location, geographic coordinates and the corresponding land cover class (ecotype) were recorded. These field data points were used to generate training and validation datasets for the land cover classification process. The field sample locations (60) are distributed throughout the RSA in such a way that all of the previously identified habitat classes by Stassinu Stantec have been sampled, plus new classes such as Jack Pine and Alder Thickett at least once. Figure 2-1 illustrates the distribution of the survey points within the RSA.

The field data was further refined by delineating polygons around each point using high-resolution satellite imagery (ESRI base maps) as well as two high-resolution Red Green Blue (RGB) airborne images. These polygons (indicating homogeneous land cover types) were digitized in the GIS environment and converted into a polygon-based shapefile. Figures 2-2 and 2-3 illustrate how the field sample location was used for the delineation of a polygon outlining a contiguous area of a specific habitat type. These polygons are then able to be used as training and validation data to support a machine learning remote sensing model to classify habitats in the study area into the land cover classes identified. The classes identified during the field sampling are outlined in Table 2-1. Additional land cover class training/test data, including Water and Developed Land, were identified through visual interpretation of ESRI base map and high resolution RGB imagery. These features were delineated based on expert knowledge and observational assessment of the study area. Approximately 80% of the delineated polygons were used for training the classification model, while 20% were used for validation and accuracy assessment. The data split was performed randomly for each individual class to ensure a representative distribution for training. Although only one field observation point was collected for the Alder Thicket class, additional polygons were delineated using visual interpretation and ESRI base maps to ensure a sufficient number of samples for both training and testing. This approach allowed for a balanced representation of all classes in the classification algorithm.

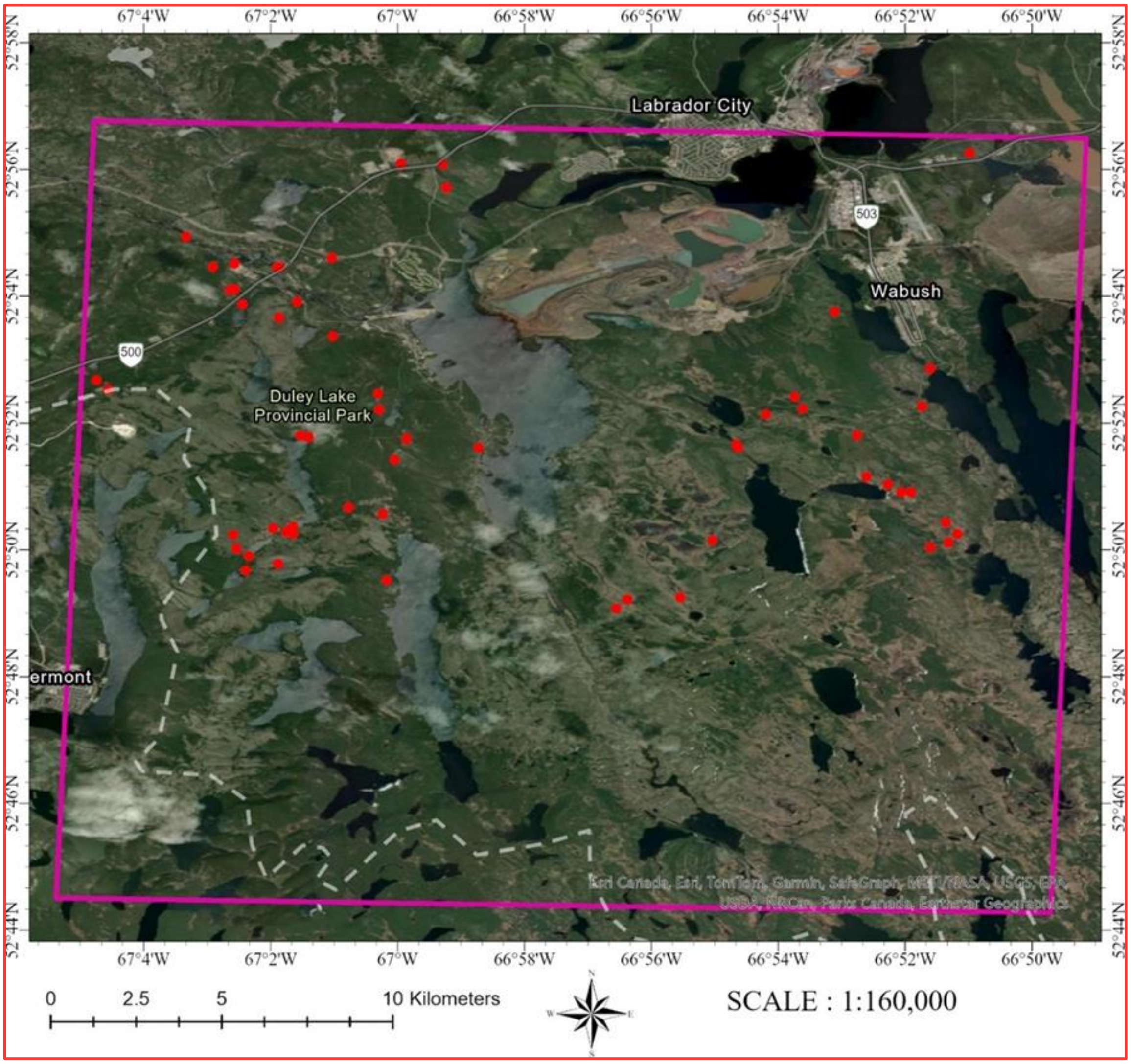

Figure 2-1: Spatial distribution of the field sample locations across the Regional Study Area

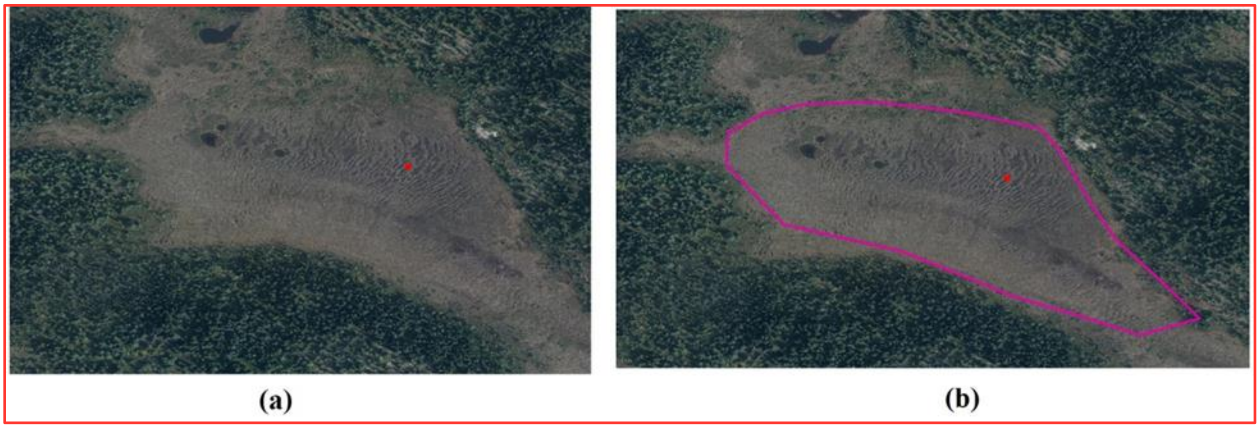

Figure 2-2: Training data for Patterned Shrub Fen: (a) Field observation point shown on the ESRI base map, (b) Training data polygon delineated using visual interpretation and ESRI base map.

Figure 2-3: Training Data for Black Spruce-Lichen: (a) Field observation point shown on the ESRI base map, (b) Training data polygon delineated using visual interpretation and ESRI base map.

Table 2-1: Number of ground-truth samples collected per land cover class for training and validation

Class ID	Class Name	Number of Samples
1	Alder Thickett	1
2	Alpine Heath	3
3	Black Spruce-Labrador Tea -Feathermoss	7
4	Black Spruce-Lichen	3
5	Black Spruce/Tamarack-Sphagnum Woodland	6
6	Graminoid Fen	4
7	Hardwood Burn/Regeneration	2
8	Hardwood Forest	4
9	Jack Pine	2
10	Mixedwood Forest	4
11	Non-Patterned Shrub Fen	3
12	Patterned Shrub Fen	3
13	Riparian Marsh (Fen)	2
14	Riparian Thickett	5
15	Softwood Burn/Regeneration	5
16	Tamarack/Black-Spruce-Feathermoss (Water Track)	6
	Total	60

2.3.2 Satellite Data

To develop the ELC WSP used Sentinel-2 Level-2A surface reflectance imagery. Sentinel-2 is part of the Copernicus program, managed by the European Commission, with the satellite itself developed and is operated by the European Space Agency. To develop the ELC, a number of the available spectral bands were utilized as outlined in Table 2-2.

In addition, the Normalized Difference Vegetation Index (NDVI) was calculated and incorporated as an input feature to improve vegetation discrimination:

$$\mathrm{NDVI} = \frac{NIR(Band\ 8) - Red(Band\ 4)}{NIR(Band\ 8) + Red(Band\ 4)}$$

The Sentinel-2 imagery was supplemented by two sources of high-resolution airborne RGB imagery including ESRI base maps and satellite imagery with a ground sampling distance of 10 cm (which partially covering the study area). These datasets helped with the preparation of training and validation samples and the quality control and visual evaluation of the classification results.

Table 2-2: Spectral bands and characteristics of Sentinel-2 imagery used in the classification.

Band	Name	Wavelength (nm)	Spatial Resolution
2	Blue	458 – 523	10
3	Green	543 – 578	10
4	Red	650-680	10
5	Red Edge 1	698 – 713	20
6	Red Edge 2	733 – 748	20
7	Red Edge 3	773 – 793	20
8	NIR	785 – 899	10
8A	NIRn	855 – 875	20
11	Short-Wave Infrared 1	1565 – 1655	20
12	Short-Wave Infrared 2	2100 – 2280	20
NDVI	Derived		10

2.3.3 Land Cover Classification Methodology

The development of the ELC required a stepped process whereby Object Based Image Analysis (OBIA) is utilized along with a series of algorithms to generate the ELC image. The process is described in more depth below.

2.3.3.1 Segmentation

The use of OBIA has been widely recognized as a more effective classification approach than traditional pixel-based methods. Its advantage lies in the integration of spatial, and spectral information, which enhances the accuracy of classification outputs by reducing noise and generating spatially coherent segments. The first step in the OBIA process is image segmentation. This requires that all bands of the Sentinel-2 imagery utilized are stacked and the resulting mosaic used to divide the study area into homogeneous image objects. Segmentation was performed using the Mean Shift algorithm implemented within the open-source QGIS platform through the Orfeo Toolbox. The resulting segments were used as the basic units for classification and each segment representing a similar spectral information. This approach ensures that all pixels within a segment are assigned the same land cover class.

2.3.3.2 Classification Algorithm

Image classification algorithms are generally categorized into two main types: supervised and unsupervised. In unsupervised classification, pixels are classified into clusters based on their spectral characteristics (pixel values), without the use of training data. In contrast, supervised classification relies on known training data (i.e., ground-truth samples) for different ELC types to train the machine learning model. Due to the ability to incorporate prior knowledge and fine-tune parameters to better capture habitat-specific features, supervised methods are often considered more accurate and suitable for ecological land cover mapping. Accordingly, a supervised Support Vector Machine (SVM) algorithm was selected for the classification process due to its proven effectiveness in handling limited training data, as well as its robustness when working with high-dimensional and multispectral datasets. The SVM model was trained using a radial basis function kernel, which helps capture complex class boundaries, ensuring improved accuracy in distinguishing the 18 classes. The spectral bands listed in Table 2-2, the field polygon-based shapefile, along with the segmentation results, were input into the SVM model. Once the model was trained, the SVM algorithm was applied to the entire project area to generate the ELC map.

The classification results were then reviewed through visual interpretation using ESRI base maps and high-resolution RGB imagery. Based on this visual assessment, the classification model and associated rulesets were refined to enhance overall accuracy and reduce potential misclassifications. As the final post-processing step, manual correction of classification errors and adjustment of segment boundaries were carried out to produce the final ELC map.

2.3.4 Accuracy Assessment

Accuracy assessments compare the classification ELC map with field data to provide information on the overall accuracy and reliability of the map, as well as to understand classification errors. The accuracy of the final ELC map was statistically assessed through a confusion matrix using test samples (20% of the field polygons). The confusion matrix summarizes how well the classification results match the test data, with correctly classified pixels appearing along the diagonal (Table 2-3). Numbers in the off-diagonal cells represent misclassified pixels and identify potential sources of error in the classification. Overall accuracy was calculated as the proportion of correctly classified pixels relative to the total number of test pixels. To account for agreement that may occur by chance, Cohen’s Kappa Coefficient (Kappa) was also computed. Kappa values close to 1 indicate strong agreement between the classification and validation data, while values near 0 suggest weak or no agreement.

The accuracy assessment was performed on a pixel-based basis rather than a polygon-based approach to ensure that classes with higher spatial density did not disproportionately influence the accuracy metrics. This method provides a more balanced evaluation by considering individual pixel classifications, rather than averaging the accuracy over entire polygons, which could bias the results toward larger or more frequent land cover types.

Generally, the accuracy for each classification was high with most classifications above 85%, and an overall accuracy of 94.6% (Table 2-3). Exceptions are: Mixedwood Forest (69%), Softwood Burn/Regeneration (81%), Non-Patterned Shrub Fen (82.3%) and Graminoid Fen (84.4%).

Table 2-3: Confusion Matrix and accuracy metrics for the ELC map

	Alpine Heath	Black Spruce-Labrador Tea -Feathermoss	Black Spruce-Lichen	Black Spruce/Tamarack-Sphagnum Woodland	Graminoid Fen	Developed Land	Hardwood Burn/Regeneration	Jack Pine	Mixedwood Forest	Non-Patterened Shrub Fen	Patterned Shrub Fen	Riparian Marsh (Fen)	Riparian Thickett	Softwood Burn/Regeneration	Tamarack/Black-Spruce-Feathermoss (Water Track)	Water	
Alpine Heath	23303	0	1188	0	0	0	0	0	517	0	601	0	0	0	0	0	
Black Spruce-Labrador Tea -Feathermoss	581	141232	0	1777	4940	0	2125	0	8111	5001	0	2	368	0	0	0	
Black Spruce-Lichen	509	123	49421	0	0	0	0	0	0	0	0	0	0	0	0	0	
Black Spruce/Tamarack-Sphagnum Woodland	0	0	0	65689	0	0	0	0	0	0	0	0	485	0	0	0	
Graminoid Fen	0	0	0	1253	27853	0	0	0	0	0	69	0	1	0	264	0	
Developed Land	0	0	0	0	0	209254	0	0	0	0	0	0	0	0	0	0	
Hardwood Burn/Regeneration	0	0	0	0	0	0	82378	0	0	0	0	0	0	16705	0	0	
Jack Pine	0	2	0	0	0	0	0	15778	17710	0	0	0	1422	220	0	0	
Mixedwood Forest	0	0	0	0	0	0	0	0	59222	0	0	0	1052	0	0	0	
Non-Patterened Shrub Fen	0	0	0	0	199	0	0	0	0	23254	0	0	0	0	0	0	
Patterned Shrub Fen	0	0	0	10	0	0	0	0	0	0	222575	0	312	0	178	0	
Riparian Marsh (Fen)	0	0	0	0	0	0	0	0	0	0	0	3996	1443	0	0	0	
Riparian Thickett	0	0	0	1	0	0	0	0	0	0	0	0	29604	0	0	0	
Softwood Burn/Regeneration	0	0	0	376	0	0	0	0	0	0	0	0	0	72120	0	0	
Tamarack/Black-Spruce-Feathermoss (Water Track)	272	0	0	0	0	0	0	0	242	0	0	0	0	0	18392	0	
Water	0	6756	0	0	0	0	0	0	0	0	0	0	87	0	0	271489	
Total	24665	148113	50609	69106	32992	209254	84503	15778	85802	28255	223245	3998	34774	89045	18834	271489	1390462
Accuracy by Class	94.5	95.4	97.7	95.1	84.4	100.0	97.5	100.0	69.0	82.3	99.7	99.9	85.1	81.0	97.7	100.0	
		OA=	94.6														
		Kappa_Coefficien		=	0.92												

2.4 ELC Reanalysis Results

The reanalysis of the habitats with the ELC area identified by Stassinu Stantec (2012a) using recent imagery resulted in a similar areal extent for some of the habitat classes, while others have experienced moderate change and others significant change. While there have been changes in the areal extent of habitats, the changes are primarily as a result of being classified into another ecotype and not as a result of development activities since the initial ELC was completed. Specifically, the Anthropogenic/Bare ground classification has increased from 22.4 km^2 to 28.3 km^2 (a change of 5.9 km^2), indicating that there has been relatively small development activities within the RSA since 2011-2012. Since the RSA includes areas within the municipal boundaries of Labrador City and Wabush, the Tacora mine site, and areas in proximity of the town of Fermont it is likely that incremental development activities over the years in these areas has led to the increase in areal extent of this classification (approximately 26%). Table 2-4 provides an overview of the changes in habitat areal extent between the initial ELC and the reassessment, while Appendix A provides a map series outlining the results of the habitat class areal extent reassessment.

The greatest changes occurred for areas of softwood forest habitat, with Black Spruce-Labrador Tea-Feathermoss increasing by 30.8 km^2, while Black Spruce/Tamarack-Sphagnum Woodland and Tamarack/Black-Spruce-Feathermoss (Water Track) saw a decrease in areal extent of 31.5 km^2 and 26.7km^2, respectively. A review of the Stassinu Stantec's accuracy assessment for the initial ELC indicates that the Black Spruce-Labrador

Tea-Feathermoss classification was not highly accurate (53.3%), while for the 2025 ELC the accuracy was above 95%, which accounts for most variation in the areal extent between ELC iterations.

Fen habitats all increased in areal extent within the 2025 ELC iteration compared to 2012. Specifically, Riparian Marsh (Fen) increased by 2.4 km^2 and Patterned Shrub Fen by 11.2 km^2. During the initial ELC, Graminoid Fen was included within Non-Patterned Shrub Fen which had a combined areal extent of 9.3 km^2. For the 2025 ELC, when these ecotypes were combined they have an areal extent of 18.7 km^2, an increase of 9.4 km^2. WSP suspects the Tamarack/Black Spruce-Feathermoss (Water Track) areal extent was overestimated during the initial ELC iteration and actually incorporated, at least partially, other adjacent habitat classes (e.g., adjacent fens). Based upon field observations the Water Track habitat occurred as a somewhat linear feature, where a small stream passed through a stand of tamarack/black spruce. Figure 2-4 depicts the typical arrangement of the Tamarack/Black Spruce-Feathermoss (Water Track) ecotype. These areas are generally slightly elevated (likely with better drainage) compared to adjacent fen habitats, and with feathermosses present at various densities, compared to an almost exclusive moss composition of *Sphagnum spp*. in adjacent fen habitats. The Tamarack/Black Spruce-Feathermoss (Water Track) habitat is typically narrow (typically 30m or less wide based on field surveys), hence there would have to be an extensive network of small streams within the RSA to account for the 30.1 km^2 identified by Stassinu Stantec (assuming an average width of 30 m there would need to be over 1000 km of streams). If this assumption is correct, the apparent loss of 26.7 km^2 of Tamarack/Black Spruce-Feathermoss (Water Track) between ELC iterations could be mostly offset by the gains in other fen habitat classes. Specifically, gains in Patterned Shrub Fen (11.2 km^2), Non-Patterned Shrub Fen & Graminoid Fen combined (9.4 km^2) and Riparian Marsh (2.4 km^2) habitat could account for 23.1 km^2 of the apparent loss of Tamarack/Black Spruce-Feathermoss (Water Track) habitat.

Table 2-4: Comparison of Historic and Current ELC Habitat Classification Areas

Ecological Land Classification Category	Stantec ELC Area (km^2)	WSP ELC Area (km^2)	Change in Area (km^2) (WSP-Stantec)
Alder Thickett	0	4.5	4.5
Alpine Heath	1.0	7.9	6.9
Black Spruce-Labrador Tea -Feathermoss	91.5	122.3	30.8
Black Spruce-Lichen	19.7	20.9	1.2
Black Spruce/Tamarack-Sphagnum Woodland	49.6	18.1	-31.5
Burn/Regeneration	76.9	58.3	-18.6
Hardwood Forest	5.4	5.6	0.2
Jack Pine	0	5.8	5.8
Mixedwood Forest	17.5	18.3	0.8
Non-Patterned Shrub Fen (includes Graminoid Fen)	9.3	5.6	-3.7
Patterned Shrub Fen	3.1	14.3	11.2
Riparian Marsh (Fen)	0.6	3.0	2.4
Riparian Thickett	0.3	3.8	3.5
Tamarack/Black-Spruce-Feathermoss (Water Track)	30.1	3.4	-26.7
Open Water	54.5	66.0	11.5
Shallow Water with Vegetation	5.0	0	-5
Developed Land	22.4	28.3	5.9
Non-ELC	9.5	0	-9.5
Total Area	**396.4**	**399.1**	

Figure 2-4: Google Earth image depicting the typical linear arrangement of Tamarack/Black Spruce-Feathermoss (Water Track) habitat ecotype (center of image), flanked by patterned fens.

The Burn/Regeneration (all Burn/Regeneration classes combined) area has decreased in overall areal extent by 18.6 km^2, suggesting that successional progression may be occurring (i.e., vegetation overgrowth has resulted in the GIS analysis reclassifying previous burned/regeneration areas as another habitat classification).

Riparian Thickett areal extent increased by 3.5 km^2 in the 2025 ELC. Anecdotally, based upon a visual review of the original mapping it appears that the areal extent provided in the Stassinu Stantec ELC report Table 7.1 (Stassinu Stantec 2012a) may be underreported (i.e., visually from the map outputs there appears to be more habitat than the 0.3 km^2 reported).

Alpine heath increased from 1.0 km^2 during the initial ELC, to 7.9 km^2 during the 2025 ELC an increase of 6.9 km^2.

The areal extent of the Black Spruce-Lichen, Hardwood Forest and Mixedwood Forest classifications showed minimal change between ELC iterations, increasing by 1.2 km^2, 0.2 km^2 and 0.8 km^2, respectively in 2025.

The 2025 ELC saw the addition of two new ecotype classes, Alder Thickett and Jack Pine Stand. Alder thickets were generally encountered along the edges of disturbed areas and generally provided extensive cover. It appears that from the Stassinu Stantec ELC mapping that Alder Thickets were previously classified as Softwood Burn/Regeneration. The addition of this class may partially account for the change in Softwood Burn/Regeneration areal extent between ELC iterations. The Alder Thickett ecotype accounted for 4.5 km^2 of habitat within the RSA. Jack Pine Stands were encountered during field surveys in proximity to the access to

Elephant Head Lake and Riordan Lake. At both locations the area appeared to be previously harvested, with Jack Pine planted post harvest. These areas are important as the species is a Species of Conservation Concern with S-Rank of S1 in the province. Jack Pine Stands accounted for 5.8 km^2 of the RSA. Based upon a review of the Stassinu Stantec ELC mapping it appears that these areas were previously classified as Tamarack/Black Spruce Treed Fen and Black Spruce/Tamarack-Sphagnum Woodland. The addition of this class may partially account for the change in Black Spruce/Tamarack-Sphagnum Woodland areal extent between ELC iterations.

The Open Water habitat classification saw an increase of 6.5 km^2. For the latest iteration, this habitat classification included what was previously identified as Shallow Water with Vegetation (5.0 km^2) during the initial Stassinu Stantec ELC. The Open Water class also increased because of the flooding of the historic pits of the Scully Mine site (currently operated by Tacora Resources) in the time between each ELC iteration.

Changes in the areal extent of some ecotypes may be explained, in part, by the inclusion of previous areas identified as Non-ELC (cloud cover, shadow etc.) which had an areal extent of 9.5 km^2 during the initial Stassinu Stantec ELC (i.e., in 2025 these Non-ELC areas were classified as one of the other habitat ecotypes). In addition, the area assessed in 2025 was slightly larger (399.1 km^2) than the area assessed in 2011-2012 (396.4 km^2) which may account, in part, to small changes in areal extent. Additional changes to the distribution of the various ELC ecotypes is likely a product of more advanced and powerful software applications (e.g., remote sensing/GIS) and image quality which has advanced considerably allowing areas to be more accurately assessed.

2.5 Comparison of Habitat Extent within Regional Study Area and Site Assessment Area

The current extent of the habitats within the site assessment area (SSA) was compared to the habitat extent within the regional study area (RSA) for each of the habitat classifications (Table 2-5) used for the 2025 ELC. Comparing the areal extent of the habitats within each of the study areas provides insight into whether a specific habitat type may be rare in the area and if it is restricted to areas which may be affected by the project. The SSA encompasses 43.2 km^2 or 10.8% of the RSA (399.1 km^2).

Most habitat classes within the SSA made up less than 25% of their areal extent within the RSA. Softwood Burn/Regeneration and Hardwood Burn/Regeneration are slightly higher (26.7 and 25.8 percent, respectively), but also have large total areas in the RSA (43.8 and 14.5 percent, respectively), so therefore would not be considered restricted to areas within the SSA.

Several habitat classes have individual relative proportions within the SSA which are less than 10% of the RSA including Water (2.0%), Developed Land (3.1%), Riparian Marsh (Fen) (5.7%), Black Spruce-Lichen (7.1%), Black Spruce/Tamarack-Sphagnum Woodland (7.4%), Black Spruce-Labrador Tea-Feathermoss (7.7%) and Riparian Thickett (8.1%). Several classes have relative proportions of the RSA which range between 10% and 20% of the RSA. These included Jack Pine (10.4%), Alpine Heath (12.8%), Mixedwood Forest (13.6%), Graminoid Fen (14.4%), Non-patterned Shrub Fen (15.9%), Alder Thickett (17%) and Hardwood Forest (17.8%). While Tamarack/Black-Spruce-Feathermoss (Water Track) and Patterned Shrub Fen have relative proportions of the RSA more than 20% but less than 25% (22.4% and 24.1%, respectively).

Table 2-5: Habitat distributions within the Regional Study Area and Site Assessment Area

Ecological Land Classification Category	WSP ELC Area (km^2)	Habitat within SSA (km^2)	Proportion of Habitat within SSA in comparison to RSA (%)
Alder Thickett	4.5	0.8	17.0
Alpine Heath	7.9	1.0	12.8
Black Spruce-Labrador Tea -Feathermoss	122.3	9.4	7.7
Black Spruce-Lichen	20.9	1.5	7.1
Black Spruce/Tamarack-Sphagnum Woodland	18.1	1.3	7.4
Developed Land	28.3	0.9	3.1
Graminoid Fen	13.2	1.9	14.4
Hardwood Burn/Regeneration	14.5	3.8	25.8
Hardwood Forest	5.6	1.0	17.8
Jack Pine	5.8	0.6	10.4
Mixedwood Forest	18.3	2.5	13.6
Non-Patterned Shrub Fen	5.6	0.9	15.9
Patterned Shrub Fen	14.3	3.4	24.1
Riparian Marsh (Fen)	3.0	0.2	5.7
Riparian Thickett	3.8	0.3	8.1
Softwood Burn/Regeneration	43.8	11.7	26.7
Tamarack/Black-Spruce-Feathermoss (Water Track)	3.4	0.8	22.4
Water	66.0	1.3	2.0
Total Area	**399.1**	**43.2**	**10.8**

3.0 DATA REVIEW FOR SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

A data review was completed to identify any potential Species at Risk (SAR) or SOCC which may occur within the region that fall in the range of S-Rankings identified within the final EIS guidelines. This data review included:

1) Revisiting the Atlantic Canada Conservation Data Center search of the RSA which was completed in 2023 to determine if there are more documented SOCC within the ranking range which may occur in the area.

2) Reviewing the field data from the 2023 Vegetation and Wetland surveys to determine if additional species within the ranking range were encountered during the field programs.

3) Reviewing a third-party report to determine if Rare Plant Surveys required as part of a permitting process encountered any SAR or SOCC. Rare plants encountered were assessed to determine if they fell into the range of S-ranks required for assessment.

4) Review of historic data to identify previous occurrences of SOCC within the vicinity of the project.

3.1 Atlantic Canada Conservation Data Centre Search Results (2023)

In 2023 WSP requested a data search from ACCDC of a 348 square kilometer area around the project. This search area was the same area used by Stassinu Stantec for initial Ecological Land Classification for the previous Kami Project Environmental Assessment within Labrador. This search identified any known occurrences of SAR and SOCC within the search area. Table 3-1 includes all species that the ACCDC search returned that had S-Ranks within the status range identified within the final EIS guidelines to be assessed. For all species identified within the status range, the common name, scientific name and S-Rank (Provincial) are provided. All but Trailing Arbutus (*Epigaea repens*), Alpine Sweet-vetch (*Hedysarum americanum*), Foxtail Barley (*Hordeum jubatum subsp. jubatum*) and Greenish-Flowered (*Pyrola chlorantha*) were included in the initial Vegetation and Wetland Report.

Table 3-1: Species of Conservation Concern within the Ranking Range for Assessment in the Final EIS Guidelines with Recorded Occurrences within the Assessment Area based upon 2023 ACCDC search

Common Name	Scientific Name	S-Rank
Green Spleenwort	*Asplenium viride*	S1S2
Beautiful Sedge	*Carex concinna*	S2
Small Yellow Lady's-Slipper	*Cypripedium parviflorum*	S1
Mountain Bladder Fern	*Cystopteris montana*	S2
Trailing Arbutus	*Epigaea repens*	S2S3
Daisy Fleabane	*Erigeron hyssopifolius*	S2
Limestone Polypody	*Gymnocarpium robertianum*	S1
Running Pine	*Lycopodium clavatum*	S1S3
Alpine Sweet-Vetch	*Hedysarum americanum*	S2S3
Foxtail Barley	*Hordeum jubatum subsp. jubatum*	S2S3
Marsh Muhly	*Muhlenbergia glomerata*	S2?
Jack Pine	*Pinus banksiana*	S1
Greenish-Flowered Wintergreen	*Pyrola chlorantha*	S2S3
Northern Valerian	*Valeriana dioica subsp. sylvatica*	S2
Green False Hellebore	*Veratrum viride var. viride*	S2

3.2 WSP Vegetation and Wetland Surveys (2023)

The field plot surveys and wetland survey data collected in 2023 by WSP focused on SAR listed under Schedule 1 of the federal Species at Risk Act (ECCC 2023), species listed under the Newfoundland and Labrador Endangered Species Act (NLESA) (Government of Newfoundland and Labrador 2023), and SOCC identified as having a provincial S-rank of S1, S2, S1S2 or S1S3. Figure 3-1 provides the location of each of the 2023 vegetation survey plots, while Figure 3-2 outlines the wetlands surveyed in 2023.

The final Environmental Impact Statement (EIS) guidelines, dated December 19, 2024, indicate that SOCC species ranked from S1 to S2S3, SH, SNR, SU and species which do not have a Labrador rank should be included in the assessment, in addition to provincially and federally listed species at risk (Government of Newfoundland and Labrador 2024). While no Federally or Provincially listed SAR were identified to occur in the area based on the ACCDC search of rare species, or during 2023 field surveys, there were several SOCC species which had provincial S-ranks which fell into the range as indicated in the Final EIS guidelines. Table 3-2 provides a list of the species encountered (common name and scientific name), the provincial rarity rank for each and the survey plot(s) or wetland where the species was found during 2023 surveys. Appendix A provides photographs of each SOCC encountered during the 2023 surveys, except for two-eyed berry (*Mitchella repens*).

Table 3-2: Species of Conservation Concern Encountered During 2023 Vegetation and Wetland Surveys which were within the Range of Rankings Required for Assessment under the 2024 Final EIS Guidelines

Common Name	Scientific Name	Provincial Rarity Rank	Plots Where Species Found
Black Bentgrass	*Agrostis gigantea*	No Labrador Rank	KV-38
Snakewort	*Conocephalum salebrosum*	S2S3	KV-41
Trailing Arbutus	*Epigaea repens*	S2S3	KV-35
Running Pine (Arctic Stag-Horn Clubmoss)	*Lycopodium clavatum*	S1S3	KV-10
Two-Eyed Berry	*Mitchella repens*	No Labrador Rank	WL-5
Bog Muhly	*Muhlenbergia uniflora*	S2S3	KV-47
Jack Pine	*Pinus banksiana*	S1	KV-7, KV-53
Little Yellow Rattle	*Rhinanthus minor*	SU	KV-56
Hoary Willow	*Salix candida*	S2S3	WL-7
Northern Valerian	*Valeriana dioica subsp. Sylvatica*	S2	KV-6
Green False Hellebore	*Veratrum viride var. viride*	S2	KV-1, KV-4, KV-27, KV-28, KV-29, KV-38, KV-43, KV-56, KV-59

Running pine (*Lycopodium clavatum*), jack pine (*Pinus banksiana*), woods valerian (*Valeriana diocia*), and green false hellebore (*Veratrum viride var. viride*) were included in the initial vegetation and wetland report but are also included in Table 3-2 for completeness. While running pine was identified as occurring in the area in 2023 (Plot KV-10) an additional review of the field data and photos resulted in the identification to be questioned. As a result, it appears that the species may have been mis-identified and is likely One-Cone Ground-Pine (*Lycopodium lagopus*) which has a provincial S-rank of S4S5 within Labrador.

Species without a Labrador S-rank included black bentgrass (*Agrostis gigantea*) and two-eyed berry (*Mitchella repens*), while little yellow rattle (*Rhinanthus minor*) was classed as SU.

Black bentgrass, is identified globally as having a G-Rank of G4G5, while throughout most of Canada the species is identified as being an exotic species (NatureServe 2024a). Areas such a Labrador and areas of northern Canada do not carry the exotic designation, nor are any rankings provided for the species. The species is also identified as introduced by the Flora of North America (Harvey 2024).

Two-eyed berry, while unranked in Labrador, carries a provincial ranking of S5 in Quebec (NatureServe 2024b) suggesting that the species is likely secure within the western Labrador region.

Little yellow rattle is unranked in Labrador and Quebec but is ranked as S3 (vulnerable) in insular Newfoundland and Nunavut (NatureServe 2024c). The species is also ranked G5 globally (NatureServe 2024c).

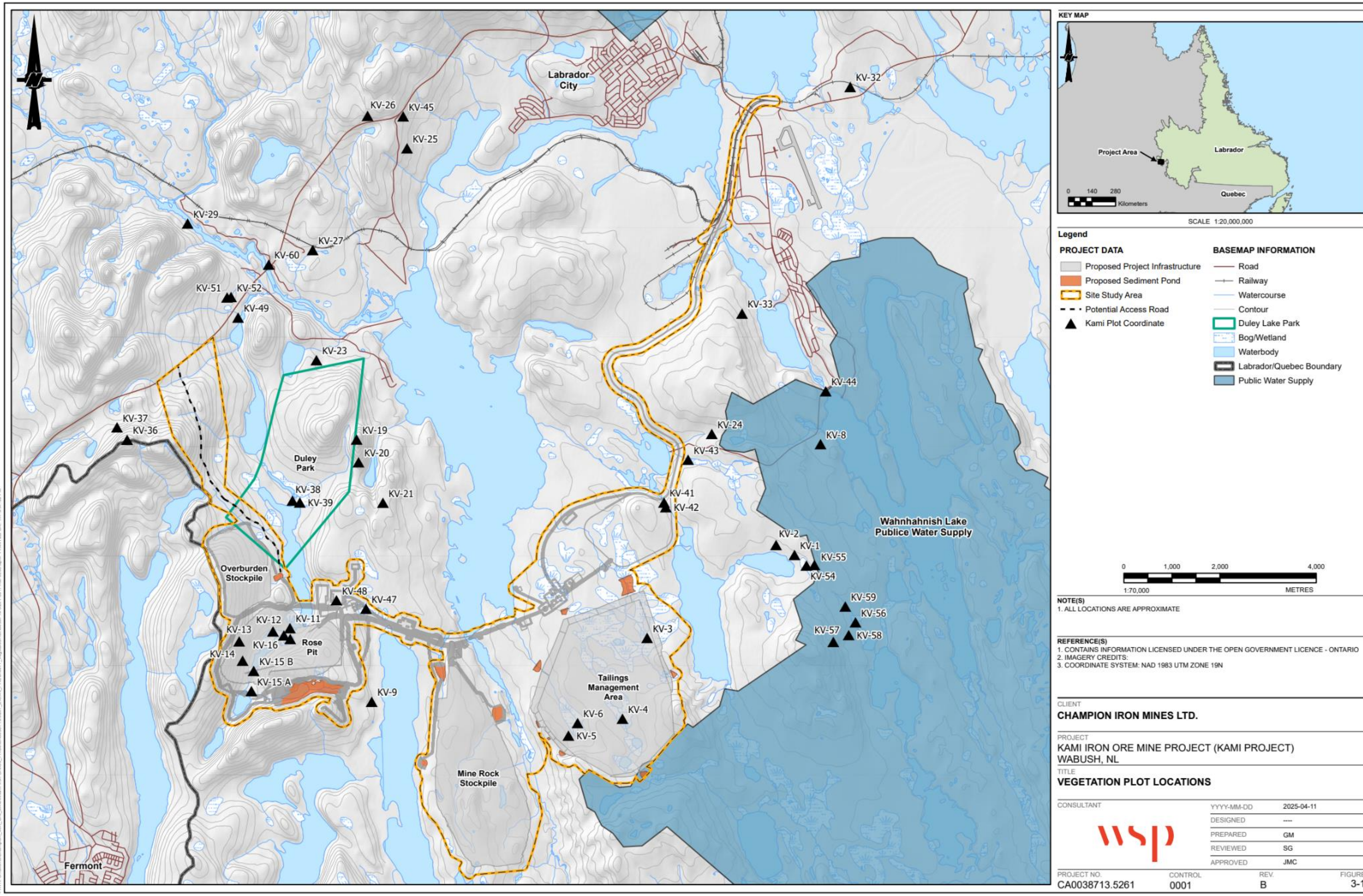

Figure 3-1: Vegetation Plot Locations

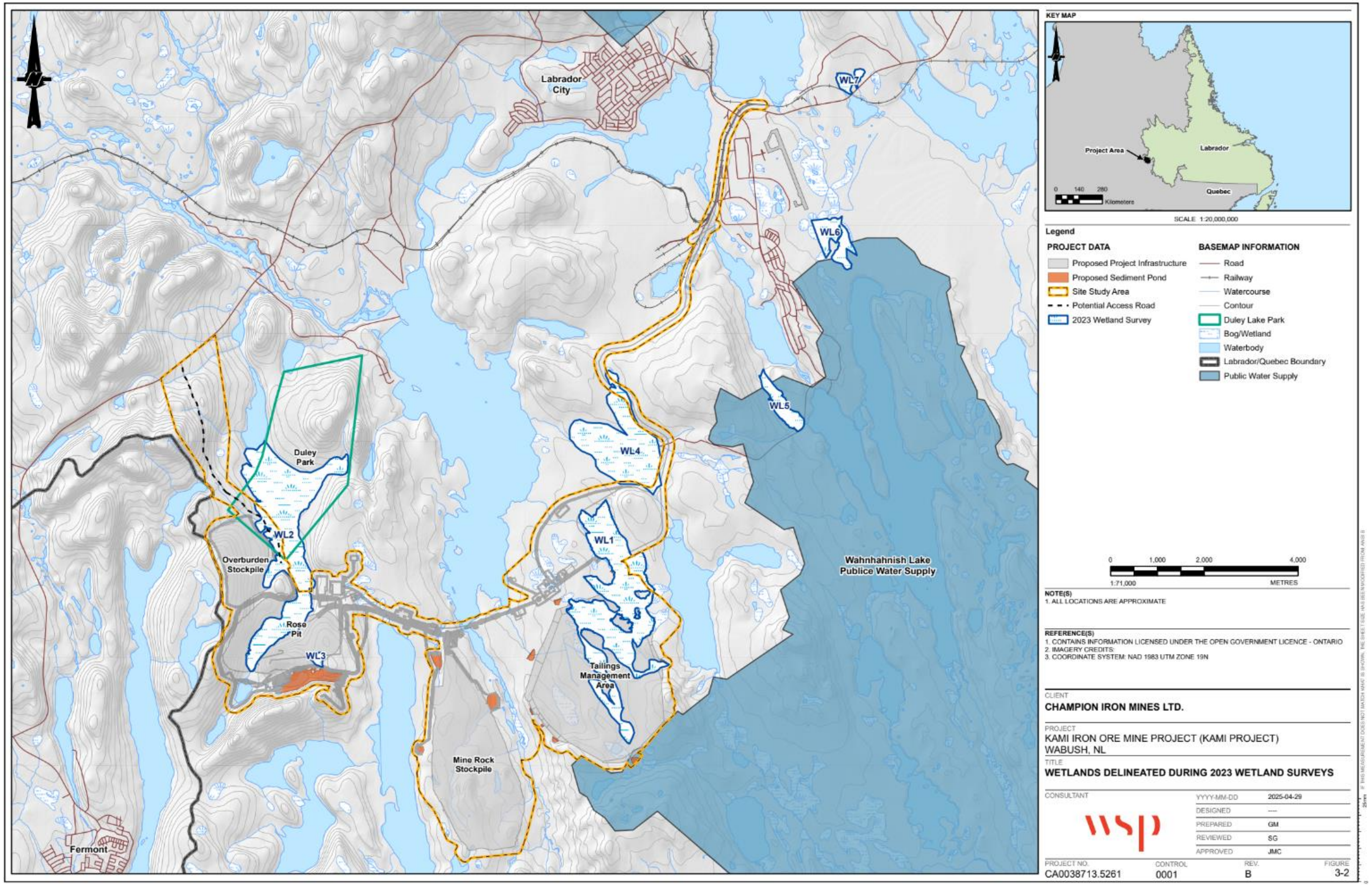

Figure 3-2: Wetlands Delineated During 2023 Wetland Surveys

3.3 Rare Plant Surveys in Support of Borehole Drilling Program

Champion Iron Ore enlisted the services of SEM to conduct rare plant surveys in support of acquiring permits for a borehole drilling program. The borehole drilling program was required for further delineation of the ore body and for determining local hydrogeological conditions. Overdale Environmental in conjunction with Boreal Environmental conducted the rare plant surveys and provided a summary report on behalf of SEM (Appendix C).

