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FOX-C Ekalugad Fjord Long Term Monitoring Event
Qikiqtaaluk Region, Nunavut

2018 Long Term Monitoring Report

CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA
NUNAVUT REGIONAL OFFICE

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2018 LONG TERM MONITORING REPORT
FOX-C EKALUGAD FJORD LONG TERM MONITORING EVENT
QIKIQTAALUK REGION, NUNAVUT

SLR Project No.: 209.40585.00000

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EXECUTIVE SUMMARY

SLR Consulting (Canada) Ltd. (SLR) was retained by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to complete the Year 10 Monitoring Program at FOX-C Ekalugad Fjord (herein referred to as "the site"), located in the Qikiqtaaluk Region of Nunavut. FOX-C is situated approximately 260 km to the south of the Hamlet of Clyde River.

The objective of the long term monitoring event was to complete Year 10 monitoring activities as described in the *FOX-C Ekalugad Fjord Long-Term Monitoring Plan,* INAC, 2008 (LTM Plan) which included the following:

- Monitor general site conditions (i.e., roads, buildings, etc.);
- Monitor the natural environment (i.e. wildlife);
- Perform a visual and geotechnical inspection of the Non-Hazardous Waste Landfill (NHWL) in accordance with the LTM Plan and the Abandoned Military Site Remediation Protocol (AMSRP);
- Conduct a groundwater sampling program at the five monitoring wells surrounding the NHWL at FOX-C;
- Collect soil samples at locations where new seepage or staining has been identified;
- Submit groundwater samples to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory for analysis; and
- Submit draft and final versions of the FOX-C Long Term Monitoring (Year 10) Report to CIRNAC which include results compared to baseline data and applicable federal criteria.

Results of the 2018 FOX-C Ekalugad Fjord site visit indicate that the NHWL is performing as designed and effectively containing the enclosed waste. Several areas of erosion, ponded water, and seepage were observed on and in the vicinity of the NHWL. However, these features appear to be of similar size, extent, and condition as observed in previous monitoring programs with the exception of erosional Features C and D on the eastern edge of the NHWL. A surface water sample was collected at this seepage point and results were compared to applicable criteria. A depression was previously noted on the landfill cap. This feature was not observed in 2018 and the cap appears to be flat and in good condition. No soil samples were collected during the 2018 monitoring event.

In addition to visual observations of the NHWL and surrounding environment, SLR collected groundwater samples from two of the five monitoring wells that surround the NHWL, MW-North and MW-Northwest. Concentrations of PHCs, BTEX, and PBCs were below reportable detection limits. Concentrations of several inorganic, total and dissolved metals parameters in each of the wells were greater than applicable criteria, and in a number of instances there are dissolved metal parameters with concentrations greater than total metals, which is anomalous. The groundwater analytical results may not be representative of true groundwater conditions at the site, and this may be attributable to the wells remaining unpurged since 2006, through multiple freeze/thaw cycles. Collection of more data is recommended to understand groundwater chemistry at this site. These exceedances should be closely monitored during the next site visit as the landfill will be considered in "marginal" condition with a "low risk of failure" should criteria be exceeded for two or more successive monitoring seasons as set out by the AMSRP guidelines.

MW-East to the east of the NHWL showed signs of frost jacking and should be monitored during future monitoring programs as repair may be required. No damage to the interior well casing

was reported. The locks were replaced on all wells and the keys remain in the possession of the CIRNAC representative.

Based on the results of the Year 10 LTM event at FOX-C Ekalugad Fjord, SLR recommends continued monitoring of landfill features, especially the erosional features noted on the east side of the NHWL. Additionally, all parameters with reported exceedances should be closely monitored during future monitoring events to confirm whether or not the landfill remains in acceptable condition. It is recommended that monitoring continue at an increased frequency compared to what has been set out in the FOX-C LTM Plan. The next monitoring event, Year 15, was to be scheduled in 2023. It is recommended that an additional monitoring event take place in 2020 (Year 12) to expand the groundwater analytical data set at the site and to gain a better understanding of groundwater chemistry at this site. No further action is recommended at this time.

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ACRONYMS AND ABBREVIATIONS

AMSRP	Abandoned Military Site Remediation Protocol
AST	Aboveground storage tank
ATV	All-terrain vehicle
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CEQG	Canadian Environmental Quality Guidelines
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CSQG	Canadian Soil Quality Guidelines
CWQG-PAL	Canadian Water Quality Guidelines for the Protection of Aquatic Life
CWS	Canada Wide Standard
ECCC	Environment and Climate Change Canada
FCSAP	Federal Contaminated Sites Action Plan
FIGQG	Federal Interim Groundwater Quality Guidelines
GIS	Geographic Information System
GPS	Global Positioning System
GW	Groundwater
HASP	Health and Safety Plan
LORAN	Long Range Navigation
LTM	Long Term Monitoring
NHWL	Non-Hazardous Waste Landfill
PCBs	Polychlorinated Biphenyls
PHCs	Petroleum Hydrocarbons
PPM	Parts per million
QAQC	Quality Assurance/Quality Control

RDL	Reportable Detection Limit
RPD	Relative Percent Difference
SLR	SLR Consulting (Canada) Ltd.
ULA	Upper Limit of Acceptability
UMA	UMA Engineering Ltd./AECOM

1.0 INTRODUCTION

SLR Consulting (Canada) Ltd. (SLR) was retained by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) to complete the Year 10 Monitoring Program at the former Distant Early Warning (DEW) Line site FOX-C (herein referred to as "the site"), located in the Qikiqtaaluk Region of Nunavut. Nunavut. FOX-C is located at approximately 68° 42' 0" N and -68° 33' 0" E and is approximately 240 km northwest of Qikiqtarjuaq, Nunavut and 260 km south of the Hamlet of Clyde River, Nunavut.

1.1 Project Objectives

The objective of the long term monitoring event was to complete Year 10 monitoring activities as described in the *FOX-C Ekalugad Fjord Long-Term Monitoring Plan,* INAC, 2008 (LTM Plan).

The program included visual monitoring of the non-hazardous waste landfill (NHWL), visual observation of general site conditions and the natural environment, and collection and analysis of groundwater and surface water samples. Analysis of field data and visual observations was conducted to satisfy the requirements of the Abandoned Military Site Remediation Protocol (AMSRP, 2009) and the site-specific Field Sampling and Quality Assurance/Quality Control Plan (SLR, 2018).

1.2 Scope of Work

The scope of work for the 2018 work program was carried out in accordance with SLR's standard field investigative procedures and is consistent with the previous year's monitoring. The final scope of work for the project included the following items:

- Prepare and submit a Logistics Plan detailing the work schedule;
- Prepare and submit a detailed Health and Safety Plan (HASP);
- Prepare and submit a Sampling and Quality Assurance/Quality Control Plan detailing the proposed scope of work to CIRNAC;
- Arrange for a wildlife monitor to be present during fieldwork and conduct interviews to understand land use and wildlife trends;
- Monitor general site conditions (i.e., roads, buildings, etc.);
- Monitor the natural environment (i.e. wildlife);
- Perform a visual and geotechnical inspection of the NHWL in accordance with the LTM Plan and AMSRP;
- Conduct a groundwater sampling program at the five monitoring wells surrounding the NHWL at FOX-C;
- Collect soil samples at locations where new seepage or staining has been identified;
- Collect and analyse duplicate samples from at least 20% of samples;
- Submit groundwater samples to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory for analysis of parameters outlined in Section 5.4.
- Prepare field reports summarizing LTM activities undertaken within two weeks of fieldwork completion; and
- Submit draft and final versions of the FOX-C Ekalugad Fjord Long Term Monitoring (Year 10) Report to CIRNAC.

Details regarding the specific methodology of each task are located in Section 4.0.

2.0 BACKGROUND INFORMATION

2.1 Site Description

The FOX-C DEW Line Site was constructed in 1957 and abandoned in 1963. The site is located on the northeast coast of Baffin Island in a mountainous area characterized by deep fjords and glaciers. The site is comprised of three areas, the Upper Station, Mid Station, and Lower Station. The Lower Station is divided into three sections: the Lake Area, the Beach Area, and the Landfill Area, which is there the NHWL is located.

The Upper Station is located 770 m above mean sea level. Before remediation, the main site facilities were located here and included a module train, warehouse, garage, Inuit house, bulk fuel storage tanks, and a radar tower.

The Mid Station is located at the base of the summit approximately 500 m east of the Upper Station. Before remediation, the Mid Station consisted of a dump, barrel storage pad, four Quonset buildings, and numerous debris areas. A glacier is located across from the former Mid Station and feeds a river that flows into an unnamed lake.

The lower station can be accessed via a roadway that connects to the upper station near the unnamed lake area. A river flows out of this lake northward and empties into Ekalugad Fjord near the beach area. The NHWL is located east of this river (see **Drawing 1**).

The NHWL was constructed at the site in 2006-2007 and was closed in 2008. It was designed to contain non-hazardous materials only. The NHWL consists of four perimeter berms constructed of granular material. The waste was placed in the landfill in layers consisting of 0.5 m lifts of waste covered by 0.15 m of granular fill. The waste layers were compacted and a final cover consisting of a minimum of 1.0 m of granular fill was used to cap the landfill. The NHWL contains the following:

- Tier I Contaminated soil (i.e. soil with lead concentration up to 500 parts per million (ppm) and polychlorinated-biphenyl (PCB) concentrations up to 5 ppm;
- Petroleum hydrocarbon (PHC) fractions F3 and F4 contaminated soil;
- Non-Hazardous demolition debris such as timbers, plywood, and sheet metal;
- Non-hazardous site debris such as scrap metal and wood;
- Non-hazardous debris/soil excavated from landfills;
- Creosote timbers; and
- Double-bagged asbestos.

The area is known to be used by hunters and fishermen according to Esa Qillaq, resident of Clyde River. Interviews with Esa indicate that residents of Clyde River and Qikiqtarjuaq may have cabins situated in nearby fjords that are utilized for hunting and fishing purposes. However, the presence of permafrost and shallow groundwater depth make it unlikely that groundwater would ever be used for drinking water in this area.

2.2 Baseline Soil and Groundwater Data

During remediation activities at FOX-C Ekalugad Fjord, UMA Engineering Ltd./AECOM (UMA) collected baseline soil and groundwater data for comparison during future monitoring programs.

2.2.1 Groundwater

In 2006, UMA installed four monitoring wells (MW-A through MW-D) around the NHWL, each to a depth of approximately 3.7 m. Groundwater samples were collected from MW-A, MW-B, and MW-C. MW-D was found to be dry. No samples were collected from any wells in 2007 as they were either dry or frozen.

During the 2008 construction, the NHWL was expanded to accommodate an additional 18,400 m^3 of waste. As a result, two of the wells installed in 2006 were removed (MW-A and MW-D) and replaced with two new wells. A third new well was also installed in 2008 bringing the total well count surrounding the NHWL to five.

No groundwater samples were collected during the 2008 sampling event as the wells remained dry. Baseline groundwater analytical data for FOX-C is based on groundwater samples collected in 2006.

2.2.2 Soil

In 2007, UMA collected eight soil samples around the NHWL and submitted them for copper and lead analysis. Concentrations of lead in the soil were reported as non-detectable and average copper concentrations in soil were reported to be 16.4 mg/kg (**Table 2**).

During the installation of the three new wells in 2008, UMA collected soil samples from the base of all five wells around the NHWL; a total of 10 samples were collected. Lead was reported as non-detectable and average copper concentrations were reported to be 11.2 mg/kg (**Table 2**). Additional soil analytical results are available in **Table 3** at the end of this report. Baseline soil analytical data is based upon soil samples collected in both 2007 and 2008.

2.3 Previous Monitoring Programs

The post construction landfill monitoring frequency follows the schedule recommended in the INAC AMSRP (2009). The three phases recommended by the protocol are:

- Phase I: Years 1, 3 and 5.
- Phase II (*if required*): Years 7, 10, 15 and 25.
- Phase III (*if required*): beyond 25 years.

To become familiar with the site, SLR reviewed the following reports pertaining to the site:

- *Long Term Monitoring, 2016, FOX-C Ekalugad Fjord, Nunavut*, Final Report, dated February 3, 2017 by Arcadis Canada Inc.;
- *FOX-C Ekalugad Fjord Long-Term Monitoring Plan,* dated March 23, 2008 by INAC;
- *Abandoned Military Site Remediation Protocol,* dated March 2009 by INAC, Contaminated Sites Program.

The monitoring plan at FOX-C began in 2009. **Tables 1 to 3** at the end of this report show baseline groundwater data from 2006 and baseline soil data from 2007 and 2008. All wells were dry in Years 1, 3, and 5 of the monitoring program and as a result, no analytical data is available. Monitoring was attempted in 2015 to complete Year 7 of the program, however, due to weather conditions; the site visit could not be completed. All wells were frozen in 2016 when

Year 8 of the monitoring program was completed. SLR completed Year 10 of the program in 2018.

3.0 REGULATORY GUIDELINES

3.1 Groundwater

3.1.1 Baseline samples

In the absence of groundwater criteria in the FOX-C Ekalugad Fjord LTM Plan, analytical data for groundwater was compared to historical data according to the AMSRP (INAC, 2009) guidance for post-construction monitoring. The AMSRP (INAC, 2009) provides the following guidance for the assessment of groundwater:

Table 3-1: AMSRP Groundwater Monitoring Guidance

Geochemical Assessment	Acceptable	Marginal	Significant	Unacceptable
Groundwater concentrations within average +/- three standard deviations or within analytical variability	Performing as expected			
Increasing trend in contaminant data over two or more successive monitoring events (variation in excess of average +/- three standard deviations or analytical variability		Low risk of failure		
Groundwater concentrations in excess of three times average baseline concentrations in more than one monitoring event			Moderate risk of failure	
Where applicable, surface water concentrations in excess of surface water quality guidelines for the protection of aquatic life				Failure
Required Actions	Monitor as per schedule	Increase monitoring frequency. Monitor surface water quality, if acceptable, in downgradient water bodies within 300 m	Assess causes of increasing contaminant concentrations. Evaluate whether remediation is required.	Assess cause of contaminant concentrations. Develop and implement a remedial plan.

The means and standard deviation of all baseline data has been obtained for comparison with the results of the most recent monitoring event (2018). No historic data other than baseline data exists as wells have been frozen or dry during every prior monitoring event. SLR calculated acceptable values (upper limit of acceptability [ULA] criteria) for 2018 groundwater results as the

mean +/- three times the standard deviation of each analytical parameter. However, baseline data is sparse and for many parameters, there was insufficient data to calculate means and standard deviations. This is due to the fact that these parameters were either not detected in the samples or were not analyzed for during baseline monitoring.

3.1.2 Federal Interim Groundwater Guidelines

In May 2010, Environment and Climate Change Canada (ECCC) under Federal Contaminated Sites Action Plan (FCSAP) released the *Federal Interim Groundwater Quality Guidelines* (FIGQG) for Federal Contaminated Sites. The guidelines were developed to assist federal custodians in assessing, remediating, and managing federally contaminated sites funded under the FCSAP. These guidelines are intended as an interim measure until Canadian Groundwater Quality Guidelines are available. The FIGQGs were most recently updated in June 2016.

The FIGQGs follow a tiered framework, consistent with the Canadian Soil Quality Guidelines (CSQGs) development through the CCME. The tiers are:

- **Tier 1:** direct application of the generic numerical guidelines; specifically, application of the lowest guideline for any pathway;
- **Tier 2:** allows for the development of site-specific remediation objectives through the consideration of site-specific conditions, by modifying (within limits) the numerical guidelines based on site specific conditions and focusing on exposure pathways and receptors that are applicable to the site; and
- **Tier 3:** use of site-specific risk assessment to develop Site-Specific Remediation Objectives.

With consideration to surrounding land use, Table 2 in the FIGQGs, Generic Guidelines for Residential/Parkland Land Uses, Tier 1 Lowest Guideline for coarse-grained soil (FIGQGs, Table 2, and Tier 1) were reference for comparison purposes in this study.

3.2 Surface water

No baseline surface water samples have been collected at the FOX-C Ekalugad Fjord site. As such, there is no baseline analytical data to compare the 2018 surface water analytical results to. The surface water sample was taken at the recommendation of the CIRNAC representative to assess the parameters of a surface water flow that appeared to be flowing from the NHWL on the eastern edge. Results of the analyses were compared to federal guidelines as described below.

3.2.1 Canadian Water Quality Guidelines for the Protection of Aquatic Life

Canadian Water Quality Guidelines for the Protection of Aquatic Life (CWQGs-PAL) are nationally approved limits of substances and other physical attributes (such as pH and temperature) in the water column where no adverse toxic effects are expected. The guidelines are a set of management tools developed to ensure that the introduction of toxic substances do not lead to the degradation of Canadian fresh and marine waters. The CWQG-PALs were developed to provide basic scientific information about the effects of water quality variables and natural and anthropogenic substances on aquatic life.

The original document was published in 1991 by the Canadian Council of Ministers of the Environment (CCME) and has since been revised. The guidelines have been produced for both

freshwater and marine aquatic life; freshwater defined as water with total dissolved salt content equal or lower to 1000 ppm and marine water defined as water with total dissolved salt concentrations greater than 5000 ppm.

Additionally, two further derivations are considered in the guidelines: short-term and long-term exposure. Short-term guidelines are meant to estimate severe effects, such as spills, on aquatic life whereas long-term guidelines are mean to protect against all negative effects during indefinite exposures.

As the NHWL at each site is a permanent structure, all surface water analytical results were compared to the long-term exposure guidelines.

3.3 Soil

3.3.1 Baseline samples

Similar to groundwater, analytical data for soil was compared to historical data according to the AMSRP (INAC, 2009) guidance for post-construction monitoring.

Baseline soil samples were collected in 2007 and 2008 at the site and ULA criteria have been derived from these analytical results. No soil samples have been collected since at FOX-C.

While no soil was sampled during the 2018 monitoring event and as a result no 2018 analytical data is available, this method of comparison should continue to be used for monitoring events.

3.3.2 CCME - Environmental Quality Guidelines

The following CCME guidelines have been referenced in previous monitoring reports with respect to soil analytical results:

- *CSQGs for the Protection of Environmental and Human Health* (CCME, 1999, with updates) for residential/parkland use, including fact sheets for BTEX, non-potable water, coarse-grained soil.
- *Canada-Wide Standard (CWS) for Petroleum Hydrocarbons in Soil* (CCME, 2008a) – Tier 1 Residential/Parkland, coarse-grained soil, non-potable groundwater.

The rationale for choosing these particular criteria is based on the fact that the groundwater at Cape Christian is not used for drinking purposes (non-potable) and coarse-grain material was assumed based on the results of a 2009 grain-size analysis, field observations, as well as for conservative reasons –criteria for coarse-grain soils are general more stringent than those applied to fine grain soils.

As described above, while no soil was sampled during the 2018 monitoring event, these guidelines should be used for the analysis of future analytical results.

4.0 INVESTIGATIVE METHODOLOGY

The visual inspection was carried out by Mathew Coady, MREM, R.P.Bio., and the groundwater sampling was carried out by Kaitlyn Roberts, M.Sc. CIRNAC representative Jean Allen was present during the sampling and inspection activities and the crew was accompanied by Esa Qillaq, resident of Clyde River, who acted as the wildlife monitor and provided knowledge on the

region. The site was accessed via helicopter provided by Summit Helicopters through Polar Continental Shelf Program (PCSP). On the scheduled flight day, August 10, 2018, weather conditions were not favourable for flying and the Cape Christian site visit was completed instead. Weather conditions were also not favourable on August 11, 2018 but crew was able to fuel the helicopter and have a safety briefing in case conditions improved. Crew visited FOX-C Ekalugad Fjord the morning of August 12, 2018; however, time on site was limited to a maximum of 2 hours due to potential incoming fog in Clyde River and the pilot's flight schedule for later that day. Conditions at the site were sunny and 8 degrees Celsius.

A copy of the field notes is available in **Appendix B.**

4.1 Health and Safety Plan

Before commencement of the field activities, a detailed Health and Safety Plan (HASP) was created for FOX-C Ekalugad Fjord that provided emergency contact information, emergency response plans, hazard identification, and hazard mitigation and prevention strategies.

The HASP was approved by SLR's internal Health and Safety Manager, Phil Folkersen, and by CIRNAC prior to field activities. The HASP was brought to site with field staff and its contents were discussed with wildlife monitor Esa Qillaq and Summit Helicopter's pilot before visiting the FOX-C site. A copy of the HASP has been retained on file at SLR and at the CIRNAC Nunavut Regional Office.

4.2 Non-Hazardous Waste Landfill Monitoring

A visual inspection of the NHWL was conducted at the FOX-C Ekalugad Fjord site. The objectives of the visual inspections of the NHWL included:

- Visual inspection of the landfill caps and observing for areas of settlement, erosion, frost action, sloughing and cracking, animal burrows, vegetation re-establishment and percentage of cover, vegetation stress, soil or water staining, odours, seepage points or ponded water, exposed debris, condition of monitoring instruments, the condition of the wells, and any other features that may affect the integrity of the landfills;
- Opportunistic observations of wildlife presence, signs and droppings;
- Photographic records noting the scale, and directional viewpoints to substantiate all recorded observations. Observations mapped and annotated to show the location and size with regards to the landfill; and
- Provide all AutoCAD / GIS files associated with the site.

4.3 Natural Environment Monitoring

Natural environment data was collected during the 2018 FOX-C Ekalugad Fjord site visit. The specific data collected included:

- Wildlife sightings (species, number, gender, etc.);
- Evidence of recent wildlife presence (droppings, tracks, feathers, etc.);
- Wildlife activity (nesting, denning, migrations);
- Qualitative assessment of relative number; and
- Revegetation of disturbed areas.

This information was collected with the assistance of the wildlife monitor Esa Qillaq who is familiar with the area.

4.4 Groundwater Sample Collection

Three of the five wells contained adequate water, and of those, two were sampled for groundwater analyses (MW-North and MW-Northwest). A lack of time on site did not allow MW-East to be sampled. A duplicate sample was collected at MW-North. Additionally, a field blank was also collected during the site visit to FOX-C. Historically, the wells have always been either dry or frozen. 2018 represents the first year of the monitoring program where groundwater analytical data has been collected.

Water level and depth of well was recorded to calculate approximate well volume. Monitoring wells were purged of three well volumes prior to sampling where available and water was retained in the event of limited volumes and low recharge rates. Water quality parameters such as temperature, dissolved oxygen, conductivity, pH, and turbidity were also recorded where available.

Following purging, samples were collected using a peristaltic pump and dedicated, disposable, polyethylene tubing. A low-flow sampling methodology was employed. Water was pumped out at an approximate rate of 100 mL per minute and water levels were closely monitored to ensure extraction rate did not exceed recovery rate. Water was pumped through a flow-through cell where water quality parameters were continually monitored. Once parameters have stabilized, sampling began. The following parameter stabilization guidelines were used:

- pH +/- 0.2 units
- Temperature +/- 0.1 degrees Celsius
- Conductivity +/- 3%
- Redox +/- 20 mV
- D/O +/- 0.2 mg/L
- Turbidity +/- 10%

In the event of very low recharge rates or low water levels, samples were collected immediately using the peristaltic pump. In addition to water quality parameters, flow rate, water levels, and total quantity of water removed from well both during purging and sampling will be recorded on the field sheet.

Sampling equipment was cleaned thoroughly using a distilled water and Alconox solution between each sample.

Samples were field filtered where applicable, using a 0.45 micron filter with the peristaltic pump.

Groundwater samples were submitted to Maxxam Analytics in Ottawa, ON for analyses of benzene, toluene, ethylbenzene and xylenes (BTEX), PHC Fractions F1 and F2 (C_6-C_{16}), total metals, dissolved metals, polychlorinated biphenyls (PCBs), total suspended solids, total dissolved solids and routine parameters including major ions and hardness. Additional routine parameters including pH, conductivity, and turbidity were measured in-situ. Laboratory Certificates of Analysis are available in **Appendix C.**

As a result of Transportation of Dangerous Goods (TDG) limitations for air transport, the required acid preservative for the CCME-compliant analytical methods for metals could not be

shipped from Ottawa, ON to Clyde River, NU, and so metals analyses were completed using Ontario Regulation 153 compliant analytical methods. The CCME-compliant analytical methods require 35% nitric acid for the preservation of total and dissolved metals. However, nitric acid concentrations exceeding 20% are prohibited from transport on commercial aircrafts. As a result of this methodological change, some RDLs were above FIGQG criteria, however no contaminants of concern were affected.

Table 4-1 contains a summary of the groundwater analysis.

Table 4-1: FOX-C Ekalugad Fjord Groundwater Sampling Plan

	Sampling Location	PHC F1 and F2 (C_6-C_{16})	BTEX	Total Metals	Dissolved Metals	PCBs	Total Suspended Solids	Major Ions[1]	Routine Parameters[2]
FOX-C	MW-North	X	X	X	X	X	X	X	X
	MW-Northwest	X	X	X	X	X	X	X	X
	MW-South	X	X	X	X	X	X	X	X
	MW-Southwest	X	X	X	X	X	X	X	X
	MW-East	X	X	X	X	X	X	X	X
	Duplicate	X	X	X	X	X	X	X	X

[1] Major ions including Calcium (Ca^{2+}), sodium (Na^{+}), magnesium (Mg^{2+}), potassium (K^{+}), strontium (Sr^{2+}), sulfate (SO_4^{2-}), chloride(Cl^{-}), bicarbonate (HCO_3^{-}), and hydroxide (OH^{-}).

[2] Routine Parameters including alkalinity, hardness, total dissolved solids, total suspended solids, pH, and conductivity.

In the absence of groundwater criteria in the FOX-C Ekalugad Fjord LTM Plan, analytical data for groundwater was compared to historical data, AMSRP (INAC, 2009) guidance, and the *Federal Interim Groundwater Quality Guidelines* (FIGQG, June 2016), Table 2 *Generic Guidelines for Residential/Parkland Land Uses*, Tier 1 Lowest Guideline Values for coarse-grained soil.

4.5 Soil Sample Collection

Soil samples were to be collected in areas that exhibit new staining, odours or stressed vegetation, along with GPS coordinates and pictures. Samples were to be collected with a shovel which will be decontaminated with a laboratory-grade biodegradable cleaner (Alconox®) and rinsed between sampling locations. Soil samples were to be collected to a maximum depth of 30 cm and packed into glass jars with minimal to no headspace. Soil samples were to be placed on ice until laboratory analysis.

Duplicate samples were to be taken for 20% of the total soil samples. All samples were to be analyzed for BTEX, PHC F1 to F4 (C_6-C_{50}), PCBs, and CCME metals. Table 4-2 contains a summary of the soil analyses.

Table 4-2: FOX-C Ekalugad Fjord Soil Sampling Plan

	BTEX	PHC F1–F4	PCBs	CCME Metals[1]
Sample X	X	X	X	X
Duplicate	X	X	X	X

[1] CCME Metals include arsenic, cadmium, chromium, cobalt, copper, lead, nickel, and zinc.

Due to no new areas of staining or settlement being observed at the site, no soil samples were taken during the 2018 monitoring event. However, should any future soil samples be taken at the site, results should be compared to previous soil sampling monitoring results, the AMSRP original DEW Line Clean-Up Criteria guidelines, CCME Environmental Quality Guidelines for the Protection of Environmental and Human Health for Parkland and Industrial Land Use sites, and the Canada Wide Standards for Petroleum Hydrocarbons.

4.6 Surface Water Sampling

One surface water sample (SW-East) was collected at FOX-C Ekalugad Fjord during the 2018 monitoring event. The sample was collected from a surface water flow running from the eastern edge of the NHWL downslope past MW-East, and continuing to the northeast. See **Drawing 2** for the surface water sampling location.

All samples were analyzed for BTEX, PHC F1 to F4 (C_6-C_{50}), PCBs, and CCME metals. Table 4-3 contains a summary of the surface water analyses.

Table 4-3: FOX-C Ekalugad Surface Water Sampling Plan

	BTEX	PHC F1–F4	PCBs	CCME Metals[1]
SW East	X	X	X	X

[1] CCME Metals include arsenic, cadmium, chromium, cobalt, copper, lead, nickel, and zinc. [1] CCME Metals include arsenic, cadmium, chromium, cobalt, copper, lead, nickel, and zinc.

Water quality parameters were recorded prior to filling all bottles and are available in **Appendix B**. Bottles were filled carefully to ensure no inclusion of sediment.

The sampling of this surface water feature was not planned prior to the commencement of the site visit, but should the feature still exist during future monitoring programs, the same location should be sampled for surface water for comparison.

In the absence of surface water criteria in the FOX-C Ekalugad Fjord LTM Plan, analytical data for surface water was compared to Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life, Long-Term Exposure.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

Field procedures were implemented to minimize the potential of cross contamination between sampling locations. Sample handling protocols were established to track and maintain the integrity of the samples. Field handling of samples was minimized by transferring samples directly into containers, when possible. Where handling is required, disposable nitrile gloves will be used at all times and changed between samples. All monitoring equipment was decontaminated prior to initial use and between each location. During groundwater sampling, disposable tubing was dedicated to the individual wells and during all sampling activities a new pair of disposable nitrile gloves was used between each sample.

Photographs were taken of all areas of interest and the scale, location, and directional view point was recorded.

5.1 Replicate Samples

A replicate sample is a sequential sample that is taken immediately following the collection of a regular sample. Replicate samples were collected for approximately 20 percent (%) of the samples collected as part of the QA/QC sampling program. This equates to one duplicate per five wells samples. Duplicates are a type of replicate sample (two of the same), and these samples provide a rough estimate of the overall variability of the field technique and laboratory analysis.

5.2 Field Blanks

Field blanks are used to evaluate for contamination resulting from the sampling technique and from exposure to the air environment of the sampling location.

For this water quality monitoring program, because there is little variability anticipated between sampling techniques used at the various sites or between their atmospheres, one field blank was collected for both the Cape Christian and FOX-C sites.

The field blank sample was collected at the FOX-C Ekalugad Fjord site on August 12, 2018 at 10:00 am.

