Government of Gouvernement des Northwest Territories Territoires du Nord-Ouest

March 29, 2024

AlecSandra Macdonald **Regulatory Specialist** Gwich'in Land and Water Board Alex Moses-Greenland Building **105 Veterans Way** Inuvik, NT X0E 0T0

RE: Submission of 2023 Annual Report and Annual Management Plan Revisions for the Inuvik Airport Type B Water Licence G23L8-002

Dear Ms. Macdonald,

The Government of Northwest Territories – Department of Infrastructure is submitting the 2023 annual report and annual management plan revisions in accordance with the Type B Water Licence G23L8-002 (the licence), revised March 11, 2024.

The annual report was prepared as per Schedules 1 and 2 of the licence and the management plans were reviewed and revised as per Part B, Condition 9. The following management plans were updated:

- Engagement Plan and Record (Version 1.1):
- Erosion and Sediment Control Plan (Version 1.1):
- Environmental Monitoring Plan (Version 1.2); and
- Spill Contingency Plan (Version 1.1).

The appended conformance table demonstrates how the contents of the report meet the conditions and requirements of the licence, includes a summary of the revisions made to the management plans, and provides an update on the Traditional Knowledge and Traditional Use Study.

Should you have any questions or concerns, please contact me at (867) 777-2467 or by email at lason MacNeil@gov.nt.ca.

Government of Gouvernement des Northwest Territories Territoires du Nord-Ouest

Sincerely,

ne

Jason MacNeil Regional Airport Manager, Inuvik Mike Zubko Airport Department of Infrastructure **Government of Northwest Territories**

Attached:

- **Conformance Table** •
- 2023 Annual Report .
- Engagement Plan and Record (Version 1.1); .
- Erosion and Sediment Control Plan (Version 1.1); .
- Environmental Monitoring Plan (Version 1.2); and
- Spill Contingency Plan (Version 1.1).



Condition Number	Requirement	Plan Title	Summary of Changes/Plans
Part B, Condition 9	GNWT-INF to conduct an annual review of all approved plans and make any revisions necessary to reflect changes in operations, contact information, or other details.	Engagement Plan and Record (Version 1.1)	 Included the issuance of the licence on September 23, 2023 and revision on March 11, 2024; and Updated the water licence activities engagement triggers and methods table to include notification to the GLWB and GNWT-ECC Inspector in the event of non-compliance with the licence.
		Environmental Monitoring Plan (Version 1.2)	 Added dissolved organic carbon and temperature to list of parameters to be analyzed; and Added the requirement to conduct a timely review of laboratory and field quality assurance and quality control results after the results are received so that any exceedances or issues can be investigated by the lab and parameters reanalyzed if required.
		Erosion and Sediment Control Plan (Version 1.1)	 parameters reanalyzed if required. Included the issuance of the licence and approvals; Updated distances of the outfalls from Airport Lake and East Lake to reflect changes in the design (the ditches and outfalls are now set further back from the lakes); and Updated seeding locations. Included applicable water licence conditions; Updated contact information for DNAC; Added available spill response equipment and locations; and Added a section for the detailed spill report that is required to the GLWB and Inspector as per Part H, Condition 4.
		Spill Contingency Plan (Version 1.1)	

Conformance Table – G23L8-002 Water Licence 2023 Annual Report Submission



Condition Number	Requirement	Plan Title	Summary of Changes/Plans
Part B, Condition 14	GNWT–INF to comply with the Surveillance Network Program in Schedule 1.	Inuvik Airport Drainage Upgrades, 2023 Annual Report, Water Licence G23L8-002	• Included data collected in the annual report as per Schedule 1 of the licence.
Part B, Condition 17	GNWT-INF to submit an annual water licence report as per requirements of Schedule 2, Condition 1 and Schedule 1 no later than March 31 every year.	Inuvik Airport Drainage Upgrades, 2023 Annual Report, Water Licence G23L8-002	 Developed as per Schedule 2 of the licence; and Provided conformity table in Table 2-1 of the report.
Part B, Condition 23 (in original licence)	GNWT–INF to submit a TK / TLU Study within 6 months of licence issuance	TK/ TLU Study	 GTC requested an extension on behalf of GNWT-INF to August 1, 2024; and GLWB approved the extension on March 11, 2024.

ECC – Department of Environment and Climate Change; GLWB – Gwich'in Land and Water Board; GNWT – Government of Northwest Territories; GTC – Gwich'in Tribal Council; INF – Department of Infrastructure; SNP – Surveillance Network Program; TK – Traditional Knowledge; TLU – Traditional Land Use.



REPORT

Government of Northwest Territories Department of Infrastructure

Inuvik Airport Drainage Upgrades 2023 Annual Report Water Licence G23L8-002



MARCH 2024 SUBMITTED TO: GWICH'IN LAND AND WATER BOARD





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REVISIONS PAGE

Inuvik Airport Drainage Upgrades 2023 Annual Report Water Licence G23L8-002					
Client:			Engineer:		
Government of Northwest Territories Department of Infrastructure (GNWT–INF)			Associated Engineering (B.C.) Ltd. (Associated)		
Revision/ Issue	Date	Description		Prepared by/ Reviewed by	Client Review
1.0	2023-03-29	Submission to the Gwich'in Land and Water Board for the G23L8- 002 2023 annual report		Associated	GNWT-INF

EXECUTIVE SUMMARY

The Government of Northwest Territories (GNWT) – Department of Infrastructure (INF) retained Associated Engineering (B.C.) Ltd. to prepare the 2023 annual report for Type B Water Licence G23L8-002 issued by the Gwich'in Land and Water Board (GLWB) on September 23, 2023.

This report summarizes the project activities completed in 2023, the activities completed under the approved management plans, results of the monitoring conducted as per the Surveillance Network Program and the environmental monitoring plan, and updates made to the management plans. It also includes select updates pertaining to the conditions and activities conducted in January and February 2024.

GNWT-INF is completing infrastructure upgrades and constructing a 914 m runway extension (the project) at the Inuvik Mike Zubko Airport (Inuvik Airport), located approximately 12 km east of Inuvik, NT. The project includes necessary upgrades to the drainage system which does not function properly in its current condition and will not support future upgrades to the airport or changes in precipitation anticipated due to climate change. The drainage upgrades will change the paths and discharge locations of runoff from the Inuvik Airport and surrounding upland areas. Defined ditches will be constructed to the east, west, and south of the airport, directing runoff to Dolomite Lake (also known as Chii Zhit Van and Airport Lake) and the unnamed lake referred to as East Lake, at locations called outfalls (OF).

In 2023, construction activities primarily involved hauling and placing embankment fill on the east and west ends of the runway and the south haul road. Construction of the east and west ditches did not begin until January 2024.

A summary of the contents of this report is as follows:

- Minor updates were made to the approved management plans;
- No spills were reportable to the NWT 24-hour Spill Line;
- An extension was granted for the Traditional Knowledge study to August 1, 2024;
- Background water and sediment quality samples were collected in October 2023;
- Water quality results met applicable guidelines except total aluminum, total iron, turbidity, and total suspended solids at some locations;
- Sediment quality results met applicable guidelines except arsenic at some locations; and
- No non-compliance events were reported.

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LIST OF ABBREVIATIONS

Abbreviation	Definition
BTEX	Benzene, toluene, ethylbenzene, xylenes
CBOD ₅	biochemical oxygen demand
CEMP	Construction environmental management plan
CCME	Canadian Council of Ministers of the Environment
D	discharge (runoff) water location
DCH	Department of Culture and Heritage
DFO	Fisheries and Oceans Canada
DNAC	Delta North Alliance Construction Inc.
DOC	dissolved organic carbon
DOT	Department of Transportation
ECC	Department of Environment and Climate Change
ECCC	Environment and Climate Change Canada
EMP	environmental monitoring plan
ESC	erosion and sediment control
ESCM	erosion and sediment control manual
F	fraction
FEQG	Federal Environmental Quality Guidelines
FWQG	Federal Water Quality Guidelines
GLWB	Gwich'in Land and Water Board
GNWT	Government of Northwest Territories
GTC	Gwich'in Tribal Council
INF	Department of Infrastructure
ISQG FAL	CCME Interim Sediment Quality Guidelines for the Protection of Freshwater Aquatic Life
LR	Department of Lands and Resources
OF	outfall
QEP	qualified environmental professional

Abbreviation	Definition
QA/QC	quality assurance/quality control
RPD	relative percent difference
RW	receiving water
SNP	Surveillance Network Program
SQGEHH	CCME Soil Quality Guidelines for the Protection of Environmental and Human Health
ТК	Traditional Knowledge
TLU	Traditional Land Use
TSS	total suspended solids
VPHw	Volatile petroleum hydrocarbons in water
WQG FAL	Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life

1 INTRODUCTION

The Government of Northwest Territories (GNWT) – Department of Infrastructure (INF) is completing infrastructure upgrades and constructing a 914 m runway extension (the project) at the Inuvik Mike Zubko Airport (Inuvik Airport), located approximately 12 km east of Inuvik, NT (Figure 1-1). The project includes necessary upgrades to the drainage system which does not function properly in its current condition and will not support future upgrades to the airport or changes in precipitation anticipated due to climate change. The drainage upgrades will change the paths and discharge locations of runoff from the Inuvik Airport and surrounding upland areas. Defined ditches will be constructed to the east, west, and south of the airport, directing runoff to Dolomite Lake (also known as Chii Zhit Van and Airport Lake) and the unnamed lake referred to as East Lake, at locations called outfalls (OF).

The project activities are permitted under Type B Water Licence G23L8-002 (the licence) issued by the Gwich'in Land and Water Board (GLWB) on September 23, 2023, under the *Mackenzie Valley Resource Management Act* (SC 1998, c. 25) and the *Northwest Territories Waters Act* (SC 1992, c. 39) and regulations. The licence permits the construction of the drainage ditches and Airport operations and future maintenance of the ditches; it expires September 22, 2028. The GLWB revised the licence on February 25, 2024, with the following updates:

- Update of final coordinates for the Surveillance Network Program (SNP);
- Addition of dissolved oxygen for SNP stations 1–6;
- Addition of SNP stations 7 and 8 for monitoring glycol in runoff; and
- Clarification of sampling timing to specify the construction and operations phases.

GNWT-INF retained Associated Engineering (B.C). Ltd. (Associated) to prepare the annual report for submission to the GLWB on their behalf. This report is organized into two main sections; Section 2 includes a summary of the annual report requirements as per Schedule 2 of the licence, and Sections 3 and 4 summarizes the monitoring conducted in 2023 and the results of the monitoring as per the SNP in Schedule 1.

1.1 Background

Infrastructure upgrades at the Inuvik Airport have been ongoing since late 2019. In 2023, upgrades to the drainage ditches were added to the future scope of work which triggered the requirement for a licence due to the "deposit of waste" from total suspended solids (TSS) in runoff during construction. The drainage upgrades will involve constructing new drainage ditches and culverts within the airport property, which includes runways, taxiways, and natural areas to the east and west of the airport, within Commissioner's land under reserve by the Inuvik Airport within property boundaries held by GNWT – Department of Lands. Construction of the new east and west ditches to Airport Lake and East Lake did not begin until 2024.



ALTHOUGH ASSOCIATED HAS TAKEN THE EFFORT AND DUE CARE TO ENSURE THE ACCURACY OF THE INFORMATION DISPLAYED AT THE DATE OF PRODUCTION, THE USER ACKNOWLEDGES THAT CHANGES OVER TIME AND THE CURRENCY OF THE DATASET(S) MAY IMPACT THE ACCURACY OF THE INFORMATION WITHOUT NOTICE ASSOCIATED SHAIL NOT BE HELD LIABLE TOWARDS THE RESULTS ORTAINED EROM THE LISE OF THIS INFORMATION. SCALE (S) SHOWN ARE INTENDED FOR LETTER (8,5% 11) SIZE ON IY



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GOVERNMENT OF NORTHWEST TERRITORIES DEPARTMENT OF INFRASTRUCTURE

INUVIK AIRPORT CIVIL INFRASTRUCTURE IMPROVEMENTS INUVIK AIRPORT RUNWAY 06-24 EXTENSION

2 ANNUAL REPORT SUMMARY

This report summarizes the environmental measures that were implemented, and project activities that occurred, in 2023 in accordance with the licence and approved management plans. It also includes updates pertaining to the conditions and activities conducted in January and February 2024. Table 2-1 summarizes the annual report requirements listed under Schedule 2 of the licence, and the section of this report that corresponds to each section.

	Condition	Section
The an about a	nual water licence report shall include, but not be limited to, the following information activities conducted during the previous calendar year:	
a)	A brief summary of Project activities.	2.1
b)	An updated Project schedule.	2.2
c)	A summary of engagement activities conducted in accordance with the approved Engagement Plan, referred to in Part B, Condition 18 of this Licence.	2.3
d)	 A summary of activities conducted in accordance with the approved spill contingency plan, referred to in Part H, Condition 2 of this Licence, including: a. A list and description of all Unauthorized Discharges, including the date, NWT spill number, volume, location, summary of the circumstances and follow-up actions taken, and status (i.e., open or closed), in accordance with the reporting requirements in Part H, Condition 4 of this licence; and b. An outline of any spill training administered. 	2.4
e)	A summary of activities conducted in accordance with the approved waste management plan, referred to in Part F, Condition 2 of the licence.	2.5
f)	A summary of activities conducted in accordance with the approved erosion and sediment management plan, referred to in Part F, Condition 3 of the licence.	2.6
g)	A summary of activities conducted in accordance with the approved environmental management plan, referred to in Part F, Condition 4 of the licence.	2.7
h)	A summary of any updates or revisions to the spill contingency plan, engagement plan, waste management plan, erosion and sediment management plan, and/or environmental management plan conducted under the annual review referred to in Part B Condition 9 of the licence.	2.8
i)	A summary of how any Traditional Knowledge, referred to in Part B Condition 4, was incorporated into decision making.	2.9
j)	A list of any non-compliance(s) with the conditions of this licence, or any directive from the Board pursuant to the conditions of this licence.	2.10
k)	A summary of actions taken to address concerns, non-compliance, or deficiencies in any reports filed by an Inspector.	2.11

Table 2-1 G23L8-002 Schedule 2 Annual Water Licence Report Conditions

3

Condition	Section
 A summary of any studies requested by the Board, and/or a brief description of any future studies planned; and 	2.12
m) Any other details requested by the Board by December 31 of the year being reported.	2.13

A summary of the sampling conducted as per the SNP in Schedule 1 of the licence is provided in Sections 3 and 4.

2.1 **Project Activities**

In 2023, earthworks were conducted on the east and west ends of the runway, and in areas north and south of the runway. The project activities conducted in 2023 primarily included the following:

- Hauling embankment fill material from the quarry to the east and west ends of the runway for the extension;
- Hauling embankment fill material from the quarry to the south haul road;
- Placing embankment fill over geotextile fabric;
- Excavating areas around the runway; and
- Stockpiling overburden material along the south side of the haul road.

Clearing and groundworks for the new east and west ditches did not begin until January 2024.

GNWT-INF retained Delta North Alliance Inc. (DNAC) as the main contractor for the embankment construction and stormwater drainage work. Nautchiuk Inc., a subconsultant of DNAC, conducted the background sampling in October 2023 (Sections 3 and 4).

2.2 Project Schedule

Clearing and groundworks for the new east and west ditches began in January 2024. Construction of the ditches is anticipated to be completed before May 2024.

2.3 Engagement Activities

A summary of the engagement activities that were conducted pre-application (before May 31, 2023) is included in the engagement plan and record that was submitted with the water licence application (Associated 2023a).

2.3.1 Primary Potentially Affected Parties and Regulators

As per the engagement plan, engagement activities post-issuance of the water licence are conducted with the following primary potentially affected parties:

- GNWT Environment and Climate Change (ECC);
- Gwich'in Tribal Council (GTC);
- GTC Department of Culture and Heritage (DCH);
- Gwich'in Renewable Resources Board;
- Inuvialuit Environmental Impact Screening Committee;
- Inuvik Native Band;

Government of Northwest Territories Department of Infrastructure

- Nihtat Gwich'in Council;
- Nihtat Gwich'in Renewable Resources Council;
- Town of Inuvik; and
- The public (in select cases).

GNWT also engages with the following regulators:

- Fisheries and Oceans Canada (DFO);
- Gwich'in Land and Water Board;
- Transport Canada Aerodromes and Air Navigation; and
- Transport Canada Navigation Protection Program.

2.3.2 2023 Engagement Record

A summary of the engagement activities conducted in 2023 after the application was submitted to the Board is provided in Table 2-2.