The rare plant surveys included surveying an area within a 25 m radius of twenty identified borehole locations, water intake access trails for nine water intakes (3 m wide survey area), and approximately 2.5 km of access trail (5 m wide survey area) connecting the borehole locations.

The rare plant surveys identified a total of four species which fell into ranking categories required for assessment as per the EIS guidelines. These species are Northern Clustered Sedge (*Carex arcta*), Vasey Oatgrass (*Danthonia intermedia*), Running Pine (*Lycopodium clavatum*), and Green False Hellebore (*Veratrum viride*), Table 3-3 provides a list of the species encountered (common name and scientific name), the provincial rarity rank for each and the general location where they were found during the rare plant survey for the borehole drilling program.

Table 3-3: Species of Conservation Concern Encountered during the borehole drilling program within the Provincial Rarity Ranking (R-ranks) Required for Assessment as Indicated in 2024 Final EIS Guidelines During 2024 Permitting Rare Plant Surveys

Common Name	Scientific Name	Provincial Rarity Rank	General Location Where Species Found
Northern Clustered Sedge	*Carex arcta*	SU	Northern Side of Rose Pit
Vasey Oatgrass	*Danthonia intermedia*	S2S3	Western Side of Rose Pit; Southwestern Corner of Rose Pit
Running Pine (Arctic Stag-Horn Clubmoss)	*Lycopodium clavatum*	S1S3	Western Side of Rose Pit
Green False Hellebore	*Veratrum viride var. viride*	S2	Western Side of Rose Pit

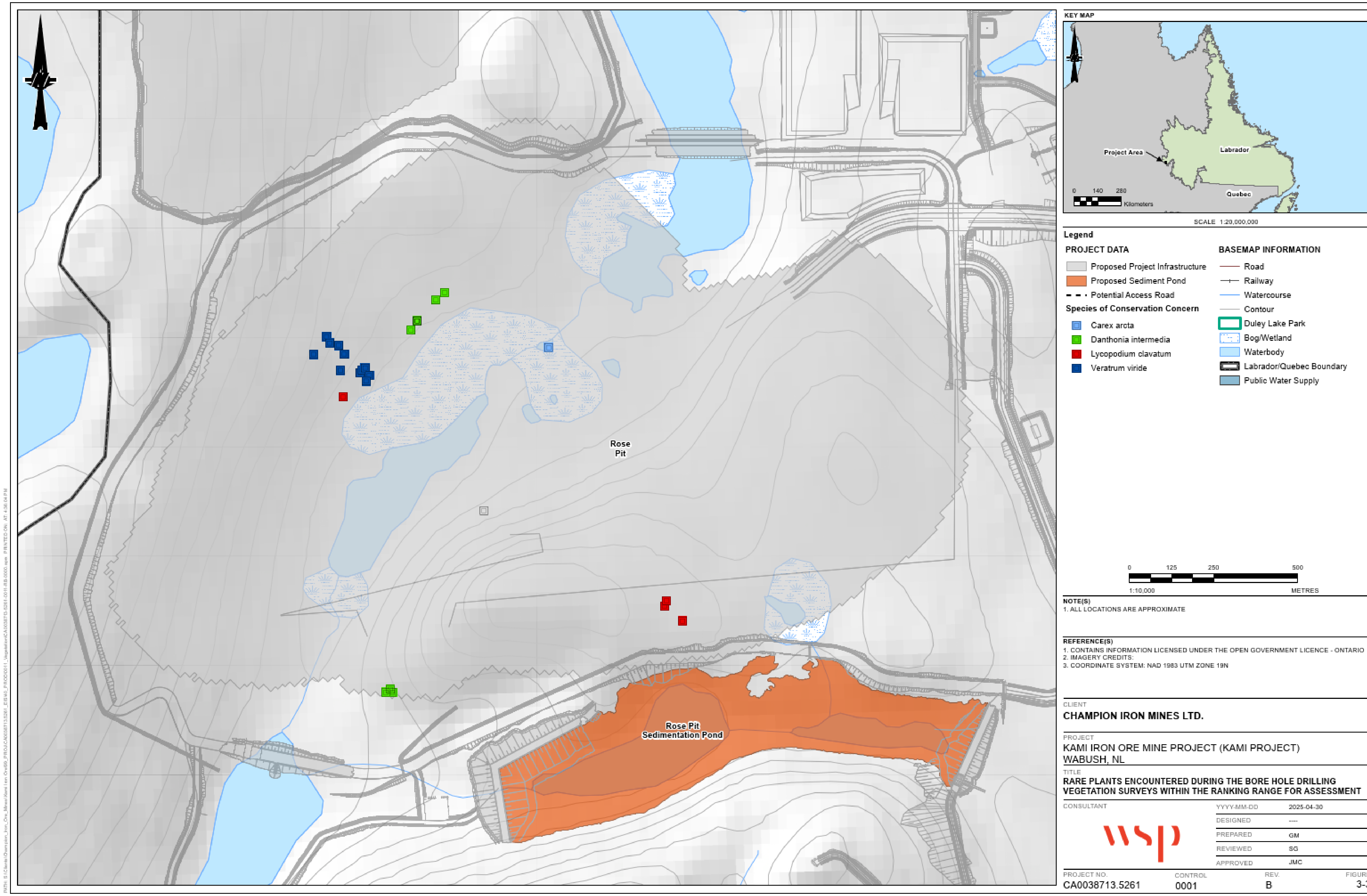

Figure 3-3: Rare plants encountered during the bore hole drilling vegetation surveys within the ranking range for assessment

3.4 Historic Occurrences of Rare Plant Species within Project Vicinity

To complete baseline studies for the original Kami project EIS, Alderon engaged Stassinu Stantec to complete rare plant surveys of the SSA and the RSA. The surveys included an initial desktop review of potential occurrences of SAR and SOCC in the area followed by field surveys to confirm rare plant occurrences.

3.4.1 Historic Distribution Data Search

The historic data search completed by Stassinu Stantec included a literature review with the intent of identifying potential SAR and SOCC which may occur within the study area. This included searches of peer-reviewed journals, research project reports, government publications and federal legislation/regulations. Government publications reviewed included Committee on the Status of Endangered Wildlife in Canada status reports and *Species at Risk Act* Recovery Strategies/Action Plans, as well as Gray's Manual of Botany, Flora of Canada and Flora of North America to determine potential species presence in the area (Stassinu Stantec 2012b). In addition, an ACCDC search of an 1,890 km^2 area centered on the project (Stassinu Stantec 2012b) was also completed and assessed for SOCC. The historic data search identified a total of eighteen rare species which may occur in the area. However, only nine of the eighteen species fall within the current S-ranking range for assessment. Table 3-4 outlines the nine species from the literature review which fall within the S-rank range for assessment along with their associated Subnational (Provincial) rank.

Table 3-4: Species of Conservation Concern Identified to Occur within Proximity of the Project during Historic Data Searches within the Range of Rankings Required for Assessment under the 2024 Final EIS Guidelines

Common Name	Scientific Name	S-Rank
Beautiful Sedge	*Carex concinna*	S2
Common Comandra	*Comandra umbellata*	S1 (2015)
Mountain Bladder Fern	*Cystopteris montana*	S2
Meadow Horsetail	*Equisetum praetense*	S2S3 (2015)
Alpine Sweet-Vetch	*Hedysarum americanum*	S2S3
Foxtail Barley	*Hordeum jubatum subsp. jubatum*	S2S3
Blunt Sweet-Cicely	*Osmorhiza depaupperata*	S1 (2015)
Narrowleaf Small Pondweed	*Potomogeton pusillus*	S2S3 (2015)
Green False Hellebore	*Veratrum viride var. viride*	S2

3.4.2 Historical Field Surveys

As part of the initial baseline studies completed for the Kami Project, while under the ownership of Alderon Iron Ore Corporation, Stassinu Stantec completed rare plant surveys within the Rare Plant Study Area. Over a five-day period in July/August 2011 and an additional five days in mid-July 2012 Stassinu Stantec completed surveys within a 161 km^2 area (Rare Plant Study Area), (Stassinu Stantec 2012b). The survey area encompassed the previous project components (pit, overburden stockpile, waste rock stockpile, tailings management area, processing plant, road/rail line/transmission corridor and associated infrastructure), key habitat for SOCC identified as possibly being present, and areas used for resource harvesting, recreational and cultural activities (Stassinu Stantec 2012b). The Stassinu Stantec (2012b) Rare Plant Survey Report provides an overview map (Page 10) which identifies the rare plant study area. At the time, these surveys identified thirty-seven rare vascular plant taxa within the Rare Plant Study Area. However, based upon the current assessment criteria only eleven taxa fall within the range for assessment. Of the eleven taxa all but one (*Pyrola chlorantha*) have been either previously identified above as occurring in the area during recent surveys, or through data searches within the area. Table 3-5 provides a list of the SOCC identified during the Stassinu Stantec surveys in 2011 and 2012 which fall into the range of rankings required for the assessment.

Table 3-5: Species of Conservation Concern Encountered During Historical Baseline Surveys (2011-2012) which were within the Range of Rankings Required for Assessment under the 2024 Final EIS Guidelines

Common Name	Scientific Name	S-Rank
Beautiful Sedge	*Carex concinna*	S2
Umbellate Bastard Toad-Flax	*Comandra umbellata*	S1 (2015)
Small Yellow Lady's-Slipper	*Cypripedium parviflorum*	S1
Trailing Arbutus	*Epigaea repens*	S2S3
Daisy Fleabane	*Erigeron hyssopifolius*	S2
Alpine Sweet-Vetch	*Hedysarum americanum*	S2S3
Marsh Muhly	*Muhlenbergia glomerata*	S2?
Greenish Flowered Wintergreen	*Pyrola chlorantha*	S2S3
Jack Pine	*Pinus banksiana*	S1
Northern Valerian	*Valeriana dioica subsp. sylvatica*	S2
Green False Hellebore	*Veratrum viride var. viride*	S2

3.5 Species Descriptions from Additional Reassessment of 2023 Survey Data, Rare Plant Surveys in Support of Borehole Drilling Program and Historical Data/Surveys

Provided below are brief descriptions of the species which were encountered during all reviews and surveys since 2011 (i.e., 2023 vegetation plot surveys, 2023 wetland surveys, historic rare plant surveys (2011 and 2012) conducted by Stassinu Stantec, and records of the species occurring in the area through ACCDC searches (2023 -WSP and 2011-Stantec)) which fell in the range criteria identified in the Final EIS guidelines.

Black Bentgrass (*Agrostis gigantea*)

Black bentgrass is perennial species commonly found in a variety of disturbed habitats including fields, roadsides and ditches, with an extensive range extending from subarctic areas to Mexico (Harvey 2024). Plants can attain heights more than 1m with panicles that range from 8-25cm. Leaves are mostly cauline from 4 to 10 cm in length (Harvey 2024). The species is identified as introduced with a provincial range which includes western and northeastern insular Newfoundland (Meades and Meades 2024 a).

Green Spleenwort (*Asplenium viride*)

Green spleenwort is a low growing creeping or ascending frequently branched plant found growing on limestone or other basic rocks. Leaves are compound (mono-pinnate) ranging from 2-13 cm in length by 0.6-1.2 cm wide. Each leaf has 6-21 pairs of pinnae per leaf with each pinnae almost as wide as long (Wagner et al. 2024). The species has a disjunct circumpolar distribution which includes insular Newfoundland (except southern portion) and from southeast to western Labrador (Meades and Meades 2024 b).

Northern Clustered Sedge (*Carex arcta*)

Northern clustered sedge can attain heights of up to 80 cm, occurring as dense tufts growing in wet locations within coniferous woods (swampy), thickets and meadows (Toivonen 2024). Inflorescences are erect ovoid to oblong in shape, comprised of 5-15 spikes each with 10-20 sessile perigynia (Toivonen 2024). Perigynia green to brown (at age), fruit are a pale dull to glossy brown and ovate (Toivonen 2024).

Provincially the species range includes much of insular Newfoundland with a disjunct distribution throughout southern and central Labrador (Meades and Meades 2024 c).

Beautiful Sedge (*Carex concinna*)

The beautiful sedge is found in a variety of habitats which include moist to dry meadows, riverbanks, tickets, floodplains, and open woodlands typically on calcareous substrates. Plants are short with culms up to 20 cm and typically with basal leaves narrow (1-3 mm wide) and shorter than culms (Crins 2024). The range of the species includes boreal areas of North America. Provincially the species range includes western and northwestern portions of insular Newfoundland, north to western Labrador (Meades and Meades 2024 d).

Common Comandra (*Comandra umbellata* subsp*. umbellata*)

Common Comandra is found within a variety of habitats including swamps/bogs, dry sandy/rocky soils, early successional forests, and rich mesic sites (Nickrent 2024). Plants are herbaceous-subshrubs which range in height from 7-40 cm and are comprised of branched to multibranched aerial stems. Leaves (0.7-5 cm) green, thin, lanceolate to ovate, with conspicuous mid and lateral veins. Flowers are funnel shaped, comprised of petals which are 2-3 mm long. The species has a distribution western and western insular Newfoundland which extends to southern Labrador (Meades and Meades e).

Snakewort (*Conocephalum salebrosum*)

Snakewort is found in moist, shaded areas along stream sides, springs and moist rock faces. (NatureServe 2024d). The species is found in calcareous habitats and has a Holarctic distribution occurring in Europe, Russia, and throughout many states and Canadian provinces. (NatureServe 2024 d). The species distribution throughout the province is unknown.

Small Yellow Lady’s Slipper (*Cypripedium parviflorum*)

Small yellow lady’s slipper is a member of the orchid family which has a conspicuous flower (1-2) which has a bright yellow lower petal which is slipper shaped. Leaves (3-5) alternate, erect to spreading and ranging from orbiculate to oblanceolate in shape (Sheviak 2024). Meades and Meades (2024 f) provide a distribution of the *pubescens* variety which includes temperate to boreal North America, with distribution from southwestern to northwestern Newfoundland and western Labrador over calcareous substrates. Meades and Meades (2024 f) also indicate that the first record of this species and variety in Labrador was located during previous studies by Stassinu Stantec in 2013 near Wabush.

Mountain Bladder Fern (*Cystopteris montana*)

Mountain bladder fern is species of fern which has fronds that may be three to four times pinnate and up to 45 cm in length. Pinnae generally ascending with leaf veins directed into notches. The species is found in wet woodlands or along water courses (Haufler et al. 2024) while having an affinity for calcareous substrates (Meades and Meades 2024 g). The species range includes boreal cordilleran areas while it has a disjunct distribution in the northwestern portion of insular Newfoundland it is also distributed in southeastern, western and northern Labrador (Meades and Meades 2024 g).

Vasey Oatgrass (*Danthonia intermedia*)

Vasey oatgrass occurs in a variety of habitats including open woods, rocky slopes, boreal/alpine meadows throughout the western United States and boreal regions of Canada (Darbyshire 2024). The species can range in height from 10-50cm, with leaf blades ranging 5-10cm long and 1-3.5mm wide. Inflorescences are comprised of 5-10 spikelets on upper branches and 2-3 on lower branches (Darbyshire 2024). The provincial range extends from western insular Newfoundland, northward to central labrador and is commonly found in association with serpentine areas (Meades and Meades 2024 h).

Trailing Arbutus (*Epigaea repens*)

Trailing arbutus is a prostrate evergreen shrub with hairy green to reddish-brown branches (Ryan 1995). Leaves are oval, alternate, rounded to heart shaped at the base, while flowers are pink to white about 1.5 cm across blooming in May-June (Ryan 1995). Plants are found in a variety of habitats including on the forest floor of coniferous forests, barrens (which may be boggy), serpentine areas, on limestone ledges and on mountain tops (Ryan 1995). The species is found in temperate North America, while occurring Provincially through southern, central and western insular Newfoundland, north to southern Labrador (Meades and Meades 2024 i).

Meadow Horsetail (*Equisetum pratense*)

Meadow horsetail is found within meadows and wet woodlands (Hauke 2024). Aerial stems are dimorphic. Vegetative stems green 16-50cm tall, hollow, and branched (with branches occurring in whorls), (Hauke 2024). Fertile steams brown initially unbranched, becoming branched after spores discharged (Hauke 2024). The species has a distribution throughout western and northeastern insular Newfoundland north to southeastern and western Labrador (Meades and Meades j).

Daisy Fleabane (*Erigeron hyssopifolius*)

Daisy fleabane can be found in a variety of habitats which include open woods, gravel areas (barren, roadsides and riverbeds), rock ledges and crevices. Plants are erect, rhizomatous ranging in height from 5-35 cm. Leaves are oblong to lanceolate 1-3 cm long and narrow (1-5 mm) with basal leaves reduced. Flower heads range from one to five each comprised of 20 -50 white to pinkish florets (Nesom 2024). The species range is boreal North America, insular Newfoundland (except eastern portion-Avalon peninsula) and a disjunct distribution in western Labrador (Meades and Meades 2024 k).

Limestone Polypody (*Gymnocarpium robertanium*)

Limestone polypody is species of fern which has fronds that may be bi- or tri- pinnate and range from 10-52 cm in length and 5-19 cm wide. The species is typically found growing in calcareous substrates, limestone pavement, outcrops, cliffs and cedar swamps (Pryer 2024). Meades et al. (2000) indicate that the species has a disjunct Eurasian distribution and can be found in southern boreal areas of eastern North America. Provincially, Meades et al. (2000) report, the species occurring in western to northern insular Newfoundland but not in Labrador, while the 2023 ACCDC search for this project identifies two records of the species within the Labrador City/Fermont area related to baseline surveys for the Kami development.

Alpine Sweet-vetch (*Hedysarum americanum*)

Alpine Sweet-vetch is found in a variety of habitats including tundra, cliffs, beaches (lake), river edges, in imperfectly to moderately drained sites on sand, silt or till substrates (Aiken et al. 2007). Plants are generally short (10-25 cm) but may be up to 60 cm tall, with arching aerial stems and leaves alternate. Pinnate leaflets with leaves glabrous above and glabrous or hairy beneath (Aiken et al. 2007). Two or more flowering stems per plant, with each inflorescence comprised of 10-15 flowers, flowers with five pink to pale purple petals (Aiken et al. 2007). The species is found in southern Labrador, central, western and northwestern Newfoundland in association with calcareous substrates (Meades and Meades 2024 l).

Foxtail Barley (*Hordeum jubatum subsp. jubatum*)

Foxtail barley is commonly found in meadows, prairies, along the edges of riverbeds/lakes, roadsides and disturbed habitats often in association with saline habitats (Bothmer et al. 2024). Plants are typically perennial, ranging from 20-80 cm in height (culm), with leaves up to 15 cm long (Bothmer et al. 2024). Spikes are 3-15 cm long, with a nodding appearance and whitish green sometimes with a light purple hue (Bothmer et al. 2024). The species generally has a distribution throughout most of insular Newfoundland except the eastern region and is an introduced species to central labrador (Meades and Meades 2024 m). It is a halophile found primarily in coastal areas, but has become introduced in inland areas, commonly along salted roadways (Meades and Meades 2024 m).

Running Pine (*Lycopodium clavatum*)

Running pine is a low growing species of clubmoss comprised of a series of branching lateral stems which grow across the forest floor which transition to an upright branched stem. Upright branches are variably forked (1-4x) up to 25 cm tall. Leaves are evergreen, needle like and 3.5-7 mm in length (Legasy et al. 1995). The species has a disjunct circumboreal distribution which includes insular Newfoundland (except southern portion) and disjunct in central Labrador (Meades and Meades 2024 n).

Two-eyed Berry (*Mitchella repens*)

Two-eyed berry is a trailing, evergreen shrub found within shady mossy woods (Ryan 1995), scrubby heath/bog and dwarf spruce thickets (Meades and Meades 2024 o). Leaves are opposite, heart shaped, shiny and hairless ranging from 6-13mm. Pink or white flowers are paired at the ends of branches and produce two-eyed red berries (Ryan 1995). The provincial distribution of the species is restricted to southern to southwestern insular Newfoundland (Meades and Meades 2024 o). However, the species carries a provincial ranking of S5 in Quebec (NatureServe 2024b), suggesting that the species is well represented in Quebec and likely within the western Labrador region.

Marsh Muhly (*Muhlenbergia glomerata*)

Marsh muhly is a perennial grass species that grows in a variety of habitats which include bogs, alkaline fens, lake and stream banks, ditches and gravel slopes (Peterson 2024a). Culms are 30-120 cm tall with leaves 2-15 cm long and 2-6 mm wide and flat. Panicles are 1.5-12 cm long 0.3-1.8 cm wide and densely packed (Peterson 2024a). The species has a range throughout boreal North America and provincially occurs generally throughout insular Newfoundland except for the Avalon peninsula (Meades and Meades 2024 p) but not within Labrador, while the 2023 ACCDC search for this project identifies 16 records of the species within the Labrador City/Fermont area related to baseline surveys for the Kami development.

Bog Muhly (*Muhlenbergia uniflora*)

The bog muhly is a perennial member of the grass family which appears to form loose mats with culms ranging from 5-45 cm in length, with diffuse panicles 2-20cm long and 2.5-6 cm wide (Peterson 2024b). The species inhabits bogs, meadows (wet) and along freshwater shorelines in sandy/peaty soils which are often acidic (Peterson 2024b). The species range includes the boreal region of eastern north America including Newfoundland and Labrador (Meades and Meades 2024 q).

Blunt Sweet Cicely (*Osmorhiza depauperata*)

Blunt sweet cicely occurs within moist/mesic open forests and forest margins (Klinkenberg 2020). The species is a herbaceous perennial ranging from 15-70 cm in height (Klinkenberg 2020). Leaves divided (twice) into threes with leaf margins coarsely toothed (Klinkenberg 2020). Flowers green-white occasionally pink-purple arranged in a series of loose compound umbels which produce 10-15 mm long club-shaped fruit (Klinkenberg 2020). The species has a distribution throughout western and northeastern insular Newfoundland north to southern Labrador (Meades and Meades r).

Jack Pine (*Pinus banksiana*)

Jack pine is a conifer tree species with an irregular rounded to spreading flattened crown that can attain heights of 27 m. The bark is orange to red-brown and scaly. Younger the twigs are orange to red brown which eventually turn grayish brown with age. Jack pine are found in post fire succession areas, in flat dry areas, and on hills where soils are sandy (Kral 2024). The species range is eastern North America boreal regions, it has disjunct distribution in western Labrador and is introduced to insular Newfoundland as a plantation tree (Meades and Meades 2024 s). It naturally occurs at a single site in southwestern Labrador which is included in the Redfir Lake-Kapitagas Channel Ecological Reserve (Meades and Meades 2024 s).

Small Pondweed (*Potomogeton Pusillus*)

Meades and Meades (2024 t) indicate that the species does not occur within the province (Meades and Meades 2004). Rather, Meades and Meads (2024 t) indicate that the species is actually *Potomogeton berchtoldii subsp. berchtoldii* (syn. *Potamogeton pusillus L. forma. tenuissimus*) which has a distribution throughout insular Newfoundland and a disjunct distribution in central Labrador. Small pondweed is an aquatic species commonly found in shallow areas of lakes and streams (Haynes and Hellquist 2024). Leaves are 0.9-5.4 cm long and narrow (up to 2.5 mm). Inflorescence comprised of three or more peduncles per plant producing ovoid fruit (Haynes and Hellquist 2024).

Greenish Flowered Wintergreen (*Pyrola chlorantha*)

Green flowered wintergreen is found in coniferous and deciduous forests within moist to dry substrates (Freeman 2024). The species can attain heights of 22 cm (occasionally 27 cm), leaves are ovate to round, with petioles up to 6 cm, light green to purplish on top and dark green beneath (Freeman 2024). From 1 to 3 inflorescences per individual typically comprised of 2-8 greenish to yellowish white flowers (Freeman 2024). The species is found in central Labrador and throughout all but southern Newfoundland (Meades and Meades 2024 u).

Little Yellow Rattle (*Rhinanthus minor*)

The little yellow rattle has two subspecies (*groenlandicus* and *minor*), both of which inhabit a variety of disturbed and natural habitats commonly over calcareous soil or rocks (Tucker and Daughery 2024). Common habitats between the two subspecies include meadows, clearings, roadsides, slopes/hillsides, forests; while the *groenlandicus* subspecies seems to also have an affinity for moist to wet habitats occurring along stream sides, lake edges, swamps, muskeg margins, and within floodplain woods (Tucker and Daughery 2024). The specimen which was found in 2023 was found within a fen along the side of a small water track, therefore the specimen was likely the *groenlandicus* subspecies. This subspecies has stems up to 30cm long and hairy on opposite sides, with bright yellowish green dentate leaves (Tucker and Daughery 2024). The *groenlandicus* subspecies is generally found throughout insular Newfoundland and northward to as far as Hebron in northern Labrador (Meades and Meades 2024 v), while the *minor* subspecies is noted as introduced and is found throughout Newfoundland to northern Labrador (Meades and Meades 2024 w).

Hoary Willow (*Salix candida*)

Hoary willow inhabits a variety of habitats such as floodplains, bogs, fens and meadows over calcareous soils (Argus 2024). Stems are dark grey-brown to yellow-brown, branchlets yellow-red-grayish brown with a white woolly covering. Leaves 47-103mm in length with a lorate to oblanceolate shape, with the underside covered in dense white hairs (Argus 2024). Hoary willow is noted to occur from southwestern Newfoundland north to central Labrador and inhabits calcareous habitats (Meades and Meades 2024 x).

Northern Valerian (*Valeria dioica* subsp. *sylvatica*)

Northern valerian is a perennial herbaceous plant found in wet to moist meadows and along stream banks which ranges in height from 10-40 cm. The basal leaves are generally simple with a spoon to egg shape. Stem leaves are opposite (2-4 pairs) twice as long as wide, pinnatifid with the terminal lobe unstalked or with a short stalk. Inflorescence is a compact round topped cluster (Douglas et al. 2001). The species range includes boreal north America with a provincial distribution through western and northwestern Newfoundland into southeastern and western Labrador with an affinity for areas with habitats over calcareous bedrock (Meades and Meades 2024 y).

Green False Hellebore (*Veratrum viride var. viride*)

The green False Hellebore is a conspicuous plant found in moist clearings and shaded woodlands with stems that range from 0.5-2 m in height. Leaves are generally oval in shape, ranging from 15-25 cm in length about 2/3 as wide as long borne in an ascending to spreading inflorescence, with individual flowers spreading 6-10 mm in length (McNeil and Shaw 2024). The range of this variety includes temperate through southern boreal regions of eastern north America including western Labrador (Meades and Meades 2024 z).

4.0 SUMMARY

4.1 ELC Reanalysis

The 2025 ELC completed by WSP had good agreement for some habitat ecotypes (five ecotypes had less than 5% change), a moderate level of variation for some (four ecotypes had between 5% and 10% change), while other ecotypes had higher levels of change (three ecotypes between 10% and 20% change, with three having greater than 20% change), when compared to the initial Stassinu Stantec ELC (Stantec 2012). Some variation is expected as habitats (e.g., burn/regeneration areas) have experienced over ten years of growth since the initial ELC was completed and may be interpreted differently through the process of ELC generation. Furthermore, advancements in image analysis procedures, software and image quality allow for habitats to be more accurately delineated compared to the initial ELC and likely resulted in the reclassification of habitats from one ecotype to another. Changes in the areal extent of Developed Land (26% increase) between ELC iterations was not extensive and was likely the result of development within municipalities (Labrador City, Wabush, Fermont) portions of each are included in the RSA or development associated with other industrial activities (e.g., expansion of pits/burden stockpiles at Tacora's mining operation south of Wabush).

Each habitat class is well represented across the RSA, with no habitat relatively over-represented in the SSA (i.e., no habitat is restricted to the SSA) and is therefore not considered rare relative to the RSA.

4.2 Species at Risk and Species of Conservation Concern

Current data searches, recent baseline field programs (2023), historic data searches and historic baseline field programs (2011 and 2012) have identified the possible/confirmed presence of 27 rare plant taxa which carry a provincial S-ranking of S1, S2, S1S2, S2S3, SU, or carry no provincial rarity ranking within Western Labrador. These rarer taxa (common and scientific name) are included in Table 4.1; along with their respective S-rank, their record of occurrence (2023 ACCDC search, 2023 field program, 2024 rare plant survey for drilling permit, historic data search, or historic baseline surveys), and whether an observed occurrence was in proximity to a project component. Of the potential 27 rare plant taxa identified, 14 taxa were confirmed to occur within proximity of project components (i.e., within the Site Assessment Area). Initial baseline surveys by Stassinu-Stantec identified a total of 37 rare vascular plant species which occurred directly within, or within proximity of the Project Footprint (Stassinu Stantec 2021b). The reduction in the number of rare species within proximity of the project footprint is likely due to the derating of several species (i.e., their rarity rank has changed since the initial surveys to indicate that populations in Labrador are more stable than when previously assessed).

Table 4-1: Possible and Confirmed Rare Plant Taxa which may occur within the vicinity of the Project based upon Previous Data Searches and Field Programs

Common Name	Scientific Name	S-Rank	Occurrence (See notes below).	Observed Occurrence Within Proximity of Project Component (Yes/No)
Black Bentgrass	*Agrostis gigantea*	No Rank	B	No
Green Spleenwort	*Asplenium viride*	S1S2	A	Undetermined
Northern Clustered Sedge	Carex arcta	SU	C	Yes
Beautiful Sedge	*Carex concinna*	S2	A, D, E	Yes
Common Comandra	*Comandra unbellata*	S1	D	Undetermined
Snakewort	*Conocephalum salebrosum*	S2S3	B	Yes
Small Yellow Lady's-Slipper	*Cypripedium parviflorum*	S1	A, E	Yes
Mountain Bladder Fern	*Cystopteris montana*	S2	A, D	Undetermined
Vasey Oatgrass	*Danthonia intermedia*	S2S3	C	Yes
Trailing Arbutus	*Epigaea repens*	S2S3	A, B, E	No
Meadow Horsetail	*Equisetum pratense*	S2S3	D	Undetermined
Daisy Fleabane	*Erigeron hyssopifolius*	S2	A, E	No
Limestone Polypody	*Gymnocarpium robertianum*	S1	A	Undetermined
Alpine Sweet-Vetch	*Hedysarum americanum*	S2S3	A, D, E	Yes
Foxtail Barley, Squirreltail Grass	*Hordeum jubatum subsp. jubatum*	S2S3	A, D	Undetermined
Running Pine	*Lycopodium clavatum*	S1S3	B, C	Yes, but possibly mis-identified.
Two-Eyed Berry	*Mitchella repens*	No Rank	B	No
Marsh Muhly	*Muhlenbergia glomerata*	S2?	A, E	Yes
Bog Muhly	*Muhlenbergia uniflora*	S2S3	B	Yes
Blunt Sweet Cicely	*Osmorhiza depaupperata*	S2	D	Undetermined
Jack pine, Labrador pine	*Pinus banksiana*	S1	A, B, E	Yes
Small Pondweed	*Potomogeton pusillus*	S2S3	D	Undetermined
Greenish-Flowered Wintergreen	*Pyrola chlorantha*	S2S3	A, E	Yes
Little Yellow Rattle	*Rhinanthus minor*	SU	B	No
Hoary Willow	*Salix candida*	S2S3	B	Yes
Northern Valerian	*Valeriana dioica subsp. sylvatica*	S2	A, B, E	Yes
Green False Hellebore	*Veratrum viride var. viride*	S2	A, B, C, D, E	Yes

A 2023 ACCDC Rare Plant Search
B 2023 Field Surveys
C 2024 Rare Plant Surveys for Drilling Program
D Stassinu Stantec Rare Plant Pre-Survey Literature Search
E Stassinu Stantec Rare Plant Surveys (2011-2012)

Signature Page

WSP Canada Inc.

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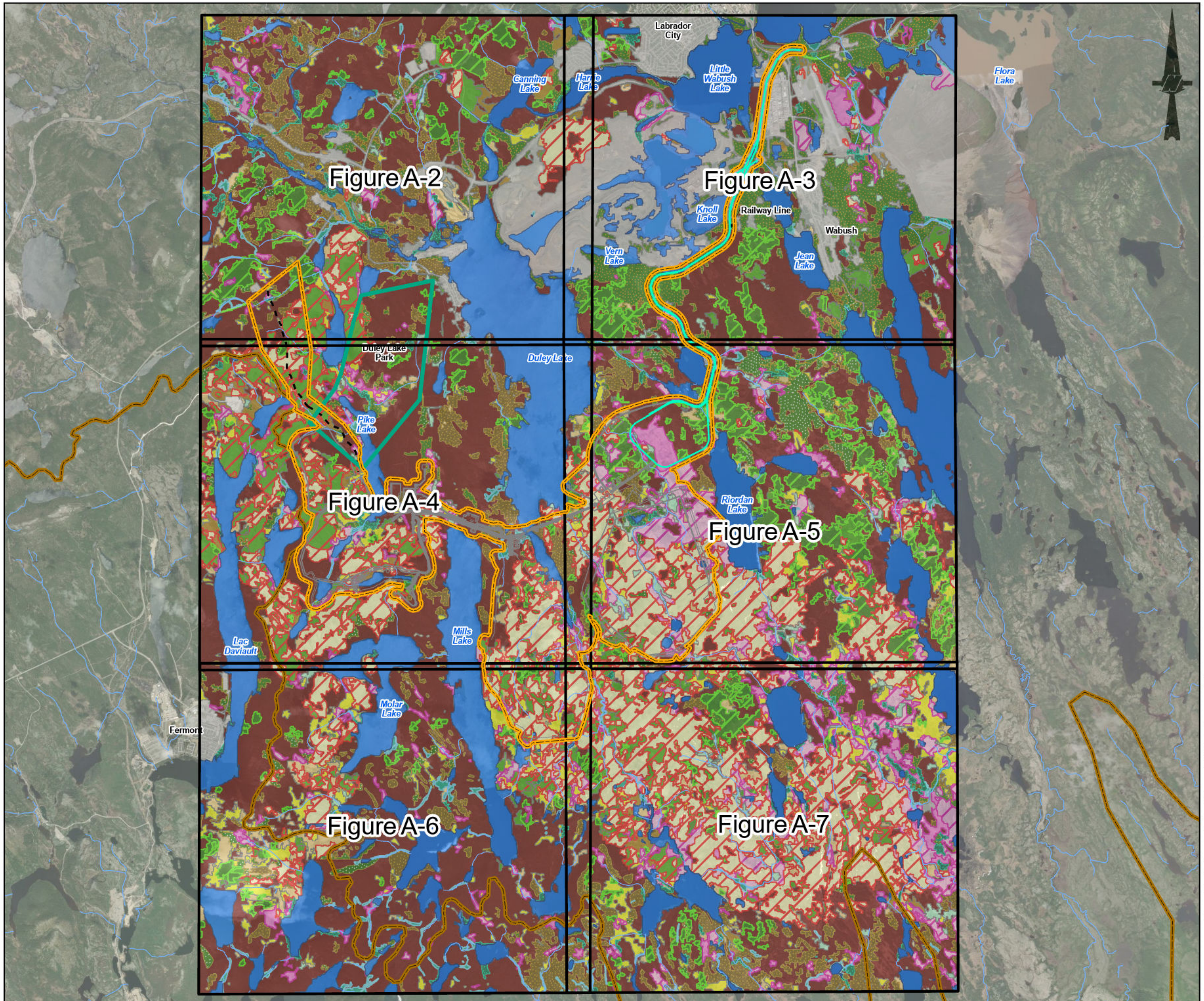
APPENDIX A

Map Series Outlining Habitat Class Areal Extent



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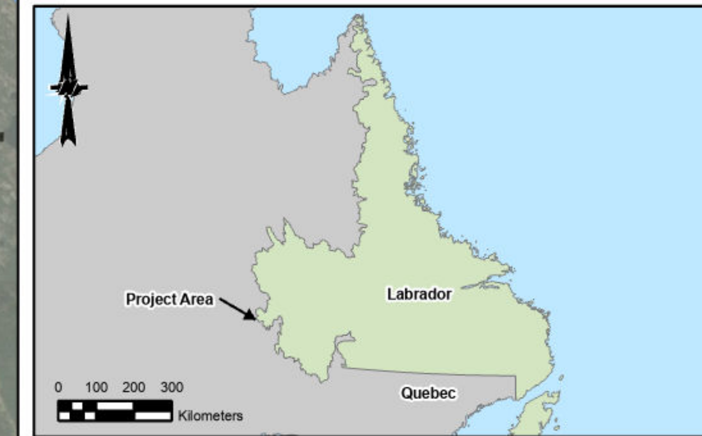


SCALE 1:20,000,000

Legend

- Proposed Project Infrastructure (Linear)
- Proposed Access Road and Railway Corridor
- River/Stream
- Index Map
- Site Study Area
- Duley Lake Park
- Labrador/Quebec Boundary

Final_LandCoverClass_DirectSite_Saeid

Ecological Land Classification

- Alder Thickett
- Alpine Heath
- Black Spruce-Labrador Tea -Feathermoss
- Black Spruce-Lichen
- Black Spruce/Tamarack-Sphagnum Woodland
- Developed Land
- Graminoid Fen
- Hardwood Burn/Regeneration
- Hardwood Forest
- Jack Pine
- Mixedwood Forest
- Non-Patterened Shrub Fen
- Patterned Shrub Fen
- Riparian Marsh (Fen)
- Riparian Thickett
- Softwood Burn/Regeneration
- Tamarack/Black-Spruce-Feathermoss (Water Track)
- Water

DRAFT

0 0.75 1.5 3
1:100,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: WORLD IMAGERY: EARTHSTAR GEOGRAPHICS
3. ELC CLASSIFICATION PROVIDED BY WSP CANADA INC.
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
VEGETATION COMMUNITIES

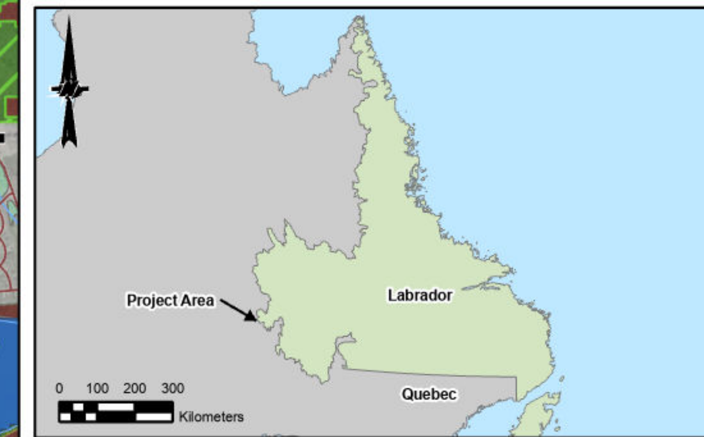
CONSULTANT

Kami

YYYY-MM-DD	2025-04-10
DESIGNED	SR
PREPARED	GM
REVIEWED	--
APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	A	A-1

KEY MAP



SCALE 1:20,000,000

Legend

- Potential Access Road
- Existing Railway
- Existing Road
- River/Stream
- Proposed Project Infrastructure (Linear)
- Site Study Area
- Duley Lake Park
- Labrador/Quebec Boundary

Ecological Land Classification

- Alder Thickett
- Alpine Heath
- Black Spruce-Labrador Tea -Feathermoss
- Black Spruce-Lichen
- Black Spruce/Tamarack-Sphagnum Woodland
- Developed Land
- Graminoid Fen
- Hardwood Burn/Regeneration
- Hardwood Forest
- Jack Pine
- Mixedwood Forest
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- Patterned Shrub Fen
- Riparian Marsh (Fen)
- Riparian Thickett
- Softwood Burn/Regeneration
- Tamarack/Black-Spruce-Feathermoss (Water Track)
- Water

