ATTACHMENT 35

LTWP Enhanced Phase I ESA

City of Iqaluit

Enhanced Phase I Environmental Site Assessment

Long Term Water Program – Supply and Storage

Iqaluit, Nunavut

April 2024

Photo of Qikiqtalik Lake

Enhanced Phase I Environmental Site Assessment

Long Term Water Program – Supply and Storage

April 2024

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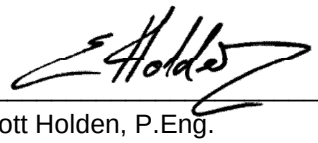

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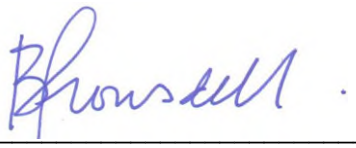

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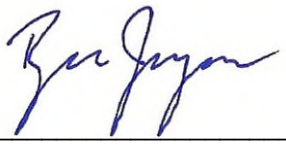

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1	0	November 27, 2023	N/A	Draft – for client review	Various
2	1	April 5, 2024	Multiple	Final Report	E. Holden and R. Janzen

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Executive Summary

Arcadis Canda Inc. (Arcadis) was retained by City of Iqaluit to conduct a Phase I Environmental Site Assessment (ESA) for a parcel of untitled land located northeast of the surveyed portion of the community in the City of Iqaluit, Nunavut (the Site). Arcadis understands that this Phase I ESA is being conducted to meet the regulatory requirements pursuant to development of a new raw water reservoir for the City, referred to as the Long Term Water Program.

The Site is located approximately 150 metres northeast of the developed portion of the City of Iqaluit and is roughly square in shape with aerial coverage of approximately 1,150 hectares. The northeast half of Lake Geraldine is included in the Site, as is the southwest half of Qikiqtalik (Unnamed) Lake. The terrain comprises rolling hills with rocky outcrops and tundra valleys, with finger lakes oriented northwest-southeast. The Niaqunnguk (Apex) River traverses the Site from its northwest boundary to its southern corner. The Site has a tundra climate and is in a zone of continuous permafrost.

The Site consists predominantly of undeveloped land used for hunting, foraging, and recreational purposes, including temporary camping, picnicking, and swimming, primarily along the Niaqunnguk River. Two unpaved roads traverse the Site and provide access to the Iqaluit Shooting Association Range, Tasiluliariaq Rotary Park, and two water pumping stations (referred to in this report as the Apex Pumping Station and Interim Pumping Station). These two pumping stations were established at the Site between 2019 and 2021 for the purpose of obtaining additional water during the summer months to help meet the potable water needs of the City of Iqaluit.

The objective of the Phase I ESA is to identify areas of potential environmental concern (APECs) on the Site that may exist as a result of current and/or past activities on or adjacent to the Site. To meet this objective, Arcadis conducted the following activities:

- Reviewed records in relevant federal, territorial, and private sector environmental-related databases using the services of Environmental Risk Information Services;
- Reviewed available aerial photographs of the Site between 1948 and 2023;
- Submitted and reviewed the findings of a Freedom of Information (FOI) request to the Nunavut Department of Environment regarding environmental information pertaining to the Site;
- Inspected the Site on 20 and 21 September 2023 to collect information on potential on- and offsite contaminant sources and to identify potentially hazardous or regulated materials;
- Interviewed personnel to collect information on past and present operations that may impact the environment; and,
- Collected and analyzed surface soil samples to provide a preliminary assessment of soil quality, and determine if contaminants of potential concern (COPC) were present.

Based on the findings of this Phase I ESA, the following four APECs were identified at the Site:

- **APEC 1:** The Iqaluit Shooting Association Range was identified as an APEC given its potential for contamination to the environment as the results of bullets and other ammunition waste. The range is currently secured by a gate that limits vehicle access to members and other authorized personnel. No fuel tanks or other sources for contamination were identified at this APEC.
- **APEC 2:** A Historical Fuel Oil Spill was identified as an APEC given its potential for contamination to the environment as the result of the spilt fuel. The spill was reported to the Government of Nunavut by email on June 14, 2018. The quantity or type of fuel product spilt was not identified. No details on the cleanup

procedure for the spill could be found. Arcadis did not identify any evidence of the spill (e.g., staining, odours, or sheen) during the site inspection.

- **APEC 3:** Apex Pumping Station at Niaqunnguk River was identified as an APEC given its potential for contamination to the environment because of the fuel or metal components used as a part of the station's construction and operation. Two 1,111-litre aboveground fuel tanks containing diesel are located beside the generator shed by the Apex Pumping Station at Niaqunnguk River. Both tanks are housed within a secondary containment structure, consisting of a plastic liner to contain spills or leaks. No other sources for contamination were identified at this APEC.
- **APEC 4:** Interim Pumping Station at Qikiqtalik Lake was identified as an APEC given its potential for contamination to the environment because of the fuel or metal components used as a part of the station's construction and operation. At the time of the site inspection by Arcadis, the station's pump and fuel tank were not present; however, the secondary containment structure used to house these components was still present onsite. No other sources for contamination were identified at this APEC.

Surface soil samples were collected at each of the APECs. All soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) fractions F1 to F4, and metals. Soil sampling locations were selected in the field at each APEC using professional judgment. No clear evidence of contamination was observed at any soil sampling locations.

Analytical results for the soil samples collected at the Shooting Association Range (APEC 1) and Apex Pumping Station (APEX 3) were compared to the Government of Nunavut (GN) Tier 1 Industrial land use criteria. These criteria were selected as both these locations have restrictions to public access and children are not permitted continuous access or occupancy. The analytical results for soil samples at the Historical Fuel Oil Spill area (APEC 2) and Interim Pumping Station (APEC 4) were compared to GN Tier 1 Residential/Parkland land use criteria as these locations are readily accessible to the public.

No detectable concentrations of BTEX and PHC F1 to F4 were reported in any of the soil samples collected. Metals were detected at varying concentrations in the soil samples; however, all concentrations were below applicable criteria.

Based on the findings of this assessment, the potential environmental impacts at the Site are considered limited. No further assessment of the four APECs identified above is deemed necessary at this time.

1 Introduction

Arcadis Canda Inc. (Arcadis) was retained by City of Iqaluit to conduct a Phase I Environmental Site Assessment (ESA) for a parcel of untitled land located northeast of the surveyed portion of the community in Iqaluit, Nunavut (the Site). Arcadis understands this Phase I ESA is being conducted to meet the regulatory requirements pursuant to development of a new potable water reservoir for the City, referred to as the Long Term Water Program. The ESA is conducted in accordance with the Government of Nunavut (GN) Guideline for Contaminated Site Remediation (2009) and Canadian Standards Association (CSA) Standard Z768-01 (R2022). This ESA includes sampling, analysis, and data interpretation for soils identified as potentially contaminated; therefore, the ESA is Enhanced. The site location is shown on **Figure 1**.

1.1 Project Objectives

The objective of the Phase I ESA is to identify areas of potential environmental concern (APEC) on the Site that may exist as a result of current and/or past activities on or adjacent to the Site.

1.2 Scope of Work

This Phase I ESA was conducted in accordance with the CSA document entitled "*Phase I Environmental Site Assessment*", (CSA document Z768-01, as amended). The scope of work associated with this ESA consisted of the following principal activities:

- *Background information review* of pertinent historical data and published registries in the public domain (records review);
- *Regulatory agency inquiries* of relevant provincial and municipal agencies for readily available information in their files pertaining to environmental records associated with the Site;
- *Personnel interviews* to collect information on past and present operations that may impact the environment;
- *Site reconnaissance* to collect information on potential on- and offsite contaminant sources and to identify potentially hazardous or regulated materials;
- *Sampling and analysis* of soils to assess for presence of contamination; and
- *Report preparation* based on an assessment of the findings of the above tasks.

2 Site Description

2.1 Site Location and Setting

The Site lies approximately 150 metres (m) northeast of the City of Iqaluit and is roughly square in shape with aerial coverage of approximately 1,150 hectares (ha). The northeast half of Lake Geraldine is included in the Site, as is the southwest half of Qikiqtalik (Unnamed) Lake. The Road to Nowhere leads from a residential area in the southeast portion of Iqaluit to the approximate centre of the Site, and the Road to Unnamed Lake splits off the Road to Nowhere and leads to the southwest shore of Qikiqtalik Lake. These site features are shown in **Figure 2**.

The coordinates of the approximate centre of the Site are:

Latitude: 63° 45’ 54.46”

Longitude: 68° 28’ 5.21”

The terrain comprises rolling hills with rocky outcrops and tundra valleys, with finger lakes oriented northwest-southeast. The Niaqunnguk (Apex) River traverses the Site from its northwest boundary to its southern corner. Water in Niaqunnguk River flows south to Frobisher Bay. Site topography and river flow directions are shown in **Figure 3**.

2.2 Legal Description

The Site is within the City of Iqaluit municipal boundary but outside of the surveyed area and is therefore considered “Untitled Municipal Land”. The land beneath water bodies is under federal jurisdiction. Please see Section 4.4 for specific information about land use designations.

2.3 Current Land Use of Adjacent Properties

Land use surrounding the Site is summarized as follows:

- North: Undeveloped land (foraging, hunting, and recreational uses)
- East: Undeveloped land (foraging, hunting, and recreational uses)
- South: Undeveloped land (foraging, hunting, and recreational uses along with the residential neighbourhood of Apex further south)
- West: City of Iqaluit

2.4 Climate

The Site has a tundra climate; the temperatures are very low all year round. According to the Canadian Climate Normals for 1991 – 2020, the average temperature in the City of Iqaluit is -8.6 degrees Celius (°C) with a typical high of +8.1 °C in July and a typical low of -27 °C in February. Over the year, the average temperatures vary by 35°C.

The low humidity in Nunavut helps reduce the impact of the cold. However, the windchill factor is often more significant than the actual air temperature. Many communities in Nunavut have steady average winds of 15 – 20 kilometers per hour (kph) daily. As most of the Arctic is a polar desert, long stretches of cloudless days without precipitation are common.

The average annual total precipitation is 361.2 millimeters (mm). The highest average precipitation falls in the month of August at 61.7 mm with the lowest average precipitation falling in February at 14.0 mm. In Nunavut, cool temperatures generally mean that snow cover does not completely melt until June.

The sunniest month in Iqaluit is July with an average of 236 hours of sunshine, and the least sunny month is December with an average of 12 hours. The longest day of the year sees approximately 20 hours of daylight, while the shortest day sees approximately four hours.

The Iqaluit area is in a zone of continuous permafrost.

2.5 Geology, Topography, and Drainage

According to Natural Resources Canada Toporama, the Site comprises rolling hills to a maximum of approximately 250 m above mean sea level (amsl) in height, with the highest elevations in the northeast (i.e., at the southwest side of Qikiqtalik Lake). The elevation generally reduces from Qikiqtalik Lake toward Lake Geraldine and the City of Iqaluit. Site topography is shown in **Figure 3**.

According to the Geological Survey of Canada Map 1860A, the Site comprises Paleoproterozoic stratified sequences. Canadian Geoscience Map 64 provides details of the surficial geology. This predominantly comprises till veneer: diamicton, contains sand, stones, and boulders in a silty sand matrix; 0.5 – 2 m thick; bedrock topography is evident. Bedrock is Precambrian. Secondarily, approximately central through the Site on a northwest-southeast axis, there is a 'ribbon' of till blanket: diamicton; sand, gravel, and boulders in a silty sand matrix; 1 – 10 m thick; generally masks bedrock structure; also appears in end moraines; affected by periglacial processes such as solifluction lobes, frost boils, and sorted patterns. Susceptible to thaw slumping on slopes or in excavations. There is a tertiary formation, adjacent to, and intermittent within, the till blanket ribbon, which is identified as glaciofluvial subaerial outwash plain. This is defined as: stratified gravel and sand; 1 – 30 m thick; proglacial floodplains, terraces, and fans; includes kame terraces, buried esker ridges, minor subglacial and subaquatic deposits, locally kettled: sediments deposited by meltwater behind, at, and in front of ice margins. May contain ice wedges and massive ice bodies.

The Site is in a zone of continuous permafrost that generally begins at a depth below 1 to 2 m. It is possible that the water bodies across the Site serve as heat sinks and depress permafrost formation to greater depths. Taliks, an area of unfrozen ground surrounded by permafrost, are likely to form in areas near or under water bodies.

Surface water drainage is likely to flow from the hills into the nearest small lake, river, or stream, and then into the associated drainage basin, discharging into the marine environment of Koojesse and/or Tarr Inlets south of the Site, shown on **Figure 1**.

2.6 Groundwater Conditions

Given the presence of bedrock and permafrost, liquid groundwater across the Site is expected to be limited to taliks and the active layer (i.e., the top layer of soil or fractured rock that thaws during the summer and freezes again during the autumn). Most groundwater is anticipated to flow during seasonal thaw conditions within the

active layer. This groundwater likely flows away from areas of higher elevation to areas of lower elevation such as the Niaqunnguk River, Lake Geraldine, and the multiple unnamed waterbodies across the Site.

Regional groundwater flow is inferred to be to the south, in the direction of Koojesse and Tarr Inlets, shown on **Figure 1**. There is no evidence or record of groundwater monitoring wells having been installed at the Site for the purposes of testing the chemical or physical properties of the groundwater. Based on the results of the Environmental Risk Information Services search and interview with Michelle Armstrong (Contract Planner with the City), no monitoring or drinking water wells are present at the Site.

Installation of piezometers has been proposed as part of the geotechnical investigations being undertaken for the construction of the upgrades to the City's water supply and distribution infrastructure systems. The groundwater data from these piezometers will provide additional details on the groundwater conditions at the Site.

3 Methodology

This Phase I ESA was conducted in accordance with the requirements outlined in the GN Guideline for Contaminated Site Remediation (2009) for environmental site assessments. This guideline document was developed by the GN Department of Environment's Environmental Protection Division (EPD) and approved by the Minister of Environment under authority of Section 2.2 of the Environmental Protection Act (EPA) for Nunavut.

The EPD is the key environmental agency responsible for ensuring the proper management of Contaminated Sites in Nunavut. Contaminated Sites are areas of land, surface water, groundwater, or sediments that have levels of contaminants exceeding applicable remediation criteria. One of the responsibilities of the EPD includes confirming the required level of remediation using the remediation criteria outlined in the GN Guideline for Contaminated Site Remediation (2009). Additionally, Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) are responsible for the management of inland waters, including surface water, and groundwater. Therefore, the Territorial Lands Act and Nunavut Waters and Nunavut Surface Rights Tribunal Act are applicable to the Site, specifically when contaminated water is found or contamination to water occurs.

In accordance with the requirements outlined in the GN Guideline for Contaminated Site Remediation (2009), this Phase I ESA was conducted to address the following:

- Assess facility characteristics and provide a current and historical description of the site, particularly as it relates to the areas of concern (e.g. contaminant sources). Review facility records and interview past and present employees to gather relevant information.
- Characterize contaminants by identifying any used or stored at the site. Contaminant quantities should be estimated by visual inspection, reviewing documentation and interviewing past and present employees.
- Describe physical site characteristics (geology, hydrology, and hydrogeology) by examining available data. The objective is to develop a comprehensive understanding of local site characteristics and a current and historical description of the area.
- A visual inspection of the site should be conducted along with interviews of local residents who may have knowledge of the site and its history. During the site inspection, the inspector will look for signs of contamination including staining and vegetation stress. Additionally, sensitive habitats (e.g. beaches, ponds, streams) should be examined for the presence of hydrocarbons.

3.1 Records Review

The following resources were consulted to obtain information on areas of physical site characteristics and potential environmental concern pertaining to the Site:

- Geological and topographical maps and surveys.
- Arcadis retained the services of Environmental Risk Information Services (ERIS) to conduct a review of all relevant federal, territorial, and private sector databases (including the GN Spill database). Search results are presented in **Appendix A** and are discussed in Section 4.3.
- Aerial photographs dated 1948, 1958, 1969, 1976, 1982, 1992, and 2022 were provided in the ERIS report and were reviewed by Arcadis. They are presented in **Appendix B** and discussed in Section 4.1.2.
- Google Earth aerial photographs . These photographs are presented in **Appendix B** and discussed in Section 4.1.2.

- Nunavut Department of Environment was contacted with a Freedom of Information (FOI) request for information regarding environmental concerns including orders, spill reports, environmental investigations/prosecutions/documents or permits related to emissions, wastes, or chemical usage. Search results are presented in **Appendix C**.

3.2 Interviews

Ms. Michelle Armstrong, Contract Planner (Planning and Development Department), Northern Futures Planning, was contacted on 23 October 2023 and provided with a Site Plan (Figure 2) and a Phase I ESA questionnaire. Ms. Armstrong's experience with the Site dates back to 2003. A copy of the transcribed interview and a map with zoning information is provided in **Appendix D**.

Mr. Blaine Heffernan, Shooting Association Range Member and Primary Contact, was contacted on 8 November 2023 regarding the history and any potential environmental issues associated with the Iqaluit Shooting Association Range. A copy of Mr. Herrernan's response has been included in **Appendix D**. Attempts were made while Arcadis was in Iqaluit for the site inspection and following the site visit to reach a member of the local Hunter and Trappers Association for an interview. However, Arcadis was unable to connect with anyone during the preparation of this Phase I ESA.

3.3 Site Inspection

Mr. Ryan Janzen (environmental/geotechnical engineer) of Arcadis conducted a site visit from 19 to 22 September 2023. Arcadis completed site inspections by making observations of the Site and the surrounding properties from the accessible locations. Give the large size of the Site, the site inspection was focused on the following areas:

- Proposed pipeline route;
- Proposed new reservoir location;
- Proposed borrow areas;
- Existing water conveyance infrastructure;
- Developed areas; and,
- Identified APECs from background document review (e.g., historical fuel oil spill area).

The inspection included, but was not limited to, making note of any stressed vegetation, drums, discarded containers, leaks, corrosion, pits, sumps, wells, dead animals, sheen on standing surface water, stained soil, suspected Asbestos-Containing Materials / Urea Formaldehyde Foam Insulation, radioactive materials, Ozone Depleting Substances, Polychlorinated Biphenyls-containing equipment and storage, lead paint, chemical storage areas, transformers, utilities, waste piles, areas of dumping, and chemical storage areas. Photographs of some of the features noted during the site visit are included in **Appendix E**.

3.4 Soil Sampling

Surface soil samples were collected between 0 and 0.15 metres below ground surface (m bgs) at ten locations across the Site where potential contaminating activities were being or had been conducted. These samples were collected during the site inspection to provide a preliminary assessment of soil quality and determine if contaminants of potential concern (COPC) were present.

Soil samples were recovered by manual methods from each sampling location. A new pair of nitrile gloves were put on prior to the collection of each sample. Individual soil samples were examined by Arcadis upon recovery in the field for the purposes of describing and recording texture, colour, odour, and moisture content.

All soil samples were submitted for laboratory analysis of:

- benzene, toluene, ethylbenzene, xylenes (BTEX);
- petroleum hydrocarbon (PHC) fractions F1 to F4; and,
- metals.

Soil samples submitted for BTEX and PHC F1 analyses were collected using disposable “Terra Core” samplers and placed into laboratory-supplied glass vials, charged with a known volume of methanol. Soil samples for the remaining parameters (F2 to F4 PHCs and metals) were collected in 120 millilitre (mL) and 250 mL wide-mouthed clear glass jars, provided by the laboratory. Following collection, all samples were placed into an insulated cooler with ice for sample preservation. The cooler containing the samples was delivered to Bureau Veritas Laboratories (BVL) in Ottawa, Ontario, by Arcadis. BVL is accredited by the Standards Council of Canada (SCC) and has Canadian Association for Laboratory Accreditation (CALA).

3.4.1 Quality Assurance/Quality Control

Laboratory and field control checks were used to ensure that the quality of the analytical data was maintained.

One field duplicate sample was prepared by obtaining a soil sample split from a preselected sample location. The field duplicate was given the sample identifier of “DUP” and submitted to the laboratory for QA/QC analysis.

The relative percent difference (RPD) was calculated, based on the equation below, for the duplicate sample and the original sample:

$$RPD = \frac{|X1 - X2|}{X_{avg}} \times 100$$

where, X1 and X2 are the measured concentrations of the duplicate pairs and X_{avg} is the mean of these two values. RPDs were only calculated when the analyte was detected in both the original and the duplicate sample at a concentration above the laboratory reportable detection limit (RDL) and the measured concentrations were greater than five times the minimum RDL. Results for duplicate analyses were considered acceptable where RPD values were <60% for soil duplicate analyses, consistent with Canadian Council of Ministers of the Environment (CCME) guidance (CCME, 2016). Calculated RPD values are shown in **Table 1** at the rear of the report.

In addition, the following laboratory QA/QC samples were analyzed:

- Matrix spikes, spiked blanks, and method blanks were conducted a minimum of once by the laboratory; and,
- Laboratory duplicates were run in the laboratory on ten percent of the samples subject to testing.

Laboratory analysis results and QA/QC program results were scrutinized on receipt to determine whether the results returned are representative. The laboratory customer services representative was contacted for any clarification, if any uncertainty associated with the veracity or quality of the results was noted when reviewed.

3.4.2 Applicable Guidelines

The Tier 1 criteria outlined in the Government of Nunavut (GN) Environmental Guideline for Contaminated Site Remediation (1999, revised 2009) were selected to evaluate the significance of the reported soil analytical results. This guideline document includes soil quality criteria derived specifically for the protection of ecological receptors in the environment and for the protection of human health associated with four land uses: agricultural/wildland, residential/parkland, commercial, and industrial. These criteria are further divided based on soil texture (i.e., coarse, or fine-grained), depth (i.e., surface soil and subsoil), and/or exposure pathways.

The land use prescribed to the locations on the Site where soil samples were collected was either residential/parkland or industrial. Residential/parkland criteria were used at soil sample locations where unrestricted recreational use of the land was possible. Industrial criteria were used at soil sample locations where public access is restricted and children are not permitted continuous access or occupancy.

Soil texture of all soil samples was classified as coarse-grained based on visual (field) observations. Furthermore, all soil samples collected as part of this ESA were considered surface soil samples as all soil samples were collected from less than 1.5 m bgs.

4 Phase I Environmental Site Assessment

4.1 Records Review / Historical Land Use

4.1.1 Previous Environmental Reports

No previous environmental reports for the Site were available for Arcadis for review. However, in 2017 Arcadis conducted an investigation at the Iqaluit Airport and there is some regional information in that report that contributed to our understanding of the surrounding area.

4.1.2 Aerial Photographs

Aerial photographs of the portion of the Site nearest Geraldine Lake were provided by ERIS. They are dated 1948, 1958, 1969, 1976, 1982, 1992, and 2022. Arcadis also reviewed Google Earth photography of the entire Site for 1985, 2003, 2006, 2009, 2011, 2016, 2020, and 2023. No imagery was available for the 1990s. As the scale and quality of the photographs varied, a detailed evaluation of the surface conditions at the Site or adjacent properties was not always possible. Copies of the aerial photographs reviewed are provided in **Appendix B**.

1948 Aerial Photograph (ERIS)

A portion of Geraldine Lake is evident. The lake level appears low such that the southeast finger is discontinuous with the rest of the lake. No clear evidence of land development on the Site can be seen.

1958 Aerial Photograph (ERIS)

No notable changes as compared to the 1948 Aerial Photograph.

1969 Aerial Photograph (ERIS)

A portion of Geraldine Lake is evident. The lake level appears low such that the southeast finger is discontinuous with the rest of the lake. A portion of Iqaluit's power plant on the southwest side of Geraldine Lake is also evident. No clear evidence of land development on the Site can be seen.

1976 Aerial Photograph (ERIS)

No notable changes as compared to the 1969 Aerial Photograph.

1982 Aerial Photograph (ERIS)

This is a composite photograph. A portion of Geraldine Lake is evident. The lake level appears low, and the southeast finger still appears as a separate body of water.

1985 Aerial Photograph (Google Earth)

The entire Site is included in the photograph; however, due to the satellite image resolution, it lacks detail. The southeast finger of Geraldine Lake still appears as a separate body of water. The Road to Nowhere is evident and appears to end in a borrow area approximately 400 m north of Niaqunnguk River. There are three areas beside the road that have a different texture and colour than the rest of the landscape and are likely also borrow areas.

1992 Aerial Photograph (ERIS)

A portion of Geraldine Lake and the Road to Nowhere is evident. The lake level appears low, and the southeast finger still appears as a separate body of water.

2003 Aerial Photograph (Google Earth)

The entire Site is included in the photograph. The lake is iced over such that it is not clear if the southeast finger of Geraldine Lake is still a separate body of water. The Road to Nowhere is evident along with the four assumed borrow areas identified in the 1985 Aerial Photograph. There is no development evident anywhere else onsite.

2006 Aerial Photograph (Google Earth)

The entire Site is included in the photograph. The southeast finger of Geraldine Lake may now be connected to the rest of the lake; however, the lake level is low. The Road to Nowhere is evident along with the four assumed borrow areas identified in the 1985 Aerial Photograph. There is no development evident anywhere else onsite.

2009 Aerial Photograph (Google Earth)

The entire Site is included in the photograph. The southeast finger of Geraldine Lake may now be connected to the rest of the lake. The lake is iced over. The Road to Nowhere is evident and it appears to extend a little farther northwest. There is no development evident anywhere else onsite.

2011 Aerial Photograph (Google Earth)

The entire Site is included in the photograph. The southeast finger of Geraldine Lake is now connected to the rest of the lake and the lake level appears high. The Iqaluit Shooting Association Range is evident near the end of the Road to Nowhere. There is a cloud shadow over the range such that there is no view of detail. Tasiluliariaq Rotary Park is evident on the north side of the Road to Nowhere near the Niaqunnguk River. There is no development evident anywhere else onsite.

2016 Aerial Photograph (Google Earth)

The entire Site is included in the photograph. The southeast finger of Geraldine Lake is connected to the rest of the lake and the lake level appears high. The Road to Nowhere is evident and still appears to extend beyond the Iqaluit Shooting Association Range. Two earth berm ranges are now evident. There is no development evident anywhere else onsite.

2020 Aerial Photograph (Google Earth)

The entire Site is included in the photograph. The southeast finger of Geraldine Lake is connected to the rest of the lake and the lake level appears high. The Road to Unnamed Lake is now evident; however, it does not yet reach Qikiqtalik Lake. There are two borrow areas along the road. There is no development evident anywhere else onsite.

2022 Aerial Photograph (ERIS)

A portion of Geraldine Lake is evident and appears in its current shape. The Iqaluit Shooting Association Range is evident and a portion of the Road to Nowhere. Offsite, a road associated with a residential neighbourhood appears to run parallel to the southwest site boundary.

2023 Aerial Photograph (Google Earth)

The entire Site is included in the photograph. The southeast finger of Geraldine Lake is connected to the rest of the lake and the lake level appears high. The Road to Nowhere is evident and it appears to extend beyond the Iqaluit Shooting Association Range. Road to Unnamed Lake now reaches Qikiqtalik Lake. There appear to be several borrow areas along the road.

4.1.3 City Directories

No City Directories are available for the Site area. See null search result in ERIS report, **Appendix A**.

4.1.4 Fire Insurance Plans

No Fire Insurance Plans are available for the Site area. See null search result in ERIS report, **Appendix A**.

4.2 Freedom of Information Request

In early November 2023, Arcadis contacted Nunavut Department of Environment with a Freedom of Information (FOI) request for information regarding environmental concerns including orders, spill reports, environmental investigations/prosecutions/documents or permits related to emissions, wastes, or chemical usage. No records were available. Search results are presented in **Appendix C**.

4.3 ERIS Database Report

Arcadis retained the services of ERIS to conduct a review of all relevant federal, territorial, and private sector databases for information about the Site and the area comprising a 250 m band around the outside of the Site boundaries (see page 10 of the Search Report, **Appendix A**). The search was requested on 05 September 2023. A limitation to the search was the very high cost associated with obtaining aerial photographs for the entire 1150 ha Site; therefore, this portion of the search was restricted to the southeast shore of Geraldine Lake east to the Apex River and inclusive of the shooting range. The historical aerial Site overview was supplemented with Google Earth imagery, per Section 4.1.2 above. Search results are presented in **Appendix A**.

The following databases were searched: Automobile Wrecking & Supplies, Dry Cleaning Facilities, Crown Land Fuel Storage Tanks, Chemical Register, Compressed Natural Gas Stations, ERIS Historical Searches, Federal Convictions, Contaminated Sites on Federal Land, Federal Identification Registry for Storage Tank Systems (FIRSTS), Greenhouse Gas Emissions from Large Facilities, Indian & Northern Affairs Fuel Tanks, Canadian Mine Locations, Mineral Occurrences, National Analysis of Trends in Emergencies System (NATES), National Defence & Canadian Forces Spills, National Defence & Canadian Forces Waste Disposal Sites, National Energy Board Pipeline Incidents, National Energy Board Wells, National Environmental Emergencies System (NEES), National PCB Inventory, National Pollutant Release Inventory 1993–2020, National Pollutant Release Inventory – Historic, Oil and Gas Wells, Retail Fuel Storage Tanks, Scott's Manufacturing Directory, and Spills.

The search results were null for all but two of the databases, as follows:

- ERIS Historical Searches (EHS) – There were seven results within the 250 m boundary area.
- Spills (SPL) – There was one result on the subject Site and six results within the 250 m boundary area.

The findings are identified with a map key on page 10 of the Search Report and are summarized below in numerical order. Note that due to duplications, the number of entries is 11, and not 14. One spill location was not plotted on the map, and this is included in the last row of the table below.

Table 4-3 – ERIS Search Findings Summary

Map Key	Identifier	Location	Details
1	SPL	Onsite (see map)	Government of Nunavut Spill No.: Spill-2018226. Spill Date: June 2018; on land; unknown product type and quantity of fuel; no other information is provided.
2	EHS	4040 Anuri Street, Iqaluit	Request Date: January 2023; Fire insurance map request
3	EHS	4100 Road to Nowhere, Iqaluit	Request Date: March 2016; Custom report request
4	SPL	Iqaluit (183m west-southwest of Site boundary)	Spill Date: October 2021; in fresh water (“south-central end of Lake Geraldine (just west of dam)”); unknown quantity of oil
5	EHS	4006 Anuri Street, Iqaluit	Request Date: November 2022; Fire insurance map request
6	SPL	Building 4110A, Road to Nowhere, Iqaluit (187m southwest of Site boundary)	Spill Date: June 2011; on land; 900L of heating oil from storage tank
	SPL	Building 4110, Road to Nowhere, Iqaluit (187m southwest of Site boundary)	Leak Date: January 2011; on land; heating oil leak in crawl space
7	EHS	4015 Anuri Street, Iqaluit	Request Date: January 2014; no other details provided
8	SPL	4054 Anuri Street/Road to Nowhere, Iqaluit (198m west-southwest of Site boundary)	Spill Date: October 2008; on land; 500L of heating oil from storage tank
9	SPL	4001 & 4059 [Anuri Street], Iqaluit (218m southwest of Site boundary)	Spill Date: April 2018; on land; 750L of heating oil from storage tank
10	EHS	Buildings 5067 A, B, C & D, Iqaluit	Request Date: October 2007; Fire insurance map request
11	SPL	Building 4002, Anuri Street, Iqaluit (241m southwest of Site boundary)	Spill Date: November 2016; on land; 2000L of heating oil from storage tank

Map Key	Identifier	Location	Details
No key, unplottable	SPL	Unit 4015-B Road to Nowhere Subdivision, Iqaluit	Spill Date: November 2016; on land; 100L of heating oil from storage tank

With regard to the spills that have occurred offsite – map key 4, 6, 8, 9, 11, and unplottable – these are all in lower elevation areas relative to elevation on the Site and are unlikely to have impacted the Site due to horizontal distance and elevation.

4.4 Interviews

Ms. Michelle Armstrong, Contract Planner with the City, was interviewed for this Phase I ESA. Ms. Armstrong was asked about the legal description (see Section 2.2) and land use designations of the Site. The Land Use Map is on the last page of **Appendix D**. A watershed occupies the northwest 45% of the Site. What is described as "open space" (Open Area Zone) occupies approximately 20% of the Site in the southeast corner. The remainder of the Site is referred to as Nuna (Municipal Reserve Zone). Within the Open Area Zone is Rotary Park.

According to Ms. Armstrong, properties accessed via the Road to Nowhere include the following:

1) The Shooting Association Range, operated and maintained by the Iqaluit Shooting Association; and
2) The former Iqaluit Ski Club permitted area which will be taken over by Embrace Life, an organization supporting land-based programming. They will construct a small cabin.

She said she is not familiar with other uses of the Site, other than recreational uses such as swimming, temporary camping, picnicking, etc. along the Niaqunnguk River.

To the best of Ms. Armstrong's knowledge, there have never been any commercial or industrial uses of the Site, and she does not know of any above- or underground utilities or above- or underground fuel storage tanks.

Mr. Blaine Heffernan, Shooting Association Range Member and Primary Contact, was contacted by Arcadis in November 2023 regarding the history and any potential environmental issues associated with the Iqaluit Shooting Association Range. Mr. Heffernan indicated he was not aware of any contamination from fuel spills or other environmental issues associated with the shooting range.

4.5 Site Inspection

The following key areas were inspected by Mr. Ryan Janzen (environmental/geotechnical engineer) of Arcadis on 20 & 21 September 2023.