Activity Licence Condition	Party	Details	Timing
DFO letter of advice	<u>DFO</u> Fish Habitat Protection Program	Issued Letter of Advice 23-HCAA-01108 for the project with recommended mitigations which are addressed as components of the approved management plans.	July 27, 2023
Sampling location approval Schedule 1, Part B.2	<u>GNWT-ECC</u> Lloyd Gruben, Water Resources Inspector	Approved the sampling locations provided in EMP V.1.1.	October 11, 2023
TK / TLU study scope Part B, Condition 23 and Annex A Concordance Table	<u>GLWB</u> AlecSandra Macdonald, Regulatory Specialist	Confirmed that the Board has no standards or expectations for the study and suggested to contact the GTC, which is whom their review will be based on.	October 25, 2023

Table 2-2 Engagement Activities Conducted Between June 1 and December 31, 2023

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Activity Licence Condition	Party	Details	Timing
TK / TLU study approach Part B, Condition 23 and Annex A Concordance Table	<u>GTC-DCH</u> Kristi Benson, Heritage Specialist	Discussed the approach to the TK / TLU study. The approach is to focus on the area of Airport Lake. Could include interviews and/or workshops. Will need to submit a research agreement. GTC can review Associated's workplan and can provide a letter to offer an extension so that it can be done properly and not rushed.	October 26, 2023
TK / TLU study approach Part B, Condition 23 and Annex A Concordance Table	GTC-DCH Kristi Benson, Heritage Specialist <u>GTC-LR</u> Alicia McRae, Land and Resources Coordinator	Discussed the approach to the TK / TLU study. GTC may have a database of cabin owners on Airport Lake to share with Associated.	October 27, 2023
Material approval Part E, Condition 2	<u>GNWT-ECC</u> Lloyd Gruben, Water Resources Inspector	Requested approval to use rock from the quarry to the line the ditches. Associated did not receive a response in 2023, but Lloyd Gruben approved of the material source on January 11, 2024.	December 12, 2023
EMP V.1.1 submission Reasons for Decision	<u>GLWB</u> AlecSandra Macdonald, Regulatory Specialist	Submitted EMP V.1.1, a cover letter which included an update on the TLU review, and a conformance table to the Board. Receipt of submission was confirmed and EMP V.1.1 was approved on February 15, 2024.	December 19, 2023
TK / TLU study work plan Part B, Condition 23 and Annex A Concordance Table	<u>GTC-DCH</u> Sharon Snowshoe, Director of Culture and Heritage; Kristi Benson, Heritage Specialist <u>GTC-LR</u> Alicia McRae, Land and Resources Coordinator	Sent draft work plan for approach to the TLU review. The GTC responded in 2024 and approved the work plan. A Traditional Knowledge Research agreement was established between the GTC and GNWT and plans are in place to conduct the TLU review in May 2024.	December 22, 2023

DCH – Department of Culture and Heritage; DFO – Fisheries and Oceans Canada; ECC – Department of Environment and Climate Change; EMP – environmental monitoring plan, Version 1.1 (Associated 2023b); GLWB – Gwich'in Land and Water Board; GNWT – Government of Northwest Territories; GTC – Gwich'in Tribal Council; LR – Department of Lands and Resources; TK – Traditional Knowledge; TLU – Traditional Land Use.

2.3.3 Activities that Prompt Engagement and Engagement Approach

The activities that would trigger engagement and the method of engagement that GNWT committed to in the engagement plan, along with a summary of what was conducted in 2023 is provided in Table 2-3.

Engagement Trigger	Primary Purpose Primary Method		Primary Participants	Engagement Conducted in 2023
Start and completion of construction activities for the west ditch to Airport Lake, and the east ditch to East Lake	To advise potentially affected parties of construction activities	Verbal and/or written notification	Potentially affected parties identified as primary potentially affected parties, Fisheries and Oceans Canada, and Transport Canada – Navigation Protection Program	N/A – Construction began on January 15, 2024. Notifications were submitted on January 5, 2024.
Temporary access restrictions to public places, such as Airport Lake	To advise potentially affected parties and the public of temporary closures that might affect access to public places	Verbal and/or written notification	Primary potentially affected parties and the public	Signage was posted on the Community Access Road to notify the community of potential blasting activities. The road was not closed for significant amounts of time. Security guards were stationed at the north and south ends of the road approximately 15 minutes prior to each blast event to stop traffic until blasting activities were finished.
Amendments to the water licence	To advise potentially affected parties of the amendments and allow an opportunity for them to provide feedback	Verbal and/or written notification	GLWB and primary potentially affected parties	N/A – The water licence was not amended in 2023.
Renewal of the water licence	To advise potentially affected parties of GNWT-INF's intention to renew the water licence	Verbal and/or written notification	GLWB and primary potentially affected parties	N/A – The water licence expires September 22, 2028.

 Table 2-3
 Water Licence Engagement Activities Conducted Under the Engagement Plan

Engagement Trigger	Primary Purpose	Primary Method	Primary Participants	Engagement Conducted in 2023
Occurrence of reportable spills	To advise affected parties and the public of spills if surface water is impacted	Verbal and/or written notification	NWT Spill Line, GNWT- ECC water resource officer, potentially affected parties identified as primary potentially affected parties, and the public if water resources are impacted and a risk to the public or the environment is identified	N/A – There were no reportable spills in 2023.
Other	To discuss any concerns or other topics that may arise during Inuvik Airport operations	Written, verbal, or as required by affected parties	Gwich'in Tribal Council, or any organization or individual	No concerns or other topics were brought forward by any organizations or individuals in 2023. ¹

Engagement triggers, primary purpose, primary method, and primary participants are those outlined in the project's engagement plan and record (Associated 2023a). ¹ Source: MacNeil, personal communication, 2024. ECC – Department of Environment and Climate Change; GLWB – Gwich'in Land and Water Board; GNWT – Government of Northwest Territories; INF – Department of Infrastructure; N/A – not applicable.

2.4 Spill Contingency Plan

A summary of the updates made to the spill contingency plan is provided in Section 2.8.1.

2.4.1 Spill Contingency Plan Activities

The contractor followed the approved spill contingency plan (Associated 2023c), which they appended to their construction environmental management plan (CEMP), and added company- and site-specific spill prevention and response procedures and contact information to their CEMP. In general:

- Fuel is stored in double-walled containment tanks in the north quarry, which is where the majority of refuelling activities occur;
- Mobile fuelling from mobile lube trucks was conducted at least 100 m from watercourses;
- No fuel, chemicals, wastes, or other deleterious substances were stored within 100 m of the ordinary highwater mark of waterbodies; and
- Maintenance activities were conducted at the quarry.

2.4.2 Unauthorized, Reportable Discharges

There were no reportable spills reported to the NWT 24-Hour Spill Line in 2023.

During a site visit on September 27, 2023, Associated discovered sheens in the puddles around the refuelling tanks in the quarry, which appeared to be from overflow events while refuelling equipment. The quantity of fuel was less than the reportable quantities under the *Spill Contingency Planning and Reporting Regulation* (R-068-93) and was contained to the area around the fuel tank. Associated notified the contractor of the spill and the requirement to clean up the

contaminated rainwater. The contractor cleaned the spill up with absorbent pads and disposed of them at Northwind Industries Ltd., a local contracting company that accepts hazardous waste.

The contractor indicated that approximately 10 small, non-reportable spills were reported in 2023 (McKillop, personal communication, 2024a). The spills were generally <1 L and primarily in the quarry. The spilled substances were cleaned up with absorbent pads and disposed of at Northwind.

2.4.3 Spill Training

The contractor regularly includes spill prevention and spill response topics in their tailgate meetings at shift change. Topics include supervising refuelling activities and discussing locations and use of spill kits (McKillop, personal communication, 2024a). However, spill prevention and response training were not a component of the new hire orientation process in 2023.

2.5 Waste Management Plan

Waste management activities were included in the water licence application form and no formal waste management plan was submitted or approved. Associated confirmed with AlecSandra Macdonald that due to the size and scope of the project, a summary of waste activities can be included in the annual reports, and that no additional submission of a waste management plan is necessary (A. Macdonald, personal communication, 2023).

The contractor's CEMP includes methods for waste management. The types of wastes that are generated during construction activities and how they were managed is summarized in Table 2-4.

Type of Waste	Storage	Disposal		
General construction waste	Waste bins near the site office at main quarry	Inuvik Solid Waste Disposal Facility		
Construction hazardous waste (e.g., oily rags, empty oil drums, used oil) ¹	In the maintenance shop at the main quarry	Waste oil drums – recycled at Northwind Used oil – recycled at Northwind in their oil-fired burner Oily rags and absorbent pads – incinerated at Northwind Hydrocarbon contaminated soil – Inuvik Soil Treatment Facility		
Airport general waste	Waste bins at or near the airport terminal building	Inuvik Solid Waste Disposal Facility		
Hazardous waste at the airport (e.g., oily rags, empty oil drums, used oil)	Each hangar occupant is responsible for storage	Each hangar occupant is responsible for disposal		

Table 2-4 Waste Management Summary 2023

Type of Waste	Storage	Disposal
Deicing chemicals ²	Inside the old Canadian North cargo shop	Used at the airport property when required

¹ Source: McKillop, personal communication, 2024a. ² Information from the contractor Braeden Burry Expediting. Source: MacNeil, personal communication, 2024.

Prevention of TSS in surface water is discussed in the erosion and sediment control section, Section 2.6.

2.6 Erosion and Sediment Control Plan

The erosion and sediment control plan (Associated 2023d), approved with the issuance of the water licence, came into effect September 23, 2023, which was during the fall runoff period. Construction of the west and east ditches to Airport Lake and East Lake, respectively, did not occur in 2023.

A summary of the erosion and sediment control mitigations that are included in the erosion and sediment control plan and the measures that were implemented for the project in 2023 are provided in Table 2-5.

Table 2-5 Genera	l Erosion and Sediment	Control Measures	Implemented in 2023
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Mitigation Measure	Performance Summary
 Scheduling: Phased construction to reduce the area of soil disturbance and perform progressive reclamation as applicable. Minimize excavation into permafrost. Plan construction scheduling in winter to minimize thermal disturbance. Not complete drainage and grading work in areas that have the potential for erosion and sediment transport to water during periods of heavy precipitation run-off. 	Construction of the east and west ditches was scheduled for January 2024 so that construction could be completed when the ground was frozen and there was no active runoff. Work in 2023 primarily involved placing embankment fill east and west of the runway and on the south haul road. The work involved placing fill over geotextile and only sub excavating when necessary; therefore, there were no opportunities for progressive reclamation in 2023.
 Minimize disturbance: Not destroy, remove, or clear vegetation to the extent greater than necessary to perform the work and maintain vegetative buffer strips, where possible. Clearly mark vegetation clearing limits and soil excavation limits to avoid unnecessary removal and damage of vegetation and soil. Identify and mark sensitive features within and adjacent to project boundaries. 	The drainage design for the east and west ditches was updated in January 2024 to provide a larger buffer of undisturbed vegetation between the ditch outfalls and the lakes, for erosion and sediment control. The new buffer for the east ditch is approximately 60 m from East Lake: an increase of 42 m. The new buffer for the west ditch is approximately 230 m from Airport Lake: an increase of 225 m from 5 m. Fill and excavation limits were clearly marked beforehand.

Mitigation Measure	Performance Summary
 Protect areas: Characterized by poor drainage, standing water, and areas where run-off drains towards waterbodies from erosion and sediment transport. 	Organic and soil overburden piles were strategically stockpiled away from drainage ditches in areas where the runoff from the piles will infiltrate to vegetated areas.
 Disturbed slopes: Roughen disturbed slopes as per the GNWT–DOT and GNWT–INF ESCM best management practice #27.¹ 	Not applicable in 2023.
 Dewatering and water discharge: Intakes elevated to minimize sediment intake. Use rock sumps. Pumps outfitted with screens per DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines in fish-bearing waters. If water is discharged on land, dissipate it over a well- vegetated area with the use of energy dissipation devices. 	Runoff water from the airport area was pumped onto vegetated areas. Water was not pumped from fish-bearing waterbodies.
Restoration:Restore bare areas with a native seed mix and/or soil bioengineering.	Construction is in progress and no areas required restoration in 2023.
ESC measures:Properly installed.Stored on site to address environmental emergencies.	ESC measures and materials were not required in 2023.
Inspections: Regular inspections. Maintenance. 	ESC inspections and maintenance were not required in 2023.
Wind and dust erosion:Cover haul trucks and drive at low speeds.Spray water on transport routes.	Contractor watered the roads using water trucks and water from the sumps in the quarry to minimize dust erosion.
 Equipment washing: Performed off site. In an area where deleterious substances will not enter watercourses. 	Construction equipment is washed in the quarry in a location where wash water will not flow to Airport Lake.
Material stockpiles:Soil and overburden stockpiled in a manner where sediment will not enter watercourses.	Overburden is stockpiled in areas where runoff flows to vegetated areas, primarily south of the new south haul road.

Mitigation measures are from the project's erosion and sediment control plan (Associated 2023d). ¹ Sources: GNWT-DOT 2013, GNWT-INF 2023). DFO – Fisheries and Oceans Canada; DOT – Department of Transportation; ESC – erosion and sediment

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control; ESCM – erosion and sediment control manual; GNWT – Government of Northwest Territories; INF – Department of Infrastructure.

Work did not occur adjacent to water bodies in 2023; therefore, a performance summary of the associated mitigation measures is not applicable in 2023. Accordingly, the response framework for erosion and sediment control measures did not have to be implemented in 2023.

2.7 Environmental Monitoring Plan

A summary of activities conducted under the approved environmental monitoring plan (EMP) (Version 1.0) in 2023 (Associated 2023e) is provided in Sections 3 and 4. A summary of the updates made to the EMP is provided in Section 2.8.5.

2.8 Management Plan Updates

A summary of the updates made during this annual review of the management plans is provided in the following sections for each. The revised plans will be submitted to the GLWB at the same time as this annual report.

2.8.1 Spill Contingency Plan

Minor updates were made to the spill contingency plan (Version 1.1); a summary of the updates is as follows:

- Included applicable water licence conditions;
- Updated contact information for the contractor (DNAC);
- Added available spill response equipment and locations; and
- Added a section for the detailed spill report that is required to be submitted to the GLWB and Inspector, as per Part H, Condition 4.

2.8.2 Engagement Plan

A summary of the updates made to the engagement plan (Version 1.1) is as follows:

- Included the issuance of the licence; and
- Updated the water licence activities engagement triggers and methods table to include notification to the GLWB and the GNWT-ECC Inspector in the event of non-compliance with the licence.

2.8.3 Waste Management Plan

A formal waste management plan is not required. Annual waste management activities will be summarized in the annual reports each year.

2.8.4 Erosion and Sediment Control Plan

Minor updates were made to the erosion and sediment control plan (Version 1.1); a summary of the updates is as follows:

- Added the licences and approvals that have been obtained; and
- Updated distances of the outfalls from Airport Lake and East Lake to reflect updates to the design.

2.8.5 Environmental Monitoring Plan

EMP Version 1.1 was approved by the Board on February 15, 2024. The updates to Version 1.1 are summarized as follows:

- Included final sampling locations approved by the Inspector;
- Added dissolved oxygen and biological oxygen demand to parameters; and
- Included the Federal Environmental Quality Guidelines (FEQG) in the list of guidelines to assess monitoring results.

Minor updates were made to EMP Version 1.2 in March 2024. The updates are summarized as follows:

- Included dissolved organic carbon (DOC) and temperature in the list of parameters analyzed by the lab so that the Federal Water Quality Guidelines (FWQG) for aluminum, copper, iron, and lead could be calculated.
- Updated the distances of the outfall locations from the lakes.
- Added SNP Station labels SNP 7 and SNP 8 to the runoff monitoring sites.
- Included a review of the laboratory QA/QC and duplicates results within one week of receiving the results so that parameters can be reanalyzed if necessary.

2.9 Traditional Knowledge

GNWT-INF began the process of confirming the scope and approach to the Traditional Knowledge (TK) / Traditional Land Use (TLU) study with the GLWB and GTC in October 2023. In December 2023, GNWT-INF submitted the draft work plan to the GTC-DCH for review and comment on the proposed approach to the TLU review. The GTC-DCH approved the work plan in January 2024. In general, the TLU review will involve engaging community members through an in-person information session, in-person interviews, and a survey. The purpose of the review is to understand how Gwich'in participants and other land users are currently using the area of Airport Lake for cultural purposes, and how the project may impact their Traditional Use. A research agreement in accordance with the Gwich'in Traditional Knowledge Research Policy (GTC-DCH 2004) was signed between the GTC and GNWT-INF on March 6, 2024.

As a result of a meeting held between Associated and the GTC–DCH on February 14, 2024, the project team determined that May 2024 would be the best time to hold the interviews, due to time constraints for planning and the festivals held in April. The GTC–DCH submitted a request to the GLWB asking for an extension on the requirement to submit a TK / TLU study by March 23, 2024, to August 1, 2024. The GLWB approved the extension on March 11, 2024.

2.10 Non-Compliance

The Board did not file any non-compliances for the conditions of the licence and did not issue any directives in 2023.

2.11 Actions to Address Concerns, Non-Compliance, or Deficiencies Filed by an Inspector

An Inspector did not file any reports that had concerns, non-compliance, or deficiencies in 2023.

2.12 Future Studies

A Traditional Land Use review (the TK/TLU study) will be conducted in the spring/summer of 2024 as discussed in Section 2.9.

2.13 Other Details

No other details were requested by the Board by December 31, 2023.

3 WATER AND SEDIMENT QUALITY MONITORING METHODS

The SNP in Schedule 1 of the licence includes the requirements for locations, frequency, and parameters that are to be sampled. The licence also requires that GNWT–INF follow the approved EMP. On October 8 and 9, 2023, Nautchiuk conducted background surface water and sediment sampling, and on October 16, 2023, conducted follow-up surface water sampling at some locations for select parameters. Sampling activities were deemed necessary due to imminent freeze-up conditions, and therefore were guided by an earlier version of the EMP (Version 1) (Associated 2023c).

3.1 Sampling Locations

On October 8, 9, and 16, 2023, the contractor conducted the background surface water and sediment sampling event, guided by the EMP Version 1 (Associated 2023d). DNAC developed a sampling plan from the EMP and the water licence after this background sampling event (Nautchiuk Environmental Inc. 2023a).

The monitoring locations, description of each location, and coordinates are provided in Table 3-1, and the locations are illustrated in Figure 3-1. The contractor collected samples from additional locations to those listed in the SNP and the EMP for the background sampling event because of the absence of historical water quality data in the area. At future sampling events, subsequent samples will not be collected from the additional sites that are not SNP Stations unless the results indicate that they are necessary.