DRAFT

0 0.28 0.55 1.1
1:30,000 KILOMETRES

NOTE(S)
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REFERENCE(S)
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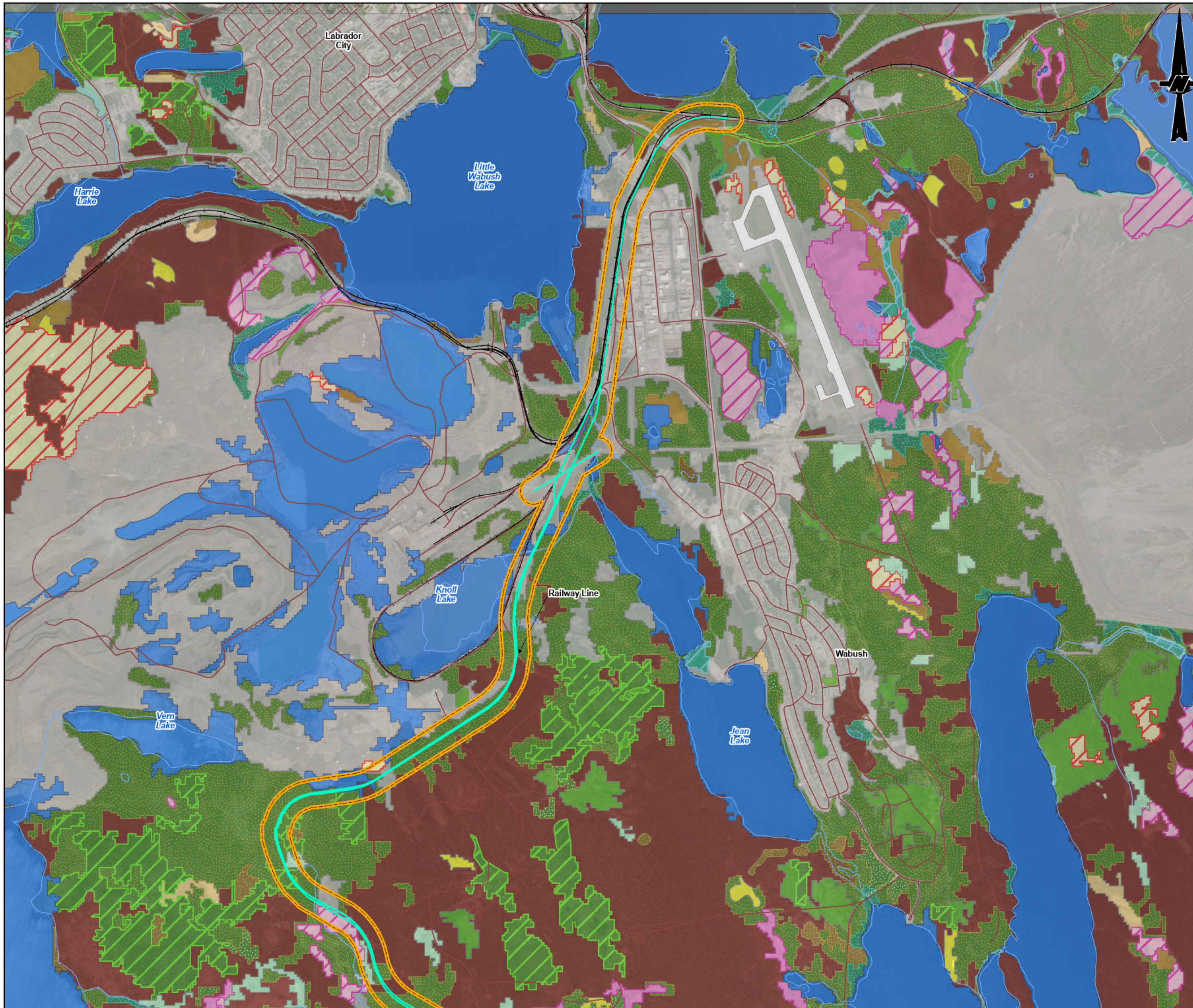

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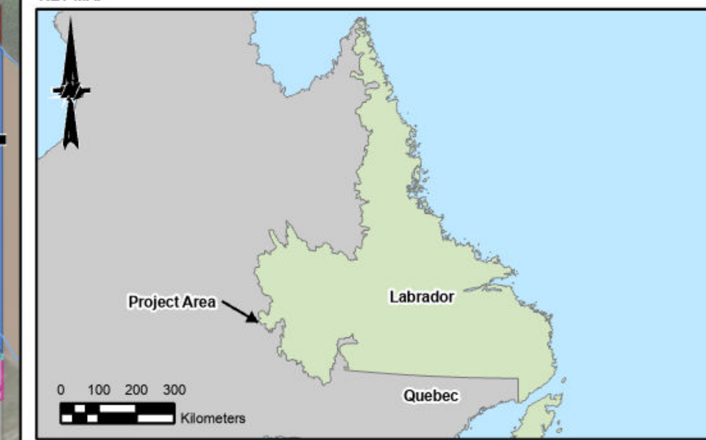

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Legend

- Proposed Access Road and Railway Corridor
- Existing Railway
- Existing Road
- River/Stream
- Proposed Project Infrastructure (Linear)
- Site Study Area
- Labrador/Quebec Boundary

Ecological Land Classification

- Alder Thickett
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- Patterned Shrub Fen
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- Riparian Thickett
- Softwood Burn/Regeneration
- Tamarack/Black-Spruce-Feathermoss (Water Track)
- Water

DRAFT

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APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
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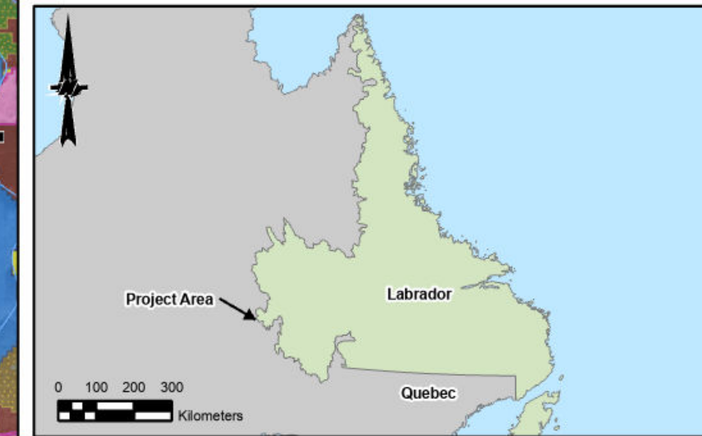
KEY MAP



SCALE 1:20,000,000

Legend

- Potential Access Road
- Existing Road
- River/Stream
- Proposed Project Infrastructure (Linear)
- Site Study Area
- Duley Lake Park
- Proposed Sedimentation Pond
- Labrador/Quebec Boundary

Ecological Land Classification

- Alder Thickett
- Alpine Heath
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- Black Spruce-Lichen
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- Tamarack/Black-Spruce-Feathermoss (Water Track)
- Water

DRAFT

0 0.28 0.55 1.1
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APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
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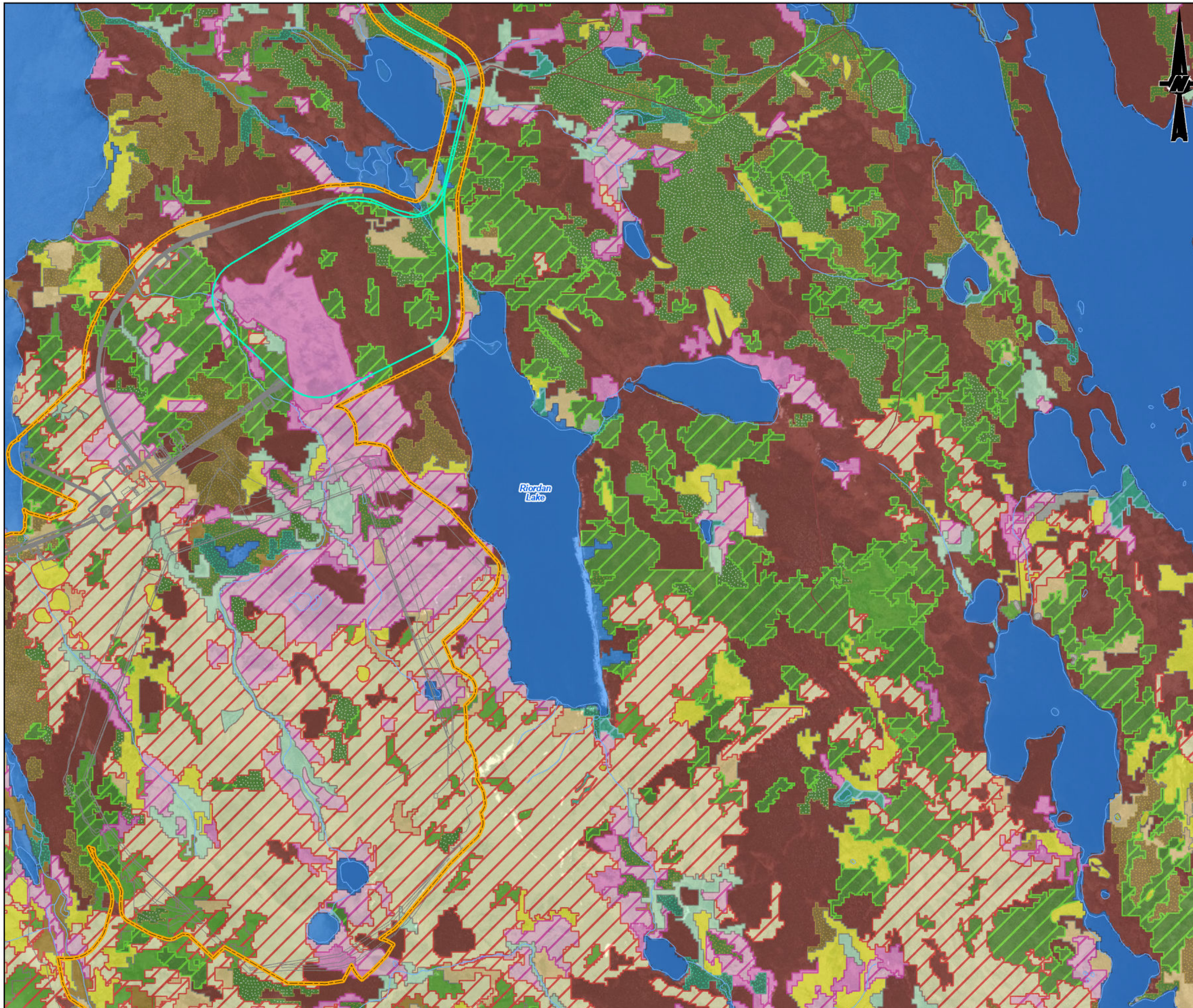

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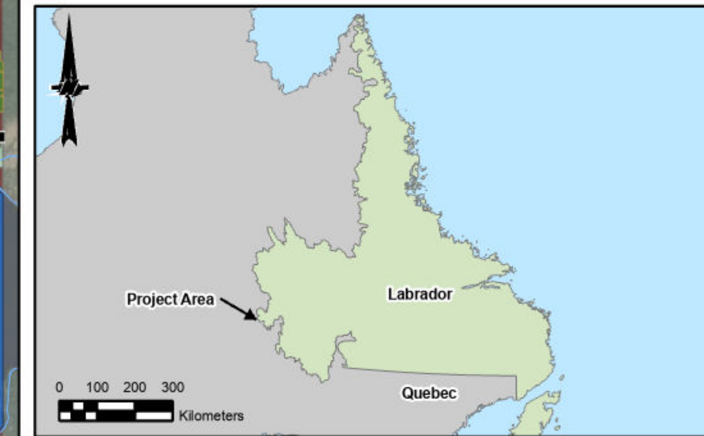

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Legend

- Proposed Access Road and Railway Corridor
- Existing Road
- River/Stream
- Proposed Project Infrastructure (Linear)
- Site Study Area
- Labrador/Quebec Boundary

Ecological Land Classification

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- Water

DRAFT

0 0.28 0.55 1.1
1:30,000 KILOMETRES

NOTE(S)
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APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	A	A-5

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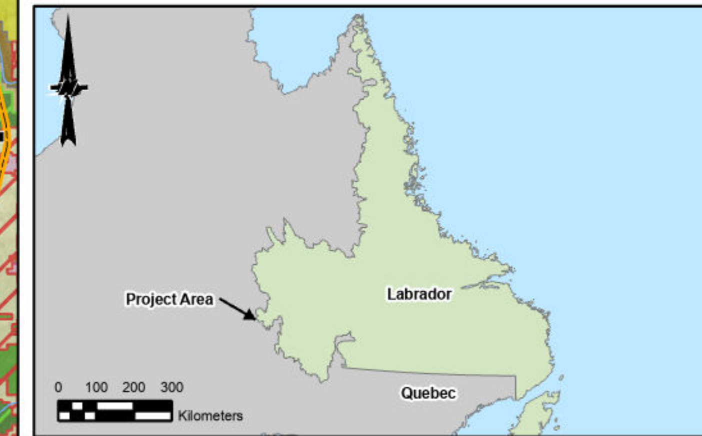
KEY MAP



SCALE 1:20,000,000

Legend

- Existing Road
- River/Stream
- Proposed Project Infrastructure (Linear)
- Site Study Area
- Labrador/Quebec Boundary

Ecological Land Classification

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DRAFT

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NOTE(S)
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REVIEWED	--
APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
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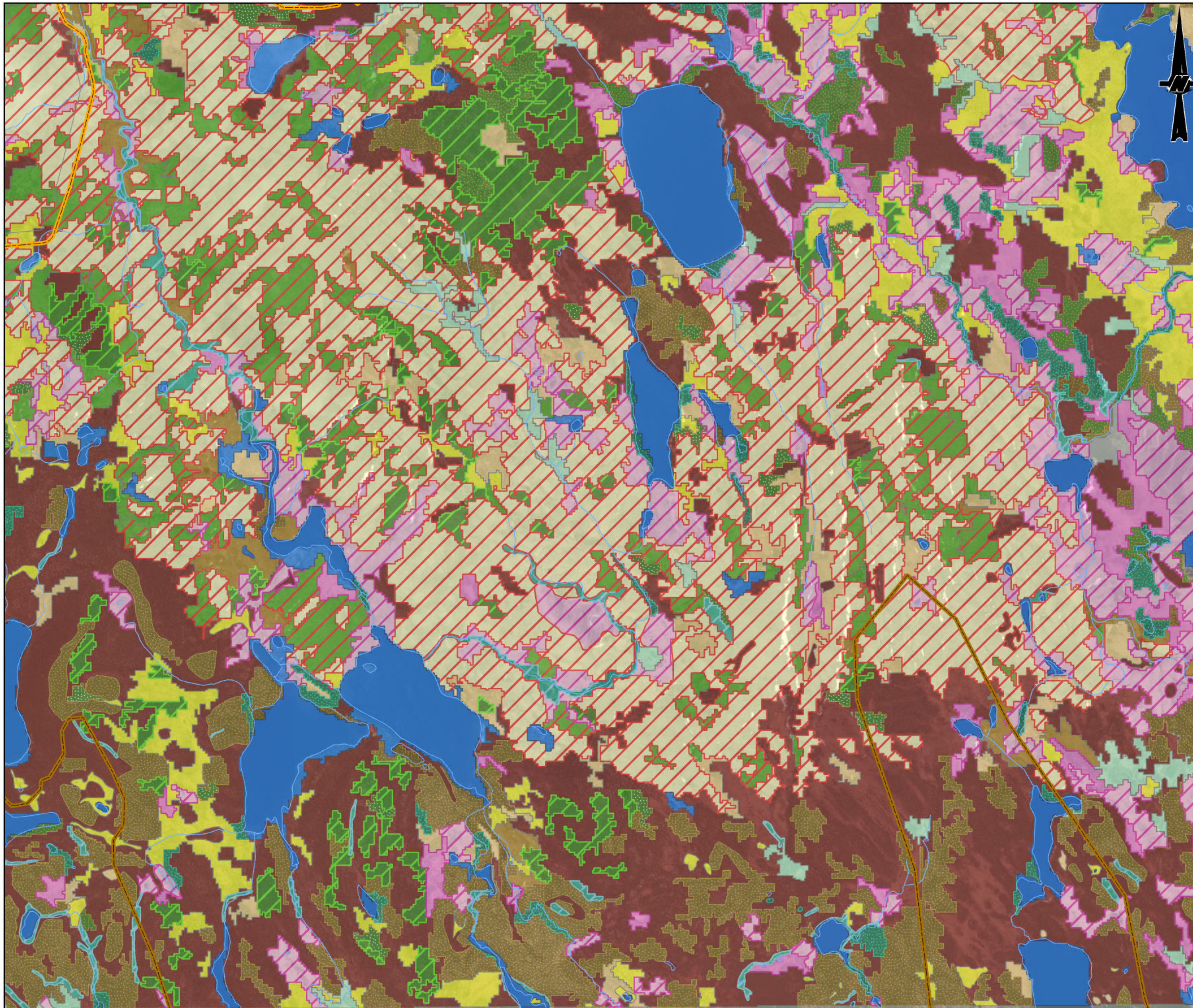

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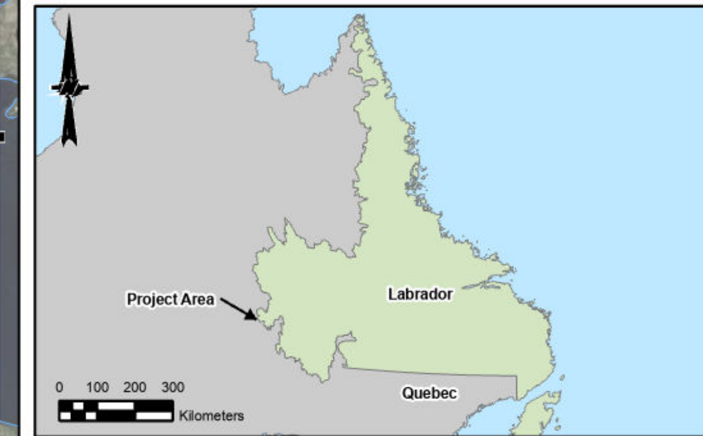

SCALE 1:20,000,000

Legend

- River/Stream
- Proposed Project Infrastructure (Linear)
- Site Study Area
- Labrador/Quebec Boundary

Ecological Land Classification

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- Water

DRAFT

0 0.28 0.55 1.1

1:30,000 KILOMETRES

NOTE(S)

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REFERENCE(S)

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2. IMAGERY CREDITS: WORLD IMAGERY: MAXAR
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4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT

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PROJECT

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WABUSH, NL

TITLE

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CONSULTANT

YYYY-MM-DD	2025-04-03
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APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	A	A-7

APPENDIX B

Photos of Species of Conservation Concern as Indicated in the EIS Guidelines

Photo 1: Black Bentgrass (*Agrostis gigantea*)

Photo 2: Snakewort (*Conocephalum salebrosum*)

Photo 3: Trailing Arbutus (*Epigaea repens*)

Photo 4: Running Pine (*Lycopodium clavatum*)
Identification is in question and is likely One-Cone Ground-Pine (*Lycopodium lagopus*)

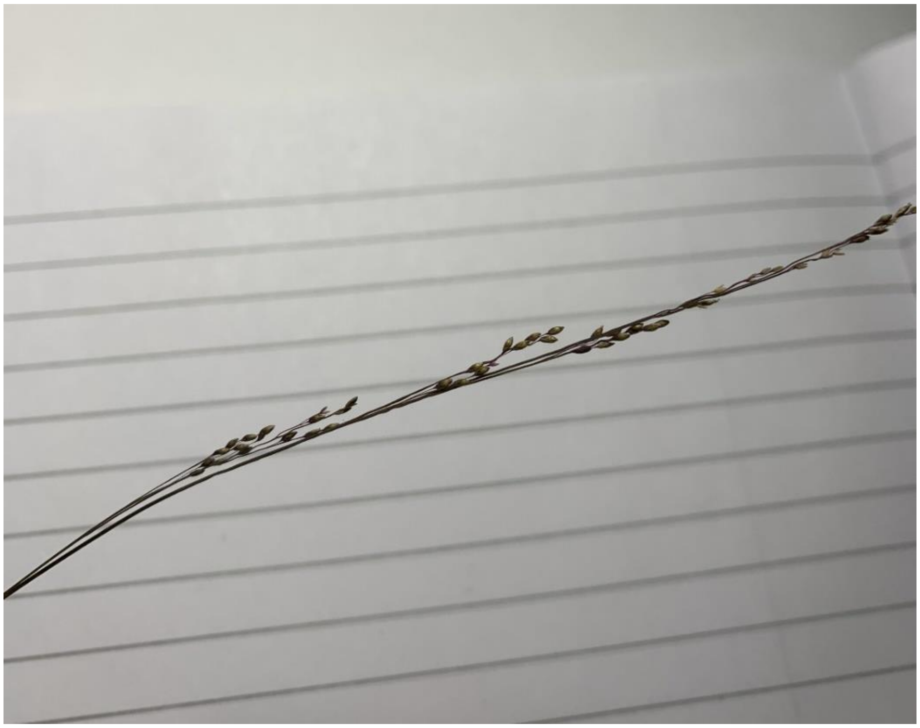


Photo 5: Bog Muhly (*Muhlenbergia uniflora*)

Photo 6: Jack Pine (*Pinus banksiana*)

Photo 7: Little Yellow Rattle (*Rhinanthus minor*)

Photo 8: Woods Valerian (*Valeriana diocia*)

Photo 9: Green False Hellebore (*Veratrum viride var. viride*)

Photo 10: Hoary Willow (*Salix candida*)

APPENDIX C

SEM Rare Plant Survey in Support of Borehole Drilling Program

BOREAL
ENVIRONMENTAL

Amy Copeland
SEM
79 Mews Place
St. John's, NL
A1B 4N2

August 19, 2024

Correspondence via email

Re: Rare plant survey at the Kami Project site for exploration boreholes, water intake locations and access trails near Labrador City, NL.

Introduction

Overdale Environmental (Overdale) and Boreal Environmental (Boreal) conducted a rare plant survey at the Kami Project site for exploration boreholes, water intake structures and trails on a site approximately 15 km from Labrador City, NL. Rare plants are considered all plants ranked S1 to S3 or any combination of these ranks by the Atlantic Canada Conservation Data Centre (ACCDC) plus any plant ranked S2S4. Overdale consulted the most recent plant species ranking for Newfoundland and Labrador from ACCDC dated October 2021.

Methods

Theo Popma a biologist with Overdale Environmental, along with an assistant, traversed the site by foot, focusing on high potential habitats within the trail Right of Ways (RoW), exploration borehole locations, and corridors leading to water intake locations, in a random meandering fashion. A total of 20 geotechnical borehole locations were surveyed (three of which are doubled up with other locations). A 25 m radius surrounding each exploration borehole location was surveyed. A 3 m wide perimeter along short trails leading to nine water intake structures were also surveyed. Approximately 2.5 km of trail connecting the borehole locations were also surveyed to a width of 5 m or 2.5 m on each side of the centerline. Some of the trails were travelled more than others as required. The first location of all plants encountered were recorded using a handheld GPS unit. However, if plants were found to be considered rare, their location was recorded and their distribution within and near the survey area was determined. Specimens were collected if a species could not be identified in the field. A complete inventory of all plant species encountered while conducting the field reconnaissance program was compiled (Attachment 1).

Results

Five connecting trail locations (Sites 5, 13, 14, 9/15 and 17), were re-aligned and borehole locations were altered to avoid populations of rare plants. A total of 107 species of vascular plants were identified during the survey, five of these were considered rare (Running pine - *Lycopodium clavatum*, Rough cotton-grass - *Eriophorum tenellum*, American false hellebore - *Veratrum viride,* Vasey oatgrass -*Danthonia intermedia* and Creeping spike-rush - *Eleocharis palustris*).

Running pine (*Lycopodium clavatum*) ranked S1S3 and occurred in upland habitat dominated by Labrador tea, birches, willows and fireweed, such as at plot 5. These areas are often sloped on the hillside and are the product of deforestation by fire approximately 25 years ago (pers. comm.; Phillippe Gervais). In fact, the majority of the survey area is impacted by this historical fire. Rough cotton-grass (*Eriophorum tenellum*), ranked S2S4, Vasey oatgrass (*Danthonia intermedia*), ranked S2S3, and Creeping spike-rush (*Eleocharis palustris*), ranked S2S4, were found infrequently scattered within the low-lying wetter areas. Rough cotton-grass was found in a similar habitat but only at one location. American false hellebore (*Veratrum viride*), ranked S2, was also only found in one area (Site 9/15) and was associated with alder where plant species diversity tends to be higher.

Attached to this document are the map and list showing locations of rare plants in relation to the borehole and access trail locations (Attachment 1). A complete inventory of recorded plants is also included in attachment 2. It should be noted that, in some cases, positive identification of a species of plant of a certain genus could not be confirmed. Whenever possible, the occurrence of the rare species of that genus was ruled out.

Kind Regards,

Derrick Mitchell

Derrick Mitchell, Senior Terrestrial Ecologist
Boreal Environmental

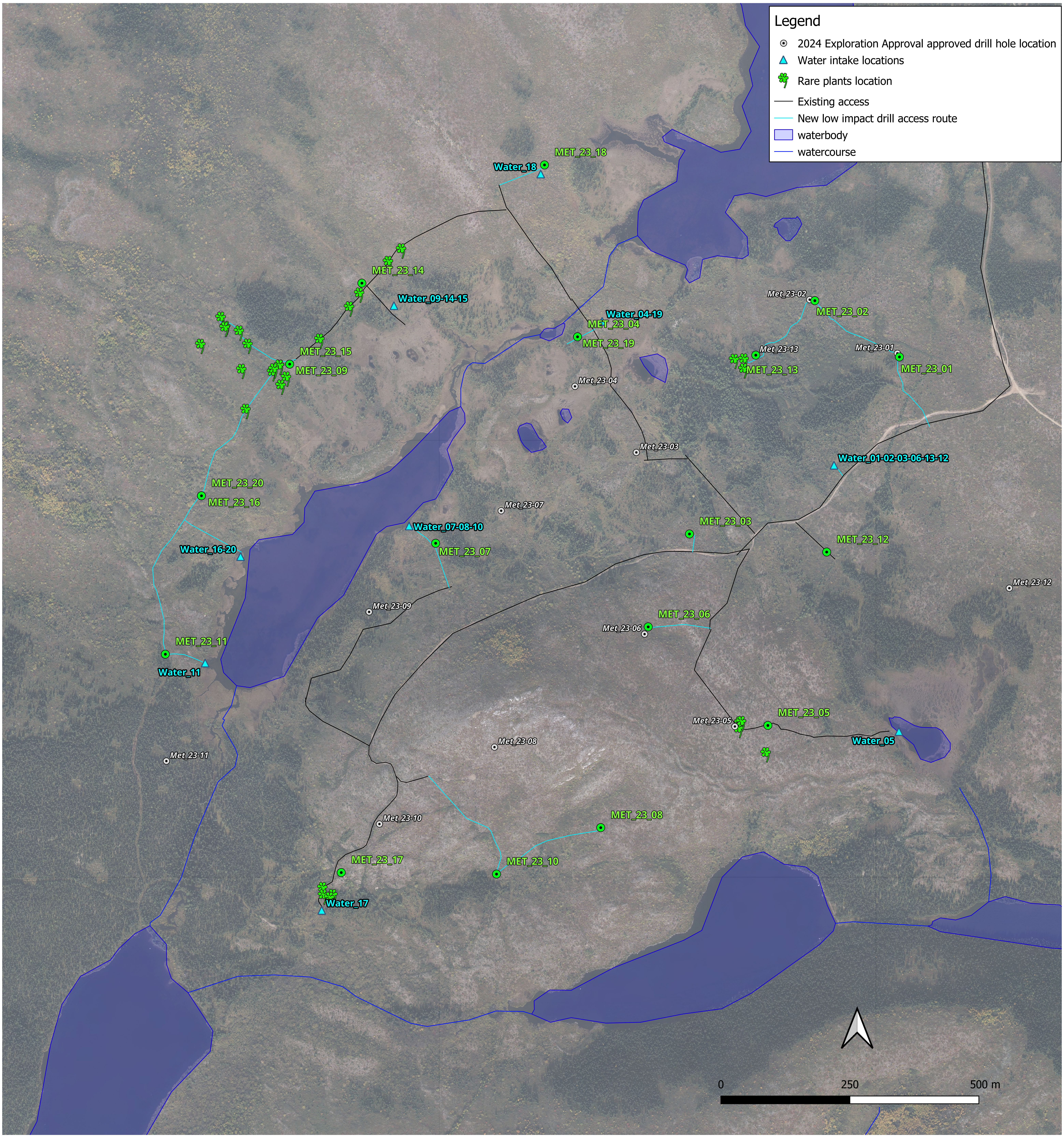
Attachment 1 – Kami Plant List
Attachment 2 – Kami Site Map Showing Rare Plant Locations

Kami Plant List

Scientific Name	sRank	Latitude	Longitude	WPT	Comment
Lycopodium clavatum	S1S3	5855272.166	633129.934	3239	Scattered infrequently in upland Betula, Ledum
Lycopodium clavatum	S1S3	5855937.415	632121.629	3302	1 clump
Lycopodium clavatum	S1S3	5855331.426	633078.959	3328	
Lycopodium clavatum	S1S3	5855319.466	633077.131	3350	2 plants in 50m diameter
Lycopodium clavatum	S1S3	5855332.742	633082.294	3351	2 clumps
Lycopodium clavatum	S1S3	5855319.466	633077.131	3350	2 plants in entire plot
Lycopodium clavatum	S1S3	5855332.742	633082.294	3351	2 clumps
Veratrum viride	S2	5856063.848	632125.39	3281	4 plants in 10 square meters
Veratrum viride	S2	5856089.33	632108.856	3282	20 plants
Veratrum viride	S2	5856115.966	632073.418	3283	
Veratrum viride	S2	5856098.18	632082.396	3284	
Veratrum viride	S2	5856096.473	632081.027	3285	
Veratrum viride	S2	5856023.346	632187.022	3290	scattered infrequently
Veratrum viride	S2	5856010.388	632173.087	3303	
Veratrum viride	S2	5856023.111	632186.557	3305	25 plants in 100 square meters
Veratrum viride	S2	5856015.921	632175.969	3306	20 plants in 4 square meters
Veratrum viride	S2	5856000.107	632200.126	3310	
Veratrum viride	S2	5855984.463	632189.702	3344	
Veratrum viride	S2	5856063.469	632034.005	3348	
Veratrum viride	S2	5855984.463	632189.702	3344	
Veratrum viride	S2	5856014.995	632113.513	3346	1 plant
Veratrum viride	S2	5856063.469	632034.005	3348	1 plant open more barren burn, Ledum, Vaccinium, White Spruce
Danthonia intermedia	S2S3	5854997.494	632290.269	3249	First found in wet area with Eriophorum, Vaccinium, Mitella, Glyceria
Danthonia intermedia	S2S3	5856162.813	632341.939	3314	20 plants at least in seepy area with Carex vaginata, Ledum
Danthonia intermedia	S2S3	5855011.093	632270.616	3323	30 plants in wetland at bottom of trail
Danthonia intermedia	S2S3	5856248.292	632423.244	3340	30 Plants on and outside trail
Danthonia intermedia	S2S3	5856224.112	632397.822	3341	
Danthonia intermedia	S2S3	5856136.011	632322.385	3342	
Danthonia intermedia	S2S3	5854996.768	632271.816	3353	
Danthonia intermedia	S2S3	5854991.873	632284.152	3354	10 plants scattered frequently
Danthonia intermedia	S2S3	5856248.292	632423.244	3340	30 plants on trail and beyond
Danthonia intermedia	S2S3	5856224.112	632397.822	3341	
Danthonia intermedia	S2S3	5856136.011	632322.385	3342	
Danthonia intermedia	S2S3	5854996.768	632271.816	3353	In wet depression
Danthonia intermedia	S2S3	5854991.873	632284.152	3354	Frequently scattered in and outside trail
Eleocharis palustris	S2S4	5856073.555	632264.847	3313	found on last day and confirmed later
Eriophorum tenellum	S2S4	5856035.212	633087.25	3221	
Eriophorum tenellum	S2S4	5856016.165	633086.763	3333	6 plants
Eriophorum tenellum	S2S4	5856016.171	633086.965	3334	20 plants
Eriophorum tenellum	S2S4	5856034.369	633068.738	3336	10 plants
Carex flava	S3S4	5856140.187	632791.914	3271	
Carex gynocrates	S3S4	5856211.376	632339.129	3278	
Carex nigra	S3S4	5856082.222	632731.967	3269	
Carex vaginata	S3S4	5856162.813	632341.939	3314	
Equisetum fluviatile	S3S4	5855772.075	632033.999	3294	
Eriophorum scheuchzeri	S3S4	5856239.516	632419.777	3277	
Fragaria virginiana	S3S4	5854997.494	632290.269	3249	
Geum rivale	S3S4	5855726.712	633149.319	3231	
Poa pratensis	S3S4	5856096.944	632834.484	3268	
Ribes lacustre	S3S4	5855927.974	633437.192	3199	
Ribes lacustre	S3S4	5854997.494	632290.269	3249	
Spiranthes romanzoffiana	S3S4	5856035.212	633087.25	3221	
Triantha glutinosa	S3S4	5855956.521	632852.29	3263	
Carex canescens	S3S5	5855920.552	632875.992	3262	
Carex echinata	S3S5	5856035.212	633087.25	3221	
Carex exilis	S3S5	5855979.918	632832.842	3264	
Carex leptalea	S3S5	5856400.329	632703.497	3274	

Scientific Name	sRank	Latitude	Longitude	WPT	Comment
Deschampsia cespitosa	S3S5	5855627.058	633075.148	3233	
Salix discolor	S3S5	5855517.094	632901.087	3232	
Scirpus atrocinctus	S3S5	5856400.329	632703.497	3274	
Dryopteris carthusiana	S4	5856017.958	633058.876	3226	
Juncus brevicaudatus	S4	5855517.094	632901.087	3232	
Lycopodium dendroideum	S4	5867186.236	643781.868	3203	
Salix vestita	S4	5856051.169	633129.207	3223	
Scirpus microcarpus	S4	5854997.494	632290.269	3249	
Stellaria crassifolia	S4	5855005.18	632660.71	3257	
Symphyotrichum puniceum	S4	5856035.212	633087.25	3221	
Actaea rubra	S4S5	5855772.075	632033.999	3294	
Alnus incana	S4S5	5856050.122	633374.242	3206	
Amelanchier bartramiana	S4S5	5867186.236	643781.868	3203	
Anaphalis margaritacea	S4S5	5855066.038	632615.088	3254	
Betula minor	S4S5	5855927.974	633437.192	3199	
Betula papyrifera	S4S5	5855927.974	633437.192	3199	
Bromus ciliatus	S4S5	5856140.187	632791.914	3271	
Carex aquatilis	S4S5	5856030.217	633099.924	3220	
Carex rariflora	S4S5	5855667.672	632474.044	3244	
Carex rostrata	S4S5	5856017.958	633058.876	3226	
Carex trisperma	S4S5	5855633.004	632504.651	3241	
Castilleja septentrionalis	S4S5	5856239.516	632419.777	3277	
Cinna latifolia	S4S5	5855646.533	631948.582	3301	
Comarum palustre	S4S5	5854832.127	632738.802	3259	
Glyceria striata	S4S5	5855726.712	633149.319	3231	
Lycopodium lagopus	S4S5	5855927.974	633437.192	3199	
Mitella nuda	S4S5	5854997.494	632290.269	3249	
Petasites frigidus	S4S5	5867186.236	643781.868	3203	
Platanthera dilatata	S4S5	5856184.36	633216.736	3216	
Populus tremuloides	S4S5	5856095.219	633285.984	3211	
Prunus pensylvanica	S4S5	5855670.626	632975.604	3228	
Rubus idaeus	S4S5	5855927.974	633437.192	3199	
Salix argyrocarpa	S4S5	5855517.094	632901.087	3232	
Sanguisorba canadensis	S4S5	5856034.132	633108.714	3219	
Tofieldia pusilla	S4S5	5855979.918	632832.842	3264	
Triglochin maritima	S4S5	5856082.222	632731.967	3269	
Triglochin palustris	S4S5	5856082.222	632731.967	3269	
Vaccinium caespitosum	S4S5	5855927.974	633437.192	3199	
Abies balsamea	S5	5855927.974	633437.192	3199	
Andromeda polifolia	S5	5855920.552	632875.992	3262	
Betula pumila	S5	5856095.219	633285.984	3211	
Calamagrostis canadensis	S5	5856050.122	633374.242	3206	
Carex brunnescens	S5	5856035.212	633087.25	3221	
Carex limosa	S5	5856082.222	632731.967	3269	
Carex magellanica	S5	5854832.127	632738.802	3259	
Chamaedaphne calyculata	S5	5855927.974	633437.192	3199	
Chamerion angustifolium	S5	5855927.974	633437.192	3199	
Clintonia borealis	S5	5856000.107	632200.126	3310	
Coptis trifolia	S5	5855627.058	633075.148	3233	
Cornus canadensis	S5	5855927.974	633437.192	3199	
Diphasiastrum complanatum	S5	5856095.219	633285.984	3211	
Empetrum nigrum	S5	5856050.122	633374.242	3206	
Epilobium ciliatum	S5	5854832.127	632738.802	3259	
Epilobium palustre	S5	5855112.827	632718.164	3256	
Equisetum arvense	S5	5856146.744	633204.763	3215	
Equisetum sylvaticum	S5	5856050.122	633374.242	3206	
Gaultheria hispidula	S5	5867186.236	643781.868	3203	

Scientific Name	sRank	Latitude	Longitude	WPT	Comment
Geocaulon lividum	S5	5856051.169	633129.207	3223	
Gymnocarpium dryopteris	S5	5856096.473	632081.027	3285	
Juncus filiformis	S5	5856007.732	632230.72	3309	
Kalmia polifolia	S5	5856050.122	633374.242	3206	
Larix laricina	S5	5855927.974	633437.192	3199	
Linnaea borealis	S5	5856093.962	633175.615	3218	
Lonicera villosa	S5	5856030.217	633099.924	3220	
Luzula parviflora	S5	5855112.827	632718.164	3256	
Maianthemum trifolium	S5	5855005.18	632660.71	3257	
Myrica gale	S5	5856035.212	633087.25	3221	
Orthilia secunda	S5	5855646.533	631948.582	3301	
Phegopteris connectilis	S5	5856104.147	632044.084	3287	
Picea glauca	S5	5855927.974	633437.192	3199	
Picea mariana	S5	5856050.122	633374.242	3206	
Rhododendron groenlandicum	S5	5855927.974	633437.192	3199	
Ribes glandulosum	S5	5855772.075	632033.999	3294	
Rubus arcticus	S5	5856211.376	632339.129	3278	
Rubus chamaemorus	S5	5856184.36	633216.736	3216	
Rubus pubescens	S5	5856095.755	632075.115	3286	
Solidago macrophylla	S5	5855927.974	633437.192	3199	
Solidago uliginosa	S5	5856051.169	633129.207	3223	
Spinulum annotinum	S5	5856095.219	633285.984	3211	
Streptopus amplexifolius	S5	5855646.533	631948.582	3301	
Trichophorum cespitosum	S5	5856239.516	632419.777	3277	
Vaccinium angustifolium	S5	5855272.166	633129.934	3239	
Vaccinium oxycoccos	S5	5854997.494	632290.269	3249	
Vaccinium vitis-idaea	S5	5856050.122	633374.242	3206	
Viburnum edule	S5	5855726.712	633149.319	3231	
Pilosella caespitosa	SNA	5856146.744	633204.763	3215	
Carex arcta	SU	5856082.222	632731.967	3269	



2024 Exploration Approved drill locations			Revised drill hole location					Water intake		
Hole ID	UTM19 X	UTM19 N	Hole ID	Depth (m)	UTM19 X	UTM19 Y	Distance (m)	ID	UTM19X	UTM19Y
Met_23-01	633385	5856050	MET_23_01	450	633389	5856043	8.1	WaterIntake_01-02-03-06-12-13	633262	5855830
Met_23-02	633215	5856154	MET_23_02	700	633225	5856152	10.2	WaterIntake_11	632041	5855451
Met_23-03	632879	5855858	MET_23_03	450	632982	5855700	188.6	WaterIntake_16-20	632112	5855669
Met_23-04	632760	5855986	MET_23_04	300	632765	5856082	96.1	WaterIntake_17	632269	5854972
			MET_23_19	550	632765	5856082	96.1	WaterIntake_07-08-10	632440	5855715
Met_23-05	633070	5855327	MET_23_05	500	633071	5855321	6.1	WaterIntake_04-19	632812	5856111
Met_23-06	632895	5855506	MET_23_06	450	632902	5855520	15.7	WaterIntake_05	633388	5855303
Met_23-07	632617	5855745	MET_23_07	450	632490	5855682	141.8	WaterIntake_09-14-15	632407	5856140
Met_23-08	632604	5855287	MET_23_08	600	632810	5855131	258.4	WaterIntake_18	632694	5856397
Met_23-09	632361	5855549	MET_23_09	450	632207	5856029	504.1			
Met_23-10	632381	5855138	MET_23_10	700	632608	5855041	246.9			
Met_23-11	631968	5855260	MET_23_11	350	631966	5855467	207.0			
Met_23-12	633602	5855595	MET_23_12	350	633248	5855665	360.9			
Met_23-13	633111	5856047	MET_23_13	500	633111	5856047	0.0			
			MET_23_14	350	632347	5856186	-			
			MET_23_15	200	632207	5856029	-			
			MET_23_16	450	632036	5855774	-			
			MET_23_20	350	632036	5855774	-			
			MET_23_17	450	632307	5855044	-			
			MET_23_18	420	632701	5856415	-			

wsp.com

REPORT

2024 Wildlife Baseline Report - 2024 Surveys

Kami Iron Ore Mine Project

Submitted to:

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May 2025

Distribution List

1 Electronic Copy - Champion Iron Mines Ltd.

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APPENDICES

1.0 INTRODUCTION

The Kamistiatusset (Kami) Iron Ore Mine Project (the Project) is a proposed iron ore mine in Newfoundland and Labrador. The Project site is located approximately seven kilometres southwest of the Town of Wabush, ten kilometres south of the Town of Labrador City, and five kilometres northeast of Ville de Fermont, Québec (Figure 1-1).

The Project was originally proposed by the Alderon Iron Ore Corporation (Alderon) and underwent a provincial and federal environmental impact assessment from 2011 to 2013, including a comprehensive baseline program that was completed in 2011 and 2012. The Project was released from the provincial and federal EA process in 2014. In 2021, Champion Iron Limited (through its subsidiary 12364042 Canada Inc, herein referred to as Champion) completed the acquisition of the Project from Alderon.

Champion is proposing several improvements to the Project design proposed by Alderon through the previous Environmental Impact Statement (EIS). These proposed improvements include optimizations to the Project's water management strategy and modernization of the proposed ore handling, conveyance, and processing. Champion's objective for the Kami Project is to produce high purity (>67.5%) iron concentrate, which can be used as direct reduction pellet feed for electric arc furnaces in the green steel supply chain.