Deionised water was included in the bottle order from Maxxam Analytics for preparation of field blanks.

5.3 Travel Blanks

A travel blank is a sample of distilled “clean” water that is prepared by the laboratory performing the analysis. The travel blank is shipped to the site and remains sealed before being shipped back to the lab for analysis. A travel blank helps to identify the presence of container or preservative contamination, and is often used when the integrity of samples is of paramount concern (e.g., in legal matters). Given the fact that the LTM programs at FOX-C and Cape Christian are mature programs that do not present such sensitivities, the added expense of trip blanks was not justified, and they were not included in this program.

5.4 Laboratory

All surface water samples were analyzed by Maxxam Analytics. Maxxam is accredited by CALA for the parameters proposed for analysis, and uses recognized methods to conduct laboratory analyses. As conveyed by the laboratory, method blanks, certified reference materials, method spikes, duplicates, surrogates and laboratory control samples are routinely analysed as part of their QA/QC programs.

5.5 Relative Percent Difference

The relative percent difference (RPD – the absolute difference between the two values, divided by the mean) of duplicate analyses is used to evaluate the sample result variability. Where the concentration of a parameter is less than five times the laboratory reportable detection limit (RDL), the results are less precise and the RPD is not calculated.

The Guidance manual for Environmental Site Characterization in Support of Human Health Risk Assessment, Volume I (CCME, 2016) recommends that RPDs for parameters of duplicate groundwater samples not exceed 40%. The guide also recommends that RPDs for laboratory duplicates not exceed 20%. Should either of these guidelines be exceeded, a potential problem may be indicated.

6.0 RESULTS

6.1 Location

The NHWL is located in the Lower Site Landfill Area (general coordinates 68° 42’0’’ N, 68° 33’0’’E), between the Beach and Lake Areas of the FOX-C Ekalugad Fjord Sire site. A map showing the location of the site is located on **Drawing 1.** The monitoring wells are located at the following coordinates:

Table 6-1: FOX-C Ekalugad Fjord Monitoring Wells

Source Description	Latitude	Longitude
MW-South	68 43 46.9	-68 39 12.76
MW-East	68 43 50.02	-68 39 7.523
MW-North	68 43 50.71	-68 39 15.45
MW-Northwest	68 43 48.54	-68 39 17.39

Monitoring of the landfill included visual observations to assess physical integrity including evidence of erosion, ponding, frost action, settlement, and lateral movement. Groundwater was thawed in some of the wells during the 2018 monitoring event and as a result, three (3) groundwater samples were collected (two monitoring wells plus one duplicate). Additionally, one (1) surface water sample was collected east of MW-East.

6.2 Photographic Record

The photographic record of the NHWL and surrounding areas has been completed as per the scope of work (Photos 1 to 40, Attached USB). Photographs referenced in the body of this

document are included in **Appendix A.** The complete photographic record is provided in the attached USB drive.

6.3 Visual Monitoring

Visual monitoring of the NHWL, natural environment, and surrounding areas was undertaken at FOX-C Ekalugad Fjord during the 2018 monitoring event. Checklists were utilized for NHWL and natural environment monitoring and interviews were conducted with local wildlife monitor to understand trends and changes over time.

6.3.1 Non-Hazardous Waste Landfill

The physical integrity of the NHWL was assessed by collecting visual evidence staining, seepage, erosion, frost action, settlement, and lateral movement. Features identified in previous monitoring programs were assessed during the 2018 site visit for condition and stability. Additionally, any new features were noted for size and extent. The locations historic features referred to in the sections below are available on **Drawing 2** at the end of this report. The following table provides a summary of the NHWL features.

Table 6-2: FOX-C NHWL Feature Summary

Feature Letter	Feature Type	Location	Extent	Description / Change Comments	Viewpoint #
A	Erosion	NW of SE Corner	<1%	Minor erosion channel. Similar size and extent as observed in 2016	N/A
B	Settlement	NW of SE Corner	<1%	Small pothole. Not observed in 2018	N/A
C	Erosion	NE of NHWL and to the SE of MW-East	<1%	Erosion channel running from SE corner of NHWL towards MW-East, grown in size and extent since 2016	8, 9
D	Erosion	NE of toe, edge of access road	<1%	Erosion channel, grown in size and extent since 2016	8, 9
E	Erosion	NE Berm	<1%	Erosion channel, Similar size and extent as 2016	N/A
F	Erosion	SE of NE Corner	<1%	Erosion channel, Similar size and extent as 2016	30
G	Erosion	SE of NE Corner	<1%	Erosion channel, Similar size and extent as 2016	31

Feature Letter	Feature Type	Location	Extent	Description / Change Comments	Viewpoint #
H	Settlement/ Erosion	North Corner	<1%	Area of settlement and erosion, ponded water, appears to have decreased in size since 2016	2, 3
I	Settlement/ Erosion	SW of NE Corner	<1%	Small pothole, not observed in 2018	N/A
J	Erosion	Toe of NW Corner	<1%	Erosion channel, Similar size and extent as observed in 2016	
K	Erosion	N of MS-Northwest	<1%	Erosion channel, Similar size and extent as observed in 2016	4
L	Erosion	SE of NW Corner	<1%	Exposed cobbles at top of berm, historically contained ponded water. Similar size and extent as observed in 2016, however no ponded water.	N/A
M	Erosion	SE of NW Corner	<1%	Two minor erosion channels stemming from L, Similar size and extent as observed in 2016	13
N	Erosion	SE of NW Corner	<1%	Erosion channels, Similar size and extent as observed in 2016	13
O	Erosion	NW of SW Corner	<1%	Erosion channels Similar size and extent as observed in 2016	14
P	Erosion	NW of SW Corner	<1%	Erosion channels, Similar size and extent as observed in 2016	14
Q	Settlement/ Erosion	E of SW Corner	<1%	Exposed cobbles at the top of the berm, minor settlement, and minor erosion, not observed in 2018	5
R	Settlement/ Erosion	E of SW Corner	<1%	Small pothole, not observed in 2018	N/A
S	Erosion	E of SW Corner	<1%	Exposed cobbles, not observed in 2018	N/A
T	Settlement/ Erosion	E of SW Corner	<1%	Small depression/ potholes, not observed in 2018	N/A

Feature Letter	Feature Type	Location	Extent	Description / Change Comments	Viewpoint #
U	Erosion	SE of NW Corner	<1%	Exposed cobbles at toe of berm, Similar size and extent as observed in 2016	4, 13
V	Erosion	SE Corner	<1%	Narrow drainage channel at base of berm, not observed in 2018	27
W	Settlement	NE of NHWL	Unknown	New in 2018, settlement, ponded water	12

Staining

No new areas of staining were observed during the 2018 site visit. Additionally, no historical staining features have ever been noted at the FOX-C NHWL.

Seepage Points

Feature D and Feature C have been historically observed as seepage points and have been growing in size and extent since 2011. The two channels begin at the toe of the eastern edge of the NHWL and converge to form a large ditch that runs to the northeast adjacent to MW-East (Photos 8 and 10, **Appendix A**). This was the site of the surface water sample that was collected in 2018 (see **Drawing 2** for surface water sampling location). Future programs should closely monitor this feature for growth and continue to collect surface water samples at this point. No other areas of seepage were observed during the 2018 site visit.

Settlement

Features Q, R, and T have been historically observed as areas of settlement along the southern edge of the NHWL. These features were not identified during the 2018 site visit. Features U and L, located along the western edge of the NHWL were identified as depressions in 2018, however no ponded water was present (Photo 4, **Appendix A**).

Feature H has been historically noted as a large depression where ponded water accumulates. This feature was observed to be present in 2018, however the size and extent of the ponded water accumulation has decreased (Photos 2 and 3, **Appendix A**). The new approximate size and extent of feature H has been noted on **Drawing 2**.

The large rectangular depression noted to be located on the landfill cap in 2016 (see **Drawing 2**, no reference letter), was not observed in 2018. The landfill cap appears to be in excellent condition with no signs of settlement, ponded water, or erosion.

A new area of settlement and ponded water was observed north of the northeast corner of the NHWL (Photo 12, **Appendix A**). Location is noted on **Drawing 2** and is referenced as Feature W.

Erosion

Erosion channels have been historically observed running down the eastern and western side of the Landfill (Features, A, E, F, G, K, M, N, O, and P, see Photos 4, 6, and 9 in **Appendix A**). All of these features were identified in 2018 but appear to be of similar size and extent to that observed previously. Channels along the southwest edge of the NHWL appear to be the largest, approximately 20 cm deep at the toe. There is an accumulation of fine grained sediment along the invert of each of these channels.

As described above, Features C and D are two large erosion channels that appear to have increased in size and extent since 2011 (Photo 8, **Appendix A**). Features C and D represent a seepage point from the eastern edge of the NHWL that runs adjacent to MW-East to the northeast.

Erosional Feature J was noted to be present along the northwestern edge of the NHWL. The size and extent of Feature J appears to be similar to what was observed during the 2016 monitoring program.

Feature S, a historic erosional feature consisting of exposed cobbles along the southern berm of the NHWL, was not observed in 2018 (Photo 5, **Appendix A**).

Frost Action

No evidence of frost action or cracking on or surrounding the landfill was observed at the time of the 2018 site visit.

Evidence of Burrows

No evidence of animal burrows was identified during the 2018 site visit.

Re-establishment of Vegetation

Re-establishment of vegetation is likely to take a significant amount of time due to the coarse materials used to construct the landfill (i.e. coarse gravel) and due to the fact that the growing season is short in northern regions. Very little vegetation was observed on the NHWL. Vegetation including grasses, lichen, Arctic poppy (*Papaver radicatum*), and Arctic cotton (*Eriophorum callitrix*) growth begins anywhere from 2 – 10 m from the toe of each side of the NHWL (Photo 14, **Appendix A**).

Debris

No exposed debris was observed in the area of the NHWL during the 2018 site visit.

Discussion

All 2018 physical observations indicate that the NHWL is performing as designed and is containing the enclosed waste. The features noted above to not appear to be affecting the physical integrity of the NHWL. Overall, the landfill appears to be in similar condition as noted in previous years. The cap of the landfill is flat, with no indication of settlement or erosion occurring.

Soil samples were not collected during the 2018 site visit due to no new areas of staining or other anomalies being observed. A surface water sample was collected from the location where Features C and D (seepage points) converge on the eastern side of the NHWL. While this feature does not currently appear to affect the stability or integrity of the NHWL, it should be closely monitored during future site visits and surface water samples should be continued to be collected.

It is recommended that monitoring continue as per the schedule set out in the LTM Plan (INAC, 2008).

6.3.2 Natural Environment

Information regarding the natural environment was gathered directly through site observations and through interviews with Esa Qillaq, a resident of Clyde River and the wildlife monitor for this project. Esa Qillaq has lived on Baffin Island, near Clyde River for the duration of his life and is knowledgeable on the history of the region.

No wildlife or wildlife indicators were observed during the site visit with the exception of geese footprints on the west side of the NHWL. Esa indicated that char are located in the lake south of the NHWL. Residents of Clyde River and Qikiqtarjuaq have cabins in nearby fjords that they utilize for hunting and fishing.

Various grasses, lichens, and other plants such as Arctic poppy (*Papaver radicatum*) and Arctic cotton (*Eriophorum callitrix*) were located on the ground surface surrounding the NHWL. No stress to vegetation was observed anywhere on site.

6.3.3 Surrounding Areas

As proposed, a brief visual inspection of the areas surrounding the site was completed during the Year 10 monitoring event. The land directly surrounding the NHWL is mostly devoid of vegetation, with vegetation growth beginning within 10 m of the NHWL toe.

The access road to the east of the NHWL continues to erode as noted during previous monitoring programs. The beach area was observed aerially and appears to be devoid of vegetation. The unnamed lake to the south was ice-free and appeared murky. Esa Qillaq indicated that to his knowledge, the lake has always had high turbidity that does not appear to be the result of former DEW Line activities or remediation.

6.4 Results – Groundwater and Surface Water

6.4.1 General

Three of the five wells contained adequate water, and of those, two were sampled for groundwater analyses (MW North and MW Northwest). A lack of time on site did not allow MW East to be sampled. MW-North and MW-Northwest both had well volumes that allowed for parameter stabilization and low flow sampling. A peristaltic pump was used for both purging and sampling and a Horiba multi-meter was used to monitor in-situ parameters prior to sample collection. However, due to a lack of time at site, neither well fully stabilized prior to sampling. Additionally, a duplicate sample (Duplicate-2) was collected at MW-North and a field blank was collected shortly after. Approximately 3 L of water was purged using a peristaltic pump at both

MW-North and MW-Northwest wells prior to sample collection. All bottles were filled at both MW-North and MW-Northwest.

MW-East, located to the east of the FOX-C NHWL is showed signs of potential frost jacking as the well monument appeared to have risen above the ground surface (Photo 9, **Appendix A**). This may be associated with the erosion occurring to the south and east of MW-East.

During the site visit, the lock on each of the monitoring wells was cut and replaced with a new lock. All five locks at FOX-C match the lock type on the wells at Cape Christian. The keys to all wells at both sites are in possession of CIRNAC personnel.

Table 6-2 below provides a summary of water levels and samples collected from each well and from surface water:

Table 6-3: Well Summary and Sample Details

Sample / Well ID	Start WL*	Well Depth*	Purged Amount	# Bottles Collected	Total Water removed from well	Notes
MW North	1.095 m	1.445 m	3 L	10	9 L	All bottles filled, limited purging time
Duplicate - 2	---	---	---	10	---	All bottles filled, MW-North
MW Northwest	0.805 m	1.275 m	3 L	10	6 L	All bottles filled, limited purging time
MW South	None	1.325 m	---	0	---	No water / frozen
MW Southwest	1.255 m	1.260 m	---	0	---	Low water level
MW East	1.385 m	1.790 m	---	0	---	Not enough time to sample
SW East	---	---	---	10	---	Surface water sample collected to east of NHWL, ~4 m from MW East
Field Blank	---	---	---	8	---	No PCBs collected

* From top of casing

6.4.2 Analytical

All PCB, BTEX, and PHC concentrations were below laboratory detection limits.

Several ULA exceedances for dissolved metals and inorganics were reported in MW-North and its duplicate (Duplicate-2). The acceptable pH range was determined to be 6.2 – 8.6 from baseline data and MW-North reported a pH of 4.52. The ULAs for cobalt and nickel were determined to be 22 µg/L and 47.8 µg/L from baseline data, respectively. 2018 MW-North

results reported cobalt and nickel concentrations of 710 µg/L and 2600 µg/L respectively. The method in which the ULA was calculated is described in Section 3.1.1.

However, baseline data is relatively sparse and thus, it was not possible to calculate ULAs for all parameters analysed in the 2018 monitoring program. As a result, results were also compared to the Federal Interim Groundwater Quality Guidelines, Table 2 Residential/ Parkland Use, Tier 1, Coarse-grained soils.

Several inorganic, total metals, and dissolved metals parameters exceeded criteria set out by the FIGQG. The exceedances are as follows:

Table 6-4: 2018 FIGQG Groundwater Exceedances at FOX-C

Well ID	Parameter	FIGQG Criteria (µg/L)	Concentration (µg/L)
MW-North	pH	6.5-9.0	4.52
	Sulphate (mg/L)	100	540
	Total Aluminum	100[1]	12000
	Dissolved Aluminum	100[1]	9400
	Total Cadmium	0.017	6.7
	Dissolved Cadmium	0.017	10
	Total Chromium	8.9	11
	Total Copper	2.8[2]	120
	Dissolved Copper	2.8[2]	140
	Total Iron	300	2400
	Dissolved Iron	300	5000
	Total Nickel	110[2]	1600
	Dissolved Nickel	110[2]	2600
	Total Zinc	10	1100
	Dissolved Zinc	10	1700
Duplicate-2	pH	6.5-9.0	4.46
	Sulphate (mg/L)	100	500
	Total Aluminum	100[1]	11000
	Dissolved Aluminum	100[1]	8900
	Total Cadmium	0.017	6.1
	Dissolved Cadmium	0.017	7.6
	Total Chromium	8.9	12

Well ID	Parameter	FIGQG Criteria (µg/L)	Concentration (µg/L)
	Total Copper	2.8[2]	110
	Dissolved Copper	2.8[2]	110
	Total Iron	300	2300
	Dissolved Iron	300	2800
	Total Nickel	110[2]	1500
	Dissolved Nickel	110[2]	1900
	Total Zinc	10	1000
	Dissolved Zinc	10	1200
MW-Northwest	Total Zinc	10	20
	Dissolved Zinc	10	22

[1] Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines – calculated using water pH as recommended by the FIGQG (2010).
[2] Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines – calculated using water hardness ($CaCO_3$) as recommended by the FIGQG (2010).

It was noted that concentrations of some dissolved metals parameters exceeded concentrations of total metals. In water samples where the metals concentrations present in the sample are 100% dissolved, results may report total and dissolved metals having slightly different concentrations due to normal variations in the analytical process. Slightly higher concentrations present in dissolved versus total analyses can occur even though all quality controls are acceptable. Similar to the duplicate process, RPDs were used to calculate if samples fall within normal analytical variability. However, several parameters, including iron and nickel, do not fall within acceptable variability of 40%.

This was noted by the lab during the analytical stage and samples were run twice to confirm this observation. SLR followed up with Maxxam and it was determined that no laboratory contamination occurred resulting in the discrepancy. Notes indicating that the samples were analyzed twice are available in the Certificates of Analysis in **Appendix C**. All 2018 groundwater analytical results are available in **Tables 4 to 8** at the end of this report.

6.4.3 Comparison to Previous Monitoring Programs / Discussion

Analytical data from previous monitoring programs is unavailable – 2018 represents the first year that the wells were neither dry nor frozen. Where available, 2018 results were compared to ULA criteria as determined by the 2006 baseline data. Baseline data is considerably sparse, and as a result, ULAs were not able to be calculated for all metals or inorganics parameters. Additionally, because the available ULA criteria were determined based on samples from three wells, one of which does not exist anymore, they may not accurately represent background conditions of the wells.

Parameters reporting FIGQG exceedances should be closely monitored in future sampling events to understand if there is an increasing contaminant trend at this site. Currently, not

enough data exists to correlate the FIGQG exceedances with the condition of the NHWL at the site.

Overall, the NHWL can still be considered to be performing as expected and in “acceptable” condition as defined by the AMSRP guidelines in **Table 3-1.** However, if the same ULA exceedances are reported during the next monitoring event, the landfill may be considered in “marginal condition” with a low risk of failure as defined in **Table 3-1**. Additional sampling events may be required.

As discussed above, concentrations of certain dissolved metals parameters exceed the concentrations of total metals. With laboratory contamination ruled out, it is determined that the water samples collected from these wells may not be representative of true groundwater/active layer conditions at FOX-C Ekalugad Fjord. These wells have remained unpurged since installation in 2006 and while water was purged during the 2018 monitoring event, it was not the recommended three well volumes, and parameter-stabilized flows were not achieved due to lack of time on site. Additionally, the low pH of the samples may have an impact on the solubility of metals in groundwater at this site. This data set must be utilized with caution. More data is required to determine if the values and exceedances noted above represent true site conditions or are the result of stagnant groundwater.

6.5 Results – Soil

6.5.1 General

Historically, soil samples were only collected during construction and remediation activities in 2007 and 2008. The soil analytical results from 2007 and 2008 are available in **Table 2** and **Table 3** at the end of this report.

A review of images from the 2017 report suggest that the NHWL is in comparable shape to previous years and does not show any evidence of present or historic staining.

As a result, no soil samples were collected at FOX-C during the 2018 sampling program.

6.6 Results – Surface water

As discussed in previous sections, a surface water sample was collected where two erosional features, Features C and D, converge. This seepage point runs from the toe of the eastern edge of the NHWL, northeast adjacent to MW-East (**Drawing 2**). No surface water samples have ever been collected at FOX-C and as a result, the 2018 surface water analytical data could not be compared to ULA criteria. Instead, surface water results have been compared to Canadian Water Quality Guidelines for the Protection of Aquatic Life (CWQG-PAL).

All PCB, BTEX, and PHC concentrations were reported below detection limits. Several inorganic, dissolved metal, and total metal parameter concentrations exceeded criteria set out by the CWQG-PAL. The exceedances are as follows:

Table 6-5: 2018 Surface Water Exceedances at FOX-C

Parameter	CWQG-PAL Criteria (µg/L)	Concentration (µg/L)
pH	6.5 – 9.0	4.69
Total Aluminum	100[1]	1700
Dissolved Aluminum	100[1]	1700
Total Cadmium	0.37	0.48
Dissolved Cadmium	0.37	0.51
Total Copper	2.8[2]	41
Dissolved Copper	2.8[2]	43
Total Nickel	110[2]	160
Dissolved Nickel	110[2]	160
Total Zinc	7	65
Dissolved Zinc	7	62

[1] Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines – calculated using water pH as recommended by the FIGQG (2010).

[2] Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines – calculated using water hardness ($CaCO_3$) as recommended by the FIGQG (2010).

As noted above, some dissolved metals concentrations are either equal to or slightly higher than total metals concentrations. However, a water sample where the metals concentrations present in the sample are 100% dissolved, may result in total and dissolved metals having slightly different concentrations due to normal variations in the analytical process. Slightly higher concentrations present in dissolved versus total analyses can occur even though all quality controls are acceptable. Similarly to the duplicate process, RPDs for all total and dissolved metals parameters were calculated and all were found to fall within the acceptable duplicate range of 40%.

As this is the first monitoring program where a surface water sample has been collected, it is difficult to draw conclusions on whether the surface water exceedances noted above are representative of background conditions or if these exceedances represent an issue related to the erosional features or the NHWL itself. The similarity between metals parameters with high concentrations in both groundwater and surface water samples suggests that these results are driven by surface conditions. It is recommended that surface water sampling occur in the same location during future monitoring programs, and that a background surface water sample location be identified and taken. Should concentrations increase, additional sampling measures surrounding the NHWL may be required. All 2018 surface water analytical results are presented in **Tables 4 to 8** at the end of this report.

6.7 QA/QC Results

6.7.1 Duplicate Samples – Relative Percent Difference

One (1) field duplicate sample was collected from MW-North at FOX-C Ekalugad Fjord and was analysed for general parameters, total metals, dissolved metals, BTEX/PHCs, and PCBs. RPD values were calculated where analyte concentrations were greater than five times the reportable detection limit (RDL).

All results for PCBs and BTEX/PHCs were below the RDL (non-detect) for all parameters, therefore no RPD values were calculated.

No field duplicate pair exceeded the 40% RPD criterion for individual total metal, dissolved metal, or inorganic parameters or batch averages. As a result, all analyses fall within RPD quality targets.

A complete list of detection limits and RPD values for all parameters are available in Tables 9 to 13 at the end of this report.

6.7.2 Field Blank

One (1) field blank was collected for both the Cape Christian and FOX-C Ekalugad Fjord sites. The field blank was filled on August 12, 2018 at 10:00 am at the FOX-C site using laboratory supplied deionized water. Not enough water was provided to fill the PCB bottles so PCB results are not available.

All field blank results were below the RDL (non-detect) for all parameters with the exception of conductivity, total suspended solids, and total/ dissolved sodium. However, none of these parameters reported concentrations above five times the reportable detection limit and are therefore not considered to be a QAQC concern.

Complete field blank results are available in **Tables 9 to 13** at the end of this report.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Observations made during the 2018 FOX-C Ekalugad Fjord site visit indicate that the NHWL is performing as designed and effectively containing the enclosed waste. Several areas of erosion, ponded water, and seepage were observed on and in the vicinity of the NHWL. However, these features appear to be of similar size, extent, and condition as observed in previous monitoring programs with the exception of erosional Features C and D on the eastern edge of the NHWL. A surface water sample was collected at this seepage point and results were compared to CWQG-PAL criteria. A depression was previously noted on the landfill cap. This feature was not observed in 2018 and the cap appears to be flat and in good condition. No soil samples were collected during the 2018 monitoring event.

Access to site was via helicopter provided by Summit Helicopters. The access road to the NHWL was in overall good condition, with some signs of erosion. The areas immediately surrounding the NHWL are generally void of vegetation with some minor signs of erosion.

In addition to these physical observations, SLR collected groundwater samples from all two monitoring wells that surround the NHWL, MW-North and MW-Northwest. Concentrations of PHCs, BTEX, and PCBs were below RDLs.

Concentrations of several inorganic, total and dissolved metals parameters in each of the wells were greater than the FIGQG and ULA criteria. These exceedances should be closely monitored during the next site visit as the landfill will be considered in “marginal” condition with a “low risk of failure” should ULA criteria be exceeded for two or more successive monitoring seasons as set out by the AMSRP guidelines.

Additionally, concentrations of some dissolved metals parameters (e.g. nickel, iron) exceed the concentrations of total metals. It is suspected that the water samples collected from these wells may not be representative of true groundwater/active layer conditions at FOX-C Ekalugad Fjord. More data is required to determine if the values and exceedances noted above represent true site conditions or are the result of stagnant groundwater.

MW-East to the east of the NHWL showed signs of frost jacking and should be monitored during future monitoring programs as repair may be required. The locks were replaced on all wells and the keys remain in the possession of the CIRNAC representative.

Based on the results of the Year 10 LTM event at FOX-C Ekalugad Fjord, SLR recommends continued monitoring of landfill features noted in above sections, especially the erosional features noted on the east side of the NHWL. Additionally, all parameters with reported FIGQG and ULA exceedances should be continually monitored during future monitoring events to confirm or eliminate the possibility of increasing trends. It is recommended that monitoring continue at an increased frequency compared to what has been set out in the FOX-C LTM Plan. The next monitoring event, Year 15, was to be scheduled in 2023. It is recommended that an additional monitoring event take place in 2020 (Year 12) to expand the groundwater and surface water analytical data set at the site and to gain a better understanding of groundwater chemistry at this site. No further action is recommended at this time.

8.0 LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR for Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) and completed in compliance with Contract Number 4500381248. Under the CIRNAC Standing Offer 4600000874, CIRNAC has the exclusive right to copy and redistribute this report.

This report has been prepared for specific application to this site and site conditions existing at the time work for the report was completed. Any conclusions or recommendations made in this report reflect SLR's professional opinion based on limited investigations including: visual observation of the site, surface and subsurface investigation at discrete locations and depths, and laboratory analysis of specific chemical parameters. The results cannot be extended to previous or future site conditions, portions of the site that were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters and materials that were not addressed. Substances other than those addressed by the investigation may exist within the site; and substances addressed by the investigation may exist in areas of the site not investigated in concentrations that differ from those reported. SLR does not warranty information from third party sources used in the development of investigations and subsequent reporting.

Nothing in this report is intended to constitute or provide a legal opinion. SLR expresses no warranty to the accuracy of laboratory methodologies and analytical results. SLR makes no representation as to the requirements of compliance with environmental laws, rules, regulations or policies established by federal, provincial or local government bodies. Revisions to the regulatory standards referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary.

CIRNAC may submit this report to the Nunavut Water Board and/or related Nunavut environmental regulatory authorities or persons for review and comment purposes.