SNP	Site	Sample	1	Coor	dinates	Approximate Distance
Station	Location	ID	Description	Latitude	Longitude	and Sample Site Description
SNP 1	OF_02	SNP1 – RW	Airport Lake Receiving water, new west ditch alignment	68.297538°	-133.527786°	5 m from edge of water Ice along shoreline but not at sample location
SNP 2	OF_02.5	SNP2 – RW	Airport Lake Receiving water, existing west ditch	68.297652°	-133.531902°	5 m from edge of water Ice along shoreline but not at sample location
SNP 3	OF_03	SNP3 – RW	Airport Lake Receiving water, east runway discharge path	68.296248°	-133.489171°	5 m from edge of water

Table 3-1 Background Surface Water Monitoring Locations

AZ

SNP	Site	Sample		Coordinates		Approximate Distance
Station	Location	ID	Description	Latitude	Longitude	and Sample Site Description
		SND4 -	East Lake			8 m from treeline, ¹ past the sedges
SNP 4	OF_04	RW	Receiving water, east ditch	68.304775°	-133.428650°	Sampled through a hole in the ice, depth of water less than 1 m
			Airport Lake			
SNP 5	- DL	SNP5	Receiving water, reference location	68.287745°	-133.509020°	5 m from treeline
	Deference		East Lake			8 m from treeline, after the sedges
SNP 6 Ref - El	- EL	SNP6	Receiving water, reference location	68.305064°	-133.425194°	Sampled through a hole in the ice, depth less than 1 m
			Airport Lake			1 m from treeline
SNP 7 ²	SNP 7 ² Runoff SNP 7 ² OF_02.5		Runoff, existing west ditch	68.297797°	-133.527882°	Sampled from a hole in the ice and snow
	During		Airport Lake			1 m from treeline
SNP 8 ²	OF_02	SNP1-D	Runoff, new west ditch location	68.297894°	-133.531969°	Sampled from a hole in the ice and snow
			Airport Lake			1.5 m from shoreline due to steep drop-off
N/A	OF_01	OF1- RW ³	Receiving water, southwest of quarry	68.299964°	-133.544373°	Ice along shoreline but not at sample location
			Airport Lake			10 m from treeline, in the bay
N/A	OF_03	SNP3-D	Receiving water, east runway discharge path	68.296457°	-133.488950°	Sampled through a hole in the ice

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SNP	Site	Sample		Coor	dinates	Approximate Distance
Station	Location	ID	Description	Latitude	Longitude	and Sample Site Description
N/A	OF_04	SNP4-D	East Lake Runoff, east ditch	68.305008°	-133.429187°	1 m from treeline Sampled through a hole in the ice, water was flowing
N/A	Airpo East N/A Creek – Runo		Airport Lake Runoff, East Lake	rport Lake Inoff, East Lake 68.290836°	-133.471563°	5 m from treeline, upstream of the first (old) beaver dam on the bank
		D	discharge to Airport Lake			Thin ice floating in bay and evidence of beaver activity
		_01 OF-01- D	Airport Lake			10 m upstream of treeline
N/A	OF_01		Runoff, west quarry 68.300088° ravine		-133.544078°	Sampled from a hole in the ice and snow

Source: Nautchiuk 2023a. ¹ Treeline refers to the edge of the shrubs or trees along the lakeshore. ² SNP 7 and SNP 8 were added as official SNP stations in the February 15, 2024 revision of the water licence. ³ Runoff from the quarry is not part of the licence but is included in this report because sampling was conducted at the same time as the samples collected for the SNP. ID – identification; N/A – not applicable; OF – outfall; RO – runoff; SNP – Surveillance Network Program.

Table 3-2 Background Sediment Monitoring Locations

SNP	Site Location	Sampla ID	Description	Coor	dinates	Sample
Station	Sile Location	Sample ID	Description	Latitude	Longitude	Description
SNP 1	OF_02	SNP1 – Sediment	Airport Lake Receiving environment, new west ditch alignment	68.297538°	-133.527786°	Sand and pebbles, the pebbles were smaller, and the sample was slightly sandier than the one from SNP 5.

ΛΞ

SNP Station	Site Location	Sample ID	Description	Coordinates		Sample
				Latitude	Longitude	Description
SNP 4	OF_04	SNP4 – Sediment	East Lake Receiving environment, new west ditch alignment	68.304775°	-133.428650°	High in organics and vegetation. Sampled through the ice and could not collect a sample farther out with less vegetation due to the safety concerns with thin ice.
SNP 5	Reference - DL	SNP5 – Sediment	Airport Lake Receiving environment, reference	68.287745°	-133.509020°	Sand and stones that were slightly larger and sharper than the sample from SNP 1.
SNP 6	Reference - EL	SNP6 – Sediment	East Lake Receiving environment, reference	68.305064°	-133.425194°	High in organics and vegetation. Sampled through the ice and could not collect a sample farther out with less vegetation due to the safety concerns with thin ice.

Source: Nautchiuk 2023a. ID - identification; N/A - not applicable; SNP - Surveillance Network Program; OF - outfall.

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Northwest Territories

LEGEND

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Receiving Water Sample





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        AE PROJECT NO.
        2020-2886-00

        SCALE
        1:20,000

        COORD. SYSTEM
        NAD 1983 UTM ZONE 8N

        DATE
        2024-03-26

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        00

        DRAWN BY
        HS

        CHECKED BY
        WL
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FIGURE 3-1 SAMPLING LOCATIONS

GOVERNMENT OF NORTHWEST TERRITORIES - DEPARTMENT OF INFRASTRUCTURE

INUVIK MIKE ZUBKO AIRPORT 2023 ANNUAL REPORT

3.2 Sampling Methods

3.2.1 Water

The parameters that were analyzed in the receiving and runoff water samples are listed in Table 3-3.

Samples were collected following the Protocols Manual for Water Sampling in Canada (CCME 2011). Water and sediment samples were collected on October 8 and 9, 2023. The samples were refrigerated overnight and shipped via chain-of-custody protocol on October 10, 2023, with Canadian North air cargo to the ALS Canada Ltd (a CALA accredited laboratory) depot in Yellowknife. On October 16, 2023, four locations (SNP1-RW, SNP1-D, SNP2-RW, and SNP2-D) were resampled and analyzed for ethylene glycol and carbonaceous biochemical oxygen demand (CBOD₅) due to holding time exceedances as a result of flight delays due to weather. The samples were shipped the same day to ALS in Yellowknife.

The contractor did not collect field parameters because they were not able to obtain field equipment in time due to the time-constraints with freezing lake and runoff conditions.

Group	Parameters		
Lab general and inorganic parameters	pH, conductivity, hardness, TSS, turbidity, and CBOD $_5$		
Total metals	aluminum, antimony, arsenic barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, phosphorous, potassium, rubidium, selenium, silicon, silver, sodium, strontium, sulfur, tellurium, thallium, thorium, tin, titanium, tungsten, uranium, vanadium, zinc, zirconium		
Dissolved metals	Arsenic ¹		
Hydrocarbons	Benzene, ethylbenzene, styrene, toluene, xylenes F1 (C6-C10), F2 (C10-C16), F3 (C16-C34), F4 (C34-C50), VPHw (C6-C10), F1-BTEX, VPHw		
Miscellaneous organic substances	methyl-ter-butyl ether		
Glycols	Ethylene glycol		

Table 3-3Receiving and Runoff Monitoring Parameters Analyzed in October 2023

¹ The contractor misread the environmental monitoring plan and only requested dissolved arsenic, not all dissolved metals. The sample was filtered in the laboratory. BTEX – benzene, toluene, ethylbenzene, xylenes; CBOD₅ – carbonaceous biochemical oxygen demand; F – fraction; TSS – total suspended solids; VPHw – volatile petroleum hydrocarbons in water.

3.2.2 Sediment

Sediment sample collection generally followed the British Columbia Field Sampling Manual, Part D2 – Sediment Sampling (Government of British Columbia 2020). Nautchiuk used a hand-held scoop and spoon to collect the sediment samples, as per Section 3.1 of the manual. Sediment samples were collected at the same locations as the receiving water lake samples after the water samples were collected. Care was taken to include fine-grained material in the samples and to remove large pieces of vegetation.

3.3 Applicable Water and Sediment Quality Guidelines

Results were compared to the following guidelines:

- Water chemistry Canadian FWQG (Government of Canada 2021 and 2023).
- Water chemistry the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life (WQG FAL), where applicable (CCME 1999a, CCME 2024);
- Water chemistry for glycol Environment and Climate Change Canada glycol guidelines (ECCC glycol) for federal airports (ECCC 1994); and
- Sediment chemistry CCME Interim Sediment Quality Guidelines for the Protection of Freshwater Aquatic Life (ISQG FAL) (CCME 1999b).

For some water parameters, the calculation of the FWQG for aluminum (ECCC 2022), copper (ECCC 2021), iron (ECCC 2019), and lead (ECCC 2020) is dependent on other parameters such as DOC, pH, hardness, and temperature. DOC and temperature were not analyzed in 2023; therefore, these guidelines could not be calculated.

As per the CCME WQG FAL, turbidity and TSS are compared to reference locations. This sample set is considered background; however, the receiving water results were still compared to the reference locations. No reference locations have been established for the runoff sample locations; therefore, the results were not compared to guidelines.

The CCME WQG FAL maximum levels for turbidity and TSS are dependent on the concentration of suspended sediments or turbidity at the background locations (i.e., clear flow or high flow) and the exposure time (i.e., short term or long term). The short-term guideline is based on a maximum increase at one time for 24 hours or less and the long-term guideline for clear flow conditions is based on a maximum average increase over a longer period of time (e.g., 30 days). Compliance with long-term guidelines is typically assessed by calculating the average concentration over a specific period (i.e., five samples in 30 days). The long-term guidelines are more stringent than the short-term guidelines because they are designed to protect from repeated or ongoing exposure. For screening purposes, the results measured from this sampling event were compared to the chronic guidelines even though only one sample was collected.

Table 3-4 summarizes the short term and long term guideline values for each flow condition. For this sampling event, the background water results met the definition of clear flow for both turbidity and TSS and results were compared to the short term and long term guidelines.

Parameter	Short-Term Guideline (<24 hours)	Long-Term Guideline (>24 hours to 30 days)
	 <u>Clear flow (background <8 NTU)</u> Maximum increase of 8 NTU from background at any one time 	 <u>Clear flow (background <8 NTU)</u> Maximum average increase of 2 NTU from background
Turbidity	 High flow or turbid waters (background >8 NTU) Maximum increase of 8 NTU from background at any one time when background is between 8 and 80 NTU Maximum increase of 10% from background when background is >80 NTU 	 High flow or turbid waters (background >8 NTU) Maximum increase of 8 NTU from background at any one time when background is between 8 and 80 NTU Maximum increase of 10% from background when background is >80 NTU
Total suspended solids	 <u>Clear flow (background <25 mg/L)</u> Maximum increase of 25 mg/L from background at any one time <u>High flow (background >25 mg/L)</u> Maximum increase of 25 mg/L from background at any one time when background is between 25 and 250 mg/L Maximum increase of 10% from background when background is >250 mg/l 	 <u>Clear flow (background <25 mg/L)</u> Maximum average increase of 5 mg/L from background <u>High flow or turbid waters (>25 mg/L)</u> Maximum increase of 25 mg/L from background at any one time when background is between 25 and 250 mg/L Maximum increase of 10% from background when background is >250 mg/l

Table 3-4 CCME Water Quality Guidelines for the Protection of Aquatic Life, Turbidity and Total Suspended Solids

Source: CCME 199a. CCME – Canadian Council of Ministers of the Environment; NTU – nephelometric turbidity units

The FEQG Sediment Quality Guidelines (Government of Canada 2021) does not have any published guidelines for the parameters that were analyzed for sediment; therefore, results were not compared to this guideline.

All water and sediment quality results were uploaded from the laboratory directly to Wireless WaterTM Database Management Services. The results were automatically tabulated and compared with the CCME WQG FAL, except for turbidity and TSS, which were manually compared to the reference locations. Associated manually added the FWQGs and ECCC glycol guidelines to the tabulated results, manually calculated the site-specific guidelines where necessary and when results were available for the dependent parameters, and compared the results to the guidelines to determine exceedances.

3.4 Quality Assurance and Quality Control

Two duplicate water samples were collected, one on October 9, 2023, and the other on October 16, 2023. No duplicate samples were collected for sediment. Nautchiuk noted that they collected the duplicate samples approximately 30 seconds after they collected the normal sample (McKillop, personal communication, 2024b). The method that was used to collect the duplicate sample is not standard protocol (see Section 4.2 for QA/QC results).

The quality assurance/quality control (QA/QC) measures applied as part of the sampling program included cleaning and calibrating instruments before sampling, wearing nitrile gloves, and collecting a field duplicate sample. Collection and analysis of duplicate samples provides information on the combined (field and analytical) precision of the sampling and analytical program. The individual analytical results for each parameter of the duplicate pair were compared, and the relative percent difference (RPD) value was calculated for each parameter pair as follows:

$$RPD = \left(\frac{(|a-b|)}{\left(\frac{a+b}{2}\right)}\right) \times 100$$

where *a* and *b* are duplicate pair values in identical units.

An RPD value of 20% or less is generally considered acceptable, whereas an RPD value greater than 20% may indicate a problem with either sampling or analysis (BC MOE 2013). This limit may vary depending on the analysis involved and the concentration of the analyte. The RPD value also tends to increase as the result approaches the detection limit. Therefore, the use of this threshold is restricted to duplicate pair values that are greater than five times their detection limit (BC MOE 2013).

In addition to the collection of the duplicate samples, trip and field blank samples were collected on October 9, 2023, and a field blank sample was collected on October 16, 2023. Trip blanks are bottles of deionized water in sealed containers that are provided by the laboratory. These are taken into the field and remain in sample coolers during sampling; they are not opened. Field blank samples are deionized water provided by the laboratory, but these samples are handled the same way as water samples. Bottles are filled in the field using the same procedure for the samples being collected. Results for both sample types are compared to the analytical results expected for deionized water.

3.5 Construction Turbidity and Visual Inspections

Construction turbidity and visual inspections were not conducted in 2023 because construction of the east and west ditches did not begin until 2024.

4 WATER AND SEDIMENT QUALITY RESULTS AND DISCUSSION

Although construction at the airport has been ongoing since late-2019, this set of water and sediment quality results are considered "background" for the construction of the east and west ditches permitted by the water licence, which began January 2024.

4.1 Results

4.1.1 Water

The CCME WQG FAL guidelines for turbidity and TSS are based on changes from background levels and exposure times. The results from this background sampling event are considered background; however, for the purposes of this report, the receiving water samples were compared to the applicable reference location on each lake (i.e., SNP 5-RW for Airport Lake and SNP 6-RW for East Lake). Water at the reference locations met the definition for "clear flow" for turbidity and TSS. Results greater than 8 NTU and 25 mg/L from the reference locations for turbidity and TSS, respectively, were recorded as CCME WQG FAL short-term exceedances, and results greater than 2 NTU and 5 mg/L
for turbidity and TSS, respectively, were recorded as CCME WQG FAL long-term exceedances. Long-term guidelines were included for screening purposes even though only one sample was collected from each location.

In 2023, the tested parameters met applicable guidelines in surface water, except for total aluminum, total iron, turbidity, and TSS. For metals, the WQG FAL (long-term) site-specific guideline for total aluminum was exceeded at SNP1-RW and SNP5; and the WQG FAL (long-term) guideline for total iron ($300 \mu g/L$) was exceeded at SNP1-RW, SNP5, East Creek-D, and East Creek-RW. For turbidity, the WQG FAL AL short-term guideline was exceeded at SNP1-RW and SNP2-RW (duplicate) and the long-term guideline was exceeded at SNP1-RW, SNP2-RW, for total suspended solids, the WQG FAL AL short-term guideline was exceeded at SNP2-RW (duplicate). For total suspended solids, the WQG FAL AL short-term guideline was exceeded at SNP2-RW (duplicate) and the long-term guideline was exceeded at SNP2-RW (duplicate). The exceedances by location and parameter are summarized in Table 4-1.

All the results, tabulated and compared to applicable guidelines, are provided in Table A-1 in Appendix A, and laboratory reports are in Appendix B.

Parameter	SNP 1 / SNP1 – RW	SNP 2 / SNP2 – RW	SNP 2 / SNP 2 - RW Duplicate	SNP 3 / SNP3 – RW	SNP 4 / SNP4 – RW	SNP 5 / SNP5	SNP 6 / SNP6	SNP 7 / SNP2-D	D-108/ SNP1-D	N/A / 0F1-RW2	N/A / SNP3-D	N/A / SNP4-D	N/A / East Creek - D	N/A / East Creek - RW	N/A / OF-01-D
Aluminum (total)	Х					Х									
Iron (total)	Х					Х								Х	Х
Turbidity (short term)	X1		Х												
Turbidity (long term)	X1	х	Х												
Total suspended solids (short-term)			Х												
Total suspended solids (long-term)	Х		Х												

 Table 4-1
 Background Water Quality Parameter Exceedances of CCME Aquatic Life Guidelines in October 2023

Site names are formatted as "SNP Station / Sample ID". The samples that are labelled N/A indicate that they do not have a corresponding SNP Station identification number because it was an extra sample collected by the contractor that is not included in the water licence. X indicates an exceedance of the Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the Protection of Aquatic Life (long-term for aluminium and iron; and clear flow for turbidity and total suspended solids). ¹ Turbidity results at SNP2 were likely influenced by the sampler stirring up sediment in the water column, see Sections 3.4 and 4.2 for a discussion on quality assurance and quality control. N/A – not applicable; SNP Surveillance Network Program.

4.1.2 Sediment

All background sediment sample results met the ISQG – FAL guidelines except for arsenic. The ISQG – FAL for arsenic (5.9 μ g/g) was exceeded at SNP 1, SNP 5, and SNP 6. The results for the arsenic exceedances are provided in Table 4-2. All the results, tabulated and compared to applicable guidelines, are provided in Table A-2 in Appendix A, and the laboratory reports are provided in Appendix B.