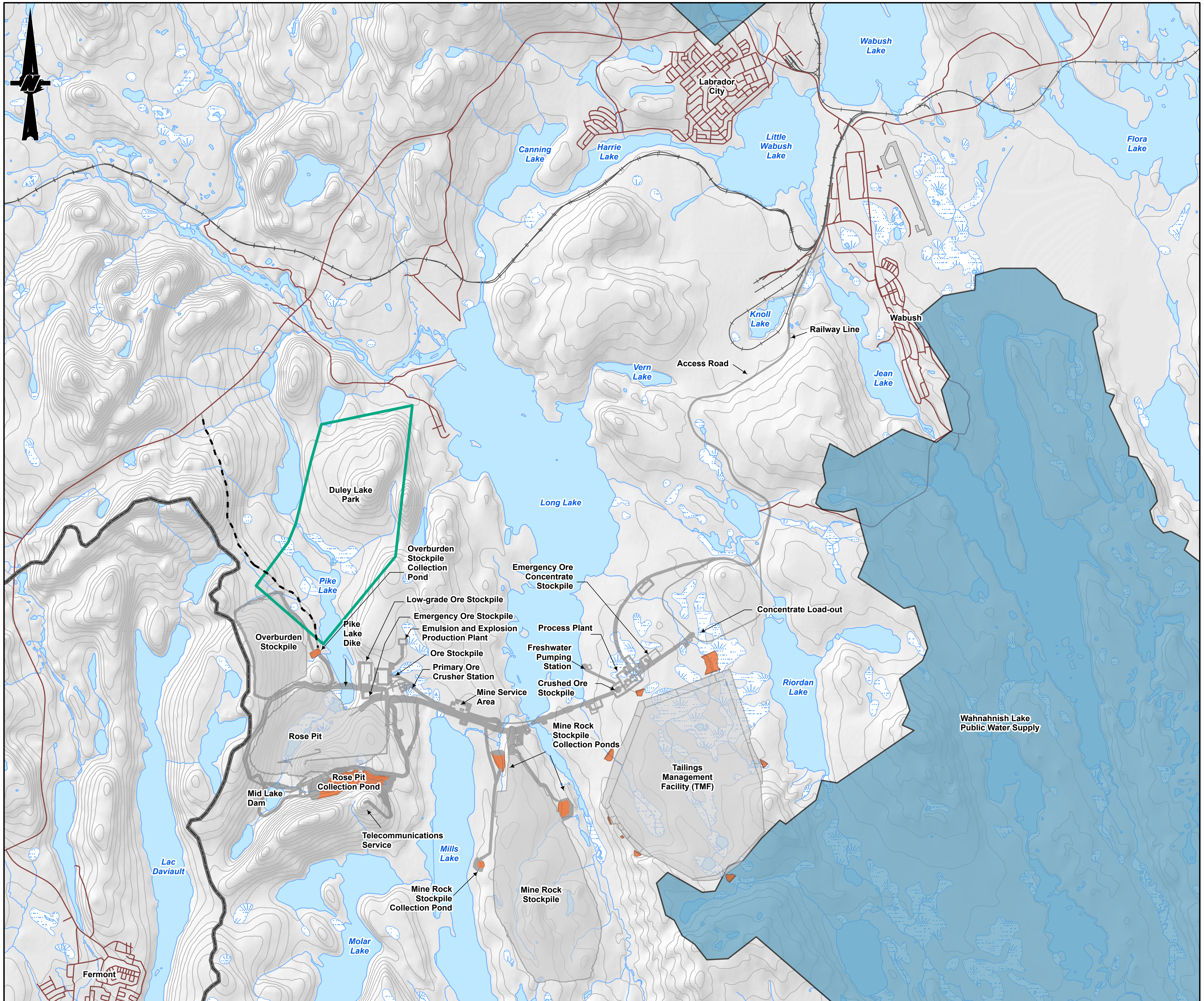
Champion submitted a Project Registration document to the NL Department of Environment and Climate Change (the Department) in April 2024 to restart the EA process for the Project. On June 13, 2024, the Minister issued a Decision Letter to Champion concluding that an EIS would be required for the Project. EIS Guidelines were issued for the Project on December 19, 2024, that includes requirements for baseline studies.

To support the EIS process, Champion has commissioned the services of WSP Canada Inc. (WSP) to complete a comprehensive baseline field program that documents the existing natural and socio-economic environments in the anticipated area of the Project, and this wildlife baseline report represents a component of the comprehensive baseline program. The wildlife baseline study was undertaken to provide context from which effects to wildlife could be evaluated and inform the development of mitigation measures and follow-up effect monitoring programs in the EIS. Champion is planning to submit the EIS to the Newfoundland and Labrador Environmental Assessment Division of the Department of Environment and Climate Change in 2025.

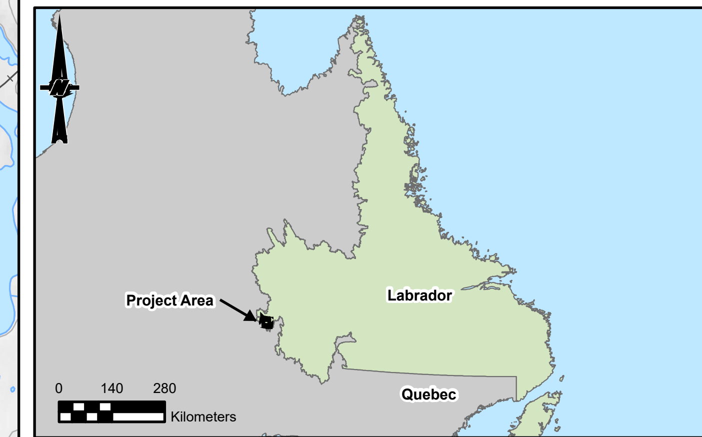
1.1 Overview of the Kami Iron Ore Mine

Figure 1-1 outlines some of the main components of the Project site, including:

- Open Pit (Rose Pit);
- Mine rock stockpile;
- Ore stockpiles (operational and reserve);
- Tailings management facility (TMF);
- Overburden stockpile;
- Processing infrastructure, including crushing and concentrating; and
- Ancillary infrastructure to support the mine and process plant.



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Potential Access Road

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Contour
- Duley Lake Park
- Bog/Wetland
- Waterbody
- Labrador/Quebec Boundary
- Public Water Supply

0 1,000 2,000 4,000

1:71,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
PROJECT LOCATION AND SITE LAYOUT

CONSULTANT

YYYY-MM-DD	2025-02-27
DESIGNED	----
PREPARED	GM
REVIEWED	AF
APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	B	1-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

2.0 STUDY AREA

The north-western portion of the proposed Kami mining development (i.e., east of Duley Lake Provincial Park) occurs within the Mid Subarctic Ecoregion (Canada Committee on Ecological Land Classification 1989) and contains multiple ecotypes including open black spruce-lichen forest, post-fire/willow habitat, alpine shrub, bog, and a range of wetland habitats. Within Canada's classification of Bird Conservation Regions (Stralberg et al., 2018), the Labrador City region occurs within the Taiga Shield and Hudson Plains Region (BCR 7). Habitat diversity within this study area enables occupancy by a range of small mammal species, herbivorous species (e.g. snowshoe hare, red squirrel), meso-carnivores (e.g. American marten, short-tailed weasel), and large mammals including black bear, moose, and woodland caribou.

The wildlife baseline study area was defined as the area of potential direct disturbance (i.e., location of proposed infrastructure, presented in Figure 1-1) and is the area where most of the direct effects from the proposed Project are likely to occur. It is represented by the proposed Project footprint and is approximately 2,681 hectares (ha). The study was based on the Project design information available at the time of planning for the field program.

3.0 RATIONALE AND OBJECTIVES

Herptiles (amphibians and reptiles) are important indicator species of environmental health because they readily absorb toxins through their highly permeable skin. They are also important prey species to avifauna and mammals. There are no known reptile species within interior Labrador. There are several amphibian species (frogs, toads, and salamanders) that have been previously documented in the study area, Potential impacts of project activities on resident amphibians is therefore important to consider. Of particular concern are potential impacts on species listed under Canadian *Species at Risk Act* (SARA) and the Newfoundland and Labrador *Endangered Species Act* (NL ESA).

Mammals are an integral component of boreal-subarctic regions and have important ecological and socio-cultural value. From an ecological perspective, mammals occupy multiple trophic levels as prey species for raptors and other carnivores (e.g. meadow voles and southern red-backed voles), top-level predators that can influence community composition (e.g. gray wolves; Johnson et al., 2019), and species that can modify the composition of plant communities and aquatic habitats (e.g. beavers; Law et al., 2016). Some groups, including ungulates and small game, are harvested as a food source or are hunted and trapped for recreational enjoyment or a source of income. Wildlife also provides recreational and aesthetic value through non-consumptive activities including photography.

A range of mammal species (including small mammals, carnivores, and ungulates) are known or are likely to occur within the baseline study area; therefore, the potential impact on resident mammals is an important consideration during all phases of project development and operation. Of particular concern are potential impacts on species listed under the SARA and NL ESA.

To supplement data collected previously for the site in 2011 and 2012, and to address the MFQ Data Gap Analysis, the purpose of the survey program was to update baseline conditions of the site prior to any future mining development on the property. Results of the baseline study will be used to support the environmental assessment of the Project and will provide the necessary data to quantify the potential harmful alteration or destruction of wildlife species and their habitat. Specifically, the objectives of this study are to provide a desktop review and conduct surveys with a focus on herptiles and bats as these were explicitly identified as gaps. To this end, the current objectives are to:

1) Provide a description of the occurrence, population status, and habitat associations of mammals that are known or are likely to occur in the study area with emphasis on federally and provincially listed Species at Risk; and

2) Identify ecologically sensitive habitats, and time periods.

4.0 METHODS

A review of existing scientific publications and environmental studies was undertaken as part of the previously submitted Wildlife Baseline report, where the findings are summarized (WSP, 2024).

4.1 Atlantic Canada Conservation Data Centre

The Atlantic Canada Conservation Data Centre (ACCDC) is a not-for-profit organization and an affiliate of NatureServe Canada. The ACCDC compiles and provides objective data on the biological diversity of Atlantic Canada and functions to further our collective understanding of the distribution and status of species of conservation concern. The ACCDC is a valuable database for assessing the occurrence and location of species and is extensively used for land use planning, environmental assessment processes etc. Results of the ACCDC report obtained prior to the 2023 survey season can be found in WSP (2024). Because the report was only valid up to December 2023, a new report was obtained December 22, 2023 (Appendix A), which provides relevant data on the occurrence of SAR and SOCC (SARA, NSESA, ACCDC S-rank) mammals within a 348 km^2 area encompassing the proposed study area. Data provided to WSP by the ACCDC is current to June 22, 2025.

4.2 Passive Wildlife Camera Survey

Four trail cameras (Stealthcam) were deployed within the Project Area (Figure 4-1) to detect potential wildlife in the area. All cameras were deployed on September 20, 2023. Cameras were subsequently checked on January 30, 2024. However, only cameras 1 and 4 could be checked due to snow conditions and weather; batteries were changed in these cameras and SD cards were downloaded. All cameras were retrieved November 06, 2024. At the time of retrieval, the cameras were still functioning.

Table 4-1: Summary of Wildlife Camera Survey Stations in the Study Area

Station	Coordinates (Zone 19t)		Site and Habitat Description
Camera 1	N 5852826	E 0633908	Black spruce, grasses, and shrubs. Set up by ATV trail with waterbodies nearby. Selected because evidence of tracks in area suggested that it was being used by wildlife.
Camera 2	N 5854996	E 0632275	Set up in a valley. Black spruce, alders, shrubs, grasses and small bogs present. Selected because evidence of tracks in area suggested that it was being used by wildlife.
Camera 3	N 5857287	E 0641958	Black spruce, grasses, shrubs, caribou moss, labrador tea. Stream in camera view. Selected because expected to see wildlife utilizing stream and surrounding habitat.
Camera 4	N 5858414	E 0642725	Black spruce, grasses, shrubs, caribou moss, labrador tea. Established ATV trail. Selected because expected to capture wildlife using the trail.

4.3 Passive Acoustic Bat Monitoring Survey

To determine if bat activity varies across years and how proposed project activity may impact bats, acoustic remote units (ARU; Wildlife Acoustics SM4BAT FS) were deployed in four locations (Figure 4-2; Table 4-2; Appendix C). One ARU (Bat01) was placed in the Rose Pit Mine where activity was the highest in 2023 (Figure 4-2). To determine if bat activity is highest in the Rose Pit Mine area because of unique features, or whether additional suitable habitat exists within and adjacent to the project area, an ARU was placed at three locations with similar habitat features present in the Rose Pit Mine, namely wetlands and surrounding treed areas (Bat02, Bat03), including one location in the Duley Lake Provincial Park (Bat04)(Figure 4-2). ARUs were deployed to capture activity during the breeding period (July 31 to late-August) when activity was highest in 2023; deployment was delayed due to wildfires in the area. ARUs were deployed on July 31, 2024. As requested by regulators, ARUs remained in place for the fall migration period and retrieved on November 05, 2024.

Recording parameters were set to limit environmental noise while maximizing detection of bat species typical of the region (Table 4-3). Acoustic data will be analyzed using Kaleidoscope Pro auto-ID which will then be manually verified by a bat expert with 25 years in acoustic ID. Activity and species composition will be compared spatially and temporally across the four locations. Because weather conditions can affect bat activity by impacting prey availability, thermoregulation, navigation, and flight, nightly weather conditions (precipitation, temperature, wind speed) were obtained from the nearest weather station located in Wabush Airport (~14km away). However, due to an apparent technical issue with the instrument, precipitation data from Wabush was not accurate from August 28, 2024, onward (e.g., recordings of >600mm in one hour on multiple occasions). Therefore, precipitation data were supplemented with information obtained from the next closest available station located at the Churchill Falls Airport (~200km away).

Resulting files were analyzed using auto-ID in Kaleidoscope Pro (Wildlife Acoustics). Files were then manually vetted following Canadian Wildlife Health Cooperative guidelines (McBurney and Segers, 2021). Files were identified to species where possible and assigned to a species group that shared call features when calls were too degraded, and therefore did not contain enough diagnostic features. Acoustic monitoring cannot differentiate among individuals and therefore activity levels are not indicative of the number of individuals in an area. Rather, they indicate the relative value of the habitat where higher activity suggests an area represents higher quality habitat.

4.4 Bat Roost Habitat Surveys

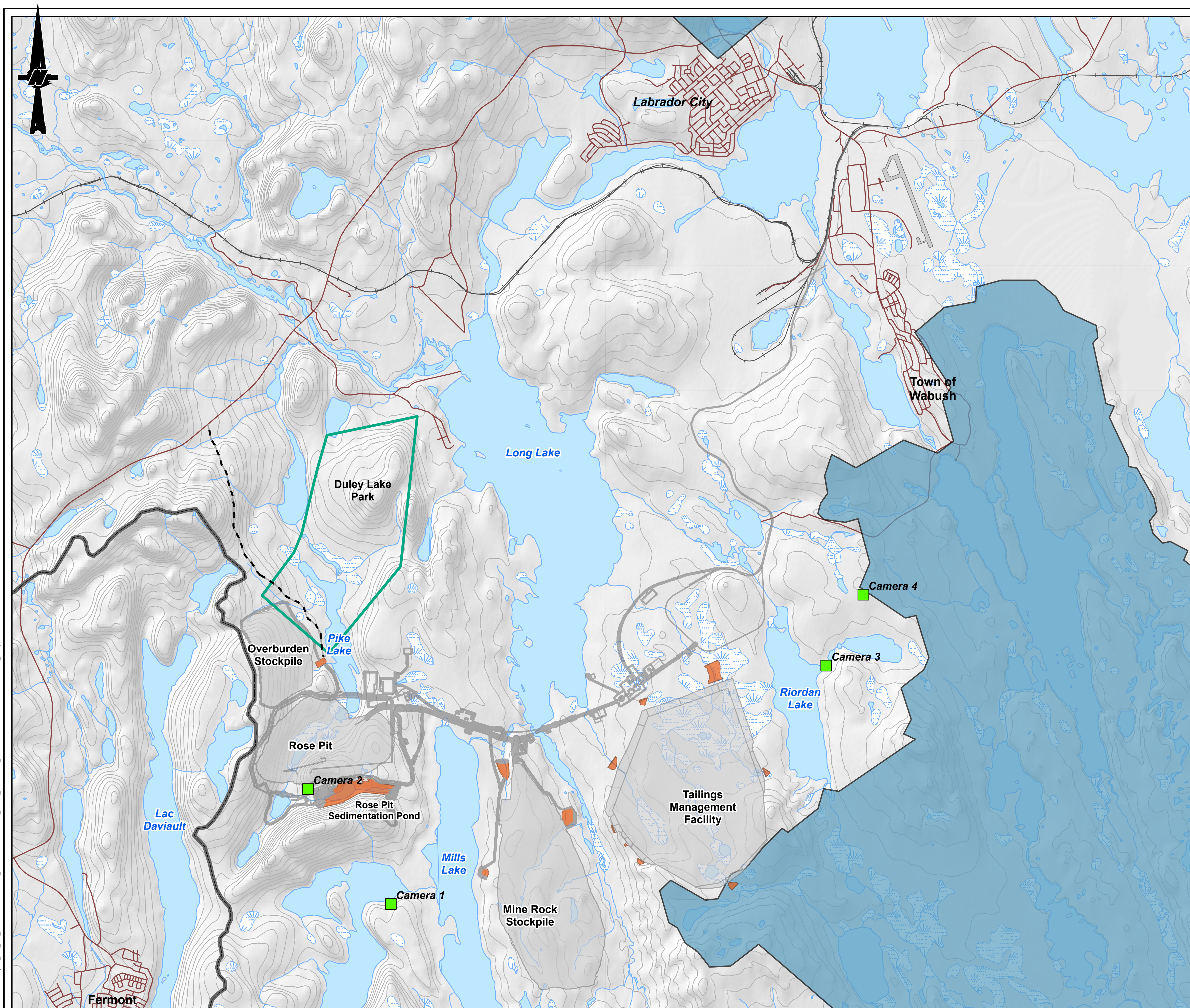
Roost searches were conducted in the Rose Pit Mine area to determine if roost availability explains the high activity recorded there in 2023 (Figure 4-2). To determine if additional suitable roost habitat exists outside the project area, an additional roost search was conducted in similar habitat adjacent the project area in Duley Lake Provincial Park (Figure 4-2). Ideally, roost searches consist of walking transects in the designated areas to search for potential maternity roosts. However, the difficult terrain limited accessibility. Instead, personnel located vantage points in different sub-areas within each of the two main search areas (Figure 4-2) that provided a good view of the area and used binoculars to scan for potential roosts to provide a qualitative assessment of roost habitat. Where possible, the locations of potential roosts were recorded using a handheld GPS. Suitable roosts for most species consist of large diameter trees that are dead or dying and that possess cracks, crevices, exfoliating bark, or woodpecker cavities. However, Hoary (*Lasiurus cinereus*) and Eastern Red Bats (*L. borealis*) roost in deciduous tree foliage where they hang from branches.

Table 4-2: Summary of Bat Acoustic Survey Stations in the Study Area

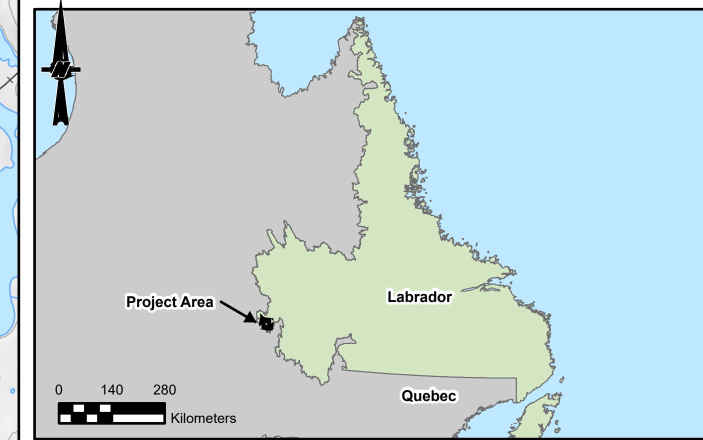
Station	Coordinates (Zone 19t)		Site and Habitat Description
BAT01 Duley Lake Park	N 5857286.99	E 641958.00	Riparian area located in Duley Lake Provincial Park on the northwest edge of Long Lake. The ARU was deployed at the edge of trees and the lake, with the microphone facing the lake. Surrounding habitat consisted of short, dense black spruce, tamarack, and alder. Several buildings were located nearby, connected by small access roads. (Appendix C).
BAT02 Unnamed Pond - NE	N 5857160.97	E 636135.00	Riparian area located adjacent to a pond. The ARU was deployed at the edge of trees and pond, with the microphone facing the pond. Surrounding habitat consisted of short, dense black spruce, tamarack, and alder, as well as open fen/wetland. (Appendix C).
BAT03 Wetland - NE	N 5855406.97	E 634806.01	Riparian area located in a wetland. The ARU was deployed at the edge of trees and wetland, with the microphone facing the wetland. Surrounding habitat consisted of short, dense black spruce, tamarack, and alder, as well as short-dense shrubs such labrador tea (Appendix C).
BAT04 Rose Pit	N 5854975.99	E 632255.00	Regenerating area adjacent a wetland and pond. The ARU was deployed at the edge of trees and open patch with shrubs, with the microphone facing the open area. Surrounding habitat consisted of black spruce, dwarf birch, tamarack, and alder (Appendix C).

Table 4-3: Summary of ARU Parameters for Bat Monitoring in the Study Area

Parameter	Setting
Gain	12dB
16 kHz Filter	ON
Sample Rate	500 kHz
Minimum Duration	1.0ms
Maximum Duration	none
Minimum Trigger Frequency	16 kHz
Trigger Level	12 dB
Trigger Window	3.0s
Maximum Length	00:15s
Compression	none
Sunset/Sunrise	solar



KEY MAP



SCALE 1:20,000,000

Legend

- Wildlife Camera Survey Location

PROJECT INFRASTRUCTURE

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Potential Access Road

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Contour
- Duley Lake Park
- Bog/Wetland
- Waterbody
- Labrador/Quebec Boundary
- Public Water Supply

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

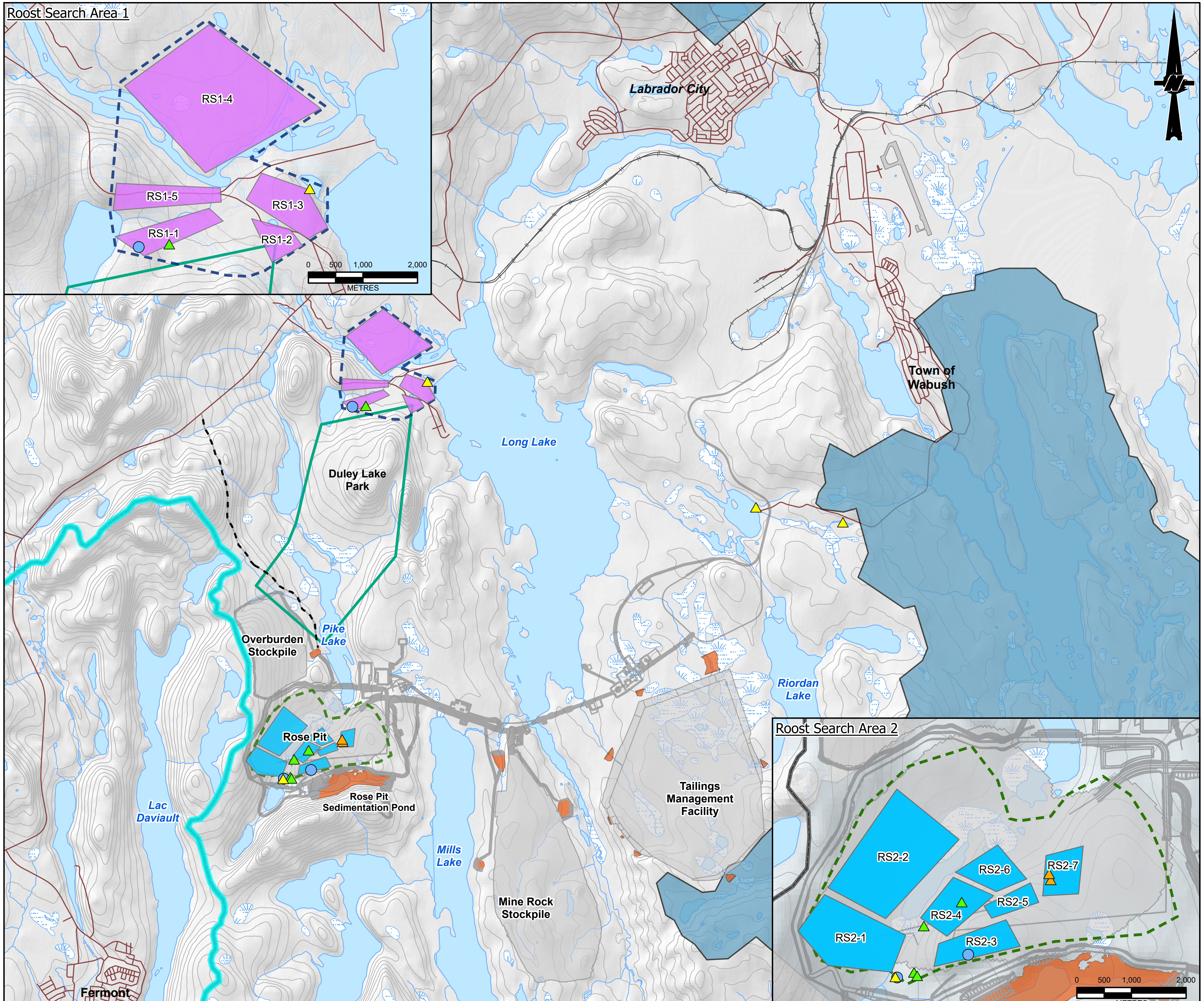
TITLE
WILDLIFE CAMERA MONITORING LOCATIONS

CONSULTANT

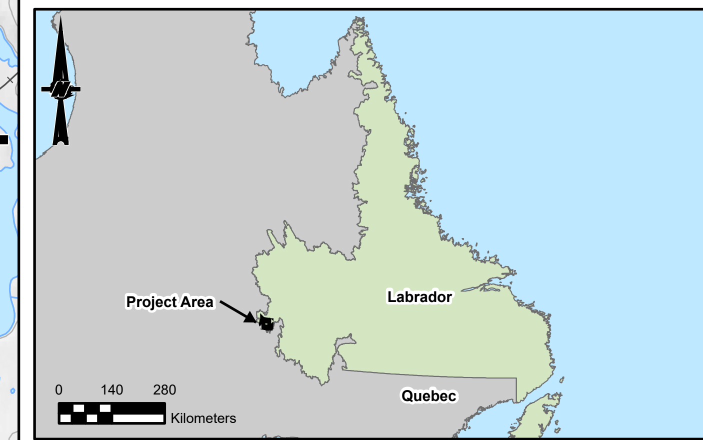
YYYY-MM-DD	2025-02-28
DESIGNED	----
PREPARED	GM
REVIEWED	AF
APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	B	4-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



KEY MAP



SCALE 1:20,000,000

Legend

PROJECT DATA

- Proposed Project Infrastructure
- Proposed Sediment Pond
- Potential Access Road

Project Data

- None

Maternity Roost Potential

- Low
- Moderate
- None
- Roost Search Area 2
- Roost Search Area 2 Subarea
- Roost Search Area 1
- Roose Search Area 1 Subarea

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Contour
- Duley Lake Park
- Bog/Wetland
- Waterbody
- Labrador/Quebec Boundary
- Public Water Supply

0 1,000 2,000 4,000

1:71,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

WILDLIFE CAMERA MONITORING LOCATIONS

CONSULTANT

wsp

YYYY-MM-DD	2025-02-28
DESIGNED	----
PREPARED	GM
REVIEWED	AF
APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	B	4-2

4.5 Quality Assurance / Quality Control Procedures

Dedicated field programs, apart from installation of wildlife cameras and bat monitors, were not completed for assessing wildlife within the study area during 2024. This baseline report primarily involves summarizing data collected during the 2024 field season, with a broad overview of past field programs completed by Stantec (2011) and AMEC (2012), as well as findings from the surveys completed as part of this assessment in 2023. For the bat surveys, a Quality Assurance / Quality Control program was implemented to verify that data collection, data entry, and data analysis were conducted with a high level of confidence. Quality Assurance / Quality Control of field data and data summary calculations consisted of:

- summarizing data collected as part of past field programs completed by Stantec (2011) and AMEC (2012)
- reviewing and verifying field data on site, at the end of each day, and at the end of each field shift to maintain data quality and consistency
- following the appropriate acoustic monitor installation procedures
- field work in pairs to limit observational gaps
- transferring and backing-up field data and field photos to online databases and laptops regularly

5.0 RESULTS

5.1 Literature Review and ACCDC Records

Details from the literature review and previous ACCDC report can be found in WSP (2024). Generally, the literature review and both ACCDC reports (Appendix A) revealed no observations of SAR or SOCC amphibians listed under SARA and currently no amphibian species have been assessed for listing under the NL ESA. A previous baseline survey in the Project Area (Stassinu Stantec, 2014) recorded American toad (*Bufo americanus*), wood frog (*Rana sylvantica*), and two-lined salamander (*Eurycea bislineata*), none of which are Species of Conservation Concern. There is one record in iNaturalist west of Labrador city of a northern dusky salamander (*Desmognathus fuscus)*, which is listed as Endangered under SARA.

No observations of SAR or SOCC mammals have been reported within the vicinity of the Project Area, with the exception of myotis bat species. A previous aerial winter survey, along with incidental observations, in the Project Area (Stassinu Stantec, 2014) recorded signs or observations of snowshoe hare (*Lepus americanus*), moose (*Alces alces*), wolf (*Canis lupus*), Canada lynx (*Lynx canadensis*), red fox (*Vulpes vulpes*), American marten (*Martes americana*), ermine (*Mustela erminea*), otter (*Lontra canadensis*), porcupine (*Erethizon dorsatum*), red squirrel (*Tamiasciurus hudsonicus*), black bear (*Ursus americanus*), and beaver (*Castor canadensis*), none of which are Species of Conservation Concern. The ACCDC report revealed the potential for myotis species to occur in the area. A passive acoustic survey completed in 2023 as part of this assessment confirmed the presence of SAR myotis species, as well as all three SOCC bats (WSP, 2024). The ACCDC reports did not indicate the potential for bat hibernacula in the area. Moreover, the literature review suggest bats are unlikely to hibernate in the area as suitable hibernation conditions are unlikely at latitudes above 55° (Ministère de l'Environnement et de la Faune, 1996). ACCDC indicated via email correspondence (December 22, 2023) that, although "we don't have observations in our database for these species within your study area, our Expert Opinion Maps suggest that Woodland Caribou are *possible"*. A more detailed review of Woodland Caribou is provided in a separate report. Each of the five bat species is discussed below in Species of Special Conservation Status.

5.2 Passive Wildlife Camera Survey

There were approximately 5000 pictures between the four cameras. Wildlife was only observed on Camera 1 and 4 (Table 5-1; Appendix B). There were two moose observed on Camera 1, while one snowshoe hare was observed on Camera 4, as well as five observations of birds (1 spruce grouse, 1 fox sparrow, and 3 unidentified birds). It is also worth noting that there were numerous people on each camera, with one being placed on a groomed snowmobile trail.

Table 5-1: Wildlife observed on Trail Cameras within the Vicinity of the Kami Project in Western Labrador

Wildlife Observations		
Date time	**Camera 1**	**Camera 4**
9/24/2023	Moose (Young Bull)	
11/21/2023		Spruce Grouse
3/24/2024		Snowshoe Hare
5/30/2024		Fox Sparrow
6/23/2024	Moose (Calf)	
8/17/2024		Unidentified Bird
9/4/2024		Unidentified Bird
9/17/2024		Unidentified Bird

5.3 Passive Acoustic Bat Monitoring Survey

Survey conditions were suitable (> 10^{o}C, no precipitation, winds < 20km/h for at least 4 hours) for at least 9 nights during the breeding period and 22 nights during fall migration (Table 5-2; Appendix D). During this time, a total of 355 bat passes were detected for multiple species across the four (4) locations (Table 5-3, Table 5-4; Appendix E).

Table 5-2: Summary of Bat Acoustic Survey Effort for the Study Area

Monitoring Period	Date Range	Number of Nights >10oC(a)	Number of Nights with No Rain(a)(d)	Number of Nights with Wind <20 km/h(a)
Spring Migration	n/a	n/a	n/a	n/a
Summer Breeding	July 31st to August 14th	9	9(b)	15
Fall Migration	August 15th to November 5th	22	74(c)	79

(a) refer to nights where conditions were met for at least 4 hours.

(b) no data were available from 2024-07-31 to 2024-08-05 (included) so the summary is from 2024-08-06 to 2024-08-14.

(c) no data were available for the following nights: 2024-10-13; 2024-10-18 to 2024-10-21.

(d) the data are from a second weather station (Churchill Falls Airport) because the precipitation data from the first station were not accurate.

5.3.1 Spatial Distribution

Rose Pit (BAT04) had the highest number of bat detections (n = 147/355), with Duley Lake Park (BAT01) having the second most detections (n = 111/355). The remaining two locations in the northeast of the SSA had lower bat detections with the pond (BAT02) having an 86/355 and wetland (BAT03) having by far the least of all (n = 11/355). This pattern was consistent for the SAR and SOCC species.

5.3.2 Temporal Pattern

The number of detections per night varied across the season (Figure 5-1). After accounting for sampling effort (total number of monitoring nights across all detectors), activity was much higher during the breeding period (n = 14.73 passes/ night) compared to during fall migration (n = 1.61 passes/night).

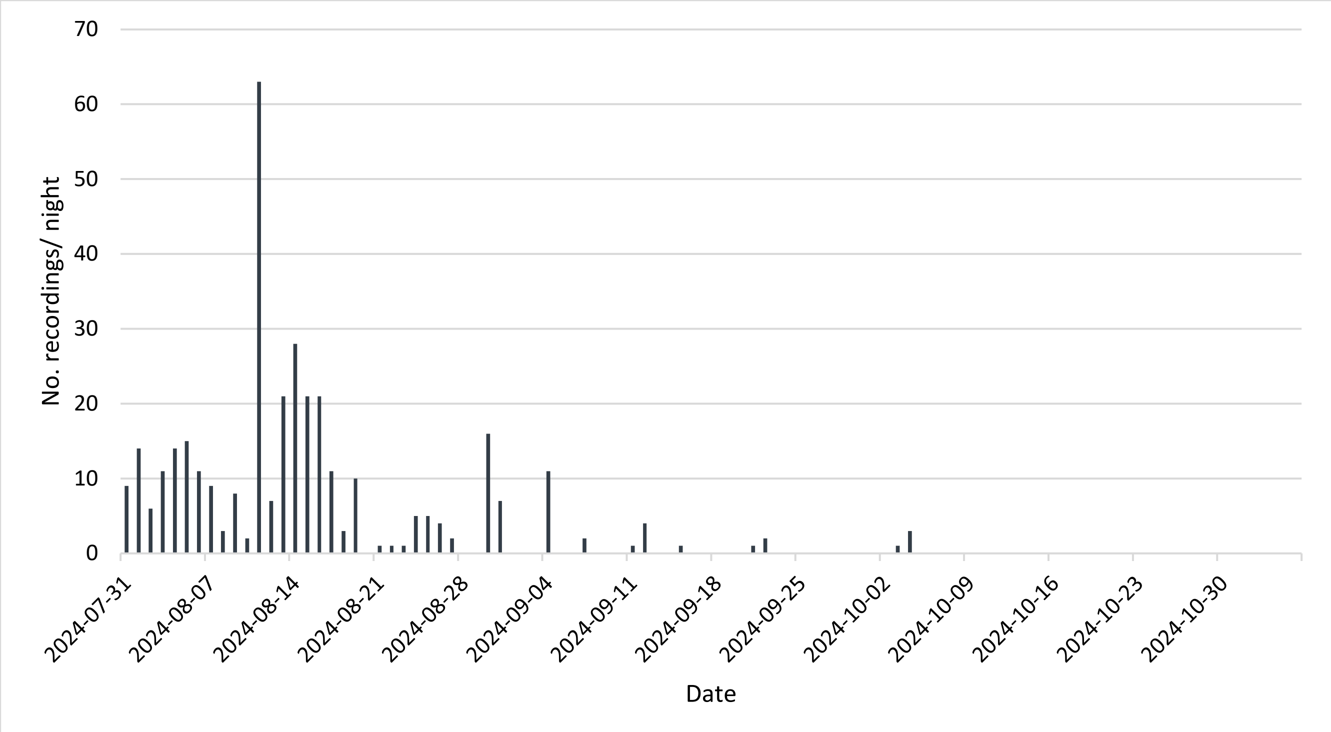


Figure 5-1 Temporal Pattern of Bat Activity in the Kami Project Area

5.3.3 Species Composition

Of the 355 bat passes, 31 were confirmed SAR species and 246 were confirmed SOCC species (Table 5-4, Table 5-5). Of the confirmed SAR passes, three (3) were attributed to Little brown myotis (MYLU), seven (7) were attributed to northern myotis (MYSE), and 21 were produced by Myotis bats but the species could not be confirmed (Table 5-4, Table 5-5). Of the confirmed SOCC passes, 195 were attributed to the hoary bat (LACI), four (4) were attributed to the silver-haired bat (LANO), and 51 were produced by the eastern red bat (LABO). The remaining passes could not be reliably identified to species and were therefore identified to species groups (Table 5-4, Table 5-5).

Table 5-3: Summary of Bat Species/Species Group Codes and Explanations

Species/Species Group Code	Latin Name/ Description	Common Name
MYLU	Myotis lucifugus	Little Brown Myotis
MYSE	Myotis septentrionalis	Northern Myotis
MYOTIS	could not differentiate between *M. lucifugus* or *M. septentrionalis*	
PESU	*Perimyotis subflavus*	Tricolored Bat
EPFU	*Eptesicus fuscus*	Big Brown Bat
LANO	*Lasionycteris noctivagans*	Silver-haired Bat
EPFU/LANO	Could not differentiate between *E. fuscus* or *L. noctivagans*	
LABO	*Lasiurus borealis*	Eastern Red Bat
LACI	*Lasiurus cinereus*	Hoary Bat
Unknown HighF (MYLU, MYSE, PESU, LABO)	Could not differentiate among species with minimum frequencies ≥35 kHz	
Unknown LowF (EPFU, LACI, LANO)	Could not differentiate among species with minimum frequencies ≤ 25 kHz	
NoID	Could not differentiate among any species; calls too degraded	

Table 5-4: Summary of Bat Acoustic Survey Results (# Passes) within the Wildlife Study Area

Species/Species Group	BAT01	BAT02	BAT03	BAT04	TOTALS
EPFU	2	0	0	2	4
LABO	1	0	1	49	51
LACI	87	81	8	19	195
LANO	3	0	0	1	4
EPFU/LANO	3	1	1	13	18
MYLU	1	0	0	2	3
MYSE	3	3	0	1	7
Myotis	7	1	0	13	21
PESU	0	0	0	0	0
LowF	1	0	0	2	3
HighF	3	0	1	45	49
NoID	0	0	0	0	0
Total Number of Bats	111	86	11	147	355

Table 5-5: Summary of Bat SAR and SOCC (# Passes) Confirmed within the Wildlife Study Area

SAR/SOCC	BAT01	BAT02	BAT03	BAT04	TOTALS
Confirmed SAR (MYLU, MYSE, MYOTIS)	11	4	0	16	31
Confirmed SOCC (LABO, LACI, LANO)	88	81	9	68	246

5.4 Bat Roost Habitat Surveys

Generally, roosting habitat in the area is limited (Appendix F). Trees are primarily live, small (dbh) trees with no cavities or exfoliating bark, and therefore not suitable for roosting bats. Additionally, most dead trees were black spruce with a lot of branches, which makes the trunk inaccessible for bats.

5.4.1 Roost Search Area 1 – Duley Lake Provincial Park

Overall, roost habitat suitability in this area was low (Appendix F). The spruce forest is very dense, so that trees are not easily accessed by bats. Very few dead or decaying trees were observed, and those that were present were not suitable for roosts as they were small in diameter and had a lot of branches. Nearby houses and camps may provide roosting habitat for bats. As there were no visible deciduous trees, suitable roosting habitat for Hoary and Red bats is unlikely in the area.

5.4.2 Roost Search Area 2 – Proposed Rose Pit Mine

Generally, roost habitat suitability in the area is low to moderate (Appendix F). Most of the roost search area is dominated by shrubs with some dead trees that are well exposed, but most are small in diameter without or cavities and therefore not suitable as roosts. Roost search area 7 (Figure 4-2) may provide suitable roosting habitat. This area is the site of past wildfires on a south-exposed slope where several dead trees were evident, including trees with a large dbh (~50cm, estimated through binoculars) and woodpecker cavities (Figure 4-2). Unfortunately, these trees were inaccessible and therefore accurate measurements could not be obtained. As there were no visible deciduous trees, suitable roosting habitat for Hoary and Red bats is unlikely in the area.

5.5 Species of Special Conservation Status

There are five mammalian Species at Risk (SAR) either listed on Schedule 1 of SARA or under the NL ESA, that potentially occur within the proposed Kami study area and the adjacent landscape: Woodland Caribou (*Rangifer tarandus caribou*), Wolverine (*Gulo gulo*), Polar Bear (*Ursus maritimus*), Little Brown Myotis (*Myotis lucifugus*), and Northern Myotis (*M. septentrionalis*). Acoustic monitoring surveys confirmed the presence of the two (2) SAR bats in the SSA, as well as three (3) Species of Conservation Concern (SOCC). A brief overview of these bat species is provided below.

The *Species at Risk Act* prohibits the harming or harassing of “wildlife species at risk” and the damage or destruction of their residences (i.e., nests or dens). Under the Act, Schedule 1 is the official list of wildlife Species at Risk. The Act also protects these species’ habitat on federally owned lands. On other lands, the Act allows for the designation and protection of “critical habitat” of these species, namely, habitat necessary for the survival or recovery of endangered, threatened or extirpated species. Critical habitat may be designated in species-specific recovery strategies or action plans. The Minister of the Environment may issue permits to authorize an activity that would contravene the Act if the effects on the species are incidental to the carrying out of the activity, if all reasonable alternatives have been considered, all feasible measures will be taken to minimize the impact, and the activity will not jeopardize the survival or recovery of the species.