Shooting Association Range

The Iqaluit Shooting Association Range is located off the Road to Nowhere near the centre of the Site, shown on **Figure 2**. Construction of the range began in 2008 according to the Mr. Blaine Heffernan, Shooting Association Range Member and Primary Contact. At the time of the site inspection by Arcadis, a locked gate to prevent vehicle access to the range area was present. The range consisted of two shooting areas: one area was approximately 30 m in length and the other approximately 100 m in length. The range's outermost sides and back consisted of earth berms to contain bullets. Evidence of brass casings and plastic shotgun hulls were observed around the range. Photographs 1 through 3 in **Appendix E** show features at the Shooting Association Range.

Historical Fuel Oil Spill

The Historical Fuel Oil Spill (Spill No.: Spill-2018226) was reported to the Government of Nunavut by email on June 14, 2018. This spill was identified in the ERIS database review outlined in Section 4.3. Based on the coordinates reported to the Government of Nunavut, the spill occurred in an area on or near the Road to Nowhere on the south side of the Site, shown on **Figure 2**. No evidence of the spill (e.g., ground staining, odours, or surface water sheen) was observed during the site inspection. The area was observed to contain evidence of bonfires and debris (e.g., chair and sheets of plywood). Photographs 4 through 6 in **Appendix E** show features at the inferred Historical Fuel Oil Spill area.

Apex Pumping Station

The Apex Pumping Station is located on the Site at Niaqunnguk River near the Shooting Association Range, shown on **Figure 2**. The purpose of the station is to pump water from the Niaqunnguk River into Lake Geraldine during the summer months to help meet the potable water needs of the City of Iqaluit. Construction of the station began in 2019. At the time of the site inspection by Arcadis, the station consisted of a leveled gravel area with three sea-can structures: office/supply shed, generator shed, and electrical shed. The area of the station containing these three structures was fenced off. A single pipeline on the southwest bank of the Niaqunnguk River was observed to run aboveground to Lake Geraldine. Photographs 7 through 17 in **Appendix E** show the Apex Pumping Station area.

Interim Pumping Station

The Interim Pumping Station is located near the north corner of the Site at Qikiqtalik Lake, shown on **Figure 2**. The station was established in 2020 to pump water from Qikiqtalik Lake to Niaqunnguk River. At the time of the site inspection by Arcadis, the station consisted of a leveled gravel area at the north end of Road to Unnamed Lake. A run of aboveground pipeline (approximately 300 m in length) and a secondary containment structure made using a plastic liner and gravel were present at the station. Photographs 18 through 20 in **Appendix E** show the Interim Pumping Station area.

Tasiluliariaq Rotary Park

The Tasiluliariaq Rotary Park was established between 2009 and 2011 on the north side of the Road to Nowhere near the Niaqunnguk River, shown on **Figure 2**. At the time of the site inspection by Arcadis, the park consisted of a picnic table, benches, decorative stone features, and leveled gavel areas. A vehicle parking area was present on the south side of Road to Nowhere immediately opposite the park.

4.5.1 Fuel and Chemical Handling Storage

Two 1111-litre aboveground fuel tanks containing diesel were observed beside the generator shed by the Apex Pumping Station at Niaqunnguk River. These tanks were manufactured in 2019 according to placards on the tanks. Both tanks are housed within a secondary containment structure consisting of a plastic liner to contain spills or leaks. Photographs of the tanks have been included in **Appendix E**. Refer to photographs 13, 14 and 15.

At the time of the site inspection, no fuel tanks were present at the Interim Pumping Station at Qikiqtalik Lake. However, a fuel tank of unknown size was present during the historical pumping activities at this location between 2020 and 2023. The secondary containment structure that housed the tank is still present at the station area.

Chemical Storage

No chemical storage areas were observed on the Site during the site inspection or were identified in the records review.

4.5.2 Waste Materials and Management

No waste disposal areas were observed on the Site during the site inspection or were identified in the records review. Waste generation on the Site, and its management, is the responsibility of individual site users and developers. There is no City-contracted waste collection service onsite.

4.5.3 Spills, Stained Areas, and Stressed Vegetation

No evidence of spills, areas of staining, or signs of stressed vegetation were observed during the site inspection.

4.5.4 Potentially Contaminated Fill

With the building of the Road to Nowhere and the Road to Unnamed Lake, earthworks have taken place; however, there is no evidence that fill was imported from a contaminated site to the subject Site. There is evidence of borrow pits along both roads, such that local earth/gravel/sand would have been used.

4.5.5 Sanitary Wastewater

As the Site is fundamentally undeveloped, there is no sanitary wastewater system currently in place.

4.5.6 Stormwater

As the Site is fundamentally undeveloped, there is no stormwater catchment system.

4.5.7 Pits, Ponds, and Lagoons

As the Site is fundamentally undeveloped, all surface water ponding is a component of the natural landscape.

4.5.8 Air Emissions

The air emissions at the Site are related to the generators used for the seasonal operations of the two pumping stations (Apex and Interim Pumping Station) and any burn pits established by recreational users of the Site.

4.5.9 Regulated Building Materials and Hazardous Substances

Because there were no permanent structures onsite at the time of the site visit, regulated building materials and hazardous substances were not assessed. These include: polychlorinated biphenyls (PCBs), asbestos-containing materials (ACM), urea formaldehyde foam insulation (UFFI), lead, mercury, ozone-depleting substances (ODS), and radioactive substances and equipment.

4.5.10 Noise and Vibration

The Site is remote and undeveloped. Noises related to the Shooting Range may echo across the landscape.

4.6 Soil Sampling Analytical Results

A total of ten soil samples were collected at the following four locations across the Site to provide a preliminary assessment of soil quality, and determine if contaminants of potential concern were present:

1. Shooting Association Range – Three soil samples (SAR-1, SAR-2, and SAR-3) were collected at the locations shown on **Figure 4**.
2. Historical Fuel Oil Spill – Two soil samples (NM-1 and NM-2) were collected at the locations shown on **Figure 5**.
3. Apex Pumping Station – Four soil samples (APS-1, APS-2, APS-3, and APS-4) were collected at the locations shown on **Figure 6**.
4. Interim Pumping Station – One soil sample (IP-1) was collected at the location shown on **Figure 7**.

Analytical results for the soil samples collected at the Shooting Association Range and Apex Pumping Station were compared to GN Tier 1 Industrial land use criteria. These criteria were selected as both these locations have restrictions to public access, and children are not permitted continuous access or occupancy. The analytical results for soil samples at the Historical Fuel Oil Spill area and Interim Pumping Station were compared to GN Tier 1 Residential/Parkland land use criteria as these locations are readily accessible to the public.

Soil sampling locations were selected in the field using professional judgment based on where contaminated soil would likely be present. No clear evidence of contamination was observed at any soil sampling location.

No detectable concentrations of BTEX and PHC F1 to F4 were reported in any of the soil samples collected. Metals were detected at varying concentrations in the soil samples; however, all concentrations were below applicable criteria. Notably, the lead concentration detected in soil sample SAR-2 (190 mg/kg) is above the GN Tier 1 Residential/Parkland land use criterion for lead of 70 mg/kg but is below the GN Tier 1 Industrial land use criterion for lead of 260 mg/kg. Soil sample SAR-2 was collected from the earth berm at the end of the shooting range. This earth berm is potentially contaminated with metals (predominantly lead) from bullets.

Analytical results are provided on **Table 1** at the end of this report. The Certificate of Analysis has been included in **Appendix F.**

4.6.1 Quality Assurance/Quality Control Results

All RPD values were below the acceptance criteria of 60% for original soil sample SAR-3 and its field duplicate, DUP. Furthermore, no RPD values exceeded the acceptance criteria for laboratory duplicates APS-4 DUP 1 and IP-1 DUP 1. RPD values were not calculated for some analytes because concentrations between original and duplicate samples were either below the RDL or less than five times the minimum RDL.

BVL conducted internal quality control tests using a matrix spike, spike blank, and method blank. All laboratory quality control tests produced results within quality control limits except in one instance: matrix spike exceeded acceptance limit due to matrix interference on lead analysis. A matrix spike sample is a sample to which a known amount of the analyte of interest has been added and is used to evaluate sample matrix interference. Sample DUP (Lab ID: XCN720) was used by the lab for the matrix spike. The matrix spike exceedance for lead could mean the lead concentration reported for sample DUP is biased high; however, the rest of the samples are not affected by this matrix spike exceedance.

Results of the laboratory QA/QC analyses are included in the laboratory Certificate of Analysis attached in **Appendix F.** Overall, the analytical results are considered valid and reliable for the purposes of this report.

5 Conclusions

Based on the results of this Enhanced Phase I ESA, the following four APECs were identified at the Site:

- APEC 1: The Iqaluit Shooting Association Range was identified as an APEC given its potential for contamination to the environment as the result of bullets and other ammunition waste. No fuel tanks or other sources for contamination were identified at this APEC.
- APEC 2: The Historical Fuel Oil Spill was identified as an APEC given its potential for contamination to the environment as the result of the spilt fuel. The spill was reported to the Government of Nunavut by email on June 14, 2018. The quantity or type of fuel product spilt was not identified. No details on the cleanup procedure for the spill could be found. Arcadis did not identify any evidence of the spill during the site inspection.
- APEC 3: Apex Pumping Station at Niaqunnguk River was identified as an APEC given its potential for contamination to the environment because of the fuel or metal components used as a part of the station's construction and operation. Two 1111-litre aboveground fuel tanks containing diesel are located beside the generator shed by the Apex Pumping Station at Niaqunnguk River. Both tanks are housed within a secondary containment structure consisting of a plastic liner to contain spills or leaks. No other sources for contamination were identified at this APEC.
- APEC 4: Interim Pumping Station at Qikiqtalik Lake was identified as an APEC given its potential for contamination to the environment because of the fuel or metal components used as a part of the station's construction and operation. At the time of the site inspection by Arcadis, the station's pump and fuel tank were not present; however, the secondary containment structure used to house these components was still present onsite. No other sources for contamination were identified at this APEC.

Surface soil samples were collected at each of the APECs and analyzed for associated potential contaminants of concern (i.e., BTEX, PHCs, and metals) during the site inspection. All analytical results were below the applicable criteria.

The potential environmental impacts at the Site are considered limited based on the findings of this assessment. No further assessment of the four APEC identified above is deemed necessary at this time.

6 Qualifications of Assessors

Elliott Holden, P. Eng., is a licensed environmental engineer at Arcadis. He has over 8 years of experience conducting Environmental Site Assessments (Phase I, II and III) and preparing remedial action plans. His field experience extends across Canada and includes work at sites in Alberta, northern Ontario, Nunavut, and the Northwest Territories. He has been the field lead and primary report author on multiple ESAs and remediation projects. He has also extensive experience in soil, groundwater, and surface water sample collection.

Bridget Trousdell, AScT, has 15 years of environmental consulting experience. She has worked on a wide variety of projects – in technical, supervisory, and project management roles – involving all aspects of contaminated sites investigations, including Stage 1 PSI/Phase I ESA, Stage 2 PSI/Phase II ESA, Detailed Site Investigations/Phase III ESA, and Remediation Planning and Execution, including Risk Assessments. Inclusive of: investigation plans, hydrogeological studies, hazardous waste investigations, soil, soil vapour and groundwater remediation, site monitoring, data management, report writing, review, and regulatory submissions. Ms. Trousdell has more than 35 years of experience writing and editing reports, and has fieldwork experience in a variety of settings, including urban, rural, and remote wilderness locations, for federal government and private clients in Alberta, British Columbia, Manitoba, and Yukon Territory. As a project manager, she has a background in critical path, time management and logistics skills, as well as budgeting and client liaison. Ms. Trousdell is familiar with the application of guidelines, standards, and regulatory environments, and has been project coordinator and report co-author for numerous successful submissions in support of applications for Certificates of Compliance for complex, urban sites.

Ryan Janzen, P. Eng., has done extensive geotechnical and environmental work as well as site supervision and project management over the past 14 years at Arcadis. Environmental expertise includes Phase I, II and III environmental site assessments; environmental monitoring including soil, groundwater, surface water, ambient air, indoor air and soil vapour sampling; data management, remedial options analyses and action plans, remediation design and execution, engineering recommendations and report preparation. He is also qualified for hazardous materials sampling (lead, PCBs, Asbestos), waste auditing, Designated Substance Surveys (asbestos) and abatement verification inspections. Mr. Janzen has experience corresponding with and coordinating federal, provincial, municipal and private clients/stakeholders, lawyers, third-party consultants, contractors and laboratories. He also acts as a senior reviewer (for engineering and reporting) and QA/QC for contract administration and project management; he has authored several of Arcadis Canada's standard operating procedures.

7 Limitations

A Phase I ESA is designed to identify existing environmental concerns based upon a physical walk-through inspection of the property and an evaluation of readily available information. Sample collection and analyses are not normal elements of the Phase I ESA, and the nature of the work dictates that findings and conclusions may not be definitive, but rather qualitative statements based on the observations made and research data accessed.

This report was prepared by Arcadis exclusively for City of Iqaluit (the CLIENT). Other than the CLIENT, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of Arcadis. Any use, reliance on or decision made by any person other than the CLIENT based on this report is the sole responsibility of such other person. The CLIENT and Arcadis make no representation or warranty to any other person with regard to this report and the work referred to in this report and the CLIENT and Arcadis accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

Achieving the study objectives stated in this report has required Arcadis to arrive at conclusions based on the information presently known to Arcadis. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce this possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained. Professional judgment was also exercised in the formulation of recommendations. Like all professional persons rendering advice, we cannot act as absolute insurers of the conclusions we reach. We perform our work, within the limits prescribed by our client, with the usual thoroughness and competence of our profession. No other warranty or representation, expressed or implied, is included or intended in this report.

Third party information reviewed and used to formulate this report is assumed to be complete and correct. This information, to the extent it was relied on to form our opinion was reviewed and evaluated for thoroughness and reliability; however, Arcadis did not independently verify the information. Arcadis used this information in good faith and will not accept any responsibility for deficiencies, misinterpretation or incompleteness of the information contained in documents prepared by third parties. Arcadis did not have actual knowledge that the information relied upon was incorrect or that it was obvious that the information was incorrect based on other information obtained during the Phase I ESA.

The conclusions presented represent the best judgment of the assessors based on current environmental standards and on the site, conditions observed on the date of Arcadis' site visit. Due to the nature of the investigation and the limited data available, the assessors cannot warrant against undiscovered environmental liabilities. Nothing in this report is intended to constitute or provide a legal opinion. Should additional information become available, Arcadis requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

8 References

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Natural Resources Canada Toporama: https://atlas.gc.ca/toporama/en/index.html

Tables

Table 1 - Soil Analytical Results - Iqaluit APECs
20-21 September 2023

APEC	(APEC 2, 3 & 4) Tier 1 Criteria Residential/Parkland (Coarse-grained)	(APEC 1) Tier 1 Criteria Industrial (Coarse-grained)	Units	APEC 1: Shooting Assoc. Range (SAR)				RPD	APEC 2: Spill Site (NM)		APEC 3: Apex Pumping Stn (APS)					RPD	APEC 4: Interim Pumping Stn (IP)		RPD
Sample ID				**SAR-1**	**SAR-2**	**SAR-3**	**DUP**		**NM-1**	**NM-2**	**APS-1**	**APS-2**	**APS-3**	**APS-4**	**APS-4 DUP 1**		**IP-1**	**IP-1 DUP 1**	
Lab ID				XCN717	XCN718	XCN719	XCN720		XCN715	XCN716	XCN711	XCN712	XCN713	XCN714	XCN714 DUP 1		XCN710	XCN710 DUP 1	
Lab Report ID				**C3T7892**	**C3T7892**	**C3T7892**	**C3T7892**		**C3T7892**	**C3T7892**	**C3T7892**	**C3T7892**	**C3T7892**	**C3T7892**	**C3T7892**		**C3T7892**	**C3T7892**	
Duplicate ID				-	-	**DUP**	**SAR-3**		-	-	-	-	-	**APS-4 DUP 1**	**APS-4**		**IP-1 DUP 1**	**IP-1**	
Sample Depth (m bgs)				0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1		0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1		0 - 0.1	0 - 0.1	
Collection Date				2023-09-21	2023-09-21	2023-09-21	2023-09-21		2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20	2023-09-20		2023-09-20	2023-09-20	
Physical Properties																			
Moisture	-	-	mg/kg	18	19	15	15	0%	13	8.4	8.6	3.8	2.6	6.2	-	-	7.5	-	-
Petroleum Hydrocarbons (PHC)																			
F1 (C6-C10)	30	320	mg/kg	<10	<10	<10	<10	nc	<10	<10	<10	<10	<10	<10	-	-	<10	<10	nc
F1 (C6-C10) - BTEX	-	-	mg/kg	<10	<10	<10	<10	nc	<10	<10	<10	<10	<10	<10	-	-	<10	<10	nc
F2 (C10-C16)	150	260	mg/kg	<10	<10	<10	<10	nc	<10	<10	<10	<10	<10	<10	-	-	<10	-	-
F3 (C16-C34)	300	1700	mg/kg	<50	<50	<50	<50	nc	<50	<50	<50	<50	<50	<50	-	-	<50	-	-
F4 (C34-C50)	2800	3300	mg/kg	<50	<50	<50	<50	nc	<50	<50	<50	<50	<50	<50	-	-	<50	-	-
Monocyclic Aromatic Hydrocarbons (MAH)																			
Benzene [t, u, x]	0.0095	0.03	mg/kg	<0.0060	<0.0060	<0.0060	<0.0060	nc	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	-	-	<0.0060	<0.0060	nc
Ethylbenzene [t]	0.082	0.082	mg/kg	<0.010	<0.010	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	nc
Styrene	0.1	50	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene [t]	0.37	0.37	mg/kg	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	<0.020	<0.020	nc
m-Xylene & p-Xylene	-	-	mg/kg	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	<0.020	<0.020	nc
o-Xylene	-	-	mg/kg	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	<0.020	<0.020	nc
Total Xylenes [t]	11	11	mg/kg	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	<0.020	<0.020	nc
Metals																			
Antimony	20	40	mg/kg	<0.20	3.0	0.33	0.21	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	-	-
Arsenic [b]	12	12	mg/kg	<1.0	<1.0	<1.0	<1.0	nc	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	nc	<1.0	-	-
Barium [c]	750	2000	mg/kg	12	14	14	12	15%	23	23	15	29	11	12	12	0%	24	-	-
Beryllium	4	8	mg/kg	<0.20	<0.20	<0.20	<0.20	nc	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	-	-
Boron (Total)	-	-	mg/kg	<5.0	<5.0	<5.0	<5.0	nc	11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	nc	<5.0		
Boron (Hot Water Soluble)	2	-	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium [b]	1.4	22	mg/kg	<0.10	<0.10	<0.10	<0.10	nc	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc	<0.10	-	-
Chromium (Total) [b]	64	87	mg/kg	7.1	12	11	11	0%	19	15	6.5	14	4.8	33	25	28%	16	-	-
Chromium VI [h]	0.4	1.4	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	40	300	mg/kg	2.9	3.7	3.3	3.2	3%	5.1	5.0	2.9	5.4	2.6	4.7	4.2	11%	4.9	-	-
Copper [b]	63	91	mg/kg	8.6	62	7.0	6.0	15%	10	16	6.0	24	4.9	2.4	2.2	9%	10.0	-	-
Lead [b]	70	260	mg/kg	3.7	190	16	11	37%	3.0	3.0	2.3	14	2.7	2.6	2.4	8%	2.6	-	-
Mercury (inorganic) [b]	6.6	24	mg/kg	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	-	-
Molybdenum	5	40	mg/kg	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50	1.6	<0.50	1.2	1	18%	0.6	-	-
Nickel [l]	50	50	mg/kg	4.5	5.1	5.1	4.9	4%	7.2	7.3	4.6	8.1	3.8	5.4	4.4	20%	6.9	-	-
Selenium [b]	1	2.9	mg/kg	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	-	-
Silver	20	40	mg/kg	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	-	-
Thallium [n]	1	1	mg/kg	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	0.051	<0.050	<0.050	<0.050	nc	<0.050	-	-
Uranium [z, t]	23	33	mg/kg	0.31	0.4	0.35	0.38	8%	0.43	0.33	0.3	0.68	0.24	0.4	0.37	17%	0.42	-	-
Vanadium [l]	130	130	mg/kg	13	25	23	23	0%	39	34	11	30	9.0	83	62	29%	36	-	-
Zinc [l]	200	360	mg/kg	19	22	19	19	0%	31	33	30	78	20	27	24	12%	27	-	-

xx Sample concentration above applicable criteria

Notes:

Source: *Environmental Guideline for Contaminated Site Remediation, Nunavut Department of Environment, Government of Nunavut, March 2009*

Table A3-1 Summary of Tier 1 Criteria for PHC for Surace Soil, Agricultural/Wildland, Coarse-grained

Table A3-3 Pathway-specific Tier 1 Levels for PHC for coarse-grained surface soils, Agricultural/Wildland; most stringent of: Protection of Potable GW and Protection of GW for Aquatic Life and Eco Soil Contact

Table A4-1 Canadian Soil Quality Guidelines, Agricultural/Wildland, Coarse-grained, Surface

Table A4-2 Interim Remediation Criteria, Agricultural/Wildland for those inorganic substances (and styrene) with no qualifier

(t): Data are sufficient and adequate to calculate an SQG_{HH} and an SQG_E. Therefore the soil quality guideline is the lower of the two andrepresents a fully integrated de novo guideline for this land use.

SQG_E: Soil Quality Guideline for Environmental Health; SQG_{HH}: Soil Quality Guideline for Human Health

(u): This guideline may be less than the common limit of detection.

(x): 10^{-6} incremental risk

(b): Data are sufficient and adequate to calculate an SQG_{HH} and an SQG_E. Therefore the SQG is the lower of the two and represents a fully integrated de novo guideline for this land use, derived in accordance with the soil protocol (CCME 1996; 2006).

(c): Data are insufficient/inadequate to calculate an SQG_{HH}, a provisional SQG_{HH}, an SQG_E or a provisional SQG_E. Therefore, the interim soil quality criterion (CCME 1991) is retained as the soil quality guideline for this land use.

(h): Data are sufficient and adequate to calculate only a provisional SQG_E, which is less than the existing interim soil quality criterion (CCME 1991). Therefore, the provisional soil quality guideline supersedes the interim soil quality criterion for this land use.

(l): Data are sufficient and adequate to calculate only an SQG_E. An interim soil quality criterion (CCME 1991) was not established for this land use therefore, the SQGE becomes the soil quality guideline.

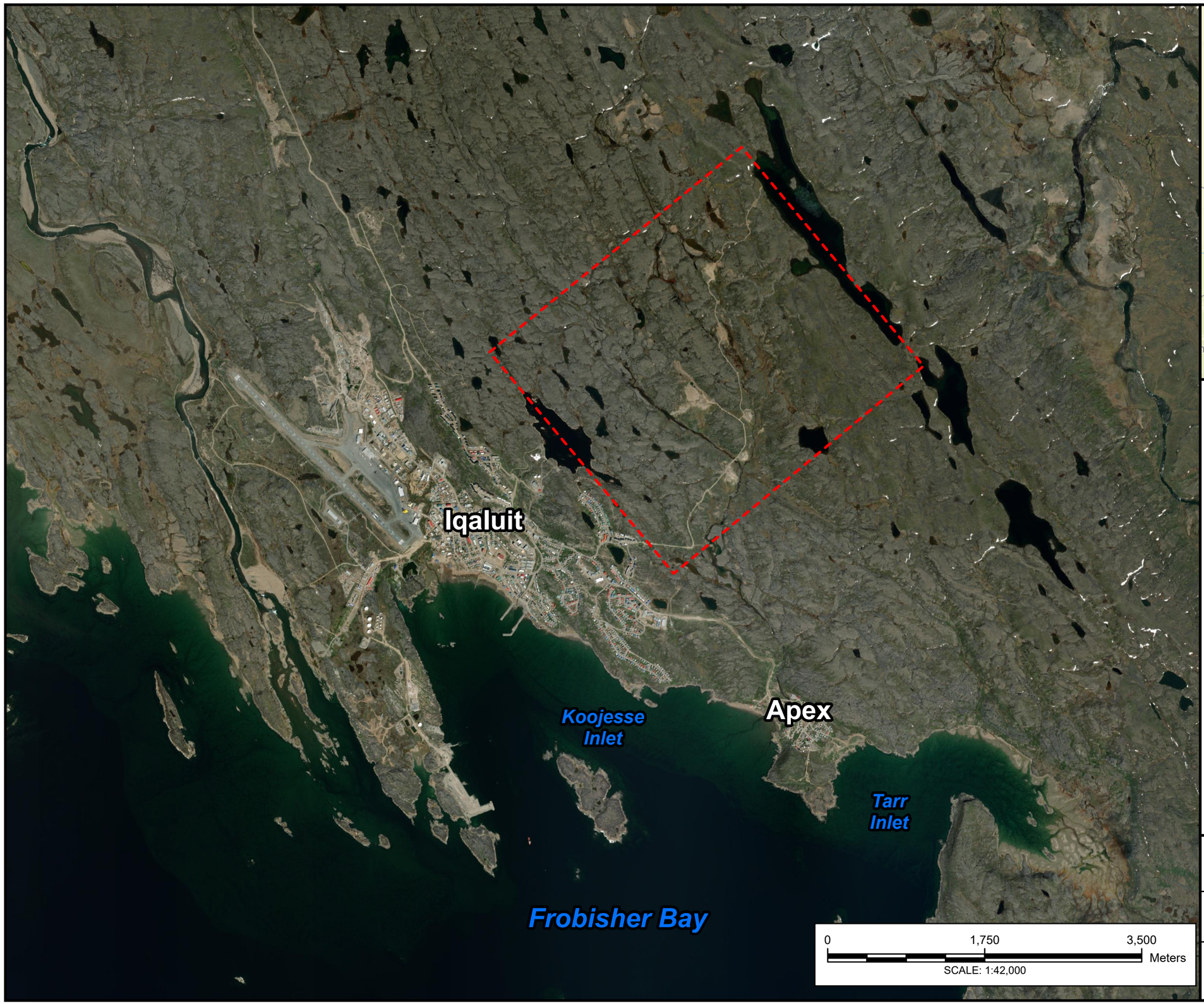
(n): Data are sufficient and adequate to calculate a provisional SQG_{HH} and an SQG_E. The provisional SQG_{HH} is equal to the SQG_E and to the existing interim soil quality criterion (CCME 1991) and thus becomes the soil quality guideline for this land use.

(z): Supporting documents are available from the Canadian Council of Ministers of the Environment.

DL: Detection Limit

nc: RPD not calculated due to either concentration <5 x DL

Figures



LEGEND

Site Area

ENHANCED PHASE I ENVIRONMENTAL SITE ASSESSMENT
FOR LONG TERM WATER PROJECT IN IQALUIT, NUNAVUT
CITY OF IQALUIT

SITE LOCATION PLAN

ARCADIS

FIGURE
1

City: SYR Div/Group: IM/DV Created By: J.RAPP Last Saved By: mayar7350
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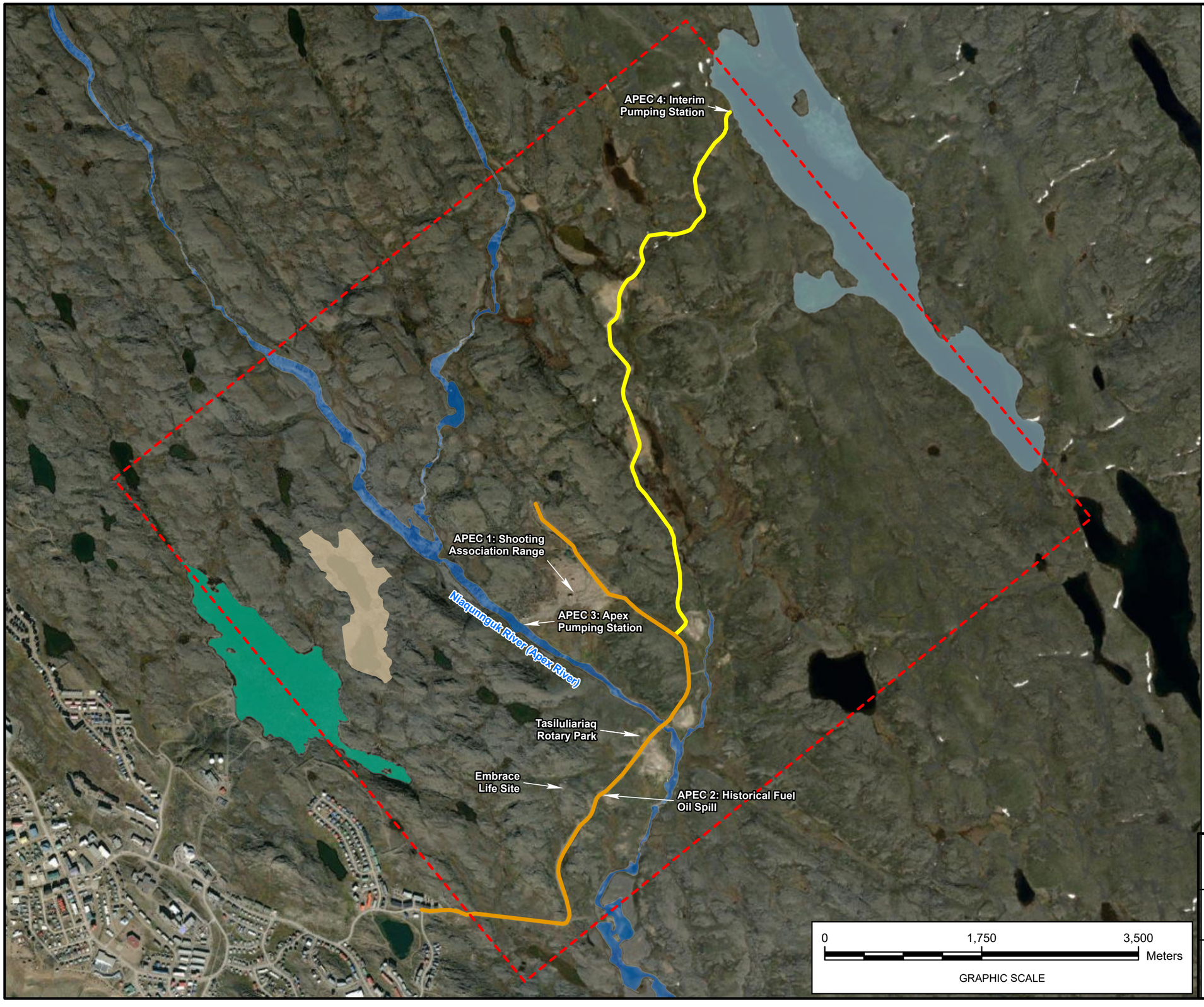

LEGEND

- Site Area
- Road to Unnamed Lake
- Road To Nowhere
- Proposed Reservoir
- Lake Geraldine
- Watercourse
- Qikiqtalik Lake (Unnamed Lake)

0 1,750 3,500 Meters

GRAPHIC SCALE

ENHANCED PHASE I ENVIRONMENTAL SITE ASSESSMENT
FOR LONG TERM WATER PROJECT IN IQALUIT, NUNAVUT
CITY OF IQALUIT

SITE PLAN

ARCADIS | FIGURE 2

City: SYR Div/Group: IM/DV Created By: J.RAPP Last Saved By: pbi00964
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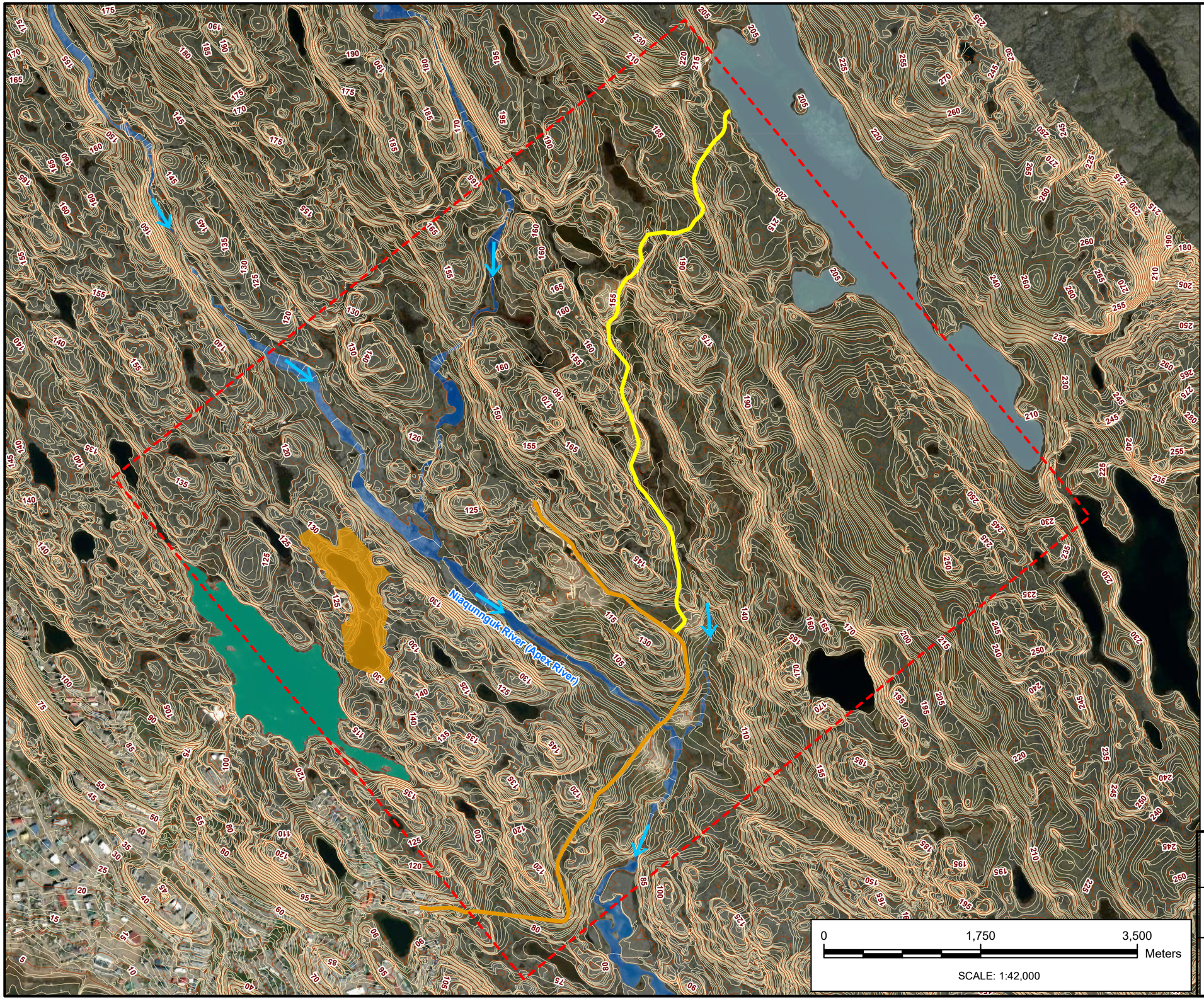