9.0 REFERENCES

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TABLES

Crown-Indigenous Relations and Northern Affairs Canada
Contaminants and Remediation Division

FOX-C Ekalugad Fjord Long Term Monitoring Event
Qikiqtaaluk Region, Nunavut
SLR Project No.: 209.40585.00000

Table 1 - 2006 Baseline Groundwater Analytical Data

Parameter (ug/L)	MW-A	MW-B	MW-C	Average Concentration	Standard Deviation
		now (MW-Northwest)	now MW-Southeast		
Year Installed	2006	2006	2006	---	---
pH	7.8	7.4	7	7.4	0.4
Total Oil and Grease	1.4	1	1.4	1.3	0.2
Benzene	ND	ND	ND	---	---
Toluene	ND	ND	ND	---	---
Ethylbenzene	ND	ND	ND	---	---
Total Xylenes	ND	ND	ND	---	---
F1 (C60 - C10)	ND	ND	ND	---	---
F2 (C10 - C16)	ND	ND	ND	---	---
F3 (C16 - C34)	830	1100	480	803.3	310.9
F4 (C34 - C50)	ND	140	ND	140.0	---
Total As	7	6	10	7.7	2.1
Dissolved Cd	ND	ND	0.3	0.3	---
Total Cr	63	78	98	79.7	17.6
Dissolved Co	1.1	8	11	6.7	5.1
Dissolved Cu	ND	ND	5	5.0	---
Dissolved Pb	ND	ND	ND	---	---
Dissolved Ni	5	25	1	10.3	12.9
Total Zn	370	180	1	183.7	184.5
Total PCB	ND	ND	ND	---	---

Notes:

ug/L - micrograms per litre
ND - Not Detected
< - less than analytical detection limit indicated
---' - not calculated

Table 2 - 2007 - 2008 Baseline Copper and Lead Soil Analytical Data

Sample ID	Year Collected	Copper (mg/kg)	Lead (mg/kg)
FC-459	2007	18	ND
FC-460		13	ND
FC-461		14	ND
FC-462		17	ND
FC-463		22	ND
FC-464		17	ND
FC-465		15	ND
FC-466		15	ND
1178	2008	10.2	ND
1179		10.4	ND
1180		13.7	ND
1181		13.7	ND
1182		7.3	ND
1183		7.9	ND
1184		10.7	ND
1185		8.6	ND
1186		12.1	ND
1187		12	ND
1188		16.1	ND
Average Concentration	N/A	13.4	---
Standard Deviation	N/A	3.8	---

Notes:

ug/L - micrograms per litre
mg/kg - miligrams per kilogram
ND - Not Detected
< - less than analytical detection limit indicated
---' - not calculated
N/A - Not applicable

Table 3 - Baseline Soil Analytical Data - Remaining Parameters

Parameter (ug/L)	Sample ID											Average Concentration	Standard Deviation
	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188		
Depth (cm)	0	30	0	0	30	0	30	0	30	0	30	---	---
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---
Cr	21	ND	28	26	ND	ND	21	ND	24	30	29	25.6	3.7
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---
Ni	7.6	5.8	9	9.1	ND	ND	7.5	6.1	7	8.9	8.9	7.8	1.3
Zn	20	18	24	23	ND	ND	19	17	21	25	26	21.4	3.2
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---
Total PCBs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---
F1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---
F2	20	235	28	18	11	ND	18	ND	20	ND	ND	50	81.7
F3	ND	ND	61	ND	ND	112	90	303	36	149	ND	125.2	95.6
F4	ND	ND	ND	ND	ND	ND	73	ND	ND	ND	ND	73	---

Notes:

ug/L - micrograms per litre
mg/kg - miligrams per kilogram
ND - Not Detected
< - less than analytical detection limit indicated
---' - not calculated

Table 4 - Summary of 2018 Groundwater and Surface Water Analytical Results - BTEX and Hydrocarbons

Sample ID	Units	RDL	Upper Limits of Acceptability [1]	FIGQG [2]	CCME Freshwater Aquatic life [4]	MW North	Duplicate-2	MW Northwest	SW East
Type						Groundwater	Groundwater	Groundwater	Surface water
Date						12-Aug-18	12-Aug-18	12-Aug-18	12-Aug-18
Time						9:50:00 AM	9:50:00 AM	11:00:00 AM	11:15:00 AM
BTEX and F1 Hydrocarbons									
Benzene	µg/L	0.2	NC	690	370	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	0.2	NC	83	2	<0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	0.2	NC	11000	90	<0.20	<0.20	<0.20	<0.20
o-Xylene	µg/L	0.2	NC	ns	ns	<0.20	<0.20	<0.20	<0.20
p+m-Xylene	µg/L	0.4	NC	ns	ns	<0.40	<0.40	<0.40	<0.40
Total Xylenes	µg/L	0.4	NC	18000	ns	<0.40	<0.40	<0.40	<0.40
F1 (C6-C10)	µg/L	25	NC	ns	ns	<25	<25	<25	<25
F1 (C6-C10) - BTEX	µg/L	25	NC	ns	ns	<25	<25	<25	<25
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	µg/L	100	NC	1300	ns	<100	<100	<100	<100
F3 (C16-C34 Hydrocarbons)	µg/L	200	1736	ns	ns	<200	<200	<200	<200
F4 (C34-C50 Hydrocarbons)	µg/L	200	NC	ns	ns	<200	<200	<200	<200

Notes:

µg/L - micrograms per Litre
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
NC - Not calculated
RDL - Reporting Detection Limit
1 - Upper Limit of Acceptability is determined as described in Report Section 3.1.1. Upper limits of acceptability are calculated using mean of baseline data (2006) +3 standard deviations.
2 - Federal Interim Groundwater Quality Guidelines, Table 2 Residential/Parkland Use, Tier 1, Coarse Grained Soils
3 - Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines - calculated using water hardness (CaCO3) or pH (aluminum only)
4 - Canadian Water Quality Guidelines for the Protection of Aquatic Life

Bold & Red	FIGQG Exceedence
Bold & Red and Outlined	ULA Exceedance. Note - ULA criteria were not applied to surface water samples
Red & White	CCME Exceedance
Highlighted	DL > Criteria

Table 5 - Summary of 2018 Groundwater and Surface Water Analytical Results - Total Metals

Sample ID	Units	RDL	Upper Limits of Acceptability [1]	FIGQG [2]	CCME Freshwater Aquatic life [4]	MW North	Duplicate-2	MW Northwest	SW East
Type						Groundwater	Groundwater	Groundwater	Surface water
Date						12-Aug-18	12-Aug-18	12-Aug-18	12-Aug-18
Time						9:50:00 AM	9:50:00 AM	11:00:00 AM	11:15:00 AM
Total Aluminum (Al)	µg/L	5	NC	100 [3]	100 [3]	**12000**	**11000**	83	**1700**
Total Antimony (Sb)	µg/L	0.5	NC	2000	ns	<0.50	<0.50	<0.50	<0.50
Total Arsenic (As)	µg/L	1	13.9	5	5	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	µg/L	2	NC	500	ns	16	15	5.6	8.8
Total Beryllium (Be)	µg/L	0.5	NC	5.3	ns	3	2.7	<0.50	0.9
Total Bismuth (Bi)	µg/L	1	NC	ns	ns	<1.0	<1.0	<1.0	<1.0
Total Boron (B)	µg/L	10	NC	5000	1500	15	14	<10	43
Total Cadmium (Cd)	µg/L	0.1	NC	0.017	0.37	**6.7**	**6.1**	<0.10	**0.48**
Total Calcium (Ca)	µg/L	200	NC	ns	ns	120000	110000	3300	27000
Total Chromium (Cr)	µg/L	5	132.5	8.9	8.9	**11**	**12**	<5.0	<5.0
Total Cobalt (Co)	µg/L	0.5	NC	ns	ns	420	380	6.1	49
Total Copper (Cu)	µg/L	1	NC	2.8 [3]	2.8 [3]	**120**	**110**	2.2	**41**
Total Iron (Fe)	µg/L	100	NC	300	300	**2400**	**2300**	<100	<100
Total Lead (Pb)	µg/L	0.5	NC	4 [3]	4 [3]	1.6	1.6	<0.50	<0.50
Total Lithium (Li)	µg/L	5	NC	ns	ns	46	44	<5.0	7.9
Total Magnesium (Mg)	µg/L	50	NC	ns	ns	18000	17000	1500	7500
Total Manganese (Mn)	µg/L	2	NC	ns	ns	1100	1100	25	610
Total Molybdenum (Mo)	µg/L	0.5	NC	73	73	<0.50	0.55	<0.50	<0.50
Total Nickel (Ni)	µg/L	1	NC	110 [3]	110 [3]	**1600**	**1500**	23	**160**
Total Potassium (K)	µg/L	200	NC	ns	ns	16000	15000	1300	4800
Total Selenium (Se)	µg/L	2	NC	1	1	<2.0	<2.0	<2.0	<2.0
Total Silicon (Si)	µg/L	50	NC	ns	ns	14000	13000	3000	9200
Total Silver (Ag)	µg/L	0.1	NC	0.1	0.25	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	µg/L	100	NC	ns	ns	17000	17000	17000	11000
Total Strontium (Sr)	µg/L	1	NC	ns	ns	330	310	20	64
Total Tellurium (Te)	µg/L	1	NC	ns	ns	<1.0	<1.0	<1.0	<1.0
Total Thallium (Tl)	µg/L	0.05	NC	0.8	0.8	0.21	0.2	<0.050	0.061
Total Tin (Sn)	µg/L	1	NC	ns	ns	<1.0	<1.0	<1.0	<1.0
Total Titanium (Ti)	µg/L	5	NC	100	ns	16	19	<5.0	5.9
Total Tungsten (W)	µg/L	1	NC	ns	ns	<1.0	<1.0	<1.0	<1.0
Total Uranium (U)	µg/L	0.1	NC	15	15	5.4	5.1	0.15	0.69
Total Vanadium (V)	µg/L	0.5	NC	ns	ns	0.75	0.82	<0.50	<0.50
Total Zinc (Zn)	µg/L	5	797.1	10	7	**1100**	**1000**	**20**	**65**
Total Zirconium (Zr)	µg/L	1	NC	ns	ns	<1.0	<1.0	<1.0	<1.0

Notes:

µg/g - micrograms per gram
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
NC - Not calculated
RDL - Reporting Detection Limit
1 - Upper Limit of Acceptability is determined as described in Report Section 3.1.1. Upper limits of acceptability are calculated using mean of baseline data (2006) +3 standard deviations.
2 - Federal Interim Groundwater Quality Guidelines, Table 2 Residential/Parkland Use, Tier 1, Coarse Grained Soils
3 - Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines - calculated using water hardness (CaCO3) or pH (aluminum only)
4 - Canadian Water Quality Guidelines for the Protection of Aquatic Life

Bold & Red	FIGQG Exceedence
Bold & Red and Outlined	ULA Exceedance. Note - ULA criteria were not applied to surface water samples
Red & White	CCME Exceedance
Highlighted	DL > Criteria

Table 6 - Summary of 2018 Groundwater and Surface Water Analytical Results - Dissolved Metals

Sample ID	Units	RDL	Upper Limits of Acceptability [1]	FIGQG [2]	CCME Freshwater Aquatic life [4]	MW North	Duplicate-2	MW Northwest	SW East
Type						Groundwater	Groundwater	Groundwater	Surface water
Date						12-Aug-18	12-Aug-18	12-Aug-18	12-Aug-18
Time						9:50:00 AM	9:50:00 AM	11:00:00 AM	11:15:00 AM
Dissolved Aluminum (Al)	µg/L	5	NC	100 [3]	100 [3]	**9400**	**8900**	N/A	**1700**
Dissolved Antimony (Sb)	µg/L	0.5	NC	2000	ns	<0.50	<0.50	<0.50	<0.50
Dissolved Arsenic (As)	µg/L	1	NC	5	5	<1.0	<1.0	<1.0	<1.0
Dissolved Barium (Ba)	µg/L	2	NC	500	ns	20	17	13	10
Dissolved Beryllium (Be)	µg/L	0.5	NC	5.3	ns	3.2	2.5	<0.50	0.9
Dissolved Bismuth (Bi)	µg/L	1	NC	ns	ns	<1.0	<1.0	N/A	<1.0
Dissolved Boron (B)	µg/L	10	NC	5000	1500	20	14	<10	38
Dissolved Cadmium (Cd)	µg/L	0.1	NC	0.017	0.37	**10**	**7.6**	<0.10	**0.51**
Dissolved Calcium (Ca)	µg/L	200	NC	ns	ns	190000	140000	4900	27000
Dissolved Chromium (Cr)	µg/L	5	NC	8.9	8.9	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	µg/L	0.5	22	ns	ns	**710**	**480**	10	49
Dissolved Copper (Cu)	µg/L	1	NC	2.8 [3]	2.8 [3]	**140**	**110**	2.2	**43**
Dissolved Iron (Fe)	µg/L	100	NC	300	300	**5000**	**2800**	N/A	<100
Dissolved Lead (Pb)	µg/L	0.5	NC	4 [3]	4 [3]	1.3	1.7	1.6	<0.50
Dissolved Lithium (Li)	µg/L	5	NC	ns	ns	80	53	N/A	8
Dissolved Magnesium (Mg)	µg/L	50	NC	ns	ns	28000	21000	2100	7600
Dissolved Manganese (Mn)	µg/L	2	NC	ns	ns	1900	1300	N/A	620
Dissolved Molybdenum (Mo)	µg/L	0.5	NC	73	73	<0.50	<0.50	<0.50	<0.50
Dissolved Nickel (Ni)	µg/L	1	47.8	110 [3]	110 [3]	**2600**	**1900**	35	**160**
Dissolved Potassium (K)	µg/L	200	NC	ns	ns	22000	17000	1400	4900
Dissolved Selenium (Se)	µg/L	2	NC	1	1	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	µg/L	50	NC	ns	ns	14000	14000	N/A	9100
Dissolved Silver (Ag)	µg/L	0.1	NC	0.1	0.25	<0.10	<0.10	<0.10	<0.10
Dissolved Sodium (Na)	µg/L	100	NC	ns	ns	18000	17000	12000	11000
Dissolved Strontium (Sr)	µg/L	1	NC	ns	ns	470	370	25	61
Dissolved Tellurium (Te)	µg/L	1	NC	ns	ns	<1.0	<1.0	N/A	<1.0
Dissolved Thallium (Tl)	µg/L	0.05	NC	0.8	0.8	0.22	0.21	<0.050	0.05
Dissolved Tin (Sn)	µg/L	1	NC	ns	ns	<1.0	<1.0	N/A	<1.0
Dissolved Titanium (Ti)	µg/L	5	NC	100	ns	<5.0	<5.0	N/A	<5.0
Dissolved Tungsten (W)	µg/L	1	NC	ns	ns	<1.0	<1.0	N/A	<1.0
Dissolved Uranium (U)	µg/L	0.1	NC	15	15	9.2	5.4	0.65	0.72
Dissolved Vanadium (V)	µg/L	0.5	NC	ns	ns	<0.50	<0.50	<0.50	<0.50
Dissolved Zinc (Zn)	µg/L	5	NC	10	7	**1700**	**1200**	**22**	**62**
Dissolved Zirconium (Zr)	µg/L	1	NC	ns	ns	<1.0	<1.0	N/A	<1.0

Notes:

µg/L - micrograms per Litre
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
NC - Not calculated
RDL - Reporting Detection Limit
1 - Upper Limit of Acceptability is determined as described in Report Section 3.1.1. Upper limits of acceptability are calculated using mean of baseline data (2006) +3 standard deviations.
2 - Federal Interim Groundwater Quality Guidelines, Table 2 Residential/Parkland Use, Tier 1, Coarse Grained Soils
3 - Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines - calculated using water hardness (CaCO3) or pH (aluminum only)
4 - Canadian Water Quality Guidelines for the Protection of Aquatic Life

Bold & Red	FIGQG Exceedence
Bold & Red and Outlined	ULA Exceedance. Note - ULA criteria were not applied to surface water samples
Red & White	CCME Exceedance
Highlighted	DL > Criteria

Table 7 - Summary of 2018 Groundwater and Surface Water Analytical Results - Inorganics and Other Parameters

Sample ID	Units	RDL	Upper Limits of Acceptability [1]	FIGQG [2]	CCME Freshwater Aquatic life [4]	MW North	Duplicate-2	MW Northwest	SW East
Type						Groundwater	Groundwater	Groundwater	Surface water
Date						12-Aug-18	12-Aug-18	12-Aug-18	12-Aug-18
Time						9:50:00 AM	9:50:00 AM	11:00:00 AM	11:15:00 AM
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	1	NC	ns	ns	<1.0	<1.0	17	<1.0
Carb. Alkalinity (calc. as CaCO3)	mg/L	1	NC	ns	ns	<1.0	<1.0	<1.0	<1.0
Hardness (CaCO3)	mg/L	1	NC	ns	ns	590	430	21	99
Conductivity	mS/cm	0.001	NC	ns	ns	1.07	1.01	0.098	0.319
pH	pH	N/A	6.2-8.6	6.5 - 9.0	6.5 - 9.0	**4.52**	**4.46**	6.94	**4.69**
Dissolved Sulphate (SO4)	mg/L	1	NC	100	ns	**540**	**500**	19	130
Alkalinity (Total as CaCO3)	mg/L	1	NC	ns	ns	<1.0	<1.0	17	<1.0
Dissolved Chloride (Cl-)	mg/L	1	NC	120	120	6.6	6.1	2.4	5.4
Total Dissolved Solids	mg/L	10	NC	ns	ns	775	785	75	205
Total Suspended Solids	mg/L	10	NC	ns	ns	<10	10	34	12

Notes:

mS/cm - microsiemens per centimetre
mg/L - miligrams per litre
ns - no standard listed
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
NC - Not calculated
RDL - Reporting Detection Limit
1 - Upper Limit of Acceptability is determined as described in Report Section 3.1.1. Upper limits of acceptability are calculated using mean of baseline data (2006) +3 standard deviations.
2 - Federal Interim Groundwater Quality Guidelines, Table 2 Residential/Parkland Use, Tier 1, Coarse Grained Soils
3 - Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines - calculated using water hardness (CaCO3) or pH (aluminum only)
4 - Canadian Water Quality Guidelines for the Protection of Aquatic Life

Bold & Red	FIGQG Exceedence
Bold & Red and Outlined	ULA Exceedance. Note - ULA criteria were not applied to surface water samples
Red & White	CCME Exceedance
Highlighted	DL > Criteria

Table 8 - Summary of 2018 Groundwater and Surface Water Analytical Results - PCBs

Sample ID	Units	RDL	Upper Limits of Acceptability [1]	FIGQG [2]	CCME Freshwater Aquatic life [4]	MW North	Duplicate-2	MW Northwest	SW East
Type						Groundwater	Groundwater	Groundwater	Surface water
Date						12-Aug-18	12-Aug-18	12-Aug-18	12-Aug-18
Time						9:50:00 AM	9:50:00 AM	11:00:00 AM	11:15:00 AM
Aroclor 1242	µg/L	0.05	NC	ns	ns	<0.05	<0.05	<0.05	<0.05
Aroclor 1248	µg/L	0.05	NC	ns	ns	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	µg/L	0.05	NC	ns	ns	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	µg/L	0.05	NC	ns	ns	<0.05	<0.05	<0.05	<0.05
Total PCB	µg/L	0.05	NC	ns	ns	<0.05	<0.05	<0.05	<0.05

Notes:

µg/L - micrograms per litre
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
ns - no standard listed
NC - Not calculated. When there are only non-detect values, no standard deviation was calculated
RDL - Reporting Detection Limit
1 - Upper Limit of Acceptability is determined as described in Report Section 3.1.1. Upper limits of acceptability are calculated using mean of baseline data (2006) +3 standard deviations.
2 - Federal Interim Groundwater Quality Guidelines, Table 2 Residential/Parkland Use, Tier 1, Coarse Grained Soils
3 - Calculated standard based on CCME Water Quality for the Protection of Aquatic Life guidelines - calculated using water hardness (CaCO3) or pH (aluminum only)
4 - Canadian Water Quality Guidelines for the Protection of Aquatic Life

Bold & Red	FIGQG Exceedence
Bold & Red and Outlined	ULA Exceedance. Note - ULA criteria were not applied to surface water samples
Red & White	CCME Exceedance
Highlighted	DL > Criteria

Table 9 - Summary of 2018 QAQC Results - BTEX and Hydrocarbons

Sample ID	Units	RDL	5x RDL	MW North	Duplicate-2	RPD	Field Blank
Type				Groundwater	Groundwater		Groundwater
Date				12-Aug-18	12-Aug-18		12-Aug-18
Time				9:50:00 AM	9:50:00 AM		10:00:00 AM
Benzene	µg/L	0.2	1	<0.20	<0.20	N/A	<0.20
Toluene	µg/L	0.2	1	<0.20	<0.20	N/A	<0.20
Ethylbenzene	µg/L	0.2	1	<0.20	<0.20	N/A	<0.20
o-Xylene	µg/L	0.2	1	<0.20	<0.20	N/A	<0.20
p+m-Xylene	µg/L	0.4	2	<0.40	<0.40	N/A	<0.40
Total Xylenes	µg/L	0.4	2	<0.40	<0.40	N/A	<0.40
F1 (C6-C10)	µg/L	25	125	<25	<25	N/A	<25
F1 (C6-C10) - BTEX	µg/L	25	125	<25	<25	N/A	<25
F2 (C10-C16 Hydrocarbons)	µg/L	100	500	<100	<100	N/A	<100
F3 (C16-C34 Hydrocarbons)	µg/L	200	1000	<200	<200	N/A	<200
F4 (C34-C50 Hydrocarbons)	µg/L	200	1000	<200	<200	N/A	<200
					Batch Average	**N/A**	

Notes:
RPD = abs (X1 - X2)/((X1 + X2)/2) * 100
X1 = Sample Parameter Value
X2 = Duplicate Parameter Value

µg/L - micrograms per Litre
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
RDL - Reporting Detection Limit
N/A - Not Applicable
Bold & Red - RPD >40%

Table 10 - Summary of 2018 QAQC Results - Total Metals

Sample ID	Units	RDL	5x RDL	MW North	Duplicate-2	RPD	Field Blank
Type				Groundwater	Groundwater		Groundwater
Date				12-Aug-18	12-Aug-18		12-Aug-18
Time				9:50:00 AM	9:50:00 AM		10:00:00 AM
Total Aluminum (Al)	µg/L	5	25	12000	11000	2.2	<5.0
Total Antimony (Sb)	µg/L	0.5	2.5	<0.50	<0.50	N/A	<0.50
Total Arsenic (As)	µg/L	1	5	<1.0	<1.0	N/A	<1.0
Total Barium (Ba)	µg/L	2	10	16	15	1.6	<2.0
Total Beryllium (Be)	µg/L	0.5	2.5	3	2.7	2.6	<0.50
Total Bismuth (Bi)	µg/L	1	5	<1.0	<1.0	N/A	<1.0
Total Boron (B)	µg/L	10	50	15	14	1.7	<10
Total Cadmium (Cd)	µg/L	0.1	0.5	6.7	6.1	2.3	<0.10
Total Calcium (Ca)	µg/L	200	1000	120000	110000	2.2	<200
Total Chromium (Cr)	µg/L	5	25	11	12	2.2	<5.0
Total Cobalt (Co)	µg/L	0.5	2.5	420	380	2.5	<0.50
Total Copper (Cu)	µg/L	1	5	120	110	2.2	<1.0
Total Iron (Fe)	µg/L	100	500	2400	2300	1.1	<100
Total Lead (Pb)	µg/L	0.5	2.5	1.6	1.6	0.0	<0.50
Total Lithium (Li)	µg/L	5	25	46	44	1.1	<5.0
Total Magnesium (Mg)	µg/L	50	250	18000	17000	1.4	<50
Total Manganese (Mn)	µg/L	2	10	1100	1100	0.0	<2.0
Total Molybdenum (Mo)	µg/L	0.5	2.5	<0.50	0.55	N/A	<0.50
Total Nickel (Ni)	µg/L	1	5	1600	1500	1.6	<1.0
Total Potassium (K)	µg/L	200	1000	16000	15000	1.6	<200
Total Selenium (Se)	µg/L	2	10	<2.0	<2.0	N/A	<2.0
Total Silicon (Si)	µg/L	50	250	14000	13000	1.9	<50
Total Silver (Ag)	µg/L	0.1	0.5	<0.10	<0.10	N/A	<0.10
Total Sodium (Na)	µg/L	100	500	17000	17000	0.0	210
Total Strontium (Sr)	µg/L	1	5	330	310	1.6	<1.0
Total Tellurium (Te)	µg/L	1	5	<1.0	<1.0	N/A	<1.0
Total Thallium (Tl)	µg/L	0.05	0.25	0.21	0.2	1.2	<0.050
Total Tin (Sn)	µg/L	1	5	<1.0	<1.0	N/A	<1.0
Total Titanium (Ti)	µg/L	5	25	16	19	4.3	<5.0
Total Tungsten (W)	µg/L	1	5	<1.0	<1.0	N/A	<1.0
Total Uranium (U)	µg/L	0.1	0.5	5.4	5.1	1.4	<0.10
Total Vanadium (V)	µg/L	0.5	2.5	0.75	0.82	2.2	<0.50
Total Zinc (Zn)	µg/L	5	25	1100	1000	2.4	<5.0
Total Zirconium (Zr)	µg/L	1	5	<1.0	<1.0	N/A	<1.0
					Batch Average	**1.7**	

Notes:
RPD = abs (X1 - X2)/((X1 + X2)/2) * 100
X1 = Sample Parameter Value
X2 = Duplicate Parameter Value

µg/L - micrograms per Litre
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
RDL - Reporting Detection Limit
N/A - Not Applicable
Bold & Red - RPD >40%

Table 11 - Summary of 2018 QAQC Results - Dissolved Metals

Sample ID	Units	RDL	5x RDL	MW North	Duplicate-2	RPD	Field Blank
Type				Groundwater	Groundwater		DI Water
Date				12-Aug-18	12-Aug-18		12-Aug-18
Time				9:50:00 AM	9:50:00 AM		10:00:00 AM
Dissolved Aluminum (Al)	ug/L	5	25	9400	8900	1.4	<5.0
Dissolved Antimony (Sb)	ug/L	0.5	2.5	<0.50	<0.50	N/A	<0.50
Dissolved Arsenic (As)	ug/L	1	5	<1.0	<1.0	N/A	<1.0
Dissolved Barium (Ba)	ug/L	2	10	20	17	4.1	<2.0
Dissolved Beryllium (Be)	ug/L	0.5	2.5	3.2	2.5	6.1	<0.50
Dissolved Bismuth (Bi)	ug/L	1	5	<1.0	<1.0	N/A	<1.0
Dissolved Boron (B)	ug/L	10	50	20	14	8.8	<10
Dissolved Cadmium (Cd)	ug/L	0.1	0.5	10	7.6	6.8	<0.10
Dissolved Calcium (Ca)	ug/L	200	1000	190000	140000	7.6	<200
Dissolved Chromium (Cr)	ug/L	5	25	<5.0	<5.0	N/A	<5.0
Dissolved Cobalt (Co)	ug/L	0.5	2.5	710	480	9.7	<0.50
Dissolved Copper (Cu)	ug/L	1	5	140	110	6.0	<1.0
Dissolved Iron (Fe)	ug/L	100	500	5000	2800	14.1	<100
Dissolved Lead (Pb)	ug/L	0.5	2.5	1.3	1.7	6.7	<0.50
Dissolved Lithium (Li)	ug/L	5	25	80	53	10.2	<5.0
Dissolved Magnesium (Mg)	ug/L	50	250	28000	21000	7.1	<50
Dissolved Manganese (Mn)	ug/L	2	10	1900	1300	9.4	<2.0
Dissolved Molybdenum (Mo)	ug/L	0.5	2.5	<0.50	<0.50	N/A	<0.50
Dissolved Nickel (Ni)	ug/L	1	5	2600	1900	7.8	<1.0
Dissolved Potassium (K)	ug/L	200	1000	22000	17000	6.4	<200
Dissolved Selenium (Se)	ug/L	2	10	<2.0	<2.0	N/A	<2.0
Dissolved Silicon (Si)	ug/L	50	250	14000	14000	0.0	<50
Dissolved Silver (Ag)	ug/L	0.1	0.5	<0.10	<0.10	N/A	<0.10
Dissolved Sodium (Na)	ug/L	100	500	18000	17000	1.4	200
Dissolved Strontium (Sr)	ug/L	1	5	470	370	6.0	<1.0
Dissolved Tellurium (Te)	ug/L	1	5	<1.0	<1.0	N/A	<1.0
Dissolved Thallium (Tl)	ug/L	0.05	0.25	0.22	0.21	1.2	<0.050
Dissolved Tin (Sn)	ug/L	1	5	<1.0	<1.0	N/A	<1.0
Dissolved Titanium (Ti)	ug/L	5	25	<5.0	<5.0	N/A	<5.0
Dissolved Tungsten (W)	ug/L	1	5	<1.0	<1.0	N/A	<1.0
Dissolved Uranium (U)	ug/L	0.1	0.5	9.2	5.4	13.0	<0.10
Dissolved Vanadium (V)	ug/L	0.5	2.5	<0.50	<0.50	N/A	<0.50
Dissolved Zinc (Zn)	ug/L	5	25	1700	1200	8.6	<5.0
Dissolved Zirconium (Zr)	ug/L	1	5	<1.0	<1.0	N/A	<1.0
					Batch Average	**6.8**	

Notes:
RPD = abs (X1 - X2)/((X1 + X2)/2) * 100
X1 = Sample Parameter Value
X2 = Duplicate Parameter Value

µg/L - micrograms per Litre
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
RDL - Reporting Detection Limit
N/A - Not Applicable
Bold & Red - RPD >40%

Table 12 - Summary of 2018 QAQC Results - Inorganics and Other Parameters

Sample ID	Units	RDL	5x RDL	MW North	Duplicate-2	RPD	Field Blank
Type				Groundwater	Groundwater		Groundwater
Date				12-Aug-18	12-Aug-18		12-Aug-18
Time				9:50:00 AM	9:50:00 AM		10:00:00 AM
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	1	5	<1.0	<1.0	N/A	<1.0
Carb. Alkalinity (calc. as CaCO3)	mg/L	1	5	<1.0	<1.0	N/A	<1.0
Hardness (CaCO3)	mg/L	1	5	590	430	7.8	<1.0
Conductivity	mS/cm	0.001	0.005	1.07	1.01	1.4	0.001
pH	pH	N/A	N/A	4.52	4.46	0.3	5.97
Dissolved Sulphate (SO4)	mg/L	1	5	540	500	1.9	<1.0
Alkalinity (Total as CaCO3)	mg/L	1	5	<1.0	<1.0	N/A	<1.0
Dissolved Chloride (Cl-)	mg/L	1	5	6.6	6.1	2.0	<1.0
Total Dissolved Solids	mg/L	10	50	775	785	0.3	25
Total Suspended Solids	mg/L	10	50	<10	10	N/A	<10
					Batch Average	**2.3**	

Notes:
RPD = abs (X1 - X2)/((X1 + X2)/2) * 100
X1 = Sample Parameter Value
X2 = Duplicate Parameter Value

µg/L - micrograms per Litre
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
RDL - Reporting Detection Limit
N/A - Not Applicable
Bold & Red - RPD >40%

Table 13 Summary of 2018 QAQC Results - PCBs

Sample ID	Units	RDL	5x RDL	MW North	Duplicate-2	RPD	Field Blank
Type				Groundwater	Groundwater		Groundwater
Date				12-Aug-18	12-Aug-18		12-Aug-18
Time				9:50:00 AM	9:50:00 AM		10:00:00 AM
Aroclor 1242	ug/L	0.05	0.25	<0.05	<0.05	N/A	---
Aroclor 1248	ug/L	0.05	0.25	<0.05	<0.05	N/A	---
Aroclor 1254	ug/L	0.05	0.25	<0.05	<0.05	N/A	---
Aroclor 1260	ug/L	0.05	0.25	<0.05	<0.05	N/A	---
Total PCB	ug/L	0.05	0.25	<0.05	<0.05	N/A	---
					Batch Average	**N/A**	

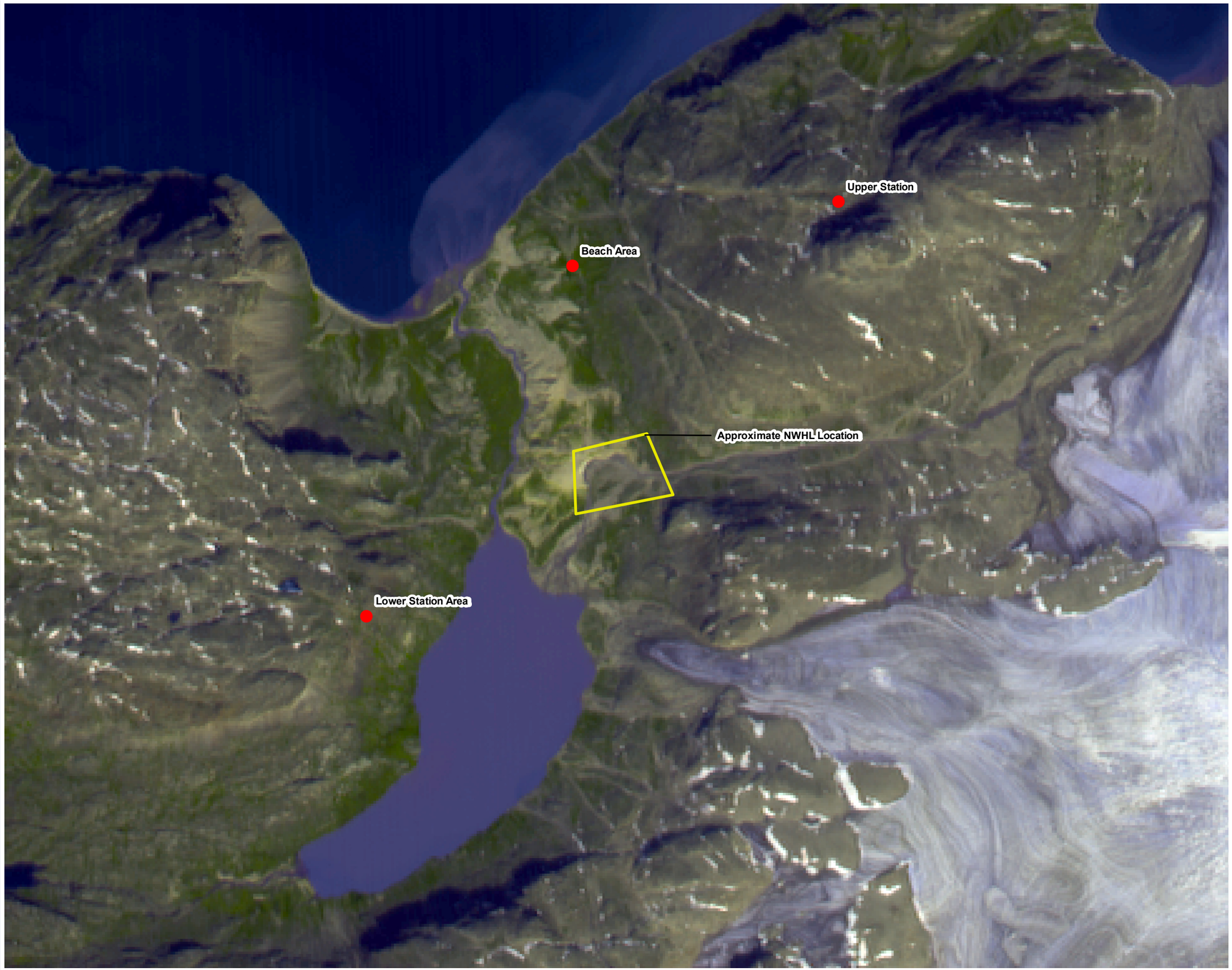
Notes:
RPD = abs (X1 - X2)/((X1 + X2)/2) * 100
X1 = Sample Parameter Value
X2 = Duplicate Parameter Value

µg/L - micrograms per Litre
< - less than analytical detection limit indicated
'---' - sample not analyzed for parameter indicated
RDL - Reporting Detection Limit
N/A - Not Applicable
Bold & Red - RPD >40%

DRAWINGS

Crown-Indigenous Relations and Northern Affairs Canada
Contaminants and Remediation Division

FOX-C Ekalugad Fjord Long Term Monitoring Event
Qikiqtaaluk Region, Nunavut
SLR Project No.: 209.40585.00000



LEGEND

Approximate Site Locations

0 0.25 0.5 1 Kilometers

SCALE: 1:30,000
WHEN PLOTTED CORRECTLY AT 11 x 17
Canada Lambert Conformal Conic

NOTES

This map is for conceptual purposes only and should not be used for navigational purposes.