Like SARA, NL ESA protects individuals, their residences, and designated critical habitat or recovery habitat of wildlife species designated under this Act. Critical habitat or recovery habitat may be identified during species recovery planning and may be designated for protection under the Act.

5.5.1 Little Brown Myotis and Northern Myotis

Little Brown Myotis and Northern Myotis are considered ‘resident’ species because they breed in NL and move short distances to overwinter in hibernacula. Northern populations of little brown myotis are thought to initiate their period of winter torpor in September and emerge from their winter hibernacula (caves and abandoned mine shafts) in mid-May (Fenton and Barclay, 1980). Females give birth around early July (Broders et al., 2013).

Both species are aerial insectivores that feed primarily on smaller, nocturnal Diptera (flies) and Hymenoptera (moths). Northern myotis typically forage in mature forest interior, as well as over ponds and wetlands. They roost under exfoliating bark, as well as in cracks and crevices in mature trees. Little brown myotis typically forage along forest edges, as well as over ponds and wetlands. In Labrador, they likely roost in buildings, as well as tree cavities, cracks, and crevices in mature trees (ECCC, 2018). Prior to this baseline investigation, the little brown myotis was only known to occur throughout portions of south-central Labrador (Broders et al., 2013; Burns et al., 2015) and northern myotis was only recorded in this region for the first time in 2013 (Broders et al., 2013).

Like all bats, these species have slow life histories, meaning they are long lived but have very low reproductive rates as females typically produce only one (1) pup a year. They are therefore vulnerable to any disturbance that could impact survival and reproductive success. This is particularly true in areas like Labrador where they are at the northern extent of their range (ECCC, 2018). In addition, both species have suffered dramatic population declines since the arrival of a fungal pathogen (*Pseudogymnoascus destructans*) that infects hibernating bats and causes the disease white-nose syndrome (Frick et al., 2010; ECCC, 2018). White-nose syndrome has resulted in widespread declines of both species, which are both listed as Endangered under Schedule 1 of SARA and NL ESA and ranked Critically Imperiled (S1) by ACCDC.

5.5.2 Eastern Red Bat, Hoary Bat, and Silver-haired Bat

The Eastern Red (*Lasiurus borealis*), Hoary Bat (*L. cinereus*), and Silver-haired Bat (*Lasionycteris noctivagans*) were recently assessed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2023). They are currently under review for listing as Endangered under Schedule 1 of SARA. All three species' migratory populations are ranked by ACCDC as Critically Imperiled (S1M), but there is currently insufficient information to rank their breeding populations (SUB). These three (3) species are considered migratory species because they come to Canada to breed but migrate to overwinter farther south. These species have been suffering declines largely due to cumulative impacts of wind energy (COSEWIC, 2023).

All three species are aerial insectivores that feed on larger nocturnal Diptera and Hymenoptera, as well as smaller Coleoptera (beetles). Compared to the Myotis species, they are larger and therefore less agile. As a result, these species are confined to edge habitat and open spaces while commuting and foraging. Hoary and Red Bats roost by hanging from branches in foliage of trees, while Silver-haired Bats roost under exfoliating bark and in tree cavities, cracks, and crevices (COSEWIC, 2023).

5.6 Important Areas and Time Periods

All terrestrial and wetland habitats within the study area provide important life history characteristics depending on the species considered and the time of year. For example, shallow, vegetated ponds and streams enable occupation by beavers, muskrat, and American mink. Upland barrens and sphagnum bogs are utilized by small mammal species and associated carnivores (i.e. red foxes) and dense conifer forest provides denning and foraging opportunities for American marten, Canada lynx, and red squirrels. With respect to biologically critical time periods, the breeding season is the most energetically demanding time for mammals as most species are vulnerable to disturbance during this life history stage. Disturbance of females during the post-parturition stage can lead to abandonment or predation of newborn young. Many wildlife species are also vulnerable to direct/indirect disturbance during late mid to late winter when ambient air temperature and snow cover increase energetic requirements. Disruption of individuals from critical habitats that provide protective cover or adequate food resources can lead to mortality or decreased reproduction output during subsequent seasons (Shively et al., 2005, Tablado and Jenni, 2017). Like all bats, the species detected in the study area have slow life histories, meaning they are long lived but have very low reproductive rates. They are therefore vulnerable to any disturbance that could impact survival and reproductive success. This is particularly true in areas like Labrador where they are at the northern extent of their range (ECCC, 2018). Habitat loss and impacts on insect prey pose a risk to all species. Disturbance during hibernation poses a risk to survival and reproductive success as bats are already experiencing considerable challenges related to white-nose syndrome. Migratory bats face increasing challenges during migration across their range as they must navigate increasing numbers of wind energy developments, as well as habitat loss (COSEWIC, 2023).

6.0 KEY FINDINGS

This report is intended to complement previous environmental assessments and address gaps identified in the previous assessments, as described above. A desktop review, including previous baseline surveys and ACCDC reports, suggests there are no known records of SAR herptiles or mammals listed under SARA or NLESA, with the exception of myotis bats. Given the wide range of terrestrial and aquatic habitats throughout the Project area (including late-successional black spruce forest, recently burned forest, barrens, wetlands, and riparian habitat), an extensive assemblage of mammals has been documented for this region. Previous surveys have reported species characteristic of northern Canada, such as black bear, red fox, American beaver, snowshoe hare, Canada lynx, and porcupine, among others. Data collected during 2023 and 2024 include the use of wildlife cameras and acoustic monitoring for bats, along with incidental accounts collected during concurrent studies.

Wildlife camera surveys confirmed the presence of snowshoe hare and moose, along with several bird species. However, no SAR were detected.

A desktop review suggests bat hibernacula are unlikely to occur in the area. Similarly, a desktop review and site visit suggest roosting habitat is limited in the study area. Field acoustic monitoring for bats conducted between June 16 – September 8, 2023 (WSP, 2024), together with the current study, confirmed the presence of the two endangered *Myotis* species. Acoustic data also revealed the presence of three Species of Conservation Concern that are under review for listing under SARA, namely the eastern red bat, hoary bat, and silver-haired bat. The monitoring station located at proposed Rose Pit Mine (BAT04) had the highest number of bat detections in 2023 and again in 2024, and this pattern was consistent for SAR and SOCC bats. However, activity was also high in Duley Lake Provincial Park, just outside the Project's boundaries, suggesting suitable habitat exists there. Availability of roost habitat in these two areas does not appear to explain the high activity detected there. Instead, it is likely bats are roosting elsewhere and either passing through the areas or foraging in the areas. The presence of high-quality foraging habitat, such as wetlands, does not fully explain the high activity observed in the Rose Pit Mine area as similar habitat was surveyed in the northeast of the Project site but bat activity was very low. This, together with evidence that bat activity was highest during the breeding season, suggest bats are likely roosting nearby and passing through the project site to feed and/or commute elsewhere to feed.

Each of these species are vulnerable to disturbance year-round. This is particularly true in areas like Labrador where they are at the northern extent of their range (ECCC, 2018). Habitat loss and impacts on insect prey pose a risk to all species. Disturbance during hibernation poses a risk to survival and reproductive success as hibernating bats are already experiencing considerable challenges related to white-nose syndrome. Migratory bats face increasing challenges during migration across their range as they must navigate increasing numbers of wind energy developments, as well as habitat loss (COSEWIC, 2023).

Potential effects to herptile and mammalian Value Ecosystem Components from the proposed Project will be further examined in the EIS, following the requirements of the Environmental Impact Statement Guidelines (Newfoundland and Labrador Department of Environment and Climate Change, December 2024). The Guidelines outline the relevant EIS requirements for the assessment of effects to wildlife, including but not limited to requirements for the baseline study, effects assessment, and environmental protection mitigation and plans. As part of this, there is a commitment to deploy additional bat ARUs in spring 2025 to capture the spring migration period. At the same time, surveys will be conducted for potential amphibian SAR as dedicated surveys were last completed in 2012. However, results from these surveys will not be available at the time of submission of the EIS. Results from these surveys will be shared with ECCC and the Department of Fisheries, Forestry and Agriculture, Wildlife Division to potentially inform updates to the mitigation and monitoring proposed in the Wildlife Mitigation and Monitoring Program submitted with the EIS.

The baseline report, together with plans for additional baseline data collection in spring 2025, addresses Section 4.3.3 (a) of the EIS Guidelines to document baseline conditions for herptile and mammals in the Project study area. Sufficient data exists from the baseline study to assess effects from the Project including cumulative effects.

Signature Page

WSP Canada Inc.

Vincent Poirier, Krista Patriquin
Senior Environmental Scientist

VP/KP/tt

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APPENDIX A

ACCD Table

Appendix A. ACCDC Report Rare Fauna within the Kami Project SSA and RSA

Scientific Name	Common Name	SRANK_2020	SRANK_2015	NRANK	GRANK	GeneralSta	COSEWIC_ST	PROVINCIAL	SARA	CITATION
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Falco sparverius	American Kestrel	S2B,SUM	S2B,SUM	N5B,N1N,N5	G5	Undetermined	Candidate (Group 3, Low Priority)			Nf.Birds, Data Entry by WD Summer Student, 2012
Bucephala islandica	Barrow's Goldeneye	S1S2B,S3S4M	S3S4M	N5B,N4N5N,	G5	Sensitive	Special Concern	Vulnerable	Special Concern	Canadian Wildlife Service
Bucephala islandica	Barrow's Goldeneye	S1S2B,S3S4M	S3S4M	N5B,N4N5N,	G5	Sensitive	Special Concern	Vulnerable	Special Concern	Email correspondence
Bucephala islandica	Barrow's Goldeneye	S1S2B,S3S4M	S3S4M	N5B,N4N5N,	G5	Sensitive	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Melanitta americana	Black Scoter	S3B,SUN,SUM	S3B,SUN,SUM	N5B,N4N5N	G5	Secure				Kami Mine Partnership Waterfowl Surveys, 2011.
Melanitta americana	Black Scoter	S3B,SUN,SUM	S3B,SUN,SUM	N5B,N4N5N	G5	Secure				Kami Mine Partnership Waterfowl Surveys, 2011.
Melanitta americana	Black Scoter	S3B,SUN,SUM	S3B,SUN,SUM	N5B,N4N5N	G5	Secure				Kami Mine Partnership Waterfowl Surveys, 2011.
Chordeiles minor	Common Nighthawk	S2B,SUM	S2B,SUM	N4B,N3M	G5	May be at risk	Special Concern	Vulnerable	Threatened	Email correspondance, original e-bird report from Gordon, forwarded by Emily Herdman, Feb 8, 2011
Chordeiles minor	Common Nighthawk	S2B,SUM	S2B,SUM	N4B,N3M	G5	May be at risk	Special Concern	Vulnerable	Threatened	Kami Mine Partnership Surveys. 2013.
Chordeiles minor	Common Nighthawk	S2B,SUM	S2B,SUM	N4B,N3M	G5	May be at risk	Special Concern	Vulnerable	Threatened	Kami Mine Partnership Surveys. 2013.
Chordeiles minor	Common Nighthawk	S2B,SUM	S2B,SUM	N4B,N3M	G5	May be at risk	Special Concern	Vulnerable	Threatened	Kami Mine Partnership Surveys. 2013.
Chordeiles minor	Common Nighthawk	S2B,SUM	S2B,SUM	N4B,N3M	G5	May be at risk	Special Concern	Vulnerable	Threatened	Avifauna surveys related to Kami Iron Ore Project, submitted to CDC on 7/2/2014
Chordeiles minor	Common Nighthawk	S2B,SUM	S2B,SUM	N4B,N3M	G5	May be at risk	Special Concern	Vulnerable	Threatened	Avifauna surveys related to Kami Iron Ore Project, submitted to CDC on 7/2/2014
Coenonympha tullia	Common Ringlet	S3	S3	N5	G5	Secure				Ross Newfoundland Data.xls
Aquila chrysaetos	Golden Eagle	S2B,SUM	S2B,SUM	N4N5B,N4N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Aquila chrysaetos	Golden Eagle	S2B,SUM	S2B,SUM	N4N5B,N4N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Aquila chrysaetos	Golden Eagle	S2B,SUM	S2B,SUM	N4N5B,N4N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Aquila chrysaetos	Golden Eagle	S2B,SUM	S2B,SUM	N4N5B,N4N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Aquila chrysaetos	Golden Eagle	S2B,SUM	S2B,SUM	N4N5B,N4N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Histrionicus histrionicus	Harlequin Duck	S3B	S3B,SUM	N4B,N3N,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Personal communication
Histrionicus histrionicus	Harlequin Duck	S3B	S3B,SUM	N4B,N3N,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Personal communication
Histrionicus histrionicus	Harlequin Duck	S3B	S3B,SUM	N4B,N3N,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Email correspondence
Histrionicus histrionicus	Harlequin Duck	S3B	S3B,SUM	N4B,N3N,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Histrionicus histrionicus	Harlequin Duck	S3B	S3B,SUM	N4B,N3N,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Lophodytes cucullatus	Hooded Merganser	S2B,S3M	S2B, S3M	N5B,N5N,N5	G5	Secure				Kami Mine Partnership Waterfowl Surveys, 2011.
Lophodytes cucullatus	Hooded Merganser	S2B,S3M	S2B, S3M	N5B,N5N,N5	G5	Secure				Kami Mine Partnership Waterfowl Surveys, 2011.
Aeshna eremita	Lake Darner	S3	S3	N5	G5	Secure				2DDragonflydata.xls
Anas platyrhynchos	Mallard	S3B,SUM	S3B,SUM	N5B,N5N,N5	G5	Secure				Kami Mine Partnership Waterfowl Surveys, 2011.
Anas platyrhynchos	Mallard	S3B,SUM	S3B,SUM	N5B,N5N,N5	G5	Secure				Kami Mine Partnership Waterfowl Surveys, 2011.
Anas platyrhynchos	Mallard	S3B,SUM	S3B,SUM	N5B,N5N,N5	G5	Secure				Kami Mine Partnership Waterfowl Surveys, 2011.
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Circus hudsonius	Northern Harrier	S3B,SUM	S3B,SUM	N5B,N4N	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Contopus cooperi	Olive-sided Flycatcher	S3B,SUM	S3B,SUM	N4B,N3M	G4	At risk	Special Concern	Vulnerable	Threatened	Avifauna surveys related to Kami Iron Ore Project, submitted to CDC on 7/2/2014
Contopus cooperi	Olive-sided Flycatcher	S3B,SUM	S3B,SUM	N4B,N3M	G4	At risk	Special Concern	Vulnerable	Threatened	Avifauna surveys related to Kami Iron Ore Project, submitted to CDC on 7/2/2014
Falco peregrinus subsp. anatum	Peregrine Falcon	S2B,SUM	S2B,SUM	N4N5B,N4N	G4T4	Sensitive	Special Concern	Vulnerable	Special Concern (anatum	NF.Birds
Falco peregrinus subsp. anatum	Peregrine Falcon	S2B,SUM	S2B,SUM	N4N5B,N4N	G4T4	Sensitive	Special Concern	Vulnerable	Special Concern (anatum	Nf.Birds, Data Entry by WD Summer Student, 2012
Falco peregrinus subsp. anatum	Peregrine Falcon	S2B,SUM	S2B,SUM	N4N5B,N4N	G4T4	Sensitive	Special Concern	Vulnerable	Special Concern (anatum	Nf.Birds, Data Entry by WD Summer Student, 2012
Falco peregrinus subsp. anatum	Peregrine Falcon	S2B,SUM	S2B,SUM	N4N5B,N4N	G4T4	Sensitive	Special Concern	Vulnerable	Special Concern (anatum	Nf.Birds, Data Entry by WD Summer Student, 2012
Falco peregrinus subsp. anatum	Peregrine Falcon	S2B,SUM	S2B,SUM	N4N5B,N4N	G4T4	Sensitive	Special Concern	Vulnerable	Special Concern (anatum	Incidental sightings called into WD
Calidris canutus	Red Knot	S2M	S2M	N2B,N2M	G4	At risk	Endangered	Endangered	Endangered	E-mail Communication, Lorne Slaney via Peter Thomas, Aug12-10
Calidris canutus	Red Knot	S2M	S2M	N2B,N2M	G4	At risk	Endangered	Endangered	Endangered	Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Buteo jamaicensis	Red-Tailed Hawk	S3S4B,SUM	S3S4B,SUM	N5B,N5N,N5	G5	Secure				Nf.Birds, Data Entry by WD Summer Student, 2012
Somatochlora albicincta	Ringed Emerald	S3	S3	N5	G5	Undetermined				2DDragonflydata.xls
Somatochlora albicincta	Ringed Emerald	S3	S3	N5	G5	Undetermined				2DDragonflydata.xls
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Canadian Wildlife Service
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Email correspondence
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	NF.Birds
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Canadian Wildlife Service
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	NatureNB
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	NatureNB
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	NatureNB
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Euphagus carolinus	Rusty Blackbird	S3B,SUM	S3B,SUM	N4B,NUN,N4	G4	Secure	Special Concern	Vulnerable	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Asio flammeus	Short-eared Owl	S2S3B	S3S4B,SUM	N4B,N3N,N4	G5	Secure	Threatened	Threatened	Special Concern	Canadian Wildlife Service
Asio flammeus	Short-eared Owl	S2S3B	S3S4B,SUM	N4B,N3N,N4	G5	Secure	Threatened	Threatened	Special Concern	Canadian Wildlife Service
Asio flammeus	Short-eared Owl	S2S3B	S3S4B,SUM	N4B,N3N,N4	G5	Secure	Threatened	Threatened	Special Concern	Canadian Wildlife Service
Asio flammeus	Short-eared Owl	S2S3B	S3S4B,SUM	N4B,N3N,N4	G5	Secure	Threatened	Threatened	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Asio flammeus	Short-eared Owl	S2S3B	S3S4B,SUM	N4B,N3N,N4	G5	Secure	Threatened	Threatened	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Asio flammeus	Short-eared Owl	S2S3B	S3S4B,SUM	N4B,N3N,N4	G5	Secure	Threatened	Threatened	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Asio flammeus	Short-eared Owl	S2S3B	S3S4B,SUM	N4B,N3N,N4	G5	Secure	Threatened	Threatened	Special Concern	Nf.Birds, Data Entry by WD Summer Student, 2012
Glaucopsyche lygdamus	Silvery Blue	S3	S3	N5	G5	Secure				Ross Newfoundland Data.xls
Coenagrion interrogatum	Subarctic Bluet	S3	S3	N5	G5	Undetermined				2DDragonflydata.xls

APPENDIX B

Wildlife Camera Photolog

Photo 1. Camera 1 surrounding habitat.

Photo 2. Young bull moose observed on Camera 1.

Photo 3. Spruce grouse observed on Camera 4.

Photo 4. Snowshoe hare observed on Camera 4.

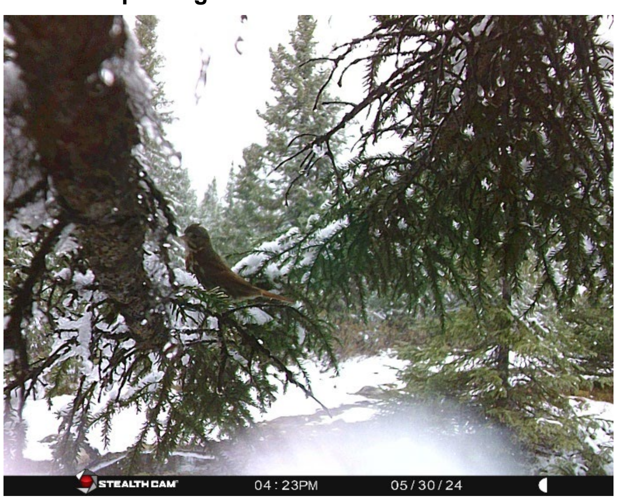

Photo 5. Fox sparrow observed on Camera 4.

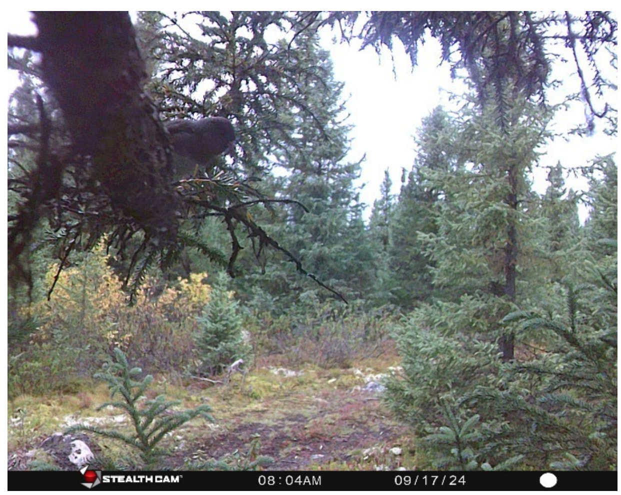

Photo 6. Unidentified bird observed on Camera 4.

APPENDIX C

Bat Acoustic Monitors Photolog

Photo 1. BAT01 – Duley Lake Provincial Park.

Photo 2. BAT02 – unnamed pond – NE project area.

Photo 3. BAT03 – wetland – NE project area.

Photo 4. BAT04 – Proposed Rose Pit Mine.

APPENDIX D

Weather Data

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-07-30 23:00:00	
2024-07-31 00:00:00	
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2024-07-31 02:00:00	
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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

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2024-08-20 11:00:00	0
2024-08-20 12:00:00	0
2024-08-20 13:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-08-20 14:00:00	0
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2024-08-20 16:00:00	0
2024-08-20 17:00:00	0
2024-08-20 18:00:00	0
2024-08-20 19:00:00	0
2024-08-20 20:00:00	0
2024-08-20 21:00:00	0
2024-08-20 22:00:00	0
2024-08-20 23:00:00	0
2024-08-21 00:00:00	0
2024-08-21 01:00:00	0
2024-08-21 02:00:00	0
2024-08-21 03:00:00	0
2024-08-21 04:00:00	0
2024-08-21 05:00:00	0
2024-08-21 06:00:00	0
2024-08-21 07:00:00	0
2024-08-21 08:00:00	0
2024-08-21 09:00:00	0
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2024-08-22 05:00:00	0
2024-08-22 06:00:00	0
2024-08-22 07:00:00	0
2024-08-22 08:00:00	0
2024-08-22 09:00:00	0
2024-08-22 10:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-08-22 11:00:00	0
2024-08-22 12:00:00	0
2024-08-22 13:00:00	0
2024-08-22 14:00:00	0
2024-08-22 15:00:00	0
2024-08-22 16:00:00	0
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2024-08-22 23:00:00	0
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2024-08-23 07:00:00	0
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2024-08-23 15:00:00	0
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2024-08-23 17:00:00	0
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2024-08-23 22:00:00	0
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2024-08-24 00:00:00	0
2024-08-24 01:00:00	0
2024-08-24 02:00:00	0
2024-08-24 03:00:00	0
2024-08-24 04:00:00	0
2024-08-24 05:00:00	0
2024-08-24 06:00:00	0
2024-08-24 07:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-08-24 08:00:00	0
2024-08-24 09:00:00	0
2024-08-24 10:00:00	0
2024-08-24 11:00:00	0
2024-08-24 12:00:00	0
2024-08-24 13:00:00	0
2024-08-24 14:00:00	0
2024-08-24 15:00:00	0
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2024-08-24 20:00:00	0
2024-08-24 21:00:00	0
2024-08-24 22:00:00	0
2024-08-24 23:00:00	0
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2024-08-25 02:00:00	0
2024-08-25 03:00:00	0
2024-08-25 04:00:00	0
2024-08-25 05:00:00	0
2024-08-25 06:00:00	0
2024-08-25 07:00:00	0
2024-08-25 08:00:00	0
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2024-08-25 12:00:00	0
2024-08-25 13:00:00	0
2024-08-25 14:00:00	0
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2024-08-25 19:00:00	0
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2024-08-25 21:00:00	0
2024-08-25 22:00:00	0
2024-08-25 23:00:00	0
2024-08-26 00:00:00	0
2024-08-26 01:00:00	0
2024-08-26 02:00:00	0
2024-08-26 03:00:00	0
2024-08-26 04:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-08-26 05:00:00	0
2024-08-26 06:00:00	0
2024-08-26 07:00:00	0
2024-08-26 08:00:00	0
2024-08-26 09:00:00	0
2024-08-26 10:00:00	0
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2024-08-26 18:00:00	0
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2024-08-27 13:00:00	0
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2024-08-27 15:00:00	1
2024-08-27 16:00:00	0
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2024-08-27 18:00:00	0
2024-08-27 19:00:00	0
2024-08-27 20:00:00	6.6
2024-08-27 21:00:00	0.2
2024-08-27 22:00:00	0
2024-08-27 23:00:00	0
2024-08-28 00:00:00	0
2024-08-28 01:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-08-28 02:00:00	0
2024-08-28 03:00:00	0
2024-08-28 04:00:00	0
2024-08-28 05:00:00	0
2024-08-28 06:00:00	0
2024-08-28 07:00:00	0
2024-08-28 08:00:00	0
2024-08-28 09:00:00	0
2024-08-28 10:00:00	0
2024-08-28 11:00:00	0.8
2024-08-28 12:00:00	0.8
2024-08-28 13:00:00	0.2
2024-08-28 14:00:00	0
2024-08-28 15:00:00	0
2024-08-28 16:00:00	0
2024-08-28 17:00:00	0.2
2024-08-28 18:00:00	0
2024-08-28 19:00:00	0
2024-08-28 20:00:00	0
2024-08-28 21:00:00	0
2024-08-28 22:00:00	0
2024-08-28 23:00:00	0
2024-08-29 00:00:00	0
2024-08-29 01:00:00	0
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2024-08-29 04:00:00	0
2024-08-29 05:00:00	0
2024-08-29 06:00:00	0
2024-08-29 07:00:00	0
2024-08-29 08:00:00	0
2024-08-29 09:00:00	0
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2024-08-29 14:00:00	0
2024-08-29 15:00:00	0
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2024-08-29 17:00:00	0
2024-08-29 18:00:00	0
2024-08-29 19:00:00	0
2024-08-29 20:00:00	0
2024-08-29 21:00:00	0
2024-08-29 22:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-08-29 23:00:00	0
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2024-08-30 01:00:00	0
2024-08-30 02:00:00	0
2024-08-30 03:00:00	0
2024-08-30 04:00:00	0
2024-08-30 05:00:00	0
2024-08-30 06:00:00	0
2024-08-30 07:00:00	0
2024-08-30 08:00:00	0
2024-08-30 09:00:00	0
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2024-08-30 22:00:00	0
2024-08-30 23:00:00	0
2024-08-31 00:00:00	0
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2024-08-31 03:00:00	0
2024-08-31 04:00:00	0
2024-08-31 05:00:00	0
2024-08-31 06:00:00	0
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2024-08-31 14:00:00	0
2024-08-31 15:00:00	0
2024-08-31 16:00:00	0
2024-08-31 17:00:00	0
2024-08-31 18:00:00	0
2024-08-31 19:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
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2024-08-31 22:00:00	0
2024-08-31 23:00:00	0
2024-09-01 00:00:00	0.8
2024-09-01 01:00:00	0
2024-09-01 02:00:00	0
2024-09-01 03:00:00	0
2024-09-01 04:00:00	0
2024-09-01 05:00:00	0
2024-09-01 06:00:00	0
2024-09-01 07:00:00	0
2024-09-01 08:00:00	0
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2024-09-01 18:00:00	0
2024-09-01 19:00:00	0
2024-09-01 20:00:00	0
2024-09-01 21:00:00	0
2024-09-01 22:00:00	0
2024-09-01 23:00:00	0.2
2024-09-02 00:00:00	0
2024-09-02 01:00:00	0
2024-09-02 02:00:00	0.2
2024-09-02 03:00:00	0.2
2024-09-02 04:00:00	0
2024-09-02 05:00:00	0.2
2024-09-02 06:00:00	0
2024-09-02 07:00:00	0
2024-09-02 08:00:00	0
2024-09-02 09:00:00	0
2024-09-02 10:00:00	0
2024-09-02 11:00:00	0
2024-09-02 12:00:00	0.2
2024-09-02 13:00:00	0
2024-09-02 14:00:00	0
2024-09-02 15:00:00	0
2024-09-02 16:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-09-02 17:00:00	0
2024-09-02 18:00:00	0
2024-09-02 19:00:00	0
2024-09-02 20:00:00	0
2024-09-02 21:00:00	0
2024-09-02 22:00:00	0
2024-09-02 23:00:00	0
2024-09-03 00:00:00	0
2024-09-03 01:00:00	0
2024-09-03 02:00:00	0
2024-09-03 03:00:00	0
2024-09-03 04:00:00	0
2024-09-03 05:00:00	0
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2024-09-03 08:00:00	0
2024-09-03 09:00:00	0
2024-09-03 10:00:00	0
2024-09-03 11:00:00	0
2024-09-03 12:00:00	0
2024-09-03 13:00:00	0
2024-09-03 14:00:00	0.2
2024-09-03 15:00:00	0.2
2024-09-03 16:00:00	0
2024-09-03 17:00:00	0.5
2024-09-03 18:00:00	0
2024-09-03 19:00:00	0
2024-09-03 20:00:00	0
2024-09-03 21:00:00	0
2024-09-03 22:00:00	1
2024-09-03 23:00:00	0
2024-09-04 00:00:00	0.2
2024-09-04 01:00:00	0
2024-09-04 02:00:00	0
2024-09-04 03:00:00	0
2024-09-04 04:00:00	0
2024-09-04 05:00:00	0
2024-09-04 06:00:00	0
2024-09-04 07:00:00	0
2024-09-04 08:00:00	0
2024-09-04 09:00:00	0
2024-09-04 10:00:00	0
2024-09-04 11:00:00	0
2024-09-04 12:00:00	0
2024-09-04 13:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-09-04 14:00:00	0
2024-09-04 15:00:00	0
2024-09-04 16:00:00	0
2024-09-04 17:00:00	0
2024-09-04 18:00:00	0
2024-09-04 19:00:00	0
2024-09-04 20:00:00	0
2024-09-04 21:00:00	0
2024-09-04 22:00:00	0
2024-09-04 23:00:00	0
2024-09-05 00:00:00	0
2024-09-05 01:00:00	0
2024-09-05 02:00:00	0
2024-09-05 03:00:00	0
2024-09-05 04:00:00	0
2024-09-05 05:00:00	0
2024-09-05 06:00:00	1.8
2024-09-05 07:00:00	0
2024-09-05 08:00:00	0
2024-09-05 09:00:00	0
2024-09-05 10:00:00	0.2
2024-09-05 11:00:00	0
2024-09-05 12:00:00	0
2024-09-05 13:00:00	0
2024-09-05 14:00:00	0
2024-09-05 15:00:00	0
2024-09-05 16:00:00	0
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2024-09-05 18:00:00	0
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2024-09-05 22:00:00	0
2024-09-05 23:00:00	0
2024-09-06 00:00:00	0
2024-09-06 01:00:00	0
2024-09-06 02:00:00	0
2024-09-06 03:00:00	0
2024-09-06 04:00:00	0
2024-09-06 05:00:00	0
2024-09-06 06:00:00	0
2024-09-06 07:00:00	0
2024-09-06 08:00:00	0
2024-09-06 09:00:00	0
2024-09-06 10:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-09-06 11:00:00	0
2024-09-06 12:00:00	0
2024-09-06 13:00:00	0
2024-09-06 14:00:00	0
2024-09-06 15:00:00	0
2024-09-06 16:00:00	0
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2024-09-06 18:00:00	0
2024-09-06 19:00:00	0
2024-09-06 20:00:00	0
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2024-09-06 22:00:00	0
2024-09-06 23:00:00	0
2024-09-07 00:00:00	0
2024-09-07 01:00:00	0
2024-09-07 02:00:00	0
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2024-09-07 08:00:00	0
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2024-09-07 12:00:00	0
2024-09-07 13:00:00	0
2024-09-07 14:00:00	0
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2024-09-07 16:00:00	0
2024-09-07 17:00:00	0
2024-09-07 18:00:00	0
2024-09-07 19:00:00	0
2024-09-07 20:00:00	0
2024-09-07 21:00:00	0
2024-09-07 22:00:00	0
2024-09-07 23:00:00	0
2024-09-08 00:00:00	0
2024-09-08 01:00:00	0
2024-09-08 02:00:00	0
2024-09-08 03:00:00	0
2024-09-08 04:00:00	0
2024-09-08 05:00:00	0
2024-09-08 06:00:00	0.5
2024-09-08 07:00:00	1.2

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-09-08 08:00:00	2.2
2024-09-08 09:00:00	2.5
2024-09-08 10:00:00	1.5
2024-09-08 11:00:00	2.2
2024-09-08 12:00:00	3.8
2024-09-08 13:00:00	4
2024-09-08 14:00:00	1.5
2024-09-08 15:00:00	0.2
2024-09-08 16:00:00	0
2024-09-08 17:00:00	0.2
2024-09-08 18:00:00	0.2
2024-09-08 19:00:00	0
2024-09-08 20:00:00	0
2024-09-08 21:00:00	0
2024-09-08 22:00:00	0.2
2024-09-08 23:00:00	0
2024-09-09 00:00:00	0
2024-09-09 01:00:00	0
2024-09-09 02:00:00	0
2024-09-09 03:00:00	0
2024-09-09 04:00:00	0
2024-09-09 05:00:00	0
2024-09-09 06:00:00	1.2
2024-09-09 07:00:00	0
2024-09-09 08:00:00	0
2024-09-09 09:00:00	0
2024-09-09 10:00:00	0
2024-09-09 11:00:00	0
2024-09-09 12:00:00	0
2024-09-09 13:00:00	0
2024-09-09 14:00:00	0.2
2024-09-09 15:00:00	0.8
2024-09-09 16:00:00	0
2024-09-09 17:00:00	0
2024-09-09 18:00:00	0.2
2024-09-09 19:00:00	0
2024-09-09 20:00:00	0.2
2024-09-09 21:00:00	0.2
2024-09-09 22:00:00	0
2024-09-09 23:00:00	0
2024-09-10 00:00:00	0
2024-09-10 01:00:00	0
2024-09-10 02:00:00	0
2024-09-10 03:00:00	0.2
2024-09-10 04:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-09-10 05:00:00	1.5
2024-09-10 06:00:00	1.5
2024-09-10 07:00:00	0.2
2024-09-10 08:00:00	0
2024-09-10 09:00:00	0.2
2024-09-10 10:00:00	0.2
2024-09-10 11:00:00	0
2024-09-10 12:00:00	0.8
2024-09-10 13:00:00	0
2024-09-10 14:00:00	0
2024-09-10 15:00:00	0.2
2024-09-10 16:00:00	0
2024-09-10 17:00:00	0
2024-09-10 18:00:00	0.2
2024-09-10 19:00:00	0
2024-09-10 20:00:00	0
2024-09-10 21:00:00	0
2024-09-10 22:00:00	0
2024-09-10 23:00:00	0
2024-09-11 00:00:00	0
2024-09-11 01:00:00	0
2024-09-11 02:00:00	0
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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

Date/time	PRECIP
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Hourly preicpitation date from Churchill

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2024-10-03 05:00:00	0
2024-10-03 06:00:00	0
2024-10-03 07:00:00	0
2024-10-03 08:00:00	0
2024-10-03 09:00:00	0
2024-10-03 10:00:00	0
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2024-10-03 12:00:00	0
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2024-10-03 15:00:00	0
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2024-10-03 22:00:00	0
2024-10-03 23:00:00	0
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2024-10-04 02:00:00	0
2024-10-04 03:00:00	0
2024-10-04 04:00:00	1.2
2024-10-04 05:00:00	0
2024-10-04 06:00:00	1.5
2024-10-04 07:00:00	4.5
2024-10-04 08:00:00	0
2024-10-04 09:00:00	0
2024-10-04 10:00:00	0
2024-10-04 11:00:00	0
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2024-10-04 13:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
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2024-10-06 09:00:00	0
2024-10-06 10:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
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2024-10-08 02:00:00	0
2024-10-08 03:00:00	0
2024-10-08 04:00:00	0
2024-10-08 05:00:00	0
2024-10-08 06:00:00	0
2024-10-08 07:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
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2024-10-08 13:00:00	0
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2024-10-09 13:00:00	0
2024-10-09 14:00:00	0
2024-10-09 15:00:00	0
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2024-10-09 17:00:00	0
2024-10-09 18:00:00	0
2024-10-09 19:00:00	0.2
2024-10-09 20:00:00	0.5
2024-10-09 21:00:00	1.5
2024-10-09 22:00:00	1.8
2024-10-09 23:00:00	0.2
2024-10-10 00:00:00	0.2
2024-10-10 01:00:00	0.5
2024-10-10 02:00:00	1.8
2024-10-10 03:00:00	0.5
2024-10-10 04:00:00	0.2

Hourly preicpitation date from Churchill

Date/time	PRECIP
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2024-10-10 07:00:00	2.5
2024-10-10 08:00:00	0.2
2024-10-10 09:00:00	0.2
2024-10-10 10:00:00	0
2024-10-10 11:00:00	0.2
2024-10-10 12:00:00	0.2
2024-10-10 13:00:00	0.2
2024-10-10 14:00:00	0
2024-10-10 15:00:00	0.2
2024-10-10 16:00:00	0
2024-10-10 17:00:00	0.2
2024-10-10 18:00:00	0.2
2024-10-10 19:00:00	0.2
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2024-10-10 21:00:00	0.2
2024-10-10 22:00:00	0.8
2024-10-10 23:00:00	0.5
2024-10-11 00:00:00	1
2024-10-11 01:00:00	0.5
2024-10-11 02:00:00	0.2
2024-10-11 03:00:00	0.8
2024-10-11 04:00:00	1.2
2024-10-11 05:00:00	1
2024-10-11 06:00:00	0.8
2024-10-11 07:00:00	1
2024-10-11 08:00:00	0.8
2024-10-11 09:00:00	0.8
2024-10-11 10:00:00	0
2024-10-11 11:00:00	0.2
2024-10-11 12:00:00	0.2
2024-10-11 13:00:00	0.5
2024-10-11 14:00:00	1.5
2024-10-11 15:00:00	0.8
2024-10-11 16:00:00	0
2024-10-11 17:00:00	0.5
2024-10-11 18:00:00	0.5
2024-10-11 19:00:00	0
2024-10-11 20:00:00	0.2
2024-10-11 21:00:00	0
2024-10-11 22:00:00	0
2024-10-11 23:00:00	0.2
2024-10-12 00:00:00	0.5
2024-10-12 01:00:00	0.5

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-12 02:00:00	0.8
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2024-10-12 04:00:00	0
2024-10-12 05:00:00	0
2024-10-12 06:00:00	0
2024-10-12 07:00:00	0
2024-10-12 08:00:00	0
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2024-10-12 11:00:00	0
2024-10-12 12:00:00	0
2024-10-12 13:00:00	0
2024-10-12 14:00:00	0.5
2024-10-12 15:00:00	0.2
2024-10-12 16:00:00	0
2024-10-12 17:00:00	0.5
2024-10-12 18:00:00	1.2
2024-10-12 19:00:00	0
2024-10-12 20:00:00	0
2024-10-12 21:00:00	0
2024-10-12 22:00:00	0.2
2024-10-12 23:00:00	0.8
2024-10-13 00:00:00	0.2
2024-10-13 01:00:00	0
2024-10-13 02:00:00	0
2024-10-13 03:00:00	1
2024-10-13 04:00:00	0
2024-10-13 05:00:00	0
2024-10-13 06:00:00	0
2024-10-13 07:00:00	0
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2024-10-13 18:00:00	
2024-10-13 19:00:00	
2024-10-13 20:00:00	
2024-10-13 21:00:00	
2024-10-13 22:00:00	

Hourly preicpitation date from Churchill

Date/time	PRECIP
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2024-10-14 16:00:00	
2024-10-14 17:00:00	
2024-10-14 18:00:00	
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2024-10-14 21:00:00	0
2024-10-14 22:00:00	0
2024-10-14 23:00:00	0
2024-10-15 00:00:00	0
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2024-10-15 14:00:00	0
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2024-10-15 17:00:00	0
2024-10-15 18:00:00	0
2024-10-15 19:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
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2024-10-15 22:00:00	0
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2024-10-16 00:00:00	0
2024-10-16 01:00:00	0
2024-10-16 02:00:00	0
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2024-10-17 10:00:00	0
2024-10-17 11:00:00	0
2024-10-17 12:00:00	0
2024-10-17 13:00:00	0.2
2024-10-17 14:00:00	0
2024-10-17 15:00:00	0
2024-10-17 16:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-17 17:00:00	0
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2024-10-17 19:00:00	0
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2024-10-17 22:00:00	0
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2024-10-19 11:00:00	
2024-10-19 12:00:00	
2024-10-19 13:00:00	

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-19 14:00:00	
2024-10-19 15:00:00	
2024-10-19 16:00:00	
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2024-10-21 06:00:00	
2024-10-21 07:00:00	
2024-10-21 08:00:00	
2024-10-21 09:00:00	
2024-10-21 10:00:00	