LEGEND

- Site Area
- Road to Unnamed Lake
- Road To Nowhere
- Lake Geraldine
- Watercourse
- Qikiqtalik Lake (Unnamed Lake)
- Proposed Reservoir
- Surface Water Flow Direction

Elevation Contours

- Index
- Intermediate

0 1,750 3,500 Meters

SCALE: 1:42,000

ENHANCED PHASE I ENVIRONMENTAL SITE ASSESSMENT
FOR LONG TERM WATER PROJECT IN IQALUIT, NUNAVUT
CITY OF IQALUIT

SITE TOPOGRAPHY

ARCADIS

FIGURE
3

City: SYR.Div/Group: IM/DV Created By: J.RAPP Last Saved By: mayyar7350
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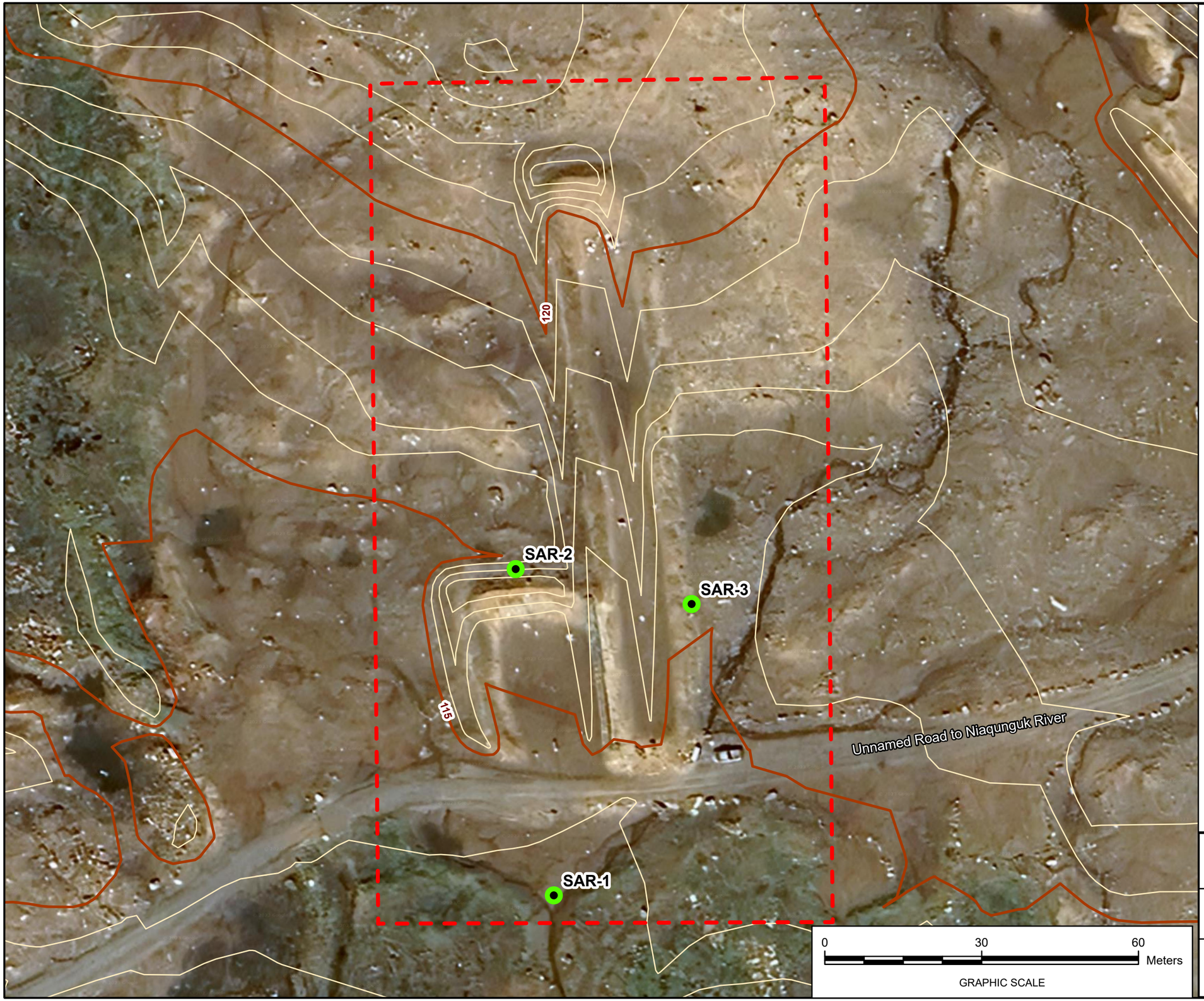

LEGEND

Surface Soil Sample

- Analytical results were below applicable criteria
- APEC 1: Shooting Association Range

Elevation Contours

- Index
- Intermediate

0 30 60 Meters

GRAPHIC SCALE

ENHANCED PHASE I ENVIRONMENTAL SITE ASSESSMENT
FOR LONG TERM WATER PROJECT IN IQALUIT, NUNAVUT
CITY OF IQALUIT

SURFACE SOIL SAMPLING RESULTS AT APEC 1

ARCADIS

FIGURE
4

City: SYR Div/Group: IM/DV Created By: J.RAPP Last Saved By: mayyar7350
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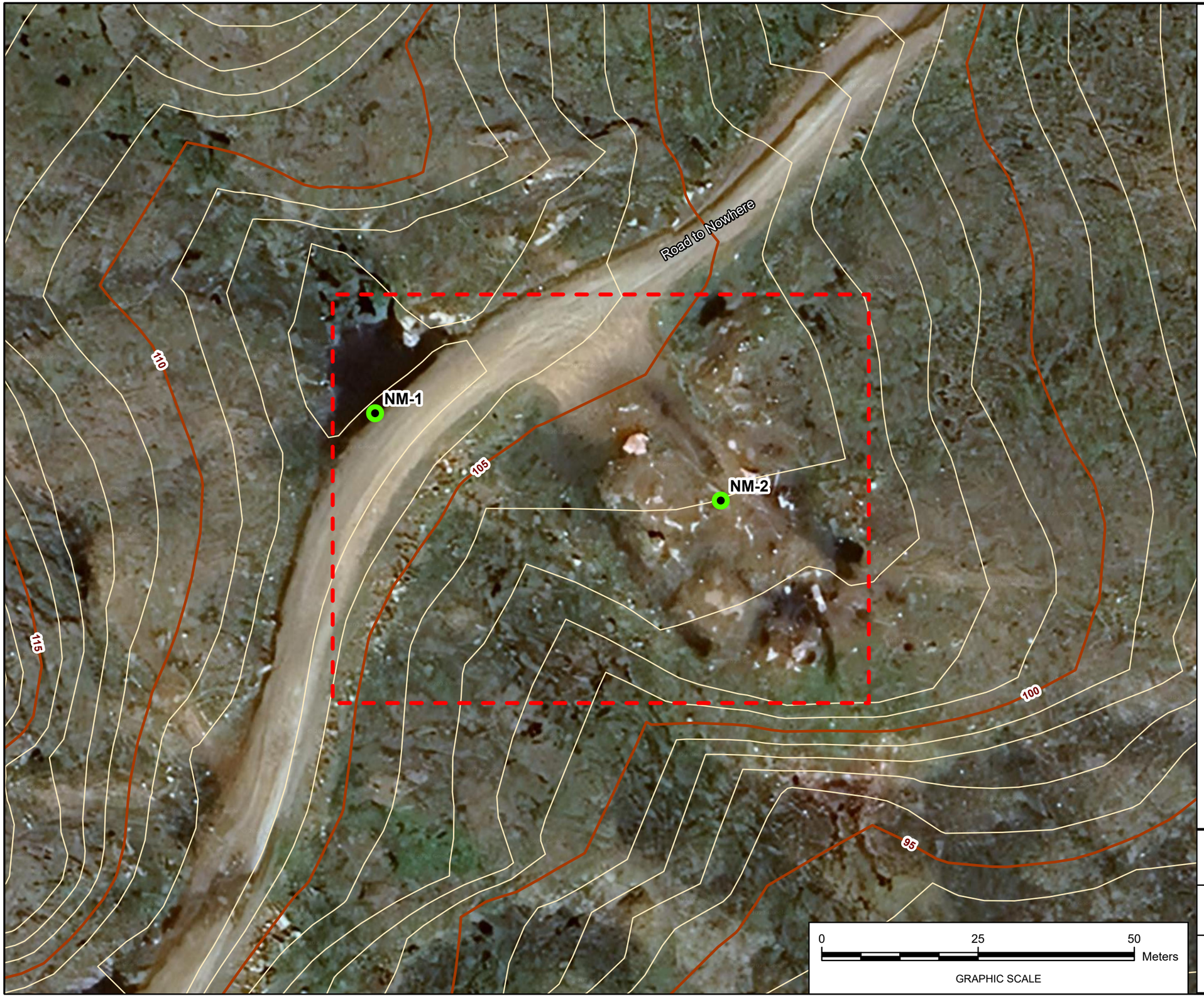

LEGEND

Surface Soil Sample

- Analytical results were below applicable criteria
- APEC 2: Historical Fuel Oil Spill

Elevation Contours

- Index
- Intermediate

0 25 50 Meters

GRAPHIC SCALE

ENHANCED PHASE I ENVIRONMENTAL SITE ASSESSMENT
FOR LONG TERM WATER PROJECT IN IQALUIT, NUNAVUT
CITY OF IQALUIT

SURFACE SOIL SAMPLING RESULTS AT APEC 2

ARCADIS

FIGURE 5

City: SYR Div/Group: IM/DV Created By: J.RAPP Last Saved By: mayyar7350
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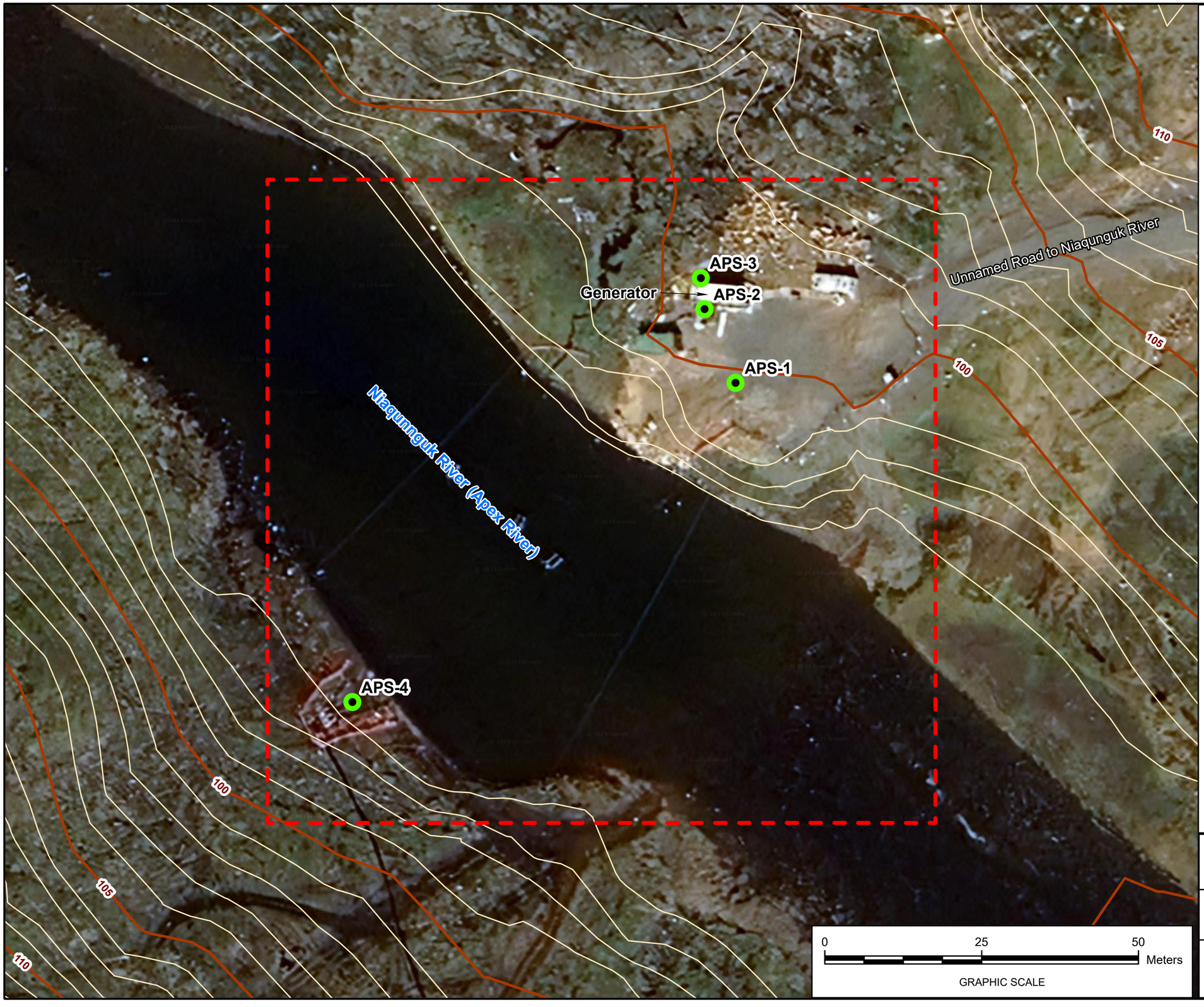

LEGEND

Surface Soil Sample

- Analytical results were below applicable criteria
- APEC 3: Apex Pumping Station

Elevation Contours

- Index
- Intermediate

0 25 50 Meters

GRAPHIC SCALE

ENHANCED PHASE I ENVIRONMENTAL SITE ASSESSMENT
FOR LONG TERM WATER PROJECT IN IQALUIT, NUNAVUT
CITY OF IQALUIT

SURFACE SOIL SAMPLING RESULTS AT APEC 3

ARCADIS

FIGURE
6

City: SYR Div/Group: IM/DV Created By: J.RAPP Last Saved By: mayyar7350
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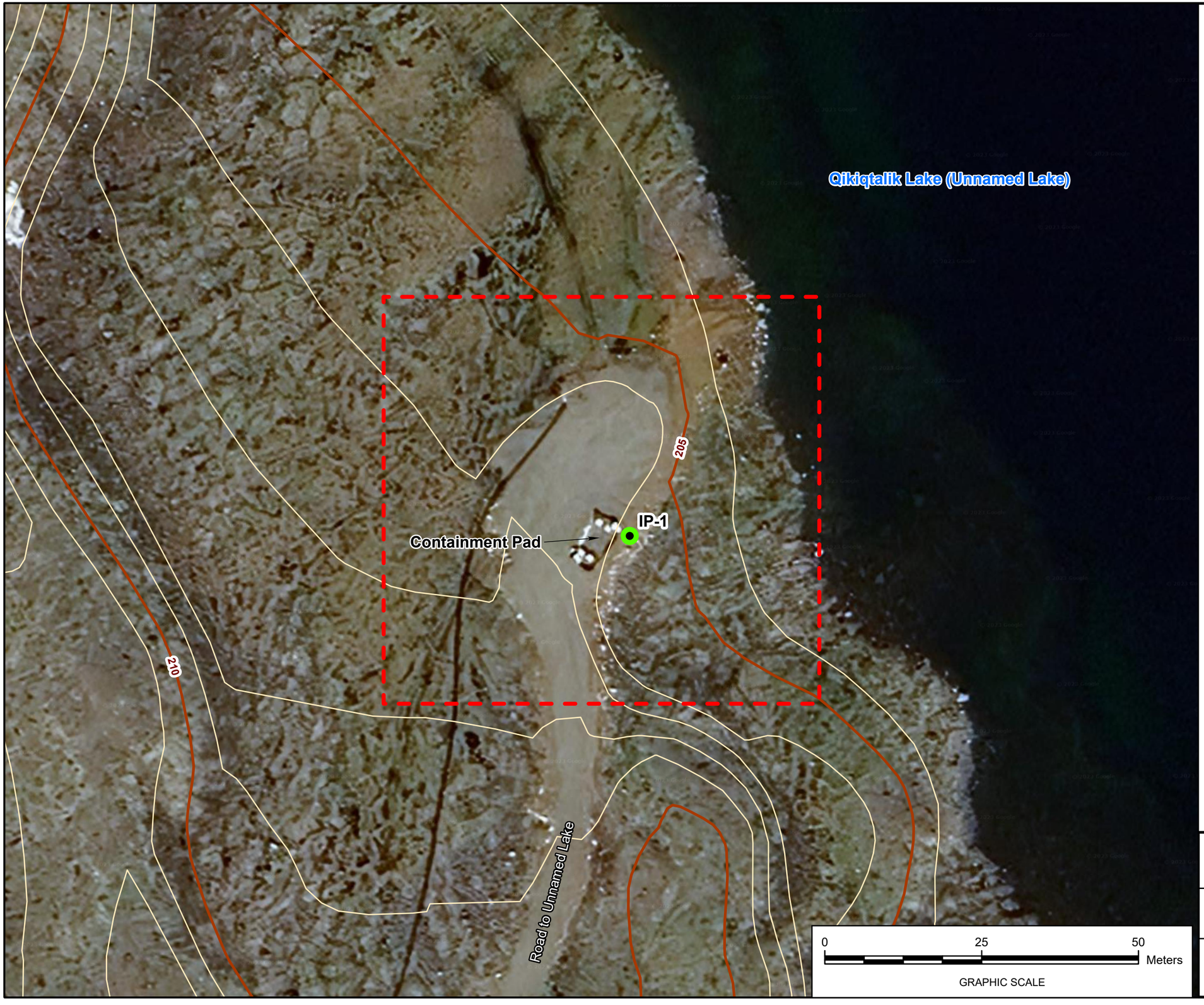


LEGEND

Surface Soil Sample

- Analytical results were below applicable criteria
- APEC 4: Interim Pumping Station

Elevation Contours

- Index
- Intermediate

0 25 50 Meters

GRAPHIC SCALE

ENHANCED PHASE I ENVIRONMENTAL SITE ASSESSMENT
FOR LONG TERM WATER PROJECT IN IQALUIT, NUNAVUT
CITY OF IQALUIT

SURFACE SOIL SAMPLING RESULTS AT APEC 4

ARCADIS

FIGURE 7

City: SYR Div/Group: IM/DV Created By: J.RAPP Last Saved By: mayyar7350
T:_ENV\City of Iqaluit\Proj\City of Iqaluit.aprx 11/14/2023 11:28 AM

Appendix A

ERIS Search Results

DATABASE REPORT

Project Property:	*Iqaluit* *n/a* *Iqaluit NU*
Project No:	*30192375*
Report Type:	*Quote - Custom-Build Your Own Report*
Order No:	*23090500478*
Requested by:	*Arcadis Canada Inc.*
Date Completed:	*September 5, 2023*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Table of Contents

Executive Summary

Property Information:

Project Property:	*Iqaluit* *n/a Iqaluit NU*
Project No:	*30192375*

Order Information:

Order No:	*23090500478*
Date Requested:	*September 5, 2023*
Requested by:	*Arcadis Canada Inc.*
Report Type:	*Quote - Custom-Build Your Own Report*

Historical/Products:

Aerial Photographs	*Aerials - National Collection*
City Directory Search	*CD - Subject Site*
ERIS Xplorer	*ERIS Xplorer*
Insurance Products	*Fire Insurance Maps/Inspection Reports/Site Plans*
Land Title Search	*Current Land Title Search*

Executive Summary: Report Summary

Database	Name	Searched	Project Property	Boundary to 0.25km	Total
AUWR	Automobile Wrecking & Supplies	Y	0	0	0
CDRY	Dry Cleaning Facilities	Y	0	0	0
CFST	Crown Land Fuel Storage Tanks	Y	0	0	0
CHM	Chemical Register	Y	0	0	0
CNG	Compressed Natural Gas Stations	Y	0	0	0
EHS	ERIS Historical Searches	Y	0	7	7
FCON	Federal Convictions	Y	0	0	0
FCS	Contaminated Sites on Federal Land	Y	0	0	0
FRST	Federal Identification Registry for Storage Tank Systems (FIRSTS)	Y	0	0	0
GHG	Greenhouse Gas Emissions from Large Facilities	Y	0	0	0
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0
MNR	Mineral Occurrences	Y	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NDSP	National Defense & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEBI	National Energy Board Pipeline Incidents	Y	0	0	0
NEBT	National Energy Board Wells	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0
NPCB	National PCB Inventory	Y	0	0	0
NPR2	National Pollutant Release Inventory 1993-2020	Y	0	0	0
NPRI	National Pollutant Release Inventory - Historic	Y	0	0	0
OGWE	Oil and Gas Wells	Y	0	0	0
RST	Retail Fuel Storage Tanks	Y	0	0	0
SCT	Scott's Manufacturing Directory	Y	0	0	0
SPL	Spills	Y	1	6	7
	Total:		1	13	14

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number
1	SPL		Iqaluit, Community, Nunavut NU	S/0.0	-37.75	13

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
2	EHS		4040 Anuri Street Iqaluit NU X0A 0H0	WSW/76.3	-59.08	13
2	EHS		4040 Anuri Street Iqaluit NU X0A 0H0	WSW/76.3	-59.08	13
3	EHS		4100 Road To Nowhere Iqaluit NU X0A0H0	SW/128.4	-64.15	14
4	SPL	The coordinates in the Geolocation bar (63.75907057634274, -68.50329636079913)	Iqaluit, Community, Nunavut NU	WSW/182.8	-55.97	14
5	EHS		4006 Anuri Street Iqaluit Nunavut Iqaluit NU X0A 0H0	SW/185.0	-58.19	14
5	EHS		4006 Anuri Street Iqaluit Nunavut Iqaluit NU X0A 0H0	SW/185.0	-58.19	14
6	SPL		Building 4110A, Road to Nowhere Iqaluit, Community, Nunavut NU	SW/187.4	-66.89	15
6	SPL		Building 4110, Road to Nowhere East, crawl space Iqaluit NU	SW/187.4	-66.89	15
7	EHS		4015 Anuri Street Iqaluit NU	SW/189.9	-58.19	15
8	SPL		4054 Anuri Street Road to Nowhere Iqaluit NU	WSW/197.8	-56.63	16
9	SPL		Tank at unit 4001 was source of spill. Product migrated under Unit 4059 Iqaluit, Community, Nunavut NU	SW/218.2	-60.10	16

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
10	EHS		Buildings 5067 A,B,C &D Iqaluit NU	WSW/239.2	-47.07	17
11	SPL		Building 4002, Anuri St. Iqaluit, NU Iqaluit NU	SW/241.3	-63.22	17

Executive Summary: Summary By Data Source

EHS - ERIS Historical Searches

A search of the EHS database, dated 1999-Jun 30, 2023 has found that there are 7 EHS site(s) within approximately 0.25 kilometers of the project property.

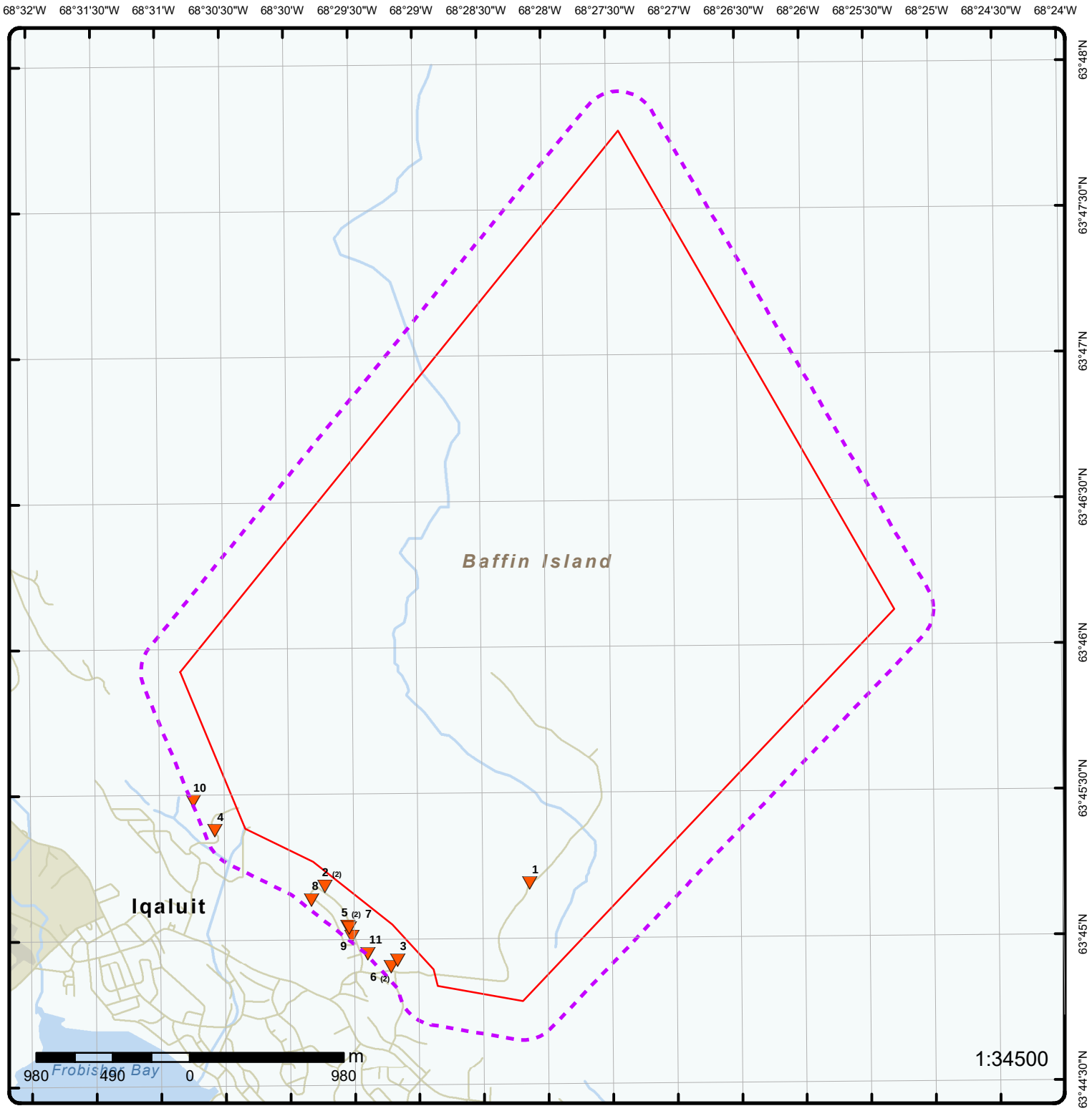
Site	Address	Distance (m)	Map Key
	4040 Anuri Street Iqaluit NU X0A 0H0	76.3	2
	4040 Anuri Street Iqaluit NU X0A 0H0	76.3	2
	4100 Road To Nowhere Iqaluit NU X0A0H0	128.4	3
	4006 Anuri Street Iqaluit Nunavut Iqaluit NU X0A 0H0	185.0	5
	4006 Anuri Street Iqaluit Nunavut Iqaluit NU X0A 0H0	185.0	5
	4015 Anuri Street Iqaluit NU	189.9	7
	Buildings 5067 A,B,C &D Iqaluit NU	239.2	10

SPL - Spills

A search of the SPL database, dated Jan 31,2023 has found that there are 7 SPL site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
	Iqaluit, Community, Nunavut NU	0.0	1

Site	Address	Distance (m)	Map Key
The coordinates in the Geolocation bar (63.75907057634274, -68.50329636079913)	Iqaluit, Community, Nunavut NU	182.8	4
	Building 4110A, Road to Nowhere Iqaluit, Community, Nunavut NU	187.4	6
	Building 4110, Road to Nowhere East, crawl space Iqaluit NU	187.4	6
	4054 Anuri Street Road to Nowhere Iqaluit NU	197.8	8
	Tank at unit 4001 was source of spill. Product migrated under Unit 4059 Iqaluit, Community, Nunavut NU	218.2	9
	Building 4002, Anuri St. Iqaluit, NU Iqaluit NU	241.3	11



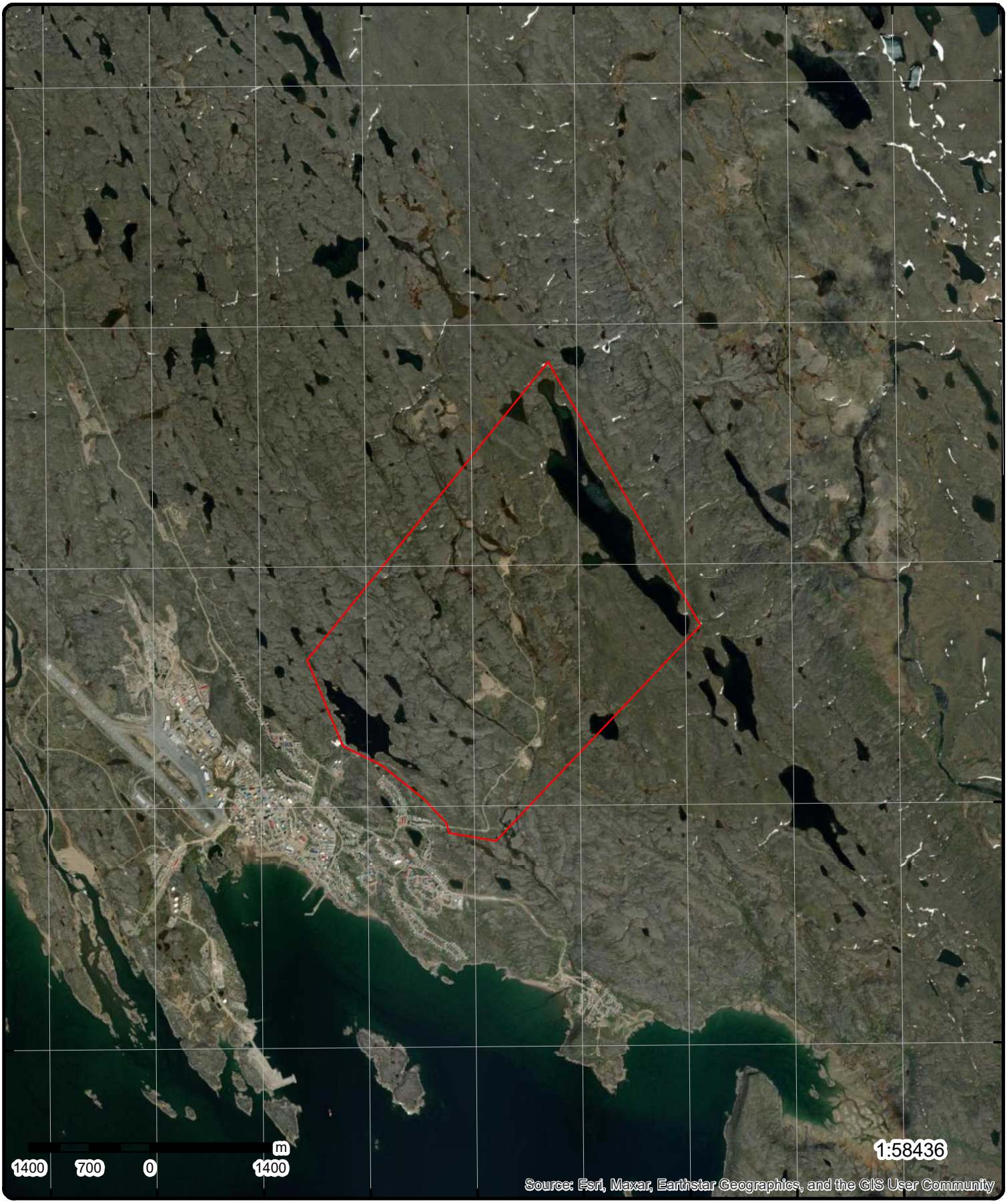
Map: 0.25 Kilometer Radius

Order Number: 23090500478

Address: n/a, Iqaluit, NU

ERIS

- Project Property
- Buffer Outline
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major Arterial; Minor Arterial
- Local Road
- Service Road; Traffic Circle; Ramp
- Rail
- Beach
- Airport
- Industrial Area
- Military Base
- Aircraft Roads
- Native Reservation
- Hospital
- Shopping & Sports Area
- University/College
- Cemetery; Golf Course
- Parkt (National)
- Park (City/County)