Basedata:

CROWN INDIGENOUS RELATIONS AND NORTHEN AFFAIRS CANADA (CIRNAC)

FOX-C, EKALUGAD FJORD, NUNAVUT

SITE LOCATION

December, 2018	Rev **0.0**	Drawing No. **1**
Project No. 209.40585.00000		

SLR global environmental solutions

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2018 EXTENT OF FEATURE H

MW-NORTH

FEATURE W 10 m TO THE NORTH

TO BEACH

MW-EAST

SW-EAST

ACCESS ROAD

RIDGE

SLIGHT DEPRESSION APPEARS MECHANICAL (NOT OBSERVED IN 2018)

APPROXIMATE DISPOSAL LOCATION OF ASBESTOS CONTAINING MATERIALS

TO MIDSTATION

MW-NORTHWEST

MW-SOUTHWEST

MW-SOUTH

74m

73m

75m

76m

72m

71m

70m

69m

68m

N

NOTES:
REFERENCED FROM ARCADIS FIGURE *NON-HAZARDOUS WASTE LANDFILL* (OCTOBER 2016).

LEGEND:

- SETTLEMENT OR DEPRESSION
- ELEVATION CONTOUR (1 m INTERVAL)
- EROSION
- POTHOLE
- SLOPE DIRECTION
- FEATURE ID
- MONITORING WELL (ARCADIS, 2016)
- SURFACE WATER SAMPLING
- MONITORING WELL SAMPLED IN 2018
- VIEWPOINT PHOTOGRAPH INCLUDED IN APPENDIX A
- VIEWPOINT PHOTOGRAPH INCLUDED IN ATTACHED USB

0 5 10 20 30 m

SCALE 1:500
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 19 W

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA (CIRNAC)
FOX-C EKALUGAD FJORD
NUNAVUT

FOX-C EKALUGAD FJORD LONG TERM MONITORING EVENT

FOX-C NON-HAZARDOUS WASTE LANDFILL PLAN

Date: December 17, 2018

Project No. 209.40585.00000

Drawing No. 2

SLR global environmental solutions

Cadfile name: S_209-40585-00000-A1.dwg

APPENDIX A
Site Photographs

Crown-Indigenous Relations and Northern Affairs Canada
Contaminants and Remediation Division

FOX-C Ekalugad Fjord Long Term Monitoring Event
Qikiqtaaluk Region, Nunavut
SLR Project No.: 209.40585.00000

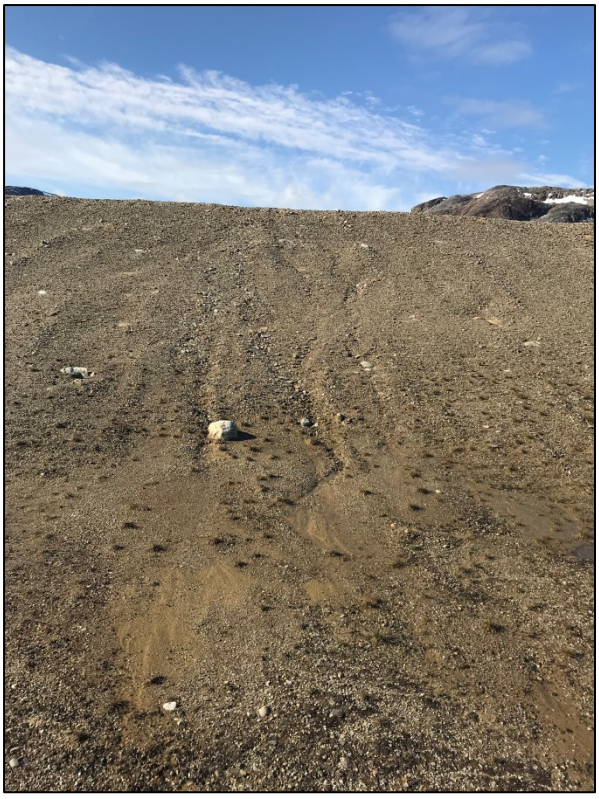
Photograph 1. FOX-C Ekalugad Fjord NHWL, Facing Northeast.

Photograph 2. Historic Feature H – Ponding observed to a lesser extent in 2018. Facing southwest

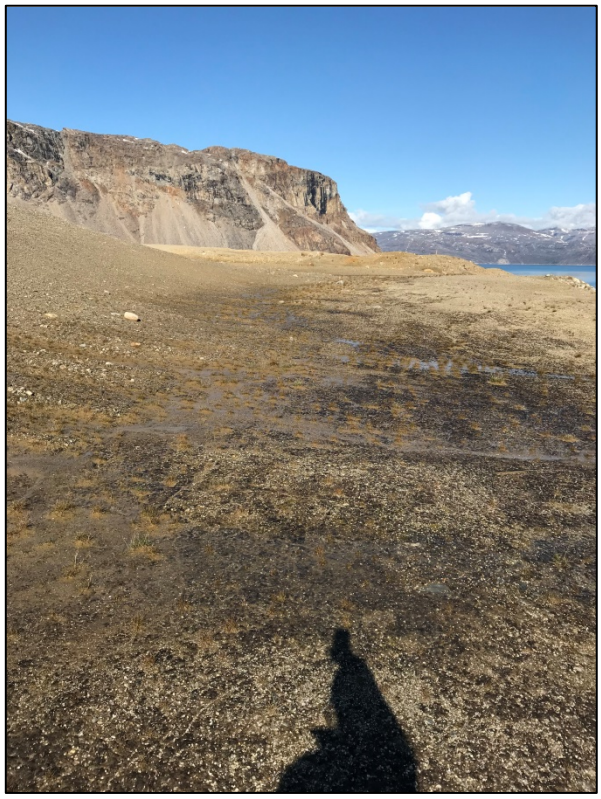
Photograph 3. Sampling at MW-North, Historic Feature H – Ponding observed to a lesser extent in 2018. Facing northwest

Photograph 4. Runnelling along western edge of NHWL, facing southeast. MW-Northwest in view.

Photograph 5. Southern edge of NHWL, facing east. Light runneling along slope.



Photograph 6. Erosion along eastern edge of NHWL. Noted during previous monitoring programs. Similar extent. Facing West.



Photograph 7. Ponded water at base of eastern slope of NHWL. Facing north

Photograph 8. Channelized water flowing from NHWL downslope to the east. MW-East in view. Facing northeast

Photograph 9. MW-East showing signs of jacking. Facing west.

Photograph 10. Location of surface water sampling, east of MW-East. Facing West.

Photograph 11. Top of NHWL, facing west. Cap appears to be very flat with no obvious signs of settlement or depression. No ponded water present.

Photograph 12. New area of ponding observed to the north of the northeast corner of the NHWL. Facing north.

Photograph 13. Sampling at MW-Northwest, facing north.

Photograph 14. Vegetation south of the NHWL including grasses and arctic cotton. Vegetation was not present on the NHWL but began 2 – 10 m from the base of the NHWL slope on all sides.

APPENDIX B
Field Sheets and Notes

Crown-Indigenous Relations and Northern Affairs Canada
Contaminants and Remediation Division

FOX-C Ekalugad Fjord Long Term Monitoring Event
Qikiqtaaluk Region, Nunavut
SLR Project No.: 209.40585.00000

Aug 8 2018 209.40585.00000

Flight Day

Kaitlyn Roberts & Mathew Coady

6:00 - arrive @ airport & go through Checked baggage & security no issues.

8:15 - Called to desk to discuss battery as TDG - might not go Someone is investigating.

8:50 - no issues w/ battery TDG labels ripped off by security ★

12:30 - arrive in Iqaluit

14:30 - Depart for Clyde

16:30 - Arrive in Clyde - Dione picks us up from airport & takes us to Hotel

17:15 - go to northern store

17:30 - meet with Esa briefly - set up 13:00 meeting tomorrow

End of day

KR

Scale: 1 square = _____

Aug 9 2018 209.40585

KR MC, sunny 6°C

8:00 - wake up - Jean's flight may be delayed.

10:00 - discuss possibility of using Esa's truck w/ Dave will use if Esa is willing

13:00 Esa arrives for meeting - he will bring his truck for Cape Christian & figure out rate for truck - we discuss scope & plan for tomorrow

13:40 - Jean arrives! meet w/ her & discuss plan

15:30 - organize bottles & samples for tomorrow

16:30 - Pilot arrives

18:00 - Pilot thinks weather may be okay for tomorrow for flying. - Rainy but winds not bad. Needs to call nav can.

19:30 - weather worse than anticipated - freezing rain to the south according to nav can. will do Cape

Scale: 1 square = _____

Aug 9 2018 209.40585.0000

Christian site tomorrow instead. Esa comes by & we tell him the plan - 8am at hotel w his truck. He doesn't seem to think we need an extra bear monitor but we will assess when we get out there - reports of 3 bears in the area.

End of day

KR

Scale: 1 square = _____

Aug 10 2018 209.40585.0000
Rainy, 3°C, overcast
KR & MC
Cape Christian

7:30 wake up, gather gear
8:15 Esa arrives, need to wait for gas station to open @ 9am so we have H&S meeting
900 - Get gun from Esa's house
9:15 - Get gas & begin heading to site
10:00 arrive @ site - 3 polar bears within 100m of sampling area. Esa scares them off w blanks. Wait a while to ensure they are gone.
10:30 - take water levels from all wells. MW-3 & MW-4 have less than 10 cm of water
11:00 start sampling @ MW-3 low flow, fill all bottles. Did not purge ~ 5cm of water.

Scale: 1 square = _____

Aug 10 2018 209.40585.
KR MC 00000

11:45 - Sample MW-4 ~10cm of water. Did not fill PCB or one amber - well was dry.

12:15 | purge 3 well volumes from MW-1, fill all bottles & Dup-1

14:00 - begin purging MW-2 WL drops extremely fast. After purging 2L, only 20cm of water remains | so we start filling bottles did not fill both PCB bottles - went dry. Waited for recovery but did not recover enough.

15:00 begin packing up

15:30 depart site

17:30 arrive @ hotel done for the day

KR.

Scale: 1 square = _____

Aug 11/2018 209.40585.00000
KR MC

Overcast 6°C

8am - Flying conditions not good, low ceiling + fog potentially moving in Pilot going to make some calls & determine conditions for later in day.

10:30 - Window may open up this afternoon. going to call Esa to get pilot to airport to fuel up.

11:00 - Esa picks up Jason. After refuelling they will pick us up to have a safety briefing @ helicopter in case we need to fly @ moments notice. Pilot says 80% Chance we will not fly today.

14:00 safety meeting @ helicopter - will not fly today, weather looks better tomorrow

KR

Scale: 1 square = _____

Rite in the Rain

August 12/18 209.40585.0000
MC KR
Sunny 6°C - FOX-C
6:30 - weather looks great, pilot gave the go ahead. Start packing gear & call Esa.
7:00 Esa picks up Jason (pilot) from Hotel to go get helicopter ready
7:30 Esa comes back to get us, we load into helicopter. have to leave buckets behind - space restrictions. may not have time for / purging anyways. Jason needs to be back in Clyde River for 1pm to leave for next job & fog may roll in around that time!
8:00 - head to site.
9:15 - Arrive @ FOX-C less than 2 hours on site.
MW North, Northwest

Aug 12/18 209.40585.0000
and east have water. South & Southwest have no water.
9:50 - Sample North first. Fill all bottles plus dup & field blank. purged ~ 3L of water but had to switch to sampling due to limited time & WL dropping.
MC doing landfill inspection as I am filling bottles.
11:00 - Fill Northwest bottles. again, limited time = limited purging. MC filled surface water sample to east of landfill (SW-East) as I filled MW-Northwest. Did not get to fill MW-East.
11:35 - pack up & leave site.
13:00 - arrive @ Clyde River hotel. Pilot leaves & we head back to

Scale: 1 square = _____
Rite in the Rain

Aug 12/18 209.40585.0000
hotel for sample labeling, organization & packing. Hotel lets us pack samples into mini fridge in common room that is currently unused.
*Note - key code for ale wells is 0332. (master lock) keys are with Jean Allen.
15:00 draw up receipt for Esa
- 250 x 3 days (bear monitor)
- 300 for truck on 10th
- 150 for half day truck today (12th)

18:00 - Esa comes by, we pay him in cash, he & Jean sign the receipt

KR

August 13/18 209.40585.0000
overcast 5°C
Flight day
8:00 pack up gear & check out
9:30 arrive @ airport & check gear in. flight is coming from pond inlet & is delayed. flight is supposed to be @ 10:45 but no ETA.
11:20 flight lands, refuels we board.
11:45 - take off - may miss connecting flight to Ottawa
14:15 - they hold flight for us & other connecting travellers. go through security w carry ons & board. told our large tote may not make. Apparently you have to pick up & re-check oversized luggage. we decide we don't have time for that (flight waiting) so we hope for the best.

Scale: 1 square = _____
Rite in the Rain

Aug 13/18 209.40585.00000

14:40 - take off.

17:30 - land in ottawa. find out that 12 v battery was confiscated in iqaluit. for not having TDG labels even though we were told they weren't needed when flying to Clyde River (security ripped all the labels off on Aug 8 when we went north). Rest of luggage made it safe including the tote.

19:00 samples to lab, COCs in cooler, custody seals put on, samples in fridge. equipment dropped at office

Kathy Adams

Fox-C Field Day. Aug 12/13

— 7:00. Esc/Jason to Ap.
— 7:30-8:00 - SLR + INAC to Apt
— 8-9:15/9:30 - Travel to Site

→ Sampling + Inspection →

Report Site ~ 11:30.

M. Cuny Aug 12.

Back to hotel for bottle labelling + sorting gear.

209.40585.00000
Fox-C

LANDFILL INSPECTION. Aug 17, 2018

NORTH SIDE OF LF1

- Slope of LF (NORTH) appears stable, showing minimal signs of erosions/ slumping.

- Some water pooling at toe of LF. at NORTHEAST CORNER, (2x5m) and NORTH SIDE. (5x5m).

- No debris or animal burrows.
- geese tracks observed along South side; pool adjacent to MW-NORTH.
- Substrate is soft.

- low/minimal plant growth

- Some light channeling occurs at NORTH-WEST side; low/no concern
- Storm water carried to west, into grass lined ravine and valley.

209.40585.03000

Aug 12/18

- No obvious signs of veg. stress

WEST SIDE of CP

- Some obvious signs of running and channelization.

- Approximately 20x runnels along the western slope with average depth of runnel (@ bottom) being approx 10cm; though runnels in centre and south-west ~ 20 cm.

- Soil/sediment erosion most pronounced in Centre/Southwest being carried 10 m west before fully settling at veg/grass line.

Southwest corner, moderately irregular ground surface; depressions that likely accumulate with during precip. runoff.

209.40585.00000
Aug 12/18

Water pooling in depressions/pockets ~35m SW of SW corner.

~~SW TIP~~ Key Issue

SOUTH SIDE OF LF

LIGHT RUNNELING ALONG south side; however appears to be associated with equipment tracks.

Veg. growth starts ~ 2 - 10m from toe of slope, found in abundance at toe of second slope (4x5m) & (2x3m)

- TWO large + ~5x small pools of water accumulating. 1m to 8m from toe of slope.

- occasional (ie 1-3 pieces of small woody debris protruding)

LEVEL

264.40585 6000

- Some evidence of erosion at South-East side LF.
- Fig. Pools/sediments getting carried ~20 M south before depositing.

EAST SIDE of LF

- Some faint/shallow running occurring in the southern half (low concern)
- Sparse veg. growth at toe of LF.
- Contour - 1-2x light to mod current (~10 cm) depth at toe.
- WATER SEEPING OUT AT TOE OF LF.; NO staining/sheen. Most pronounced in NORTHERN Half.

→

209.40585.08000

GROUNDWATER that has daylighted in carried (channels) to the east towards MW-EAST.

- pronounced channeling starts at road/pad ~ 7m west of MW-EAST. Two defined channels that join at MW-EAST; Continue for approx 75 m (as evidenced by sediment deposition)

294.40505.00200

TOP OF LF

SURFACE/TOP of LF. looking up very well; very flat, / some depressions in SW corner / associated with equipment tracks.

- NORTHERN — Exceptionally flat,

- Southern, some tapering towards South-East corner.

* Ditcher along side of access road to NORTH-EAST showing moderate wear. — refer to photos.

Groundwater Sampling Record
(Field Parameter Stabilization Method)

SLR

Project Number.: 209.40585.00000 | Date: Aug 12/18 | Vapour Probe & WL Tape (Type/ID): 0.3 ppm background (MiniRae)

Project Name: Fox-C | Weather: Clear 6°C | Parameter Stabilization Probe (Type/ID): 24794 (horiba)

Area: | Field Staff: KR MC | Sampling Equipment ID: 033239 (pump)

BH ID	Monitoring Data: Headspace (ppm/%)	Depth (m): to GW	to 1 m above EOH	to EOH	Purge Water Parameter Stabilization Data: Purge Method	Start Time	Flow Rate	Elapsed Purge Time	Water level (m bTOP)	Cumul. Purge Vol. (L)	T (°C)	pH	Conductivity	Dissolved Oxygen	Turbidity	Sampling Data: Sample ID	Sampling Method	Time	Analysis & Number of Bottles	Comments (odor, colour, sediment, etc., total water volume removed)
MW-NORTH	0.4 (background 0.3)	1.095	1.445 →		Low Flow	9:35	Low Flow ~0.150	0	1.095	—	17.27	5.95	263	7.29	35.1	MW-North	low flow	9:50	MW-North All (10) bottles	Dup #2 (duplicate 2) water volume approx. No purging prior to flow through cell - limited time on site.
								3		0.250	16.87	5.74	264	6.57	20.8					
								6		0.750	16.44	5.56	265	6.30	1.7					
								9		1.250	16.02	5.64	263	6.22	3.7					
								12		1.780	15.38	5.79	174	6.06	4.7					
								15	1.215	2.00	14.98	5.77	180	5.97	4.4					
																Dup #2 Duplicate-2 →			all bottles (10)	Clear, no odor / total V = 5 L
																Field blank →		10:00am	no (8) PCBs	

Note: EOH - end of hole
All depth measurements from top of pipe
Do not monitor EOH if free-product is present in well

Parameter Stabilization Guidelines:

pH: +/- 0.2 units | Redox: +/- 20mV
Temp: +/- 0.1°C | D/O: +/- 0.2mg/L
Conductivity: +/- 5% | Turbidity: +/- 10%

Well volume Calculation:
One standing volume of water in well and annulus = $V_w + V_a$
$V_w = \pi r_i^2 (H) \times 1000$
$V_a = \pi R^2 (H) \times 300 - (\pi r_o^2 (H) \times 300)$
V_w = one well volume (L)
V_a = one standing volume (annulus)(L)

r_i = radius of well inside of pipe (m)
r_o = radius of well outside of pipe (m)
R = radius of the borehole (m)
H = distance from static water level to bottom of well (m)
2" casing has 2.032 L/m; 1" casing has 0.509 L/m
8" sandpack has 9.271 L/m; 6 5/8" sandpack has 6.35 L/m

★ Limited time on site < 2hrs did not fully purge or stabilize

Groundwater Sampling Record
(Field Parameter Stabilization Method)

Project Number.: 209.840585.00000 Date: Aug 12 Vapour Probe & WL Tape (Type/ID): MiniRae:

Project Name: FOX-C Weather: Clear 6°C Parameter Stabilization Probe (Type/ID): Horiba: 24794

Area: Northwest Field Staff: KR MC Sampling Equipment ID: pump: 033239

BH ID	Monitoring Data: Headspace (ppm/%)	Depth (m): to GW	to 1 m above EOH	to EOH	Purge Water Parameter Stabilization Data: Purge Method	Start Time	Flow Rate	Elapsed Purge Time	Water level (m bTOP)	Cumul. Purge Vol. (L)	T (°C)	pH	Conductivity	Dissolved Oxygen	Turbidity	Sampling Data: Sample ID	Sampling Method	Time	Analysis & Number of Bottles	Comments (odor, colour, sediment, etc., total water volume removed)
MW - NORTHWEST	0 ppm (basement)	0.805	1.275		low flow	10:40	low flow ~ 0.150 L/min	0	1.081	—	15.46	5.79	0.129	8.68	388					Clear, no odor
								3	1.114	0.500	15.10	6.18	0.113	7.36	401					Volume removed is approx ~ 6L
								6	1.136	0.950	14.31	6.18	0.105	6.69	391					Limited time on site
								9	1.148	1.350	13.46	6.05	0.091	6.65	374					<40 mins left, 15 mins into stabilization WCH to Sampling
								12	1.160	1.850	12.88	5.93	0.088	6.71	209					
								15	1.167	2.00	12.50	5.86	0.086	6.78	137					
																MW - Northwest	low flow	11:00		

Note: EOH - end of hole
All depth measurements from top of pipe
Do not monitor EOH if free-product is present in well

Parameter Stabilization Guidelines:

pH: +/- 0.2 units
Temp: +/- 0.1°C
Conductivity: +/- 5%
Redox: +/- 20mV
D/O: +/- 0.2mg/L
Turbidity: +/- 10%

Well volume Calculation:
One standing volume of water in well and annulus = $V_w + V_a$
$V_w = \pi r_i^2 (H) \times 1000$
$V_a = \pi R^2 (H) \times 300 - (\pi r_o^2 (H) \times 300)$
V_w = one well volume (L)
V_a = one standing volume (annulus)(L)

r_i = radius of well inside of pipe (m)
r_o = radius of well outside of pipe (m)
R = radius of the borehole (m)
H = distance from static water level to bottom of well (m)
2" casing has 2.032 L/m; 1" casing has 0.509 L/m
8" sandpack has 9.271 L/m; 6 5/8" sandpack has 6.35 L/m

Groundwater Sampling Record
(Field Parameter Stabilization Method)

Project Number.: 209.40585.00000
Date: Aug. 12/18
Vapour Probe & WL Tape (Type/ID): Mini Rae :

Project Name: FOX-C
Weather: Clear 6°C
Parameter Stabilization Probe (Type/ID): Heriba : # 249794

Area: East Landfill
Field Staff: KR MC
Sampling Equipment ID: pump : 033239

BH ID	Monitoring Data: Headspace (ppm/%)	Depth (m): to GW	Depth (m): to 1 m above EOH	Depth (m): to EOH	Purge Water Parameter Stabilization Data: Purge Method	Start Time	Flow Rate	Elapsed Purge Time	Water level (m bTOP)	Cumul. Purge Vol. (L)	T (°C)	pH	Conductivity	Dissolved Oxygen	Turbidity	Sampling Data: Sample ID	Sampling Method	Time	Analysis & Number of Bottles	Comments (odor, colour, sediment, etc., total water volume removed)
MW-FAST	4 ppm (background 3 ppm)	1.385	1.790																	feels like there is a bit of sediment on the bottom did not sample - no time

Note: EOH - end of hole
All depth measurements from top of pipe
Do not monitor EOH if free-product is present in well

Parameter Stabilization Guidelines:

pH: +/- 0.2 units
Temp: +/- 0.1°C
Conductivity: +/- 5%
Redox: +/- 20mV
D/O: +/- 0.2mg/L
Turbidity: +/- 10%

Well volume Calculation:
One standing volume of water in well and annulus = $V_w + V_a$
$V_w = \pi r_i^2 (H) \times 1000$
$V_a = \pi R^2 (H) \times 300 - (\pi r_o^2 (H) \times 300)$
V_w = one well volume (L)
V_a = one standing volume (annulus)(L)

r_i = radius of well inside of pipe (m)
r_o = radius of well outside of pipe (m)
R = radius of the borehole (m)
H = distance from static water level to bottom of well (m)
2" casing has 2.032 L/m; 1" casing has 0.509 L/m
8" sandpack has 9.271 L/m; 6 5/8" sandpack has 6.35 L/m

Groundwater Sampling Record
(Field Parameter Stabilization Method)

Project Number.: 269.40585.00000 Date: Aug 12/2018 Vapour Probe & WL Tape (Type/ID): MiniRae

Project Name: FOX-C Weather: Clear 6°C Parameter Stabilization Probe (Type/ID): Horiba: 24796

Area: South LANDFILL Field Staff: MC KR Sampling Equipment ID: Pump: 033239

BH ID	Monitoring Data: Headspace (ppm/%)	Depth (m): to GW	to 1 m above EOH	to EOH	Purge Water Parameter Stabilization Data: Purge Method	Start Time	Flow Rate	Elapsed Purge Time	Water level (m bTOP)	Cumul. Purge Vol. (L)	T (°C)	pH	Conductivity	Dissolved Oxygen	Turbidity	Sampling Data: Sample ID	Sampling Method	Time	Analysis & Number of Bottles	Comments (odor, colour, sediment, etc., total water volume removed)
MW-SOUTH	4 ppm (bore sound 3 ppm)	nowater	1.325																	when dipping the well, it sounded like we were hitting ice did not Smple

Note: EOH - end of hole
All depth measurements from top of pipe
Do not monitor EOH if free-product is present in well

Parameter Stabilization Guidelines:

pH: +/- 0.2 units Redox: +/- 20mV
Temp: +/- 0.1°C D/O: +/- 0.2mg/L
Conductivity: +/- 5% Turbidity: +/- 10%

Well volume Calculation:
One standing volume of water in well and annulus = $V_w + V_a$
$V_w = \pi r_i^2 (H) \times 1000$
$V_a = \pi R^2 (H) \times 300 - (\pi r_o^2 (H) \times 300)$
V_w = one well volume (L)
V_a = one standing volume (annulus)(L)

r_i = radius of well inside of pipe (m)
r_o = radius of well outside of pipe (m)
R = radius of the borehole (m)
H = distance from static water level to bottom of well (m)
2" casing has 2.032 L/m; 1" casing has 0.509 L/m
8" sandpack has 9.271 L/m; 6 5/8" sandpack has 6.35 L/m

Groundwater Sampling Record
(Field Parameter Stabilization Method)

Project Number.: 209.40585.00000 Date: Aug 12 Vapour Probe & WL Tape (Type/ID): Mini Rae:

Project Name: FOX-C Weather: Clear 6°C Parameter Stabilization Probe (Type/ID): Horiba: 24794

Area: southwest Field Staff: KR MC Sampling Equipment ID: Low Flow pump : 033239

BH ID	Monitoring Data: Headspace (ppm/%)	Depth (m): to GW	Depth (m): to I m above EOH	Depth (m): to EOH	Purge Water Parameter Stabilization Data: Purge Method	Start Time	Flow Rate	Elapsed Purge Time	Water level (m bTOP)	Cumul. Purge Vol. (L)	T (°C)	pH	Conductivity	Dissolved Oxygen	Turbidity	Sampling Data: Sample ID	Sampling Method	Time	Analysis & Number of Bottles	Comments (odor, colour, sediment, etc., total water volume removed)
MW-South WEST	0 ppm (3 ppm background)	1.255	1.260																	did not sample ~5cm of water ran out of time

Note: EOH - end of hole
All depth measurements from top of pipe
Do not monitor EOH if free-product is present in well

Parameter Stabilization Guidelines:

pH: +/- 0.2 units Redox: +/- 20mV
Temp: +/- 0.1°C D/O: +/- 0.2mg/L
Conductivity: +/- 5% Turbidity: +/- 10%

Well volume Calculation:
One standing volume of water in well and annulus = $V_w + V_a$
$V_w = \pi r_i^2 (H) \times 1000$
$V_a = \pi R^2 (H) \times 300 - (\pi r_o^2 (H) \times 300)$
V_w = one well volume (L)
V_a = one standing volume (annulus)(L)

r_i = radius of well inside of pipe (m)
r_o = radius of well outside of pipe (m)
R = radius of the borehole (m)
H = distance from static water level to bottom of well (m)
2" casing has 2.032 L/m; 1" casing has 0.509 L/m
8" sandpack has 9.271 L/m; 6 5/8" sandpack has 6.35 L/m

Surface Water Sample

SW [A5] @ 11:15

T	pH	Conductivity	turb.	DO
8.13	3.70	0.288	0	7.80

Comments:

Took water bottle (accidentally dissolved, and vice versa)

Very low flow
tested pH in ponded water → 3.25 to confirm low pH above.