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-21 11:00:00	
2024-10-21 12:00:00	
2024-10-21 13:00:00	
2024-10-21 14:00:00	
2024-10-21 15:00:00	
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2024-10-23 01:00:00	0
2024-10-23 02:00:00	0
2024-10-23 03:00:00	0
2024-10-23 04:00:00	1.2
2024-10-23 05:00:00	0.2
2024-10-23 06:00:00	0
2024-10-23 07:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-23 08:00:00	0
2024-10-23 09:00:00	0
2024-10-23 10:00:00	0
2024-10-23 11:00:00	0
2024-10-23 12:00:00	0
2024-10-23 13:00:00	0
2024-10-23 14:00:00	0
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2024-10-23 18:00:00	0
2024-10-23 19:00:00	0
2024-10-23 20:00:00	0
2024-10-23 21:00:00	0.2
2024-10-23 22:00:00	0
2024-10-23 23:00:00	1.2
2024-10-24 00:00:00	0.2
2024-10-24 01:00:00	0
2024-10-24 02:00:00	0
2024-10-24 03:00:00	0
2024-10-24 04:00:00	0
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2024-10-24 22:00:00	0
2024-10-24 23:00:00	0
2024-10-25 00:00:00	0
2024-10-25 01:00:00	0
2024-10-25 02:00:00	0
2024-10-25 03:00:00	0
2024-10-25 04:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-25 05:00:00	0
2024-10-25 06:00:00	0
2024-10-25 07:00:00	0
2024-10-25 08:00:00	0
2024-10-25 09:00:00	0
2024-10-25 10:00:00	0
2024-10-25 11:00:00	0
2024-10-25 12:00:00	0
2024-10-25 13:00:00	0
2024-10-25 14:00:00	0
2024-10-25 15:00:00	0
2024-10-25 16:00:00	0
2024-10-25 17:00:00	0
2024-10-25 18:00:00	0
2024-10-25 19:00:00	0
2024-10-25 20:00:00	0
2024-10-25 21:00:00	0
2024-10-25 22:00:00	0
2024-10-25 23:00:00	0
2024-10-26 00:00:00	0
2024-10-26 01:00:00	0
2024-10-26 02:00:00	0
2024-10-26 03:00:00	0
2024-10-26 04:00:00	0
2024-10-26 05:00:00	0
2024-10-26 06:00:00	0
2024-10-26 07:00:00	0
2024-10-26 08:00:00	0
2024-10-26 09:00:00	0
2024-10-26 10:00:00	0
2024-10-26 11:00:00	0
2024-10-26 12:00:00	0
2024-10-26 13:00:00	0
2024-10-26 14:00:00	0
2024-10-26 15:00:00	0
2024-10-26 16:00:00	0
2024-10-26 17:00:00	0.2
2024-10-26 18:00:00	0
2024-10-26 19:00:00	0
2024-10-26 20:00:00	0
2024-10-26 21:00:00	0
2024-10-26 22:00:00	0
2024-10-26 23:00:00	0.2
2024-10-27 00:00:00	0.2
2024-10-27 01:00:00	0.5

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-27 02:00:00	0.2
2024-10-27 03:00:00	0.5
2024-10-27 04:00:00	0.8
2024-10-27 05:00:00	0.5
2024-10-27 06:00:00	0.2
2024-10-27 07:00:00	0.2
2024-10-27 08:00:00	0.2
2024-10-27 09:00:00	0.5
2024-10-27 10:00:00	0
2024-10-27 11:00:00	0.2
2024-10-27 12:00:00	0.2
2024-10-27 13:00:00	0
2024-10-27 14:00:00	0.2
2024-10-27 15:00:00	0
2024-10-27 16:00:00	0
2024-10-27 17:00:00	0.2
2024-10-27 18:00:00	0
2024-10-27 19:00:00	0
2024-10-27 20:00:00	0.2
2024-10-27 21:00:00	0.2
2024-10-27 22:00:00	0
2024-10-27 23:00:00	0
2024-10-28 00:00:00	0
2024-10-28 01:00:00	0
2024-10-28 02:00:00	0.2
2024-10-28 03:00:00	0.2
2024-10-28 04:00:00	0.2
2024-10-28 05:00:00	0
2024-10-28 06:00:00	0
2024-10-28 07:00:00	0
2024-10-28 08:00:00	0
2024-10-28 09:00:00	0
2024-10-28 10:00:00	0
2024-10-28 11:00:00	0
2024-10-28 12:00:00	0
2024-10-28 13:00:00	0
2024-10-28 14:00:00	0
2024-10-28 15:00:00	0
2024-10-28 16:00:00	0
2024-10-28 17:00:00	0
2024-10-28 18:00:00	0
2024-10-28 19:00:00	0
2024-10-28 20:00:00	0
2024-10-28 21:00:00	0
2024-10-28 22:00:00	0

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-28 23:00:00	0
2024-10-29 00:00:00	0
2024-10-29 01:00:00	0
2024-10-29 02:00:00	0
2024-10-29 03:00:00	0
2024-10-29 04:00:00	0
2024-10-29 05:00:00	0
2024-10-29 06:00:00	0
2024-10-29 07:00:00	0
2024-10-29 08:00:00	0
2024-10-29 09:00:00	0
2024-10-29 10:00:00	0
2024-10-29 11:00:00	0
2024-10-29 12:00:00	0
2024-10-29 13:00:00	0
2024-10-29 14:00:00	0
2024-10-29 15:00:00	0
2024-10-29 16:00:00	0
2024-10-29 17:00:00	0
2024-10-29 18:00:00	0
2024-10-29 19:00:00	0
2024-10-29 20:00:00	0
2024-10-29 21:00:00	0
2024-10-29 22:00:00	0
2024-10-29 23:00:00	0
2024-10-30 00:00:00	0
2024-10-30 01:00:00	0
2024-10-30 02:00:00	0
2024-10-30 03:00:00	0
2024-10-30 04:00:00	0
2024-10-30 05:00:00	0
2024-10-30 06:00:00	0
2024-10-30 07:00:00	0
2024-10-30 08:00:00	0
2024-10-30 09:00:00	0
2024-10-30 10:00:00	0
2024-10-30 11:00:00	0
2024-10-30 12:00:00	0
2024-10-30 13:00:00	0
2024-10-30 14:00:00	0
2024-10-30 15:00:00	0
2024-10-30 16:00:00	0.8
2024-10-30 17:00:00	1.5
2024-10-30 18:00:00	2
2024-10-30 19:00:00	4

Hourly preicpitation date from Churchill

Date/time	PRECIP
2024-10-30 20:00:00	0.8
2024-10-30 21:00:00	1
2024-10-30 22:00:00	2.8
2024-10-30 23:00:00	0.8
2024-10-31 00:00:00	0.2
2024-10-31 01:00:00	0.2
2024-10-31 02:00:00	0
2024-10-31 03:00:00	0.5
2024-10-31 04:00:00	0
2024-10-31 05:00:00	0
2024-10-31 06:00:00	0
2024-10-31 07:00:00	0
2024-10-31 08:00:00	0
2024-10-31 09:00:00	0
2024-10-31 10:00:00	0
2024-10-31 11:00:00	0
2024-10-31 12:00:00	0
2024-10-31 13:00:00	0
2024-10-31 14:00:00	0
2024-10-31 15:00:00	0
2024-10-31 16:00:00	0
2024-10-31 17:00:00	0
2024-10-31 18:00:00	0
2024-10-31 19:00:00	0
2024-10-31 20:00:00	0
2024-10-31 21:00:00	0
2024-10-31 22:00:00	0
2024-10-31 23:00:00	0
2024-11-01 00:00:00	0
2024-11-01 01:00:00	0
2024-11-01 02:00:00	0
2024-11-01 03:00:00	0
2024-11-01 04:00:00	0
2024-11-01 05:00:00	0
2024-11-01 06:00:00	0

Hourly weather data from Wasbush Airport.

Night Date	Month	Day	min temp (°C)	max temp (°C)	total precip (mm)	mean wind (km/hr)	# hours ≥10	# hours no rain	hours wind <20
2024-07-31 00:00:00	**7**	**31**	15.4	18.4	4.6	6.142857	7	4	7
2024-08-01 00:00:00	**8**	**1**	13.4	17	0	8.428571	7	7	7
2024-08-02 00:00:00	**8**	**2**	15.5	19.9	0	8.571429	7	7	7
2024-08-03 00:00:00	**8**	**3**	12.3	15.4	0	12.28571	7	7	7
2024-08-04 00:00:00	**8**	**4**	10	12.5	0.2	7.714286	7	6	7
2024-08-05 00:00:00	**8**	**5**	7.6	11.1	0	9.571429	2	7	7
2024-08-06 00:00:00	**8**	**6**	7.3	8.4	0	15	0	7	6
2024-08-07 00:00:00	**8**	**7**	8.2	8.8	0	10.14286	0	7	7
2024-08-08 00:00:00	**8**	**8**	2.7	7.1	0	3.428571	0	7	7
2024-08-09 00:00:00	**8**	**9**	6.5	11.1	0	2.571429	2	7	7
2024-08-10 00:00:00	**8**	**10**	11.9	13.9	0.2	3.857143	7	6	7
2024-08-11 00:00:00	**8**	**11**	14.5	16.6	0	11	7	7	7
2024-08-12 00:00:00	**8**	**12**	12.6	14.2	0	8.285714	7	7	7
2024-08-13 00:00:00	**8**	**13**	8.4	11.7	0	8.571429	2	7	7
2024-08-14 00:00:00	**8**	**14**	13.5	17.2	0	5.75	8	8	8
2024-08-15 00:00:00	**8**	**15**	10.7	16.4	0	8	8	8	8
2024-08-16 00:00:00	**8**	**16**	13.6	18.2	0	6.25	8	8	8
2024-08-17 00:00:00	**8**	**17**	10.8	18	0	7.111111	9	9	9
2024-08-18 00:00:00	**8**	**18**	12.1	16.8	1319	14.55556	9	2	7
2024-08-19 00:00:00	**8**	**19**	6.6	9.5	0	14.88889	0	9	9
2024-08-20 00:00:00	**8**	**20**	3.5	10	0	2.333333	1	9	9
2024-08-21 00:00:00	**8**	**21**	1.8	8.1	0	2.888889	0	9	9
2024-08-22 00:00:00	**8**	**22**	5.1	10.9	0	1.444444	1	9	9
2024-08-23 00:00:00	**8**	**23**	7.9	12.4	0	7.111111	5	9	9
2024-08-24 00:00:00	**8**	**24**	15.7	19.8	0	9.777778	9	9	9
2024-08-25 00:00:00	**8**	**25**	9.9	17.9	0	4.666667	8	9	9
2024-08-26 00:00:00	**8**	**26**	14.2	19	0	10.33333	9	9	9
2024-08-27 00:00:00	**8**	**27**	7.3	14.5	0	19.33333	5	9	4
2024-08-28 00:00:00	**8**	**28**	4.8	8.1	3049.6	15.11111	0	0	9
2024-08-29 00:00:00	**8**	**29**	4.1	11.6	1828.8	8.444444	1	0	9

Hourly weather data from Wasbush Airport.

Night Date	Month	Day	min temp (°C)	max temp (°C)	total precip (mm)	mean wind (km/hr)	# hours ≥10	# hours no rain	hours wind <20
2024-08-30 00:00:00	**8**	**30**	14.5	16.7	1219.2	18.77778	9	0	5
2024-08-31 00:00:00	**8**	**31**	11.3	15.7	0	9.333333	9	9	9
2024-09-01 00:00:00	**9**	**1**	6.9	12.9	169.4	18.22222	2	8	4
2024-09-02 00:00:00	**9**	**2**	5.4	6.8	2438.4	15.55556	0	0	8
2024-09-03 00:00:00	**9**	**3**	4.6	7.4	2439.2	10.44444	0	0	9
2024-09-04 00:00:00	**9**	**4**	14.3	16.6	3657.7	21.88889	9	0	2
2024-09-05 00:00:00	**9**	**5**	7.2	17.1	3048	8.222222	6	0	9
2024-09-06 00:00:00	**9**	**6**	9.9	16	1219.2	11.88889	8	0	8
2024-09-07 00:00:00	**9**	**7**	8.3	12	1964.4	7.666667	7	1	9
2024-09-08 00:00:00	**9**	**8**	6.1	11.6	1145.3	9.777778	4	4	9
2024-09-09 00:00:00	**9**	**9**	6.6	9.4	223.7	11.77778	0	7	9
2024-09-10 00:00:00	**9**	**10**	1	5.6	4266.3	10.7	0	0	10
2024-09-11 00:00:00	**9**	**11**	-2.1	4.7	2436.4	5.3	0	0	10
2024-09-12 00:00:00	**9**	**12**	8.1	15	796.1	14	7	8	9
2024-09-13 00:00:00	**9**	**13**	-1	7.5	0	5.1	0	10	10
2024-09-14 00:00:00	**9**	**14**	4.8	8.2	0	6.3	0	10	10
2024-09-15 00:00:00	**9**	**15**	16.5	18.6	0	12.8	10	10	10
2024-09-16 00:00:00	**9**	**16**	13.2	16.6	0	6.636364	11	11	11
2024-09-17 00:00:00	**9**	**17**	8.8	13.9	0	5.727273	6	11	11
2024-09-18 00:00:00	**9**	**18**	0.8	5.4	0	6.090909	0	11	11
2024-09-19 00:00:00	**9**	**19**	0	6.6	0	2.727273	0	11	11
2024-09-20 00:00:00	**9**	**20**	1.4	10.5	0	3.909091	1	11	11
2024-09-21 00:00:00	**9**	**21**	2.5	7.4	0	7.363636	0	11	11
2024-09-22 00:00:00	**9**	**22**	1.9	7.7	0	2.181818	0	11	11
2024-09-23 00:00:00	**9**	**23**	4.4	10.5	0	3	1	11	11
2024-09-24 00:00:00	**9**	**24**	6	11.7	0	7	4	11	11
2024-09-25 00:00:00	**9**	**25**	4.1	8.5	0	9.454545	0	11	11
2024-09-26 00:00:00	**9**	**26**	7.5	9.6	0	5.363636	0	11	11
2024-09-27 00:00:00	**9**	**27**	2.6	11	0	6.363636	1	11	11
2024-09-28 00:00:00	**9**	**28**	10.5	12.1	0	16.09091	11	11	9

Hourly weather data from Wasbush Airport.

Night Date	Month	Day	min temp (°C)	max temp (°C)	total precip (mm)	mean wind (km/hr)	# hours ≥10	# hours no rain	hours wind <20
2024-09-29 00:00:00	**9**	**29**	2.9	7.3	2438.4	12.09091	0	0	11
2024-09-30 00:00:00	**9**	**30**	-1.4	8.3	1828.8	3.636364	0	0	11
2024-10-01 00:00:00	**10**	**1**	2.8	7.5	2439.4	11.36364	0	0	11
2024-10-02 00:00:00	**10**	**2**	7	9.1	2437.6	11.18182	0	0	11
2024-10-03 00:00:00	**10**	**3**	6.1	7.9	735.8	12.18182	0	6	11
2024-10-04 00:00:00	**10**	**4**	-0.3	3.3	2438.3	5.363636	0	0	11
2024-10-05 00:00:00	**10**	**5**	-4.3	5	4267.2	3	0	0	12
2024-10-06 00:00:00	**10**	**6**	7.8	8.5	3047.2	14.5	0	0	11
2024-10-07 00:00:00	**10**	**7**	4.3	7.2	3659.5	14.33333	0	0	11
2024-10-08 00:00:00	**10**	**8**	3.3	4.6	2321.9	13.16667	0	0	12
2024-10-09 00:00:00	**10**	**9**	2.1	3.5	1467.9	15.16667	0	7	11
2024-10-10 00:00:00	**10**	**10**	2.1	3.3	3331.5	20.58333	0	1	6
2024-10-11 00:00:00	**10**	**11**	1.5	3	1829.6	19.16667	0	0	7
2024-10-12 00:00:00	**10**	**12**	1	2.2	0	18.75	0	12	8
2024-10-13 00:00:00	**10**	**13**	-1.7	3	0	6.25	0	12	12
2024-10-14 00:00:00	**10**	**14**	-0.3	1	0	17.16667	0	12	7
2024-10-15 00:00:00	**10**	**15**	-2.2	0.6	0	30.08333	0	12	0
2024-10-16 00:00:00	**10**	**16**	-0.6	1.2	3047.2	11	0	0	12
2024-10-17 00:00:00	**10**	**17**	-1.9	1.3	0	13.66667	0	12	10
2024-10-18 00:00:00	**10**	**18**	0.3	2.4	0	11.41667	0	12	12
2024-10-19 00:00:00	**10**	**19**	3.9	8.7	2937.9	11	0	0	12
2024-10-20 00:00:00	**10**	**20**	2.4	7.9	1242.6	15.75	0	7	11
2024-10-21 00:00:00	**10**	**21**	-1	0.9	0	13.15385	0	13	12
2024-10-22 00:00:00	**10**	**22**	0.5	8.1	1690	23	0	7	2
2024-10-23 00:00:00	**10**	**23**	-0.9	10.7	1055.1	16.92308	1	10	9
2024-10-24 00:00:00	**10**	**24**	-7.3	-0.2	0	6.846154	0	13	13
2024-10-25 00:00:00	**10**	**25**	-2.8	-1.1	0	5.846154	0	13	13
2024-10-26 00:00:00	**10**	**26**	-3.2	0.3	1401.4	25.76923	0	7	1
2024-10-27 00:00:00	**10**	**27**	-3.2	-2.3	681.7	18.61538	0	9	8
2024-10-28 00:00:00	**10**	**28**	-13.4	-4.3	3658.4	8.538462	0	0	13

Hourly weather data from Wasbush Airport.

Night Date	Month	Day	min temp (^oC)	max temp (^oC)	total precip (mm)	mean wind (km/hr)	# hours ≥10	# hours no rain	hours wind <20
2024-10-29 00:00:00	**10**	**29**	-6.2	-1.1	3656	14.53846	0	0	13
2024-10-30 00:00:00	**10**	**30**	0.3	5.4	2215.1	18.76923	0	6	7
2024-10-31 00:00:00	**10**	**31**	-3.6	-1.9	3810.2	11.30769	0	0	13
2024-11-01 00:00:00	**11**	**1**	-4.4	-2.5	3047	21	0	0	5
2024-11-02 00:00:00	**11**	**2**	-4.9	-4.3	2438.2	21.76923	0	0	4
2024-11-03 00:00:00	**11**	**3**	-4.9	-3.2	0	14.42857	0	0	14
2024-11-04 00:00:00	**11**	**4**	-5.5	-1.1	5485.6	8.857143	0	0	14
2024-11-05 00:00:00	**11**	**5**	0.6	2.4	0	9.714286	0	14	14
2024-11-06 00:00:00	**11**	**6**	-0.1	0.3	0	17.92857			
2024-11-07 00:00:00	**11**	**7**	-5.5	-2.6	1672.1	11.64286			
2024-11-08 00:00:00	**11**	**8**	-8.5	-4.5	0	14.92857			
2024-11-09 00:00:00	**11**	**9**	-6.1	-2.8	0	20.5			
2024-11-10 00:00:00	**11**	**10**	-4.7	0.9	0	9.642857			
2024-11-11 00:00:00	**11**	**11**	-5.3	-3.7	1830.8	10.5			
2024-11-12 00:00:00	**11**	**12**	-11.4	-8.2	0	13.5			

APPENDIX E

Bat Acoustic Activity

Bat activity across nights at Duley Lake Park monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
7/31/2024	0	0	5	0	1	0	0	0	0	0	0	0	1233	1239	6
8/1/2024	0	0	0	0	0	0	1	0	0	0	0	0	19	20	1
8/2/2024	0	0	4	0	0	0	0	1	0	0	0	0	28	33	5
8/3/2024	0	0	3	0	0	0	0	0	0	0	0	0	1	4	3
8/4/2024	1	1	3	0	0	0	0	0	0	0	0	0	76	81	5
8/5/2024	0	0	4	0	0	0	0	0	0	0	0	0	12	16	4
8/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
8/7/2024	0	0	0	0	0	0	0	0	0	0	0	0	89	89	0
8/8/2024	0	0	1	0	0	0	0	0	0	0	0	0	20	21	1
8/9/2024	0	0	0	0	0	0	0	0	0	0	1	0	36	37	1
8/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	434	434	0
8/11/2024	0	0	16	0	0	0	1	1	0	0	0	0	46	64	18
8/12/2024	0	0	0	0	0	0	1	1	0	0	0	0	683	685	2
8/13/2024	0	0	6	0	0	0	0	0	0	0	0	0	23	29	6
8/14/2024	0	0	6	0	0	0	0	2	0	0	0	0	41	49	8
8/15/2024	0	0	10	0	0	0	0	0	0	0	0	0	13	23	10
8/16/2024	0	0	12	0	0	0	0	0	0	0	0	0	29	41	12
8/17/2024	0	0	6	0	0	0	0	0	0	0	0	0	14	20	6
8/18/2024	0	0	3	0	0	0	0	0	0	0	0	0	373	376	3
8/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	107	107	0
8/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	28	28	0
8/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	13	13	0
8/22/2024	0	0	1	0	0	0	0	0	0	0	0	0	22	23	1
8/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	17	17	0
8/24/2024	0	0	1	0	0	0	0	0	0	0	0	0	17	18	1
8/25/2024	0	0	2	0	0	0	0	0	0	0	2	0	18	22	4
8/26/2024	0	0	1	0	0	0	0	0	0	0	0	0	14	15	1
8/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	330	330	0
8/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	107	107	0
8/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	19	19	0
8/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	121	121	0
8/31/2024	0	0	1	0	0	0	0	0	0	0	0	0	8	9	1
9/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0

Bat activity across nights at Duley Lake Park monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
9/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	45	45	0
9/3/2024	0	0	0	0	0	0	0	0	0	0	0	0	14	14	0
9/4/2024	1	0	0	0	2	0	0	0	0	1	0	0	41	45	4
9/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	11	11	0
9/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	25	25	0
9/7/2024	0	0	1	0	0	0	0	1	0	0	0	0	111	113	2
9/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	34	34	0
9/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	7	7	0
9/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	16	16	0
9/12/2024	0	0	1	0	0	0	0	0	0	0	0	0	170	171	1
9/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	9	9	0
9/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	8	8	0
9/15/2024	0	0	0	0	0	0	0	0	0	0	0	0	141	141	0
9/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	18	18	0
9/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	9	9	0
9/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	20	20	0
9/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	26	26	0
9/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	7	7	0
9/21/2024	0	0	0	1	0	0	0	0	0	0	0	0	268	269	1
9/22/2024	0	0	0	2	0	0	0	0	0	0	0	0	5	7	2
9/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
9/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0
9/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	8	8	0
9/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0
9/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0
9/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	106	106	0
9/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	40	40	0
9/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	97	97	0
10/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	13	13	0
10/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	275	275	0
10/3/2024	0	0	0	0	0	0	0	1	0	0	0	0	903	904	1
10/4/2024	0	0	0	0	0	1	0	0	0	0	0	0	70	71	1

Bat activity across nights at Duley Lake Park monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
10/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	17	17	0
10/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	443	443	0
10/7/2024	0	0	0	0	0	0	0	0	0	0	0	0	1489	1489	0
10/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	1014	1014	0
10/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0
10/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	1225	1225	0
10/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	247	247	0
10/12/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/15/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/31/2024	0	0	0	0	0	0	0	0	0	0	0	0	12	12	0
11/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Totals	**2**	**1**	**87**	**3**	**3**	**1**	**3**	**7**	**0**	**1**	**3**	**0**	**10,967**	**11,078**	**111**

Bat activity across nights at an unnamed pond in the northeast monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
7/31/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/2024	0	0	2	0	0	0	0	0	0	0	0	0	15	17	2
8/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	167	167	0
8/3/2024	0	0	1	0	0	0	0	0	0	0	0	0	512	513	1
8/4/2024	0	0	0	0	0	0	0	0	0	0	0	0	314	314	0
8/5/2024	0	0	4	0	0	0	0	0	0	0	0	0	1153	1157	4
8/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	1998	1998	0
8/7/2024	0	0	1	0	0	0	1	0	0	0	0	0	113	115	2
8/8/2024	0	0	0	0	0	0	1	0	0	0	0	0	12	13	1
8/9/2024	0	0	3	0	0	0	0	0	0	0	0	0	12	15	3
8/10/2024	0	0	2	0	0	0	0	0	0	0	0	0	291	293	2
8/11/2024	0	0	5	0	0	0	0	0	0	0	0	0	102	107	5
8/12/2024	0	0	0	0	0	0	0	0	0	0	0	0	438	438	0
8/13/2024	0	0	10	0	0	0	0	0	0	0	0	0	20	30	10
8/14/2024	0	0	6	0	1	0	1	1	0	0	0	0	45	54	9
8/15/2024	0	0	1	0	0	0	0	0	0	0	0	0	21	22	1
8/16/2024	0	0	2	0	0	0	0	0	0	0	0	0	96	98	2
8/17/2024	0	0	2	0	0	0	0	0	0	0	0	0	15	17	2
8/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	245	245	0
8/19/2024	0	0	10	0	0	0	0	0	0	0	0	0	133	143	10
8/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	14	14	0
8/21/2024	0	0	1	0	0	0	0	0	0	0	0	0	20	21	1
8/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	15	15	0
8/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	24	24	0
8/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	225	225	0
8/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	43	43	0
8/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	511	511	0
8/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	2810	2810	0
8/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	1347	1347	0
8/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	17	17	0
8/30/2024	0	0	16	0	0	0	0	0	0	0	0	0	1501	1517	16

Bat activity across nights at an unnamed pond in the northeast monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
8/31/2024	0	0	5	0	0	0	0	0	0	0	0	0	115	120	5
9/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	1948	1948	0
9/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	2793	2793	0
9/3/2024	0	0	0	0	0	0	0	0	0	0	0	0	409	409	0
9/4/2024	0	0	6	0	0	0	0	0	0	0	0	0	537	543	6
9/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/7/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	17	17	0
9/12/2024	0	0	3	0	0	0	0	0	0	0	0	0	1036	1039	3
9/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0
9/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	7	7	0
9/15/2024	0	0	1	0	0	0	0	0	0	0	0	0	717	718	1
9/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	92	92	0
9/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	37	37	0
9/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	37	37	0
9/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	9	9	0
9/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	30	30	0
9/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	26	26	0
9/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0
9/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0
9/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0
9/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	97	97	0
9/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0
9/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
9/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	1609	1609	0
9/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	73	73	0
9/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0

Bat activity across nights at an unnamed pond in the northeast monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
10/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	336	336	0
10/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	749	749	0
10/3/2024	0	0	0	0	0	0	0	0	0	0	0	0	907	907	0
10/4/2024	0	0	0	0	0	0	0	0	0	0	0	0	43	43	0
10/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0
10/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	295	295	0
10/7/2024	0	0	0	0	0	0	0	0	0	0	0	0	1029	1029	0
10/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	1206	1206	0
10/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	46	46	0
10/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	3257	3257	0
10/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	1457	1457	0
10/12/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/15/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/31/2024	0	0	0	0	0	0	0	0	0	0	0	0	119	119	0

Bat activity across nights at an unnamed pond in the northeast monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
11/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**0**	**0**	**81**	**0**	**1**	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**31,296**	**31,382**	**86**

Bat activity across nights at a wetland in the northeast monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
7/31/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	12	12	0
8/3/2024	0	0	0	0	0	0	0	0	0	0	0	0	305	305	0
8/4/2024	0	0	1	0	0	0	0	0	0	0	0	0	78	79	1
8/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	41	41	0
8/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	94	94	0
8/7/2024	0	0	1	0	0	0	0	0	0	0	0	0	121	122	1
8/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0
8/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0
8/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	162	162	0
8/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	7	7	0
8/12/2024	0	0	1	0	0	0	0	0	0	0	0	0	262	263	1
8/13/2024	0	0	2	0	1	0	0	0	0	0	0	0	12	15	3
8/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	16	16	0
8/15/2024	0	1	1	0	0	0	0	0	0	0	0	0	3	5	2
8/16/2024	0	0	1	0	0	0	0	0	0	0	1	0	14	16	2
8/17/2024	0	0	1	0	0	0	0	0	0	0	0	0	5	6	1
8/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	1219	1219	0
8/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	57	57	0
8/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0
8/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0
8/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	18	18	0
8/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	16	16	0
8/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	57	57	0
8/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	22	22	0
8/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	39	39	0
8/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	1490	1490	0
8/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	475	475	0
8/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
8/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	1066	1066	0

Bat activity across nights at a wetland in the northeast monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
8/31/2024	0	0	0	0	0	0	0	0	0	0	0	0	14	14	0
9/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	327	327	0
9/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	954	954	0
9/3/2024	0	0	0	0	0	0	0	0	0	0	0	0	35	35	0
9/4/2024	0	0	0	0	0	0	0	0	0	0	0	0	362	362	0
9/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	28	28	0
9/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	677	677	0
9/7/2024	0	0	0	0	0	0	0	0	0	0	0	0	869	869	0
9/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	246	246	0
9/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	974	974	0
9/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	36	36	0
9/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
9/12/2024	0	0	0	0	0	0	0	0	0	0	0	0	251	251	0
9/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	7	7	0
9/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
9/15/2024	0	0	0	0	0	0	0	0	0	0	0	0	409	409	0
9/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	60	60	0
9/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	285	285	0
9/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
9/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
9/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	7	7	0
9/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	94	94	0
9/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0
9/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	69	69	0
9/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0
9/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	77	77	0
9/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	12	12	0
9/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0
9/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	336	336	0
9/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	169	169	0
9/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	11	11	0

Bat activity across nights at a wetland in the northeast monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
10/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	331	331	0
10/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	286	286	0
10/3/2024	0	0	0	0	0	0	0	0	0	0	0	0	759	759	0
10/4/2024	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0
10/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0
10/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	1168	1168	0
10/7/2024	0	0	0	0	0	0	0	0	0	0	0	0	1949	1949	0
10/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	1297	1297	0
10/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0
10/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	313	313	0
10/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/12/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/15/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/31/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bat activity across nights at a wetland in the northeast monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
11/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	1	8	0	1	0	0	0	0	0	1	0	18,116	18,127	11

Bat activity across nights at the proposed Rose Pit monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
7/31/2024	0	0	2	0	0	0	0	0	0	0	1	0	2251	2254	3
8/1/2024	2	0	0	0	8	0	0	0	0	1	0	0	33	44	11
8/2/2024	0	0	0	0	0	0	0	0	0	0	1	0	24	25	1
8/3/2024	0	0	3	1	2	0	0	0	0	0	1	0	132	139	7
8/4/2024	0	0	5	0	2	0	0	0	0	0	1	0	111	119	8
8/5/2024	0	2	0	0	0	0	0	4	0	0	1	0	49	56	7
8/6/2024	0	6	0	0	0	0	0	2	0	0	3	0	30	41	11
8/7/2024	0	2	0	0	0	1	0	0	0	0	3	0	80	86	6
8/8/2024	0	0	0	0	0	0	0	0	0	0	1	0	9	10	1
8/9/2024	0	4	0	0	0	0	0	0	0	0	0	0	35	39	4
8/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	365	365	0
8/11/2024	0	29	0	0	1	0	0	0	0	0	10	0	41	81	40
8/12/2024	0	0	1	0	0	0	0	1	0	0	2	0	1023	1027	4
8/13/2024	0	0	0	0	0	0	0	0	0	0	2	0	23	25	2
8/14/2024	0	1	1	0	0	0	0	2	0	1	6	0	94	105	11
8/15/2024	0	3	0	0	0	0	0	0	0	0	5	0	16	24	8
8/16/2024	0	1	0	0	0	0	0	0	0	0	4	0	40	45	5
8/17/2024	0	0	2	0	0	0	0	0	0	0	0	0	14	16	2
8/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	2247	2247	0
8/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	315	315	0
8/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	16	16	0
8/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	27	27	0
8/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	24	24	0
8/23/2024	0	0	0	0	0	0	0	1	0	0	0	0	29	30	1
8/24/2024	0	1	0	0	0	1	1	0	0	0	1	0	34	38	4
8/25/2024	0	0	0	0	0	0	0	1	0	0	0	0	20	21	1
8/26/2024	0	0	0	0	0	0	0	1	0	0	2	0	32	35	3
8/27/2024	0	0	0	0	0	0	0	1	0	0	1	0	92	94	2
8/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	75	75	0
8/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	14	14	0
8/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	230	230	0

Bat activity across nights at the proposed Rose Pit monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
8/31/2024	0	0	1	0	0	0	0	0	0	0	0	0	15	16	1
9/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	1006	1006	0
9/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	28	28	0
9/3/2024	0	0	0	0	0	0	0	0	0	0	0	0	110	110	0
9/4/2024	0	0	1	0	0	0	0	0	0	0	0	0	52	53	1
9/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	20	20	0
9/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	79	79	0
9/7/2024	0	0	0	0	0	0	0	0	0	0	0	0	196	196	0
9/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	338	338	0
9/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/11/2024	0	0	1	0	0	0	0	0	0	0	0	0	30	31	1
9/12/2024	0	0	0	0	0	0	0	0	0	0	0	0	349	349	0
9/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	14	14	0
9/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	37	37	0
9/15/2024	0	0	0	0	0	0	0	0	0	0	0	0	41	41	0
9/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	146	146	0
9/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	24	24	0
9/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	36	36	0
9/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	38	38	0
9/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	60	60	0
9/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	38	38	0
9/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0
9/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	24	24	0
9/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	49	49	0
9/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	125	125	0
9/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	16	16	0
9/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	78	78	0
9/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	139	139	0
9/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	183	183	0
9/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	163	163	0

Bat activity across nights at the proposed Rose Pit monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
10/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	328	328	0
10/2/2024	0	0	0	0	0	0	0	0	0	0	0	0	398	398	0
10/3/2024	0	0	0	0	0	0	0	0	0	0	0	0	1410	1410	0
10/4/2024	0	0	2	0	0	0	0	0	0	0	0	0	33	35	2
10/5/2024	0	0	0	0	0	0	0	0	0	0	0	0	28	28	0
10/6/2024	0	0	0	0	0	0	0	0	0	0	0	0	343	343	0
10/7/2024	0	0	0	0	0	0	0	0	0	0	0	0	1268	1268	0
10/8/2024	0	0	0	0	0	0	0	0	0	0	0	0	2875	2875	0
10/9/2024	0	0	0	0	0	0	0	0	0	0	0	0	278	278	0
10/10/2024	0	0	0	0	0	0	0	0	0	0	0	0	16	16	0
10/11/2024	0	0	0	0	0	0	0	0	0	0	0	0	74	74	0
10/12/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/13/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/14/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/15/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/16/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/17/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/18/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/19/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/20/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/21/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/22/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/23/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/24/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/25/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/26/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/27/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/28/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/29/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/30/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/31/2024	0	0	0	0	0	0	0	0	0	0	0	0	91	91	0

Bat activity across nights at the proposed Rose Pit monitoring station in Kami Project Area.

Night of	EPFU	LABO	LACI	LANO	EPFU/ LANO	MYLU	MYSE	Myotis	PESU	LowF	HighF	NoID	Noise	Totals	Total Bats
11/1/2024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**2**	**49**	**19**	**1**	**13**	**2**	**1**	**13**	**0**	**2**	**45**	**0**	**18,105**	**18,252**	**147**

APPENDIX F

Roost Surveys Photolog

Photo 1. Typical habitat in Project Area.

Photo 2. Potential roost tree with woodpecker cavity.

Photo 3. Potential roost tree with exfoliating bark.

Photo 4. Decaying tree with no available cracks, crevices, cavities, or exfoliating bark.

wsp.com

REPORT

Avifauna Baseline Report

Kami Iron Ore Mine Project

Submitted to:

Champion Iron
1155 René-Lévesque Blvd. West
Suite 3300
Montréal, QC H3B 3X733S

Submitted by:

WSP Canada Inc.
25 York St.
Suite 700
Toronto, ON M5J 2V5

1-416-487-5256

May 2025

Distribution List

1 Electronic Copy - Champion Iron Mines Ltd.

1 Electronic Copy - WSP Canada Inc.

Study Limitations

Executive Summary

Two study areas were developed to support the characterization of baseline conditions of avifauna within the vicinity of the Kami Project; a site study area (SSA) and regional study area (RSA). A range of taxonomic and functional groups are well represented in the proposed SSA including waterfowl, sparrows, thrushes, and wood warblers. Collectively, these species inhabit all terrestrial and riparian habitats including black spruce dominated forest, early successional post-fire habitat, and wetlands. The most prevalent species detected during point count surveys were ruby-crowned kinglet, white-throated sparrow, yellow-rumped warbler, hermit thrush, American robin, and Tennessee warbler. Birds of prey also utilize this area (e.g. bald eagle, northern goshawk), though abundance is low as is expected for this upper-level trophic group. Common waterfowl species confirmed to nest in the SSA include American black duck, common goldeneye, and both merganser species. The early season migratory bird species survey, which focused on wetland areas, did not indicate any significant staging areas for waterfowl, though the earlier than normal onset of spring may have resulted in a shorter stopover period in this region during the northward migration of this species group.

Overall, the assemblage of bird species found in the SSA is reflective of community composition that has been more extensively described for this region of Labrador from long-term submissions of data to eBIRD and the ACCDC. The only species at risk detected during point count surveys was olive-sided flycatcher though an actively nesting common nighthawk was recorded in the SSA by AMEC in 2014 (AMEC Environment and Infrastructure, 2014). Several other species at risk have been reported within the vicinity of the Project area (i.e. bank swallow, barn swallow, barrow’s goldeneye, harlequin duck, peregrine falcon, red know, rusty blackbird, and short-eared owl), but were not found during the survey window in 2023.

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1.0 INTRODUCTION

The Kamistiatusset (Kami) Iron Ore Mine Project (the Project) is a proposed iron ore mine in Newfoundland and Labrador. The Project site is located approximately seven kilometres southwest of the Town of Wabush, ten kilometres south of the Town of Labrador City, and five kilometres northeast of Ville de Fermont, Québec (Figure 1-1).

The Project was originally proposed by the Alderon Iron Ore Corporation (Alderon) and underwent a provincial and federal environmental impact assessment from 2011 to 2013, including a comprehensive baseline program that was completed in 2011 and 2012. The Project was released from the provincial and federal EA process in 2014. In 2021, Champion Iron Limited (through its subsidiary 12364042 Canada Inc, herein referred to as Champion) completed the acquisition of the Project from Alderon.

Champion is proposing several improvements to the Project design proposed by Alderon through the previous Environmental Impact Statement (EIS). These proposed improvements include optimizations to the Project's water management strategy and modernization of the proposed ore handling, conveyance, and processing. Champion's objective for the Kami Project is to produce high purity (>67.5%) iron concentrate, which can be used as direct reduction pellet feed for electric arc furnaces in the green steel supply chain.

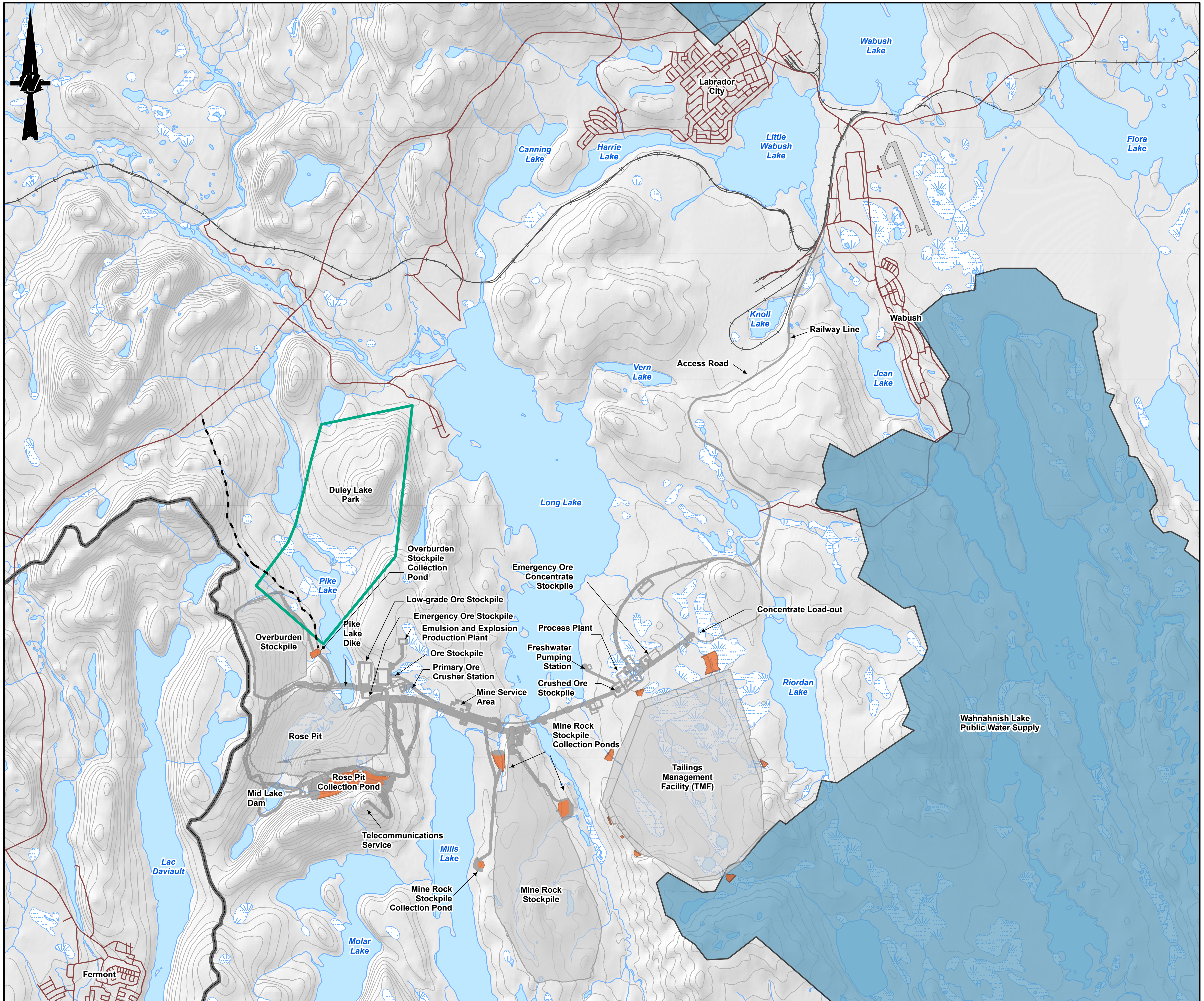
Champion submitted a Project Registration document to the NL Department of Environment and Climate Change (the Department) in April 2024 to restart the EA process for the Project. On June 13, 2024, the Minister issued a Decision Letter to Champion concluding that an EIS would be required for the Project. EIS Guidelines were issued for the Project on December 19, 2024, that includes requirements for baseline studies.