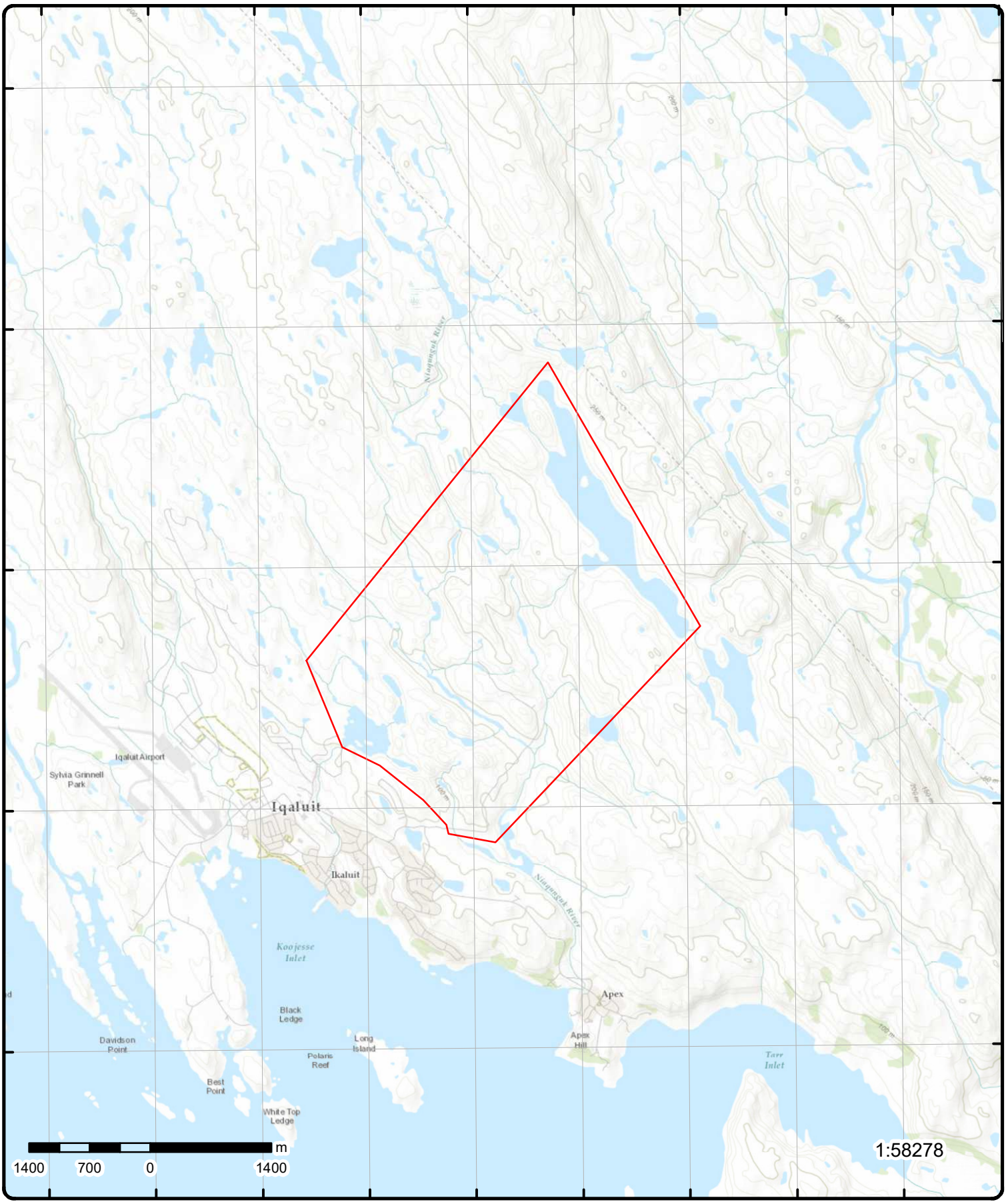
Aerial **Year: 2022**

Address: n/a, Iqaluit, NU

Source: ESRI World Imagery

Order Number: 23090500478

ERIS



Topographic Map

Address: n/a, NU

Source: ESRI World Topographic Map

Order Number: 23090500478

ERIS

Detail Report

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	1 of 1	S/0.0	113.3 / -37.75	Iqaluit, Community, Nunavut NU	SPL

Spill No: spill-2018226
Spill Date:
Spill Quantity: Unknown Quantity
Measurement:
Spill Cause:
Spill Source:
Product Spilled: Unknown
Product Spilled Description: Fuel Oil
Area of Contamination:
Spill Location Description:
Known Hazards:
Occurrence Date/Time: June 14, 2018
Reporting Date and Time: Thursday, June 14, 2018 - 13:00
Support Info Un No:
Supp Info Describe Any Assi:
Support Info Water Use Permit:
Supp Info Land Use Permit N:
Support Info Factors Affecting:
Support Info Additional Inform:
Supporting Agencies:
Lead Agency: GN - Government of Nunavut
URL: https://www.enr.gov.nt.ca/en/spill/spill-2018226
Land Sea Indicator: Land
Potential Spill: No
Received Method: Email
Involved Parties Type:
Spill Region: Baffin

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
2	1 of 2	WSW/76.3	92.0 / -59.08	4040 Anuri Street Iqaluit NU X0A 0H0	EHS

Order No: 23012301509
Status: C
Report Type: Custom Report
Report Date: 26-JAN-23
Date Received: 23-JAN-23
Previous Site Name:
Lot/Building Size:
Additional Info Ordered: Fire Insur. Maps and/or Site Plans
Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): .25
X: -68.4954481
Y: 63.7530591

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
2	2 of 2	WSW/76.3	92.0 / -59.08	4040 Anuri Street Iqaluit NU X0A 0H0	EHS

Order No: 23012301509
Status: C
Report Type: Custom Report
Report Date: 26-JAN-23
Date Received: 23-JAN-23
Previous Site Name:
Lot/Building Size:
Additional Info Ordered: Fire Insur. Maps and/or Site Plans
Nearest Intersection:
Municipality:
Client Prov/State: ON
Search Radius (km): .25
X: -68.4954481
Y: 63.7530591

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
3	1 of 1	SW/128.4	86.9 / -64.15	4100 Road To Nowhere Iqaluit NU X0A0H0	EHS

Order No:	20160323052	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	29-MAR-16	**Search Radius (km):**	.25
Date Received:	23-MAR-16	**X:**	-68.486064
Previous Site Name:		**Y:**	63.748784
Lot/Building Size:			
Additional Info Ordered:			

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
4	1 of 1	WSW/182.8	95.1 / -55.97	The coordinates in the Geolocation bar (63.75907057634274, -68.50329636079913) Iqaluit, Community, Nunavut NU	SPL

Spill No:	spill-2021446	**Land Sea Indicator:**	Fresh Water
Spill Date:		**Potential Spill:**	No
Spill Quantity:	Unknown Quantity	**Received Method:**	Email
Measurement:		**Involved Parties Type:**	Unknown
Spill Cause:	Unknown Cause	**Spill Region:**	Baffin
Spill Source:	Unknown		
Product Spilled:	Petroleum - unknown		
Product Spilled Description:	Oil		
Area of Contamination:			
Spill Location Description:	The coordinates in the Geolocation bar (63.75907057634274, -68.50329636079913) are estimated by ECCC NEEC LTa from the following description in the report: "south-central end of Lake Geraldine (just west of the dam).		
Known Hazards:			
Occurrence Date/Time:	October 18, 2021		
Reporting Date and Time:	Monday, October 18, 2021 - 07:45		
Support Info Un No:			
Supp Info Describe Any Assi:			
Support Info Water Use Permit:			
Supp Info Land Use Permit N:			
Support Info Factors Affecting:			
Support Info Additional Inform:			
Supporting Agencies:			
Lead Agency:	CIRNAC - Crown-Indigenous Relations and Northern Affairs Canada		
URL:	https://www.enr.gov.nt.ca/en/spill/spill-2021446		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
5	1 of 2	SW/185.0	92.9 / -58.19	4006 Anuri Street Iqaluit Nunavut Iqaluit NU X0A 0H0	EHS

Order No:	22111501458	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	18-NOV-22	**Search Radius (km):**	.25
Date Received:	15-NOV-22	**X:**	-68.49249684
Previous Site Name:		**Y:**	63.75075345
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps and/or Site Plans		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
5	2 of 2	SW/185.0	92.9 / -58.19	4006 Anuri Street Iqaluit Nunavut Iqaluit NU X0A 0H0	EHS

Order No:	22111501458	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	18-NOV-22	**Search Radius (km):**	.25
Date Received:	15-NOV-22	**X:**	-68.49249684

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Previous Site Name: **Y:** 63.75075345
Lot/Building Size:
Additional Info Ordered: Fire Insur. Maps and/or Site Plans

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6 **1 of 2** **SW/187.4** **84.2 / -66.89** **Building 4110A, Road to Nowhere**
Iqaluit, Community, Nunavut NU **SPL**

Spill No: spill-2011216
Spill Date:
Spill Quantity: 900.00
Measurement: Litres
Spill Cause: Collision or Crash
Spill Source: Storage tank < 4000 Litre
Land Sea Indicator: Land
Potential Spill: No
Received Method:
Involved Parties Type: Other
Spill Region: Baffin
Product Spilled: Petroleum - fuel oil (jet A, diesel, turbo A, heat)
Product Spilled Description: Heating Fuel P-50
Area of Contamination:
Spill Location Description: Building 4110A, Road to Nowhere
Known Hazards:
Occurrence Date/Time: June 8, 2011
Reporting Date and Time: Tuesday, June 7, 2011 - 18:00
Support Info Un No:
Supp Info Describe Any Assi:
Support Info Water Use Permit:
Supp Info Land Use Permit N:
Support Info Factors Affecting:
Support Info Additional Inform:
Supporting Agencies:
Lead Agency: GN - Government of Nunavut
URL: https://www.enr.gov.nt.ca/en/spill/spill-2011216

---

6 **2 of 2** **SW/187.4** **84.2 / -66.89** **Building 4110, Road to Nowhere East, crawl space**
Iqaluit NU **SPL**

Spill No: spill-2011350
Spill Date:
Spill Quantity: 0.00
Measurement: Litres
Spill Cause: Tank Leak
Spill Source: Storage tank < 4000 Litre
Land Sea Indicator: Land
Potential Spill: No
Received Method:
Involved Parties Type: Other
Spill Region: Baffin
Product Spilled: Petroleum - fuel oil (jet A, diesel, turbo A, heat)
Product Spilled Description: Heating Fuel P-50
Area of Contamination:
Spill Location Description: Building 4110, Road to Nowhere East, crawl space
Known Hazards:
Occurrence Date/Time: January 1, 2011
Reporting Date and Time: Monday, August 29, 2011 - 18:00
Support Info Un No:
Supp Info Describe Any Assi:
Support Info Water Use Permit:
Supp Info Land Use Permit N:
Support Info Factors Affecting:
Support Info Additional Inform:
Supporting Agencies:
Lead Agency: GN - Government of Nunavut
URL: https://www.enr.gov.nt.ca/en/spill/spill-2011350

---

7 **1 of 1** **SW/189.9** **92.9 / -58.19** **4015 Anuri Street**
Iqaluit NU **EHS**

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

Order No:	20140120059	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	Custom Report	**Client Prov/State:**	ON
Report Date:	27-JAN-14	**Search Radius (km):**	.25
Date Received:	20-JAN-14	**X:**	-68.49235
Previous Site Name:		**Y:**	63.750645
Lot/Building Size:			
Additional Info Ordered:			

8 | **1 of 1** | **WSW/197.8** | **94.4 / -56.63** | **4054 Anuri Street Road to Nowhere Iqaluit NU** | **SPL**

Spill No:	spill-2008485	**Land Sea Indicator:**	Land
Spill Date:		**Potential Spill:**	No
Spill Quantity:	500.00	**Received Method:**	
Measurement:	Litres	**Involved Parties Type:**	Unknown
Spill Cause:	Pipe Leaks	**Spill Region:**	Baffin
Spill Source:	Storage tank < 4000 Litre		
Product Spilled:	Petroleum - fuel oil (jet A, diesel, turbo A, heat)		
Product Spilled Description:	Fuel Oil		
Area of Contamination:			
Spill Location Description:	4054 Anuri Street Road to Nowhere		
Known Hazards:			
Occurrence Date/Time:	October 8, 2008		
Reporting Date and Time:	Tuesday, October 7, 2008 - 18:00		
Support Info Un No:			
Supp Info Describe Any Assi:			
Support Info Water Use Permit:			
Supp Info Land Use Permit N:			
Support Info Factors Affecting:			
Support Info Additional Inform:			
Supporting Agencies:			
Lead Agency:	GN - Government of Nunavut		
URL:	https://www.enr.gov.nt.ca/en/spill/spill-2008485		

9 | **1 of 1** | **SW/218.2** | **91.0 / -60.10** | **Tank at unit 4001 was source of spill. Product migrated under Unit 4059 Iqaluit, Community, Nunavut NU** | **SPL**

Spill No:	spill-2018112	**Land Sea Indicator:**	Land
Spill Date:		**Potential Spill:**	No
Spill Quantity:	750.00	**Received Method:**	Fax
Measurement:	Litres	**Involved Parties Type:**	Other
Spill Cause:	Damage due to weather	**Spill Region:**	Baffin
Spill Source:	Storage tank < 4000 Litre		
Product Spilled:	Petroleum - fuel oil (jet A, diesel, turbo A, heat)		
Product Spilled Description:	P50		
Area of Contamination:	40.00		
Spill Location Description:	Tank at unit 4001 was source of spill. Product migrated under Unit 4059		
Known Hazards:			
Occurrence Date/Time:	April 4, 2018		
Reporting Date and Time:	Wednesday, April 4, 2018 - 18:15		
Support Info Un No:	1202		
Supp Info Describe Any Assi:			
Support Info Water Use Permit:			
Supp Info Land Use Permit N:			
Support Info Factors Affecting:			
Support Info Additional Inform:			
Supporting Agencies:			
Lead Agency:	GN - Government of Nunavut		
URL:	https://www.enr.gov.nt.ca/en/spill/spill-2018112		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
10	1 of 1	WSW/239.2	104.0 / -47.07	Buildings 5067 A,B,C &D Iqaluit NU	EHS

Order No:	20071022002	**Nearest Intersection:**	
Status:	C	**Municipality:**	
Report Type:	CAN - Custom Report	**Client Prov/State:**	
Report Date:	10/30/2007	**Search Radius (km):**	0.25
Date Received:	10/22/2007	**X:**	-68.512344
Previous Site Name:		**Y:**	63.75796
Lot/Building Size:			
Additional Info Ordered:	Fire Insur. Maps And /or Site Plans		

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
11	1 of 1	SW/241.3	87.8 / -63.22	Building 4002, Anuri St. Iqaluit, NU Iqaluit NU	SPL

Spill No:	spill-2016398	**Land Sea Indicator:**	Land
Spill Date:		**Potential Spill:**	No
Spill Quantity:	2000.00	**Received Method:**	
Measurement:	Litres	**Involved Parties Type:**	Other
Spill Cause:	Fitting Leak	**Spill Region:**	Baffin
Spill Source:	Storage tank < 4000 Litre		
Product Spilled:	Petroleum - fuel oil (jet A, diesel, turbo A, heat)		
Product Spilled Description:	Heating Fuel P-50		
Area of Contamination:			
Spill Location Description:	Building 4002, Anuri St. Iqaluit, NU		
Known Hazards:			
Occurrence Date/Time:	November 6, 2016		
Reporting Date and Time:	Sunday, November 6, 2016 - 17:00		
Support Info Un No:			
Supp Info Describe Any Assi:			
Support Info Water Use Permit:			
Supp Info Land Use Permit N:			
Support Info Factors Affecting:			
Support Info Additional Inform:			
Supporting Agencies:			
Lead Agency:	GN - Government of Nunavut		
URL:	https://www.enr.gov.nt.ca/en/spill/spill-2016398		

Unplottable Summary

Total: 1 Unplottable sites

DB	Company Name/Site Name	Address	City	Postal
SPL		Unit 4015-B Road to Nowhere Subdivision	Iqaluit NU	

Unplottable Report

Site:

Unit 4015-B Road to Nowhere Subdivision Iqaluit NU

Database:
SPL

Spill No:	spill-2005247	***Land Sea Indicator:***	Land
Spill Date:		***Potential Spill:***	No
Spill Quantity:	100.00	***Received Method:***	
Measurement:	Litres	***Involved Parties Type:***	Other
Spill Cause:	Pipe Leaks	***Spill Region:***	Baffin
Spill Source:	Pipe or Line		

Product Spilled:	Petroleum - fuel oil (jet A, diesel, turbo A, heat)
Product Spilled Description:	Heating Fuel P-50
Area of Contamination:	
Spill Location Description:	Unit 4015-B Road to Nowhere Subdivision
Known Hazards:	
Occurrence Date/Time:	May 11, 2005
Reporting Date and Time:	Wednesday, May 11, 2005 - 18:00
Support Info Un No:	
Supp Info Describe Any Assi:	
Support Info Water Use Permit:	
Supp Info Land Use Permit N:	
Support Info Factors Affecting:	
Support Info Additional Inform:	
Supporting Agencies:	
Lead Agency:	GN - Government of Nunavut
URL:	https://www.enr.gov.nt.ca/en/spill/spill-2005247

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Automobile Wrecking & Supplies: Private AUWR

This database provides an inventory of known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Government Publication Date: 1999-Feb 28, 2022

Dry Cleaning Facilities: Federal CDRY

List of dry cleaning facilities made available by Environment and Climate Change Canada. Environment and Climate Change Canada's Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations (SOR/2003-79) are intended to reduce releases of tetrachloroethylene to the environment from dry cleaning facilities.

Government Publication Date: Jan 2004-Dec 2021

Crown Land Fuel Storage Tanks: Territorial CFST

The Department of Indian and Northern Affairs Canada mandates that all fuel storage tanks on Crown Land be recorded, when an individual applies for a land use permit or surface lease. Please note that there are numerous records in the database where the "Commencement Date" is previous to 1997. However, since INAC only began registering tank locations in 1997, any tanks installed previous to that may or may not be in the database, due to lack of regulations. Note the following descriptions: Commencement Date is the original file date, Fuel Application Date is the date an application was submitted for a tank, and the Fuel Confirmation Date is the date the department accepted the application and confirmed the information submitted.

Government Publication Date: Oct 1997-Apr 2022

Chemical Register: Private CHM

This database includes a listing of locations of facilities within the Province or Territory that either manufacture and/or distributes chemicals.

Government Publication Date: 1999-Feb 28, 2023

Compressed Natural Gas Stations: Private CNG

Canada has a network of public access compressed natural gas (CNG) refuelling stations. These stations dispense natural gas in compressed form at 3,000 pounds per square inch (psi), the pressure which is allowed within the current Canadian codes and standards. The majority of natural gas refuelling is located at existing retail gasoline that have a separate refuelling island for natural gas. This list of stations is made available by the Canadian Natural Gas Vehicle Alliance.

Government Publication Date: Dec 2012 -May 2023

ERIS Historical Searches: Private EHS

ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Government Publication Date: 1999-Jun 30, 2023

Federal Convictions: Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land: Federal FCS

The Federal Contaminated Sites Inventory includes information on known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government. Includes fire training sites and sites at which Per- and Polyfluoroalkyl Substances (PFAS) are a concern.

Government Publication Date: Jun 2000-Jun 2023

Federal Identification Registry for Storage Tank Systems (FIRSTS): Federal FRST

A list of federally regulated Storage tanks from the Federal Identification Registry for Storage Tank Systems (FIRSTS). FIRSTS is Environment and Climate Change Canada's database of storage tank systems subject to the Storage Tank for Petroleum Products and Allied Petroleum Products Regulations. The main objective of the Regulations is to prevent soil and groundwater contamination from storage tank systems located on federal and aboriginal lands. Storage tank systems that do not have a valid identification number displayed in a readily visible location on or near the storage tank system may be refused product delivery.

Government Publication Date: May 31, 2018

Greenhouse Gas Emissions from Large Facilities: Federal GHG

List of greenhouse gas emissions from large facilities made available by Environment Canada. Greenhouse gas emissions in kilotonnes of carbon dioxide equivalents (kt CO2 eq).

Government Publication Date: 2013-Dec 2019

Indian & Northern Affairs Fuel Tanks: Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

Government Publication Date: 1950-Aug 2003*

Canadian Mine Locations: Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Government Publication Date: 1998-2009*

Mineral Occurrences: Territorial MNR

The C.S. Lord Northern Geoscience Centre maintains a database of mineral showings (commodity occurrences) for both the Northwest Territories and Nunavut. The database provides Showing ID, latitude, longitude, Showing Name, commodity type, current development stage, and general comments on lithology, mineralization and geological settings.

Government Publication Date: 1900-Jan 2023

National Analysis of Trends in Emergencies System (NATES): Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Government Publication Date: 1974-1994*

National Defense & Canadian Forces Spills: Federal NDSP

The Department of National Defense and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

Government Publication Date: Mar 1999-Oct 2022

National Defence & Canadian Forces Waste Disposal Sites: Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents: Federal NEBI

Locations of pipeline incidents from 2008 to present, made available by the Canada Energy Regulator (CER) - previously the National Energy Board (NEB). Includes incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations related to pipelines under federal jurisdiction, does not include incident data related to pipelines under provincial or territorial jurisdiction.

Government Publication Date: 2008-Jun 30, 2021

National Energy Board Wells: Federal NEBT

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES): Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

Government Publication Date: 1974-2003*

National PCB Inventory: Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. Federal out-of-service PCB containing equipment and PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites. Some addresses provided may be Head Office addresses and are not necessarily the location of where the waste is being used or stored.

Government Publication Date: 1988-2008*

National Pollutant Release Inventory 1993-2020: Federal NPR2

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of pollutant releases (to air, water and land), disposals, and transfers for recycling. The inventory, managed by Environment and Climate Change Canada, tracks over 300 substances. Under the authority of the Canadian Environmental Protection Act (CEPA), owners or operators of facilities that meet published reporting requirements are required to report to the NPRI.

Government Publication Date: Sep 2020

National Pollutant Release Inventory - Historic: Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances. This data holds historic records; current records are found in NPR2.

Government Publication Date: 1993-May 2017

Oil and Gas Wells: Private OGWE

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Government Publication Date: 1988-May 31, 2023

Retail Fuel Storage Tanks: Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Government Publication Date: 1999-Feb 28, 2023

Scott's Manufacturing Directory: Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Government Publication Date: 1992-Mar 2011*

Spills: Territorial SPL

The Department of Environment and Natural Resource (ENR) in Yellowknife maintains an inventory of spill locations through the "Hazardous Materials Spills Database". Information is provided on the spill number, date, location, spill description, quantity & commodity spilled and all applicable parties involved. Data previously maintained and made available by the Department of Resources, Wildlife & Economic Development (RWED).

Government Publication Date: Jan 31,2023

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

CITY DIRECTORY

Project Property:	*Iqaluit* *n/a* *Iqaluit,NU*
Project No:	*30192375*
Requested By:	*Arcadis Canada Inc.*
Order No:	*23090500478*
Date Completed:	*September 08, 2023*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

September 08, 2023
RE: CITY DIRECTORY RESEARCH
n/a
Iqaluit,NU

Thank you for contacting ERIS for an City Directory Search for the site described above. Our staff has conducted a reverse listing City Directory search to determine prior occupants of the subject site and adjacent properties. We have provided the nearest addresses(s) when adjacent addresses are not listed. If we have searched a range of addresses, all addresses in that range found in the Directory are included.

Note: Reverse Listing Directories generally are focused on more highly developed areas. Newly developed areas may be covered in the more recent years, but the older directories will tend to cover only the "central" parts of the city. To complete the search, we have either utilized the Toronto Reference Library, Library & Archives Canada and multiple digitized directories. These do not claim to be a complete collection of all reverse listing city directories produced.

ERIS has made every effort to provide accurate and complete information but shall not be held liable for missing, incomplete or inaccurate information.To complete this search we used the general range(s) below to search for relevant findings. If you believe there are additional addresses or streets that require searching please contact us at 866-517-5204.

No coverage was found for the identified site or surrounding area

Project Name: Iqaluit

Project #: 23090500478
P.O. #: 30192375

Selected Fire Insurance Plans and Inspection Reports

Requested by:
Eleanor Goolab
Date Completed: 09/19/2023 09:09:37

OPTA INFORMATION INTELLIGENCE

Search Fee	**$50.00**

Selected Fire Insurance Plans

None

Selected Inspection Reports

None

Total	**$50.00**

Project Name: Iqaluit

Project #: 23090500478
P.O. #: 30192375

Excluded Fire Insurance Plans and Inspection Reports

Requested by:
Eleanor Goolab
Date Completed: 09/19/2023 09:09:37

OPTA INFORMATION INTELLIGENCE

Excluded Fire Insurance Plans

None

Excluded Inspection Reports

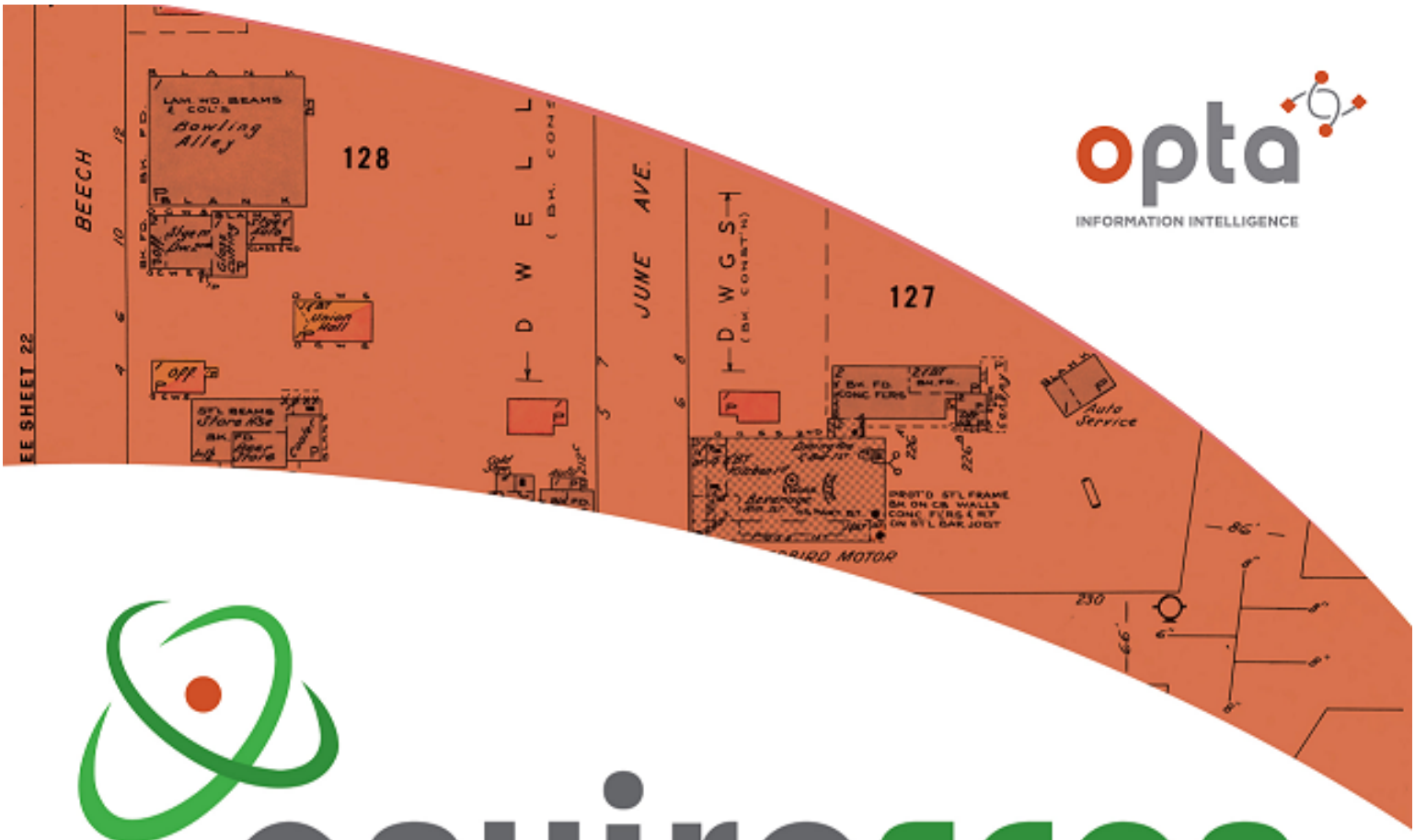
None

INFORMATION INTELLIGENCE

175 Commerce Valley Drive W
Markham, Ontario
L3T 7Z3

T: 877.244.9437
Toll Free: 877.244.9437
F: 877.244.9437

www.optaintel.ca



opta
INFORMATION INTELLIGENCE

enviroscan



An SCM Company

175 Commerce Valley Drive W
Markham, Ontario L3T 7Z3

T: 905-882-6300
W: www.optaintel.ca

Report Completed By:

Midori

Site Address:

N/A, Iqaluit, NU

Project No:

23090500478

Opta Order ID:

133235

Requested by:

Eleanor Goolab
ERIS

Date Completed:

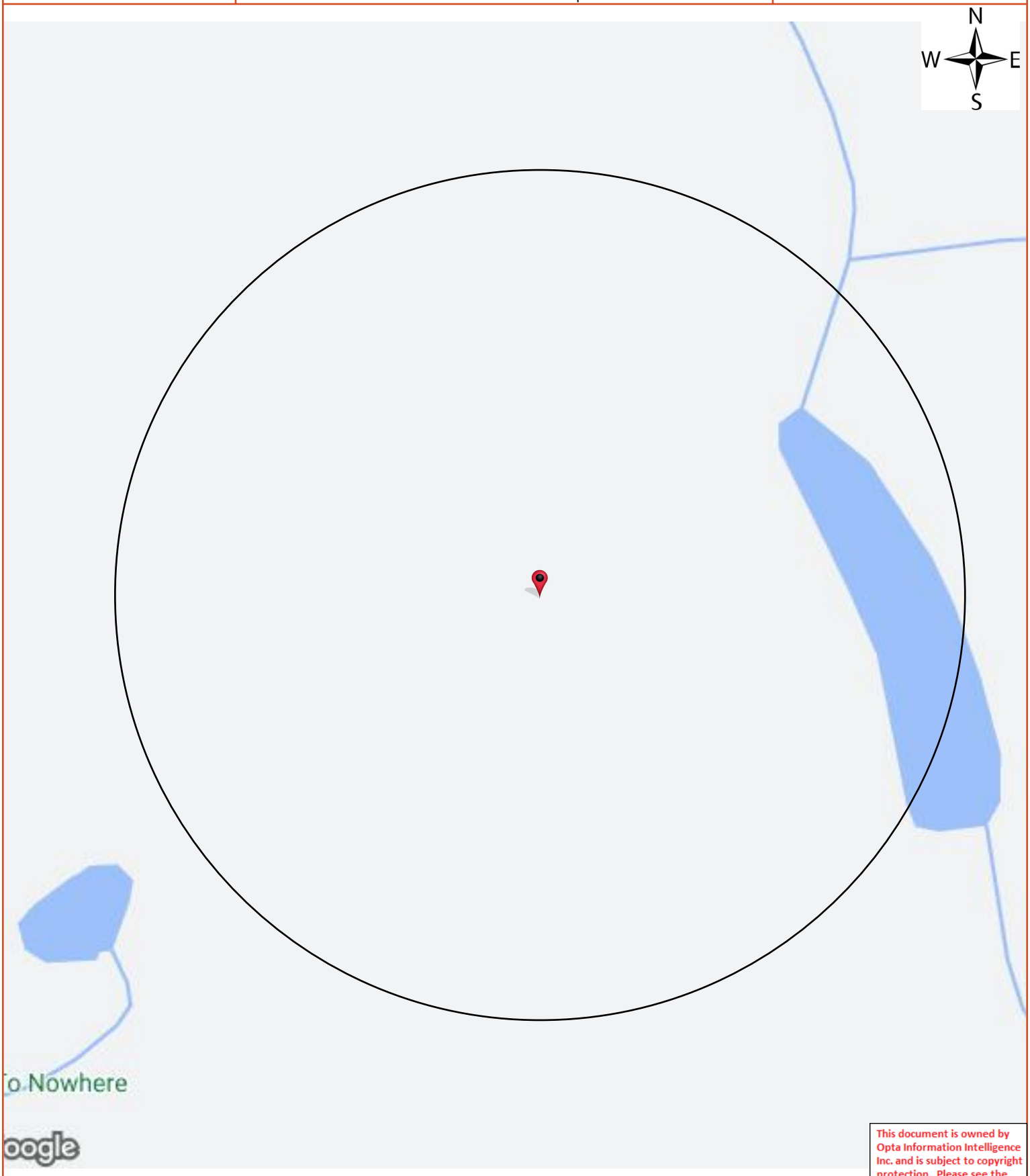
9/19/2023 9:09:37 AM

ENVIROSCAN Report

Search Area: N/A, Iqaluit, NU

Requested by:
Eleanor Goolab
Date Completed: 09/19/2023 09:09:37

enviroscan
OPTA INFORMATION INTELLIGENCE



Opta Historical Environmental Services Enviroscan™ Terms and Conditions

Report

The documents (hereinafter referred to as the "Documents") to be released as part of the report (hereinafter referred to as the "Report") to be delivered to the purchaser as set out above are documents in Opta's records relating to the described property (hereinafter referred to as the "Property"). Opta makes no representations or warranties respecting the Documents whatsoever, including, without limitation, with respect to the completeness, accuracy or usefulness of the Documents, and does not represent or warrant that these are the only plans and reports prepared in association with the Property or in Opta's possession at the time of Report delivery to the purchaser. The Documents are current as of the date(s) indicated on them. Interpretation of the Documents, if any, is by inference based upon the information which is apparent and obvious on the face of the Documents only. Opta does not represent, warrant or guarantee that interpretations other than those referred to do not exist from other sources. The Report will be prepared for use by the purchaser of the services as shown above hereof only.