APPENDIX C
Laboratory Certificates of Analysis

Crown-Indigenous Relations and Northern Affairs Canada
Contaminants and Remediation Division

FOX-C Ekalugad Fjord Long Term Monitoring Event
Qikiqtaaluk Region, Nunavut
SLR Project No.: 209.40585.00000

Maxxam
A Bureau Veritas Group Company

Your P.O. #: MAR2516
Your Project #: 209.40585.00000
Site#: FOX-C Ekalugad Fjord
Site Location: FOX-C Ekalugad Fjord
Your C.O.C. #: 677100-01-01

Attention: Kaitlyn Roberts

SLR Consulting (Canada) Ltd.
Ottawa
43 Auriga Drive, Suite 203
Nepean, ON
CANADA K2E 7Y8

Report Date: 2018/10/01
Report #: R5422884
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8K8119
Received: 2018/08/14, 09:50

Sample Matrix: Water
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity (1)	10	N/A	2018/08/17	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide (1)	10	N/A	2018/08/20	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry (1)	10	N/A	2018/08/17	CAM SOP-00463	EPA 325.2 m
Conductivity (1)	10	N/A	2018/08/17	CAM SOP-00414	SM 23 2510 m
Petroleum Hydro. CCME F1 & BTEX in Water (1)	10	N/A	2018/08/16	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	10	2018/08/16	2018/08/17	CAM SOP-00316	CCME PHC-CWS m
Hardness (calculated as CaCO3) (1)	8	N/A	2018/08/17	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3) (1)	2	N/A	2018/08/20	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS (1)	7	N/A	2018/08/17	CAM SOP-00447	EPA 6020B m
Dissolved Metals by ICPMS (1)	1	N/A	2018/08/20	CAM SOP-00447	EPA 6020B m
Dissolved Metals by ICPMS (1)	2	N/A	2018/08/21	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS (1)	8	N/A	2018/08/16	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS (1)	2	N/A	2018/08/21	CAM SOP-00447	EPA 6020B m
Polychlorinated Biphenyl in Water (1)	4	2018/08/17	2018/08/17	CAM SOP-00309	EPA 8082A m
Polychlorinated Biphenyl in Water (1)	3	2018/08/17	2018/08/18	CAM SOP-00309	EPA 8082A m
Polychlorinated Biphenyl in Water (1)	1	2018/08/17	2018/08/20	CAM SOP-00309	EPA 8082A m
pH (1)	10	N/A	2018/08/17	CAM SOP-00413	SM 4500H+ B m
Sulphate by Automated Colourimetry (1)	10	N/A	2018/08/17	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (1)	10	2018/08/18	2018/08/18	CAM SOP-00428	SM 23 2540C m
Total Suspended Solids (1)	10	2018/08/16	2018/08/16	CAM SOP-00428	SM 23 2540D m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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

Maxxam
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Your P.O. #: MAR2516
Your Project #: 209.40585.00000
Site#: FOX-C Ekalugad Fjord
Site Location: FOX-C Ekalugad Fjord
Your C.O.C. #: 677100-01-01

Attention: Kaitlyn Roberts

SLR Consulting (Canada) Ltd.
Ottawa
43 Auriga Drive, Suite 203
Nepean, ON
CANADA K2E 7Y8

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CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8K8119
Received: 2018/08/14, 09:50

accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing. Maxxam 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 Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Analytics Mississauga
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam 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.

Encryption Key

Antonella Brasil
Senior Project Manager
01 Oct 2018 17:09:08

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B8K8119
Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

RESULTS OF ANALYSES OF WATER

Maxxam ID		HMB935	HMB936	HMB937	HMB938	HMB939		
Sampling Date		2018/08/12 09:50	2018/08/12 11:00	2018/08/12 09:50	2018/08/12 11:15	2018/08/12 10:00		
COC Number		677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01		
	UNITS	MW NORTH	MW NORTHWEST	DUPLICATE-2	SW EAST	FIELD BLANK	QC Batch	RDL
Calculated Parameters								
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	17	<1.0	<1.0	<1.0	5684770	1.0
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	5684770	1.0
Hardness (CaCO3)	mg/L	590	21	430	99	<1.0	5680667	1.0
Inorganics								
Conductivity	mS/cm	1.07	0.098	1.01	0.319	0.001	5683075	0.001
Total Dissolved Solids	mg/L	775	75	785	205	25	5687460	10
pH	pH	4.52	6.94	4.46	4.69	5.97	5683076	N/A
Total Suspended Solids	mg/L	<10	34	10	12	<10	5683093	10
Dissolved Sulphate (SO4)	mg/L	540	19	500	130	<1.0	5682189	1.0
Alkalinity (Total as CaCO3)	mg/L	<1.0	17	<1.0	<1.0	<1.0	5683073	1.0
Dissolved Chloride (Cl-)	mg/L	6.6	2.4	6.1	5.4	<1.0	5682184	1.0

QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		HMB940	HMB941	HMB942	HMB943	HMB943	HMB944		
Sampling Date		2018/08/10 13:00	2018/08/10 14:30	2018/08/10 11:00	2018/08/10 11:45	2018/08/10 11:45	2018/08/10 13:00		
COC Number		677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01		
	UNITS	MW-1	MW-2	MW-3	MW-4	MW-4 Lab-Dup	DUPLICATE	QC Batch	RDL
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	230	95	25	57	N/A	220	5684770	1.0
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.7	<1.0	<1.0	<1.0	N/A	2.8	5684770	1.0
Hardness (CaCO3)	mg/L	200	100	33	76	N/A	200	5680667	1.0
Inorganics									
Conductivity	mS/cm	0.719	0.517	0.146	0.297	N/A	0.718	5683075	0.001
Total Dissolved Solids	mg/L	380	295	65	175	175	375	5687460	10
pH	pH	8.11	7.36	7.37	7.70	N/A	8.12	5683076	N/A
Total Suspended Solids	mg/L	21	210	<10	<10	N/A	10	5683093	10
Dissolved Sulphate (SO4)	mg/L	37	30	10	28	N/A	37	5682189	1.0
Alkalinity (Total as CaCO3)	mg/L	230	95	25	57	N/A	230	5683073	1.0
Dissolved Chloride (Cl-)	mg/L	73	81	16	34	N/A	73	5682184	1.0

QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B8K8119
Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

RESULTS OF ANALYSES OF WATER

Maxxam ID		HMB944		
Sampling Date		2018/08/10 13:00		
COC Number		677100-01-01		
	UNITS	**DUPLICATE Lab-Dup**	**QC Batch**	**RDL**
Inorganics				
Conductivity	mS/cm	0.722	5683075	0.001
pH	pH	8.11	5683076	N/A
Alkalinity (Total as CaCO3)	mg/L	230	5683073	1.0

QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B8K8119
Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		HMB935		HMB936		HMB937		HMB938		
Sampling Date		2018/08/12 09:50		2018/08/12 11:00		2018/08/12 09:50		2018/08/12 11:15		
COC Number		677100-01-01		677100-01-01		677100-01-01		677100-01-01		
	UNITS	MW NORTH	QC Batch	MW NORTHWEST	QC Batch	DUPLICATE-2	QC Batch	SW EAST	QC Batch	RDL
Metals										
Total Aluminum (Al)	ug/L	12000	5690128	83	5683846	11000	5690128	1700	5683846	5.0
Total Antimony (Sb)	ug/L	<0.50	5690128	<0.50	5683846	<0.50	5690128	<0.50	5683846	0.50
Total Arsenic (As)	ug/L	<1.0	5690128	<1.0	5683846	<1.0	5690128	<1.0	5683846	1.0
Total Barium (Ba)	ug/L	16	5690128	5.6	5683846	15	5690128	8.8	5683846	2.0
Total Beryllium (Be)	ug/L	3.0	5690128	<0.50	5683846	2.7	5690128	0.90	5683846	0.50
Total Bismuth (Bi)	ug/L	<1.0	5690128	<1.0	5683846	<1.0	5690128	<1.0	5683846	1.0
Total Boron (B)	ug/L	15	5690128	<10	5683846	14	5690128	43	5683846	10
Total Cadmium (Cd)	ug/L	6.7	5690128	<0.10	5683846	6.1	5690128	0.48	5683846	0.10
Total Calcium (Ca)	ug/L	120000	5690128	3300	5683846	110000	5690128	27000	5683846	200
Total Chromium (Cr)	ug/L	11	5690128	<5.0	5683846	12	5690128	<5.0	5683846	5.0
Total Cobalt (Co)	ug/L	420	5690128	6.1	5683846	380	5690128	49	5683846	0.50
Total Copper (Cu)	ug/L	120	5690128	2.2	5683846	110	5690128	41	5683846	1.0
Total Iron (Fe)	ug/L	2400	5690128	<100	5683846	2300	5690128	<100	5683846	100
Total Lead (Pb)	ug/L	1.6	5690128	<0.50	5683846	1.6	5690128	<0.50	5683846	0.50
Total Lithium (Li)	ug/L	46	5690128	<5.0	5683846	44	5690128	7.9	5683846	5.0
Total Magnesium (Mg)	ug/L	18000	5690128	1500	5683846	17000	5690128	7500	5683846	50
Total Manganese (Mn)	ug/L	1100	5690128	25	5683846	1100	5690128	610	5683846	2.0
Total Molybdenum (Mo)	ug/L	<0.50	5690128	<0.50	5683846	0.55	5690128	<0.50	5683846	0.50
Total Nickel (Ni)	ug/L	1600	5690128	23	5683846	1500	5690128	160	5683846	1.0
Total Potassium (K)	ug/L	16000	5690128	1300	5683846	15000	5690128	4800	5683846	200
Total Selenium (Se)	ug/L	<2.0	5690128	<2.0	5683846	<2.0	5690128	<2.0	5683846	2.0
Total Silicon (Si)	ug/L	14000	5690128	3000	5683846	13000	5690128	9200	5683846	50
Total Silver (Ag)	ug/L	<0.10	5690128	<0.10	5683846	<0.10	5690128	<0.10	5683846	0.10
Total Sodium (Na)	ug/L	17000	5690128	17000	5683846	17000	5690128	11000	5683846	100
Total Strontium (Sr)	ug/L	330	5690128	20	5683846	310	5690128	64	5683846	1.0
Total Tellurium (Te)	ug/L	<1.0	5690128	<1.0	5683846	<1.0	5690128	<1.0	5683846	1.0
Total Thallium (Tl)	ug/L	0.21	5690128	<0.050	5683846	0.20	5690128	0.061	5683846	0.050
Total Tin (Sn)	ug/L	<1.0	5690128	<1.0	5683846	<1.0	5690128	<1.0	5683846	1.0
Total Titanium (Ti)	ug/L	16	5690128	<5.0	5683846	19	5690128	5.9	5683846	5.0
Total Tungsten (W)	ug/L	<1.0	5690128	<1.0	5683846	<1.0	5690128	<1.0	5683846	1.0
Total Uranium (U)	ug/L	5.4	5690128	0.15	5683846	5.1	5690128	0.69	5683846	0.10
Total Vanadium (V)	ug/L	0.75	5690128	<0.50	5683846	0.82	5690128	<0.50	5683846	0.50
Total Zinc (Zn)	ug/L	1100	5690128	20	5683846	1000	5690128	65	5683846	5.0
Total Zirconium (Zr)	ug/L	<1.0	5690128	<1.0	5683846	<1.0	5690128	<1.0	5683846	1.0

QC Batch = Quality Control Batch

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Maxxam Job #: B8K8119
Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		HMB939	HMB940	HMB941	HMB941	HMB942	HMB943		
Sampling Date		2018/08/12 10:00	2018/08/10 13:00	2018/08/10 14:30	2018/08/10 14:30	2018/08/10 11:00	2018/08/10 11:45		
COC Number		677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01		
	UNITS	FIELD BLANK	MW-1	MW-2	MW-2 Lab-Dup	MW-3	MW-4	QC Batch	RDL
Metals									
Total Aluminum (Al)	ug/L	<5.0	4600	5300	4800	400	540	5683846	5.0
Total Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.61	5683846	0.50
Total Arsenic (As)	ug/L	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	5683846	1.0
Total Barium (Ba)	ug/L	<2.0	36	45	42	7.3	11	5683846	2.0
Total Beryllium (Be)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5683846	0.50
Total Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5683846	1.0
Total Boron (B)	ug/L	<10	52	18	17	13	78	5683846	10
Total Cadmium (Cd)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	5683846	0.10
Total Calcium (Ca)	ug/L	<200	40000	23000	22000	6800	17000	5683846	200
Total Chromium (Cr)	ug/L	<5.0	<5.0	7.6	7.3	17	18	5683846	5.0
Total Cobalt (Co)	ug/L	<0.50	1.0	8.7	8.4	<0.50	<0.50	5683846	0.50
Total Copper (Cu)	ug/L	<1.0	5.3	12	11	7.0	4.8	5683846	1.0
Total Iron (Fe)	ug/L	<100	5100	9300	9000	390	590	5683846	100
Total Lead (Pb)	ug/L	<0.50	2.4	2.2	2.1	0.58	1.1	5683846	0.50
Total Lithium (Li)	ug/L	<5.0	16	8.4	7.8	<5.0	<5.0	5683846	5.0
Total Magnesium (Mg)	ug/L	<50	28000	13000	13000	3000	6500	5683846	50
Total Manganese (Mn)	ug/L	<2.0	110	1000	1000	10	12	5683846	2.0
Total Molybdenum (Mo)	ug/L	<0.50	4.1	1.8	1.6	0.66	2.4	5683846	0.50
Total Nickel (Ni)	ug/L	<1.0	5.6	12	11	12	16	5683846	1.0
Total Potassium (K)	ug/L	<200	8300	6100	5900	1600	3100	5683846	200
Total Selenium (Se)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5683846	2.0
Total Silicon (Si)	ug/L	<50	16000	15000	14000	2700	3600	5683846	50
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	5683846	0.10
Total Sodium (Na)	ug/L	210	80000	50000	49000	13000	29000	5683846	100
Total Strontium (Sr)	ug/L	<1.0	170	120	110	33	69	5683846	1.0
Total Tellurium (Te)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5683846	1.0
Total Thallium (Tl)	ug/L	<0.050	0.062	0.12	0.083	<0.050	<0.050	5683846	0.050
Total Tin (Sn)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5683846	1.0
Total Titanium (Ti)	ug/L	<5.0	180	450	440	29	26	5683846	5.0
Total Tungsten (W)	ug/L	<1.0	1.8	<1.0	<1.0	<1.0	<1.0	5683846	1.0
Total Uranium (U)	ug/L	<0.10	5.2	0.30	0.29	0.24	1.4	5683846	0.10
Total Vanadium (V)	ug/L	<0.50	3.8	9.0	9.3	0.62	0.93	5683846	0.50
Total Zinc (Zn)	ug/L	<5.0	13	31	29	<5.0	5.2	5683846	5.0

QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		HMB939	HMB940	HMB941	HMB941	HMB942	HMB943		
Sampling Date		2018/08/12 10:00	2018/08/10 13:00	2018/08/10 14:30	2018/08/10 14:30	2018/08/10 11:00	2018/08/10 11:45		
COC Number		677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01		
	UNITS	**FIELD BLANK**	**MW-1**	**MW-2**	**MW-2 Lab-Dup**	**MW-3**	**MW-4**	**QC Batch**	**RDL**
Total Zirconium (Zr)	ug/L	<1.0	3.6	2.8	2.3	<1.0	<1.0	5683846	1.0

QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Report Date: 2018/10/01

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Sampler Initials: KR

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		HMB944		
Sampling Date		2018/08/10 13:00		
COC Number		677100-01-01		
	UNITS	DUPLICATE	QC Batch	RDL
Metals				
Total Aluminum (Al)	ug/L	5200	5683846	5.0
Total Antimony (Sb)	ug/L	<0.50	5683846	0.50
Total Arsenic (As)	ug/L	1.0	5683846	1.0
Total Barium (Ba)	ug/L	39	5683846	2.0
Total Beryllium (Be)	ug/L	<0.50	5683846	0.50
Total Bismuth (Bi)	ug/L	<1.0	5683846	1.0
Total Boron (B)	ug/L	51	5683846	10
Total Cadmium (Cd)	ug/L	<0.10	5683846	0.10
Total Calcium (Ca)	ug/L	40000	5683846	200
Total Chromium (Cr)	ug/L	<5.0	5683846	5.0
Total Cobalt (Co)	ug/L	1.0	5683846	0.50
Total Copper (Cu)	ug/L	6.4	5683846	1.0
Total Iron (Fe)	ug/L	4800	5683846	100
Total Lead (Pb)	ug/L	2.2	5683846	0.50
Total Lithium (Li)	ug/L	16	5683846	5.0
Total Magnesium (Mg)	ug/L	28000	5683846	50
Total Manganese (Mn)	ug/L	96	5683846	2.0
Total Molybdenum (Mo)	ug/L	3.8	5683846	0.50
Total Nickel (Ni)	ug/L	4.6	5683846	1.0
Total Potassium (K)	ug/L	8400	5683846	200
Total Selenium (Se)	ug/L	<2.0	5683846	2.0
Total Silicon (Si)	ug/L	19000	5683846	50
Total Silver (Ag)	ug/L	<0.10	5683846	0.10
Total Sodium (Na)	ug/L	78000	5683846	100
Total Strontium (Sr)	ug/L	170	5683846	1.0
Total Tellurium (Te)	ug/L	<1.0	5683846	1.0
Total Thallium (Tl)	ug/L	0.052	5683846	0.050
Total Tin (Sn)	ug/L	<1.0	5683846	1.0
Total Titanium (Ti)	ug/L	190	5683846	5.0
Total Tungsten (W)	ug/L	1.8	5683846	1.0
Total Uranium (U)	ug/L	5.0	5683846	0.10
Total Vanadium (V)	ug/L	3.7	5683846	0.50
Total Zinc (Zn)	ug/L	12	5683846	5.0
Total Zirconium (Zr)	ug/L	4.0	5683846	1.0
QC Batch = Quality Control Batch				

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Maxxam Job #: B8K8119
Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

O.REG 153 DISSOLVED ICPMS METALS (WATER)

Maxxam ID		HMB935		HMB936		HMB937		
Sampling Date		2018/08/12 09:50		2018/08/12 11:00		2018/08/12 09:50		
COC Number		677100-01-01		677100-01-01		677100-01-01		
	UNITS	MW NORTH	QC Batch	MW NORTHWEST	QC Batch	DUPLICATE-2	QC Batch	RDL
Metals								
Dissolved Aluminum (Al)	ug/L	9400	5690047	N/A	5690047	8900	5690047	5.0
Dissolved Antimony (Sb)	ug/L	<0.50	5690047	<0.50	5683052	<0.50	5690047	0.50
Dissolved Arsenic (As)	ug/L	<1.0	5690047	<1.0	5683052	<1.0	5690047	1.0
Dissolved Barium (Ba)	ug/L	20	5690047	13	5683052	17	5690047	2.0
Dissolved Beryllium (Be)	ug/L	3.2	5690047	<0.50	5683052	2.5	5690047	0.50
Dissolved Bismuth (Bi)	ug/L	<1.0	5690047	N/A	N/A	<1.0	5690047	1.0
Dissolved Boron (B)	ug/L	20	5690047	<10	5683052	14	5690047	10
Dissolved Cadmium (Cd)	ug/L	10	5690047	<0.10	5683052	7.6	5690047	0.10
Dissolved Calcium (Ca)	ug/L	190000	5690047	4900	5683052	140000	5690047	200
Dissolved Chromium (Cr)	ug/L	<5.0	5690047	<5.0	5683052	<5.0	5690047	5.0
Dissolved Cobalt (Co)	ug/L	710	5690047	10	5683052	480	5690047	0.50
Dissolved Copper (Cu)	ug/L	140	5690047	2.2	5683052	110	5690047	1.0
Dissolved Iron (Fe)	ug/L	5000	5690047	N/A	N/A	2800	5690047	100
Dissolved Lead (Pb)	ug/L	1.3	5690047	1.6	5683052	1.7	5690047	0.50
Dissolved Lithium (Li)	ug/L	80	5690047	N/A	N/A	53	5690047	5.0
Dissolved Magnesium (Mg)	ug/L	28000	5690047	2100	5683052	21000	5690047	50
Dissolved Manganese (Mn)	ug/L	1900	5690047	N/A	N/A	1300	5690047	2.0
Dissolved Molybdenum (Mo)	ug/L	<0.50	5690047	<0.50	5683052	<0.50	5690047	0.50
Dissolved Nickel (Ni)	ug/L	2600	5690047	35	5683052	1900	5690047	1.0
Dissolved Potassium (K)	ug/L	22000	5690047	1400	5683052	17000	5690047	200
Dissolved Selenium (Se)	ug/L	<2.0	5690047	<2.0	5683052	<2.0	5690047	2.0
Dissolved Silicon (Si)	ug/L	14000	5690047	N/A	N/A	14000	5690047	50
Dissolved Silver (Ag)	ug/L	<0.10	5690047	<0.10	5683052	<0.10	5690047	0.10
Dissolved Sodium (Na)	ug/L	18000	5690047	12000	5683052	17000	5690047	100
Dissolved Strontium (Sr)	ug/L	470	5690047	25	5683052	370	5690047	1.0
Dissolved Tellurium (Te)	ug/L	<1.0	5690047	N/A	N/A	<1.0	5690047	1.0
Dissolved Thallium (Tl)	ug/L	0.22	5690047	<0.050	5683052	0.21	5690047	0.050
Dissolved Tin (Sn)	ug/L	<1.0	5690047	N/A	N/A	<1.0	5690047	1.0
Dissolved Titanium (Ti)	ug/L	<5.0	5690047	N/A	N/A	<5.0	5690047	5.0
Dissolved Tungsten (W)	ug/L	<1.0	5690047	N/A	N/A	<1.0	5690047	1.0
Dissolved Uranium (U)	ug/L	9.2	5690047	0.65	5683052	5.4	5690047	0.10
Dissolved Vanadium (V)	ug/L	<0.50	5690047	<0.50	5683052	<0.50	5690047	0.50
Dissolved Zinc (Zn)	ug/L	1700	5690047	22	5683052	1200	5690047	5.0

QC Batch = Quality Control Batch
N/A = Not Applicable

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SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

O.REG 153 DISSOLVED ICPMS METALS (WATER)

Maxxam ID		HMB935		HMB936		HMB937		
Sampling Date		2018/08/12 09:50		2018/08/12 11:00		2018/08/12 09:50		
COC Number		677100-01-01		677100-01-01		677100-01-01		
	UNITS	MW NORTH	QC Batch	MW NORTHWEST	QC Batch	DUPLICATE-2	QC Batch	RDL
Dissolved Zirconium (Zr)	ug/L	<1.0	5690047	N/A	N/A	<1.0	5690047	1.0

QC Batch = Quality Control Batch
N/A = Not Applicable

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Report Date: 2018/10/01

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Sampler Initials: KR

O.REG 153 DISSOLVED ICPMS METALS (WATER)

Maxxam ID		HMB938		HMB939	HMB940	HMB941	HMB942		
Sampling Date		2018/08/12 11:15		2018/08/12 10:00	2018/08/10 13:00	2018/08/10 14:30	2018/08/10 11:00		
COC Number		677100-01-01		677100-01-01	677100-01-01	677100-01-01	677100-01-01		
	UNITS	SW EAST	QC Batch	FIELD BLANK	MW-1	MW-2	MW-3	QC Batch	RDL
Metals									
Dissolved Aluminum (Al)	ug/L	1700	5686273	<5.0	11	110	34	5683052	5.0
Dissolved Antimony (Sb)	ug/L	<0.50	5686273	<0.50	<0.50	<0.50	<0.50	5683052	0.50
Dissolved Arsenic (As)	ug/L	<1.0	5686273	<1.0	<1.0	<1.0	<1.0	5683052	1.0
Dissolved Barium (Ba)	ug/L	10	5686273	<2.0	9.6	11	5.0	5683052	2.0
Dissolved Beryllium (Be)	ug/L	0.90	5686273	<0.50	<0.50	<0.50	<0.50	5683052	0.50
Dissolved Bismuth (Bi)	ug/L	<1.0	5686273	<1.0	<1.0	<1.0	<1.0	5683052	1.0
Dissolved Boron (B)	ug/L	38	5686273	<10	39	12	11	5683052	10
Dissolved Cadmium (Cd)	ug/L	0.51	5686273	<0.10	<0.10	<0.10	<0.10	5683052	0.10
Dissolved Calcium (Ca)	ug/L	27000	5686273	<200	38000	22000	8100	5683052	200
Dissolved Chromium (Cr)	ug/L	<5.0	5686273	<5.0	<5.0	<5.0	<5.0	5683052	5.0
Dissolved Cobalt (Co)	ug/L	49	5686273	<0.50	<0.50	5.8	<0.50	5683052	0.50
Dissolved Copper (Cu)	ug/L	43	5686273	<1.0	2.5	6.7	5.5	5683052	1.0
Dissolved Iron (Fe)	ug/L	<100	5686273	<100	<100	2600	<100	5683052	100
Dissolved Lead (Pb)	ug/L	<0.50	5686273	<0.50	<0.50	<0.50	<0.50	5683052	0.50
Dissolved Lithium (Li)	ug/L	8.0	5686273	<5.0	15	<5.0	<5.0	5683052	5.0
Dissolved Magnesium (Mg)	ug/L	7600	5686273	<50	25000	12000	3100	5683052	50
Dissolved Manganese (Mn)	ug/L	620	5686273	<2.0	43	890	<2.0	5683052	2.0
Dissolved Molybdenum (Mo)	ug/L	<0.50	5686273	<0.50	3.4	1.5	<0.50	5683052	0.50
Dissolved Nickel (Ni)	ug/L	160	5686273	<1.0	1.5	6.9	<1.0	5683052	1.0
Dissolved Potassium (K)	ug/L	4900	5686273	<200	6700	4000	1500	5683052	200
Dissolved Selenium (Se)	ug/L	<2.0	5686273	<2.0	<2.0	<2.0	<2.0	5683052	2.0
Dissolved Silicon (Si)	ug/L	9100	5686273	<50	3200	4800	2100	5683052	50
Dissolved Silver (Ag)	ug/L	<0.10	5686273	<0.10	<0.10	<0.10	<0.10	5683052	0.10
Dissolved Sodium (Na)	ug/L	11000	5686273	200	75000	47000	14000	5683052	100
Dissolved Strontium (Sr)	ug/L	61	5686273	<1.0	150	110	36	5683052	1.0
Dissolved Tellurium (Te)	ug/L	<1.0	5686273	<1.0	<1.0	<1.0	<1.0	5683052	1.0
Dissolved Thallium (Tl)	ug/L	0.050	5686273	<0.050	<0.050	<0.050	<0.050	5683052	0.050
Dissolved Tin (Sn)	ug/L	<1.0	5686273	<1.0	<1.0	<1.0	<1.0	5683052	1.0
Dissolved Titanium (Ti)	ug/L	<5.0	5686273	<5.0	<5.0	<5.0	<5.0	5683052	5.0
Dissolved Tungsten (W)	ug/L	<1.0	5686273	<1.0	1.4	<1.0	<1.0	5683052	1.0
Dissolved Uranium (U)	ug/L	0.72	5686273	<0.10	4.3	<0.10	0.23	5683052	0.10
Dissolved Vanadium (V)	ug/L	<0.50	5686273	<0.50	<0.50	<0.50	<0.50	5683052	0.50
Dissolved Zinc (Zn)	ug/L	62	5686273	<5.0	<5.0	17	<5.0	5683052	5.0
Dissolved Zirconium (Zr)	ug/L	<1.0	5686273	<1.0	<1.0	<1.0	<1.0	5683052	1.0

QC Batch = Quality Control Batch

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Maxxam Job #: B8K8119
Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

O.REG 153 DISSOLVED ICPMS METALS (WATER)