To support the EIS process, Champion has commissioned the services of WSP Canada Inc. (WSP) to complete a comprehensive baseline field program that documents the existing natural and socio-economic environments in the anticipated area of the Project, and this avifauna baseline report represents a component of the comprehensive baseline program. The avifauna baseline study was undertaken to provide context from which effects to avifauna could be evaluated and inform the development of mitigation measures and follow-up effect monitoring programs in the EIS. Champion is planning to submit the EIS to the Newfoundland and Labrador Environmental Assessment Division of the Department of Environment and Climate Change in 2025.

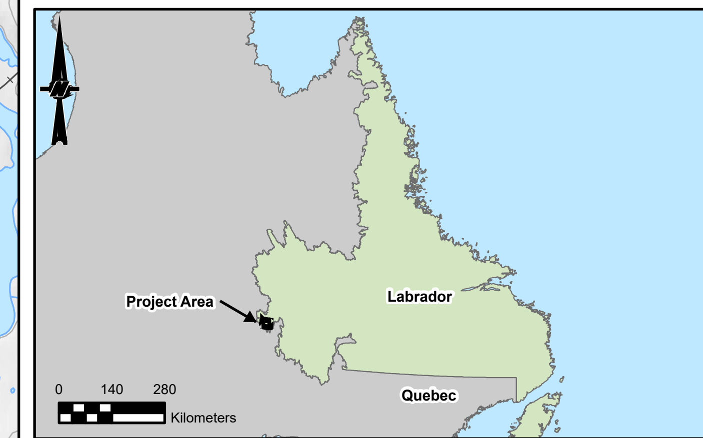
1.1 Overview of the Proposed Kami Project

Figure 1-1 outlines some of the main components of the Project site including:

- Open Pit (Rose Pit);
- Mine rock stockpile;
- Ore stockpiles (operational and reserve);
- Tailings management facility (TMF);
- Overburden stockpile;
- Processing infrastructure including crushing and concentrating;
- Ancillary infrastructure to support the mine and process plant.



KEY MAP



SCALE 1:20,000,000

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT
CHAMPION IRON MINES LTD.

PROJECT
KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE
PROJECT LOCATION AND SITE LAYOUT

CONSULTANT

YYYY-MM-DD	2025-02-27
DESIGNED	----
PREPARED	GM
REVIEWED	AF
APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	B	1-1

2.0 STUDY AREAS

2.1 Ecological Setting

The north-western portion of the proposed Kami mining development occurs within the *Mid Subarctic Ecoregion* (Canada Committee on Ecological Land Classification 1989) and contains multiple ecotypes including open black spruce-lichen forest, post-fire/willow habitat, alpine shrub, bog, and a range of wetland habitats. Within Canada's classification of Bird Conservation Regions (Stralberg et al. 2018), the Labrador City region occurs within the Taiga Shield and Hudson Plains Region (BCR 7). Habitat diversity within this region enables occupancy by a range of functional groups including waterfowl, birds of prey, shorebirds, woodpeckers, and a number of passerine species (e.g. sparrows, wood warblers, and flycatchers).

2.2 Baseline Study Areas

Two study areas were developed to support the characterization of baseline conditions of avifauna within the vicinity of the Kami Project; a site study area (SSA) and regional study area (RSA).

The SSA was defined as the area of potential direct disturbance (i.e., location of proposed infrastructure) and is the area where most of the direct effects from the proposed Project are likely to occur. It is represented by the proposed Project footprint and the area immediately adjacent to the proposed Kami Project where extensive ground disturbance and infrastructure development will potentially occur (Figure 1-1). This zone extends to a radius of 10 km from the northern extent of Mills Lake and encompasses all features of the proposed development including the tailings management facility, Rose pit, overburden and mine rock stockpiles, and access roads. All field-based surveys conducted in 2023 (i.e. waterfowl and point count surveys) occurred within this SSA (see Figure 5-1 and Figure 5-2).

The RSA was developed to further understand the occurrence of avifauna at a larger spatial scale and included the SSA, the adjacent municipalities of Labrador City and Wabush, and properties managed by the Iron Ore Company of Canada. Bird communities within the RSA have been more extensively documented as a function of their accessibility to citizen scientists and their inclusion in previous environmental assessments.

3.0 RATIONALE AND OBJECTIVES

Birds are an important component of boreal environments and are often used as indicators of ecosystem health. Ecologically, birds occupy multiple trophic levels as scavengers, predators and prey and can function as seed dispersers of dominant tree and shrub species. Some groups, including waterfowl and upland game birds, are harvested as a food source, or are hunted recreationally (e.g. willow ptarmigan). Avifauna also provide recreational and aesthetic value through non-consumptive activities including bird viewing and photography. Many bird species are declining throughout their historic ranges because of their sensitivity to various forms of anthropogenic disturbance (North American Bird Conservation Initiative Canada 2012). Consequently, birds have been given increasing consideration during the environmental assessment process and are a valued ecosystem component for the proposed Kami Project.

A number of bird species (including raptors, waterfowl, and songbirds) are known or are likely to occur within the area of the proposed Project; therefore, the potential impact on resident and migratory birds is an important consideration during all phases of the Project (i.e., Construction, Operations and Closure). Of particular concern are potential impacts on species listed under the Canadian *Species at Risk Act* (SARA) and the *Newfoundland and Labrador Endangered Species Act* (NL ESA).

To supplement data collected previously for the site in 2011 and 2012, the purpose of the survey program is to update baseline conditions of the site prior to any future mining development on the property. Results of the baseline study will be used to support the environmental assessment of the Project and will provide the necessary data to quantify the potential harmful effects to avifauna and their habitat. Specific objectives of this study are to:

1) Provide a description of the seasonal occurrence, population status, distribution, and habitat associations of avifauna that are known or are likely to occur in the area of the Project with emphasis on federally and provincially listed Species at Risk; and

2) Identify ecologically sensitive habitats, and time periods.

4.0 METHODS

4.1 Desktop Review

As outlined in the MFQ Data Gap Analysis, a thorough desktop literature review was conducted of existing data sources to provide an updated overview of conservation status of species and on the occurrence and distribution of avifauna in the SSA and the RSA. Information sources included publications from scientific journals, government reports, previous Environmental Assessments, species at risk data maintained by the Atlantic Canada Conservation Data Centre (ACCDC), and general species accounts available from online portals (i.e. eBird Canada and nf.birds). A description of each data source is provided in the sections below. Given the remoteness and inaccessibility of much of the SSA there have been few structured surveys conducted for birds in this region. Therefore, most inference on the assemblage of bird species that occur within this area was based on their known occurrence in similar habitats at a larger spatial scale (i.e. the RSA).

4.1.1 Atlantic Canada Conservation Data Centre

The Atlantic Canada Conservation Data Centre (ACCDC) is a not-for-profit organization and an affiliate of NatureServe Canada. The ACCDC compiles and provides objective data on the biological diversity of Atlantic Canada and functions to further the collective understanding of the distribution and status of species of conservation concern. The ACCDC is a valuable database for assessing the occurrence and location of species and is extensively used for land use planning and environmental assessment processes. For this baseline study, the ACCDC (Corner Brook, NL office) was contacted to provide relevant data on the occurrence and distribution of all avian species at risk within a 15 km radius buffer around the Kami Project Area, within the past 10 years. However, precise locations are not known and therefore it cannot be determined which species may or may not occur within the SSA vs those that may occur within the broader RSA.

4.1.2 Online Databases

Information on the occurrence and location of birds is also available through an online data portal (eBird) which is administered by the Cornell Lab of Ornithology and the National Audubon Society in partnership with Bird Studies Canada. This online checklist provides a portal for recreational birders to record their observations and is a powerful tool for providing basic information on bird abundance and distribution. Note that all records of federally and provincially listed species at risk obtained from eBird were from the adjacent municipality of Labrador City-Wabush and not within the immediate SSA.

In addition to these sources, a search for all relevant databases was conducted through the Nature Counts open data platform by Birds Canada. The search was completed by drawing a polygon around the Project area and filtering for observations between 2011 and 2024, which then returned a list of any databases with records in that area. The search returned the following databases:

- eBird Canada (Atlantic)
- eBird Canada (Québec)
- eBird Canada Sensitive Observations
- Newfoundland and Labrador Breeding Bird Atlas (2020 – 2024)
- Québec Breeding Bird Atlas (2010-2014): point count data
- Québec Breeding Bird Atlas (2010-2014): raw breeding evidence
- Québec Breeding Bird Atlas (northern project): point count data
- Québec Breeding Bird Atlas (northern project): raw breeding evidence

4.2 Field Surveys

4.2.1 Early-Season Migratory Bird Species Survey

In line with the MFQ Data Gap Analysis, which highlighted the need for migratory bird surveys, field surveys were conducted during the late-spring or early summer period in 2023 to evaluate the occurrence of avifauna within the SSA. This temporal period generally coincides with winter break-up and the availability of open water to support both resident breeders and species destined for more northern regions. Focal species for this effort included waterfowl (ducks and geese), shorebirds, birds of prey, and other species associated with aquatic habitats (e.g., terns, kingfishers etc.). Field staff travelled by vehicle, boat, and by foot to survey all accessible aquatic habitats within the SSA that were likely to support these species groups (Appendix A). Species identification and breeding status was determined using a combination of visual, auditory, and behavioural cues.

4.2.2 Point Count Surveys for Migratory Breeding Songbirds

Early morning (6 am to 10 am) point count surveys were conducted for breeding birds at 71 locations (June 11 to 18, 2023) by a team of two experienced biologists. The point-count survey design followed the standing operating procedures as used for recent land-bird monitoring in Newfoundland and Labrador. This approach involved identifying the occurrence of all species within pre-defined point count locations. These locations were stratified and spatially weighted within available habitat types and resulted in effective coverage of accessible areas (i.e. < 1 km from primary access roads and trails) within the SSA (see Appendix A for habitat descriptions). Once on site, all birds within a radius of 400 m were identified to species based on vocal signatures and physical characteristics. Additional information collected at each point count location included weather conditions, habitat characteristics (e.g., conifer forest, upland barrens, wetlands etc.), time and date, the distance of each observation relative to each survey point location, and the presence of other wildlife species. Since weather conditions play an important role in the activity of birds and the ability of observers to detect birds, surveys were not conducted during periods of inclement weather (e.g. periods of sustained rain or wind >40 km/h).

The occurrence of all bird species and nesting sites that were detected incidentally (during other component studies) and outside of systematic survey efforts were also recorded. Collectively, this approach provides a detailed description of the bird community within the SSA and will allow for more effective mitigation during all phases of project development and operation.

5.0 RESULTS

5.1 Desktop Review

The ACCDC report obtained in December 2023 revealed 21 rare avian species that have been reported within the Project SSA and/or RSA (Table 5-1; Appendix B and C). Eight (8) SAR avifauna were identified, including those listed as either Endangered, Threatened, or Vulnerable under SARA or NLESA. An additional twelve (12) avifauna are identified as either Critically Imperiled (S1), Imperiled (S2), or Vulnerable (S3) by ACCDC

A review of previous surveys and online databases revealed a total of 137 avifauna species with potential to occur within the SSA and/or RSA (Table 5-2). Of these, ten (10) are listed as either Endangered, Threatened, or Vulnerable under SARA or NLESA.

A more detailed discussion of SAR and SOCC is provided in Species of Special Conservation Status.

Table 5-1: Avian Species at Risk Species that Occur or Potentially Occur Within the Site Study Area and Regional Study Area (ACCDC, 2023)

Common Name	Scientific Name	SRANK_2020 (ACCDC)	COSEWIC	NLESA	SARA
American Kestrel	*Falco sparverius*	S2B,SUM	Candidate (Group 3, Low Priority)		
Barrow's Goldeneye	***Bucephala islandica***	**S1S2B,S3S4M**	**Special Concern**	**Vulnerable**	**Special Concern**
Black Scoter	*Melanitta americana*	S3B,SUN,SUM			
Common Nighthawk	***Chordeiles minor***	**S2B,SUM**	**Special Concern**	**Vulnerable**	**Threatened**
Common Ringlet	*Coenonympha tullia*	S3			
Golden Eagle	*Aquila chrysaetos*	S2B,SUM			
Harlequin Duck	***Histrionicus histrionicus***	**S3B**	**Special Concern**	**Vulnerable**	**Special Concern**
Hooded Merganser	*Lophodytes cucullatus*	S2B,S3M			
Lake Darner	*Aeshna eremita*	S3			
Mallard	*Anas platyrhynchos*	S3B,SUM			
Northern Harrier	*Circus hudsonius*	S3B,SUM			
Olive-sided Flycatcher	***Contopus cooperi***	**S3B,SUM**	**Special Concern**	**Vulnerable**	**Threatened**
Peregrine Falcon	***Falco peregrinus subsp. anatum***	**S2B,SUM**	**Special Concern**	**Vulnerable**	**Special Concern (anatum/tundrius)**
Red Knot	***Calidris canutus***	**S2M**	**Endangered**	**Endangered**	**Endangered**
Red-Tailed Hawk	*Buteo jamaicensis*	S3S4B,SUM			
Ringed Emerald	*Somatochlora albicincta*	S3			
Rusty Blackbird	***Euphagus carolinus***	**S3B,SUM**	**Special Concern**	**Vulnerable**	**Special Concern**
Short-eared Owl	***Asio flammeus***	**S2S3B**	**Threatened**	**Threatened**	**Special Concern**
Silvery Blue	*Glaucopsyche lygdamus*	S3			
Subarctic Bluet	*Coenagrion interrogatum*	S3			

Bold indicates SAR avifauna

Table 5-2: Avian Species that Occur or Potentially Occur Within the Site Study Area and Regional Study Area

Species	Scientific name	Occurrence	Data source	Relative abundance (breeding status)	Habitat
Alder flycatcher	***Empidonax alnorum***	**CONFIRMED**	**EBIRD, Stassinu-Stantec**	**Common (breeder)**	**Forest**
American bittern	***Botaurus lentiginosus***	**REPORTED**	**EBIRD**	**Common (breeder)**	**Wetlands**
American black duck	***Anas rubripes***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Wetlands**
American coot	***Fulica americana***	**REPORTED**	**EBIRD**	**Rare (breeder)**	**Freshwater wetlands and riparian areas**
American crow	***Corvus brachyrhynchos***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**General**
American golden plover	*Pluvialis dominica*	REPORTED	EBIRD	Common (migratory)	Upland barrens/shoreline
American goldfinch	***Spinus tristis***	**REPORTED**	**EBIRD, Stassinu-Stantec**	**Rare (breeding)**	**Open woodlands**
American kestrel	*Falco sparverius*	REPORTED	EBIRD	Uncommon (breeder)	Barrens
American pipit	*Anthus rubescens*	REPORTED	EBIRD	Common (migrant)	Open meadows
American robin	***Turdus migratorius***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**General**
American three-toed woodpecker	***Picoides dorsalis***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Coniferous forest**
American tree sparrow	*Spizella arborea*	REPORTED	EBIRD	Uncommon (breeder)	Barrens/forest
American wigeon	*Mareca americana*	REPORTED	EBIRD	Rare (breeder)	Wetlands and grasslands
Arctic tern	*Sterna paradisaea*	REPORTED	EBIRD	Uncommon (breeder)	Shorelines
Aythya sp.		REPORTED	EBIRD		Aquatic
Bald eagle	***Haliaeetus leucocephalus***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**General**
Bank swallow	*Riparia riparia*	REPORTED	EBIRD	Uncommon (breeder)	Wetlands
Barn swallow	*Hirundo rustica*	REPORTED	EBIRD	Uncommon (breeder)	Open areas/ structures/ cliffs
Barrow's goldeneye	*Bucephala islandica*	REPORTED	EBIRD	Uncommon (breeder)	Wetlands
Belted kingfisher	***Megaceryle alcyon***	**REPORTED**	**EBIRD**	**Common (breeder)**	**Wetlands**
Black scoter	***Melanitta americana***	**REPORTED**	**ACCDC, EBIRD**	**Uncommon (migrant)**	**Wetlands**
Black tern	*Chlidonias niger*	REPORTED	EBIRD	Rare (migrant)	Wetlands/ shorelines
Black vulture	*Coragyps atratus*	REPORTED	EBIRD	Rare (all seasons)	General
Black-and-white Warbler	*Mniotilta varia*	REPORTED	EBIRD	Rare (breeding)	Forest
Black-backed woodpecker	***Picoides arcticus***	**REPORTED**	**EBIRD, QC**	**Common (breeder)**	**Coniferous forest**
Black-belied plover	*Pluvialis squatarola*	**REPORTED**	EBIRD	**Common (migrant)**	**Wetlands/ coastal areas**
Black-capped chickadee	***Poecile atricapillus***	**REPORTED**	**EBIRD**	**Common (breeder)**	**Forest**
Blackpoll warbler	***Dendroica striata***	**CONFIRMED**	**EBIRD, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Blue jay	*Cyanocitta cristata*	REPORTED	EBIRD	Common (breeder)	Forest/towns

Table 5-2: Avian Species that Occur or Potentially Occur Within the Site Study Area and Regional Study Area

Species	Scientific name	Occurrence	Data source	Relative abundance (breeding status)	Habitat
Blue-headed vireo	***Vireo solitaries***	**REPORTED**	**EBIRD**	**Uncommon (breeder)**	**Mixed forest**
Bohemian waxwing	*Bombycilla garrulus*	**REPORTED**	EBIRD	**Rare (winter)**	**General**
Boreal chickadee	***Poecile hudsonicus***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Boreal owl	*Aegolius funereus*	REPORTED	EBIRD	Uncommon (breeder)	Forest
Brant	*Branta bernicla*	REPORTED	EBIRD	Rare (migration)	Freshwater lakes
Brown creeper	*Certhia americana*	CONFIRMED	EBIRD	Uncommon (breeder)	Forest
Brown-headed cowbird	*Molothrus ater*	REPORTED	EBIRD	Rare (breeder)	Open country
Bufflehead	*Bucephala albeola*	CONFIRMED	EBIRD	Uncommon (breeder)	Wetlands
Cackling goose	*Branta hutchinsii*	REPORTED	EBIRD	Rare (migrant)	Tundra/Lakes
Canada Goose	***Branta canadensis***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Wetlands**
Canada Jay	***Perisoreus canadensis***	**CONFIRMED**	**EBIRD, QC**	**Common (breeder)**	**Coniferous forest**
Cedar waxwing	***Bombycilla cedrorum***	**REPORTED**	**EBIRD, Stassinu-Stantec**	**Uncommon (breeder)**	**Forest**
Common goldeneye	***Bucephala clangula***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Wetlands**
Common grackle	*Quiscalus quiscula*	REPORTED	EBIRD	Uncommon (breeder)	Towns
Common loon	***Gavia immer***	**CONFIRMED**	**EBIRD, QC**	**Common (breeder)**	**Wetlands**
Common merganser	***Mergus merganser***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Wetlands**
Common nighthawk	***Chordeiles minor***	**CONFIRMED**	**AMEC; 2014, EBIRD**	**Uncommon (breeder)**	**Open forest**
Common raven	***Corvus corax***	**CONFIRMED**	**EBIRD, QC**	**Common (breeder)**	**General**
Common redpoll	***Acanthis flammea***	**REPORTED**	**EBIRD, GBBC**	**Common (breeder)**	**Barrens/forest**
Common tern	***Sterna hirundo***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Aquatic habitats**
Common/ red breasted merganser	*Mergus merganser/serrator*	REPORTED	EBIRD	Common (breeder)	Lakes
Dark-eyed junco	***Junco hyemalis***	**CONFIRMED**	**EBIRD, QC, NL**	**Common (breeder)**	**Forest**
European starling	*Sturnus vulgaris*	REPORTED	EBIRD	Common (breeder)	Towns
Fox sparrow	***Passerella liliaca***	**CONFIRMED**	**EBIRD, QC, NL, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Golden eagle	*Aquila chrysaetos*	REPORTED	EBIRD	Uncommon (migrant)	Forest/barrens
Golden-crowned kinglet	***Regulus satrapa***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Forest**
Gray-cheeked thrush	*Catharus minimus*	REPORTED	EBIRD, QC	Uncommon (breeder)	Forest
Great black-backed gull	*Larus marinus*	REPORTED	EBIRD	Common (breeder)	General
Great horned owl	*Bubo virginianus*	REPORTED	EBIRD	Uncommon (breeder)	Forest

Table 5-2: Avian Species that Occur or Potentially Occur Within the Site Study Area and Regional Study Area

Species	Scientific name	Occurrence	Data source	Relative abundance (breeding status)	Habitat
Greater scaup	*Aythya marila*	REPORTED	EBIRD	Uncommon (breeder)	Wetlands
Greater yellowlegs	***Tringa melanoleuca***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Wetlands**
Green-winged teal	***Anas crecca***	**CONFIRMED**	**EBIRD**	**Uncommon (breeder)**	**Wetlands**
Gyrfalcon	*Falco rusticolus*	REPORTED	EBIRD	**Uncommon (wintering)**	**Arctic barrens**
Hairy woodpecker	*Picoides villosus*	CONFIRMED	EBIRD	Uncommon (breeder)	Forest
Harlequin duck	*Histrionicus histrionicus*	REPORTED	EBIRD	Uncommon (migrant)	Wetlands
Hermit thrush	***Catharus guttatus***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Herring gull	***Larus argentatus***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**General**
Hoary redpoll	***Acanthis hornemanni***	**CONFIRMED**	**EBIRD, GBBC**	**Uncommon (breeder)**	**Barrens/forest**
Horned lark	*Eremophila alpestris*	REPORTED	EBIRD	Uncommon (breeder)	Barrens
Killdeer	*Charadrius vociferus*	REPORTED	EBIRD	**Uncommon (breeder)**	**Open ground**
Lapland longspur	***Calcarius lapponicus***	**REPORTED**	**EBIRD**	**Common (migrant)**	**General habitat during migration**
Least flycatcher	***Empidonax minimus***	**REPORTED**	**EBIRD**	**Uncommon (breeder)**	**Forest**
Least sandpiper	*Calidris minutilla*	REPORTED	EBIRD	Uncommon (breeder)	Upland barrens/shoreline
Lesser scaup	*Aythya affinis*	REPORTED	EBIRD	Rare (migration)	Wetlands/lakes
Lesser yellowlegs	*Tringa flavipes*	REPORTED	EBIRD	Rare (migration)	Wetlands/Open boreal forest
Lincoln's sparrow	***Melospiza lincolnii***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**Barrens**
Long-tailed duck	*Clangula hyemalis*	REPORTED	EBIRD	Uncommon (breeder)	Wetlands
Magnolia warbler	***Dendroica magnolia***	**CONFIRMED**	**EBIRD**	**Uncommon (breeder)**	**Forest**
Mallard	***Anas platyrhynchos***	**REPORTED**	**EBIRD, QC**	**Uncommon (breeder)**	**Wetlands**
Merlin	***Falco columbarius***	**REPORTED**	**EBIRD, QC**	**Common (breeder)**	**Forest/barrens**
Mourning dove	*Zenaida macroura*	**REPORTED**	EBIRD	**Rare (year-round)**	**Any semi-open area**
Nashville warbler	*Oreothlypis ruficapilla*	**REPORTED**	EBIRD	**Rare (year-round)**	**Forest**
Northern flicker	***Colaptes auratus***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Northern goshawk	***Accipiter gentilis***	**CONFIRMED**	**EBIRD**	**Uncommon (breeder)**	**Forest**
Northern harrier	*Circus cyaneus*	REPORTED	EBIRD	Uncommon (breeder)	Open, vegetated habitat
Northern hawk owl	*Surnia ulula*	REPORTED	EBIRD	Uncommon (breeder)	Barrens/forest
Northern Pintail	*Anas acuta*	REPORTED	EBIRD	Uncommon (breeder)	Wetlands
Northern shrike	*Lanius borealis*	REPORTED	EBIRD	Uncommon (breeder)	Forest

Table 5-2: Avian Species that Occur or Potentially Occur Within the Site Study Area and Regional Study Area

Species	Scientific name	Occurrence	Data source	Relative abundance (breeding status)	Habitat
Northern waterthrush	***Seirus noveboracensis***	**CONFIRMED**	**EBIRD, QC, NL**	**Common (breeder)**	**Forest**
Olive-sided flycatcher	***Contopus cooperii***	**CONFIRMED**	**EBIRD, Stassinu-Stantec**	**Uncommon (breeder)**	**Forest**
Orange-crowned warbler	***Vermivora celata***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Osprey	***Pandion haliaetus***	**CONFIRMED**	**EBIRD, QC**	**Common (breeder)**	**Riparian forest**
Peregrine falcon	*Falco peregrinus anatum*	REPORTED	EBIRD, QC	Uncommon migrant	Forest/barrens
Philadelphia vireo	***Vireo philadelphicus***	**REPORTED**	**EBIRD**	**Uncommon (breeder)**	**Mixed forest**
Pine grosbeak	***Pinicola enucleator***	**REPORTED**	**EBIRD, NL, GBBC**	**Common (breeder)**	**Forest**
Pine siskin	***Spinus pinus***	**CONFIRMED**	**EBIRD, QC, NL**	**Common (breeder)**	**Barrens/forest**
Purple finch	***Carpodacus purpureus***	REPORTED	**EBIRD**	**Common (breeder)**	**Coniferous forest**
Red crossbill	*Loxia curvirostra*	REPORTED	EBIRD	Uncommon (breeder)	Coniferous forest
Red knot	*Calidris canutus*	REPORTED	ACCDC	Uncommon (migrant)	Shoreline habitats
Red-breasted merganser	***Mergus serrator***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Wetlands**
Red-breasted nuthatch	***Sitta canadensis***	**CONFIRMED**	**EBIRD, QC**	**Common (breeder)**	**Forest**
Red-eyed vireo	*Vireo olivaceus*	REPORTED	EBIRD	Uncommon (breeder)	Mixed forest
Red-tailed hawk	*Buteo jamaicensis*	REPORTED	EBIRD	Uncommon (breeder)	Barrens
Red-winged blackbird	*Agelaius phoeniceus*	REPORTED	EBIRD	Uncommon (breeder)	Wetlands
Ring-billed gull	*Larus delawarensis*	REPORTED	EBIRD	Common (breeder)	General
Ring-necked duck	***Aythya collaris***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Wetlands**
Rough-legged hawk	*Buteo lagopus*	REPORTED	EBIRD	Uncommon (breeder)	Barrens
Ruby-crowned kinglet	***Regulus calendula***	**CONFIRMED**	**EBIRD, QC, NL, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Ruffed grouse	*Bonas umbellus*	REPORTED	EBIRD	Common (breeder)	Forest
Rusty blackbird	***Euphagus carolinus***	**CONFIRMED**	**EBIRD, Stassinu- Stantec**	**Uncommon (breeder)**	**Wetlands**
Savannah sparrow	***Passerculus sandwichensis***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Post-fire habitat/barrens**
Semipalmated plover	*Charadrius semipalmatus*	REPORTED	EBIRD	Common in migration	Shoreline habitat
Semipalmated sandpiper	*Calidris pusilla*	REPORTED	EBIRD	Uncommon breeder	Shoreline habitat
Sharp-shinned hawk	*Accipiter striatus*	REPORTED	EBIRD	Uncommon (breeder)	Forest
Shorebird sp.	*Charadriiformes sp.*	REPORTED	EBIRD		
Short-eared owl	***Asio flammeus***	**REPORTED**	**EBIRD**	**Uncommon (breeder)**	**Barrens**

Table 5-2: Avian Species that Occur or Potentially Occur Within the Site Study Area and Regional Study Area

Species	Scientific name	Occurrence	Data source	Relative abundance (breeding status)	Habitat
Snow bunting	***Plectrophenax nivalis***	**CONFIRMED**	**EBIRD**	**Common (migrant)**	**General habitat during migration**
Snow goose	*Answer caerulescens*	CONFIRMED	EBIRD	Uncommon (migrant)	Wetlands
Snowy owl	*Bubo scandiacus*	REPORTED	EBIRD	Uncommon (wintering)	Tundra/open country
Solitary sandpiper	*Tringa solitaria*	REPORTED	EBIRD	Common (breeder)	Wetlands
Song sparrow	***Melospiza melodia***	**CONFIRMED**	**EBIRD**	**Uncommon (breeder)**	**Forest**
Spotted sandpiper	***Actitis macularius***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Shoreline habitat**
Spruce grouse	***Falcipennis canadensis***	**CONFIRMED**	**EBIRD**	**Uncommon (breeder)**	**Forest**
Surf scoter	***Melanitta perspicillata***	**REPORTED**	**EBIRD, QC**	**Uncommon (breeder)**	**Wetlands**
Swainson's thrush	***Catharus ustulatus***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Swamp sparrow	***Melospiza georgina***	**CONFIRMED**	**EBIRD, Stassinu-Stantec**	**Common (breeder)**	**Wetlands/forest**
Tennessee warbler	***Vermivora peregrine***	**CONFIRMED**	**EBIRD, QC, NL, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Tree swallow	***Tachycineta bicolor***	**CONFIRMED**	**EBIRD, Stassinu-Stantec**	**Common (breeder)**	**Wetlands/near open water**
White-crowned sparrow	***Zonotrichia leucophrys***	**CONFIRMED**	**EBIRD, NL, Stassinu-Stantec**	**Uncommon (breeder)**	**Forest**
White-throated sparrow	***Zonotrichia albicollis***	**CONFIRMED**	**EBIRD, NL, QC, Stassinu-Stantec**	**Common (breeder)**	**Forest**
White-winged crossbill	***Loxia leucoptera***	**CONFIRMED**	**EBIRD, NL, Stassinu-Stantec**	**Common (breeder)**	**Coniferous forest**
Willow ptarmigan	***Lagopus lagopus***	**REPORTED**	**EBIRD**	**Common (breeder)**	**Barrens**
Wilson's snipe	***Gallinago delicata***	**CONFIRMED**	**EBIRD**	**Common (breeder)**	**Wetlands**
Wilson's warbler	***Wilsonia pusilla***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Winter wren	***Troglodytes troglodytes***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Uncommon (breeder)**	**Forest**
Yellow warbler	***Dendroica petechia***	**CONFIRMED**	**EBIRD, NL, Stassinu-Stantec**	**Common (breeder)**	**Forest**
Yellow-bellied flycatcher	***Empidonax flavivetris***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec**	**Common (breeder)**	**Forest (Wet forest)**
Yellow-rumped warbler	***Dendroica coronate***	**CONFIRMED**	**EBIRD, QC, Stassinu-Stantec, NL**	**Common (breeder)**	**Forest**

Note: CONFIRMED = observed during current surveys (see Results). REPORTED = reported in databases/ previous surveys not conducted as part of this study. Species occurrences shown in **bold text** are confirmed to occur within the immediate SSA.

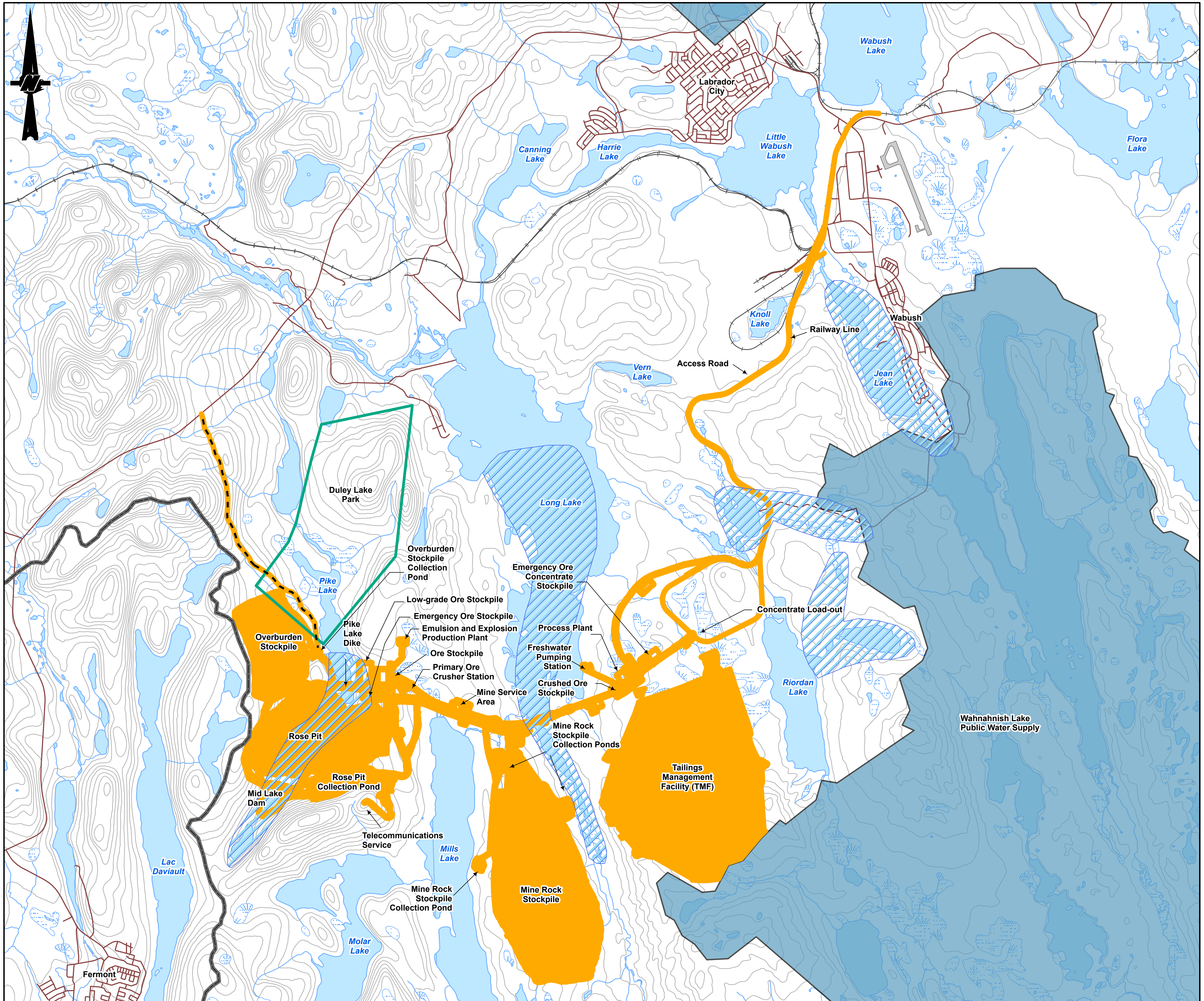
Data sources: AMEC = Amec Environment and Infrastructure (2014) consultant report; ACCDC = Atlantic Canada Conservation Data Centre; GBBD = Great Backyard Bird Count; EBIRD = Observations submitted to eBird.com, including eBird Canada, eBird Atlantic, and eBird Sensitive observations; NL = Newfoundland and Labrador Breeding Bird Atlas; QC = Québec Breeding Bird Atlas, including 2011-2014 point counts, 2011-2014 raw breeding evidence, northern point counts, northern raw breeding evidence; Stassinu Stantec = Stassinu Stantec Limited Partnership (2012) consultant report

5.2 Early-Season Migratory Bird Species Survey

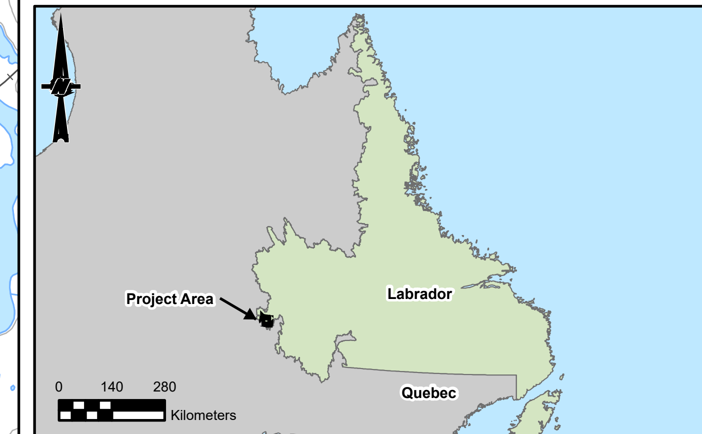
Spring break-up occurred earlier in the Labrador West region than normal during the 2023 season and waterbodies were mostly ice-free during the survey period. A single round of surveys was conducted across wetland habitat between June 7 – June 11, 2023. Wetland habitats within the SSA included large lakes with rocky shorelines, smaller ponds (i.e. < 1 km^2) with emergent vegetation, shallow meandering streams, and sphagnum bog with standing water. Surveys encompassed the full range of these available habitats and are shown in Figure 5-1. Large congregations of migrating waterfowl were not detected but seven species were recorded that had initiated breeding. All wetland habitat types were utilized, and species included Canada goose, red-breasted merganser, common merganser, common goldeneye, American black duck, and green-winged teal. One of these species (common goldeneye) was using a wooden nest box on a small pond south of Pike Lake and had laid a clutch of 12 eggs. Other wetland associated species detected during this sampling period included common loon, Wilson's snipe, and common tern. These are all expected species for boreal regions at this latitude and the occurrence of paired individuals during the surveys indicates that these are local breeders. Breeding status of these species is further corroborated by long-term observations submitted to eBird from multiple observers (Table 5-1).

Table 5-3: Relative Abundance of Bird Species Encountered Within the Site Study Area During the Early Summer Migration Period (June 7, 2023 to June 11, 2023)

Common Name	Scientific Name	General location	Number of individuals	Date
American black duck	*Anas rubripes*	South end of Pike Lake	2 (breeding pair)	June 7
American black duck	*Anas rubripes*	Small pond 1.5 km south of Pike Lake	1	June 8
Bald eagle	*Haliaeetus leucocephalus*	Small pond 1.5 km south of Pike Lake	1	June 8
Canada goose	*Branta canadensis*	Riordan Lake	Accumulated faeces	June 9
Canada goose	*Branta canadensis*	Long Lake	1	June 10
Common goldeneye	*Bucephala clangula*	Small pond 500 m south of Pike Lake	4 (two breeding pairs + a nest box with 12 eggs)	June 7
Common loon	*Gavia immer*	South end of Pike Lake	2	June 7
Common loon	*Gavia immer*	Small pond 1.5 km south of Pike Lake	3 (Pair + single individual)	June 8
Common loon	*Gavia immer*	Riordan Lake and Harris Lake	2 (1 individual/pond)	June 9
Common loon	*Gavia immer*	Long Lake	4 (2 breeding pairs)	June 10
Common loon	*Gavia immer*	Jean Lake	1	June 11
Common merganser	*Mergus merganser*	Wetland/inflow south of Long Lake	10 (Flyover)	June 10
Common tern	*Sterna hirundo*	Elephant Lake and connecting ponds	1	June 9
Common tern	*Sterna hirundo*	Jean Lake	1	June 11
Green-winged teal	*Anas crecca*	Harris Lake	3 (2 males and 1 female)	June 9
Osprey	*Pandion haliaetus*	Elephant Lake and connecting ponds	1	June 9
Red-breasted merganser	*Mergus serrator*	Long Lake	3 (breeding pair + 1 individual)	June 10
Red-breasted merganser	*Mergus serrator*	Jean Lake	1	June 11
Ring-necked duck	*Aythya collaris*	Small pond 500 m south of Pike Lake	2 (breeding pair)	June 7
Wilson's snipe	*Gallinago delicata*	Small pond 500 m south of Pike Lake	2	June 7
Wilson's snipe	*Gallinago delicata*	Small pond 1.5 km south of Pike Lake	1	June 8
Wilson's snipe	*Gallinago delicata*	Elephant Lake and connecting ponds	1	June 9



KEY MAP



SCALE 1:20,000,000

Legend

- 2023 Wetlands Survey (Potential)

Site Study Area (SSA)

- Site Study Area (SSA)
- Potential Access Road

BASEMAP INFORMATION

- Road
- Railway
- Watercourse
- Contour
- Duley Lake Park
- Bog/Wetland
- Waterbody
- Labrador/Quebec Boundary
- Public Water Supply

0 1,000 2,000 4,000

1:71,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE MINE PROJECT (KAMI PROJECT)
WABUSH, NL

TITLE

WETLANDS DELINEATED DURING 2023 WETLAND SURVEYS

CONSULTANT

YYYY-MM-DD	2025-02-27
DESIGNED	----
PREPARED	GM
REVIEWED	AF
APPROVED	--

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	B	5-1

5.3 Point Count Surveys for Migratory Breeding Songbirds

All available terrestrial habitats within the SSA were sampled during a single round of point counts between June 12 – June 18, 2023, with an emphasis on the most dominant forest classes (i.e. mature black spruce forest and post-fire regenerating forest; Appendix A). The distribution of point count locations (n=71) is shown in Figure 5-2. The six most common species detected (by frequency of occurrence) were ruby-crowned kinglet, white-throated sparrow, yellow-rumped warbler, hermit thrush, American robin, and Tennessee warbler (Table 5-4). All species detected during this survey were ‘expected’ species given their known distribution in western Labrador and their prevalence in eBird records (Table 5-4). However, there are multiple species that were not detected during the surveys that likely inhabit the SSA. This is a consequence of their low density, secretive behaviour (both of which limit detectability) and the limited time frame during which WSP conducted surveys. Table 5-2 provides a more complete list of birds that have been recorded in this region over the past several decades, based on previous surveys and databases (i.e., Reported) and those observed during the current study are indicated as “Confirmed”. This table reflects a greater diversity than the accounts from the sampling period in 2023.