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Opta disclaims responsibility for any losses or damages of any kind whatsoever, whether consequential or other, however caused, incurred or suffered, arising directly or indirectly as a result of the services (which services include, but are not limited to, the preparation of the Report provided hereunder), including but not limited to, any losses or damages arising directly or indirectly from any breach of contract, fundamental or otherwise, from reliance on Opta Reports or from any tortious acts or omissions of Opta's agents, employees or representatives.

Entire Agreement

The parties hereto acknowledge and agree to be bound by the terms and conditions hereof. The request form constitutes the entire agreement between the parties pertaining to the subject matter hereof and supersedes all prior and contemporaneous agreements, negotiations and discussions, whether oral or written, and there are no representations or warranties, or other agreements between the parties in connection with the subject matter hereof except as specifically set forth herein. No supplement, modification, waiver, or termination of the request shall be binding, unless confirmed in writing by the parties hereto.

Governing Document

In the event of any conflicts or inconsistencies between the provisions hereof and the Reports, the rights and obligations of the parties shall be deemed to be governed by the request form, which shall be the paramount document.

Law

This agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein.

ENVIROSCAN Report

No Records Found

Requested by:
Eleanor Goolab
Date Completed: 09/19/2023 09:09:37

OPTA INFORMATION INTELLIGENCE

No Records Found

N
W E
S

Appendix B

Aerial Photographs (ERIS & Google Earth)

HISTORICAL AERIALS

Project Property: Iqaluit
n/a
Iqaluit NU
Project No: 30192375
Requested By: Arcadis Canada Inc.
Order No: 23090500478
Date Completed: September 18,2023

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

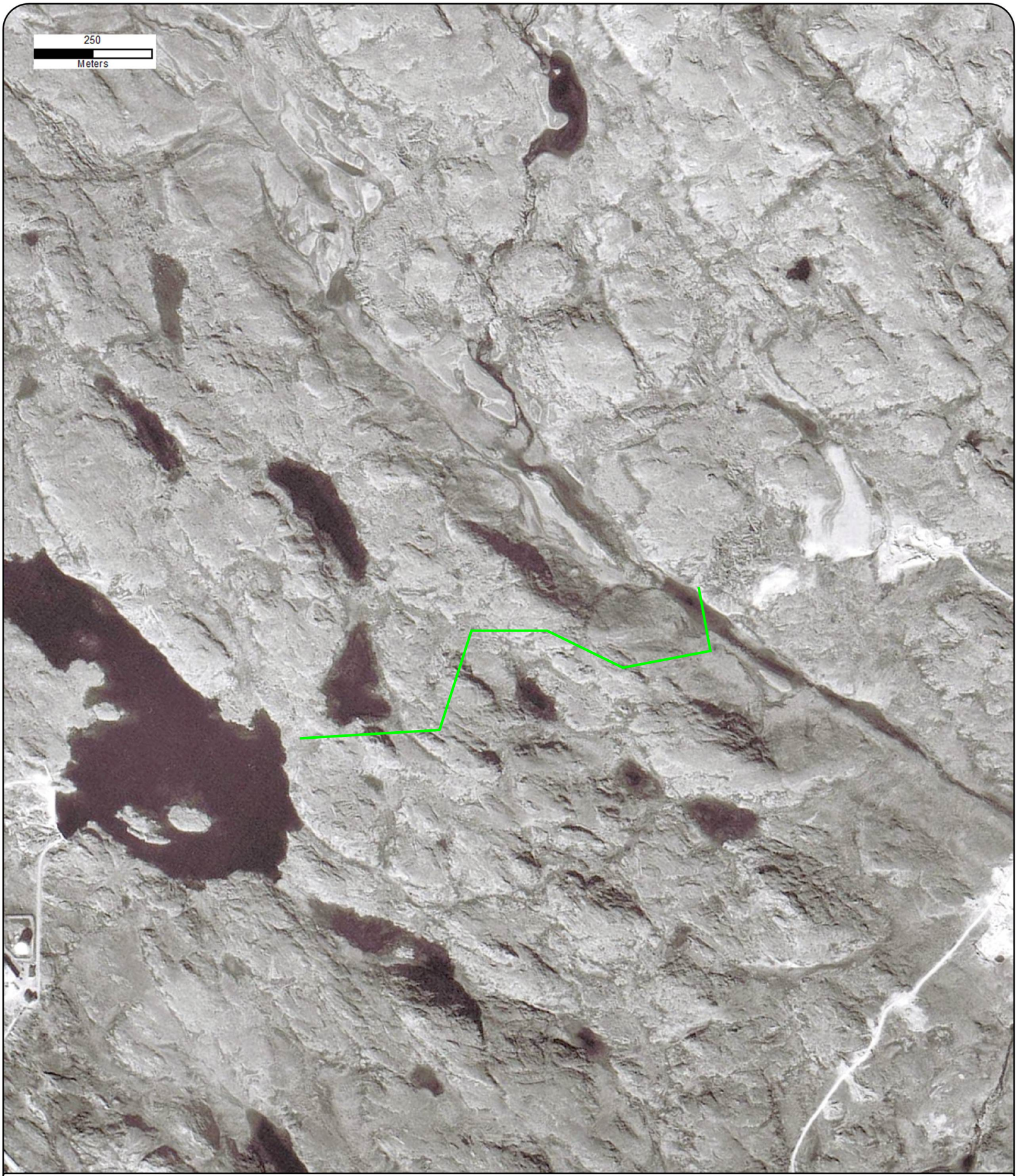
Date	Source	Scale	Comments
2022	MAXAR TECHNOLOGIES	10,000	
2010	Decade Coverage Unavailable	10,000	
2000	Decade Coverage Unavailable	10,000	
1992	National Air Photo Library	10,000	Best Copy Available
1982	National Air Photo Library	10,000	
1976	National Air Photo Library	10,000	
1969	National Air Photo Library	10,000	
1958	National Air Photo Library	10,000	
1948	National Air Photo Library	10,000	
1930	Decade Coverage Unavailable	10,000	
1920	Decade Coverage Unavailable	10,000	

Year: 2022
Source: MAXAR
Scale: 10,000
Comment:

Address: n/a, Iqaluit, NU
Approx Center: -68.48558758,63.75978215

Order No: 23090500478

ERIS

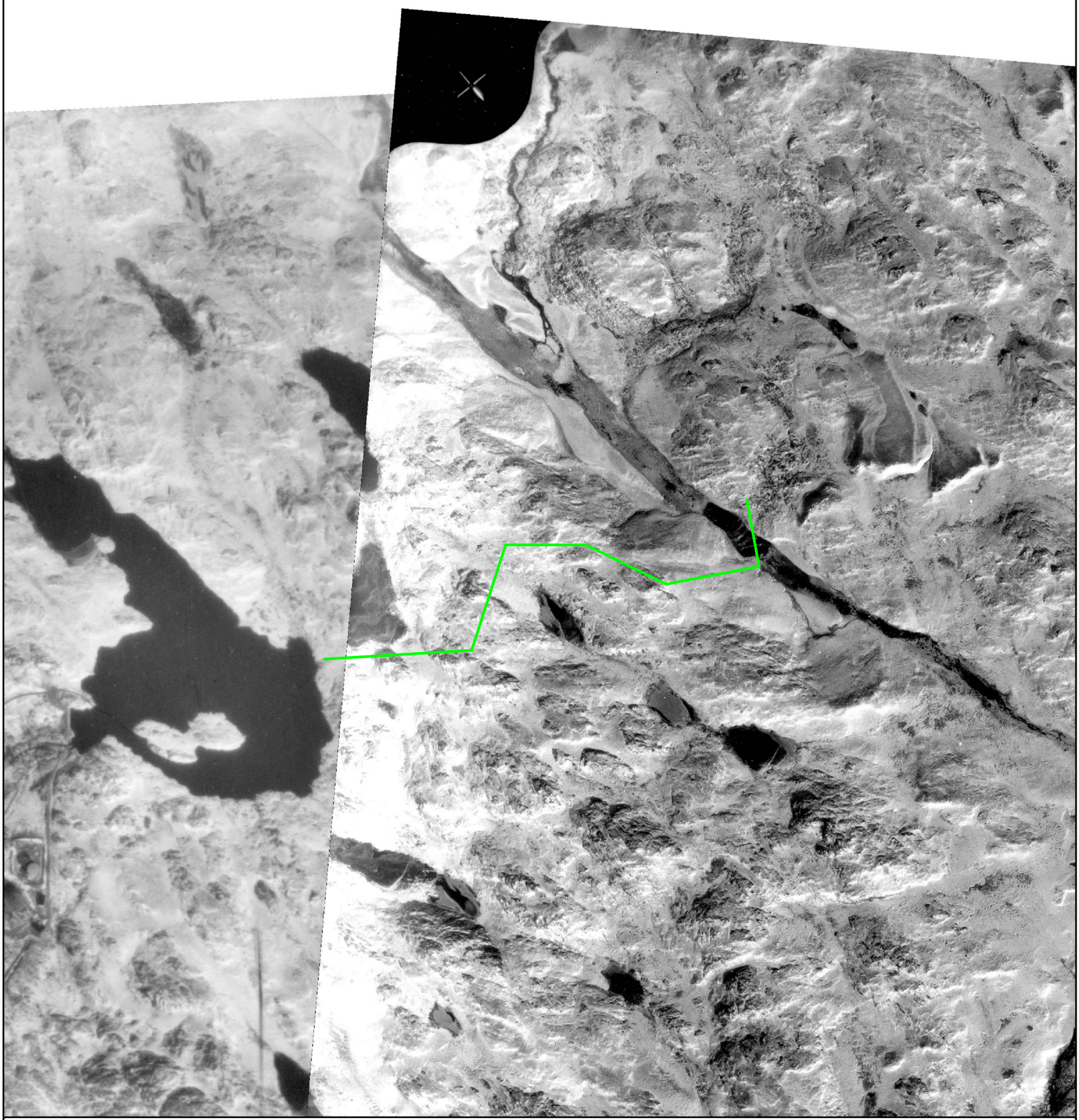


Year: 1992
Source: NAPL
Scale: 10,000
Comment: Best Copy Available

Address: n/a, Iqaluit, NU
Approx Center: -68.48558758,63.75978215

Order No: 23090500478

ERIS



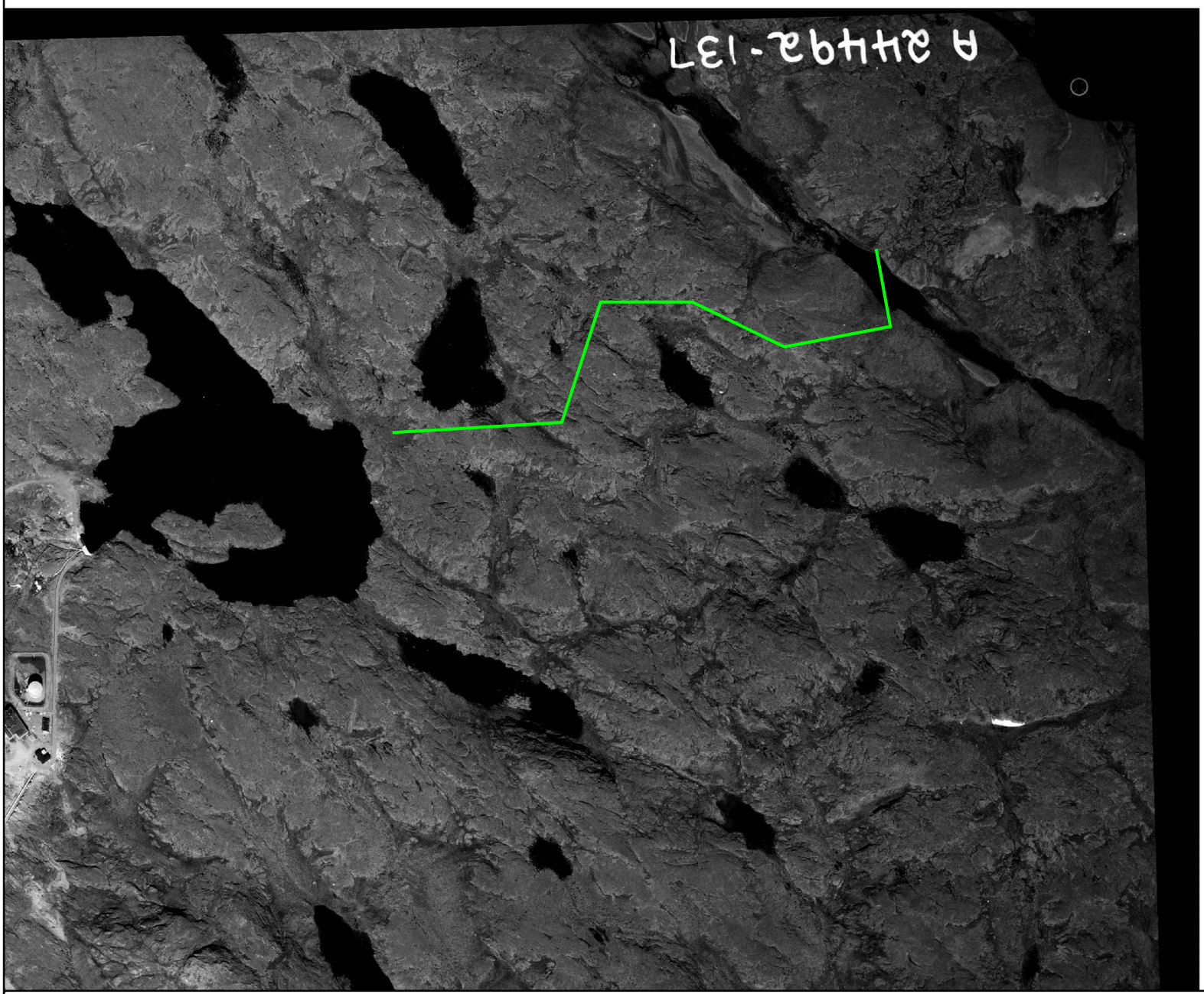
Year: 1982
Source: NAPL
Scale: 10,000
Comment:

Address: n/a, Iqaluit, NU
Approx Center: -68.48558758,63.75978215

Order No: 23090500478

ERIS

250
Meters

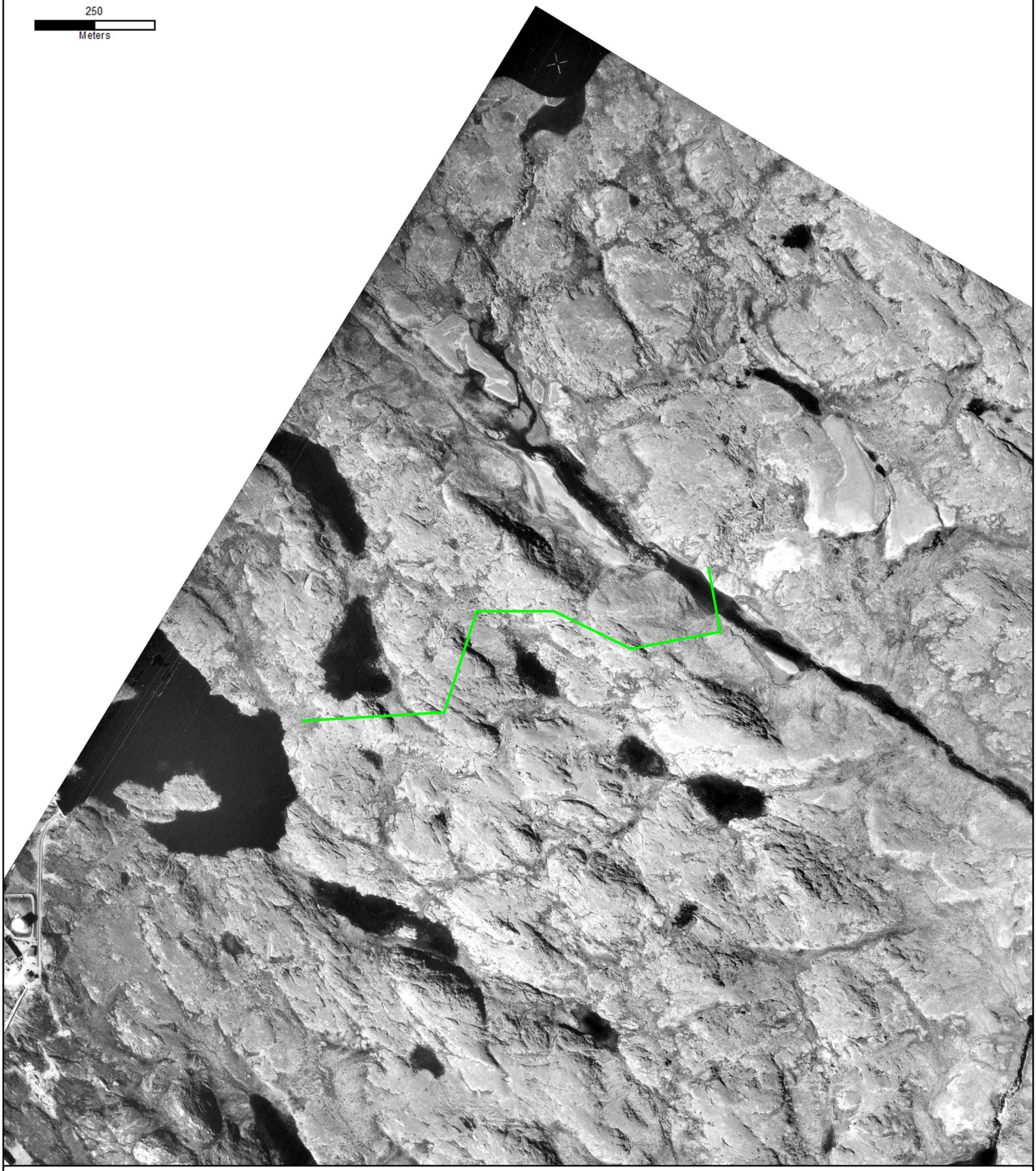


Year: 1976
Source: NAPL
Scale: 10,000
Comment:

Address: n/a, Iqaluit, NU
Approx Center: -68.48558758,63.75978215

Order No: 23090500478

ERIS

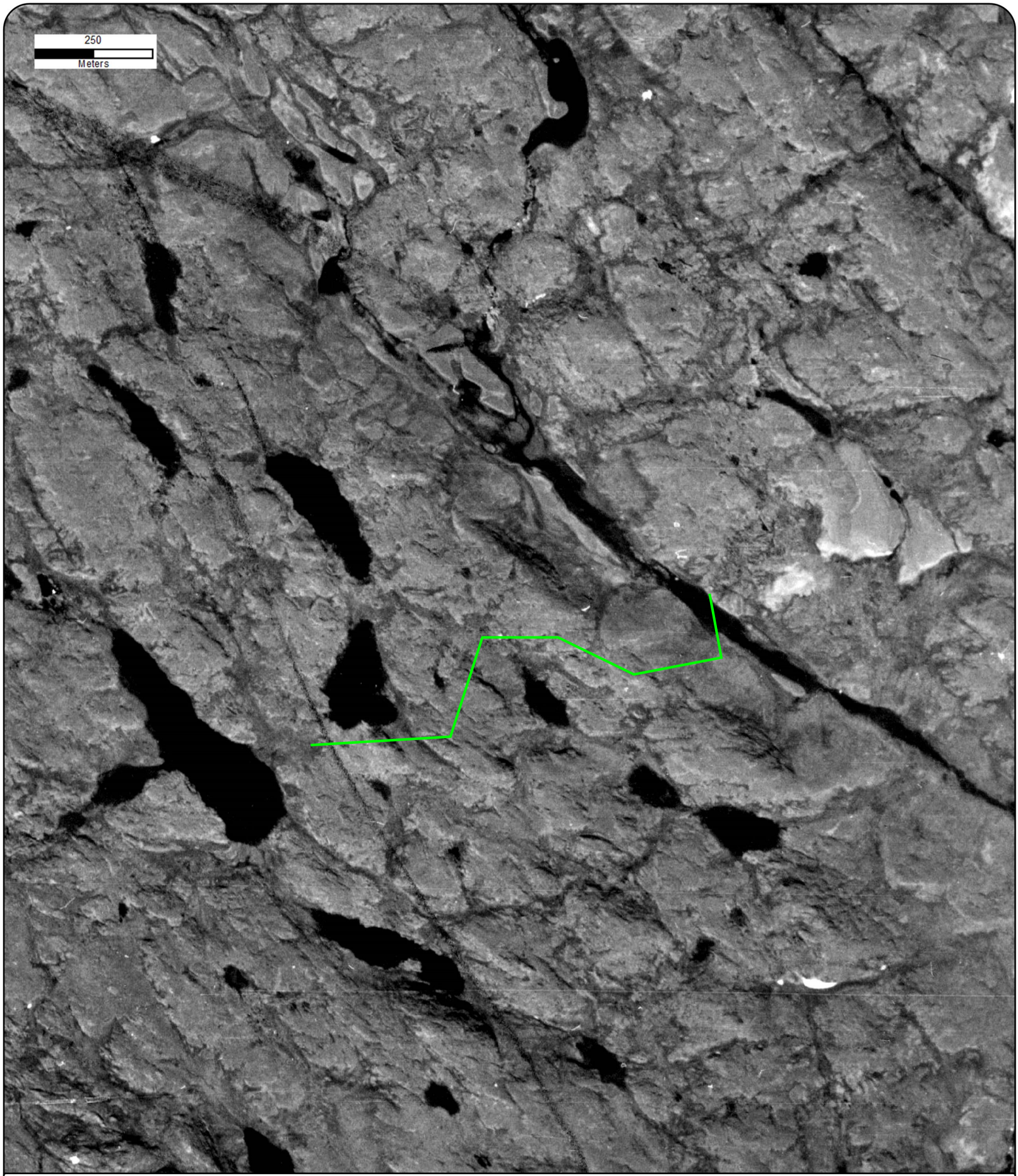


Year: 1969
Source: NAPL
Scale: 10,000
Comment:

Address: n/a, Iqaluit, NU
Approx Center: -68.48558758,63.75978215

Order No: 23090500478

ERIS

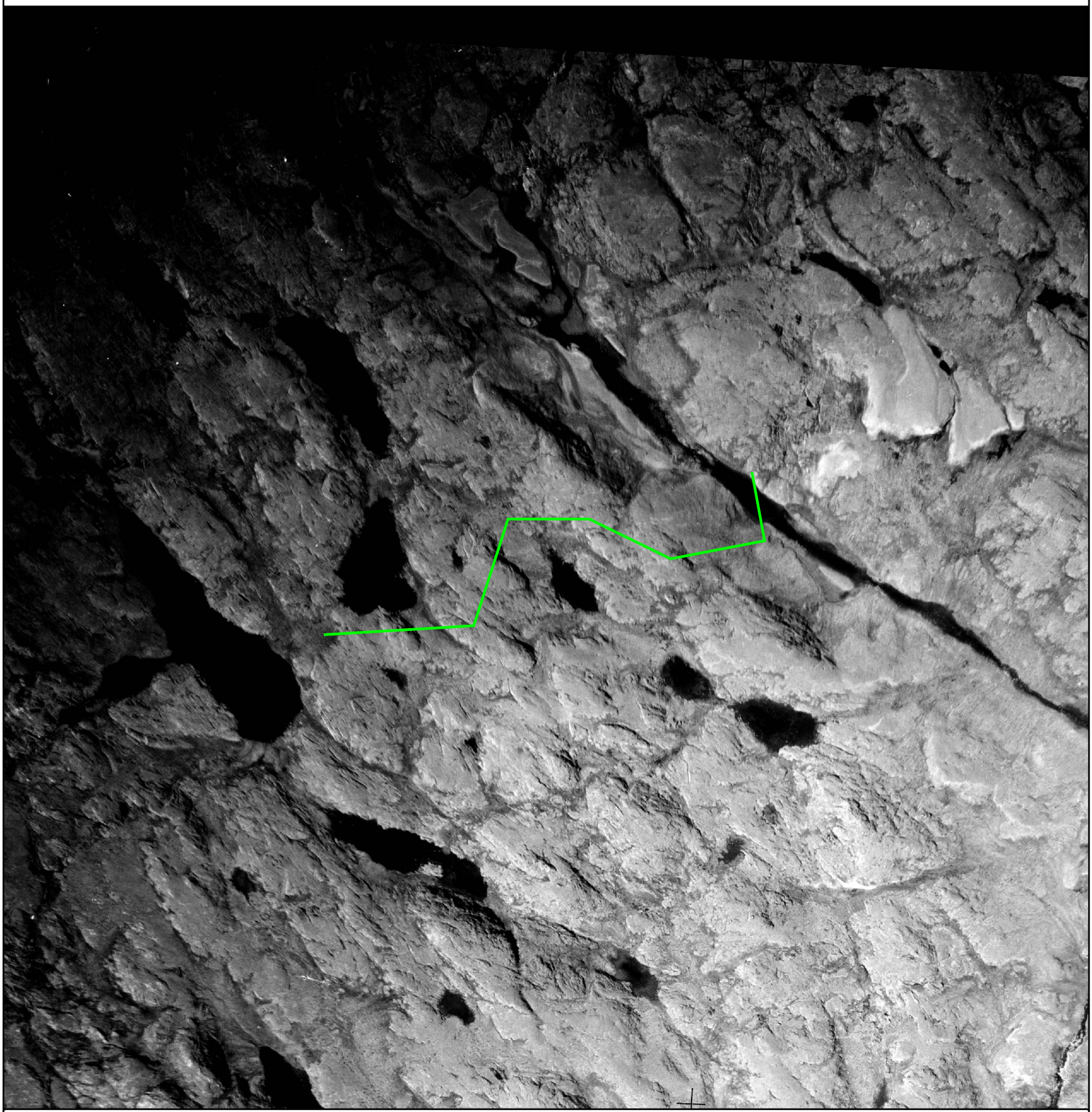


Year: 1958
Source: NAPL
Scale: 10,000
Comment:

Address: n/a, Iqaluit, NU
Approx Center: -68.48558758,63.75978215

Order No: 23090500478

ERIS



Year: 1948
Source: NAPL
Scale: 10,000
Comment:

Address: n/a, Iqaluit, NU
Approx Center: -68.48558758,63.75978215

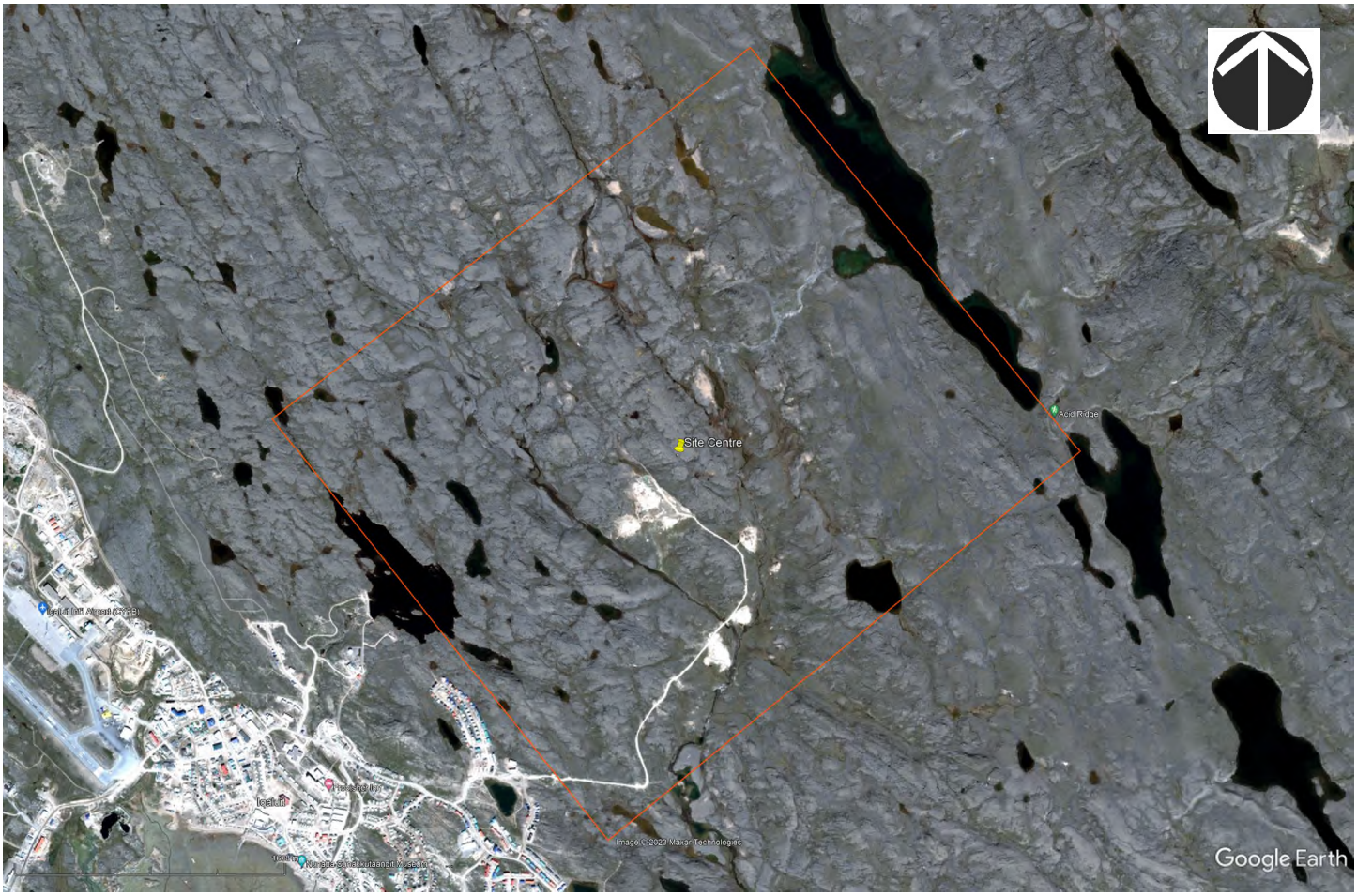
Order No: 23090500478

ERIS

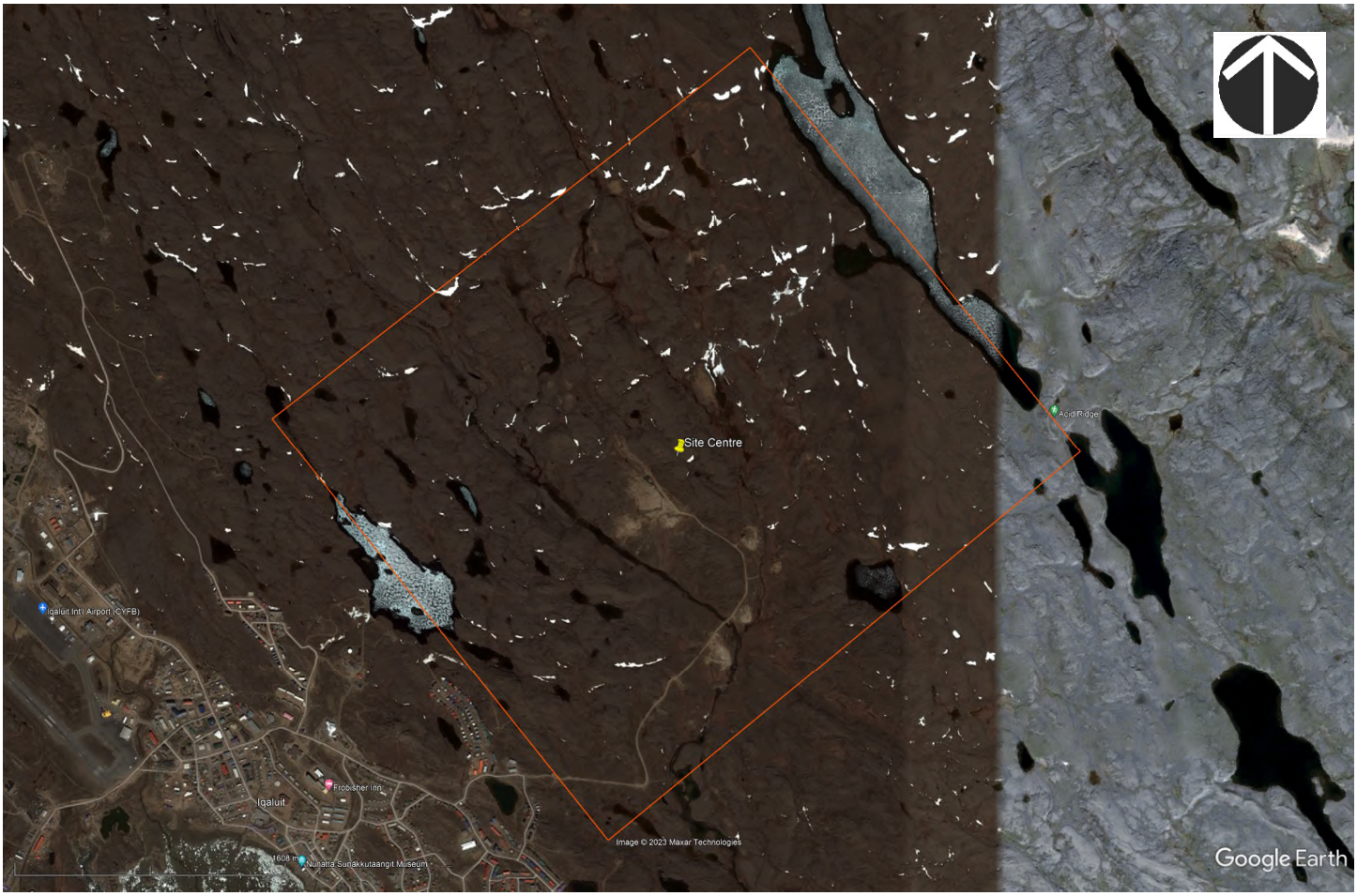
Aerial Photograph 1985 (GoogleEarth)