Maxxam ID		HMB943	HMB944		
Sampling Date		2018/08/10 11:45	2018/08/10 13:00		
COC Number		677100-01-01	677100-01-01		
	UNITS	MW-4	DUPLICATE	QC Batch	RDL
Metals					
Dissolved Aluminum (Al)	ug/L	17	10	5683052	5.0
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	5683052	0.50
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	5683052	1.0
Dissolved Barium (Ba)	ug/L	8.2	9.3	5683052	2.0
Dissolved Beryllium (Be)	ug/L	<0.50	<0.50	5683052	0.50
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	5683052	1.0
Dissolved Boron (B)	ug/L	68	40	5683052	10
Dissolved Cadmium (Cd)	ug/L	<0.10	<0.10	5683052	0.10
Dissolved Calcium (Ca)	ug/L	19000	37000	5683052	200
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	5683052	5.0
Dissolved Cobalt (Co)	ug/L	<0.50	<0.50	5683052	0.50
Dissolved Copper (Cu)	ug/L	3.6	2.3	5683052	1.0
Dissolved Iron (Fe)	ug/L	<100	<100	5683052	100
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	5683052	0.50
Dissolved Lithium (Li)	ug/L	<5.0	14	5683052	5.0
Dissolved Magnesium (Mg)	ug/L	6800	25000	5683052	50
Dissolved Manganese (Mn)	ug/L	6.9	48	5683052	2.0
Dissolved Molybdenum (Mo)	ug/L	2.0	3.5	5683052	0.50
Dissolved Nickel (Ni)	ug/L	1.4	1.3	5683052	1.0
Dissolved Potassium (K)	ug/L	3100	6800	5683052	200
Dissolved Selenium (Se)	ug/L	<2.0	<2.0	5683052	2.0
Dissolved Silicon (Si)	ug/L	2300	3200	5683052	50
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	5683052	0.10
Dissolved Sodium (Na)	ug/L	30000	75000	5683052	100
Dissolved Strontium (Sr)	ug/L	72	160	5683052	1.0
Dissolved Tellurium (Te)	ug/L	<1.0	<1.0	5683052	1.0
Dissolved Thallium (Tl)	ug/L	<0.050	<0.050	5683052	0.050
Dissolved Tin (Sn)	ug/L	<1.0	<1.0	5683052	1.0
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	5683052	5.0
Dissolved Tungsten (W)	ug/L	<1.0	1.5	5683052	1.0
Dissolved Uranium (U)	ug/L	1.8	4.2	5683052	0.10
Dissolved Vanadium (V)	ug/L	<0.50	<0.50	5683052	0.50
Dissolved Zinc (Zn)	ug/L	9.7	<5.0	5683052	5.0
Dissolved Zirconium (Zr)	ug/L	<1.0	<1.0	5683052	1.0
QC Batch = Quality Control Batch					

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O.REG 153 PCBS (WATER)

Maxxam ID		HMB935	HMB936	HMB937	HMB938	HMB938	HMB940		
Sampling Date		2018/08/12 09:50	2018/08/12 11:00	2018/08/12 09:50	2018/08/12 11:15	2018/08/12 11:15	2018/08/10 13:00		
COC Number		677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01		
	UNITS	MW NORTH	MW NORTHWEST	DUPLICATE-2	SW EAST	SW EAST Lab-Dup	MW-1	QC Batch	RDL
PCBs									
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	5685612	0.05
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	5685612	0.05
Aroclor 1254	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	5685612	0.05
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	5685612	0.05
Total PCB	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	5685612	0.05
Surrogate Recovery (%)									
Decachlorobiphenyl	%	99	104	102	108	103	102	5685612	N/A

QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam ID		HMB941	HMB942	HMB944		
Sampling Date		2018/08/10 14:30	2018/08/10 11:00	2018/08/10 13:00		
COC Number		677100-01-01	677100-01-01	677100-01-01		
	UNITS	MW-2	MW-3	DUPLICATE	QC Batch	RDL
PCBs						
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	5685612	0.05
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	5685612	0.05
Aroclor 1254	ug/L	<0.05	<0.05	<0.05	5685612	0.05
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	5685612	0.05
Total PCB	ug/L	<0.05	<0.05	<0.05	5685612	0.05
Surrogate Recovery (%)						
Decachlorobiphenyl	%	86	92	83	5685612	N/A

QC Batch = Quality Control Batch
N/A = Not Applicable

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O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		HMB935	HMB935	HMB936	HMB937	HMB938	HMB939		
Sampling Date		2018/08/12 09:50	2018/08/12 09:50	2018/08/12 11:00	2018/08/12 09:50	2018/08/12 11:15	2018/08/12 10:00		
COC Number		677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01		
	UNITS	MW NORTH	MW NORTH Lab-Dup	MW NORTHWEST	DUPLICATE-2	SW EAST	FIELD BLANK	QC Batch	RDL
BTEX & F1 Hydrocarbons									
Benzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	5682316	0.20
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	5682316	0.20
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	5682316	0.20
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	5682316	0.20
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	5682316	0.40
Total Xylenes	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	5682316	0.40
F1 (C6-C10)	ug/L	<25	<25	<25	<25	<25	<25	5682316	25
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	<25	<25	<25	5682316	25
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/L	<100	N/A	<100	<100	<100	<100	5683334	100
F3 (C16-C34 Hydrocarbons)	ug/L	<200	N/A	<200	<200	<200	<200	5683334	200
F4 (C34-C50 Hydrocarbons)	ug/L	<200	N/A	<200	<200	<200	<200	5683334	200
Reached Baseline at C50	ug/L	Yes	N/A	Yes	Yes	Yes	Yes	5683334	N/A
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	103	101	104	102	102	105	5682316	N/A
4-Bromofluorobenzene	%	97	98	98	97	98	97	5682316	N/A
D10-Ethylbenzene	%	85	85	89	84	84	86	5682316	N/A
D4-1,2-Dichloroethane	%	102	101	101	98	99	100	5682316	N/A
o-Terphenyl	%	90	N/A	90	92	91	90	5683334	N/A

QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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O.REG 153 PETROLEUM HYDROCARBONS (WATER)

Maxxam ID		HMB940	HMB941	HMB942	HMB943	HMB944		
Sampling Date		2018/08/10 13:00	2018/08/10 14:30	2018/08/10 11:00	2018/08/10 11:45	2018/08/10 13:00		
COC Number		677100-01-01	677100-01-01	677100-01-01	677100-01-01	677100-01-01		
	UNITS	MW-1	MW-2	MW-3	MW-4	DUPLICATE	QC Batch	RDL
BTEX & F1 Hydrocarbons								
Benzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	5682316	0.20
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	5682316	0.20
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	5682316	0.20
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	5682316	0.20
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	5682316	0.40
Total Xylenes	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	5682316	0.40
F1 (C6-C10)	ug/L	<25	<25	<25	<25	<25	5682316	25
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	<25	<25	5682316	25
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	<100	<100	5683334	100
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	5683334	200
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	5683334	200
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes	5683334	N/A
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	103	102	103	104	104	5682316	N/A
4-Bromofluorobenzene	%	98	98	98	98	97	5682316	N/A
D10-Ethylbenzene	%	84	86	86	85	85	5682316	N/A
D4-1,2-Dichloroethane	%	100	100	102	101	102	5682316	N/A
o-Terphenyl	%	90	93	91	92	91	5683334	N/A

QC Batch = Quality Control Batch
N/A = Not Applicable

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GENERAL COMMENTS

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

Package 1	1.7°C

Revised Report (2018/10/01): Pertinent Total and Dissolved Metals included as per client request.

Sample HMB935 [MW NORTH] : Elevated ion balance was confirmed by re-analysis.
The results for some dissolved metals were greater than the results for total metals. This was confirmed by re-analysis.

Sample HMB936 [MW NORTHWEST] : The results for some dissolved metals were greater than the results for total metals. This was confirmed by re-analysis. The bottle labelled as dissolved metals was darker in appearance than the bottle labelled as total metals.

Sample HMB937 [DUPLICATE-2] : The results for some dissolved metals were greater than the results for total metals. This was confirmed by re-analysis.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5682184	DRM	Matrix Spike	Dissolved Chloride (Cl-)	2018/08/17		NC	%	80 - 120
5682184	DRM	Spiked Blank	Dissolved Chloride (Cl-)	2018/08/17		104	%	80 - 120
5682184	DRM	Method Blank	Dissolved Chloride (Cl-)	2018/08/17	<1.0		mg/L	
5682184	DRM	RPD	Dissolved Chloride (Cl-)	2018/08/17	3.6		%	20
5682189	DRM	Matrix Spike	Dissolved Sulphate (SO4)	2018/08/17		NC	%	75 - 125
5682189	DRM	Spiked Blank	Dissolved Sulphate (SO4)	2018/08/17		104	%	80 - 120
5682189	DRM	Method Blank	Dissolved Sulphate (SO4)	2018/08/17	<1.0		mg/L	
5682189	DRM	RPD	Dissolved Sulphate (SO4)	2018/08/17	0.36		%	20
5682316	JP5	Matrix Spike [HMB935-07]	1,4-Difluorobenzene	2018/08/16		105	%	70 - 130
			4-Bromofluorobenzene	2018/08/16		98	%	70 - 130
			D10-Ethylbenzene	2018/08/16		86	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/16		102	%	70 - 130
			Benzene	2018/08/16		88	%	70 - 130
			Toluene	2018/08/16		85	%	70 - 130
			Ethylbenzene	2018/08/16		86	%	70 - 130
			o-Xylene	2018/08/16		84	%	70 - 130
			p+m-Xylene	2018/08/16		84	%	70 - 130
			F1 (C6-C10)	2018/08/16		106	%	70 - 130
5682316	JP5	Spiked Blank	1,4-Difluorobenzene	2018/08/16		104	%	70 - 130
			4-Bromofluorobenzene	2018/08/16		98	%	70 - 130
			D10-Ethylbenzene	2018/08/16		110	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/16		108	%	70 - 130
			Benzene	2018/08/16		107	%	70 - 130
			Toluene	2018/08/16		105	%	70 - 130
			Ethylbenzene	2018/08/16		102	%	70 - 130
			o-Xylene	2018/08/16		105	%	70 - 130
			p+m-Xylene	2018/08/16		102	%	70 - 130
			F1 (C6-C10)	2018/08/16		93	%	70 - 130
5682316	JP5	Method Blank	1,4-Difluorobenzene	2018/08/16		103	%	70 - 130
			4-Bromofluorobenzene	2018/08/16		98	%	70 - 130
			D10-Ethylbenzene	2018/08/16		87	%	70 - 130
			D4-1,2-Dichloroethane	2018/08/16		103	%	70 - 130
			Benzene	2018/08/16	<0.20		ug/L	
			Toluene	2018/08/16	<0.20		ug/L	
			Ethylbenzene	2018/08/16	<0.20		ug/L	
			o-Xylene	2018/08/16	<0.20		ug/L	
			p+m-Xylene	2018/08/16	<0.40		ug/L	
			Total Xylenes	2018/08/16	<0.40		ug/L	
			F1 (C6-C10)	2018/08/16	<25		ug/L	
			F1 (C6-C10) - BTEX	2018/08/16	<25		ug/L	
5682316	JP5	RPD [HMB935-07]	Benzene	2018/08/16	NC		%	30
			Toluene	2018/08/16	NC		%	30
			Ethylbenzene	2018/08/16	NC		%	30
			o-Xylene	2018/08/16	NC		%	30
			p+m-Xylene	2018/08/16	NC		%	30
			Total Xylenes	2018/08/16	NC		%	30
			F1 (C6-C10)	2018/08/16	NC		%	30
			F1 (C6-C10) - BTEX	2018/08/16	NC		%	30
5683052	PBA	Matrix Spike	Dissolved Aluminum (Al)	2018/08/17		101	%	80 - 120
			Dissolved Antimony (Sb)	2018/08/17		107	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Arsenic (As)	2018/08/17		104	%	80 - 120
			Dissolved Barium (Ba)	2018/08/17		101	%	80 - 120
			Dissolved Beryllium (Be)	2018/08/17		104	%	80 - 120
			Dissolved Bismuth (Bi)	2018/08/17		101	%	80 - 120
			Dissolved Boron (B)	2018/08/17		98	%	80 - 120
			Dissolved Cadmium (Cd)	2018/08/17		103	%	80 - 120
			Dissolved Calcium (Ca)	2018/08/17		NC	%	80 - 120
			Dissolved Chromium (Cr)	2018/08/17		100	%	80 - 120
			Dissolved Cobalt (Co)	2018/08/17		107	%	80 - 120
			Dissolved Copper (Cu)	2018/08/17		98	%	80 - 120
			Dissolved Iron (Fe)	2018/08/17		106	%	80 - 120
			Dissolved Lead (Pb)	2018/08/17		97	%	80 - 120
			Dissolved Lithium (Li)	2018/08/17		101	%	80 - 120
			Dissolved Magnesium (Mg)	2018/08/17		NC	%	80 - 120
			Dissolved Manganese (Mn)	2018/08/17		NC	%	80 - 120
			Dissolved Molybdenum (Mo)	2018/08/17		100	%	80 - 120
			Dissolved Nickel (Ni)	2018/08/17		100	%	80 - 120
			Dissolved Potassium (K)	2018/08/17		109	%	80 - 120
			Dissolved Selenium (Se)	2018/08/17		102	%	80 - 120
			Dissolved Silicon (Si)	2018/08/17		109	%	80 - 120
			Dissolved Silver (Ag)	2018/08/17		81	%	80 - 120
			Dissolved Sodium (Na)	2018/08/17		97	%	80 - 120
			Dissolved Strontium (Sr)	2018/08/17		104	%	80 - 120
			Dissolved Tellurium (Te)	2018/08/17		102	%	80 - 120
			Dissolved Thallium (Tl)	2018/08/17		100	%	80 - 120
			Dissolved Tin (Sn)	2018/08/17		103	%	80 - 120
			Dissolved Titanium (Ti)	2018/08/17		106	%	80 - 120
			Dissolved Tungsten (W)	2018/08/17		98	%	80 - 120
			Dissolved Uranium (U)	2018/08/17		103	%	80 - 120
			Dissolved Vanadium (V)	2018/08/17		103	%	80 - 120
			Dissolved Zinc (Zn)	2018/08/17		102	%	80 - 120
			Dissolved Zirconium (Zr)	2018/08/17		105	%	80 - 120
5683052	PBA	Spiked Blank	Dissolved Aluminum (Al)	2018/08/17		100	%	80 - 120
			Dissolved Antimony (Sb)	2018/08/17		104	%	80 - 120
			Dissolved Arsenic (As)	2018/08/17		100	%	80 - 120
			Dissolved Barium (Ba)	2018/08/17		97	%	80 - 120
			Dissolved Beryllium (Be)	2018/08/17		103	%	80 - 120
			Dissolved Bismuth (Bi)	2018/08/17		101	%	80 - 120
			Dissolved Boron (B)	2018/08/17		97	%	80 - 120
			Dissolved Cadmium (Cd)	2018/08/17		100	%	80 - 120
			Dissolved Calcium (Ca)	2018/08/17		102	%	80 - 120
			Dissolved Chromium (Cr)	2018/08/17		97	%	80 - 120
			Dissolved Cobalt (Co)	2018/08/17		102	%	80 - 120
			Dissolved Copper (Cu)	2018/08/17		97	%	80 - 120
			Dissolved Iron (Fe)	2018/08/17		104	%	80 - 120
			Dissolved Lead (Pb)	2018/08/17		99	%	80 - 120
			Dissolved Lithium (Li)	2018/08/17		102	%	80 - 120
			Dissolved Magnesium (Mg)	2018/08/17		104	%	80 - 120
			Dissolved Manganese (Mn)	2018/08/17		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2018/08/17		97	%	80 - 120
			Dissolved Nickel (Ni)	2018/08/17		98	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Potassium (K)	2018/08/17		102	%	80 - 120
			Dissolved Selenium (Se)	2018/08/17		98	%	80 - 120
			Dissolved Silicon (Si)	2018/08/17		104	%	80 - 120
			Dissolved Silver (Ag)	2018/08/17		97	%	80 - 120
			Dissolved Sodium (Na)	2018/08/17		101	%	80 - 120
			Dissolved Strontium (Sr)	2018/08/17		99	%	80 - 120
			Dissolved Tellurium (Te)	2018/08/17		100	%	80 - 120
			Dissolved Thallium (Tl)	2018/08/17		99	%	80 - 120
			Dissolved Tin (Sn)	2018/08/17		101	%	80 - 120
			Dissolved Titanium (Ti)	2018/08/17		104	%	80 - 120
			Dissolved Tungsten (W)	2018/08/17		96	%	80 - 120
			Dissolved Uranium (U)	2018/08/17		103	%	80 - 120
			Dissolved Vanadium (V)	2018/08/17		99	%	80 - 120
			Dissolved Zinc (Zn)	2018/08/17		101	%	80 - 120
			Dissolved Zirconium (Zr)	2018/08/17		102	%	80 - 120
5683052	PBA	Method Blank	Dissolved Aluminum (Al)	2018/08/17	<5.0		ug/L	
			Dissolved Antimony (Sb)	2018/08/17	<0.50		ug/L	
			Dissolved Arsenic (As)	2018/08/17	<1.0		ug/L	
			Dissolved Barium (Ba)	2018/08/17	<2.0		ug/L	
			Dissolved Beryllium (Be)	2018/08/17	<0.50		ug/L	
			Dissolved Bismuth (Bi)	2018/08/17	<1.0		ug/L	
			Dissolved Boron (B)	2018/08/17	<10		ug/L	
			Dissolved Cadmium (Cd)	2018/08/17	<0.10		ug/L	
			Dissolved Calcium (Ca)	2018/08/17	<200		ug/L	
			Dissolved Chromium (Cr)	2018/08/17	<5.0		ug/L	
			Dissolved Cobalt (Co)	2018/08/17	<0.50		ug/L	
			Dissolved Copper (Cu)	2018/08/17	<1.0		ug/L	
			Dissolved Iron (Fe)	2018/08/17	<100		ug/L	
			Dissolved Lead (Pb)	2018/08/17	<0.50		ug/L	
			Dissolved Lithium (Li)	2018/08/17	<5.0		ug/L	
			Dissolved Magnesium (Mg)	2018/08/17	<50		ug/L	
			Dissolved Manganese (Mn)	2018/08/17	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2018/08/17	<0.50		ug/L	
			Dissolved Nickel (Ni)	2018/08/17	<1.0		ug/L	
			Dissolved Potassium (K)	2018/08/17	<200		ug/L	
			Dissolved Selenium (Se)	2018/08/17	<2.0		ug/L	
			Dissolved Silicon (Si)	2018/08/17	<50		ug/L	
			Dissolved Silver (Ag)	2018/08/17	<0.10		ug/L	
			Dissolved Sodium (Na)	2018/08/17	<100		ug/L	
			Dissolved Strontium (Sr)	2018/08/17	<1.0		ug/L	
			Dissolved Tellurium (Te)	2018/08/17	<1.0		ug/L	
			Dissolved Thallium (Tl)	2018/08/17	<0.050		ug/L	
			Dissolved Tin (Sn)	2018/08/17	<1.0		ug/L	
			Dissolved Titanium (Ti)	2018/08/17	<5.0		ug/L	
			Dissolved Tungsten (W)	2018/08/17	<1.0		ug/L	
			Dissolved Uranium (U)	2018/08/17	<0.10		ug/L	
			Dissolved Vanadium (V)	2018/08/17	<0.50		ug/L	
			Dissolved Zinc (Zn)	2018/08/17	<5.0		ug/L	
			Dissolved Zirconium (Zr)	2018/08/17	<1.0		ug/L	
5683052	PBA	RPD	Dissolved Lead (Pb)	2018/08/17	NC		%	20
5683073	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2018/08/17		96	%	85 - 115