Table 4-2 Background Sediment Q	ality Parameter Exceedance of Guidelines in	October 2023
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SNP ID	Sample ID	Sediment Arsenic Concentrations (µg/g)
SNP 1	SNP2 – Sediment ¹	18.1
SNP 4	SNP4 – Sediment	3.31
SNP 5	SNP5 – Sediment	14.8
SNP 6	SNP6 – Sediment	14.4

¹ The contractor incorrectly labelled the sediment sample. **Bold** results indicate an exceedance of the Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines for the Protection of Freshwater Aquatic Life (ISQG FAL) (CCME 1999b).

4.2 Quality Assurance and Quality Control

Two duplicate samples were collected at SNP2-RW, one on October 9, 2023 and the other on October 16, 2023. For the duplicate sample collected on October 9, the RPD ranged from 0.2% to 157.6% (average 17.3%) after values less than five times their respective detection limit were removed (Section 3.4). All results met the applicable thresholds (Section 3.4) except TSS and turbidity, which had RPDs of 157.6% and 114.3%, respectively. The duplicate sample was reportedly collected 30 seconds after the normal sample was collected; therefore, the RPDs were likely elevated due to the sampler stirring up sediment in the water column. Results from the duplicate pair for TSS and turbidity had elevated RPDs above 50% and thus interpretation of data for these parameters should proceed with caution. The results for the duplicate sample collected on October 16 were less than the reported detection limit; therefore, RPD values could not be calculated. Overall, the QA/QC results indicated acceptable precision of the analytical data aside from TSS and turbidity. Further information about the laboratory's QA/QC is provided in the laboratory reports (Appendix B).

Results from the trip and field blank samples were consistent with the results expected for deionized water (i.e., all results were below detection) except for the field blank, which had a detectable total sodium result of 0.139 mg/L (2.8 times the detection limit). This detection may be a result of contamination in the field, however as the results for all other parameters were below their respective detection limit, the total sodium result is more likely a result of an issue or error in the laboratory analysis.

4.3 Summary and Discussion

4.3.1 Water

Total iron exceeded guidelines at four sampling locations; three in the receiving water of Airport Lake, including the reference location, and one in the runoff from East Creek which flows into Airport Lake. The exceedances of iron in the background samples could indicate existing elevated concentrations of iron in water. Total aluminum exceeded

guidelines at two sampling locations on Airport Lake, including one at the reference location. The exceedances could indicate existing elevated concentrations of aluminum in water.

Turbidity and TSS guidelines were exceeded at two receiving water locations on Airport Lake.

The exceedances of total iron and total aluminium parameters at SNP1 (new west ditch outfall location) are related to the exceedances of TSS and turbidity at that location. These metals are associated with soils and the results indicate that there could be an existing terrestrial source at this outfall. However, the new ditch had not been constructed and the runoff area was still vegetated at the time of sampling. The results could have been influenced by the sampling method, similar to the samples collected at SNP2.

Based on the exceedances of some parameters in this background sampling event, guideline exceedances for future sampling events will be identified based on the background data collected during this sampling event in addition to applicable guidelines.

Results for petroleum hydrocarbons and glycols were below the detection limit at all sampling locations.

Field parameters, and therefore dissolved oxygen, were not measured in October 2023.

No parameters exceeded guidelines at the four additional sample locations added by the contractor (SNP3-D, SNP4-D, East Creek – D, and East Creek – RW). The results do not indicate a reason to sample at these locations during the next sample event. Therefore, water samples at future sampling events will only be collected from the SNP stations listed in the licence and the latest version of the EMP, and from OF_01 to monitor water quality from the quarry. The sampling locations include the receiving water at SNP 1 to SNP 6 and OF_01; and runoff water at SNP 7, SNP 8, and OF_01. Sampling at SNP3-D, SNP4-D, East Creek – D, and East Creek – RW is not necessary.

4.3.2 Sediment

Arsenic exceeded guidelines in the samples collected from three of the four sampling locations. The concentration of arsenic in sediment at SNP 4 was significantly lower than the concentration at SNP 6 (reference location). This result is unexpected. It is possible that the high level of organics and vegetation contributed to the low concentrations at this location.

Background arsenic concentrations in sediment in the Inuvik area are not publicly available. However, arsenic concentrations in soil in the Inuvik area are known to exceed CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (SQGEHH) (CCME 1997) (12 mg/kg) (GNWT-ECC 2022). Stantec conducted a review of the arsenic background concentrations in soil in the Inuvik area (2020). The review showed that the mean arsenic concentrations in soil around the developed areas of Inuvik (town) were approximately four times higher than the concentrations in soil from regional background locations separate from the developed area of town (Stantec 2020). This was attributed to the use of fill materials sourced from local borrow pits and quarries where arsenic concentrations are naturally elevated in construction. However, arsenic concentrations in some of the soil samples collected outside developed areas of Inuvik still exceeded the SQGEHH, indicating that there are naturally occurring elevated levels of arsenic in the area. A summary of the calculated statistics for arsenic concentrations in soil in the Inuvik area are provided in Table 4-3.

Lesstien	Arsenic in soil (mg/kg)									
Location	Minimum	Maximum	Mean							
Inuvik town	1.7	141	48							
Inuvik regional background	2.0	37	12							
Combined	1.7	141	40							

Table 4-3 Concentrations of Arsenic in Soil in the Inuvik Area (Stantec 2020)

Source: Stantec 2020.

Based on the results of Stantec's study (2020), GNWT-ECC assigned ambient background soil concentrations for Inuvik at 50 mg/kg in the draft Remediation Soil Quality Guidelines for Arsenic for Yellowknife and Inuvik (2022). While concentrations of arsenic in soil cannot be directly compared to concentrations of arsenic in sediment, it is likely that arsenic is also naturally elevated in the sediment in the Inuvik area.

Two samples analyzed from the rock at the airport quarry in 2022 exceeded the ISQG for arsenic but were below the SQGEHH (Associated 2023f).

Based on the exceedance of arsenic in sediment at three of the four sampling locations during the background sampling event, guideline exceedances for arsenic at future sampling events will be identified based on the background data collected during this sampling event in addition to the applicable guidelines.

Government of Northwest Territories Department of Infrastructure

CLOSURE

This report was prepared for the Government of Northwest Territories – Department of Infrastructure to summarize the activities conducted under Water Licence G23L8-002 in 2023 as required by Schedule 1 and Schedule 2 of the licence in a format acceptable for submission to the Gwich'in Land and Water Board.

The services provided by Associated Engineering (B.C.) Ltd. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,

Associated Engineering (B.C.) Ltd.

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APPENDIX A - WATER AND SEDIMENT QUALITY SUMMARY TABLES

				Sa	mpling Location	East Creek-D	East Creek-RW	OF1-D	OF1-RW	SNP1-D	SNP1-D	SNP1-RW	SNP1-RW	SNP2-D	SNP2-D
					Date Sampled	08-Oct-23	08-Oct-23	09-Oct-23	09-Oct-23	09-Oct-23	16-Oct-23	09-Oct-23	16-Oct-23	09-Oct-23	16-Oct-23
					Lab Sample ID	YL2301358-007	YL2301358-008	YL2301402-006	YL2301402-007	YL2301402-001	YL2301453-	YL2301402-002	YL2301453-002	YL2301402-003	YL2301453-003
					Sample Type	Normal	Normal	Normal	Normal	Normal	001 Normal	Normal	Normal	Normal	Normal
	1		Guide	line	oumpie Type	Norma	Norman	Norma	Norman	Normai	Norman	, include the second se	Norman	Norma	Norman
Analyte	Unit				ECCC Clycol										
Lab Results				INGOTAL	LCCC Clycol										
General and Inorganic Parameters															
5-d Carbonaceous BOD	ma/l	NG	NG	NG	NG	3	0	0	0	0	3	0	0	0	8
Conductivity	uS/cm	NG	NG	NG	NG	181	101	948	310	1080	-	354	-	1740	-
nH	μο/cm	65-9	NG	NG	NG	7 50	7.65	8 27	81	8.31		8.12	_	8 23	
Total suspended solids	ma/l	NI 1.1	NO N2.1	NG	NG	11.55	<3.0	21.3	<3.0	<3.0		38.3		<3.0	
Turbidity	NTU	N 1.2	N ^{2.2}	NG	NG	2.7	2.57	3.24	2 78	0.19		17.4		-3.0	
	NIO	IN	IN	110	NO	2.1	2.57	5.24	2.70	0.13		<u></u>	_	0.23	_
Total Metals															
Aluminum (total)	ug/l	Colo ^{1.3}	NG	Colo 3.1	NG	68.1	49.5	26.0	20.4	5.9		402		0	
Antimony (total)	µg/L	NG	NG	NG	NG	<0.10	49.5	<0.10	<0.10	<0.10		0.11		<0.10	
Arsenic (total)	µg/L	F 0 ^{1.4}	NG	NG	NG	-0.10	-0.10	-0.10	-0.10	-0.10		0.66	_	-0.10	_
Barium (total)	µg/L	5.0 NG	NG	NG	NG	36.8	0.5	27.1	58.1	34.1	-	62.8	-	25.3	-
Ben/lium (total)	µg/L	NG	NG	NG	NG	<0.100	<0.100	<0.100	<0.100	<0.100		<0.100	_	<0.100	
Bismuth (total)	µg/L	NG	NG	NG	NG	<0.100	<0.050	<0.100	<0.100	<0.100		<0.050	_	<0.100	_
Boron (total)	µg/L	1500 1.5	20000	NG	NG	<10	11	-0.050	10	54		22	_	-0.030	
Cadmium (total)	ug/L	Colo ^{1.6}	Calo ^{2.3}	NG	NG	<0.0050	<0.0050	<0.0050	8900.0	<0.0050	_	0.0172	_	<0.0050	-
Calcium (total)	mg/L	NG	NG	NG	NG	27.1	31.4	110	33.5	114		37.7	_	165	
Cesium (total)	ug/l	NG	NG	NG	NG	0.013	0.012	0.011	<0.010	<0.010	_	0.098		<0.010	
Chromium (total)		1.0 ^{1.7}	NG	NG	NG	<0.50	<0.50	<0.50	<0.50	<0.50	-	0.62	_	<0.50	_
Cobalt (total)	ug/l	NG	NG	Calc ^{3,2}	NG	0.15	0.12	<0.10	<0.00	<0.00	-	0.39	_	0.1	_
Copper (total)	ua/L	Calc ^{1.8}	NG	Calc ^{3.3}	NG	0.57	0.86	1.06	1.47	1.06	-	2.05	-	0.6	-
Hardness (as CaCO3), from total Ca/Mg	ma/l	NG	NG	NG	NG	93.6	110	430	124	433	-	141	_	684	-
Iron (total)	ua/L	300	NG	Calc ^{3,4}	NG	741	561	78	55	15	-	794	-	19	-
Lead (total)	ua/L	Calc ^{1.9}	NG	Calc ^{3.5}	NG	0.106	0.076	<0.050	<0.050	<0.050	-	0.42	-	<0.050	-
Lithium (total)	ua/L	NG	NG	NG	NG	2.8	3.8	19	7.2	28.8	-	9.1	-	57.6	-
Magnesium (total)	mg/L	NG	NG	NG	NG	6.31	7.56	37.8	9.68	36	-	11.3	-	66	-
Manganese (total)	µg/L	NG	NG	NG	NG	39.2	33.8	4.84	3.91	1.02	-	29.5	-	0.36	-
Mercury (total)	µg/L	0.026 1.10	NG	NG	NG	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	-	<0.0050	-
Molybdenum (total)	µg/L	73	NG	NG	NG	0.107	0.355	0.264	0.856	0.242	-	0.854	-	0.125	-
Nickel (total)	µg/L	Calc 1.11	NG	NG	NG	1.11	1.16	1.12	1.12	1.02	-	2.04	-	1.1	-
Phosphorus (total, by ICPMS/ICPOES)	µg/L	N 1.12	NG	NG	NG	<50	<50	<50	<50	<50	-	<50	-	<50	-
Potassium (total)	µg/L	NG	NG	NG	NG	660	759	2080	1080	2720	-	1300	-	1860	-
Rubidium (total)	µg/L	NG	NG	NG	NG	0.42	0.48	0.61	0.74	0.52	-	1.51	-	0.26	-
Selenium (total)	µg/L	1.0	NG	NG	NG	0.059	0.106	0.087	0.184	0.089	-	0.214	-	0.091	-
Silicon (total, as Si)	µg/L	NG	NG	NG	NG	1170	1160	2730	1350	2830	-	2100	-	2580	-
Silver (total)	µg/L	0.25	NG	NG	NG	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	-	<0.010	-
Sodium (total)	mg/L	NG	NG	NG	NG	2.62	5.15	44.2	13.3	73.7	-	17	-	160	-
Strontium (total)	µg/L	NG	NG	2500 ^{3.6}	NG	45.7	87.1	373	176	299	-	188	-	399	-
Sulphur (total)	µg/L	NG	NG	NG	NG	11000	11600	106000	14600	119000	-	17900	-	265000	-
Tellurium (total)	µg/L	NG	NG	NG	NG	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20	-	<0.20	-
Thallium (total)	µg/L	0.8	NG	NG	NG	<0.010	<0.010	<0.010	<0.010	<0.010	-	0.011	-	<0.010	-
Thorium (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	<0.10	<0.10	<0.10	-	<0.10	-	<0.10	-
Tin (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	<0.10	<0.10	<0.10	-	<0.10	-	<0.10	-
Titanium (total)	µg/L	NG	NG	NG	NG	0.64	0.57	0.46	0.55	<0.30	-	8.47	-	<0.30	-
Tungsten (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	<0.10	<0.10	<0.10	-	<0.10	-	<0.10	-
Uranium (total)	µg/L	15 ^{1.13}	33 ^{2.4}	NG	NG	0.021	0.163	1.57	0.413	0.492	-	0.453	-	0.638	-
Vanadium (total)	µg/L	NG	NG	120 ^{3.7}	NG	<0.50	<0.50	<0.50	<0.50	<0.50	-	1.29	-	<0.50	-
Zinc (total)	µg/L	NG	NG	NG	NG	<3.0	<3.0	<3.0	<3.0	<3.0	-	3.2	-	<3.0	-
Zirconium (total)	µg/L	NG	NG	NG	NG	<0.20	<0.20	<0.20	<0.20	<0.20	-	0.5	-	0.38	-

				Sa	mpling Location	East Creek-D	East Creek-RW	OF1-D	OF1-RW	SNP1-D	SNP1-D	SNP1-RW	SNP1-RW	SNP2-D	SNP2-D
					Date Sampled	08-Oct-23	08-Oct-23	09-Oct-23	09-Oct-23	09-Oct-23	16-Oct-23	09-Oct-23	16-Oct-23	09-Oct-23	16-Oct-23
					l ab Sample ID	VI 2301358-007	VI 2301358-008	VI 2301402-006	VI 2301402-007	YI 2301402-001	YL2301453-	YI 2301402-002	VI 2301453-002	YI 2301402-003	VI 2301453-003
							1220010000000	122001402 000	122001402 001	122001402 001	001	122001402 002	122001400 002	122001402 000	122001400 000
r	1				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Analyte	Unit														
		CCME AL (LT)	CCME AL (ST)	FWQG FAL	ECCC Glycol										
Dissolved Metals															
Arsenic (dissolved)	µg/L	5.0 1.14	NG	NG	NG	0.35	0.36	0.27	0.39	0.28	-	0.38	-	0.26	-
Glycols															
Ethylene glycol	mg/L	192.0	NG	NG	100 4.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Petroleum Hydrocarbons															
Benzene	µg/L	370	NG	590 ^{3.8}	NG	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	-	<0.50	-
Ethylbenzene	µg/L	90	NG	30 ^{3.8}	NG	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	-	<0.50	-
F1 (C6-C10)	µg/L	NG	NG	NG	NG	<100	<100	<100	<100	<100	-	<100	-	<100	-
F1-BTEX	µg/L	NG	NG	NG	NG	<100	<100	<100	<100	<100	-	<100	-	<100	-
F2 (>C10-C16)	µg/L	NG	NG	NG	NG	<300	<300	<300	<300	<300	-	<300	-	<300	-
F3 (>C16-C34)	µg/L	NG	NG	NG	NG	<300	<300	<300	<300	<300	-	<300	-	<300	-
F4 (>C34-C50)	µg/L	NG	NG	NG	NG	<300	<300	<300	<300	<300	-	<300	-	<300	-
Methyl tert-butyl ether (MTBE)	µg/L	10000	NG	NG	NG	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	-	<0.50	-
Toluene	µg/L	2.0	NG	30 ^{3.8}	NG	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	-	<0.50	-
VHw6-10	µg/L	NG	NG	NG	NG	<100	<100	<100	<100	<100	-	<100	-	<100	-
VPHw	µg/L	NG	NG	NG	NG	<100	<100	<100	<100	<100	-	<100	-	<100	-
m,p-Xylene	µg/L	NG	NG	NG	NG	<0.40	<0.40	<0.40	<0.40	<0.40	-	<0.40	-	<0.40	-
o-Xylene	µg/L	NG	NG	NG	NG	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.30	-	<0.30	-
Xylenes (total)	µg/L	NG	NG	120 3.8	NG	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	-	<0.50	-
Valatila Organia Compoundo															
		70	NO	NO	NG	10.50	-0.50	-0.50	10.50	10.50		-0.50		10.50	
Stylelle	µg/∟	12	NG	NG	NG	<0.50	<0.50	<0.50	<0.50	<0.00	-	VC.0V	-	<0.50	-