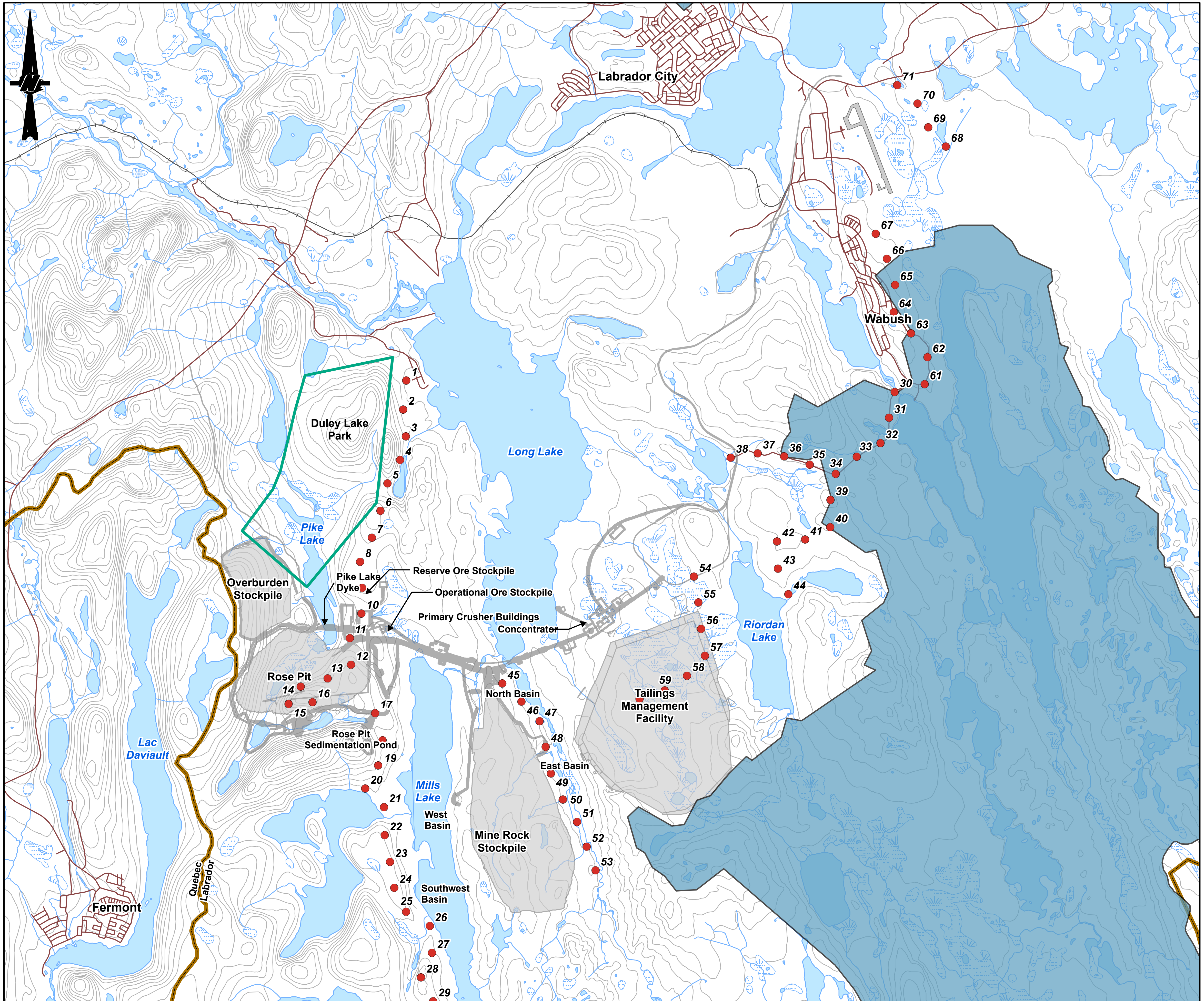
Overall, the assemblage of bird species found in the SSA is reflective of community composition that has been more extensively described for the western Labrador region. All terrestrial habitats provide nesting, roosting, and foraging opportunities for distinct bird communities thus emphasizing the importance of mitigations and best management practices throughout the future phases of the Project.

Table 5-4: The Relative Abundance of Species Encountered Across Point Count Stations (N=71) Within the Site Study Area From June 12, 2023, to June 18, 2023

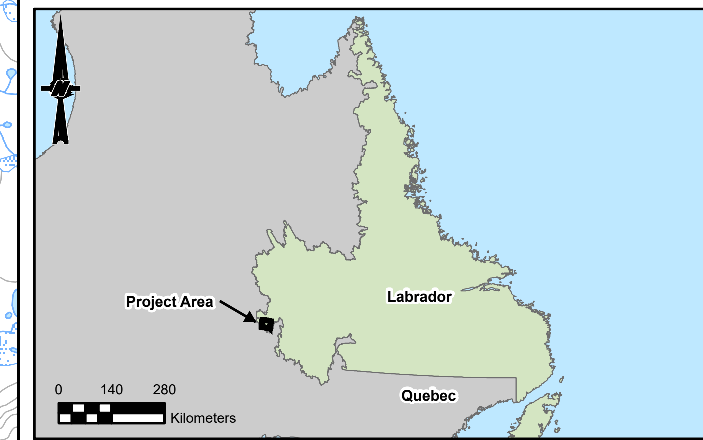
Species	Scientific name	Total	Percent of point counts occupied
Alder flycatcher	*Empidonax alnorum*	13	14.08
American robin	*Turdus migratorius*	37	29.58
Black-backed woodpecker	*Picoides arcticus*	1	1.41
Blackpoll warbler	*Dendroica striata*	3	4.23
Boreal chickadee	*Poecile hudsonicus*	2	1.41
Canada jay	*Perisoreus canadensis*	7	9.86
Common raven	*Corvus corax*	7	7.04
Common tern	*Sterna hirundo*	2	2.82
Dark-eyed junco	*Junco hyemalis*	17	22.54
Fox sparrow	*Passerella liliaca*	15	15.49
Golden-crowned kinglet	*Regulus satrapa*	1	1.41
Greater yellowlegs	*Tringa melanoleuca*	9	11.27
Hermit thrush	*Catharus guttatus*	33	32.39
Lincoln’s sparrow	*Melospiza lincolnii*	7	8.45
Magnolia warbler	*Dendroica magnolia*	3	4.23
Northern flicker	*Colaptes auratus*	4	5.63
Northern goshawk	*Accipiter gentilis*	1	1.41
Northern waterthrush	*Seirus noveboracensis*	5	7.04
Olive-sided flycatcher	*Contopus cooperii*	1	1.41
Orange-crowned warbler	*Vermivora celata*	12	15.49

Table 5-4: The Relative Abundance of Species Encountered Across Point Count Stations (N=71) Within the Site Study Area From June 12, 2023, to June 18, 2023

Species	Scientific name	Total	Percent of point counts occupied
Pine siskin	*Spinus pinus*	1	1.41
Ruby-crowned kinglet	*Regulus calendula*	90	84.51
Savannah sparrow	*Passerculus sandwichensis*	1	1.41
Song sparrow	*Melospiza melodia*	1	1.41
Swainson’s thrush	*Catharus ustulatus*	11	11.27
Swamp sparrow	*Melospiza georgina*	1	1.41
Tennessee warbler	*Vermivora peregrine*	28	29.58
White-crowned sparrow	*Zonotrichia leucophrys*	7	7.04
White-throated sparrow	*Zonotrichia albicollis*	63	60.56
Wilson’s warbler	*Wilsonia pusilla*	2	2.82
Wilson's snipe	*Gallinago delicata*	13	14.08
Winter wren	*Troglodytes troglodytes*	1	1.41
Yellow warbler	*Dendroica petechia*	3	4.23
Yellow-bellied flycatcher	*Empidonax flavivetris*	11	14.08
Yellow-rumped warbler	*Dendroica coronata*	26	33.80



KEY MAP



SCALE 1:20,000,000

LEGEND

PROJECT DATA

- Point Count
- Proposed Project Infrastructure

OTHER MAP DATA

- Public Water Supply

BASEMAP INFORMATION

- Railway
- Watercourse
- Road
- Contour
- Duley Lake Park
- Waterbody
- Bog/Wetland
- Labrador/Quebec Boundary

0 1,000 2,000 4,000

1:73,750 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - NEWFOUNDLAND AND LABRADOR
2. IMAGERY CREDITS:
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N

CLIENT

CHAMPION IRON MINES LTD.

PROJECT

KAMI IRON ORE PROJECT
WABUSH, NL

TITLE

POINT COUNT SURVEY LOCATIONS

CONSULTANT

YYYY-MM-DD	2025-03-11
DESIGNED	----
PREPARED	GM
REVIEWED	JG
APPROVED	JMC

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038713.5261	0001	A	Figure 5-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

5.4 Species of Special Conservation Status

The *Species at Risk Act* (SARA) prohibits the harming or harassing of "wildlife species at risk" and the damage or destruction of their residences (i.e., nests or dens). Under the Act, Schedule 1 is the official list of wildlife Species at Risk. The Act also protects these species' habitat on federally owned lands. On other lands, the Act allows for the designation and protection of "critical habitat" of these species, namely, habitat necessary for the survival or recovery of endangered, threatened or extirpated species. Critical habitat may be designated in species-specific recovery strategies or action plans. The Minister of the Environment may issue permits to authorize an activity that would contravene the Act if the effects on the species are incidental to the carrying out of the activity, if all reasonable alternatives have been considered, all feasible measures will be taken to minimize the impact, and the activity will not jeopardize the survival or recovery of the species.

Like SARA, the NL ESA protects individuals, their residences, and designated critical habitat or recovery habitat of wildlife species designated under this Act. Critical habitat or recovery habitat may be identified during species recovery planning and may be designated for protection under the Act.

There are ten Species at Risk that potentially occur within the SSA and the RSA; of this group, two were recorded during systematic point count surveys by WSP in 2023 (olive-sided flycatcher) and AMEC Environment and Infrastructure in 2014 (common nighthawk) (Table 5-5). These species are either listed on Schedule 1 of the federal *Species at Risk Act* (SARA) or under the NL ESA (Table 5-6). For each of these species a brief overview is provided of known breeding range, general biology, and the likelihood of their occurrence in the SSA. It should be noted that critical habitat has not been designated for any of these species.

Table 5-5: Summary of Species of Special Conservation Status Observed within the Study Area

Avian Surveys	AMEC		Stassinu Stantec		WSP	
	Survey Period; effort	SAR/NLESA observed	Survey Period; effort	SAR/NLESA observed	Survey Period; effort	SAR/ NLESA observed
Migratory Surveys	N/A	N/A	N/A	N/A	June 7 – 11, 2023; one round	N/A
Raptors	N/A	N/A	N/A	N/A	June 7 – 11, 2023; one round	N/A
Waterfowl	N/A	N/A	May 20, 31; June 08, 09; July 12, 27; August 17, 24,25; September 8, 14, 15, 2011	N/A	June 7 – 11, 2023; one round	N/A
Summer/Breeding Bird	June 10 - 18, 2014; one round	Olive-sided Flycatcher (Endangered),	June 27 – July 1, 2011; one round July 2 -8, 2012; one round	Rusty Blackbird (Special Concern, incidental)/	June 11 – 18, 2023; one round	Olive-sided Flycatcher (Endangered),
Nocturnal Owls/Nighthawks	June 10 – 17, one round	Common Nighthawk (Threatened)				

Table 5-6: Species at Risk that are Known or Potentially Occur Within the Site Study Area or Regional Study Area

Species	Scientific name	Legal designation	SAR status
Bank swallow	*Riparia riparia*	NLESA SARA	Not listed Threatened
Barn swallow	*Hirundo rustica*	NLESA SARA	Not listed Special Concern
Barrow's goldeneye	*Bucephala islandica*	NLESA SARA	Vulnerable Special Concern
Common nighthawk	*Chordeiles minor*	NLESA SARA	Threatened
Harlequin duck	*Histrionicus histrionicus*	NLESA SARA	Vulnerable Special Concern
Olive-sided flycatcher	*Contopus cooperii*	NLESA SARA	Threatened
Peregrine falcon	*Falco peregrinus anatum*	NLESA SARA	Vulnerable Special Concern
Red knot	*Calidris canutus rufa*	NLESA SARA	Endangered
Rusty blackbird	*Euphagus carolinus*	NLESA SARA	Vulnerable Special Concern
Short-eared owl	*Asio flammeus*	NLESA SARA	Vulnerable Special Concern

NLESA = Newfoundland and Labrador *Endangered Species Act*; SARA = Federal *Species at Risk Act*.

5.4.1 Bank Swallow

Bank Swallows breed in all Canadian provinces and Territories, except for Nunavut. Its wintering range includes south America. Bank Swallows are associated with cliffs and banks alongside or near rivers, streams, and oceans. The Bank Swallow is an aerial insectivore and is experiencing long-term decline in its Canadian populations. This is likely driven by loss of breeding and foraging habitats and widespread pesticide usage (COSEWIC, 2013).

Bank Swallows are known to breed in Labrador and throughout the Labrador City Region (EBIRD), though they were not detected during the 2023 surveys.

5.4.2 Barn Swallow

Barn Swallows breed in all Canadian provinces and Territories, except for Nunavut. Its wintering range includes parts of South American. Areas where Barn Swallows typically nest include barns, houses, stables, sheds and bridges, and natural features such as rocky cliffs and caves. Barn swallows are aerial insectivores and thus forage in open areas for insects and require areas with structures or cliffs to build nests, and a source of mud to provide material for nest building. Like other insectivores, this species has experienced a significant long-term decline (1968 to 2005) throughout its' breeding range. Reasons for this decline can be attributed to declining populations of insect prey and increased severe temperature shifts during both spring migration and breeding seasons (COSEWIC, 2021)

Barn Swallows only occur occasionally in Labrador, primarily along the southeast coast (COSEWIC, 2021). They were not detected in the 2023 surveys, and it is unlikely that the species occurs in the SSA due to the scarcity of records and since the Labrador is at the limits of the species' range (COSEWIC, 2021).

5.4.3 Barrow's Goldeneye

The breeding range of barrow's goldeneye is discontinuous in North America with more than 90% of birds occurring in the northwest portion of the continent. The eastern North American population is estimated at just 4,500 individuals. These birds are thought to nest in high elevation lakes north of the St. Lawrence Estuary and the Quebec North Shore (Schmelzer, 2006). The overwintering area for 90% of this population includes two main regions in the Gulf of St. Lawrence. The remaining 10% use a range of sites elsewhere in Atlantic Canada and Maine (Robert et. al., 2000; Savard, 1990). There has been some indication that this species may breed on the Northern Peninsula of Newfoundland (Daury and Bateman, 1996) though this has not been confirmed. There are only two observations of this species in the Labrador City region (single individuals in 2004 and 2007; eBIRD) which strongly suggests that it is not a common breeder and similarly does not overwinter in this region. Barrow's goldeneye were not detected in the SSA during breeding bird surveys in 2014 (AMEC Environment and Infrastructure, 2014) or 2023 (this survey).

5.4.4 Common Nighthawk

The breeding range of the common nighthawk includes all Canadian Provinces and Territories, except for Nunavut. Its' wintering range includes southern Brazil and regions of eastern Peru and Ecuador (COSEWIC 2007). The common nighthawk is an aerial insectivore and is associated with open habitats including recently burned forest, clearcuts, barrens, and open fields. Like other insectivores, this species has experienced a significant long-term decline (1968 to 2005) throughout its' breeding range. Reasons for this decline are unclear though a reduction of insect prey stemming from the wide-scale use of pesticides has been suggested (COSEWIC, 2007). Two individuals have been reported in Labrador West Region (2023, eBird).

Common nighthawks are known to breed throughout the Labrador City region though densities appear to be low. Though not detected during point count surveys in 2023, an active nest was found in the SSA by AMEC biologists in 2014 (AMEC Environment and Infrastructure, 2014).

5.4.5 Harlequin duck

The eastern population of harlequin duck breeds on inland rivers and streams from northern New Brunswick to Nunavut, and winters in coastal areas from Newfoundland, south to Maryland, and parts of southwest Greenland (Environment Canada 2007). Breeding habitat generally includes fast flowing river systems (Rodway 1998) while wintering areas are typically areas of rocky coastline, exposed headlands, and sub-tidal ledges (Robertson and Goudie 1999). Harlequin ducks were originally federally designated as Endangered in 1990; however, an increase in abundance at four main wintering areas and the discovery of an additional over-wintering population in southwest Greenland led to a down listing to Special Concern in 2001 (Environment Canada 2007). Only two individuals have been reported around the Labrador City region (1999 and 2005; eBird) which suggests that they do not breed in this portion of Labrador or regularly utilize this region as staging or over-wintering habitat. Harlequin ducks were not detected in the SSA during breeding bird surveys in 2011/2012 surveys (Stassinu Stantec, 2012), 2014 (Amec Environment and Infrastructure, 2014) or 2023 (this survey).

5.4.6 Olive-sided Flycatcher

The olive-sided flycatcher (*Contopus cooperi*) is a medium-sized aerial insectivore that has a New World distribution. The species is generally distributed across boreal regions of North America during the breeding season (May to August) and over-winters in Central and South America. Habitat types used during the breeding season include post-fire stands, partially open coniferous forest, and forest edges along riparian areas (Hutto and Young 1999, Lance and Phinney 2001, Altman and Sallabanks 2000). Olive-sided flycatchers are designated as *threatened* under both the federal *Species at Risk Act* and the Newfoundland and Labrador *Endangered Species Act*. Reasons for the continent-wide decline are unknown, though habitat degradation in both breeding and non-breeding areas has been implicated (Petit et al. 1993, Altman and Sallabanks 2000). Olive-sided flycatchers are known to breed in Newfoundland and Labrador though the distribution and abundance of this species is not well understood. The only known source of trend data for Newfoundland and Labrador (i.e. breeding bird survey data) suggests a population decline over recent decades. Potential threats to local populations may include both temporary and permanent alteration of habitat, changes to prey abundance and availability, and nest predation. Territorial olive-sided flycatchers were recorded singing in the SSA during point count surveys in both 2014 (AMEC Environment and Infrastructure) and 2023 suggesting that they breed in this area at low density. The species was also detected in 2011 and 2012 (Stantec).

5.4.7 Peregrine Falcon

The peregrine falcon breeds in coastal and mountainous regions across much of northern Canada. Within Labrador, their breeding range extends from Cape Chidley to Black Tickle and includes some of the larger river valleys in the north (COSEWIC 2007). There is only one account of this species in the Labrador west region (two individuals in 2007; eBIRD) which suggests that it does not breed locally. These observations occurred on a single day in late summer which suggests that these were transient birds on their southward migration. Two occurrences have been recorded in the Labrador West Region (unknown number of individuals, 2024; Quebec Breeding Bird Atlas). Peregrine falcons were not detected in the SSA during breeding bird surveys in 2014 (AMEC Environment and Infrastructure, 2014) or 2023 (this survey).

5.4.8 Red Knot

The red knot is a medium-sized, migratory shorebird that winters in South America and breeds in coastal regions of the Canadian Arctic. There are six subspecies of red knot worldwide; three of which occur in Canada, and one of these in Newfoundland and Labrador (*rufa* subspecies). Red knots are regularly seen during the fall migration at several key stop-over locations around the province. These include the Stephenville Crossing area, St. Paul's inlet, the northeast coast (Cape Freels), the southern Avalon Peninsula and Bellevue Beach. There are just two observations of red knots in the Labrador City area (2007 and 2010; eBird) which suggests that this area in not an important location for this migratory species. Red knots were not detected in the SSA during breeding bird surveys in 2014 (AMEC Environment and Infrastructure, 2014) or 2023 (this survey).

5.4.9 Rusty Blackbird

The breeding range of the rusty includes most boreal forest regions of Canada (including Newfoundland and Labrador) and the northern United States. Over-wintering areas include the eastern United States and southern portions of the eastern provinces of Canada (COSEWIC 2006). Habitats used by this species during the breeding season include riparian forest, sedge meadows, marshes, and the edges of swamps and cultivated fields. The population of this species in Canada has declined by 5.1% per year since 1966 (COSEWIC 2006). The primary reason for this decline is thought to be the conversion of over-wintering forest habitat to agricultural and urban landscapes. Three occurrences have been reported in the Labrador West Region (9 individuals, 2017; eBird).

Rusty blackbirds are a common breeder at low density in western Labrador and have been regularly recorded in suitable habitat around Labrador City-Wabush across multiple years. Though this species was not detected during surveys in 2023, it was detected in 2011 (Stantec), and it is highly likely that the species occurs in portions of the SSA that were not assessed as part of baseline field investigations.

5.4.10 Short-eared Owl

Short-eared owls have a nearly global distribution though only one subspecies (*Asio flammeus flammeus*) occurs in North America. Across their range, short-eared owls are mostly associated with grasslands and barrens of subarctic and temperate environments (Schmelzer 2005). Populations are typically irruptive and nomadic as they track small mammals, their primary prey, across the landscape. Short-eared owls were regularly observed in the Labrador City region between 2003 and 2009 including near mining tailings and the Wabush airport. Given the vast expanse of open, post-fire habitat within and adjacent to the SSA, it is likely that short-eared owls are regular breeders in this area. Short-eared owls were not detected in the SSA during breeding bird surveys in 2014 (AMEC Environment and Infrastructure, 2014) or 2023 (this survey).

6.0 KEY FINDINGS AND RECOMMENDATIONS

The current surveys, together with those previously conducted in the Project area, provide a comprehensive assessment of a range of taxonomic and functional avian groups in the proposed SSA, including waterfowl, sparrows, thrushes, and wood warblers. Collectively, these species inhabit all terrestrial and riparian habitats including black spruce dominated forest, early successional post-fire habitat, and wetlands. The most prevalent species detected during the point count surveys were ruby-crowned kinglet, white-throated sparrow, yellow-rumped warbler, hermit thrush, American robin, and Tennessee warbler. Birds of prey also utilize this area (e.g. bald eagle, northern goshawk) though abundance is low as is expected for this upper-level trophic group. Common waterfowl species confirmed to nest in the SSA include American black duck, common goldeneye, and both merganser species. The early season migratory bird species survey, which focused on wetland areas, did not indicate any significant staging areas for waterfowl, though the earlier than normal onset of spring may have resulted in a shorter stopover period in this region during the northward migration of this species group.

Overall, the assemblage of bird species found in the SSA is reflective of community composition that has been more extensively described for this region of Labrador from long-term submissions of data to eBIRD, the ACCDC, and the Quebec Breeding Bird Atlas. The only species at risk detected during the 2023 point count surveys was olive-sided flycatcher, though an actively nesting common nighthawk was recorded in the SSA by AMEC in 2014 (AMEC Environment and Infrastructure, 2014). Based on the desktop review, several other species-at-risk are known to occur in the Labrador City region (i.e. short-eared owl, rusty blackbird, harlequin duck, bank swallow, barn swallow) but were not found during the limited survey window in 2023.

Potential effects to avifauna and their habitat from the proposed Project will be further examined in the EIS, following the requirements of the Environmental Impact Statement Guidelines (Newfoundland and Labrador Department of Environment and Climate Change, December 2024). The Guidelines outline the relevant EIS requirements for the assessment of effects to avifauna, including but not limited to requirements for the baseline study, effects assessment, and environmental protection mitigation and plans. Sufficient data exists from the baseline study to assess effects from the Project, cumulative effects, and inform the Avifauna Mitigation and Monitoring Program. The Avifauna Mitigation and Monitoring Program (including migratory birds, raptors, upland game birds and SAR) will be included in the EIS and developed in consultation with ECCC's Canadian Wildlife Service and the Department of Fisheries, Forestry and Agriculture, Wildlife Division. The plan will include mitigation measures, monitoring, and adaptive management frameworks for minimizing effects to Avifauna.

While information has been presented in this baseline report on the baseline data collected previously and in 2023, additional baseline work would be required to meet the requirements of the EIS Guidelines issued in December 2024. Specifically, EIS Guideline Section 4.3.3 (a, ii), which notes:

> ii. Avifauna SAR and relevant habitat: information related to targeted surveys within the regional /local study area for species including, but not limited to, the following: Common Nighthawk (Nightjar surveys shall be conducted following the Canadian Nightjar Survey Protocols. Available at https://www.birdscanada.org/bird-science/canadian-nightjar-survey.), Peregrine Falcon, Short-Eared Owl, Harlequin Duck and Bank Swallow.

Champion is committed to completing targeted surveys in 2025; however, results from these surveys will not be available at the time of submission of the EIS. Results from these surveys will be shared with ECCC and the Department of Fisheries, Forestry and Agriculture, Wildlife Division to potentially inform updates to the mitigation and monitoring proposed in the Avifauna Mitigation and Monitoring Program submitted with the EIS.

Signature Page

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APPENDIX A

General Habitat Descriptions and Locations of Point Count Surveys

Point Count #	Habitat Description	Northing	Easting
1	Mature black spruce forest	5861391	634659
2	Mature black spruce forest with a mix of eastern larch	5860838	634600
3	Mature black spruce forest	5860329	634650
4	Mature black spruce forest	5859880	634542
5	Mature black spruce forest	5859433	634301
6	Mature black spruce forest	5858911	634167
7	Mature black spruce forest	5858400	634005
8	Mature black spruce forest	5857939	633780
9	Mature black spruce forest	5857444	633819
10	Mature black spruce forest	5856956	633805
11	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5856486	633585
12	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5855982	633608
13	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5855721	633162
14	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5855564	632651
15	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5855235	632419
16	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5855267	632875
17	Mature black spruce forest	5855057	634066
18	Mature black spruce forest	5854543	634208
19	Mature black spruce forest	5854064	634124
20	Mature black spruce forest	5853626	633878
21	Mature black spruce forest	5853270	634235
22	Mature black spruce forest	5852738	634248
23	Mature black spruce forest	5852229	634349
24	Mature black spruce forest	5851736	634431
25	Mature black spruce forest	5851279	634656
26	Mature black spruce forest	5851009	635107
27	Mature black spruce forest	5850496	635148
28	Mature black spruce forest	5850030	634939
29	Mature black spruce forest	5849574	635170
30	Riverine habitat with dense willow and dwarf birch understory and open-canopied black spruce forest	5861173	643952
31	Roadside/forest edge habitat with a black spruce overstory and a mixed alder/willow understory	5860684	643844
32	Roadside/forest edge habitat with a black spruce overstory and a mixed alder/willow understory	5860198	643681
33	Roadside/forest edge habitat with a black spruce overstory and a mixed alder/willow understory	5859941	643230

Point Count #	Habitat Description	Northing	Easting
34	Roadside/forest edge habitat with a black spruce overstory and a mixed alder/willow understory	5859614	642829
35	Roadside/forest edge habitat with a black spruce overstory and a mixed alder/willow understory	5859790	642336
36	Roadside/forest edge habitat with a black spruce overstory and a mixed alder/willow understory	5859947	641849
37	Eastern larch forest with a sub-dominant black spruce component	5860004	641345
38	Eastern larch forest with a sub-dominant black spruce component	5859924	640833
39	Jack pine plantation	5859119	642731
40	Jack pine plantation	5858598	642726
41	Mixed black spruce/willow wetland habitat	5858365	642248
42	Mature black spruce forest	5858329	641713
43	Mixed black spruce, jack pine, trembling aspen forest	5857810	641731
44	Stunted (<3 m) black spruce forest	5857324	641929
45	Mature black spruce forest	5855626	636486
46	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5855280	636850
47	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5854906	637196
48	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5854417	637311
49	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5853911	637410
50	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5853416	637639
51	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5852989	637909
52	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5852518	638092
53	Post-fire habitat with low (<2 m) black spruce, willow sp., dwarf birch and heath vegetation (sheep laurel and Labrador tea)	5852068	638261
54	Open fen/peat bog with a low density of stunted black spruce and eastern larch	5857659	640132
55	Open fen/peat bog with a low density of stunted black spruce and eastern larch	5857166	640216
56	Open fen/peat bog with a low density of stunted black spruce and eastern larch	5856664	640268
57	Open fen/peat bog with a low density of stunted black spruce and eastern larch	5856153	640342
58	Open fen/peat bog with a low density of stunted black spruce and eastern larch	5855771	640001
59	Open fen/peat bog with a low density of stunted black spruce and eastern larch	5855490	639578
60	Open fen/peat bog with a low density of stunted black spruce and eastern larch	5855332	639097
61	Roadside alder and willow shrub habitat	5861322	644522
62	Roadside alder and willow shrub habitat	5861836	644576
63	Mature black spruce with a disturbed soil ground layer	5862290	644262
64	Mature black spruce forest	5862691	643934
65	Previously disturbed gravel pit with dense alder re-growth	5863210	643960

Point Count #	Habitat Description	Northing	Easting
66	Previously disturbed gravel pit with dense alder re-growth	5863708	643803
67	Alder/willow roadside vegetation	5864183	643591
68	Mature black spruce forest	5865846	644926
69	Mature black spruce forest	5866212	644591
70	Mature black spruce forest adjacent to a vegetated wetland	5866663	644385
71	Wetland bordered by an alder/willow thicket.	5867015	643998

APPENDIX B

Birds Found in Site Study Area

Avifauna Observed in Kami SSA

Common Name	Scientifc Name	ObservationCount	DecimalLatitude	DecimalLongitude
American Black Duck	Anas rubripes	2	52.9345	-66.8764
American Robin	Turdus migratorius	3	52.9345	-66.8764
Black Scoter (aka American Scoter)	**Melanitta americana**	**10**	**52.9345**	**-66.8764**
Canada Goose	Branta canadensis	1	52.9345	-66.8764
Canada Jay	Perisoreus canadensis	1	52.9345	-66.8764
Common Loon	Gavia immer	1	52.9345	-66.8764
Dark-eyed Junco	Junco hyemalis	4	52.9345	-66.8764
Fox Sparrow	Passerella iliaca	4	52.9345	-66.8764
Green-winged Teal	Anas crecca	2	52.9345	-66.8764
Least Flycatcher	**Empidonax minimus**	**3**	**52.9345**	**-66.8764**
Lincoln's Sparrow	Melospiza lincolnii	2	52.9345	-66.8764
Mallard	**Anas platyrhynchos**	**1**	**52.9345**	**-66.8764**
Northern Waterthrush	Parkesia noveboracensis	5	52.9345	-66.8764
Orange-crowned Warbler	Leiothlypis celata	2	52.9345	-66.8764
Purple Finch	**Haemorhous purpureus**	**1**	**52.9345**	**-66.8764**
Red-breasted Merganser	**Stta canadensis**	2	52.9345	-66.8764
Ruby-crowned Kinglet	Corthylio calendula	3	52.9345	-66.8764
Savannah Sparrow	Passerculus sandwichensis	1	52.9345	-66.8764
Spotted Sandpiper	Actitis macularius	5	52.9345	-66.8764
Surf Scoter	Melanitta perspicillata	3	52.9345	-66.8764
Swainson's Thrush	Catharus ustulatus	1	52.9345	-66.8764
Tree Swallow	Tachycineta bicolor	18	52.9345	-66.8764
White-crowned Sparrow	Zonotrichia leucophrys	4	52.9345	-66.8764
White-throated Sparrow	Zonotrichia albicollis	7	52.9345	-66.8764
Wilson's Warbler	Cardellina pusilla	2	52.9345	-66.8764
Yellow Warbler	Setophaga petechia	1	52.9345	-66.8764
Yellow-rumped Warbler	Setophaga coronata	5	52.9345	-66.8764

***Bolded is SOCC**

APPENDIX C

Birds Found in Regional Study Area

Avifauna reported in Kami RSA

Common Name	Scientific Name	FED Status	PROV Status	Status
Alder Flycatcher	Empidonax alnorum	N5B	S4B,SUM	N/A
American Bittern	**Botaurus lentiginosus**	**N5B,N3N**	**S3B,SUM**	**SOCC**
American Black Duck	Anas rubripes	N5B,N5N	S5B	N/A
American Coot	Fulica americana	N5B,N4N	SNA	N/A
American Crow	**Corvus brachyrhynchos**	**N5B,N5N**	**S3**	**SOCC**
American Goldfinch	**Spinus tristis**	**N5B,N5N**	**S1**	**SOCC**
American Kestrel	**Falco sparverius**	**N5B,N4N**	**S2B,SUM**	**SOCC**
American Pipit	Anthus rubescens	N5B,N4N	S5B	N/A
American Robin	Turdus migratorius	N5B,N5N	S5B	N/A
American Scoter	**Melanitta americana**	**N5B,N4N5N**	**S3B,SUN,SUM**	**N/A**
American Three-toed Woodpecker	Picoides dorsalis	N5	S5	N/A
American Tree Sparrow	Spizelloides arborea	N5B,N5N	S4B,SUM	N/A
American Wigeon	**Mareca americana**	**N5B,N5N**	**S2B,S3M**	**SOCC**
Arctic Tern	**Sterna paradisaea**	**N5B**	**S3S4B,SUM**	**SOCC**
Aythya sp.	Not Found	Not Found	Not Found	N/A
Bald Eagle	Haliaeetus leucocephalus	N5B,N5N	S4B,SUM	N/A
Bank Swallow	**Riparia riparia**	**N4B,N5M**	**S2B,SUM**	**SAR**
Barn Swallow	Hirundo rustica	N4N5B	SNA	**SAR**
Barrow's Goldeneye	**Bucephala islandica**	**N5B,N4N,N4N5M**	**S1S2B,S3S4M**	**SAR**
Bay-breasted Warbler	**Setophaga castanea**	**N5B**	**S2B,SUM**	**SOCC**
Belted Kingfisher	**Megaceryle alcyon**	**N5B,N4N**	**S3B,SUM**	**SOCC**
Black Tern	Chlidonias niger	N5B	SNA	N/A
Black Vulture	Coragyps atratus	NNA	SNA	N/A
Black-and-white Warbler	**Mniotilta varia**	**N5B**	**S3B,SUM**	**SOCC**
Black-backed Woodpecker	Picoides arcticus	N5	S4	N/A
Black-bellied Plover	**Pluvialis squatarola**	**N3N4B,N5N**	**S3M**	**SOCC**
Black-capped Chickadee	**Poecile atricapillus**	**N5**	**S2**	**SOCC**
Blackpoll Warbler	Setophaga striata	N5B	S5B	N/A
Blue-headed Vireo	Vireo solitarius	N5B	0	N/A
Bohemian Waxwing	Bombycilla garrulus	N5B,N5N	S4N,SUM	N/A
Boreal Chickadee	Poecile hudsonicus	N5	S4	N/A
Boreal Owl	Aegolius funereus	N4N5	S4	N/A
Brant	Branta bernicla	N5B,N3N	SNA	N/A
Brown Creeper	**Certhia americana**	**N5B,N5N**	**S3B,SUM**	**SOCC**
Brown-headed Cowbird	Molothrus ater	N5B,N5N	SNA	N/A
Bufflehead	**Bucephala albeola**	**N5B,N5N**	**S2B**	**SOCC**
Cackling Goose	Branta hutchinsii	N5B,N4N5N	0	N/A
Canada Goose	Branta canadensis	N5B,N5N	S5B,SUN	N/A
Canada Jay	Perisoreus canadensis	N5	S5	N/A
Cedar Waxwing	**Bombycilla cedrorum**	**N5B,N5N**	**S2B,SUM**	**SOCC**
Common Goldeneye	Bucephala clangula	N5B,N5N	S5B	N/A
Common Loon	Gavia immer	N5B,N5N	S5B	N/A
Common Merganser	Mergus merganser	N5B,N5N	S5B	N/A
Common Nighthawk	**Chordeiles minor**	**N4N5B,N5M**	**S2B,SUM**	**SAR**
Common Raven	Corvus corax	N5	S5	N/A
Common Redpoll	Acanthis flammea	N5B,N5N	S4	N/A
Common Tern	Sterna hirundo	N5B,NUN	S4B,SUM	N/A
Common/Red-breasted Merganser	Not Found	Not Found	Not Found	N/A

Avifauna reported in Kami RSA

Common Name	Scientific Name	FED Status	PROV Status	Status
Dark-eyed Junco	Junco hyemalis	N5B,N5N	S5B	N/A
Fox Sparrow	Passerella iliaca	N5B,N4N	S5B	N/A
Gray-cheeked Thrush	Not Found	Not Found	Not Found	N/A
Great Horned Owl	Bubo virginianus	N5	S4	N/A
Greater Scaup	Aythya marila	N5B,N5N	S5B	N/A
Greater Yellowlegs	**Tringa melanoleuca**	**N5B,N4N**	**S4B,SUM**	**SOCC**
Greater/Lesser Scaup	Not Found	Not Found	Not Found	N/A
Green-winged Teal	Anas crecca	N5B,N5N	S5B	N/A
gull sp.	Not Found	Not Found	Not Found	N/A
Gyrfalcon	**Falco rusticolus**	**N4N5B,N5N**	**S3**	**SOCC**
Hermit Thrush	Catharus guttatus	N5B,N4N	S5B	N/A
Herring Gull	**Larus argentatus**	**N5B,N5N**	**S3B,SUM**	**SOCC**
Hoary Redpoll	**Acanthis hornemanni**	**N4N5B,N5N**	**S1S2N,SUM**	**SOCC**
Horned Lark	Eremophila alpestris	N5B,N5N	S4B,SUM	N/A
Killdeer	**Charadrius vociferus**	**N5B,N4N5N**	**S2B,SUM**	**SOCC**
Least Flycatcher	**Empidonax minimus**	**N5B**	**S3B,SUM**	**SOCC**
Least Sandpiper	**Calidris minutilla**	**N5B,N1N2N**	**S3B,SUM**	**SOCC**
Lesser Scaup	Aythya affinis	N5B,N5N	S4B,SUM	N/A
Lesser Yellowlegs	**Tringa flavipes**	**N3B,N4M**	**S3M**	**SOCC**
Lincoln's Sparrow	Melospiza lincolnii	N5B,N5N	S5B	N/A
Magnolia Warbler	Setophaga magnolia	N5B	S5B	N/A
Mallard	**Anas platyrhynchos**	**N5B,N5N**	**S3B,SUM**	**SOCC**
Merlin	Falco columbarius	N5B,N5N	S5B	N/A
Mourning Dove	**Zenaida macroura**	**N5B,N5N**	**S3B,SUM**	**SOCC**
Nashville Warbler	**Leiothlypis ruficapilla**	**N5B**	**S2B,SUM**	**SOCC**
NO observations - data represent point cour	Not Found	Not Found	Not Found	N/A
Northern Flicker	**Colaptes auratus**	**N5B,N5N**	**S3B,SUM**	**SOCC**
Northern Goshawk	Not Found	Not Found	Not Found	N/A
Northern Waterthrush	Parkesia noveboracensis	N5B	S5B	N/A
Orange-crowned Warbler	Leiothlypis celata	N5B,N3N	S4B,SUM	N/A
Osprey	Pandion haliaetus	N5B	S4B,SUM	N/A
Peregrine Falcon	**Falco peregrinus**	**N4N5B,N4N**	**S2B,SUM**	**SOCC**
Philadelphia Vireo	**Vireo philadelphicus**	**N5B**	**S2B,SUM**	**SOCC**
Pine Grosbeak	Pinicola enucleator	N5	S5	N/A
Pine Siskin	Spinus pinus	N5B,N5N	S4B,SUM	N/A
Purple Finch	**Haemorhous purpureus**	**N5B,N5N**	**S2B,SUM**	**SOCC**
Red-breasted Nuthatch	**Sitta canadensis**	**N5**	**S3**	**SOCC**
Red-tailed Hawk	**Buteo jamaicensis**	**N5B,N5N**	**S3S4B,SUM**	**SOCC**
Ring-necked Duck	Aythya collaris	N5B,N5N	S5B	N/A
Ruby-crowned Kinglet	Corthylio calendula	N5B,N5N	S5B	N/A
Rusty Blackbird	**Euphagus carolinus**	**N4B,NUN**	**S3B,SUM**	**SAR**
Savannah Sparrow	Passerculus sandwichensis	N5B,N4N	S4B,SUM	N/A
Sharp-shinned Hawk	**Accipiter striatus**	**N5B,N5N**	**S3S4B,SUM**	**SOCC**
shorebird sp.	Not Found	Not Found	Not Found	N/A
Snow Bunting	Plectrophenax nivalis	N5B,N5N	S4B,S5M	N/A
Snowy Owl	**Bubo scandiacus**	**N4N5B,N5N**	**S1B,S3N,SUM**	**SOCC**
Solitary Sandpiper	Tringa solitaria	N5B	S4B,SUM	N/A
Song Sparrow	**Melospiza melodia**	**N5B,N5N**	**S3B,SUM**	**SOCC**

Avifauna reported in Kami RSA

Common Name	Scientific Name	FED Status	PROV Status	Status
Spotted Sandpiper	Actitis macularius	N5B,N3N	S4B,SUM	N/A
Spruce Grouse	Canachites canadensis	N5	S5	N/A
Surf Scoter	Melanitta perspicillata	N5B,N5N	S5B	N/A
Swainson's Thrush	Catharus ustulatus	N5B	S5B	N/A
Swamp Sparrow	**Melospiza georgiana**	**N5B,N4N**	**S3B,SUM**	**SOCC**
Tennessee Warbler	Leiothlypis peregrina	N5B	S5B	N/A
Tree Swallow	Tachycineta bicolor	N5B	S5B	N/A
White-crowned Sparrow	Zonotrichia leucophrys	N5B,N5N	S5B	N/A
White-throated Sparrow	Zonotrichia albicollis	N5B,N5N	S5B	N/A
White-winged Crossbill	Loxia leucoptera	N5	S5	N/A
Willow Ptarmigan	Not Found	Not Found	Not Found	N/A
Wilson's Snipe	Gallinago delicata	N5B	S5B	N/A
Wilson's Warbler	Cardellina pusilla	N5B	S5B	N/A
Winter Wren	**Troglodytes hiemalis**	**N5B,N4N**	**S2B,SUM**	**SOCC**
Yellow Warbler	Setophaga petechia	N5B	S5B	N/A
Yellow-bellied Flycatcher	Empidonax flaviventris	N5B	S5B	N/A
Yellow-rumped Warbler	Setophaga coronata	N5B,N4N	S5B	N/A

***Bolded is SOCC**

Highlighted is SAR

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