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Maxxam Job #: B8K8119
Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5683073	SAU	Method Blank	Alkalinity (Total as CaCO3)	2018/08/17	<1.0		mg/L	
5683073	SAU	RPD [HMB944-03]	Alkalinity (Total as CaCO3)	2018/08/17	1.1		%	20
5683075	SAU	Spiked Blank	Conductivity	2018/08/17		102	%	85 - 115
5683075	SAU	Method Blank	Conductivity	2018/08/17	<0.001		mS/cm	
5683075	SAU	RPD [HMB944-03]	Conductivity	2018/08/17	0.54		%	25
5683076	SAU	Spiked Blank	pH	2018/08/17		101	%	98 - 103
5683076	SAU	RPD [HMB944-03]	pH	2018/08/17	0.18		%	N/A
5683093	MKX	QC Standard	Total Suspended Solids	2018/08/16		96	%	85 - 115
5683093	MKX	Method Blank	Total Suspended Solids	2018/08/16	<10		mg/L	
5683093	MKX	RPD	Total Suspended Solids	2018/08/16	NC		%	25
5683334	BWW	Matrix Spike	o-Terphenyl	2018/08/17		94	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/17		96	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2018/08/17		96	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2018/08/17		93	%	50 - 130
5683334	BWW	Spiked Blank	o-Terphenyl	2018/08/17		95	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/17		99	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2018/08/17		98	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2018/08/17		94	%	60 - 130
5683334	BWW	Method Blank	o-Terphenyl	2018/08/16		91	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/08/16	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2018/08/16	<200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2018/08/16	<200		ug/L	
5683334	BWW	RPD	F2 (C10-C16 Hydrocarbons)	2018/08/17	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2018/08/17	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2018/08/17	NC		%	30
5683846	TNG	Matrix Spike [HMB941-05]	Total Aluminum (Al)	2018/08/16		NC	%	80 - 120
			Total Antimony (Sb)	2018/08/16		105	%	80 - 120
			Total Arsenic (As)	2018/08/16		102	%	80 - 120
			Total Barium (Ba)	2018/08/16		102	%	80 - 120
			Total Beryllium (Be)	2018/08/16		100	%	80 - 120
			Total Bismuth (Bi)	2018/08/16		93	%	80 - 120
			Total Boron (B)	2018/08/16		99	%	80 - 120
			Total Cadmium (Cd)	2018/08/16		102	%	80 - 120
			Total Calcium (Ca)	2018/08/16		99	%	80 - 120
			Total Chromium (Cr)	2018/08/16		99	%	80 - 120
			Total Cobalt (Co)	2018/08/16		99	%	80 - 120
			Total Copper (Cu)	2018/08/16		101	%	80 - 120
			Total Iron (Fe)	2018/08/16		104	%	80 - 120
			Total Lead (Pb)	2018/08/16		97	%	80 - 120
			Total Lithium (Li)	2018/08/16		100	%	80 - 120
			Total Magnesium (Mg)	2018/08/16		100	%	80 - 120
			Total Manganese (Mn)	2018/08/16		NC	%	80 - 120
			Total Molybdenum (Mo)	2018/08/16		104	%	80 - 120
			Total Nickel (Ni)	2018/08/16		98	%	80 - 120
			Total Potassium (K)	2018/08/16		102	%	80 - 120
			Total Selenium (Se)	2018/08/16		106	%	80 - 120
			Total Silicon (Si)	2018/08/16		119	%	80 - 120
			Total Silver (Ag)	2018/08/16		100	%	80 - 120
			Total Sodium (Na)	2018/08/16		NC	%	80 - 120
			Total Strontium (Sr)	2018/08/16		98	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Tellurium (Te)	2018/08/16		104	%	80 - 120
			Total Thallium (Tl)	2018/08/16		96	%	80 - 120
			Total Tin (Sn)	2018/08/16		103	%	80 - 120
			Total Titanium (Ti)	2018/08/16		NC	%	80 - 120
			Total Tungsten (W)	2018/08/16		100	%	80 - 120
			Total Uranium (U)	2018/08/16		98	%	80 - 120
			Total Vanadium (V)	2018/08/16		100	%	80 - 120
			Total Zinc (Zn)	2018/08/16		102	%	80 - 120
			Total Zirconium (Zr)	2018/08/16		104	%	80 - 120
5683846	TNG	Spiked Blank	Total Aluminum (Al)	2018/08/16		102	%	80 - 120
			Total Antimony (Sb)	2018/08/16		103	%	80 - 120
			Total Arsenic (As)	2018/08/16		103	%	80 - 120
			Total Barium (Ba)	2018/08/16		95	%	80 - 120
			Total Beryllium (Be)	2018/08/16		98	%	80 - 120
			Total Bismuth (Bi)	2018/08/16		92	%	80 - 120
			Total Boron (B)	2018/08/16		100	%	80 - 120
			Total Cadmium (Cd)	2018/08/16		100	%	80 - 120
			Total Calcium (Ca)	2018/08/16		101	%	80 - 120
			Total Chromium (Cr)	2018/08/16		99	%	80 - 120
			Total Cobalt (Co)	2018/08/16		99	%	80 - 120
			Total Copper (Cu)	2018/08/16		98	%	80 - 120
			Total Iron (Fe)	2018/08/16		102	%	80 - 120
			Total Lead (Pb)	2018/08/16		95	%	80 - 120
			Total Lithium (Li)	2018/08/16		98	%	80 - 120
			Total Magnesium (Mg)	2018/08/16		101	%	80 - 120
			Total Manganese (Mn)	2018/08/16		96	%	80 - 120
			Total Molybdenum (Mo)	2018/08/16		101	%	80 - 120
			Total Nickel (Ni)	2018/08/16		99	%	80 - 120
			Total Potassium (K)	2018/08/16		100	%	80 - 120
			Total Selenium (Se)	2018/08/16		107	%	80 - 120
			Total Silicon (Si)	2018/08/16		101	%	80 - 120
			Total Silver (Ag)	2018/08/16		98	%	80 - 120
			Total Sodium (Na)	2018/08/16		101	%	80 - 120
			Total Strontium (Sr)	2018/08/16		96	%	80 - 120
			Total Tellurium (Te)	2018/08/16		103	%	80 - 120
			Total Thallium (Tl)	2018/08/16		95	%	80 - 120
			Total Tin (Sn)	2018/08/16		100	%	80 - 120
			Total Titanium (Ti)	2018/08/16		106	%	80 - 120
			Total Tungsten (W)	2018/08/16		98	%	80 - 120
			Total Uranium (U)	2018/08/16		95	%	80 - 120
			Total Vanadium (V)	2018/08/16		100	%	80 - 120
			Total Zinc (Zn)	2018/08/16		105	%	80 - 120
			Total Zirconium (Zr)	2018/08/16		100	%	80 - 120
5683846	TNG	Method Blank	Total Aluminum (Al)	2018/08/16	<5.0		ug/L	
			Total Antimony (Sb)	2018/08/16	<0.50		ug/L	
			Total Arsenic (As)	2018/08/16	<1.0		ug/L	
			Total Barium (Ba)	2018/08/16	<2.0		ug/L	
			Total Beryllium (Be)	2018/08/16	<0.50		ug/L	
			Total Bismuth (Bi)	2018/08/16	<1.0		ug/L	
			Total Boron (B)	2018/08/16	<10		ug/L	
			Total Cadmium (Cd)	2018/08/16	<0.10		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Calcium (Ca)	2018/08/16	<200		ug/L	
			Total Chromium (Cr)	2018/08/16	<5.0		ug/L	
			Total Cobalt (Co)	2018/08/16	<0.50		ug/L	
			Total Copper (Cu)	2018/08/16	<1.0		ug/L	
			Total Iron (Fe)	2018/08/16	<100		ug/L	
			Total Lead (Pb)	2018/08/16	<0.50		ug/L	
			Total Lithium (Li)	2018/08/16	<5.0		ug/L	
			Total Magnesium (Mg)	2018/08/16	<50		ug/L	
			Total Manganese (Mn)	2018/08/16	<2.0		ug/L	
			Total Molybdenum (Mo)	2018/08/16	<0.50		ug/L	
			Total Nickel (Ni)	2018/08/16	<1.0		ug/L	
			Total Potassium (K)	2018/08/16	<200		ug/L	
			Total Selenium (Se)	2018/08/16	<2.0		ug/L	
			Total Silicon (Si)	2018/08/16	<50		ug/L	
			Total Silver (Ag)	2018/08/16	<0.10		ug/L	
			Total Sodium (Na)	2018/08/16	<100		ug/L	
			Total Strontium (Sr)	2018/08/16	<1.0		ug/L	
			Total Tellurium (Te)	2018/08/16	<1.0		ug/L	
			Total Thallium (Tl)	2018/08/16	<0.050		ug/L	
			Total Tin (Sn)	2018/08/16	<1.0		ug/L	
			Total Titanium (Ti)	2018/08/16	<5.0		ug/L	
			Total Tungsten (W)	2018/08/16	<1.0		ug/L	
			Total Uranium (U)	2018/08/16	<0.10		ug/L	
			Total Vanadium (V)	2018/08/16	<0.50		ug/L	
			Total Zinc (Zn)	2018/08/16	<5.0		ug/L	
			Total Zirconium (Zr)	2018/08/16	<1.0		ug/L	
5683846	TNG	RPD [HMB941-05]	Total Aluminum (Al)	2018/08/16	10		%	20
			Total Antimony (Sb)	2018/08/16	NC		%	20
			Total Arsenic (As)	2018/08/16	NC		%	20
			Total Barium (Ba)	2018/08/16	7.0		%	20
			Total Beryllium (Be)	2018/08/16	NC		%	20
			Total Bismuth (Bi)	2018/08/16	NC		%	20
			Total Boron (B)	2018/08/16	2.2		%	20
			Total Cadmium (Cd)	2018/08/16	NC		%	20
			Total Calcium (Ca)	2018/08/16	3.7		%	20
			Total Chromium (Cr)	2018/08/16	3.6		%	20
			Total Cobalt (Co)	2018/08/16	3.1		%	20
			Total Copper (Cu)	2018/08/16	4.2		%	20
			Total Iron (Fe)	2018/08/16	2.4		%	20
			Total Lead (Pb)	2018/08/16	3.8		%	20
			Total Lithium (Li)	2018/08/16	7.0		%	20
			Total Magnesium (Mg)	2018/08/16	1.8		%	20
			Total Manganese (Mn)	2018/08/16	2.1		%	20
			Total Molybdenum (Mo)	2018/08/16	9.0		%	20
			Total Nickel (Ni)	2018/08/16	6.5		%	20
			Total Potassium (K)	2018/08/16	3.6		%	20
			Total Selenium (Se)	2018/08/16	NC		%	20
			Total Silicon (Si)	2018/08/16	9.2		%	20
			Total Silver (Ag)	2018/08/16	NC		%	20
			Total Sodium (Na)	2018/08/16	2.4		%	20
			Total Strontium (Sr)	2018/08/16	2.8		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Tellurium (Te)	2018/08/16	NC		%	20
			Total Thallium (Tl)	2018/08/16	NC		%	20
			Total Tin (Sn)	2018/08/16	NC		%	20
			Total Titanium (Ti)	2018/08/16	3.5		%	20
			Total Tungsten (W)	2018/08/16	NC		%	20
			Total Uranium (U)	2018/08/16	3.4		%	20
			Total Vanadium (V)	2018/08/16	3.4		%	20
			Total Zinc (Zn)	2018/08/16	8.6		%	20
			Total Zirconium (Zr)	2018/08/16	19		%	20
5685612	SHG	Matrix Spike [HMB935-01]	Decachlorobiphenyl	2018/08/17		109	%	60 - 130
			Aroclor 1260	2018/08/17		95	%	60 - 130
			Total PCB	2018/08/17		95	%	60 - 130
5685612	SHG	Spiked Blank	Decachlorobiphenyl	2018/08/17		88	%	60 - 130
			Aroclor 1260	2018/08/17		83	%	60 - 130
			Total PCB	2018/08/17		83	%	60 - 130
5685612	SHG	Method Blank	Decachlorobiphenyl	2018/08/17		99	%	60 - 130
			Aroclor 1242	2018/08/17	<0.05		ug/L	
			Aroclor 1248	2018/08/17	<0.05		ug/L	
			Aroclor 1254	2018/08/17	<0.05		ug/L	
			Aroclor 1260	2018/08/17	<0.05		ug/L	
			Total PCB	2018/08/17	<0.05		ug/L	
5685612	SHG	RPD [HMB938-01]	Aroclor 1242	2018/08/17	NC		%	30
			Aroclor 1248	2018/08/17	NC		%	30
			Aroclor 1254	2018/08/17	NC		%	30
			Aroclor 1260	2018/08/17	NC		%	30
			Total PCB	2018/08/17	NC		%	40
5686273	TNG	Matrix Spike	Dissolved Aluminum (Al)	2018/08/20		107	%	80 - 120
			Dissolved Antimony (Sb)	2018/08/20		110	%	80 - 120
			Dissolved Arsenic (As)	2018/08/20		106	%	80 - 120
			Dissolved Barium (Ba)	2018/08/20		105	%	80 - 120
			Dissolved Beryllium (Be)	2018/08/20		106	%	80 - 120
			Dissolved Bismuth (Bi)	2018/08/20		98	%	80 - 120
			Dissolved Boron (B)	2018/08/20		104	%	80 - 120
			Dissolved Cadmium (Cd)	2018/08/20		106	%	80 - 120
			Dissolved Calcium (Ca)	2018/08/20		107	%	80 - 120
			Dissolved Chromium (Cr)	2018/08/20		103	%	80 - 120
			Dissolved Cobalt (Co)	2018/08/20		103	%	80 - 120
			Dissolved Copper (Cu)	2018/08/20		108	%	80 - 120
			Dissolved Iron (Fe)	2018/08/20		107	%	80 - 120
			Dissolved Lead (Pb)	2018/08/20		100	%	80 - 120
			Dissolved Lithium (Li)	2018/08/20		108	%	80 - 120
			Dissolved Magnesium (Mg)	2018/08/20		106	%	80 - 120
			Dissolved Manganese (Mn)	2018/08/20		104	%	80 - 120
			Dissolved Molybdenum (Mo)	2018/08/20		108	%	80 - 120
			Dissolved Nickel (Ni)	2018/08/20		103	%	80 - 120
			Dissolved Potassium (K)	2018/08/20		106	%	80 - 120
			Dissolved Selenium (Se)	2018/08/20		106	%	80 - 120
			Dissolved Silicon (Si)	2018/08/20		107	%	80 - 120
			Dissolved Silver (Ag)	2018/08/20		103	%	80 - 120
			Dissolved Sodium (Na)	2018/08/20		103	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Strontium (Sr)	2018/08/20		105	%	80 - 120
			Dissolved Tellurium (Te)	2018/08/20		110	%	80 - 120
			Dissolved Thallium (Tl)	2018/08/20		99	%	80 - 120
			Dissolved Tin (Sn)	2018/08/20		109	%	80 - 120
			Dissolved Titanium (Ti)	2018/08/20		105	%	80 - 120
			Dissolved Tungsten (W)	2018/08/20		103	%	80 - 120
			Dissolved Uranium (U)	2018/08/20		106	%	80 - 120
			Dissolved Vanadium (V)	2018/08/20		105	%	80 - 120
			Dissolved Zinc (Zn)	2018/08/20		104	%	80 - 120
			Dissolved Zirconium (Zr)	2018/08/20		110	%	80 - 120
5686273	TNG	Spiked Blank	Dissolved Aluminum (Al)	2018/08/20		103	%	80 - 120
			Dissolved Antimony (Sb)	2018/08/20		103	%	80 - 120
			Dissolved Arsenic (As)	2018/08/20		98	%	80 - 120
			Dissolved Barium (Ba)	2018/08/20		103	%	80 - 120
			Dissolved Beryllium (Be)	2018/08/20		100	%	80 - 120
			Dissolved Bismuth (Bi)	2018/08/20		93	%	80 - 120
			Dissolved Boron (B)	2018/08/20		101	%	80 - 120
			Dissolved Cadmium (Cd)	2018/08/20		99	%	80 - 120
			Dissolved Calcium (Ca)	2018/08/20		103	%	80 - 120
			Dissolved Chromium (Cr)	2018/08/20		98	%	80 - 120
			Dissolved Cobalt (Co)	2018/08/20		96	%	80 - 120
			Dissolved Copper (Cu)	2018/08/20		101	%	80 - 120
			Dissolved Iron (Fe)	2018/08/20		101	%	80 - 120
			Dissolved Lead (Pb)	2018/08/20		95	%	80 - 120
			Dissolved Lithium (Li)	2018/08/20		101	%	80 - 120
			Dissolved Magnesium (Mg)	2018/08/20		100	%	80 - 120
			Dissolved Manganese (Mn)	2018/08/20		98	%	80 - 120
			Dissolved Molybdenum (Mo)	2018/08/20		102	%	80 - 120
			Dissolved Nickel (Ni)	2018/08/20		96	%	80 - 120
			Dissolved Potassium (K)	2018/08/20		101	%	80 - 120
			Dissolved Selenium (Se)	2018/08/20		99	%	80 - 120
			Dissolved Silicon (Si)	2018/08/20		103	%	80 - 120
			Dissolved Silver (Ag)	2018/08/20		98	%	80 - 120
			Dissolved Sodium (Na)	2018/08/20		99	%	80 - 120
			Dissolved Strontium (Sr)	2018/08/20		97	%	80 - 120
			Dissolved Tellurium (Te)	2018/08/20		102	%	80 - 120
			Dissolved Thallium (Tl)	2018/08/20		94	%	80 - 120
			Dissolved Tin (Sn)	2018/08/20		102	%	80 - 120
			Dissolved Titanium (Ti)	2018/08/20		102	%	80 - 120
			Dissolved Tungsten (W)	2018/08/20		98	%	80 - 120
			Dissolved Uranium (U)	2018/08/20		99	%	80 - 120
			Dissolved Vanadium (V)	2018/08/20		99	%	80 - 120
			Dissolved Zinc (Zn)	2018/08/20		97	%	80 - 120
			Dissolved Zirconium (Zr)	2018/08/20		105	%	80 - 120
5686273	TNG	Method Blank	Dissolved Aluminum (Al)	2018/08/20	<5.0		ug/L	
			Dissolved Antimony (Sb)	2018/08/20	<0.50		ug/L	
			Dissolved Arsenic (As)	2018/08/20	<1.0		ug/L	
			Dissolved Barium (Ba)	2018/08/20	<2.0		ug/L	
			Dissolved Beryllium (Be)	2018/08/20	<0.50		ug/L	
			Dissolved Bismuth (Bi)	2018/08/20	<1.0		ug/L	
			Dissolved Boron (B)	2018/08/20	<10		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Cadmium (Cd)	2018/08/20	<0.10		ug/L	
			Dissolved Calcium (Ca)	2018/08/20	<200		ug/L	
			Dissolved Chromium (Cr)	2018/08/20	<5.0		ug/L	
			Dissolved Cobalt (Co)	2018/08/20	<0.50		ug/L	
			Dissolved Copper (Cu)	2018/08/20	<1.0		ug/L	
			Dissolved Iron (Fe)	2018/08/20	<100		ug/L	
			Dissolved Lead (Pb)	2018/08/20	<0.50		ug/L	
			Dissolved Lithium (Li)	2018/08/20	<5.0		ug/L	
			Dissolved Magnesium (Mg)	2018/08/20	<50		ug/L	
			Dissolved Manganese (Mn)	2018/08/20	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2018/08/20	<0.50		ug/L	
			Dissolved Nickel (Ni)	2018/08/20	<1.0		ug/L	
			Dissolved Potassium (K)	2018/08/20	<200		ug/L	
			Dissolved Selenium (Se)	2018/08/20	<2.0		ug/L	
			Dissolved Silicon (Si)	2018/08/20	<50		ug/L	
			Dissolved Silver (Ag)	2018/08/20	<0.10		ug/L	
			Dissolved Sodium (Na)	2018/08/20	<100		ug/L	
			Dissolved Strontium (Sr)	2018/08/20	<1.0		ug/L	
			Dissolved Tellurium (Te)	2018/08/20	<1.0		ug/L	
			Dissolved Thallium (Tl)	2018/08/20	<0.050		ug/L	
			Dissolved Tin (Sn)	2018/08/20	<1.0		ug/L	
			Dissolved Titanium (Ti)	2018/08/20	<5.0		ug/L	
			Dissolved Tungsten (W)	2018/08/20	<1.0		ug/L	
			Dissolved Uranium (U)	2018/08/20	<0.10		ug/L	
			Dissolved Vanadium (V)	2018/08/20	<0.50		ug/L	
			Dissolved Zinc (Zn)	2018/08/20	<5.0		ug/L	
			Dissolved Zirconium (Zr)	2018/08/20	<1.0		ug/L	
5686273	TNG	RPD	Dissolved Antimony (Sb)	2018/08/20	NC		%	20
			Dissolved Arsenic (As)	2018/08/20	NC		%	20
			Dissolved Cadmium (Cd)	2018/08/20	NC		%	20
			Dissolved Calcium (Ca)	2018/08/20	1.3		%	20
			Dissolved Cobalt (Co)	2018/08/20	NC		%	20
			Dissolved Copper (Cu)	2018/08/20	5.2		%	20
			Dissolved Lead (Pb)	2018/08/20	NC		%	20
			Dissolved Magnesium (Mg)	2018/08/20	1.2		%	20
			Dissolved Nickel (Ni)	2018/08/20	NC		%	20
			Dissolved Potassium (K)	2018/08/20	5.6		%	20
			Dissolved Selenium (Se)	2018/08/20	NC		%	20
			Dissolved Silver (Ag)	2018/08/20	NC		%	20
			Dissolved Sodium (Na)	2018/08/20	1.7		%	20
			Dissolved Zinc (Zn)	2018/08/20	9.3		%	20
5687460	JS7	QC Standard	Total Dissolved Solids	2018/08/18		97	%	90 - 110
5687460	JS7	Method Blank	Total Dissolved Solids	2018/08/18	<10		mg/L	
5687460	JS7	RPD [HMB943-03]	Total Dissolved Solids	2018/08/18	0		%	25
5690047	ADA	Matrix Spike	Dissolved Aluminum (Al)	2018/08/21		108	%	80 - 120
			Dissolved Antimony (Sb)	2018/08/21		107	%	80 - 120
			Dissolved Arsenic (As)	2018/08/21		103	%	80 - 120
			Dissolved Barium (Ba)	2018/08/21		NC	%	80 - 120
			Dissolved Beryllium (Be)	2018/08/21		106	%	80 - 120
			Dissolved Bismuth (Bi)	2018/08/21		94	%	80 - 120
			Dissolved Boron (B)	2018/08/21		107	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Cadmium (Cd)	2018/08/21		102	%	80 - 120
			Dissolved Calcium (Ca)	2018/08/21		NC	%	80 - 120
			Dissolved Chromium (Cr)	2018/08/21		98	%	80 - 120
			Dissolved Cobalt (Co)	2018/08/21		102	%	80 - 120
			Dissolved Copper (Cu)	2018/08/21		102	%	80 - 120
			Dissolved Iron (Fe)	2018/08/21		NC	%	80 - 120
			Dissolved Lead (Pb)	2018/08/21		97	%	80 - 120
			Dissolved Lithium (Li)	2018/08/21		108	%	80 - 120
			Dissolved Magnesium (Mg)	2018/08/21		NC	%	80 - 120
			Dissolved Manganese (Mn)	2018/08/21		NC	%	80 - 120
			Dissolved Molybdenum (Mo)	2018/08/21		107	%	80 - 120
			Dissolved Nickel (Ni)	2018/08/21		98	%	80 - 120
			Dissolved Potassium (K)	2018/08/21		110	%	80 - 120
			Dissolved Selenium (Se)	2018/08/21		97	%	80 - 120
			Dissolved Silicon (Si)	2018/08/21		108	%	80 - 120
			Dissolved Silver (Ag)	2018/08/21		64 (1)	%	80 - 120
			Dissolved Sodium (Na)	2018/08/21		NC	%	80 - 120
			Dissolved Strontium (Sr)	2018/08/21		NC	%	80 - 120
			Dissolved Tellurium (Te)	2018/08/21		98	%	80 - 120
			Dissolved Thallium (Tl)	2018/08/21		100	%	80 - 120
			Dissolved Tin (Sn)	2018/08/21		105	%	80 - 120
			Dissolved Titanium (Ti)	2018/08/21		108	%	80 - 120
			Dissolved Tungsten (W)	2018/08/21		103	%	80 - 120
			Dissolved Uranium (U)	2018/08/21		99	%	80 - 120
			Dissolved Vanadium (V)	2018/08/21		106	%	80 - 120
			Dissolved Zinc (Zn)	2018/08/21		97	%	80 - 120
			Dissolved Zirconium (Zr)	2018/08/21		112	%	80 - 120
5690047	ADA	Spiked Blank	Dissolved Aluminum (Al)	2018/08/21		103	%	80 - 120
			Dissolved Antimony (Sb)	2018/08/21		100	%	80 - 120
			Dissolved Arsenic (As)	2018/08/21		100	%	80 - 120
			Dissolved Barium (Ba)	2018/08/21		97	%	80 - 120
			Dissolved Beryllium (Be)	2018/08/21		101	%	80 - 120
			Dissolved Bismuth (Bi)	2018/08/21		100	%	80 - 120
			Dissolved Boron (B)	2018/08/21		103	%	80 - 120
			Dissolved Cadmium (Cd)	2018/08/21		99	%	80 - 120
			Dissolved Calcium (Ca)	2018/08/21		100	%	80 - 120
			Dissolved Chromium (Cr)	2018/08/21		97	%	80 - 120
			Dissolved Cobalt (Co)	2018/08/21		101	%	80 - 120
			Dissolved Copper (Cu)	2018/08/21		98	%	80 - 120
			Dissolved Iron (Fe)	2018/08/21		105	%	80 - 120
			Dissolved Lead (Pb)	2018/08/21		102	%	80 - 120
			Dissolved Lithium (Li)	2018/08/21		108	%	80 - 120
			Dissolved Magnesium (Mg)	2018/08/21		108	%	80 - 120
			Dissolved Manganese (Mn)	2018/08/21		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2018/08/21		98	%	80 - 120
			Dissolved Nickel (Ni)	2018/08/21		100	%	80 - 120
			Dissolved Potassium (K)	2018/08/21		103	%	80 - 120
			Dissolved Selenium (Se)	2018/08/21		99	%	80 - 120
			Dissolved Silicon (Si)	2018/08/21		103	%	80 - 120
			Dissolved Silver (Ag)	2018/08/21		99	%	80 - 120
			Dissolved Sodium (Na)	2018/08/21		104	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Strontium (Sr)	2018/08/21		98	%	80 - 120
			Dissolved Tellurium (Te)	2018/08/21		99	%	80 - 120
			Dissolved Thallium (Tl)	2018/08/21		102	%	80 - 120
			Dissolved Tin (Sn)	2018/08/21		100	%	80 - 120
			Dissolved Titanium (Ti)	2018/08/21		99	%	80 - 120
			Dissolved Tungsten (W)	2018/08/21		101	%	80 - 120
			Dissolved Uranium (U)	2018/08/21		99	%	80 - 120
			Dissolved Vanadium (V)	2018/08/21		100	%	80 - 120
			Dissolved Zinc (Zn)	2018/08/21		99	%	80 - 120
			Dissolved Zirconium (Zr)	2018/08/21		103	%	80 - 120
5690047	ADA	Method Blank	Dissolved Aluminum (Al)	2018/08/21	<5.0		ug/L	
			Dissolved Antimony (Sb)	2018/08/21	<0.50		ug/L	
			Dissolved Arsenic (As)	2018/08/21	<1.0		ug/L	
			Dissolved Barium (Ba)	2018/08/21	<2.0		ug/L	
			Dissolved Beryllium (Be)	2018/08/21	<0.50		ug/L	
			Dissolved Bismuth (Bi)	2018/08/21	<1.0		ug/L	
			Dissolved Boron (B)	2018/08/21	<10		ug/L	
			Dissolved Cadmium (Cd)	2018/08/21	<0.10		ug/L	
			Dissolved Calcium (Ca)	2018/08/21	<200		ug/L	
			Dissolved Chromium (Cr)	2018/08/21	<5.0		ug/L	
			Dissolved Cobalt (Co)	2018/08/21	<0.50		ug/L	
			Dissolved Copper (Cu)	2018/08/21	<1.0		ug/L	
			Dissolved Iron (Fe)	2018/08/21	<100		ug/L	
			Dissolved Lead (Pb)	2018/08/21	<0.50		ug/L	
			Dissolved Lithium (Li)	2018/08/21	<5.0		ug/L	
			Dissolved Magnesium (Mg)	2018/08/21	<50		ug/L	
			Dissolved Manganese (Mn)	2018/08/21	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2018/08/21	<0.50		ug/L	
			Dissolved Nickel (Ni)	2018/08/21	<1.0		ug/L	
			Dissolved Potassium (K)	2018/08/21	<200		ug/L	
			Dissolved Selenium (Se)	2018/08/21	<2.0		ug/L	
			Dissolved Silicon (Si)	2018/08/21	<50		ug/L	
			Dissolved Silver (Ag)	2018/08/21	<0.10		ug/L	
			Dissolved Sodium (Na)	2018/08/21	<100		ug/L	
			Dissolved Strontium (Sr)	2018/08/21	<1.0		ug/L	
			Dissolved Tellurium (Te)	2018/08/21	<1.0		ug/L	
			Dissolved Thallium (Tl)	2018/08/21	<0.050		ug/L	
			Dissolved Tin (Sn)	2018/08/21	<1.0		ug/L	
			Dissolved Titanium (Ti)	2018/08/21	<5.0		ug/L	
			Dissolved Tungsten (W)	2018/08/21	<1.0		ug/L	
			Dissolved Uranium (U)	2018/08/21	<0.10		ug/L	
			Dissolved Vanadium (V)	2018/08/21	<0.50		ug/L	
			Dissolved Zinc (Zn)	2018/08/21	<5.0		ug/L	
			Dissolved Zirconium (Zr)	2018/08/21	<1.0		ug/L	
5690047	ADA	RPD	Dissolved Antimony (Sb)	2018/08/21	NC		%	20
			Dissolved Arsenic (As)	2018/08/21	NC		%	20
			Dissolved Barium (Ba)	2018/08/21	1.1		%	20
			Dissolved Beryllium (Be)	2018/08/21	NC		%	20
			Dissolved Boron (B)	2018/08/21	1.1		%	20
			Dissolved Cadmium (Cd)	2018/08/21	NC		%	20
			Dissolved Chromium (Cr)	2018/08/21	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Cobalt (Co)	2018/08/21	NC		%	20
			Dissolved Copper (Cu)	2018/08/21	NC		%	20
			Dissolved Lead (Pb)	2018/08/21	NC		%	20
			Dissolved Molybdenum (Mo)	2018/08/21	NC		%	20
			Dissolved Nickel (Ni)	2018/08/21	NC		%	20
			Dissolved Selenium (Se)	2018/08/21	NC		%	20
			Dissolved Silver (Ag)	2018/08/21	NC		%	20
			Dissolved Sodium (Na)	2018/08/21	0.63		%	20
			Dissolved Thallium (Tl)	2018/08/21	NC		%	20
			Dissolved Uranium (U)	2018/08/21	NC		%	20
			Dissolved Vanadium (V)	2018/08/21	NC		%	20
			Dissolved Zinc (Zn)	2018/08/21	NC		%	20
5690128	ADA	Matrix Spike	Total Aluminum (Al)	2018/08/21		119	%	80 - 120
			Total Antimony (Sb)	2018/08/21		99	%	80 - 120
			Total Arsenic (As)	2018/08/21		101	%	80 - 120
			Total Barium (Ba)	2018/08/21		96	%	80 - 120
			Total Beryllium (Be)	2018/08/21		97	%	80 - 120
			Total Bismuth (Bi)	2018/08/21		94	%	80 - 120
			Total Boron (B)	2018/08/21		99	%	80 - 120
			Total Cadmium (Cd)	2018/08/21		98	%	80 - 120
			Total Calcium (Ca)	2018/08/21		NC	%	80 - 120
			Total Chromium (Cr)	2018/08/21		96	%	80 - 120
			Total Cobalt (Co)	2018/08/21		98	%	80 - 120
			Total Copper (Cu)	2018/08/21		95	%	80 - 120
			Total Iron (Fe)	2018/08/21		100	%	80 - 120
			Total Lead (Pb)	2018/08/21		99	%	80 - 120
			Total Lithium (Li)	2018/08/21		100	%	80 - 120
			Total Magnesium (Mg)	2018/08/21		100	%	80 - 120
			Total Manganese (Mn)	2018/08/21		96	%	80 - 120
			Total Molybdenum (Mo)	2018/08/21		97	%	80 - 120
			Total Nickel (Ni)	2018/08/21		97	%	80 - 120
			Total Potassium (K)	2018/08/21		101	%	80 - 120
			Total Selenium (Se)	2018/08/21		103	%	80 - 120
			Total Silicon (Si)	2018/08/21		100	%	80 - 120
			Total Silver (Ag)	2018/08/21		94	%	80 - 120
			Total Sodium (Na)	2018/08/21		NC	%	80 - 120
			Total Strontium (Sr)	2018/08/21		NC	%	80 - 120
			Total Tellurium (Te)	2018/08/21		101	%	80 - 120
			Total Thallium (Tl)	2018/08/21		98	%	80 - 120
			Total Tin (Sn)	2018/08/21		99	%	80 - 120
			Total Titanium (Ti)	2018/08/21		98	%	80 - 120
			Total Tungsten (W)	2018/08/21		101	%	80 - 120
			Total Uranium (U)	2018/08/21		99	%	80 - 120
			Total Vanadium (V)	2018/08/21		100	%	80 - 120
			Total Zinc (Zn)	2018/08/21		100	%	80 - 120
			Total Zirconium (Zr)	2018/08/21		101	%	80 - 120
5690128	ADA	Spiked Blank	Total Aluminum (Al)	2018/08/21		96	%	80 - 120
			Total Antimony (Sb)	2018/08/21		95	%	80 - 120
			Total Arsenic (As)	2018/08/21		100	%	80 - 120
			Total Barium (Ba)	2018/08/21		94	%	80 - 120
			Total Beryllium (Be)	2018/08/21		95	%	80 - 120

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Bismuth (Bi)	2018/08/21		95	%	80 - 120
			Total Boron (B)	2018/08/21		95	%	80 - 120
			Total Cadmium (Cd)	2018/08/21		97	%	80 - 120
			Total Calcium (Ca)	2018/08/21		96	%	80 - 120
			Total Chromium (Cr)	2018/08/21		94	%	80 - 120
			Total Cobalt (Co)	2018/08/21		98	%	80 - 120
			Total Copper (Cu)	2018/08/21		94	%	80 - 120
			Total Iron (Fe)	2018/08/21		99	%	80 - 120
			Total Lead (Pb)	2018/08/21		98	%	80 - 120
			Total Lithium (Li)	2018/08/21		104	%	80 - 120
			Total Magnesium (Mg)	2018/08/21		103	%	80 - 120
			Total Manganese (Mn)	2018/08/21		96	%	80 - 120
			Total Molybdenum (Mo)	2018/08/21		93	%	80 - 120
			Total Nickel (Ni)	2018/08/21		97	%	80 - 120
			Total Potassium (K)	2018/08/21		99	%	80 - 120
			Total Selenium (Se)	2018/08/21		104	%	80 - 120
			Total Silicon (Si)	2018/08/21		97	%	80 - 120
			Total Silver (Ag)	2018/08/21		94	%	80 - 120
			Total Sodium (Na)	2018/08/21		99	%	80 - 120
			Total Strontium (Sr)	2018/08/21		95	%	80 - 120
			Total Tellurium (Te)	2018/08/21		100	%	80 - 120
			Total Thallium (Tl)	2018/08/21		100	%	80 - 120
			Total Tin (Sn)	2018/08/21		94	%	80 - 120
			Total Titanium (Ti)	2018/08/21		94	%	80 - 120
			Total Tungsten (W)	2018/08/21		98	%	80 - 120
			Total Uranium (U)	2018/08/21		97	%	80 - 120
			Total Vanadium (V)	2018/08/21		97	%	80 - 120
			Total Zinc (Zn)	2018/08/21		101	%	80 - 120
			Total Zirconium (Zr)	2018/08/21		96	%	80 - 120
5690128	ADA	Method Blank	Total Aluminum (Al)	2018/08/21	<5.0		ug/L	
			Total Antimony (Sb)	2018/08/21	<0.50		ug/L	
			Total Arsenic (As)	2018/08/21	<1.0		ug/L	
			Total Barium (Ba)	2018/08/21	<2.0		ug/L	
			Total Beryllium (Be)	2018/08/21	<0.50		ug/L	
			Total Bismuth (Bi)	2018/08/21	<1.0		ug/L	
			Total Boron (B)	2018/08/21	<10		ug/L	
			Total Cadmium (Cd)	2018/08/21	<0.10		ug/L	
			Total Calcium (Ca)	2018/08/21	<200		ug/L	
			Total Chromium (Cr)	2018/08/21	<5.0		ug/L	
			Total Cobalt (Co)	2018/08/21	<0.50		ug/L	
			Total Copper (Cu)	2018/08/21	<1.0		ug/L	
			Total Iron (Fe)	2018/08/21	<100		ug/L	
			Total Lead (Pb)	2018/08/21	<0.50		ug/L	
			Total Lithium (Li)	2018/08/21	<5.0		ug/L	
			Total Magnesium (Mg)	2018/08/21	<50		ug/L	
			Total Manganese (Mn)	2018/08/21	<2.0		ug/L	
			Total Molybdenum (Mo)	2018/08/21	<0.50		ug/L	
			Total Nickel (Ni)	2018/08/21	<1.0		ug/L	
			Total Potassium (K)	2018/08/21	<200		ug/L	
			Total Selenium (Se)	2018/08/21	<2.0		ug/L	
			Total Silicon (Si)	2018/08/21	<50		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Silver (Ag)	2018/08/21	<0.10		ug/L	
			Total Sodium (Na)	2018/08/21	<100		ug/L	
			Total Strontium (Sr)	2018/08/21	<1.0		ug/L	
			Total Tellurium (Te)	2018/08/21	<1.0		ug/L	
			Total Thallium (Tl)	2018/08/21	<0.050		ug/L	
			Total Tin (Sn)	2018/08/21	<1.0		ug/L	
			Total Titanium (Ti)	2018/08/21	<5.0		ug/L	
			Total Tungsten (W)	2018/08/21	<1.0		ug/L	
			Total Uranium (U)	2018/08/21	<0.10		ug/L	
			Total Vanadium (V)	2018/08/21	<0.50		ug/L	
			Total Zinc (Zn)	2018/08/21	<5.0		ug/L	
			Total Zirconium (Zr)	2018/08/21	<1.0		ug/L	
5690128	ADA	RPD	Total Aluminum (Al)	2018/08/21	18		%	20
			Total Antimony (Sb)	2018/08/21	NC		%	20
			Total Arsenic (As)	2018/08/21	NC		%	20
			Total Beryllium (Be)	2018/08/21	NC		%	20
			Total Boron (B)	2018/08/21	1.9		%	20
			Total Cadmium (Cd)	2018/08/21	NC		%	20
			Total Chromium (Cr)	2018/08/21	NC		%	20
			Total Cobalt (Co)	2018/08/21	NC		%	20
			Total Copper (Cu)	2018/08/21	6.4		%	20
			Total Iron (Fe)	2018/08/21	3.7		%	20
			Total Lead (Pb)	2018/08/21	0.52		%	20
			Total Manganese (Mn)	2018/08/21	2.5		%	20
			Total Molybdenum (Mo)	2018/08/21	4.0		%	20
			Total Nickel (Ni)	2018/08/21	NC		%	20
			Total Selenium (Se)	2018/08/21	NC		%	20
			Total Silver (Ag)	2018/08/21	NC		%	20
			Total Thallium (Tl)	2018/08/21	NC		%	20
			Total Tungsten (W)	2018/08/21	NC		%	20
			Total Uranium (U)	2018/08/21	3.2		%	20
			Total Vanadium (V)	2018/08/21	7.3		%	20
			Total Zinc (Zn)	2018/08/21	NC		%	20
			Total Zirconium (Zr)	2018/08/21	NC		%	20

N/A = Not Applicable

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

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

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

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

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

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

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Maxxam Job #: B8K8119
Report Date: 2018/10/01

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Site Location: FOX-C Ekalugad Fjord
Your P.O. #: MAR2516
Sampler Initials: KR

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere, Scientific Service Specialist

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

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Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