				Sa	mpling Location	SNP2-RW	SNP2-RW	SNP2-RW	SNP2-RW	SNP3-D	SNP3-RW	SNP4-D	SNP4-RW	SNP5	SNP6
					Date Sampled	09-Oct-23	09-Oct-23	16-Oct-23	16-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23
					Lab Sample ID	YL2301402-004	YL2301402-005	YL2301453-004	YL2301453-005	YL2301358-004	YL2301358-005	YL2301358-001	YL2301358-002	YL2301358-006	YL2301358-003
					Sample Type	Normal	Duplicate	Normal	Duplicate	Normal	Normal	Normal	Normal	Normal	Normal
Analysis	11	1	Guide	line											
Analyte	Unit	CCME AL (LT)	CCME AL (ST)	FWQG FAL	ECCC Glycol										
Lab Results															
General and Inorganic Parameters															
5-d Carbonaceous BOD	mg/L	NG	NG	NG	NG	0	0	0	0	0	0	0	0	0	3
Conductivity	µS/cm	NG	NG	NG	NG	329	340	-	-	710	303	150	153	307	147
pН		6.5 - 9	NG	NG	NG	8.11	8.09	-	-	7.9	7.94	7.14	7.08	8.02	7.35
Total suspended solids	mg/L	N 1.1	N ^{2.1}	NG	NG	19.1	<u>161</u>	-	-	<3.0	<3.0	<3.0	<3.0	16.8	<3.0
Turbidity	NTU	N 1.2	N ^{2.2}	NG	NG	10.2	<u>37.4</u>	-	-	0.22	1.6	0.44	0.57	7.27	1.08
Total Metals															
Aluminum (total)	µg/L	Calc ^{1.3}	NG	Calc 3.1	NG	48.2	44.4	-	-	9.7	34.4	56.2	66.9	336	21.7
Antimony (total)	µg/L	NG	NG	NG	NG	0.1	0.1	-	-	<0.10	0.1	<0.10	<0.10	0.1	<0.10
Arsenic (total)	µg/L	5.0 ^{1.4}	NG	NG	NG	0.41	0.44	-	-	0.22	0.45	0.26	0.29	0.66	0.4
Barium (total)	µg/L	NG	NG	NG	NG	59	56.3	-	-	35	62.3	33	33.5	65.6	37.1
Beryllium (total)	µg/L	NG	NG	NG	NG	<0.100	<0.100	-	-	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Bismuth (total)	µg/L	NG	NG	NG	NG	<0.050	<0.050	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Boron (total)	µg/L	1500 ^{1.5}	29000	NG	NG	21	20	-	-	12	20	<10	<10	19	<10
Cadmium (total)	µg/L	Calc 1.6	Calc 2.3	NG	NG	0.0066	<0.0050	-	-	<0.0050	0.0061	0.0067	0.005	0.0148	0.011
Calcium (total)	mg/L	NG	NG	NG	NG	34.5	33.6	-	-	95.1	38.5	22.2	23.2	39.2	21.9
Cesium (total)	µg/L	NG	NG	NG	NG	0.013	0.015	-	-	<0.010	0.012	<0.010	0.012	0.083	0.011
Chromium (total)	µg/L	1.0 1.7	NG	NG	NG	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	0.58	<0.50
Cobalt (total)	µg/L	NG	NG	Calc 3.2	NG	<0.10	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	0.24	<0.10
Copper (total)	µg/L	Calc 1.8	NG	Calc ^{3.3}	NG	1.48	1.48	-	-	<0.50	1.48	0.85	0.9	1.98	0.93
Hardness (as CaCO3), from total Ca/Mg	mg/L	NG	NG	NG	NG	126	124	-	-	346	139	76.3	78.8	142	75.3
Iron (total)	µg/L	300	NG	Calc 3.4	NG	117	131	-	-	18	157	98	119	607	166
Lead (total)	µg/L	Calc 1.9	NG	Calc ^{3.5}	NG	0.056	0.086	-	-	<0.050	0.056	<0.050	<0.050	0.306	<0.050
Lithium (total)	µg/L	NG	NG	NG	NG	8	7.8	-	-	13.4	6.4	4.3	4.4	6.6	2.6
Magnesium (total)	mg/L	NG	NG	NG	NG	9.82	9.62	-	-	26.5	10.4	5.06	5.06	10.8	5.01
Manganese (total)	µg/L	NG	NG	NG	NG	7.19	7.22	-	-	0.37	7.4	0.66	1.45	22.6	4.11
Mercury (total)	µg/L	0.026 1.10	NG	NG	NG	<0.0050	<0.0050	-	-	<0.0500	<0.0050	<0.0500	<0.0500	<0.0050	<0.0500
Molybdenum (total)	µg/L	73	NG	NG	NG	0.833	0.844	-	-	0.059	0.89	<0.050	<0.050	0.843	0.107
Nickel (total)	µg/L	Calc 1.11	NG	NG	NG	1.28	1.29	-	-	1.07	1.27	1.96	2.07	2.06	0.98
Phosphorus (total, by ICPMS/ICPOES)	µg/L	N 1.12	NG	NG	NG	<50	<50	-	-	<50	<50	<50	<50	<50	<50
Potassium (total)	µg/L	NG	NG	NG	NG	1140	1100	-	-	518	1020	66	170	1040	792
Rubidium (total)	µg/L	NG	NG	NG	NG	0.73	0.77	-	-	<0.20	0.77	<0.20	0.2	1.34	0.63
Selenium (total)	µg/L	1.0	NG	NG	NG	0.194	0.17	-	-	0.074	0.186	0.122	0.112	0.181	0.068
Silicon (total, as Si)	µg/L	NG	NG	NG	NG	1430	1370	-	-	2820	1380	3040	3110	1960	940
Silver (total)	µg/L	0.25	NG	NG	NG	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sodium (total)	mg/L	NG	NG	NG	NG	15.1	14.6	-	-	27.9	12.3	4.74	4.96	12	2.7
Strontium (total)	µg/L	NG	NG	2500 ^{3.6}	NG	184	172	-	-	216	181	52.6	55.3	177	40.9
Sulphur (total)	µg/L	NG	NG	NG	NG	14600	15100	-	-	88500	14200	11500	11900	13000	6360
Tellurium (total)	µg/L	NG	NG	NG	NG	<0.20	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium (total)	µg/L	0.8	NG	NG	NG	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	0.011	<0.010
Thorium (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium (total)	µg/L	NG	NG	NG	NG	1.15	0.92	-	-	<0.30	<0.90	<0.60	<0.60	<5.40	0.32
Tungsten (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (total)	µg/L	15 ^{1.13}	33 ^{2.4}	NG	NG	0.416	0.415	-	-	0.024	0.479	<0.010	<0.010	0.51	0.013
Vanadium (total)	µg/L	NG	NG	120 ^{3.7}	NG	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	1.06	<0.50
Zinc (total)	µg/L	NG	NG	NG	NG	<3.0	<3.0	-	-	<3.0	<3.0	4.6	4.5	<3.0	4.4
Zirconium (total)	µg/L	NG	NG	NG	NG	<0.20	<0.20	-	-	<0.20	<0.20	0.4	0.4	0.31	<0.20

				Sa	mpling Location	SNP2-RW	SNP2-RW	SNP2-RW	SNP2-RW	SNP3-D	SNP3-RW	SNP4-D	SNP4-RW	SNP5	SNP6
					Date Sampled	09-Oct-23	09-Oct-23	16-Oct-23	16-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23
					I ab Sample ID	VI 2301402-004	VI 2301402-005	YI 2301453-004	VI 2301453-005	VI 2301358-004	VI 2301358-005	VI 2301358-001	YI 2301358-002	VI 2301358-006	VI 2301358-003
						122001402 004		122001400 004		1220010000004	1220010000000	1220010000001	122001000002	1220010000000	1220010000000
[1			Sample Type	Normal	Duplicate	Normal	Duplicate	Normal	Normal	Normal	Normal	Normal	Normal
Analyte	Unit		Guide	line	5000 OL 1										
Diagonal Materia		COME AL (LT)	COME AL (ST)	FWQG FAL	ECCC Glycol										
		= 0 1 14	10	20		0.00	0.05				0.00	0.05	0.04	0.00	0.04
Arsenic (dissolved)	µg/L	5.0	NG	NG	NG	0.38	0.35	-	-	0.2	0.39	0.25	0.24	0.38	0.34
Glycols															
Ethylene glycol	mg/L	192.0	NG	NG	100 4.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Petroleum Hydrocarbons															
Benzene	µg/L	370	NG	590 ^{3.8}	NG	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	µg/L	90	NG	30 ^{3.8}	NG	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
F1 (C6-C10)	µg/L	NG	NG	NG	NG	<100	<100	-	-	<100	<100	<100	<100	<100	<100
F1-BTEX	µg/L	NG	NG	NG	NG	<100	<100	-	-	<100	<100	<100	<100	<100	<100
F2 (>C10-C16)	µg/L	NG	NG	NG	NG	<300	<300	-	-	<300	<300	<300	<300	<300	<300
F3 (>C16-C34)	µg/L	NG	NG	NG	NG	<750	<300	-	-	<300	<300	<300	<300	<300	<300
F4 (>C34-C50)	µg/L	NG	NG	NG	NG	<300	<300	-	-	<300	<300	<300	<300	<300	<300
Methyl tert-butyl ether (MTBE)	µg/L	10000	NG	NG	NG	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	µg/L	2.0	NG	30 ^{3.8}	NG	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
VHw6-10	µg/L	NG	NG	NG	NG	<100	<100	-	-	<100	<100	<100	<100	<100	<100
VPHw	µg/L	NG	NG	NG	NG	<100	<100	-	-	<100	<100	<100	<100	<100	<100
m,p-Xylene	µg/L	NG	NG	NG	NG	<0.40	<0.40	-	-	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
o-Xylene	µg/L	NG	NG	NG	NG	<0.30	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Xylenes (total)	µg/L	NG	NG	120 ^{3.8}	NG	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Volatile Organic Compounds															
Styrene	µg/L	72	NG	NG	NG	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50



Legend for Table A-1 Inuvik Mike Zubko Airport Water Licence G23L8-002 Background Water Quality Results 2023

<	Less than reported detection limit
-	Not analyzed
Calc	Calculated guideline or standard. The guideline or standard is dependent on the value of one or more other analytes, and is calculated from a formula or table.
Calc	The maximum guideline value cannot be determined because a result for a dependent analyte in a calculation is not available for the sample.
CCME	Canadian Council of Ministers of the Environment
CCME AL (LT)	CCME. Canadian water quality guidelines for the protection of freshwater aquatic life, long-term exposure guidelines.
CCME AL (ST)	CCME. Canadian water quality guidelines for the protection of freshwater aquatic life, short-term exposure guidelines.
ECCC	Environment and Climate Change
ECCC Glycol	ECCC Glycol Guidelines for federal airports
FWQG FAL	Federal Environmental Quality Guidelines - Federal Water Quality Guidelines for freshwater aquatic life
N	Narrative type of guideline or standard, or Result Note.
NG	No Guideline
	Highlighted value has a lower detection limit that is greater than the guideline/standard maximum and/or the guideline/standard minimum, or has an upper detection limit that is less than the guideline/standard maximum and/or the guideline/standard minimum.
CCME AL (LT)	Highlighted value exceeds CCME AL (LT)
CCME AL (ST)	Double underlined value exceeds CCME AL (ST)
FWQG FAL	Bold value exceeds FWQG FAL
ECCC Glycol	Bold outlined value exceeds ECCC Glycol

1 Notes for Canadian Council of Ministers of the Environment (CCME). Canadian water quality quidelines for the
protection of freshwater aquatic life. Long-Term Exposure quidelines. (CCME AL [LT])
General Notes:
The CCME Canadian water quality guidelines for the protection of freshwater aquatic life provide both a Long-Term Exposure
guideline, and Short-Term Exposure guideline for some analytes. Only the Long-Term Exposure guidelines are included in this
criteria set, the Short-Term Exposure guidelines are included in Note 2.
Note 1.1 for Total suspended solids:
Water quality guideline for long-term exposure for suspended sediments is as follows.
Clear flow:
Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30
d).
High flow:
Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should
not increase more than 10% of background levels when background is >250 mg/L.
Note 1.2 for Turbidity:
Water quality guideline for turbidity is as follows.
Clear flow:
Maximum average increase of 2 NTUS from background levels for a longer term exposure (e.g., 30-d period).
High flow of turbid waters: Maximum increases of 8 NTL is from background levels at any one time when background levels are between 8 and 80 NTL is
Should not increase more than 10% of background levels when background is S80 NTUs.
Note 1 3 for Aluminum (total):
The quideline for aluminum is:
5 µg/l, when pH is less than 6.5
100 µg/L when pH is greater than or equal to 6.5
Note 1.4 for Arsenic (total):
Guideline is for total arsenic.
Note 1.5 for Boron (total):
The Short-Term Exposure Guideline is 29 mg/L. The Long-Term Exposure Guideline is 1.5 mg/L.
Note 1.6 for Cadmium (total):
The long-term guideline for cadmium is determined on a site-specific basis according to the local water hardness. The guideline
for total cadmium in μg/L is determined as follows for long-term exposure:
1. If hardness (as CaCO3) is less than 17 mg/L then maximum is 0.04 μg/L
2. If hardness (as CaCO3) is from 17 to 280 mg/L then maximum is based on equation:
10 raised to the power of {0.83[log(hardness)] - 2.46}
3. If hardness (as CaCO3) is greater than 280 mg/L then maximum is 0.37 μg/L.
Note 1.7 for Chromium (total):
CCME guideline for freshwater aquatic life is 0.0010 mg/L for chromium VI. CCME interim guideline for freshwater aquatic life is
0.0089 mg/L for chromium III. The guideline of 0.0010 mg/L was used, in this report, to identify exceedances for dissolved
chromium, and total chromium as a means for determining the potential for exceeding the chromium VI and/or chromium III
guidelines.
Note 1.8 for Copper (total):
I he guideline for copper in µg/L is determined as follows:
when the water hardness is 0 to < 82 mg/L, the CWQG is 2 μ g/L
At hardness ≥ 62 to ≥ 180 mg/L the GWQG is calculated using the equation:
The raised to the power of $\{0.0040[in(hardness)]-1.400\}^{\circ}$ 0.2 µg/L
Where water hardness is reported as mall. CaCO3
If the water hardness is unknown, the CWOC is 2 un/l
Note 1.9 for Lead (total):
The guideline for lead in ug/L is determined as follows:
When the hardness is 0 to $\leq 60 \text{ mg/l}$ the CWOG is 1 µg/l
At hardness > 60 to \leq 180 mg/L the CWQG is calculated using the equation:
e raised to the power of {1.273[In(hardness)] - 4.705}
At hardness >180 mg/L, the CWQG is 7 µg/L
Where water hardness is reported as mg/L CaCO3.
If the water hardness is unknown, the CWQG is 1 µg/L
Note 1.10 for Mercury (total):
May not prevent accumulation of methylmercury in aquatic life, therefore, may not protect wildlife that consume aquatic life; see
fact sheet for details.
Consult also the appropriate Canadian Tissue Residue Guideline for the Protection of Wildlife Consumers of Aquatic Biota.

Note 1.11 for Nickel (total):
The guideline for nickel in μg/L is determined as follows:
When the water hardness is 0 to \leq 60 mg/L, the CWQG is 25 µg/L
At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using the equation:
e raised to the power of {0.76[In(hardness)] + 1.06}
At hardness >180 mg/L, the CWQG is 150 μg/L
Where water hardness is reported as mg/L CaCO3.
If the water hardness is unknown, the CWQG is 25 μg/L
Note 1.12 for Phosphorus (total, by ICPMS/ICPOES):
Canadian Guidance Framework for Phosphorus is for developing phosphorus guidelines (does not provide guidance on other
freshwater nutrients). It provides Trigger Ranges for Total Phosphorus (see Guidance Framework for Phosphorus factsheet):
ultra-oligotrophic <4 µg/L;
oligotrophic 4-10 μg/L;
mesotrophic 10-20 μg/L;
meso-eutrophic 20-35 μg/L;
eutrophic 35-100 µg/L;
hyper-eutrophic >100 μg/L
Note 1.13 for Uranium (total):
The Short-Term Exposure Guideline is 33 µg/L. The Long-Term Exposure Guideline is 15 µg/L. The guidelines are for total
recoverable, unfiltered analyses.
Note 1.14 for Arsenic (dissolved):
Guideline is for total arsenic.
2. Notes for CCME. Canadian water quality guidelines for the protection of freshwater aquatic life, Short-Term Exposure
guidelines. (CCME AL [ST])
General Notes:
The CCME Canadian water quality guidelines for the protection of freshwater aquatic life provide both a Long-Term Exposure
guideline, and Short-Term Exposure guideline for some analytes. Only the Short-Term Exposure guidelines are included in this
criteria set.
Note 2.1 for Total suspended solids:
Water quality guideline for shot-term exposure for suspended sediments is as follows.
Clear flow:
Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period).
High flow:
Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should
not increase more than 10% of background levels when background is >250 mg/L.
Note 2.2 for Turbidity:
Water quality guideline for turbidity is as follows.
Clear flow:
Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period).
Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters:
Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs.
Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs.
Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total):
Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The
Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure:
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation:
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation: 10 raised to the power of {1.016[log(hardness)] - 1.71}
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation: 10 raised to the power of {1.016[log(hardness)] - 1.71} 3. If hardness (as CaCO3) is greater than 360 mg/L then maximum is 7.7 µg/L.
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation: 10 raised to the power of {1.016[log(hardness)] - 1.71} 3. If hardness (as CaCO3) is greater than 360 mg/L then maximum is 7.7 µg/L. Note 2.4 for Uranium (total):
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation: 10 raised to the power of {1.016[log(hardness)] - 1.71} 3. If hardness (as CaCO3) is greater than 360 mg/L then maximum is 7.7 µg/L. Note 2.4 for Uranium (total): The guideline is for total recoverable, unfiltered analyses.
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation: 10 raised to the power of {1.016[log(hardness)] - 1.71} 3. If hardness (as CaCO3) is greater than 360 mg/L then maximum is 7.7 µg/L. Note 2.4 for Uranium (total): The guideline is for total recoverable, unfiltered analyses. 3. Notes for Federal Environmental Quality Guidelines Federal Water Quality Guidelines (FWQG) for freshwater aquatic
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation: 10 raised to the power of {1.016[log(hardness)] - 1.71} 3. If hardness (as CaCO3) is greater than 360 mg/L then maximum is 7.7 µg/L. Note 2.4 for Uranium (total): The guideline is for total recoverable, unfiltered analyses. 3. Notes for Federal Environmental Quality Guidelines Federal Water Quality Guidelines (FWQG) for freshwater aquatic life (FAL)
Clear now: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation: 10 raised to the power of {1.016[log(hardness)] - 1.71} 3. If hardness (as CaCO3) is greater than 360 mg/L then maximum is 7.7 µg/L. Note 2.4 for Uranium (total): The guideline is for total recoverable, unfiltered analyses. 3. Notes for Federal Environmental Quality Guidelines Federal Water Quality Guidelines (FWQG) for freshwater aquatic life (FAL) General Notes:
Clear how: Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-hour period). High flow or turbid waters: Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is >80 NTUs. Note 2.3 for Cadmium (total): The short-term benchmark for cadmium is determined on a site-specific basis according to the local water hardness. The benchmark for total cadmium in µg/L is determined as follows for short-term exposure: 1. If hardness (as CaCO3) is less than 5.3 mg/L then maximum is 0.11 µg/L 2. If hardness (as CaCO3) is from 5.3 to 360 mg/L then maximum is based on equation: 10 raised to the power of {1.016[log(hardness)] - 1.71} 3. If hardness (as CaCO3) is greater than 360 mg/L then maximum is 7.7 µg/L. Note 2.4 for Uranium (total): The guideline is for total recoverable, unfiltered analyses. 3. Notes for Federal Environmental Quality Guidelines Federal Water Quality Guidelines (FWQG) for freshwater aquatic life (FAL) General Notes: The FEQG WQ FAL guidelines are available for some analytes. The comparison of results to guidelines was done manually by

a provided equation which is dependent on the rsults of other analytes. See notes below for specifics for each guideline.