Aerial Photograph 2003 (GoogleEarth)

Aerial Photograph 2006 (GoogleEarth)

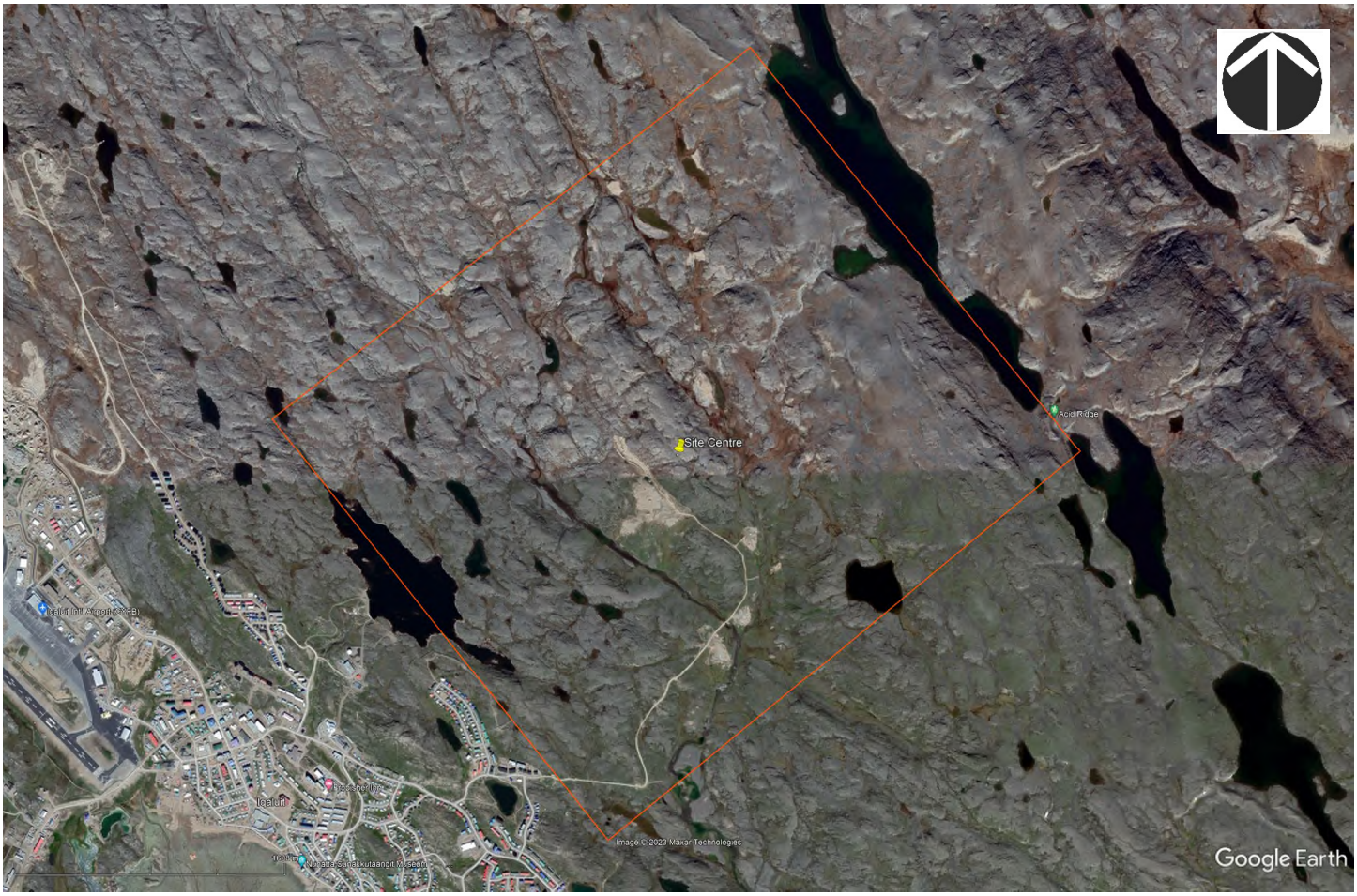


Aerial Photograph 2009 (GoogleEarth)

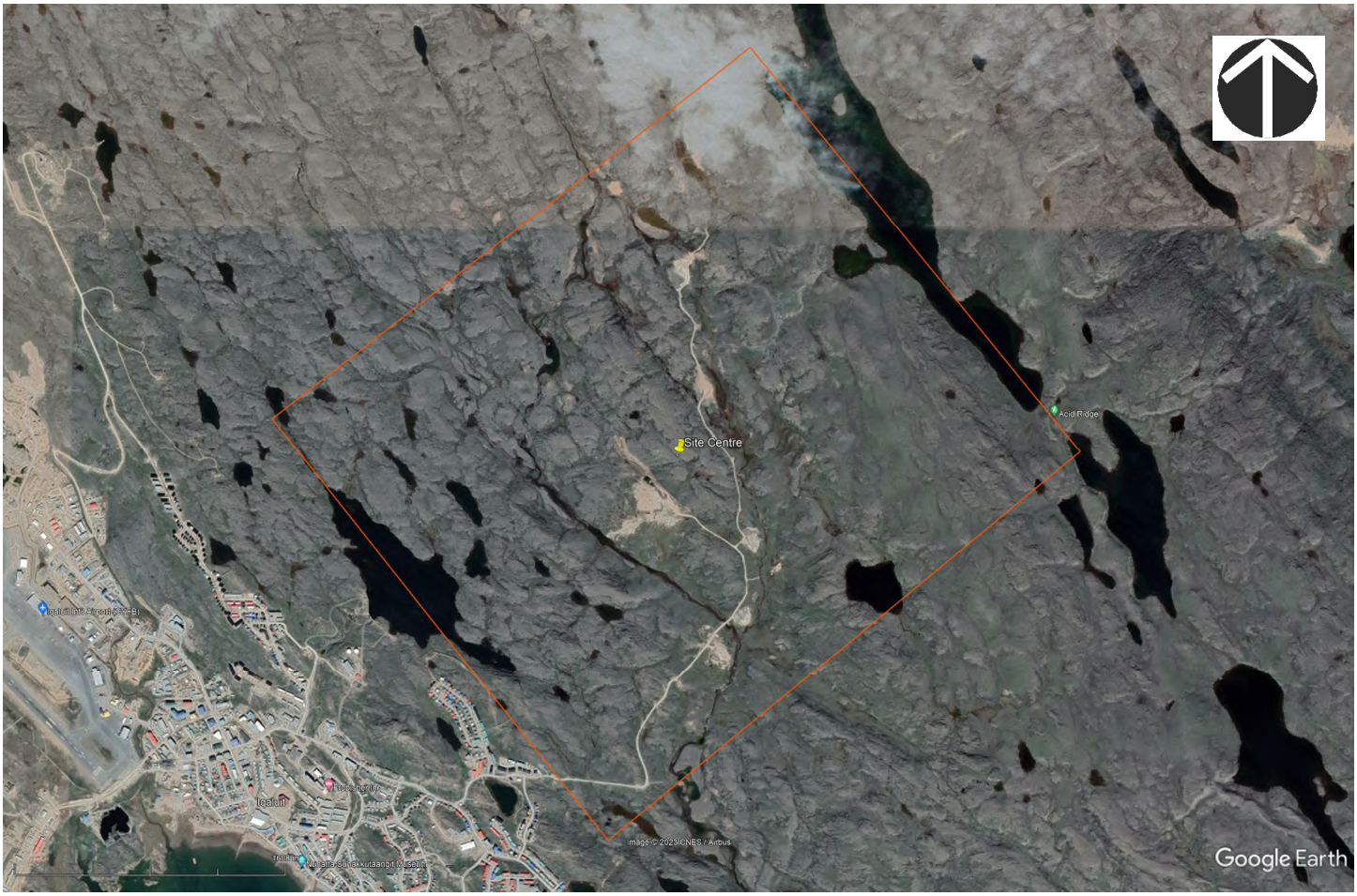


Aerial Photograph 2011 (GoogleEarth)

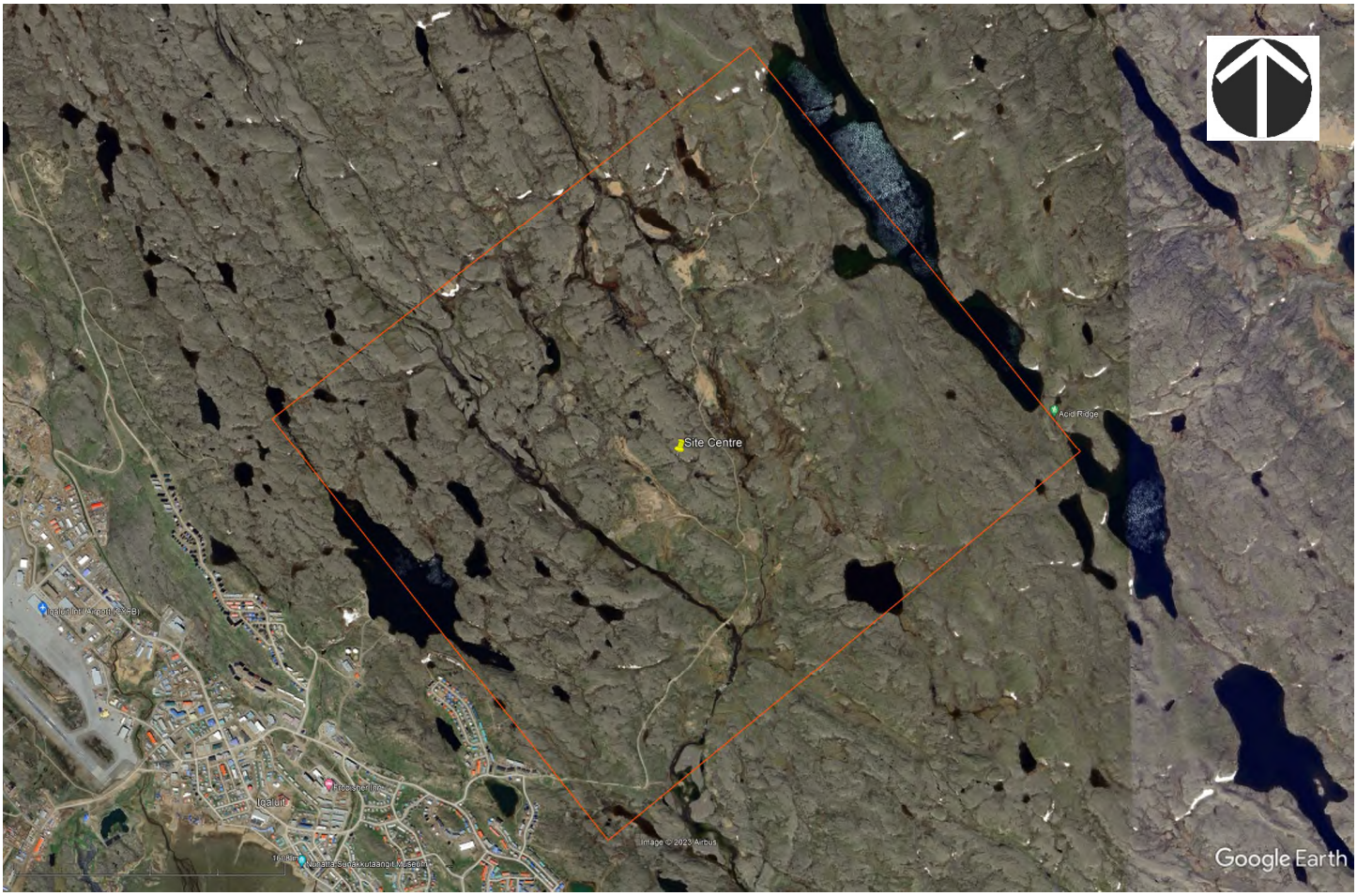
Aerial Photograph 2016 (GoogleEarth)



Aerial Photograph 2020 (GoogleEarth)



Aerial Photograph 2023 (GoogleEarth)



Appendix C

FOI Search Results

ᐊᕙᑎᓕᕆᔨᒃᑯᑦ
Department of Environment
Avatiliqiyikkut
Ministère de l'Environnement

November 7, 2023

Request Number # 1029-20-2324ENV0499

Jacob Holden
Arcadis Canada Inc.
jacob.holden@arcadis.com

RE: Release of Access to Information and Protection of Privacy Request

Dear Jacob Holden,

This letter is to confirm that the Department of Environment has processed your request for access to information under the *Access to Information and Protection of Privacy (ATIPP) Act* for the following information:

"Arcadis is conducting a Phase I Environmental Site Assessment for the site shown on the attached figure. This site area contains the following:

Environmental concerns (General correspondence, occurrence reports, abatement);
We are looking for information within this site area related to:

1. Nunavut Marketing;
2. Road to Nowhere Park;
3. Nunavut Parks and Special Places.
4. Iqaluit Shooting Range; and,
5. Water pipeline from Apex River used to supply water to Iqaluit s drinking water reservoir.

We are looking for information within this site area related to:

- Environmental concerns (General correspondence, occurrence reports, abatement);
- Orders;
- Spills reports;
- Environmental investigations/prosecutions documents; and,
- Permits related to air emissions, water/sewage/ waste water, waste sites (landfill/disposal sites), herbicide/pesticide usage. "

Unfortunately, we were unable to locate any records responsive to your request. Our Director of Environment conducted a search of both their physical and digital (network drive, databases, etc.) records as summarized in the table below:

Search term	Location	Result
Pesticide	Y:\4.0 ENVIRONMENTAL PROTECTION	No documents found related to area of interest
Order	Y:\4.0 ENVIRONMENTAL PROTECTION	No documents found related to area of interest
investigation	Y:\4.0 ENVIRONMENTAL PROTECTION	No documents found related to area of interest
prosecut	Y:\4.0 ENVIRONMENTAL PROTECTION	No documents found related to area of interest

As per section 28 of the *ATIPP Act*, you may ask the Information and Privacy Commissioner to review any manner concerning the response to your request. You have 30 days upon the receipt of this notice to request a review in writing to the following address:

Office of the Information and Privacy Commissioner of Nunavut
PO Box 1000, Station #270
607 Queen Elizabeth II Way
Iqaluit, Nunavut, X0A 0H0
tel: (867) 979-3081 | email: admin@atipp-nu.ca

If you wish to request a review, please provide the Office of the Commissioner with the following information:

1. The reference number quoted at the top of this notice.
2. A copy of this letter.
3. A copy of your original request for information that you sent to the Department.
4. The reason why you are requesting a review.

Should you have any questions regarding this letter, please feel free to contact me, Tina Price via email at tprice3@gov.nu.ca or by phone at 867-975-7749.

Sincerely,

Tina Price
Director, Policy Planning and Legislation

Cc: Yvonne Niego, Deputy Minister, Department of Environment
Yuri Podmoroff, Manager, Territorial ATIPP Office, Executive and Intergovernmental Affairs

Appendix D

Interview Log

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT
SITE RECONNAISSANCE QUESTIONNAIRE

Client Name: City of Iqaluit
Project Name: Long Term Water Program – Raw Water Supply and Storage
Project No.: 30192375

A site plan showing the Phase I ESA boundaries has been appended to the end of this questionnaire.

Item#	Item	Response
1	Name, title, and contact information of respondent	Michelle Armstrong, Contract Planner (Planning & Development Dept), Northern Futures Planning
2	How familiar is the respondent with historical activities at this site (e.g., years of experience with City)	I have been providing contract planning services to the City for various projects since 2003.
3	What is the legal description of the site or area occupied by the site	The site (shown as yellow box on Fig.2) is fully inside the Municipal Boundary (red dashed line on Fig.2) and outside the surveyed part of the community and is therefore "Untitled Municipal Land", with the exception of the beds of bodies of water which are Federal Lands.
4	What is the current zoning of the site? What was the former zoning of site and date of zoning change?	General Plan designations: • Green – Open Space • No colour – Nuna • Blue outline – Watershed Overlay • Firing Range Symbol – identifies the location of the Firing Range on Figure B on the General Plan. • Cemetery Symbol – also identified along the Road To Nowhere however the planned cemetery at this location was never constructed and was converted to a park – "Rotary Park". Zoning By-law • Green – Open Area Zone • No colour – Municipal Reserve Zone
5	Provide details of site ownership (owner/lessee names and dates, current and former)	There are a number of uses along the Road To Nowhere: • **Firing Range** - I understand that the firing range is operated and maintained by the Iqaluit Shooting Association, a non-profit organization. • **Embrace Life** – this organization is in the process of obtaining a lease to construct a small cabin to support land-based programming (more details can be provided as needed). They plan to occupy the site of

		a former Land Use Permit area issued to the Iqaluit Ski Club for an outdoor education program which consisted of a few wooden platforms but no buildings.
6	What is the site currently used for? What activities take place on the site? Provide details on when these activities start and end, if possible. Please provide details on the following areas if possible: 1) Iqaluit Shooting Range 2) Road to Nowhere Park 3) Nunavut Marketing	I am not familiar with the details of how the sites are used but there is swimming in Niaqunnguk River, temporary camping, picnicking, etc in the summer along the Niaqunnguk River.
7	What is the site formerly used for? Provide details on when these activities started and ended, if possible.	The City has historical aerial photos that could be consulted to confirm the date the various uses were established. The Iqaluit Shooting Association could provide details on when their operations started and whether more than one site was used in the past.
8	Have any potentially contaminating activities (e.g., spill events) occurred on the site?	I am not aware of any spills.
9	Is the site used, or has it ever been used, in whole or in part for an industrial use or for any of the following commercial uses, (i) as a garage, (ii) as a bulk liquid dispensing facility, including a gasoline outlet, or (iii) for the operation of dry cleaning equipment)? If yes, provide details.	I am not aware of any such uses on these lands.
10	Are there any structures on the site? Provide a general description of current and former structures (e.g., age, size, location, use, condition).	Not familiar with the details of the sites.
11	Are there any above and below ground tanks on the site? Provide details of all current and former above and below ground tanks (e.g., age, content, volume, use, location)	unknown
12	Provide details of underground utility and service corridors and aboveground utilities (e.g., sewer, water, electrical, gas, communication lines, and septic systems) on, in or under the site.	Not aware of any utilities being present within the site.

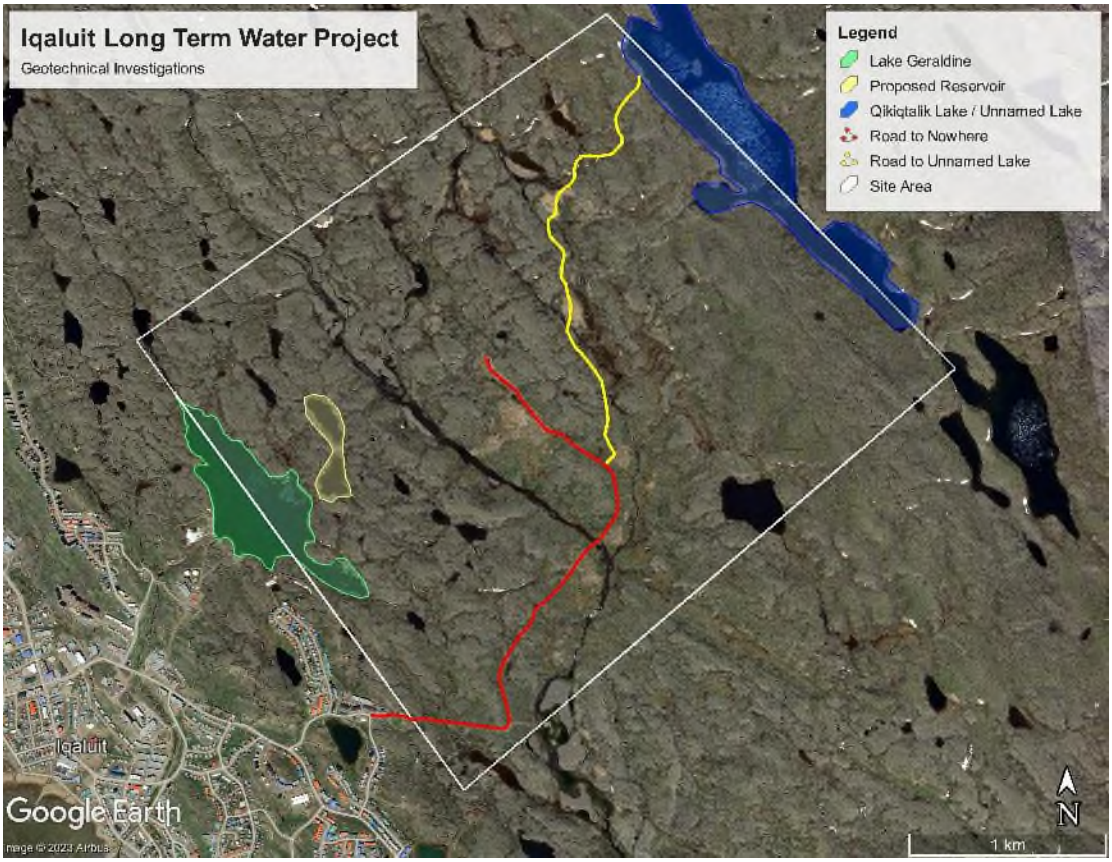


Figure 1. Phase I ESA Site Area

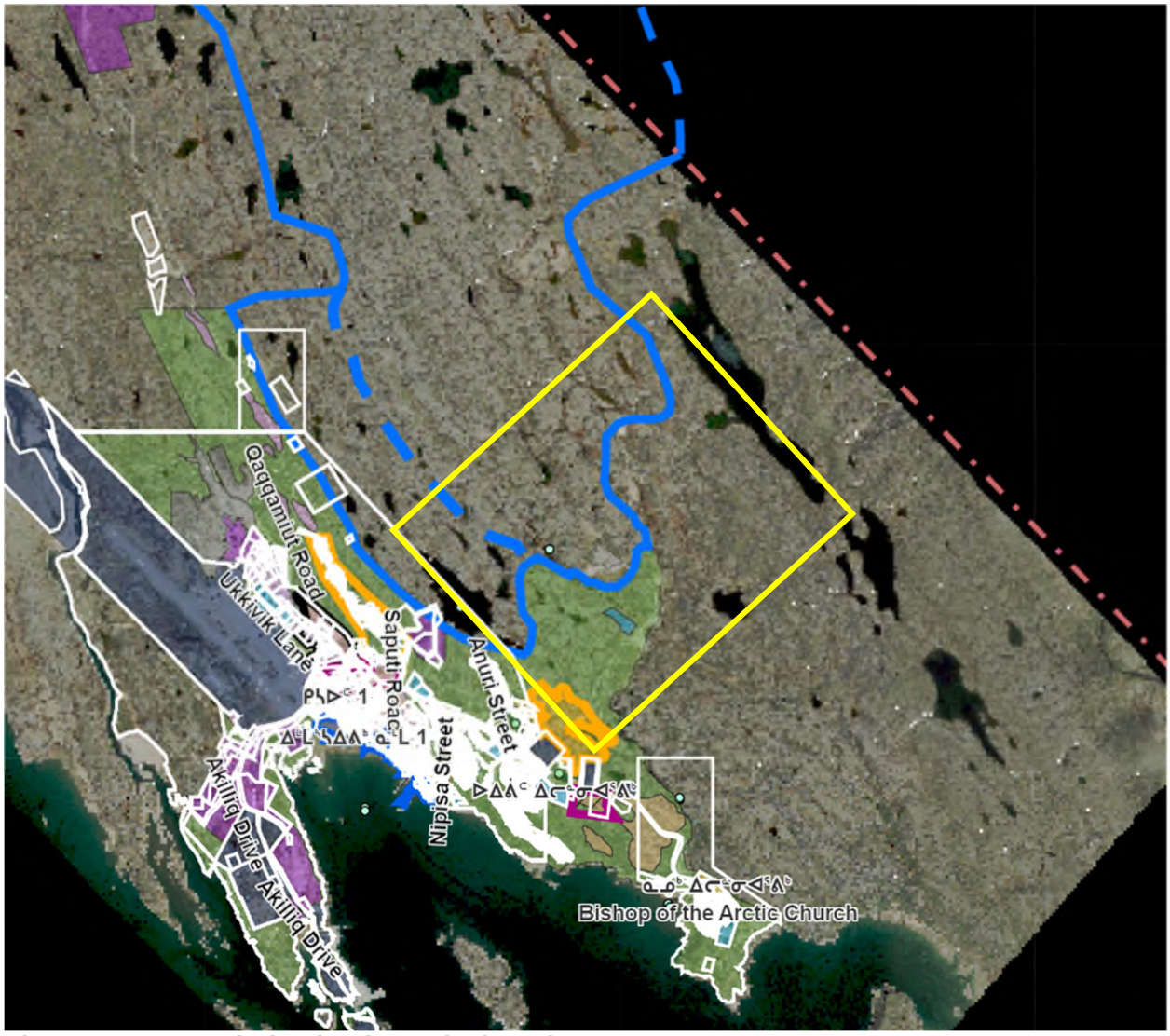


Figure 2 – General Plan land use designations

Holden, Jacob

From: Holden, Jacob
Sent: November 9, 2023 9:33 AM
To: Blaine Heffernan
Subject: RE: Iqaluit Shooting Range Inquiry

Hi Blaine,

I appreciate the prompt response. Thank you for this information.

Kind regards,
Elliott

From: Blaine Heffernan <blaine.heffernan@gmail.com>
Sent: Wednesday, November 8, 2023 2:45 PM
To: Holden, Jacob <Jacob.Holden@arcadis.com>
Subject: Re: Iqaluit Shooting Range Inquiry

Hi Elliott,

The range first broke ground in 2008. There has been no environmental issues or fuel contamination to my knowledge.

Please let me know if you have any other questions.

Kind regards,
Blaine

On Wed, Nov 8, 2023 at 2:00 PM Holden, Jacob <Jacob.Holden@arcadis.com> wrote:

> Good afternoon Mr. Heffernan,
>
> I was given your contact information by Rod Mugford of the City of Iqaluit. I am conducting a Phase I Environmental Site Assessment on behalf of the City for the area of land between Lake Geraldine and Qikiqtalik Lake. The Iqaluit Shooting Range falls within the assessment area for this work. Given this, I was wondering if you could answer a few questions I have about the range:
>
> 1. When was the shooting range first built/established?
> 2. Has there been any environmental issues of note associated with the range (e.g., spilt fuel)?

Regards,

Elliott

Jacob (Elliott) Holden, P.Eng.
Environmental Engineer
Arcadis Canada Inc.
333 Preston Street, Suite 500 | Ottawa, ON | K1S 5N4 | Canada

T 613 703 3818
M 613 809 4651
www.arcadis.com

Appendix E

Photograph Log

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 1

Description:
Front gate at APEC 1: Shooting Association Range looking southwest.

Location:
63.762066 N
-68.468209 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 2

Description:
East range at APEC 1: Shooting Association Range looking north.

Location:
63.761779 N
-68.47116 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 3

Description:
West range at APEC 1: Shooting Association Range looking north.

Location:
63.76167 N
-68.471402 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 4

Description:
APEC 2: Historical Fuel Oil Spill looking southeast from Road to Nowhere.

Location:
63.753197 N
-68.468377 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 5

Description:
APEC 2: Historical Fuel Oil Spill looking southeast.

Location:
63.753138 N
-68.46782 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 6

Description:
APEC 2: Historical Fuel Oil Spill looking east.

Location:
63.752954 N
-68.468037 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 7

Description:
Apex Pumping Station (APEC 3) at Niaqunnguk (Apex) River looking west.

Location:
63.760807 N
-68.475167 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 8

Description:
Pump intakes at APEC 3: Apex Pumping Station looking southwest/west.

Location:
63.760854 N
-68.476521 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 9

Description:
Office/Supply shed at APEC 3: Apex Pumping Station looking west.

Location:
63.761043 N
-68.475604 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 10

Description:
Office/Supply shed at APEC 3: Apex Pumping Station looking North.

Location:
63.761005 N
-68.47569 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 11

Description:
Office/Supply shed at APEC 3: Apex Pumping Station looking east.

Location:
63.761081 N
-68.475989 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 12

Description:
Generator shed at APEC 3: Apex Pumping Station looking north.

Location:
63.760981 N
-68.47621 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 13

Description:
Generator shed at APEC 3: Apex Pumping Station looking northeast.

Location:
63.761046 N
-68.476419 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 14

Description:
Generator shed at APEC 3: Apex Pumping Station looking East.

Location:
63.761062 N
-68.476423 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 15

Description:
Fuel tank placard for generator at APEC 3: Apex Pumping Station looking south.

Location:
63.761078 N
-68.476363 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 16

Description:
Electrical shed at APEC 3: Apex Pumping Station looking northwest.

Location:
63.760939 N
-68.476208 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 17

Description:
Electrical shed at APEC 3: Apex Pumping Station looking east.

Location:
63.760971 N
-68.476619 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 18

Description:
APEC 4: Interim Pumping Station at Qikiqtalik Lake looking north.

Location:
63.782729 N
-68.455702 E

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 19

Description:
Pump containment pad at APEC 4: Interim Pumping Station looking southeast.

Location:
63.78321 N
-68.455875 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph: 20

Description:
APEC 4: Interim Pumping Station at Qikiqtalik Lake looking southwest.

Location:
63.783503 N
-68.455421 W

Photograph taken by:
Ryan Janzen

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 21

Description:
Interim Pumping Station at Qikiqtalik Lake looking north.

Location:
63.782733 N
-68.455611 W

Photograph taken by:
Michael Kehle

Date: September 19, 2023

Photograph: 22

Description:
Southwest shoreline of Qikiqtalik Lake near Interim Pumping Station looking southeast.

Location:
63.783595 N
-68.455475 W

Photograph taken by:
Michael Kehle

Date: September 19, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 23

Description:
Southwest shoreline of Qikiqtalik Lake near Interim Pumping Station looking northwest.

Location:
63.783564 N
-68.455453 W

Photograph taken by:
Michael Kehle

Date: September 19, 2023

Photograph: 24

Description:
Access road to Qikiqtalik Lake looking northwest.

Location:
63.776978 N
-68.464234 W

Photograph taken by:
Ryan Janzen

Date: September 19, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 25

Description:
North shoreline of Niaqunnguk (Apex) River near Apex Pumping Station looking northwest.

Location:
63.760661 N
-68.475792 W

Photograph taken by:
Michael Kehle

Date: September 20, 2023

Photograph: 26

Description:
North shoreline of Niaqunnguk (Apex) River near Apex Pumping Station looking west.

Location:
63.760661 N
-68.475786 W

Photograph taken by:
Michael Kehle

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 27

Description:
South shoreline of Niaqunnguk (Apex) River near Apex Pumping Station looking northeast.

Location:
63.760378 N
-68.477439 W

Photograph taken by:
Michael Kehle

Date: September 20, 2023

Photograph: 28

Description:
Pipeline from Apex Pumping Station to Lake Geraldine looking southwest.

Location:
63.758909 N
-68.489978 W

Photograph taken by:
Michael Kehle

Date: September 20, 2023

Photograph Log

City of Iqaluit
Enhanced Phase I Environmental Site Assessment
Long Term Water Program Iqaluit, Nunavut
30192375

Photograph: 29

Description:
Unnamed waterbody north of Lake Geraldine (water pipeline in background) looking south.

Location:
63.759755 N
-68.493614 W

Photograph taken by:
Michael Kehle

Date: September 20, 2023

Photograph: 30

Description:
Outlet of water pipeline from the Apex Pumping Station at Lake Geraldine.