Table A-1 Guideline Notes Inuvik Mike Zubko Airport Water Licence G23L8-002 Background Water Quality Results 2023

Note 3.1 for Aluminium (total):
The site-specific FWQG for total aluminum (μ g/L) is variable and calculated using the following equation:
1. FWQG (μg/L) = exp([0.645 × ln(DOC)] + [2.255 × ln(hardness)] + [1.995 × pH] + [-0.284 × (ln(hardness) × pH)] -9.898)
2. The FWQG equation is valid between hardness 10 and 430 mg/L, pH 6 and 8.7, and dissolved organic carbon (DOC) 0.08 and
12.3 mg/l
The guideline values could not be calculated because dissolved organic carbon was not analyzed.
···· gamma ····· ·······················
Source: Environment and Climate Change Canada (ECCC) 2022, Federal Environmental Quality Guidelines: Aluminum, August
2022. Note 3.2 for Cobalt (total):
The site specific EWOC for total scholt (ug/L) is variable and determined by the following equation:
The site-specific PWQG to total cobalt $(\mu)/L$ is variable and determined by the following equation.
1. For a narrows value of 100 mg/L, the guideline is 1.0 µg/L.
2. For hardness values between 52-396 mg/L, the FWQG can be calculated with the following equation: FWQG =
[exp{(0.414](in(naraness)] = 1.887}
3. OF 1-D, SNP 1-D, and SNP-2 had hardness values > 396; therefore, the calculation does not apply to those samples.
Source: Environment and Climate Change Canada (ECCC). 2017. Federal Environmental Quality Guidelines: Cobalt. May 2017.
Note 3.3 for Copper (total):
The guideline is for dissolved copper.
The site-specific FWQG for dissolved copper (μ g/L) is variable and calculated using the Biotic Ligand Model (BLM) tool.
If the BLM tool cannot be used for the calculation, the FWQG calculator for copper can be used.
The calculator provides a value using the BLM software and simple chemitry inputs (temperature, pH, DOC, and hardness).
The guideline values could not be calculated because temperature and DOC results are not available.
Source: Environment and Climate Change Canada (ECCC). 2021. Federal Environmental Quality Guidelines: Copper. April 2021.
Note 3.4 for Iron (total):
The guideline (May 2019) is a draft open for public comment.
The site-specific EWOG for total iron (ug/l) is variable and calculated using the following equation:
EWOG = exc(0.671[hr/DOC]) + 0.171[hr/] + 5.586)
The guideline values could not be calculated because DOC results are not available
The guideline values could not be calculated because boo results are not available.
Source: Environment and Climate Change Canada (ECCC) 2019, Federal Environmental Quality Guidelines: Iron, Draft for public
comment May 2019
Noto 3 5 for Load (total):
The guideline is for disequence lead
The guideline is for dissolved read.
The site-specific FWQG for dissolved lead (µg/L) is variable and calculated using the following equation:
FWQG = exp(0.5) 4[in(DOC)] + 0.2 4[in(Hardness)] + 0.4 152)
The guideline values could not be calculated because DOC results are not available.
Source: Environment and climate change canada (ECCC). 2020a. Federal Environmental Quality Guidelines: Lead. July 2020.
Note 3.6 for Strontum (total):
The guideline is for dissolved stronuum.
Source: Environment and Climete Change Concele (ECCC), 2020b. Endered Environmental Quality Quidelines: Streptions, July
Source: Environment and Climate Change Canada (ECCC). 2020b. Federal Environmental Quality Guidelines: Strontium. July
2020. Nata 0.7 fan Vanadium (Astol)
Note 3.7 for Vanadium (total):
Source: Environment and Climate Change Canada (ECCC). 2016. Federal Environmental Quality Guidelines: Vanadium. May
Note 3.6 for Benzene, Ethylbenzene, Toluene, and Xylenes (total):
The guideline provides short-term benchmarks (mg/L) and long-term guidelines (mg/L). The long-term guidelines were used
because they are more stringent.
Source: Environment and climate change canada (ECCC). 2023. Federal Environmental Quality Guidelines: Benzene, Toluene,
Enybenzene, Aylene (BTEA). June 2023.
4. Nates for Environment and Olimete Oberge Oceande (ECOO) Oberg Ovidelines for foderal simerte (ECOO Oberg)
4. Notes for Environment and Climate Change Canada (ECCC) Glycol Guidelines for federal airports (ECCC Glycol)
Note 4.1 for etnylene glycol:
Environment and Climate Change Canada (ECCC). 1994. Order in Council: Glycol Guidelines, modified May 19, 2017. Available
at: https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/guidelines-
jobjectives-codes-practice/order-council-glycol.html.

	Sai	mpling Location	SNP2-Sediment	SNP4-Sediment	SNP5-Sediment	SNP6-Sediment
		Date Sampled	09-Oct-23	08-Oct-23	08-Oct-23	08-Oct-23
		Lab Sample ID	YL2301402-009	YL2301358-009	YL2301358-010	YL2301358-011
		Sample Type	Normal	Normal	Normal	Normal
		Guideline				
Analyta	Unit	ССМЕ				
Alldiyte	Unit	Sediment				
		FAL				
Lab Results						
General						
pH (in 2:1 water:soil mixture)		NG	7.98	6.12	7.12	5.74
Metals						
Aluminum	µg/g	NG	6320	12400	8970	9130
Antimony	µg/g	NG	0.42	<0.15	0.58	0.21
Arsenic	µg/g	5.9	18.1	3.31	14.8	14.4
Barium	µg/g	NG	88.5	162	190	173
Beryllium	µg/g	NG	0.64	0.52	0.68	0.64
Bismuth	µg/g	NG	<0.20	<0.29	<0.20	<0.29
Boron	µg/g	NG	9.3	12.7	9	9.8
Cadmium	µg/g	0.6	0.126	0.154	0.532	0.244
Calcium	µg/g	NG	10100	7660	35500	6490
Chromium	µg/g	37.3	10.2	23.1	16.2	19.3
Cobalt	µg/g	NG	11.4	5.07	11.6	11.2
Copper	µg/g	35.7	15.6	15.2	23.8	23.4
Iron	µg/g	NG	52900	15400	28100	21600
Lead	µg/g	35.0	13.5	8.84	13.2	12.3
Lithium	µg/g	NG	14.4	19.4	14.5	13.9
Magnesium	µg/g	NG	5400	3360	18400	2280
Manganese	µg/g	NG	318	90.9	316	113
Mercury	µg/g	0.17	0.0576	0.072	0.0502	0.0958
Molybdenum	µg/g	NG	2.01	0.34	1.38	0.69
Nickel	µg/g	NG	28.3	21.1	31.6	29.8
Phosphorus	µg/g	NG	433	485	595	564
Potassium	µg/g	NG	880	2180	1390	1230
Selenium	µg/g	NG	0.81	0.53	0.86	0.84
Silver	µg/g	NG	<0.10	<0.15	0.11	<0.15
Sodium	µg/g	NG	148	120	437	<74
Strontium	µg/g	NG	22	27.7	51.8	19.2
Sulphur	µg/g	NG	1800	3000	3300	6200
Thallium	µg/g	NG	0.111	0.115	0.21	0.114
Tin	µg/g	NG	<2.0	<2.9	<2.0	<2.9
Titanium	µg/g	NG	46.2	18	15	13.5
Tungsten	µg/g	NG	<0.50	<0.74	<0.50	<0.74
Uranium	µg/g	NG	0.543	0.487	1.02	0.737
Vanadium	µg/g	NG	20	32.6	30.3	29.6
Zinc	µg/g	123.0	92	86.1	94.3	96.8
Zirconium	hď/ď	NG	4.2	3.8	3.9	6.2



Legend for Table A-2 Inuvik Mike Zubko Airport Water Licence G23L8-002 Background Sediment Quality Results October 2023

<	Less than reported detection limit
CCME	Canadian Council of Ministers of the Environment
CCME Sediment FAL	CCME Canadian Sediment Quality Guidelines for the protection of freshwater aquatic life
NG	No guideline
CCME Sediment FAL	Bold value exceeds CCME Sediment FAL



Notes for Canadian Council of Ministers of the Environment (CCME) Canadian Sediment Quality Guidelines for the protection of freshwater aquatic life (CCME Sediment FAL)

General Notes:

The CCME Sediment FAL provide Interim Sediment Quality Guidelines (ISQGs) and Probable Effect Levels (PELs). The ISQG have been used in this report.



APPENDIX B - LABORATORY REPORTS

ALS Canada Ltd.



CERTIFICATE OF ANALYSIS								
: YL2301358	Page	: 1 of 10						
: Nautchiuk Environmental Inc.	Laboratory	: ALS Environmental - Yellowknife						
: Cam McKillop	Account Manager	: Oliver Gregg						
: PO BOX 1463 18 NATALA DRIVE	Address	: 314 Old Airport Road, Unit 116						
INUVIK NT Canada X0E 0T0		Yellowknife NT Canada X1A 3T3						
:	Telephone	: 1 867 445 7143						
:	Date Samples Received	: 10-Oct-2023 08:45						
:	Date Analysis Commenced	: 10-Oct-2023						
: 17 - 824284	Issue Date	: 23-Oct-2023 15:21						
: Cam McKillop								
:								
: YL23-NAUT100-001								
: 11								
: 11								
	EXAMPLE 2301358 Nautchiuk Environmental Inc. Cam McKillop PO BOX 1463 18 NATALA DRIVE INUVIK NT Canada X0E 0T0 17 - 824284 Cam McKillop YL23-NAUT100-001 11 11	EXPLICIANCE OF ANALYSIS : YL2301358 Page : Nautchiuk Environmental Inc. Laboratory : Cam McKillop Account Manager : PO BOX 1463 18 NATALA DRIVE Address INUVIK NT Canada XOE 0T0 Telephone : Date Samples Received : Date Analysis Commenced : 17 - 824284 Issue Date : Cam McKillop Issue Date : YL23-NAUT100-001 11 : 11 11						

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Alphina Mathew	Laboratory Assistant	Inorganics, Calgary, Alberta
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Baxter	Team Leader - Inorganics	Metals, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Nik Perkio	Inorganics Analyst	Metals, Waterloo, Ontario
Oliver Gregg	Client Services Supervisor	External Subcontracting, Yellowknife, Northwest Territories
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shirley Li	Team Leader - Inorganics	Metals, Calgary, Alberta



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference. Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
µg/L	micrograms per litre
μS/cm	microsiemens per centimetre
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference,
	colour, turbidity).
FR10	As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was
	modified to 1:10 due to high soil organic content.
FR4	As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was
	modified to 1:4 due to high soil organic content.



Sub-Matrix: Soil/Solid			C	lient sample ID	SNP4 -	SNP5 -	SNP6 -		
(Matrix: Soil/Solid)					SEDIMENT	SEDIMENT	SEDIMENT		
			Client samp	oling date / time	08-Oct-2023 14:00	08-Oct-2023 17:50	08-Oct-2023 14:45		
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301358-009	YL2301358-010	YL2301358-011		
					Result	Result	Result		
Physical Tests									
pH (1:2 soil:water)		E108/CG	0.10	pH units	6.12 FR10	7.12 FR4	5.74 FR10		
Metals									
Aluminum	7429-90-5	E440/CG	50	mg/kg	12400	8970	9130		
Antimony	7440-36-0	E440/CG	0.10	mg/kg	<0.15 ^{DLM}	0.58	0.21		
Arsenic	7440-38-2	E440/CG	0.10	mg/kg	3.31	14.8	14.4		
Barium	7440-39-3	E440/CG	0.50	mg/kg	162	190	173		
Beryllium	7440-41-7	E440/CG	0.10	mg/kg	0.52	0.68	0.64		
Bismuth	7440-69-9	E440/CG	0.20	mg/kg	<0.29 DLM	<0.20	<0.29 DLM		
Boron	7440-42-8	E440/CG	5.0	mg/kg	12.7	9.0	9.8		
Cadmium	7440-43-9	E440/CG	0.020	mg/kg	0.154	0.532	0.244		
Calcium	7440-70-2	E440/CG	50	mg/kg	7660	35500	6490		
Chromium	7440-47-3	E440/CG	0.50	mg/kg	23.1	16.2	19.3		
Cobalt	7440-48-4	E440/CG	0.10	mg/kg	5.07	11.6	11.2		
Copper	7440-50-8	E440/CG	0.50	mg/kg	15.2	23.8	23.4		
Iron	7439-89-6	E440/CG	50	mg/kg	15400	28100	21600		
Lead	7439-92-1	E440/CG	0.50	mg/kg	8.84	13.2	12.3		
Lithium	7439-93-2	E440/CG	2.0	mg/kg	19.4	14.5	13.9		
Magnesium	7439-95-4	E440/CG	20	mg/kg	3360	18400	2280		
Manganese	7439-96-5	E440/CG	1.0	mg/kg	90.9	316	113		
Mercury	7439-97-6	E510/CG	0.0050	mg/kg	0.0720	0.0502	0.0958		
Molybdenum	7439-98-7	E440/CG	0.10	mg/kg	0.34	1.38	0.69		
Nickel	7440-02-0	E440/CG	0.50	mg/kg	21.1	31.6	29.8		
Phosphorus	7723-14-0	E440/CG	50	mg/kg	485	595	564		
Potassium	7440-09-7	E440/CG	100	mg/kg	2180	1390	1230		
Selenium	7782-49-2	E440/CG	0.20	mg/kg	0.53	0.86	0.84		
Silver	7440-22-4	E440/CG	0.10	mg/kg	<0.15 ^{DLM}	0.11	<0.15 DLM		
Sodium	7440-23-5	E440/CG	50	mg/kg	120	437	<74 ^{DLM}		
Strontium	7440-24-6	E440/CG	0.50	mg/kg	27.7	51.8	19.2		
Sulfur	7704-34-9	E440/CG	1000	mg/kg	3000	3300	6200		
I		I	1			I		I	I



Sub-Matrix: Soil/Solid			Cl	ient sample ID	SNP4 -	SNP5 -	SNP6 -	
(Matrix: Soil/Solid)					SEDIMENT	SEDIMENT	SEDIMENT	
			Client samp	ling date / time	08-Oct-2023 14:00	08-Oct-2023 17:50	08-Oct-2023 14:45	
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301358-009	YL2301358-010	YL2301358-011	
					Result	Result	Result	
Metals								
Thallium	7440-28-0	E440/CG	0.050	mg/kg	0.115	0.210	0.114	
Tin	7440-31-5	E440/CG	2.0	mg/kg	<2.9 ^{DLM}	<2.0	<2.9 ^{DLM}	
Titanium	7440-32-6	E440/CG	1.0	mg/kg	18.0	15.0	13.5	
Tungsten	7440-33-7	E440/CG	0.50	mg/kg	<0.74 ^{DLM}	<0.50	<0.74 ^{DLM}	
Uranium	7440-61-1	E440/CG	0.050	mg/kg	0.487	1.02	0.737	
Vanadium	7440-62-2	E440/CG	0.20	mg/kg	32.6	30.3	29.6	
Zinc	7440-66-6	E440/CG	2.0	mg/kg	86.1	94.3	96.8	
Zirconium	7440-67-7	E440/CG	1.0	mg/kg	3.8	3.9	6.2	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Sub-Matrix: Water			Cl	ient sample ID	SNP4 - D	SNP4 - RW	SNP6	SNP3 - D	SNP3 - RW
(Matrix: Water)									
		I	Client samp	ling date / time	08-Oct-2023 13:35	08-Oct-2023 13:55	08-Oct-2023 14:35	08-Oct-2023 18:35	08-Oct-2023 19:00
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301358-001	YL2301358-002	YL2301358-003	YL2301358-004	YL2301358-005
					Result	Result	Result	Result	Result
Physical lests		E100/\/A	2.0	uS/cm	150	153	147	710	303
Hardness (as CaCO3) from total Ca/Mg			0.60	ma/l	76.3	78.8	75.3	346	139
nH		E108/\/A	0.00	nH unite	7 14	7 08	7 35	7 90	7 94
Solids total suspended ITSS1		E160/VA	3.0	ma/l	<3.0	<3.0	<3.0	<3.0	<3.0
Turbidity		E121/VA	0.10	NTU	0.44	0.57	1.08	0.22	1 60
Aluminum, total	7429-90-5	E420/VA	0.0030	ma/L	0.0562	0.0669	0.0217	0.0097	0.0344
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	0.00026	0.00029	0.00040	0.00022	0.00045
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	0.0330	0.0335	0.0371	0.0350	0.0623
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L	<0.010	<0.010	<0.010	0.012	0.020
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	0.0000067	0.0000050	0.0000110	<0.000050	0.0000061
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	22.2	23.2	21.9	95.1	38.5
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	<0.000010	0.000012	0.000011	<0.000010	0.000012
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	0.00085	0.00090	0.00093	<0.00050	0.00148
Iron, total	7439-89-6	E420/VA	0.010	mg/L	0.098	0.119	0.166	0.018	0.157
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	0.000056
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	0.0043	0.0044	0.0026	0.0134	0.0064
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L	5.06	5.06	5.01	26.5	10.4
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.00066	0.00145	0.00411	0.00037	0.00740
Mercury, total	7439-97-6	E508/WT	0.0000050	mg/L	<0.0000500 DLM	<0.0000500	<0.0000500 DLM	<0.0000500 DLM	<0.0000050
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	<0.000050	<0.000050	0.000107	0.000059	0.000890
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	0.00196	0.00207	0.00098	0.00107	0.00127
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	0.066	0.170	0.792	0.518	1.02
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	<0.00020	0.00020	0.00063	<0.00020	0.00077



Sub-Matrix: Water		Client sample ID		SNP4 - D	SNP4 - RW	SNP6	SNP3 - D	SNP3 - RW
(Matrix: Water)								
		Client samp	ling date / time	08-Oct-2023 13:35	08-Oct-2023 13:55	08-Oct-2023 14:35	08-Oct-2023 18:35	08-Oct-2023 19:00
Analyte	CAS Number Method/Lab	LOR	Unit	YL2301358-001	YL2301358-002	YL2301358-003	YL2301358-004	YL2301358-005
				Result	Result	Result	Result	Result
Total Metals								
Selenium, total	7782-49-2 E420/VA	0.000050	mg/L	0.000122	0.000112	0.000068	0.000074	0.000186
Silicon, total	7440-21-3 E420/VA	0.10	mg/L	3.04	3.11	0.94	2.82	1.38
Silver, total	7440-22-4 E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5 E420/VA	0.050	mg/L	4.74	4.96	2.70	27.9	12.3
Strontium, total	7440-24-6 E420/VA	0.00020	mg/L	0.0526	0.0553	0.0409	0.216	0.181
Sulfur, total	7704-34-9 E420/VA	0.50	mg/L	11.5	11.9	6.36	88.5	14.2
Tellurium, total	13494-80-9 E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0 E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6 E420/VA	0.00030	mg/L	<0.00060 DLM	<0.00060 DLM	0.00032	<0.00030	<0.00090 DLM
Tungsten, total	7440-33-7 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1 E420/VA	0.000010	mg/L	<0.000010	<0.000010	0.000013	0.000024	0.000479
Vanadium, total	7440-62-2 E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6 E420/VA	0.0030	mg/L	0.0046	0.0045	0.0044	<0.0030	<0.0030
Zirconium, total	7440-67-7 E420/VA	0.00020	mg/L	0.00040	0.00040	<0.00020	<0.00020	<0.00020
Dissolved Metals								
Arsenic, dissolved	7440-38-2 E421/VA	0.00010	mg/L	0.00025	0.00024	0.00034	0.00020	0.00039
Dissolved metals filtration location	EP421/VA	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
Aggregate Organics								
Carbonaceous biochemical oxygen demand [CBOD]	CBOD5/1Y	2	mg/L	0	0	3	0	0
Volatile Organic Compounds [Fuels]								
Benzene	71-43-2 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	100-41-4 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	1634-04-4 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	100-42-5 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	108-88-3 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	179601-23-1 E611A/VA	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	<0.40
Xylene, o-	95-47-6 E611A/VA	0.30	μg/L	<0.30	<0.30	<0.30	<0.30	<0.30



Sub-Matrix: Water			Cl	ient sample ID	SNP4 - D	SNP4 - RW	SNP6	SNP3 - D	SNP3 - RW
(Matrix: Water)									
	Client sampling de				08-Oct-2023 13:35	08-Oct-2023 13:55	08-Oct-2023 14:35	08-Oct-2023 18:35	08-Oct-2023 19:00
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301358-001	YL2301358-002	YL2301358-003	YL2301358-004	YL2301358-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]									
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Hydrocarbons									
F1 (C6-C10)		E581.VH+F1/	100	µg/L	<100	<100	<100	<100	<100
F2 (C10-C16)		VA E601/VA	300	µg/L	<300	<300	<300	<300	<300
F3 (C16-C34)		E601/VA	300	µg/L	<300	<300	<300	<300	<300
F4 (C34-C50)		E601/VA	300	µg/L	<300	<300	<300	<300	<300
VHw (C6-C10)		E581.VH+F1/ VA	100	µg/L	<100	<100	<100	<100	<100
F1-BTEX		EC580/VA	100	μg/L	<100	<100	<100	<100	<100
VPHw		EC580A/VA	100	µg/L	<100	<100	<100	<100	<100
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%	81.5	79.0	88.0	75.8	79.5
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/	1.0	%	90.2	98.9	97.8	100	100
	Y	VA							
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%	93.4	94.2	93.3	89.9	84.9
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%	101	101	100	101	100
Glycols									
Ethylene glycol	107-21-1	E680E/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Glycols Surrogates									
Propanediol, 1,3-	504-63-2	E680E/VA	1.0	%	97.0	97.0	95.7	91.1	95.3

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Sub-Matrix: Water			Cl	lient sample ID	SNP5	East Creek - D	East Creek -	
(Matrix: Water)							RW	
			Client samp	oling date / time	08-Oct-2023 17:40	08-Oct-2023 17:00	08-Oct-2023 17:05	
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301358-006	YL2301358-007	YL2301358-008	
					Result	Result	Result	
Physical Tests								
Conductivity	E	E100/VA	2.0	μS/cm	307	181	191	
Hardness (as CaCO3), from total Ca/Mg	E	EC100A/VA	0.60	mg/L	142	93.6	110	
рН	E	E108/VA	0.10	pH units	8.02	7.59	7.65	
Solids, total suspended [TSS]	E	E160/VA	3.0	mg/L	16.8	11.6	<3.0	
Turbidity	E	E121/VA	0.10	NTU	7.27	2.70	2.57	
Total Metals								
Aluminum, total	7429-90-5 ^E	E420/VA	0.0030	mg/L	0.336	0.0681	0.0495	
Antimony, total	7440-36-0 ^E	E420/VA	0.00010	mg/L	0.00010	<0.00010	<0.00010	
Arsenic, total	7440-38-2 ^E	E420/VA	0.00010	mg/L	0.00066	0.00050	0.00050	
Barium, total	7440-39-3 ^E	E420/VA	0.00010	mg/L	0.0656	0.0368	0.0444	
Beryllium, total	7440-41-7 ^E	E420/VA	0.000100	mg/L	<0.000100	<0.000100	<0.000100	
Bismuth, total	7440-69-9 ^E	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	
Boron, total	7440-42-8	E420/VA	0.010	mg/L	0.019	<0.010	0.011	
Cadmium, total	7440-43-9 ^E	E420/VA	0.0000050	mg/L	0.0000148	<0.000050	<0.0000050	
Calcium, total	7440-70-2 ^E	E420/VA	0.050	mg/L	39.2	27.1	31.4	
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	0.000083	0.000013	0.000012	
Chromium, total	7440-47-3 ^E	E420/VA	0.00050	mg/L	0.00058	<0.00050	<0.00050	
Cobalt, total	7440-48-4 ^E	E420/VA	0.00010	mg/L	0.00024	0.00015	0.00012	
Copper, total	7440-50-8 ^E	E420/VA	0.00050	mg/L	0.00198	0.00057	0.00086	
Iron, total	7439-89-6 ^E	E420/VA	0.010	mg/L	0.607	0.741	0.561	
Lead, total	7439-92-1 E	E420/VA	0.000050	mg/L	0.000306	0.000106	0.000076	
Lithium, total	7439-93-2 ^E	E420/VA	0.0010	mg/L	0.0066	0.0028	0.0038	
Magnesium, total	7439-95-4 E	E420/VA	0.0050	mg/L	10.8	6.31	7.56	
Manganese, total	7439-96-5 E	E420/VA	0.00010	mg/L	0.0226	0.0392	0.0338	
Mercury, total	7439-97-6 ^E	E508/WT	0.0000050	mg/L	<0.000050	<0.000050	<0.0000050	
Molybdenum, total	7439-98-7 E	E420/VA	0.000050	mg/L	0.000843	0.000107	0.000355	
Nickel, total	7440-02-0 ^E	E420/VA	0.00050	mg/L	0.00206	0.00111	0.00116	
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	<0.050	<0.050	<0.050	
Potassium, total	7440-09-7 E	E420/VA	0.050	mg/L	1.04	0.660	0.759	
Rubidium, total	7440-17-7 ^E	E420/VA	0.00020	mg/L	0.00134	0.00042	0.00048	



Sub-Matrix: Water		Cli	ent sample ID	SNP5	East Creek - D	East Creek -	
(Matrix: Water)						RW	
		Client samp	ling date / time	08-Oct-2023 17:40	08-Oct-2023 17:00	08-Oct-2023 17:05	
Analyte	CAS Number Method/Lab	LOR	Unit	YL2301358-006	YL2301358-007	YL2301358-008	
				Result	Result	Result	
Total Metals							
Selenium, total	7782-49-2 E420/VA	0.000050	mg/L	0.000181	0.000059	0.000106	
Silicon, total	7440-21-3 E420/VA	0.10	mg/L	1.96	1.17	1.16	
Silver, total	7440-22-4 E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	
Sodium, total	7440-23-5 E420/VA	0.050	mg/L	12.0	2.62	5.15	
Strontium, total	7440-24-6 E420/VA	0.00020	mg/L	0.177	0.0457	0.0871	
Sulfur, total	7704-34-9 E420/VA	0.50	mg/L	13.0	11.0	11.6	
Tellurium, total	13494-80-9 E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	
Thallium, total	7440-28-0 E420/VA	0.000010	mg/L	0.000011	<0.000010	<0.000010	
Thorium, total	7440-29-1 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	
Tin, total	7440-31-5 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	
Titanium, total	7440-32-6 E420/VA	0.00030	mg/L	<0.00540 DLM	0.00064	0.00057	
Tungsten, total	7440-33-7 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	
Uranium, total	7440-61-1 E420/VA	0.000010	mg/L	0.000510	0.000021	0.000163	
Vanadium, total	7440-62-2 E420/VA	0.00050	mg/L	0.00106	<0.00050	<0.00050	
Zinc, total	7440-66-6 E420/VA	0.0030	mg/L	<0.0030	<0.0030	<0.0030	
Zirconium, total	7440-67-7 E420/VA	0.00020	mg/L	0.00031	<0.00020	<0.00020	
Dissolved Metals							
Arsenic, dissolved	7440-38-2 E421/VA	0.00010	mg/L	0.00038	0.00035	0.00036	
Dissolved metals filtration location	EP421/VA	-	-	Laboratory	Laboratory	Laboratory	
Aggregate Organics							
Carbonaceous biochemical oxygen demand	CBOD5/1Y	2	mg/L	0	3	0	
[CBOD]							
Volatile Organic Compounds [Fuels]							
Benzene	71-43-2 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	
Ethylbenzene	100-41-4 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	
Methyl-tert-butyl ether [MTBE]	1634-04-4 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	
Styrene	100-42-5 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	
Toluene	108-88-3 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	
Xylene, m+p-	179601-23-1 E611A/VA	0.40	µg/L	<0.40	<0.40	<0.40	
Xylene, o-	95-47-6 E611A/VA	0.30	μg/L	<0.30	<0.30	<0.30	



Sub-Matrix: Water	Client sample ID		lient sample ID	SNP5	East Creek - D	East Creek -	
(Matrix: Water)						RW	
		Client samp	ling date / time	08-Oct-2023 17:40	08-Oct-2023 17:00	08-Oct-2023 17:05	
Analyte	CAS Number Method/Lab	LOR	Unit	YL2301358-006	YL2301358-007	YL2301358-008	
				Result	Result	Result	
Volatile Organic Compounds [Fuels]							
Xylenes, total	1330-20-7 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	
Hydrocarbons							
F1 (C6-C10)	E581.VH+F1/	100	µg/L	<100	<100	<100	
F2 (C10-C16)	VA E601/VA	300	µg/L	<300	<300	<300	
F3 (C16-C34)	E601/VA	300	µg/L	<300	<300	<300	
F4 (C34-C50)	E601/VA	300	µg/L	<300	<300	<300	
VHw (C6-C10)	E581.VH+F1/ VA	100	µg/L	<100	<100	<100	
F1-BTEX	EC580/VA	100	µg/L	<100	<100	<100	
VPHw	EC580A/VA	100	µg/L	<100	<100	<100	
Hydrocarbons Surrogates							
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6 E601/VA	1.0	%	86.1	78.1	79.2	
Dichlorotoluene, 3,4-	95-75-0 E581.VH+F1/ VA	1.0	%	98.7	109	102	
Volatile Organic Compounds Surrogates							
Bromofluorobenzene, 4-	460-00-4 E611A/VA	1.0	%	90.6	95.5	93.6	
Difluorobenzene, 1,4-	540-36-3 E611A/VA	1.0	%	100	99.8	99.6	
Glycols							
Ethylene glycol	107-21-1 E680E/VA	5.0	mg/L	<5.0	<5.0	<5.0	
Glycols Surrogates							
Propanediol, 1,3-	504-63-2 E680E/VA	1.0	%	97.2	98.9	100	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.



CERTIFICATE OF ANALYSIS							
: YL2301402	Page	: 1 of 10					
: Nautchiuk Environmental Inc.	Laboratory	: ALS Environmental - Yellowknife					
: Cam McKillop	Account Manager	: Oliver Gregg					
: PO BOX 1463 18 NATALA DRIVE	Address	: 314 Old Airport Road, Unit 116					
INUVIK NT Canada X0E 0T0		Yellowknife NT Canada X1A 3T3					
:	Telephone	: 1 867 445 7143					
:	Date Samples Received	: 12-Oct-2023 11:00					
:	Date Analysis Commenced	: 13-Oct-2023					
: 17-824285	Issue Date	: 27-Oct-2023 15:49					
:							
:							
: YL23-NAUT100-001							
: 10							
: 10							
	CERTIN	E YL2301402 Page : Nautchiuk Environmental Inc. Laboratory : Cam McKillop Account Manager : PO BOX 1463 18 NATALA DRIVE Address INUVIK NT Canada X0E 0T0 Telephone : Date Samples Received : Date Analysis Commenced : 17-824285 Issue Date : Issue Date : Issue Date : 10 10					

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department	
Alphina Mathew	Laboratory Assistant	Inorganics, Calgary, Alberta	
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia	
George Huang	Supervisor - Inorganic	Metals, Calgary, Alberta	
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia	
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia	
Oliver Gregg	Client Services Supervisor	External Subcontracting, Yellowknife, Northwest Territories	
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia	
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia	
Sukhman Khosa	Lab Assistant	Metals, Burnaby, British Columbia	



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference. Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key :	CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
	LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Sample Comments

Sample	Client Id	Comment
YL2301402-004	SNP2-RW	F3 (C16-C34) LOR raised for YL230 402-004 due to known contamination pattern.

Qualifiers

Qualifier	Description
RRR	Refer to report comments for issues regarding this analysis.