Location:
63.758328 N
-68.494172 W

Photograph taken by:
Michael Kehle

Date: September 21, 2023

Appendix F

Certificate of Analysis for Soil Samples

Your Project #: 30192375
Site Location: IQALUIT
Your C.O.C. #: na

Attention: Ryan Janzen

ARCADIS Canada Inc
500-333 Preston Street
Ottawa, ON
CANADA K1S 5N4

Report Date: 2023/10/04
Report #: R7845640
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3T7892
Received: 2023/09/27, 09:00

Sample Matrix: Soil
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Petroleum Hydrocarbons F2-F4 in Soil (1, 2)	11	2023/10/02	2023/10/02	CAM SOP-00316	CCME CWS m
Acid Extractable Metals by ICPMS (1)	11	2023/10/03	2023/10/04	CAM SOP-00447	EPA 6020B m
Moisture (1)	11	N/A	2023/09/30	CAM SOP-00445	Carter 2nd ed 51.2 m
Volatile Organic Compounds and F1 PHCs (1)	11	N/A	2023/10/02	CAM SOP-00230	EPA 8260C m

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Your Project #: 30192375
Site Location: IQALUIT
Your C.O.C. #: na

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CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3T7892
Received: 2023/09/27, 09:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633

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This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04

ARCADIS Canada Inc
Client Project #: 30192375
Site Location: IQALUIT
Sampler Initials: RVJ

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Bureau Veritas ID		XCN710			XCN710			XCN711	XCN712		
Sampling Date		2023/09/20 11:10			2023/09/20 11:10			2023/09/20 09:10	2023/09/20 09:13		
COC Number		na			na			na	na		
	UNITS	**IP-1**	**RDL**	**QC Batch**	**IP-1 Lab-Dup**	**RDL**	**QC Batch**	**APS-1**	**APS-2**	**RDL**	**QC Batch**
Volatile Organics											
Benzene	ug/g	<0.0060	0.0060	8950839	<0.0060	0.0060	8950839	<0.0060	<0.0060	0.0060	8950839
Ethylbenzene	ug/g	<0.010	0.010	8950839	<0.010	0.010	8950839	<0.010	<0.010	0.010	8950839
Toluene	ug/g	<0.020	0.020	8950839	<0.020	0.020	8950839	<0.020	<0.020	0.020	8950839
p+m-Xylene	ug/g	<0.020	0.020	8950839	<0.020	0.020	8950839	<0.020	<0.020	0.020	8950839
o-Xylene	ug/g	<0.020	0.020	8950839	<0.020	0.020	8950839	<0.020	<0.020	0.020	8950839
Total Xylenes	ug/g	<0.020	0.020	8950839	<0.020	0.020	8950839	<0.020	<0.020	0.020	8950839
F1 (C6-C10)	ug/g	<10	10	8950839	<10	10	8950839	<10	<10	10	8950839
F1 (C6-C10) - BTEX	ug/g	<10	10	8950839	<10	10	8950839	<10	<10	10	8950839
F2-F4 Hydrocarbons											
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	8954588				<10	<10	10	8954588
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	8954588				<50	<50	50	8954588
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	8954588				<50	<50	50	8954588
Reached Baseline at C50	ug/g	Yes		8954588				Yes	Yes		8954588
Surrogate Recovery (%)											
o-Terphenyl	%	85		8954588				86	86		8954588
4-Bromofluorobenzene	%	96		8950839	96		8950839	96	97		8950839
D10-o-Xylene	%	107		8950839	110		8950839	88	94		8950839
D4-1,2-Dichloroethane	%	101		8950839	105		8950839	102	103		8950839
D8-Toluene	%	90		8950839	90		8950839	91	90		8950839

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Bureau Veritas ID		XCN713	XCN714	XCN715	XCN716	XCN717	XCN718		
Sampling Date		2023/09/20 09:15	2023/09/20 14:15	2023/09/20 11:50	2023/09/20 11:55	2023/09/21 10:00	2023/09/21		
COC Number		na	na	na	na	na	na		
	UNITS	**APS-3**	**APS-4**	**NM-1**	**NM-2**	**SAR-1**	**SAR-2**	**RDL**	**QC Batch**
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	8950839
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	8950839
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	8950839
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	8950839
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	8950839
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	8950839
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	<10	10	8950839
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	<10	10	8950839
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	<10	10	8954588
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	<50	50	8954588
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	<50	50	8954588
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	Yes		8954588
Surrogate Recovery (%)									
o-Terphenyl	%	87	85	77	84	85	86		8954588
4-Bromofluorobenzene	%	96	96	96	95	97	95		8950839
D10-o-Xylene	%	87	93	92	92	88	92		8950839
D4-1,2-Dichloroethane	%	103	104	103	104	104	105		8950839
D8-Toluene	%	91	90	89	90	90	89		8950839

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

Bureau Veritas ID		XCN719	XCN720		
Sampling Date		2023/09/21	2023/09/21		
COC Number		na	na		
	UNITS	**SAR-3**	**DUP**	**RDL**	**QC Batch**
Volatile Organics					
Benzene	ug/g	<0.0060	<0.0060	0.0060	8950839
Ethylbenzene	ug/g	<0.010	<0.010	0.010	8950839
Toluene	ug/g	<0.020	<0.020	0.020	8950839
p+m-Xylene	ug/g	<0.020	<0.020	0.020	8950839
o-Xylene	ug/g	<0.020	<0.020	0.020	8950839
Total Xylenes	ug/g	<0.020	<0.020	0.020	8950839
F1 (C6-C10)	ug/g	<10	<10	10	8950839
F1 (C6-C10) - BTEX	ug/g	<10	<10	10	8950839
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	10	8954588
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	50	8954588
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	50	8954588
Reached Baseline at C50	ug/g	Yes	Yes		8954588
Surrogate Recovery (%)					
o-Terphenyl	%	83	86		8954588
4-Bromofluorobenzene	%	96	96		8950839
D10-o-Xylene	%	101	89		8950839
D4-1,2-Dichloroethane	%	105	106		8950839
D8-Toluene	%	90	90		8950839

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04

ARCADIS Canada Inc
Client Project #: 30192375
Site Location: IQALUIT
Sampler Initials: RVJ

CCME ICPMS METALS (SOIL)

Bureau Veritas ID		XCN710	XCN711	XCN712	XCN713		XCN714	XCN714		
Sampling Date		2023/09/20 11:10	2023/09/20 09:10	2023/09/20 09:13	2023/09/20 09:15		2023/09/20 14:15	2023/09/20 14:15		
COC Number		na	na	na	na		na	na		
	UNITS	**IP-1**	**APS-1**	**APS-2**	**APS-3**	**QC Batch**	**APS-4**	**APS-4 Lab-Dup**	**RDL**	**QC Batch**
Metals										
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	<0.20	<0.20	8957079	<0.20	<0.20	0.20	8957082
Acid Extractable Arsenic (As)	ug/g	<1.0	<1.0	<1.0	<1.0	8957079	<1.0	<1.0	1.0	8957082
Acid Extractable Barium (Ba)	ug/g	24	15	29	11	8957079	12	12	0.50	8957082
Acid Extractable Beryllium (Be)	ug/g	<0.20	<0.20	<0.20	<0.20	8957079	<0.20	<0.20	0.20	8957082
Acid Extractable Boron (B)	ug/g	<5.0	<5.0	<5.0	<5.0	8957079	<5.0	<5.0	5.0	8957082
Acid Extractable Cadmium (Cd)	ug/g	<0.10	<0.10	<0.10	<0.10	8957079	<0.10	<0.10	0.10	8957082
Acid Extractable Chromium (Cr)	ug/g	16	6.5	14	4.8	8957079	33	25	1.0	8957082
Acid Extractable Cobalt (Co)	ug/g	4.9	2.9	5.4	2.6	8957079	4.7	4.2	0.10	8957082
Acid Extractable Copper (Cu)	ug/g	10	6.0	24	4.9	8957079	2.4	2.2	0.50	8957082
Acid Extractable Lead (Pb)	ug/g	2.6	2.3	14	2.7	8957079	2.6	2.4	1.0	8957082
Acid Extractable Molybdenum (Mo)	ug/g	0.60	<0.50	1.6	<0.50	8957079	1.2	1.0	0.50	8957082
Acid Extractable Nickel (Ni)	ug/g	6.9	4.6	8.1	3.8	8957079	5.4	4.4	0.50	8957082
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	<0.50	<0.50	8957079	<0.50	<0.50	0.50	8957082
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	8957079	<0.20	<0.20	0.20	8957082
Acid Extractable Thallium (Tl)	ug/g	<0.050	<0.050	0.051	<0.050	8957079	<0.050	<0.050	0.050	8957082
Acid Extractable Tin (Sn)	ug/g	<1.0	<1.0	<1.0	<1.0	8957079	<1.0	<1.0	1.0	8957082
Acid Extractable Uranium (U)	ug/g	0.42	0.30	0.68	0.24	8957079	0.44	0.37	0.050	8957082
Acid Extractable Vanadium (V)	ug/g	36	11	30	9.0	8957079	83	62	5.0	8957082
Acid Extractable Zinc (Zn)	ug/g	27	30	78	20	8957079	27	24	5.0	8957082
Acid Extractable Mercury (Hg)	ug/g	<0.050	<0.050	<0.050	<0.050	8957079	<0.050	<0.050	0.050	8957082

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

CCME ICPMS METALS (SOIL)

Bureau Veritas ID		XCN715	XCN716	XCN717	XCN718	XCN719	XCN720		
Sampling Date		2023/09/20 11:50	2023/09/20 11:55	2023/09/21 10:00	2023/09/21	2023/09/21	2023/09/21		
COC Number		na	na	na	na	na	na		
	UNITS	**NM-1**	**NM-2**	**SAR-1**	**SAR-2**	**SAR-3**	**DUP**	**RDL**	**QC Batch**
Metals									
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	<0.20	3.0	0.33	0.21	0.20	8957079
Acid Extractable Arsenic (As)	ug/g	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	1.0	8957079
Acid Extractable Barium (Ba)	ug/g	23	23	12	14	14	12	0.50	8957079
Acid Extractable Beryllium (Be)	ug/g	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	8957079
Acid Extractable Boron (B)	ug/g	11	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	8957079
Acid Extractable Cadmium (Cd)	ug/g	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	8957079
Acid Extractable Chromium (Cr)	ug/g	19	15	7.1	12	11	11	1.0	8957079
Acid Extractable Cobalt (Co)	ug/g	5.1	5.0	2.9	3.7	3.3	3.2	0.10	8957079
Acid Extractable Copper (Cu)	ug/g	10	16	8.6	62	7.0	6.0	0.50	8957079
Acid Extractable Lead (Pb)	ug/g	3.0	3.0	3.7	190	16	11	1.0	8957079
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	8957079
Acid Extractable Nickel (Ni)	ug/g	7.2	7.3	4.5	5.1	5.1	4.9	0.50	8957079
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	8957079
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	8957079
Acid Extractable Thallium (Tl)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8957079
Acid Extractable Tin (Sn)	ug/g	<1.0	<1.0	<1.0	18	<1.0	<1.0	1.0	8957079
Acid Extractable Uranium (U)	ug/g	0.43	0.33	0.31	0.40	0.35	0.38	0.050	8957079
Acid Extractable Vanadium (V)	ug/g	39	34	13	25	23	23	5.0	8957079
Acid Extractable Zinc (Zn)	ug/g	31	33	19	22	19	19	5.0	8957079
Acid Extractable Mercury (Hg)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8957079

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

CCME ICPMS METALS (SOIL)

Bureau Veritas ID		XCN720		
Sampling Date		2023/09/21		
COC Number		na		
	UNITS	**DUP Lab-Dup**	**RDL**	**QC Batch**
Metals				
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	8957079
Acid Extractable Arsenic (As)	ug/g	<1.0	1.0	8957079
Acid Extractable Barium (Ba)	ug/g	14	0.50	8957079
Acid Extractable Beryllium (Be)	ug/g	<0.20	0.20	8957079
Acid Extractable Boron (B)	ug/g	<5.0	5.0	8957079
Acid Extractable Cadmium (Cd)	ug/g	<0.10	0.10	8957079
Acid Extractable Chromium (Cr)	ug/g	12	1.0	8957079
Acid Extractable Cobalt (Co)	ug/g	3.3	0.10	8957079
Acid Extractable Copper (Cu)	ug/g	6.8	0.50	8957079
Acid Extractable Lead (Pb)	ug/g	12	1.0	8957079
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	8957079
Acid Extractable Nickel (Ni)	ug/g	4.9	0.50	8957079
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	8957079
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	8957079
Acid Extractable Thallium (Tl)	ug/g	<0.050	0.050	8957079
Acid Extractable Tin (Sn)	ug/g	<1.0	1.0	8957079
Acid Extractable Uranium (U)	ug/g	0.42	0.050	8957079
Acid Extractable Vanadium (V)	ug/g	26	5.0	8957079
Acid Extractable Zinc (Zn)	ug/g	20	5.0	8957079
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	8957079

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04

ARCADIS Canada Inc
Client Project #: 30192375
Site Location: IQALUIT
Sampler Initials: RVJ

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		XCN710	XCN711	XCN712	XCN713		XCN714	XCN714		
Sampling Date		2023/09/20 11:10	2023/09/20 09:10	2023/09/20 09:13	2023/09/20 09:15		2023/09/20 14:15	2023/09/20 14:15		
COC Number		na	na	na	na		na	na		
	UNITS	**IP-1**	**APS-1**	**APS-2**	**APS-3**	**QC Batch**	**APS-4**	**APS-4 Lab-Dup**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	7.5	8.6	3.8	2.6	8952837	6.2	6.3	1.0	8952789

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		XCN715	XCN716	XCN717	XCN718	XCN719	XCN720		
Sampling Date		2023/09/20 11:50	2023/09/20 11:55	2023/09/21 10:00	2023/09/21	2023/09/21	2023/09/21		
COC Number		na	na	na	na	na	na		
	UNITS	**NM-1**	**NM-2**	**SAR-1**	**SAR-2**	**SAR-3**	**DUP**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	13	8.4	18	19	15	15	1.0	8952837

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

TEST SUMMARY

Bureau Veritas ID: XCN710 **Collected:** 2023/09/20
Sample ID: IP-1 **Shipped:**
Matrix: Soil **Received:** 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN710 Dup **Collected:** 2023/09/20
Sample ID: IP-1 **Shipped:**
Matrix: Soil **Received:** 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN711 **Collected:** 2023/09/20
Sample ID: APS-1 **Shipped:**
Matrix: Soil **Received:** 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN712 **Collected:** 2023/09/20
Sample ID: APS-2 **Shipped:**
Matrix: Soil **Received:** 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN713 **Collected:** 2023/09/20
Sample ID: APS-3 **Shipped:**
Matrix: Soil **Received:** 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

TEST SUMMARY

Bureau Veritas ID: XCN714
Sample ID: APS-4
Matrix: Soil

Collected: 2023/09/20
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957082	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952789	N/A	2023/09/30	Min Yang
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN714 Dup
Sample ID: APS-4
Matrix: Soil

Collected: 2023/09/20
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acid Extractable Metals by ICPMS	ICP/MS	8957082	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952789	N/A	2023/09/30	Min Yang

Bureau Veritas ID: XCN715
Sample ID: NM-1
Matrix: Soil

Collected: 2023/09/20
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN716
Sample ID: NM-2
Matrix: Soil

Collected: 2023/09/20
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN717
Sample ID: SAR-1
Matrix: Soil

Collected: 2023/09/21
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04

ARCADIS Canada Inc
Client Project #: 30192375
Site Location: IQALUIT
Sampler Initials: RVJ

TEST SUMMARY

Bureau Veritas ID: XCN718
Sample ID: SAR-2
Matrix: Soil

Collected: 2023/09/21
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN719
Sample ID: SAR-3
Matrix: Soil

Collected: 2023/09/21
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN720
Sample ID: DUP
Matrix: Soil

Collected: 2023/09/21
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	8954588	2023/10/02	2023/10/02	Agnieszka Brzuzy-Snopko
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu
Moisture	BAL	8952837	N/A	2023/09/30	Simranjit KAUR
Volatile Organic Compounds and F1 PHCs	GC/MSFD	8950839	N/A	2023/10/02	Xueming Jiang

Bureau Veritas ID: XCN720 Dup
Sample ID: DUP
Matrix: Soil

Collected: 2023/09/21
Shipped:
Received: 2023/09/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acid Extractable Metals by ICPMS	ICP/MS	8957079	2023/10/03	2023/10/04	Daniel Teclu

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.7°C

Sample XCN718 [SAR-2] : F24 Analysis: Expiry date is missing for the sample.

Sample XCN719 [SAR-3] : F24 Analysis: Expiry date is missing for the sample.

Sample XCN720 [DUP] : F24 Analysis: Expiry date is missing for the sample.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8950839	4-Bromofluorobenzene	2023/10/02	119	60 - 140	112	60 - 140	95	%		
8950839	D10-o-Xylene	2023/10/02	122	60 - 130	116	60 - 130	113	%		
8950839	D4-1,2-Dichloroethane	2023/10/02	98	60 - 140	98	60 - 140	102	%		
8950839	D8-Toluene	2023/10/02	120	60 - 140	112	60 - 140	90	%		
8954588	o-Terphenyl	2023/10/02	94	60 - 130	87	60 - 130	87	%		
8950839	Benzene	2023/10/02	76	60 - 140	82	60 - 130	<0.0060	ug/g	NC	50
8950839	Ethylbenzene	2023/10/02	86	60 - 140	89	60 - 130	<0.010	ug/g	NC	50
8950839	F1 (C6-C10) - BTEX	2023/10/02					<10	ug/g	NC	30
8950839	F1 (C6-C10)	2023/10/02	71	60 - 140	95	80 - 120	<10	ug/g	NC	30
8950839	o-Xylene	2023/10/02	81	60 - 140	84	60 - 130	<0.020	ug/g	NC	50
8950839	p+m-Xylene	2023/10/02	89	60 - 140	92	60 - 130	<0.020	ug/g	NC	50
8950839	Toluene	2023/10/02	90	60 - 140	92	60 - 130	<0.020	ug/g	NC	50
8950839	Total Xylenes	2023/10/02					<0.020	ug/g	NC	50
8952789	Moisture	2023/09/30							1.6	20
8952837	Moisture	2023/09/30							2.4	20
8954588	F2 (C10-C16 Hydrocarbons)	2023/10/02	102	60 - 130	93	80 - 120	<10	ug/g	NC	30
8954588	F3 (C16-C34 Hydrocarbons)	2023/10/02	102	60 - 130	94	80 - 120	<50	ug/g	NC	30
8954588	F4 (C34-C50 Hydrocarbons)	2023/10/02	102	60 - 130	94	80 - 120	<50	ug/g	NC	30
8957079	Acid Extractable Antimony (Sb)	2023/10/04	101	75 - 125	102	80 - 120	<0.20	ug/g	6.3	30
8957079	Acid Extractable Arsenic (As)	2023/10/04	100	75 - 125	100	80 - 120	<1.0	ug/g	NC	30
8957079	Acid Extractable Barium (Ba)	2023/10/04	102	75 - 125	96	80 - 120	<0.50	ug/g	16	30
8957079	Acid Extractable Beryllium (Be)	2023/10/04	99	75 - 125	94	80 - 120	<0.20	ug/g	NC	30
8957079	Acid Extractable Boron (B)	2023/10/04	94	75 - 125	91	80 - 120	<5.0	ug/g	NC	30
8957079	Acid Extractable Cadmium (Cd)	2023/10/04	102	75 - 125	100	80 - 120	<0.10	ug/g	NC	30
8957079	Acid Extractable Chromium (Cr)	2023/10/04	91	75 - 125	95	80 - 120	<1.0	ug/g	2.8	30
8957079	Acid Extractable Cobalt (Co)	2023/10/04	100	75 - 125	101	80 - 120	<0.10	ug/g	1.9	30
8957079	Acid Extractable Copper (Cu)	2023/10/04	95	75 - 125	93	80 - 120	<0.50	ug/g	12	30
8957079	Acid Extractable Lead (Pb)	2023/10/04	154 (1)	75 - 125	102	80 - 120	<1.0	ug/g	7.3	30
8957079	Acid Extractable Mercury (Hg)	2023/10/04	109	75 - 125	105	80 - 120	<0.050	ug/g	NC	30
8957079	Acid Extractable Molybdenum (Mo)	2023/10/04	100	75 - 125	98	80 - 120	<0.50	ug/g	NC	30
8957079	Acid Extractable Nickel (Ni)	2023/10/04	100	75 - 125	101	80 - 120	<0.50	ug/g	1.5	30
8957079	Acid Extractable Selenium (Se)	2023/10/04	104	75 - 125	103	80 - 120	<0.50	ug/g	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8957079	Acid Extractable Silver (Ag)	2023/10/04	106	75 - 125	105	80 - 120	<0.20	ug/g	NC	30
8957079	Acid Extractable Thallium (Tl)	2023/10/04	108	75 - 125	106	80 - 120	<0.050	ug/g	NC	30
8957079	Acid Extractable Tin (Sn)	2023/10/04	105	75 - 125	95	80 - 120	<1.0	ug/g	NC	30
8957079	Acid Extractable Uranium (U)	2023/10/04	106	75 - 125	105	80 - 120	<0.050	ug/g	9.3	30
8957079	Acid Extractable Vanadium (V)	2023/10/04	90	75 - 125	96	80 - 120	<5.0	ug/g	12	30
8957079	Acid Extractable Zinc (Zn)	2023/10/04	102	75 - 125	94	80 - 120	<5.0	ug/g	5.5	30
8957082	Acid Extractable Antimony (Sb)	2023/10/04	100	75 - 125	100	80 - 120	<0.20	ug/g	NC	30
8957082	Acid Extractable Arsenic (As)	2023/10/04	101	75 - 125	100	80 - 120	<1.0	ug/g	NC	30
8957082	Acid Extractable Barium (Ba)	2023/10/04	101	75 - 125	98	80 - 120	<0.50	ug/g	4.2	30
8957082	Acid Extractable Beryllium (Be)	2023/10/04	98	75 - 125	98	80 - 120	<0.20	ug/g	NC	30
8957082	Acid Extractable Boron (B)	2023/10/04	93	75 - 125	94	80 - 120	<5.0	ug/g	NC	30
8957082	Acid Extractable Cadmium (Cd)	2023/10/04	100	75 - 125	98	80 - 120	<0.10	ug/g	NC	30
8957082	Acid Extractable Chromium (Cr)	2023/10/04	NC	75 - 125	97	80 - 120	<1.0	ug/g	25	30
8957082	Acid Extractable Cobalt (Co)	2023/10/04	103	75 - 125	100	80 - 120	<0.10	ug/g	11	30
8957082	Acid Extractable Copper (Cu)	2023/10/04	96	75 - 125	95	80 - 120	<0.50	ug/g	7.8	30
8957082	Acid Extractable Lead (Pb)	2023/10/04	100	75 - 125	99	80 - 120	<1.0	ug/g	4.8	30
8957082	Acid Extractable Mercury (Hg)	2023/10/04	103	75 - 125	105	80 - 120	<0.050	ug/g	NC	30
8957082	Acid Extractable Molybdenum (Mo)	2023/10/04	97	75 - 125	98	80 - 120	<0.50	ug/g	22	30
8957082	Acid Extractable Nickel (Ni)	2023/10/04	102	75 - 125	102	80 - 120	<0.50	ug/g	19	30
8957082	Acid Extractable Selenium (Se)	2023/10/04	101	75 - 125	100	80 - 120	<0.50	ug/g	NC	30
8957082	Acid Extractable Silver (Ag)	2023/10/04	106	75 - 125	102	80 - 120	<0.20	ug/g	NC	30
8957082	Acid Extractable Thallium (Tl)	2023/10/04	105	75 - 125	102	80 - 120	<0.050	ug/g	NC	30
8957082	Acid Extractable Tin (Sn)	2023/10/04	104	75 - 125	91	80 - 120	<1.0	ug/g	NC	30
8957082	Acid Extractable Uranium (U)	2023/10/04	103	75 - 125	100	80 - 120	<0.050	ug/g	15	30
8957082	Acid Extractable Vanadium (V)	2023/10/04	NC	75 - 125	95	80 - 120	<5.0	ug/g	29	30

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8957082	Acid Extractable Zinc (Zn)	2023/10/04	NC	75 - 125	99	80 - 120	<5.0	ug/g	8.7	30

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

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

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

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

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

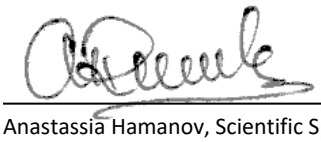
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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

(1) Metal Analysis (ICPMSALM-S) Matrix Spike exceeds acceptance limits, probable matrix interference

VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266

CHAIN OF CUSTODY RECORD

ENV COC - 00014v3

27-Sep-23 09:00
Katherine Szozda
C3T7892
L ENV-1173

Invoice Information		Report Information (if differs from invoice)		Project Information	
Invoice to (requires report)	☑				
Company:	Arcadis	Company:		Quotation #:	80 Arcadis MSA
Contact Name:	Ryan Janzen	Contact Name:		P.O. #/ AFE#:	30192375
Street Address:	333 Preston St.	Street Address:		Project #:	
City: Ottawa Prov: ON Postal Code:		City: Prov: Postal Code:		Site #:	
Phone:	613-721-0555	Phone:		Site Location:	Iqaluit
Email:	ryan.janzen@arcadis.com	Email:		Site Location Province:	NU
Copies:	jacob.holden@arcadis.com	Copies:		Sampled By:	RVJ

Regulatory Criteria

REG 153: ☐ Table 1 ☐ Table 2 ☐ Table 3 ☐ Table ____ ☐ Res/Park ☐ Ind/Comm ☐ Agri/other ☐ Med/Fine ☐ Course ☐ For RSC

OTHER: ☑ CCME ☐ Reg 558* ☐ *min 3 day TAT ☐ MISA ☐ PWQO ☐ Reg 406, Table: ____ ☐ Sanitary Sewer Bylaw ☐ Storm Sewer Bylaw Municipality ____ ☐ Other: ____

Include Criteria on Certificate of Analysis (check if yes): ☐

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

Regular Turnaround Time (TAT)
☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply
☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YY ____ MM ____ DD ____

	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX/ F1	5 F2 - F4	6 VOCs	7 Reg 153 metals and inorganics	8 Reg 153 ICPMS metals	9 Reg 153 metals (Hg, Cr VI, ICPMS metals, HWS - B)	10	11	12	13	14	15	16	17	18	19	20	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Comments
1	IP-1	23	09	20	11	10	soil				X	X			X													
2	APS-1				09	10					X	X			X													
3	APS-2				09	13					X	X			X													
4	APS-3				09	15					X	X			X													
5	APS-4				14	15					X	X			X													
6	NM-1				11	50					X	X			X													
7	NM-2			↓	11	55					X	X			X													
8	SAR-1			21	10	00					X	X			X													
9	SAR-2				10	07					X	X			X													
10	SAR-3				10	14					X	X			X													
11	DUP	↓	↓		12	00	↓				X	X			X													
12																												

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

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

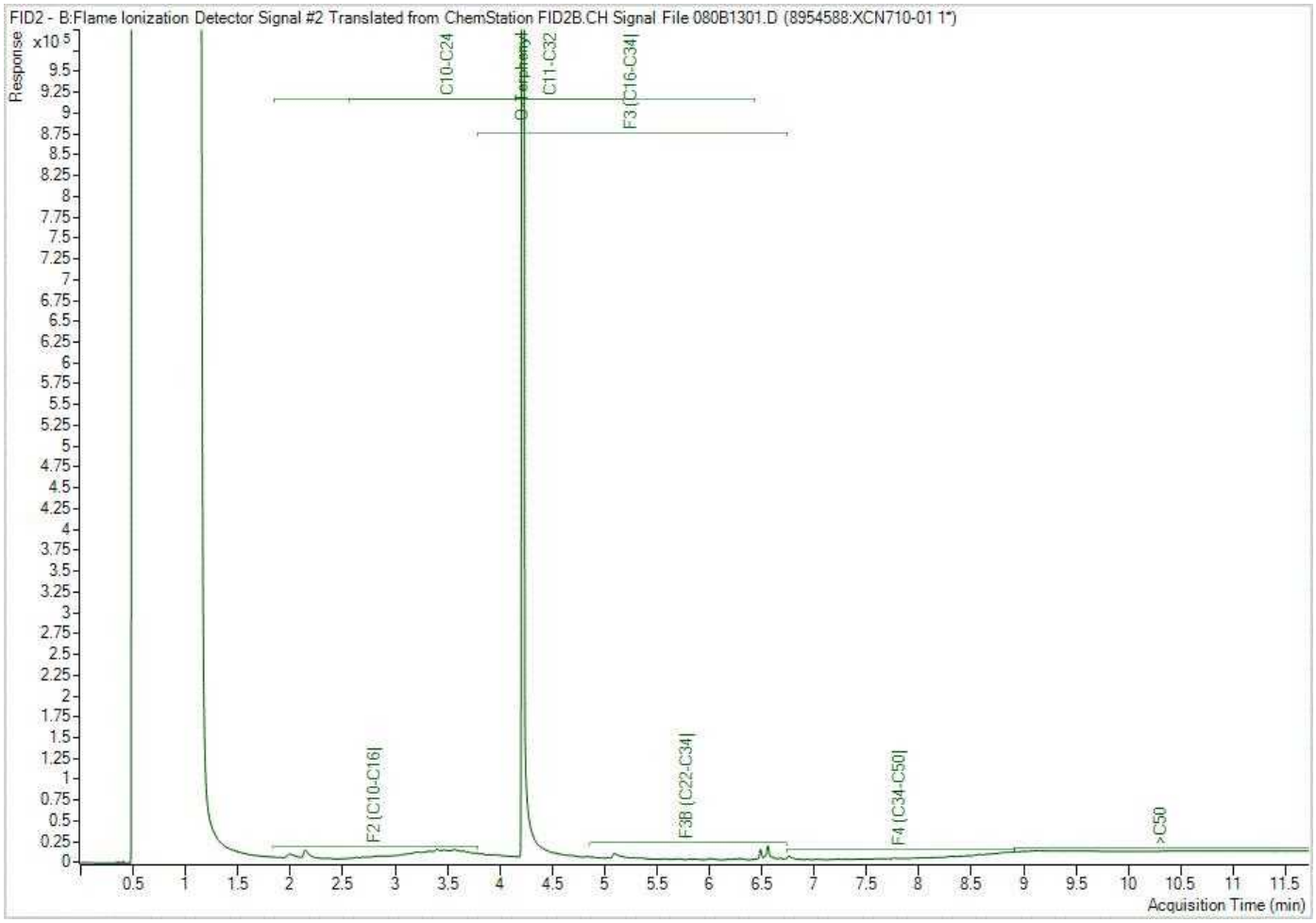
LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							

	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special instructions
1	Ryan Janzen	2023	09	25	22	25	1	2023	09	27	09	00	
2							2						

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN710

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: IP-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

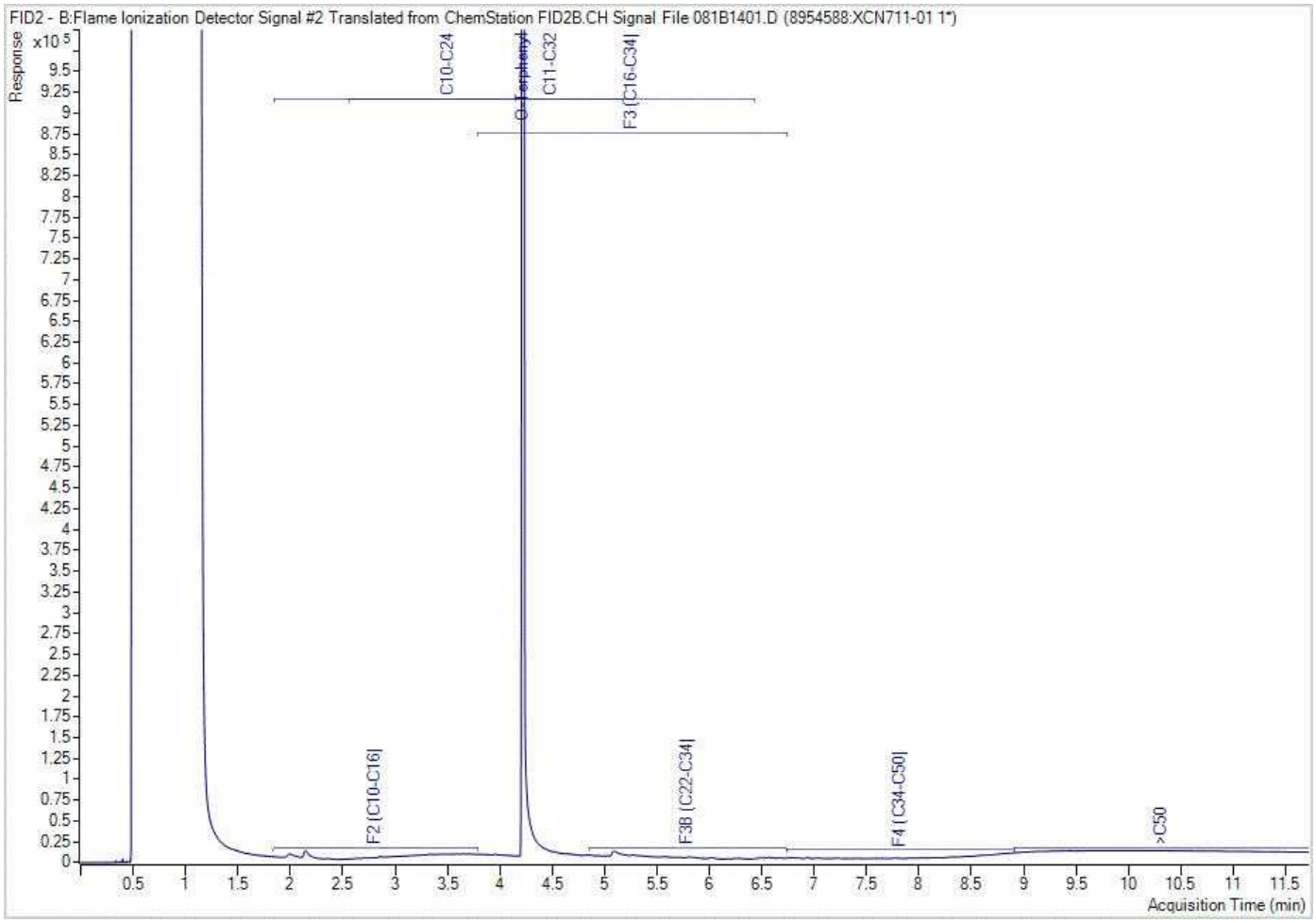


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN711

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: APS-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