Sub-Matrix: Soil/Solid			C	lient sample ID	SNP2-Sediment	 	
(Matrix: Soil/Solid)							
			Client samp	oling date / time	09-Oct-2023 17:15	 	
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301402-009	 	
					Result	 	
Physical Tests							
pH (1:2 soil:water)		E108/CG	0.10	pH units	7.98	 	
Metals							
Aluminum	7429-90-5	E440/CG	50	mg/kg	6320	 	
Antimony	7440-36-0	E440/CG	0.10	mg/kg	0.42	 	
Arsenic	7440-38-2	E440/CG	0.10	mg/kg	18.1	 	
Barium	7440-39-3	E440/CG	0.50	mg/kg	88.5	 	
Beryllium	7440-41-7	E440/CG	0.10	mg/kg	0.64	 	
Bismuth	7440-69-9	E440/CG	0.20	mg/kg	<0.20	 	
Boron	7440-42-8	E440/CG	5.0	mg/kg	9.3	 	
Cadmium	7440-43-9	E440/CG	0.020	mg/kg	0.126	 	
Calcium	7440-70-2	E440/CG	50	mg/kg	10100	 	
Chromium	7440-47-3	E440/CG	0.50	mg/kg	10.2	 	
Cobalt	7440-48-4	E440/CG	0.10	mg/kg	11.4	 	
Copper	7440-50-8	E440/CG	0.50	mg/kg	15.6	 	
Iron	7439-89-6	E440/CG	50	mg/kg	52900	 	
Lead	7439-92-1	E440/CG	0.50	mg/kg	13.5	 	
Lithium	7439-93-2	E440/CG	2.0	mg/kg	14.4	 	
Magnesium	7439-95-4	E440/CG	20	mg/kg	5400	 	
Manganese	7439-96-5	E440/CG	1.0	mg/kg	318	 	
Mercury	7439-97-6	E510/CG	0.0050	mg/kg	0.0576	 	
Molybdenum	7439-98-7	E440/CG	0.10	mg/kg	2.01	 	
Nickel	7440-02-0	E440/CG	0.50	mg/kg	28.3	 	
Phosphorus	7723-14-0	E440/CG	50	mg/kg	433	 	
Potassium	7440-09-7	E440/CG	100	mg/kg	880	 	
Selenium	7782-49-2	E440/CG	0.20	mg/kg	0.81	 	
Silver	7440-22-4	E440/CG	0.10	mg/kg	<0.10	 	
Sodium	7440-23-5	E440/CG	50	mg/kg	148	 	
Strontium	7440-24-6	E440/CG	0.50	mg/kg	22.0	 	
Sulfur	7704-34-9	E440/CG	1000	mg/kg	1800	 	



Sub-Matrix: Soil/Solid			Cl	ient sample ID	SNP2-Sediment	 	
(Matrix: Soil/Solid)							
			Client samp	ling date / time	09-Oct-2023 17:15	 	
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301402-009	 	
					Result	 	
Metals							
Thallium	7440-28-0	E440/CG	0.050	mg/kg	0.111	 	
Tin	7440-31-5	E440/CG	2.0	mg/kg	<2.0	 	
Titanium	7440-32-6	E440/CG	1.0	mg/kg	46.2	 	
Tungsten	7440-33-7	E440/CG	0.50	mg/kg	<0.50	 	
Uranium	7440-61-1	E440/CG	0.050	mg/kg	0.543	 	
Vanadium	7440-62-2	E440/CG	0.20	mg/kg	20.0	 	
Zinc	7440-66-6	E440/CG	2.0	mg/kg	92.0	 	
Zirconium	7440-67-7	E440/CG	1.0	mg/kg	4.2	 	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Sub-Matrix: Water			Ci	lient sample ID	SNP1-D	SNP1-RW	SNP2-D	SNP2-RW	FD
(Matrix: Water)									
			Client samp	oling date / time	09-Oct-2023 15:35	09-Oct-2023 15:55	09-Oct-2023 14:30	09-Oct-2023 14:40	09-Oct-2023 14:40
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301402-001	YL2301402-002	YL2301402-003	YL2301402-004	YL2301402-005
					Result	Result	Result	Result	Result
Physical Tests		E 4000 (A			1000	0.5.4	1710		0.40
Conductivity			2.0	µS/cm	1080	354	1740	329	340
Hardness (as CaCO3), from total Ca/Mg		EC100A/VA	0.60	mg/L	433	141	684	126	124
рН		E108/VA	0.10	pH units	8.31	8.12	8.23	8.11	8.09
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	<3.0	38.3	<3.0	19.1	161
Turbidity		E121/VA	0.10	NTU	0.19	17.4	0.23	10.2	37.4
Total Metals									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0059	0.402	0.0090	0.0482	0.0444
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	<0.00010	0.00011	<0.00010	0.00010	0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	0.00027	0.00066	0.00023	0.00041	0.00044
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	0.0341	0.0628	0.0253	0.0590	0.0563
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L	0.054	0.022	0.072	0.021	0.020
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	<0.0000050	0.0000172	<0.000050	0.0000066	<0.000050
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	114	37.7	165	34.5	33.6
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	<0.000010	0.000098	<0.000010	0.000013	0.000015
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	0.00062	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	<0.00010	0.00039	0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	0.00106	0.00205	0.00060	0.00148	0.00148
Iron, total	7439-89-6	E420/VA	0.010	mg/L	0.015	0.794	0.019	0.117	0.131
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	<0.000050	0.000420	<0.000050	0.000056	0.000086
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	0.0288	0.0091	0.0576	0.0080	0.0078
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L	36.0	11.3	66.0	9.82	9.62
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.00102	0.0295	0.00036	0.00719	0.00722
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.000050	<0.0000050
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	0.000242	0.000854	0.000125	0.000833	0.000844
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	0.00102	0.00204	0.00110	0.00128	0.00129
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	2.72	1.30	1.86	1.14	1.10
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	0.00052	0.00151	0.00026	0.00073	0.00077
 A second sec second second sec		• · · · · · · · · · · · · · · · · · · ·				•	•	•	•


Sub-Matrix: Water		Client sample ID		SNP1-D	SNP1-RW	SNP2-D	SNP2-RW	FD
(Matrix: Water)								
		Client samp	ling date / time	09-Oct-2023 15:35	09-Oct-2023 15:55	09-Oct-2023 14:30	09-Oct-2023 14:40	09-Oct-2023 14:40
Analyte	CAS Number Method/Lab	LOR	Unit	YL2301402-001	YL2301402-002	YL2301402-003	YL2301402-004	YL2301402-005
				Result	Result	Result	Result	Result
Total Metals								
Selenium, total	7782-49-2 E420/VA	0.000050	mg/L	0.000089	0.000214	0.000091	0.000194	0.000170
Silicon, total	7440-21-3 E420/VA	0.10	mg/L	2.83	2.10	2.58	1.43	1.37
Silver, total	7440-22-4 E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5 E420/VA	0.050	mg/L	73.7	17.0	160	15.1	14.6
Strontium, total	7440-24-6 E420/VA	0.00020	mg/L	0.299	0.188	0.399	0.184	0.172
Sulfur, total	7704-34-9 E420/VA	0.50	mg/L	119	17.9	265	14.6	15.1
Tellurium, total	13494-80-9 E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0 E420/VA	0.000010	mg/L	<0.000010	0.000011	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6 E420/VA	0.00030	mg/L	<0.00030	0.00847	<0.00030	0.00115	0.00092
Tungsten, total	7440-33-7 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1 E420/VA	0.000010	mg/L	0.000492	0.000453	0.000638	0.000416	0.000415
Vanadium, total	7440-62-2 E420/VA	0.00050	mg/L	<0.00050	0.00129	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6 E420/VA	0.0030	mg/L	<0.0030	0.0032	<0.0030	<0.0030	<0.0030
Zirconium, total	7440-67-7 E420/VA	0.00020	mg/L	<0.00020	0.00050	0.00038	<0.00020	<0.00020
Dissolved Metals								
Arsenic, dissolved	7440-38-2 E421/VA	0.00010	mg/L	0.00028	0.00038	0.00026	0.00038	0.00035
Dissolved metals filtration location	EP421/VA	-	-	Laboratory	Laboratory	Laboratory	Laboratory	Laboratory
Aggregate Organics								
Carbonaceous biochemical oxygen demand [CBOD]	CBOD5/1Y	2	mg/L	0	0	0	0	0
Volatile Organic Compounds [Fuels]								
Benzene	71-43-2 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	100-41-4 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	1634-04-4 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	100-42-5 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	108-88-3 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	179601-23-1 E611A/VA	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	<0.40
Xylene, o-	95-47-6 E611A/VA	0.30	µg/L	<0.30	<0.30	<0.30	<0.30	<0.30



Sub-Matrix: Water	ub-Matrix: Water Client sample ID			SNP1-D	SNP1-RW	SNP2-D	SNP2-RW	FD	
(Matrix: Water)									
	Client sa			ling date / time	09-Oct-2023 15:35	09-Oct-2023 15:55	09-Oct-2023 14:30	09-Oct-2023 14:40	09-Oct-2023 14:40
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301402-001	YL2301402-002	YL2301402-003	YL2301402-004	YL2301402-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]									
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50
Hydrocarbons									
F1 (C6-C10)		E581.VH+F1/	100	µg/L	<100	<100	<100	<100	<100
F2 (C10-C16)		VA E601/VA	300	µg/L	<300	<300	<300	<300	<300
F3 (C16-C34)		E601/VA	300	µg/L	<300	<300	<300	<750 RRR	<300
F4 (C34-C50)		E601/VA	300	µg/L	<300	<300	<300	<300	<300
VHw (C6-C10)		E581.VH+F1/ VA	100	µg/L	<100	<100	<100	<100	<100
F1-BTEX		EC580/VA	100	µg/L	<100	<100	<100	<100	<100
VPHw		EC580A/VA	100	µg/L	<100	<100	<100	<100	<100
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%	82.1	79.3	75.2	69.9	77.1
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/	1.0	%	95.6	96.0	89.0	72.5	112
		VA							
Volatile Organic Compounds Surrogates		504440/4	4.0	0/	00.0	00.0	01.0	01.0	07.0
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%	93.0	92.2	91.0	91.2	97.8
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%	101	100	99.7	100	100
Glycols									
Ethylene glycol	107-21-1	E680E/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Glycols Surrogates									
Propanediol, 1,3-	504-63-2	E680E/VA	1.0	%	103	100	105	104	108

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.



Sub-Matrix: Water			Ci	lient sample ID	OF1-D	OF1-RW	FB	ТВ	
(Matrix: Water)									
			Client samp	oling date / time	09-Oct-2023 14:40	09-Oct-2023 16:40	09-Oct-2023 17:00	09-Oct-2023 15:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301402-006	YL2301402-007	YL2301402-008	YL2301402-010	
					Result	Result	Result	Result	
Physical Tests									
Conductivity		E100/VA	2.0	µS/cm	948	319	<2.0	<2.0	
Hardness (as CaCO3), from total Ca/Mg		EC100A/VA	0.60	mg/L	430	124	<0.60	<0.60	
pH		E108/VA	0.10	pH units	8.27	8.10	5.48	5.46	
Solids, total suspended [TSS]		E160/VA	3.0	mg/L	21.3	<3.0	<3.0	<3.0	
Turbidity		E121/VA	0.10	NTU	3.24	2.78	<0.10	<0.10	
Total Metals									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0269	0.0204	<0.0030	<0.0030	
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	0.00029	0.00045	<0.00010	<0.00010	
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	0.0271	0.0581	<0.00010	<0.00010	
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	
Boron, total	7440-42-8	E420/VA	0.010	mg/L	0.096	0.019	<0.010	<0.010	
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	<0.0000050	0.000068	<0.000050	<0.000050	
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	110	33.5	<0.050	<0.050	
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	0.000011	<0.000010	<0.000010	<0.000010	
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	0.00106	0.00147	<0.00050	<0.00050	
Iron, total	7439-89-6	E420/VA	0.010	mg/L	0.078	0.055	<0.010	<0.010	
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	0.0190	0.0072	<0.0010	<0.0010	
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L	37.8	9.68	<0.0050	<0.0050	
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.00484	0.00391	<0.00010	<0.00010	
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	0.000264	0.000856	<0.000050	<0.000050	
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	0.00112	0.00112	<0.00050	<0.00050	
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	2.08	1.08	<0.050	<0.050	
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	0.00061	0.00074	<0.00020	<0.00020	
1 Contraction of the second			1	1 1		1	1	1	1



Sub-Matrix: Water		Cli	ient sample ID	OF1-D	OF1-RW	FB	ТВ	
(Matrix: Water)								
		Client samp	ling date / time	09-Oct-2023 14:40	09-Oct-2023 16:40	09-Oct-2023 17:00	09-Oct-2023 15:00	
Analyte	CAS Number Method/Lab	LOR	Unit	YL2301402-006	YL2301402-007	YL2301402-008	YL2301402-010	
				Result	Result	Result	Result	
Total Metals								
Selenium, total	7782-49-2 E420/VA	0.000050	mg/L	0.000087	0.000184	<0.000050	<0.000050	
Silicon, total	7440-21-3 E420/VA	0.10	mg/L	2.73	1.35	<0.10	<0.10	
Silver, total	7440-22-4 E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium, total	7440-23-5 E420/VA	0.050	mg/L	44.2	13.3	0.139	<0.050	
Strontium, total	7440-24-6 E420/VA	0.00020	mg/L	0.373	0.176	<0.00020	<0.00020	
Sulfur, total	7704-34-9 E420/VA	0.50	mg/L	106	14.6	<0.50	<0.50	
Tellurium, total	13494-80-9 E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium, total	7440-28-0 E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium, total	7440-29-1 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Tin, total	7440-31-5 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium, total	7440-32-6 E420/VA	0.00030	mg/L	0.00046	0.00055	<0.00030	<0.00030	
Tungsten, total	7440-33-7 E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium, total	7440-61-1 E420/VA	0.000010	mg/L	0.00157	0.000413	<0.000010	<0.000010	
Vanadium, total	7440-62-2 E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc, total	7440-66-6 E420/VA	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	
Zirconium, total	7440-67-7 E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved Metals								
Arsenic, dissolved	7440-38-2 E421/VA	0.00010	mg/L	0.00027	0.00039	<0.00010		
Dissolved metals filtration location	EP421/VA	-	-	Laboratory	Laboratory	Laboratory		
Aggregate Organics								
Carbonaceous biochemical oxygen demand [CBOD]	CBOD5/1Y	2	mg/L	0	0	0	0	
Volatile Organic Compounds [Fuels]								
Benzene	71-43-2 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	
Ethylbenzene	100-41-4 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	
Methyl-tert-butyl ether [MTBE]	1634-04-4 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	
Styrene	100-42-5 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	
Toluene	108-88-3 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	
Xylene, m+p-	179601-23-1 E611A/VA	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	
Xylene, o-	95-47-6 E611A/VA	0.30	μg/L	<0.30	<0.30	<0.30	<0.30	



Sub-Matrix: Water	Client sample ID		OF1-D	OF1-RW	FB	ТВ		
(Matrix: Water)								
		Client sampling date / time		09-Oct-2023 14:40	09-Oct-2023 16:40	09-Oct-2023 17:00	09-Oct-2023 15:00	
Analyte	CAS Number Method/Lab	LOR	Unit	YL2301402-006	YL2301402-007	YL2301402-008	YL2301402-010	
				Result	Result	Result	Result	
Volatile Organic Compounds [Fuels]								
Xylenes, total	1330-20-7 E611A/VA	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	
Hydrocarbons								
F1 (C6-C10)	E581.VH+F1/	100	µg/L	<100	<100	<100	<100	
F2 (C10-C16)	VA E601/VA	300	µg/L	<300	<300	<300	<300	
F3 (C16-C34)	E601/VA	300	µg/L	<300	<300	<300	<300	
F4 (C34-C50)	E601/VA	300	µg/L	<300	<300	<300	<300	
VHw (C6-C10)	E581.VH+F1/ VA	100	µg/L	<100	<100	<100	<100	
F1-BTEX	EC580/VA	100	µg/L	<100	<100	<100	<100	
VPHw	EC580A/VA	100	µg/L	<100	<100	<100	<100	
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6 E601/VA	1.0	%	72.7	75.2	74.9	67.1	
Dichlorotoluene, 3,4-	95-75-0 E581.VH+F1/ VA	1.0	%	96.4	119	114	112	
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4 E611A/VA	1.0	%	94.3	95.9	96.2	94.5	
Difluorobenzene, 1,4-	540-36-3 E611A/VA	1.0	%	100.0	99.7	100	99.6	
Glycols								
Ethylene glycol	107-21-1 E680E/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	
Glycols Surrogates								
Propanediol, 1,3-	504-63-2 E680E/VA	1.0	%	99.1	95.9	102	105	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.



CERTIFICATE OF ANALYSIS								
Work Order	: YL2301453	Page	: 1 of 3					
Client	: Nautchiuk Environmental Inc.	Laboratory	: ALS Environmental - Yellowknife					
Contact	: Cam McKillop	Account Manager	: Oliver Gregg					
Address	: PO BOX 1463 18 NATALA DRIVE	Address	: 314 Old Airport Road, Unit 116					
	INUVIK NT Canada X0E 0T0		Yellowknife NT Canada X1A 3T3					
Telephone		Telephone	: 1 867 445 7143					
Project		Date Samples Received	: 18-Oct-2023 09:15					
PO	:	Date Analysis Commenced	: 18-Oct-2023					
C-O-C number	: 17-824283	Issue Date	: 15-Nov-2023 09:44					
Sampler	:							
Site	:							
Quote number	: YL23-NAUT100-001							
No. of samples received	: 6							
No. of samples analysed	: 6							

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Oliver Gregg	Client Services Supervisor	External Subcontracting, Yellowknife, Northwest Territories
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference. Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances LOR: Limit of Reporting (detection limit).

Unit	Description
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Sub-Matrix: Water			Ci	lient sample ID	SNP1-D	SNP1-RW	SNP2-D	SNP2-RW	FD
(Matrix: Water)									
			Client samp	oling date / time	16-Oct-2023 10:20	16-Oct-2023 10:15	16-Oct-2023 10:05	16-Oct-2023 10:00	16-Oct-2023 10:00
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301453-001	YL2301453-002	YL2301453-003	YL2301453-004	YL2301453-005
					Result	Result	Result	Result	Result
Aggregate Organics									
Carbonaceous biochemical oxygen demand [CBOD]		CBOD5/1Y	2	mg/L	3	0	8	0	0
Glycols									
Ethylene glycol	107-21-1	E680E/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Glycols Surrogates									
Propanediol, 1,3-	504-63-2	E680E/VA	1.0	%	110	109	104	110	106

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water Client sample ID			ient sample ID	FB	 	 	
(Matrix: Water)							
Client sampling date / time				16-Oct-2023 10:25	 	 	
Analyte	CAS Number	Method/Lab	LOR	Unit	YL2301453-006	 	
					Result	 	
Aggregate Organics							
Carbonaceous biochemical oxygen demand [CBOD]		CBOD5/1Y	2	mg/L	0	 	
Glycols							
Ethylene glycol	107-21-1	E680E/VA	5.0	mg/L	<5.0	 	
Glycols Surrogates							
Propanediol, 1,3-	504-63-2	E680E/VA	1.0	%	112	 	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.