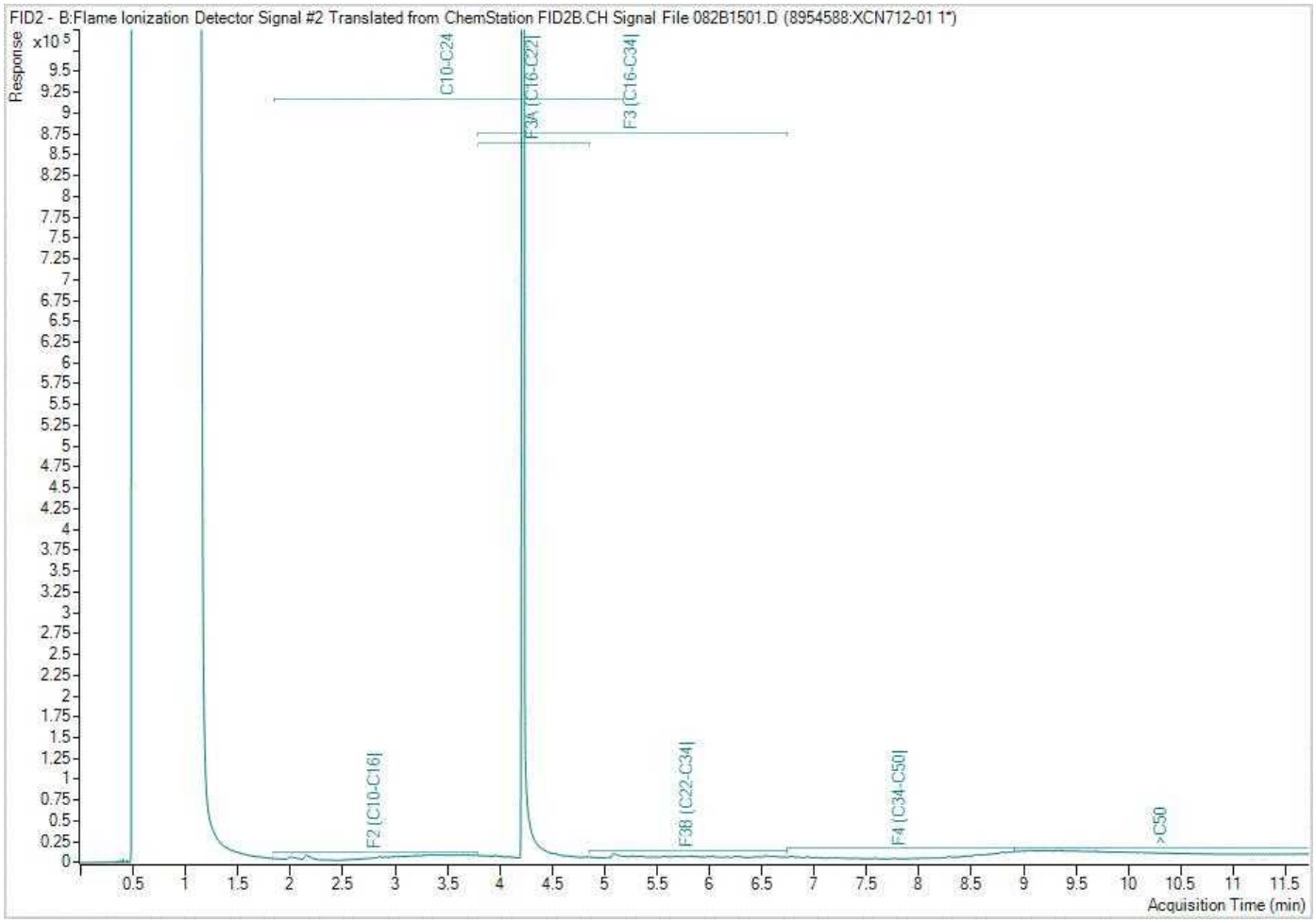


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN712

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: APS-2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

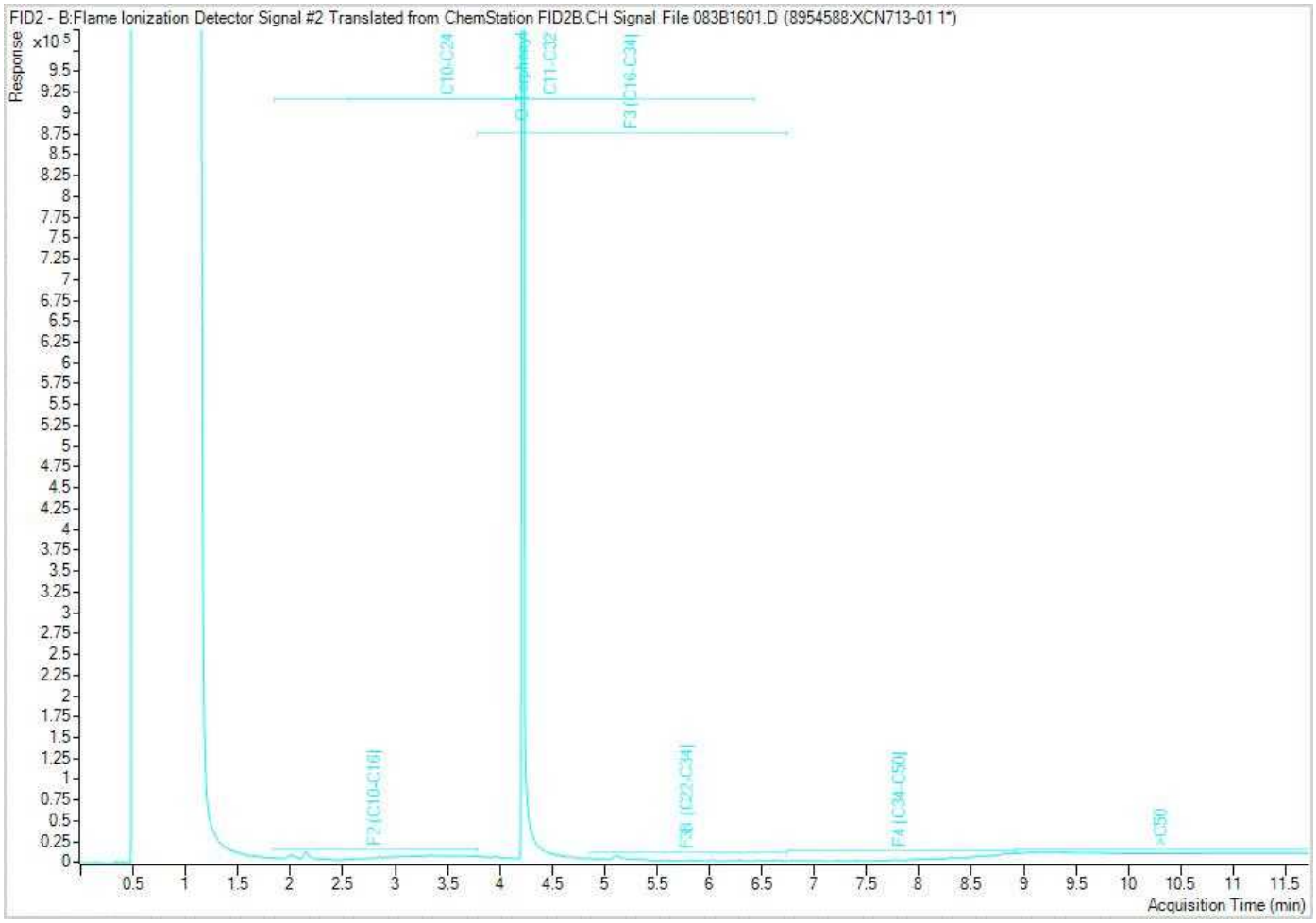


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN713

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: APS-3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

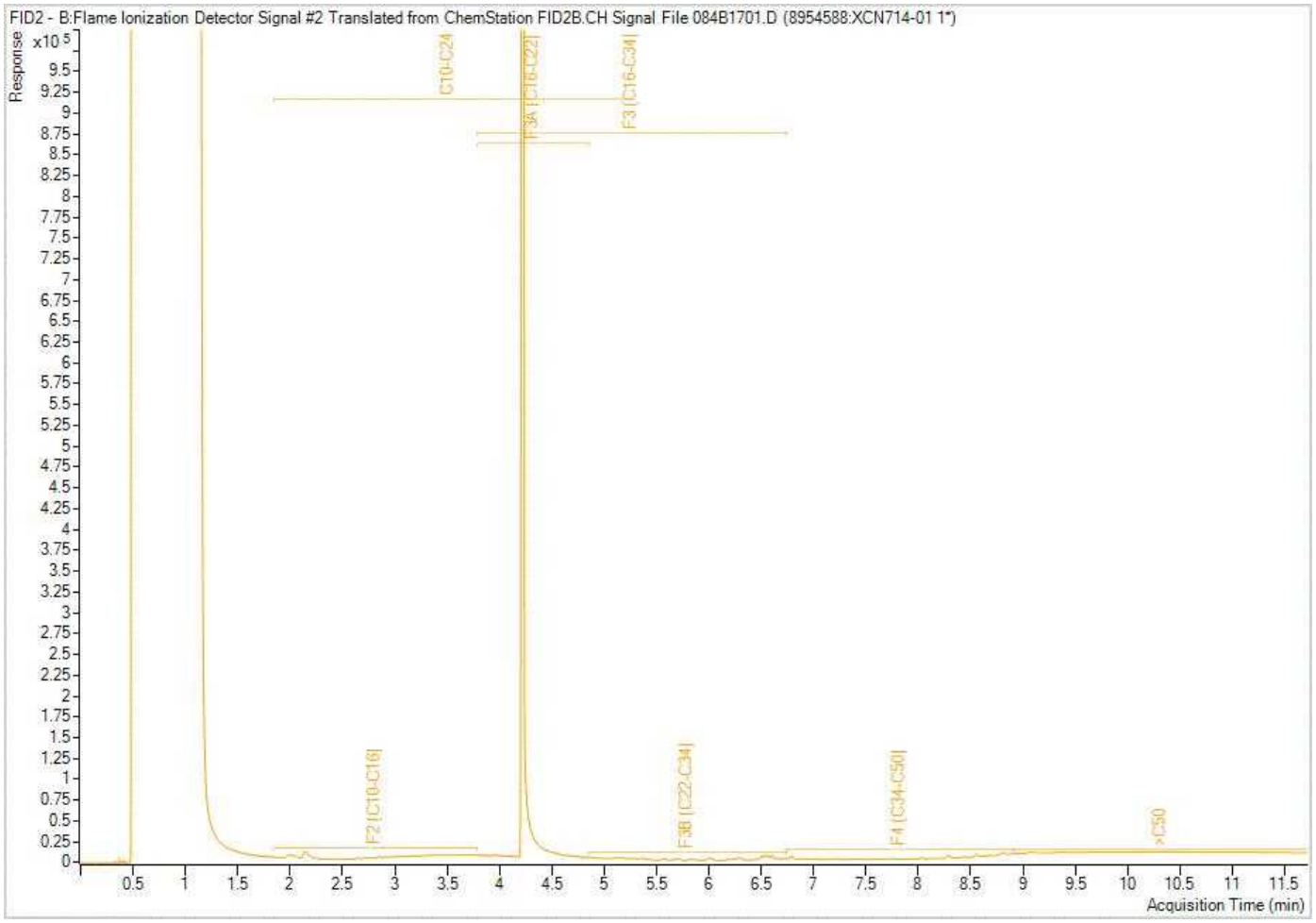


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN714

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: APS-4

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

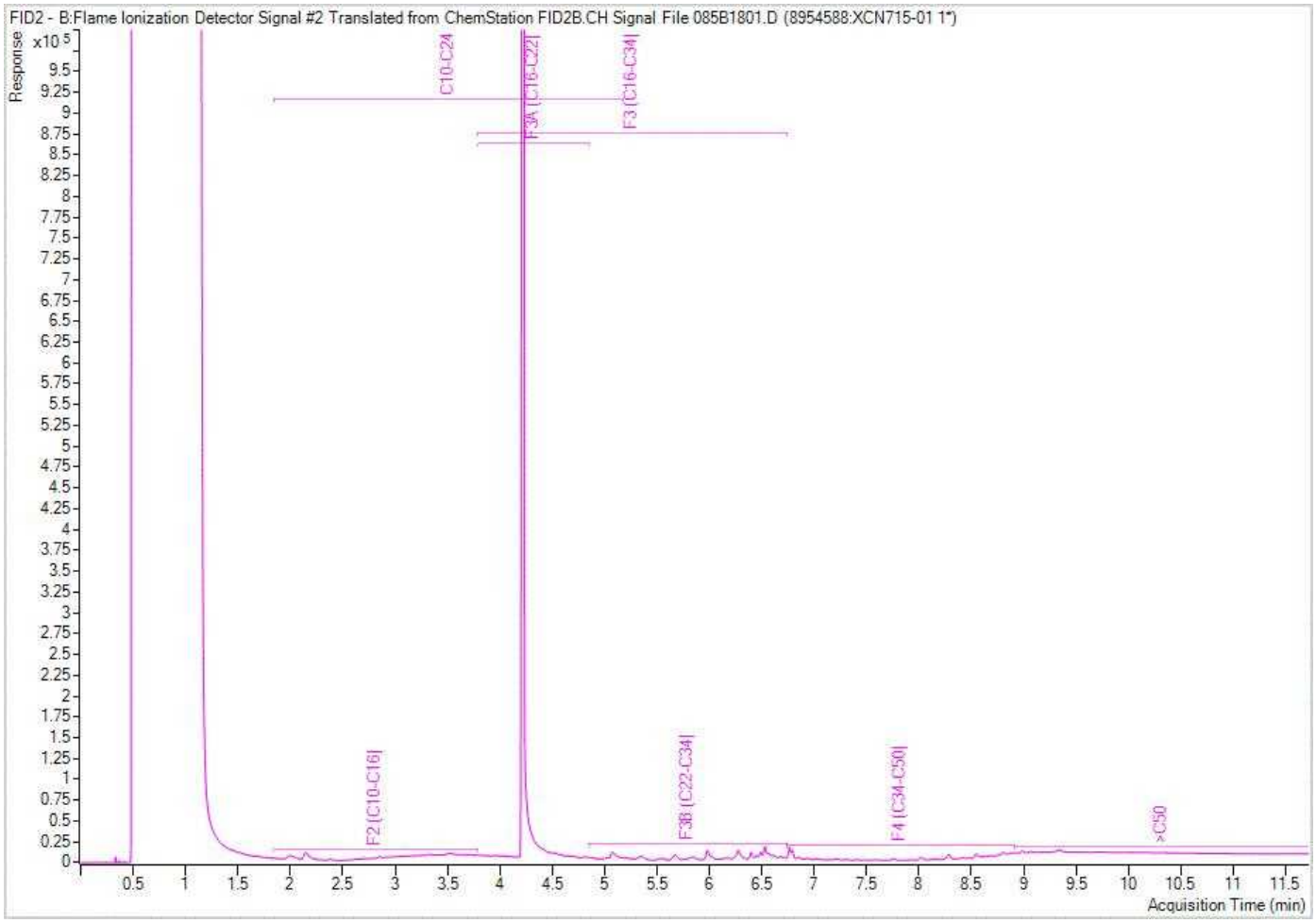


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN715

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: NM-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

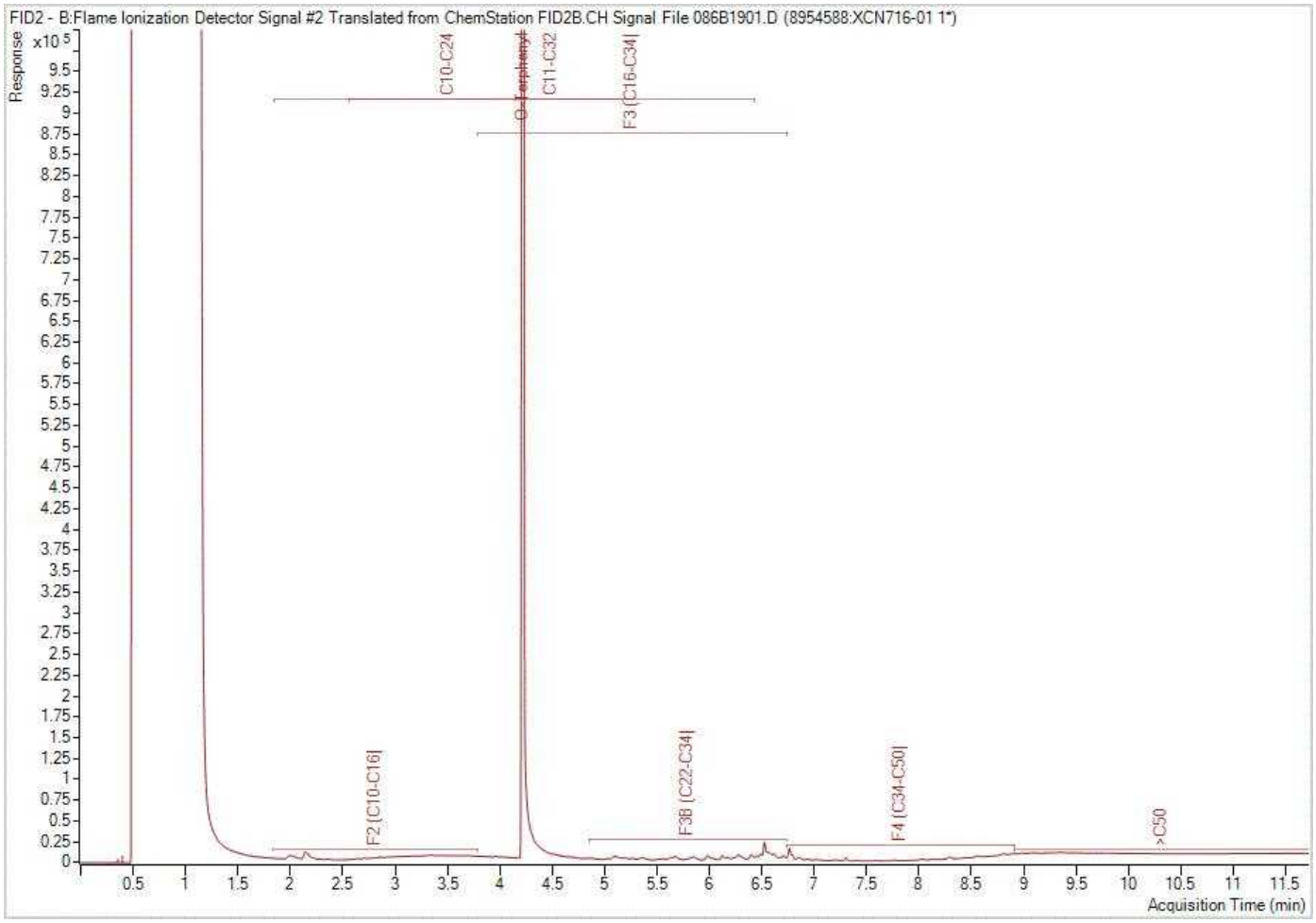


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN716

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: NM-2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

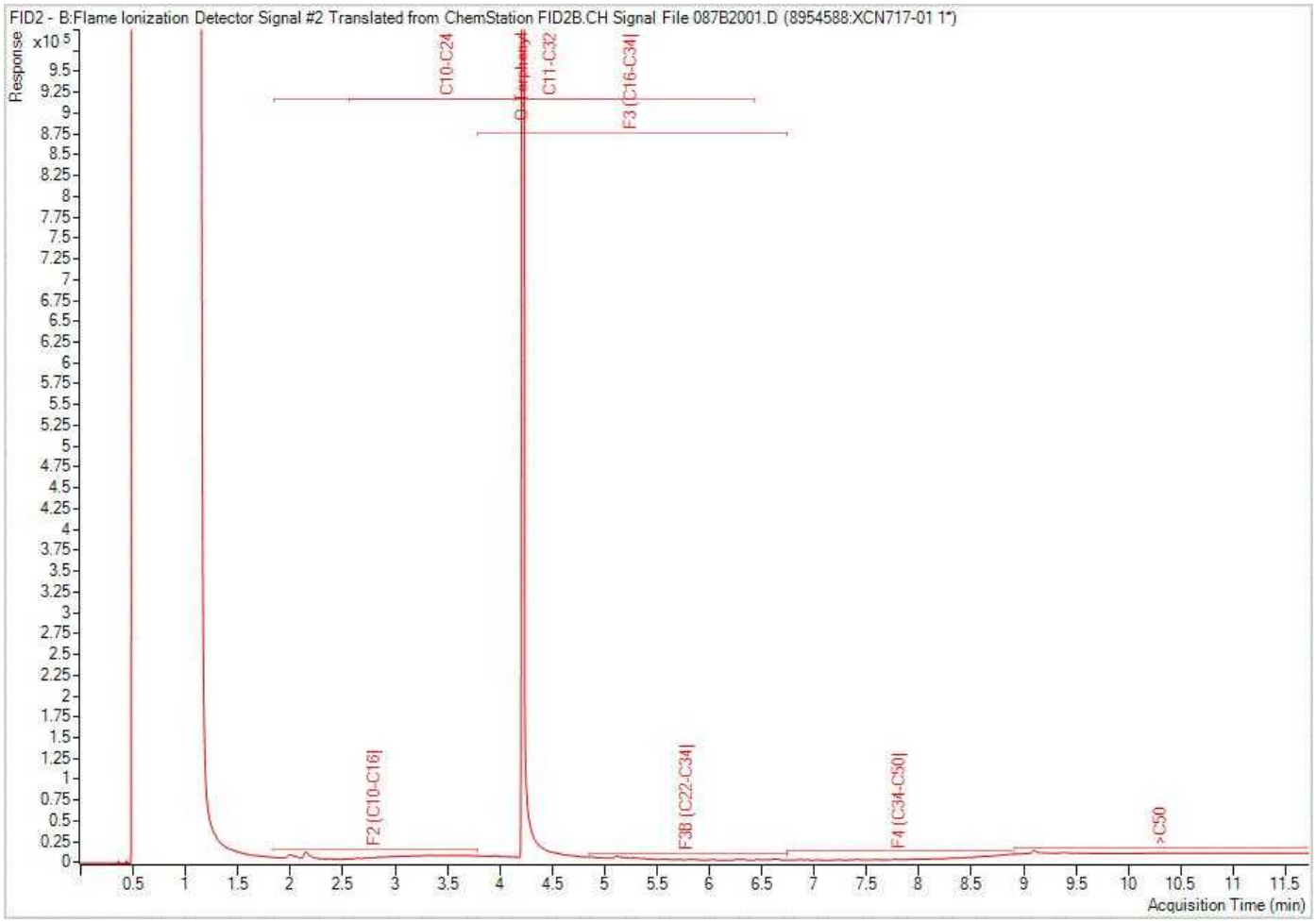


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN717

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: SAR-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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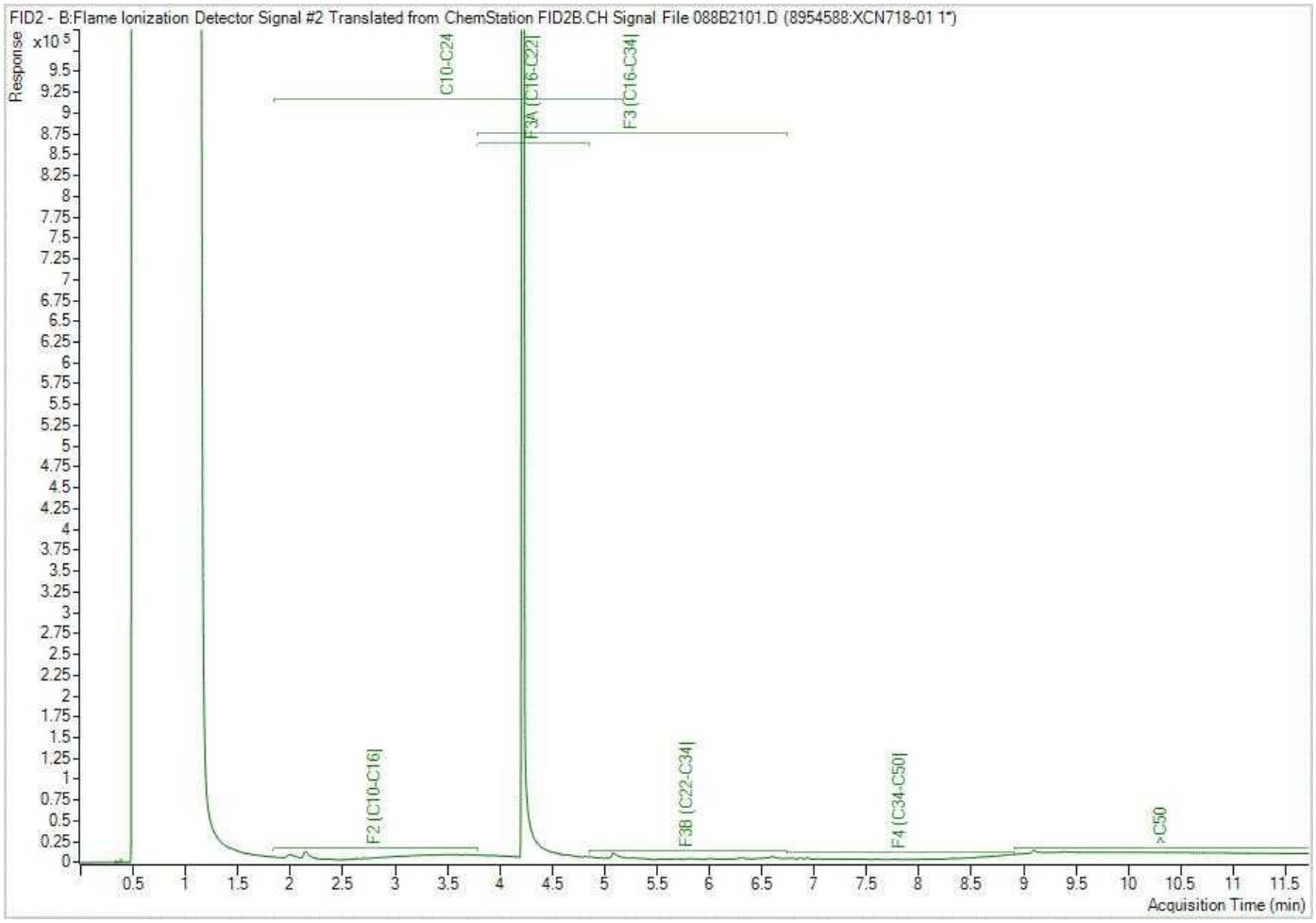
Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN718

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: SAR-2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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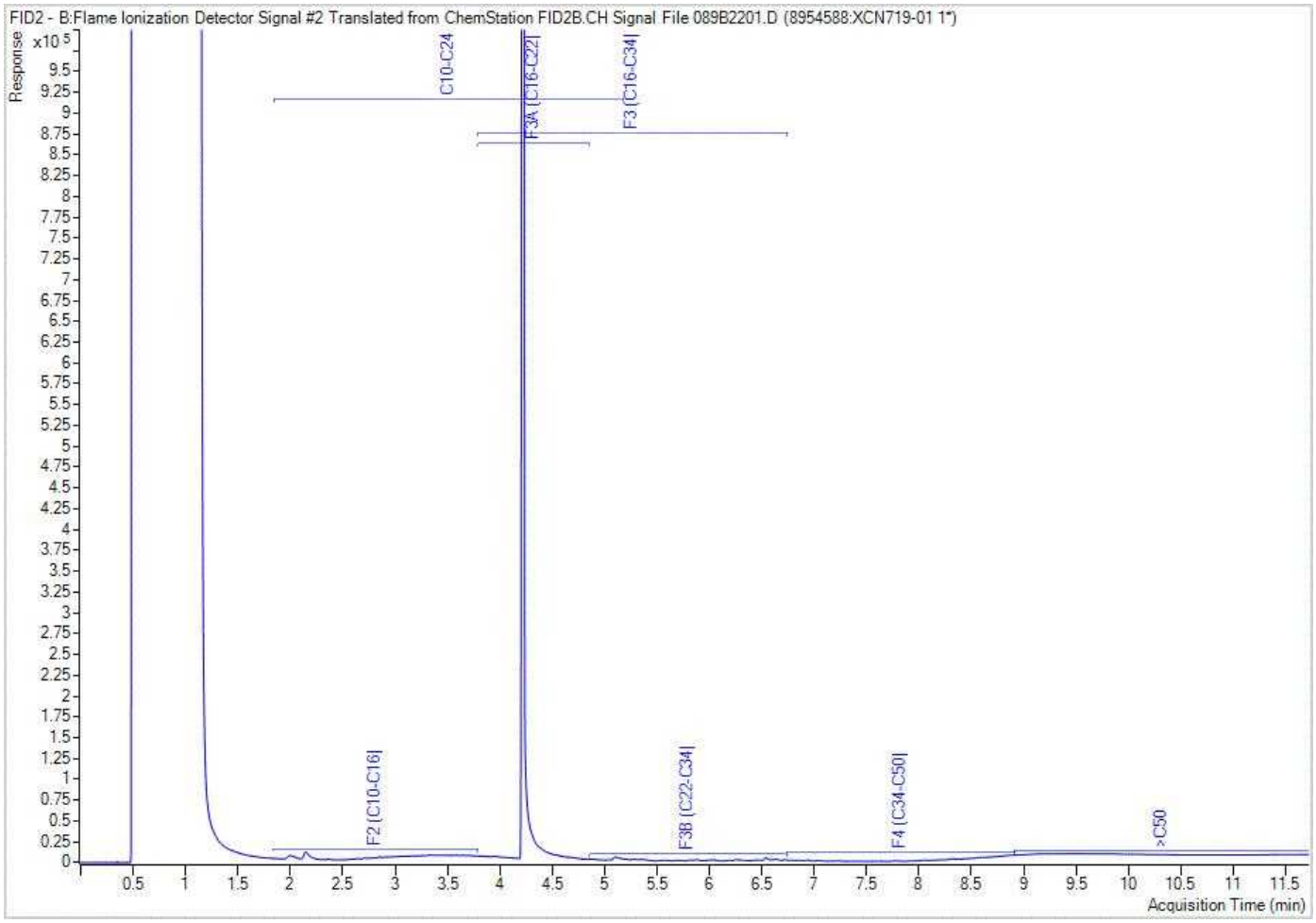
Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN719

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: SAR-3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

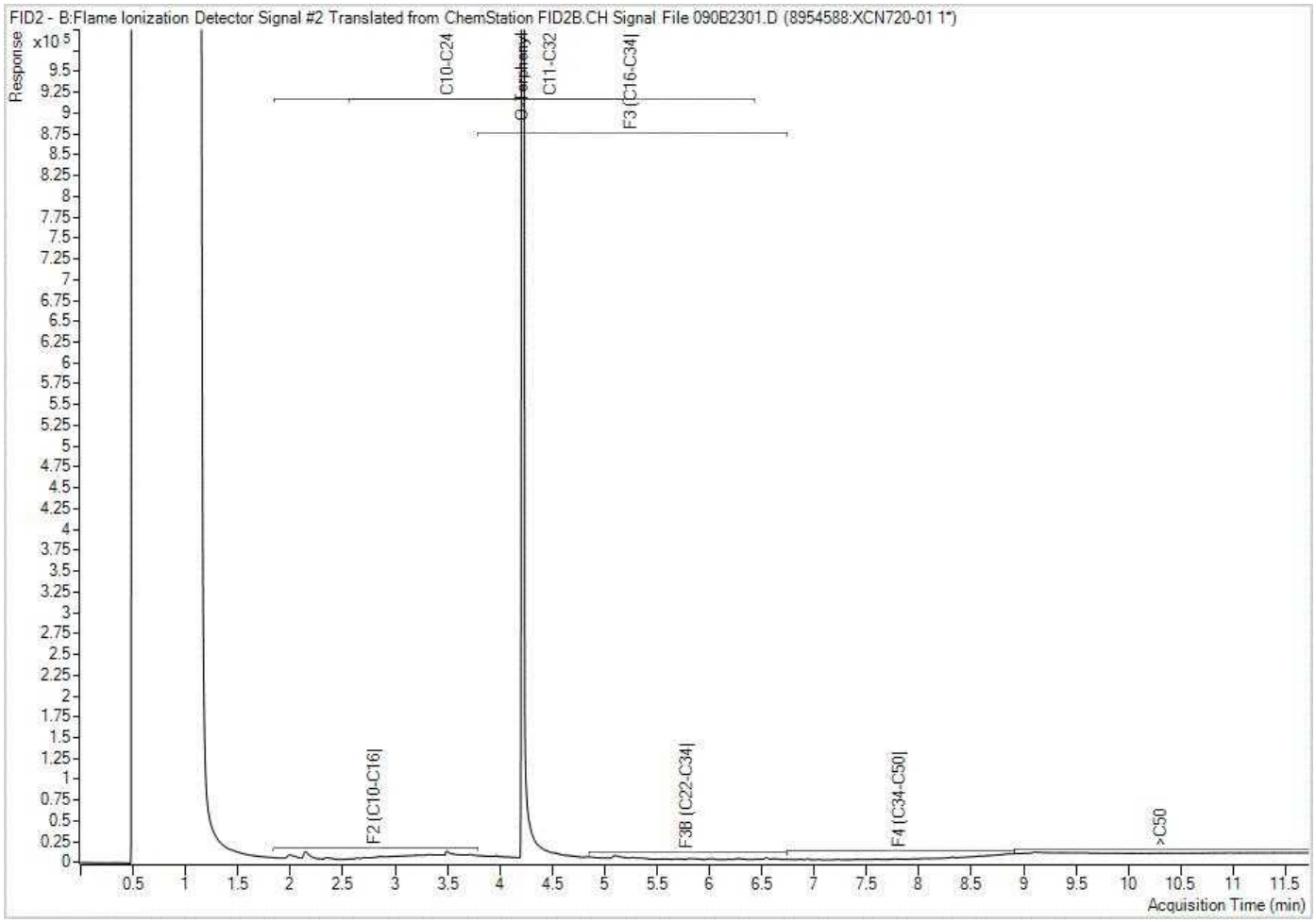


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3T7892
Report Date: 2023/10/04
Bureau Veritas Sample: XCN720

ARCADIS Canada Inc
Client Project #: 30192375
Project name: IQALUIT
Client ID: DUP

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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