14-Aug-18 09:50
Antonella Brasil
B8K8119
J_L ENV-1164

Page 1 of 2

Bottle Order #: 677100

Project Manager: Antonella Brasil

C#677100-01-01

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#34676 SLR Consulting (Canada) Ltd.	Company Name:	SLR Consulting Ltd.	Quotation #:	B81132
Attention:	Kaitlyn Roberts	Attention:	Kaitlyn Roberts	P.O. #:	MAR2516
Address:	43 Auriga Drive, Suite 203 Nepean ON K2E 7Y8	Address:		Project:	209.40585.00000
Tel:	(613) 805-1065 Fax:	Tel:	(613) 805-1065 Fax:	Project Name:	
Email:	kroberts@slrconsulting.com	Email:	kroberts@slrconsulting.com	Site #:	FOX-C Ekalugad Fjord
				Sampled By:	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ For RSC
☐ Table ___

Other Regulations
☒ CCME ☐ Sanitary Sewer Bylaw
☐ Reg 558. ☐ Storm Sewer Bylaw
☐ MISA Municipality ___
☐ PWQO
☐ Other ___

Special Instructions
Metals only
↓
Reg 153

Include Criteria on Certificate of Analysis (Y/N)? Y

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): (Metals) / Hg / Cr VI	Petroleum Hydrocarbons	Total Metals Analysis by ICPMS	Dissolved ICPMS Metals	PCBs	Total Suspended Solids	Sulphate by Automated Colourimetry	Chloride by Automated Colourimetry	Carbonate, Bicarbonate and Hydroxide	Alkalinity	Hardness (calculated as CaCO3)	# of Bottles	Comments
1		MW South KR																on ice
2		MW East KR																
3		MW North	2018/08/12	9:50	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	RECEIVED IN OTTAWA
4		MW Northwest	2018/08/12	11:00	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	
5		MW Southwest KR																
6		Duplicate - 2	2018/08/12	9:50	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	
7		SW East	2018/08/12	11:15	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	
8		Field Blank	2018/08/12	10:00	Water	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	8	no PCBs
9																		
10																		

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Kaitlyn Roberts	18/08/13	19:30	Ian Campbell	2018/08/14	9:50	
				2018/08/15	0800	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	1,2,2	Present	✓	
		Intact	✓	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

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

White: Maxxa Yellow: Client

71610
61818
71517

Maxxam Analytics International Corporation o/a Maxxam Analytics

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A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#34676 SLR Consulting (Canada) Ltd.	Company Name:	SLR Consulting	Quotation #:	B81132	Maxxam Job #:	Bottle Order #:
Attention:	Kaitlyn Roberts	Attention:	Kaitlyn Roberts	P.O. #:	MAR2516		676889
Address:	43 Auriga Drive, Suite 203 Nepean ON K2E 7Y8	Address:		Project:	209.40585.00000	COC #:	Project Manager:
Tel:	(613) 805-1065 Fax:	Tel:	(613) 805-1065 Fax:	Project Name:		C#676889-01-01	Antonella Brasil
Email:	kroberts@slrconsulting.com	Email:	kroberts@slrconsulting.com	Site #:	Cape Christian		
				Sampled By:			

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☒ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558. ☐ Storm Sewer Bylaw
- ☐ MISA Municipality ___
- ☐ PWQO
- ☐ Other ___

Special Instructions: Metals → Reg 153 only

Include Criteria on Certificate of Analysis (Y/N)? Y

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Petroleum Hydrocarbons	Total Metals Analysis by ICPMS	Dissolved ICPMS Metals	PCBs	Total Suspended Solids	Sulphate by Automated Colourimetry	Chloride by Automated Colourimetry	Carbonate, Bicarbonate and Hydroxide	Alkalinity	Hardness (calculated as CaCO3)	# of Bottles	Comments
1		MW-1	2018/08/10	13:00	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	
2		MW-2	"	14:30	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	one PCB ~ less than half full
3		MW-3	"	11:00	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	
4		MW-4	"	11:45	"	✓	✓	✓	✓	KR ✓	✓	✓	✓	✓	✓	✓	7	no PCBs and only one PAH
5		Duplicate	"	13:00	"	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	
6		~~FIELD BLANK~~ KR																On ice
7																		RECEIVED IN OTTAWA
8																		
9																		
10																		

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Kaitlyn Roberts	18/08/13	19:30	Ian Campbell	2018/08/14	9:50	
				2018/08/15	0800	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	1,2,2	Present	X	
		Intact	X	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

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

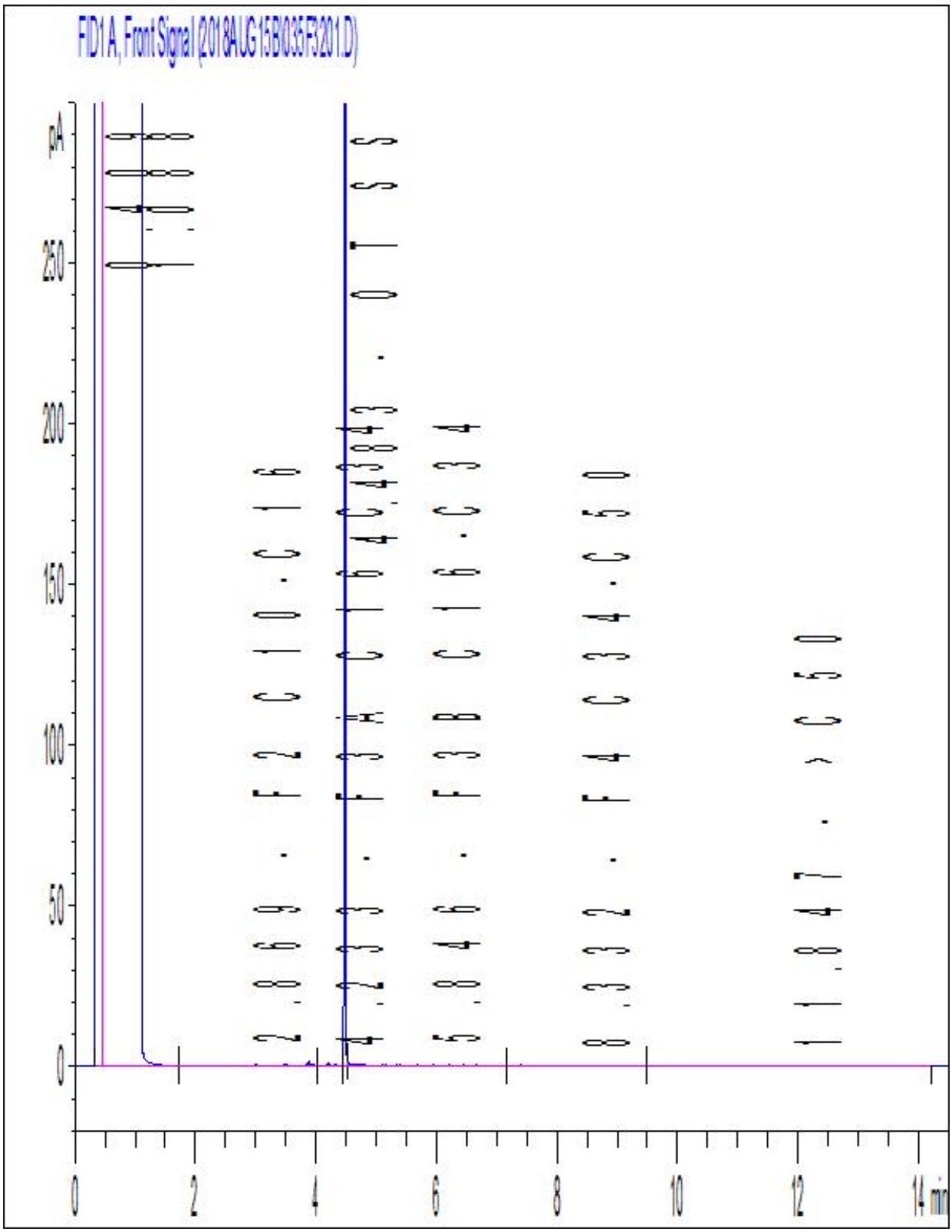
White: Maxxa Yellow: Client

7/16/10
6/18/16
7/15/7

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB935

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: MW NORTH

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

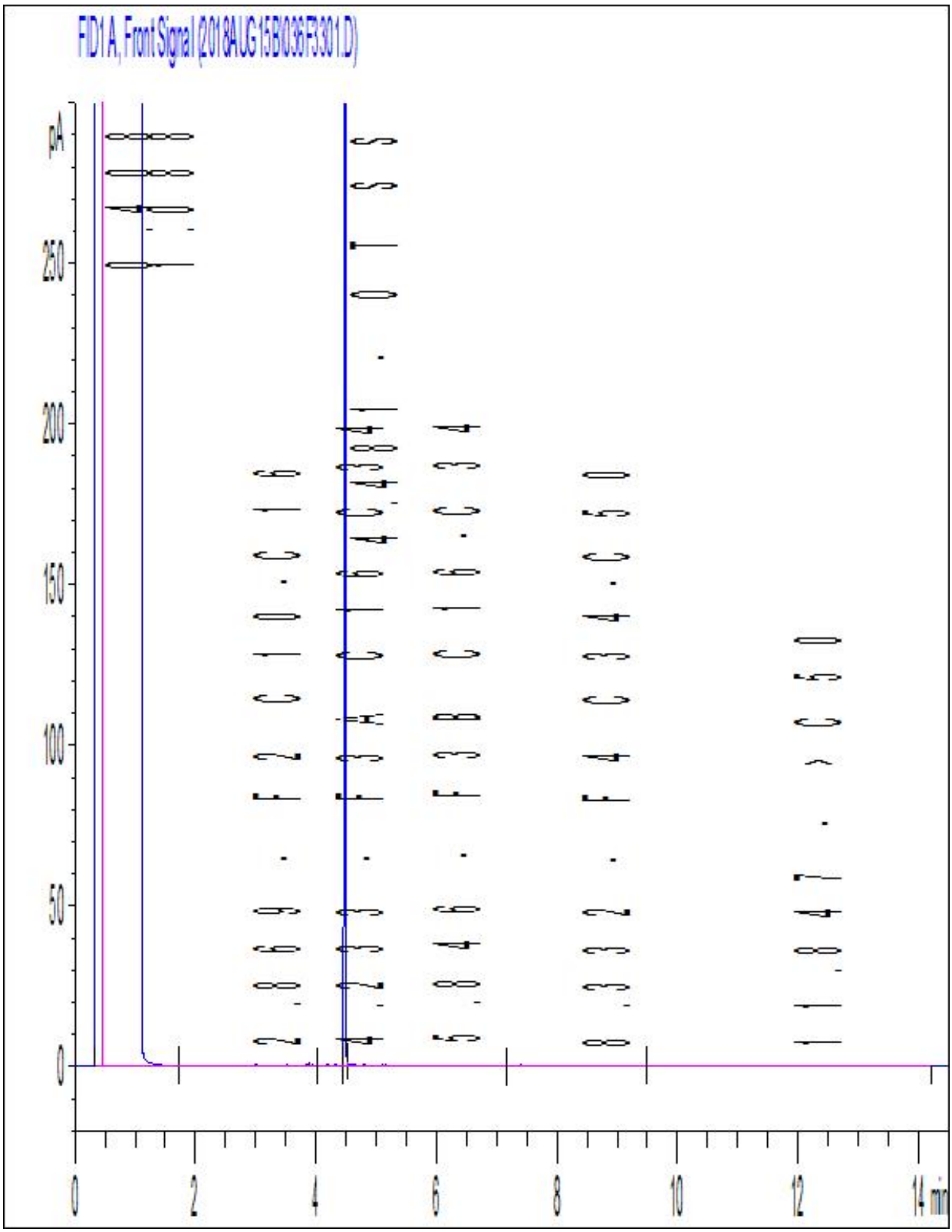


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB936

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: MW NORTHWEST

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

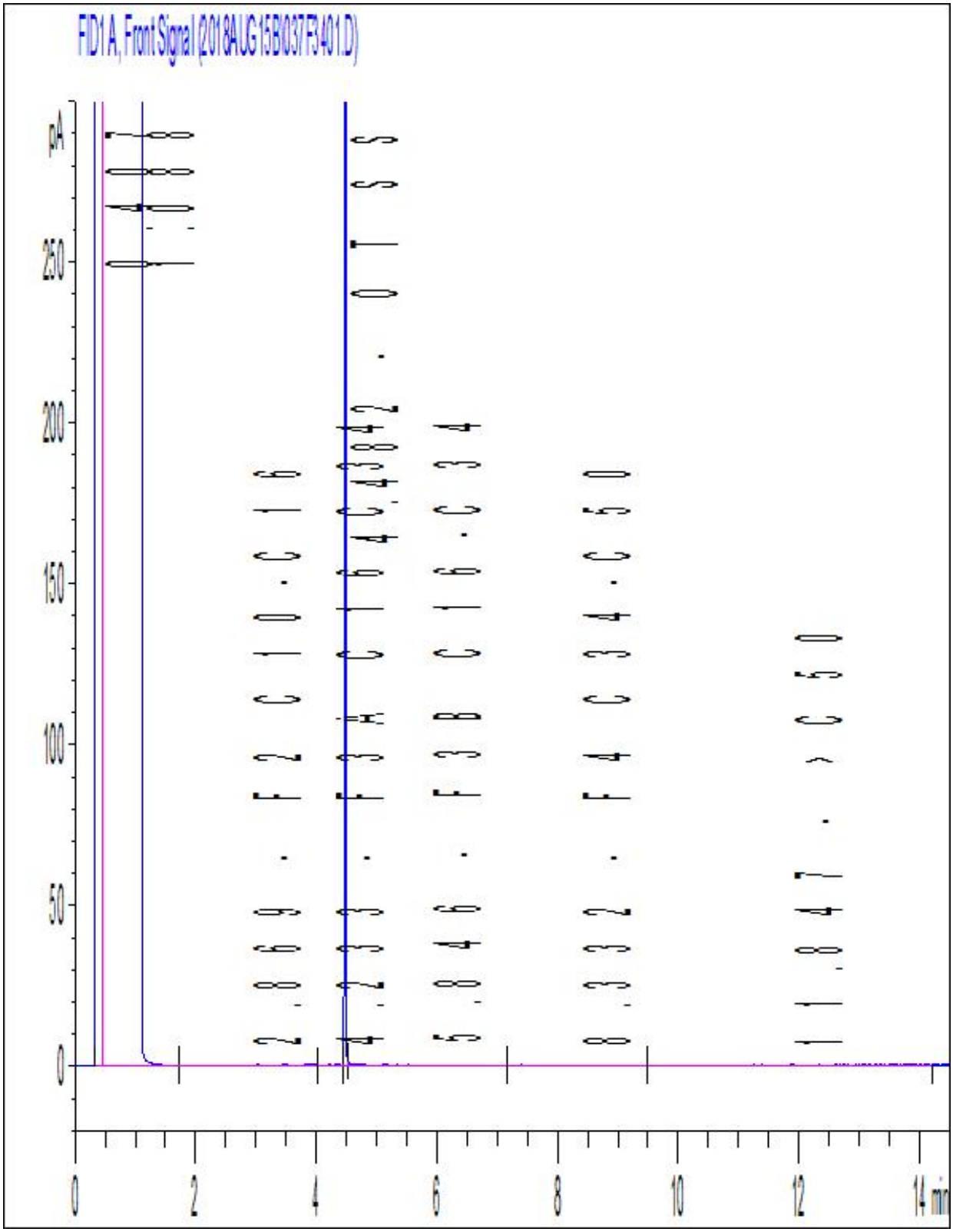


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB937

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: DUPLICATE-2

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

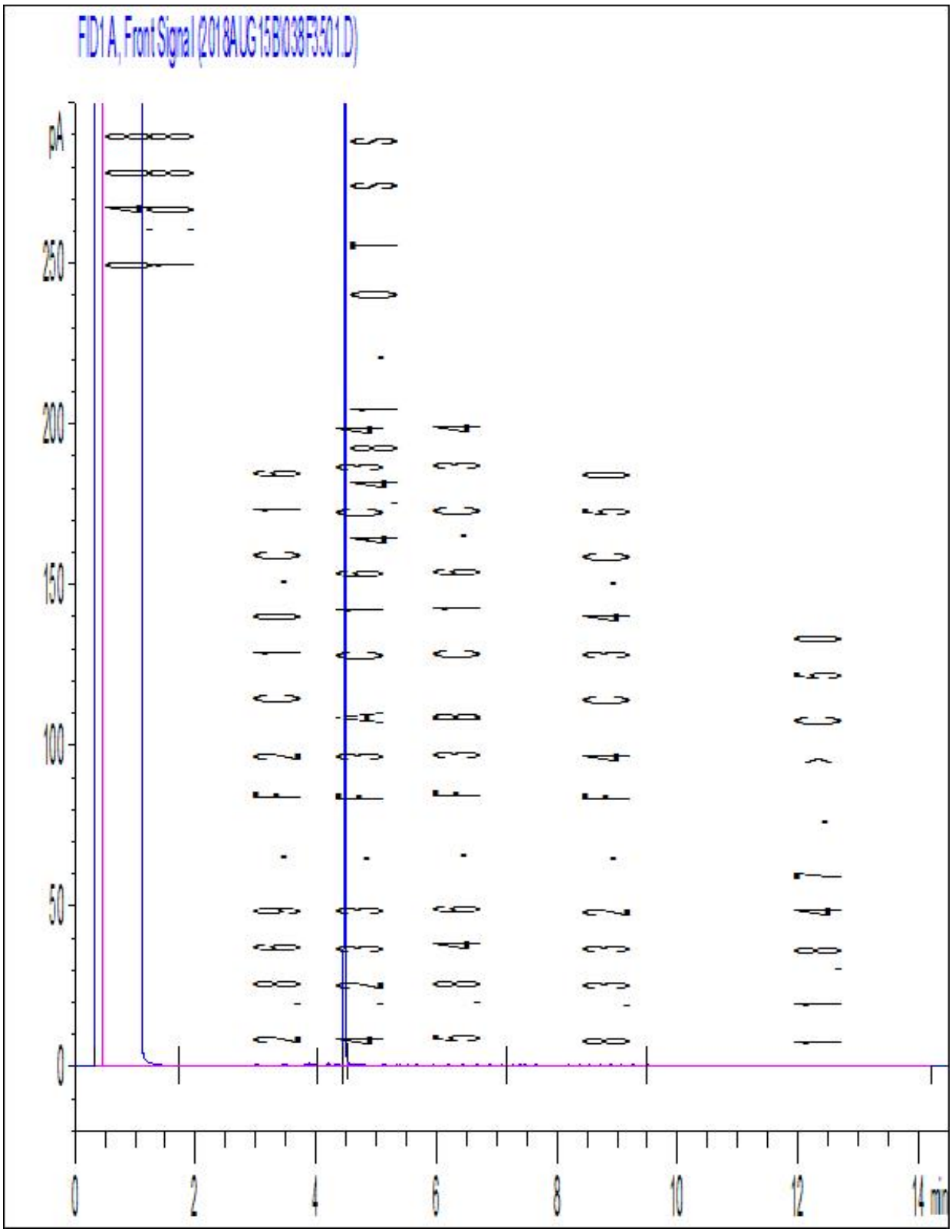


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB938

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: SW EAST

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

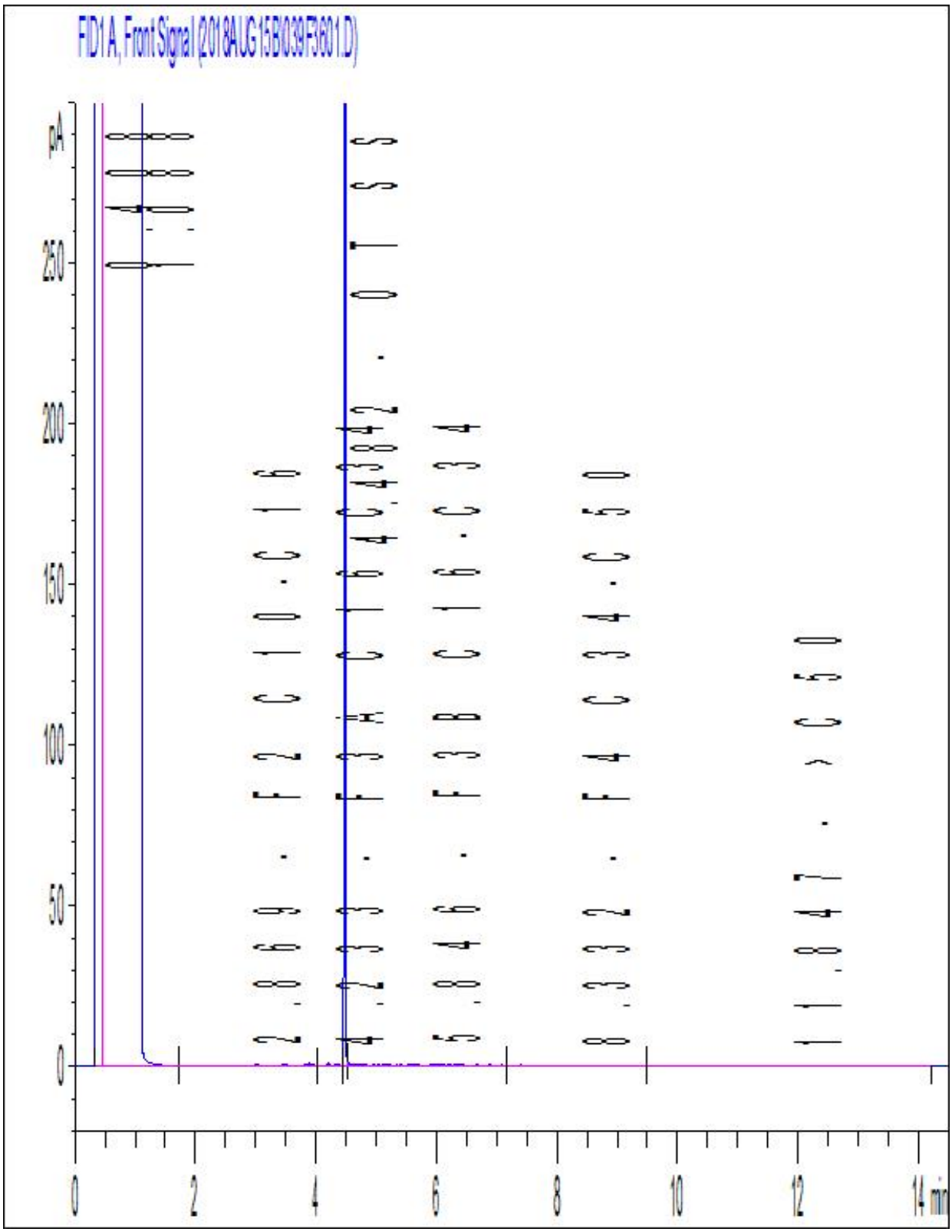


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB939

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: FIELD BLANK

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

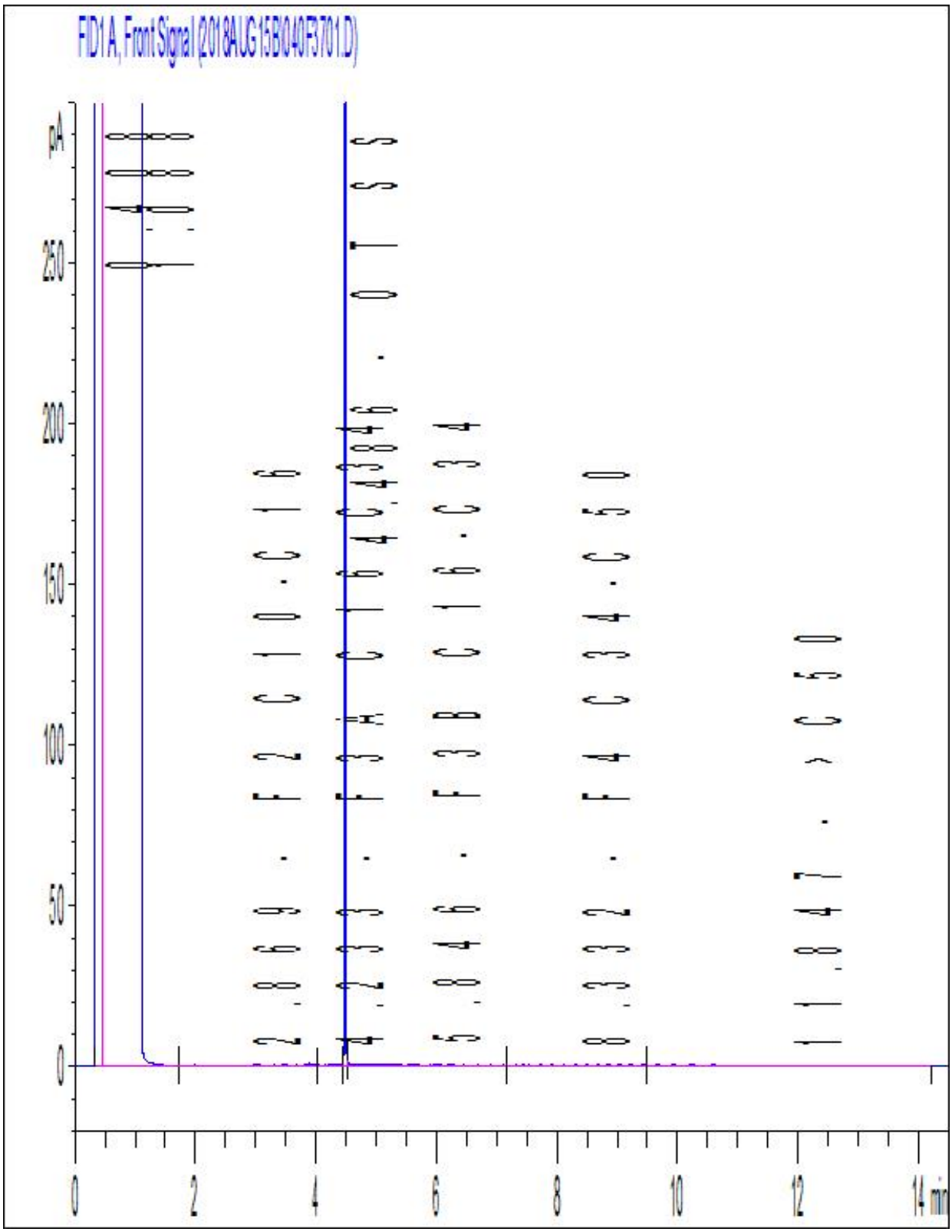


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB940

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: MW-1

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

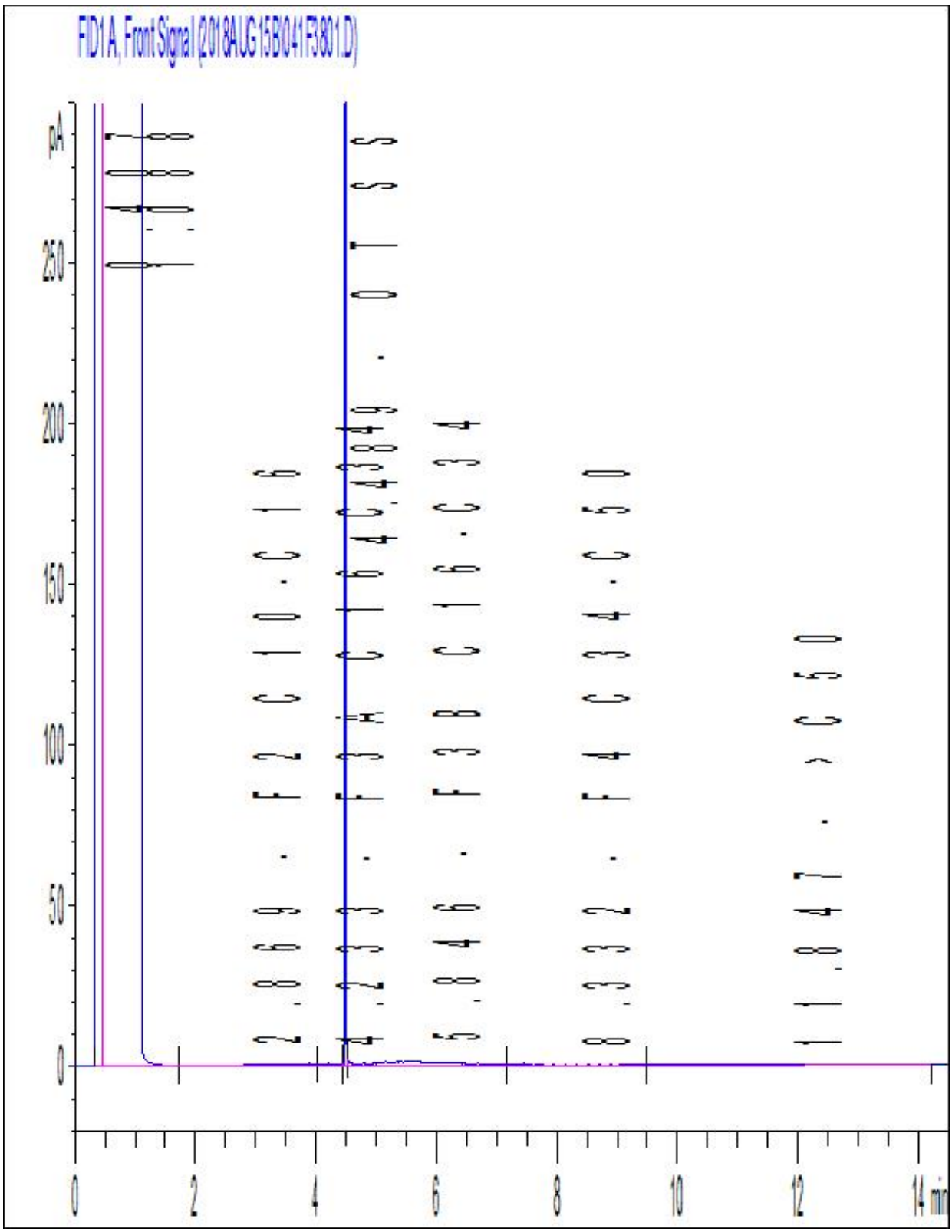


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB941

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: MW-2

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

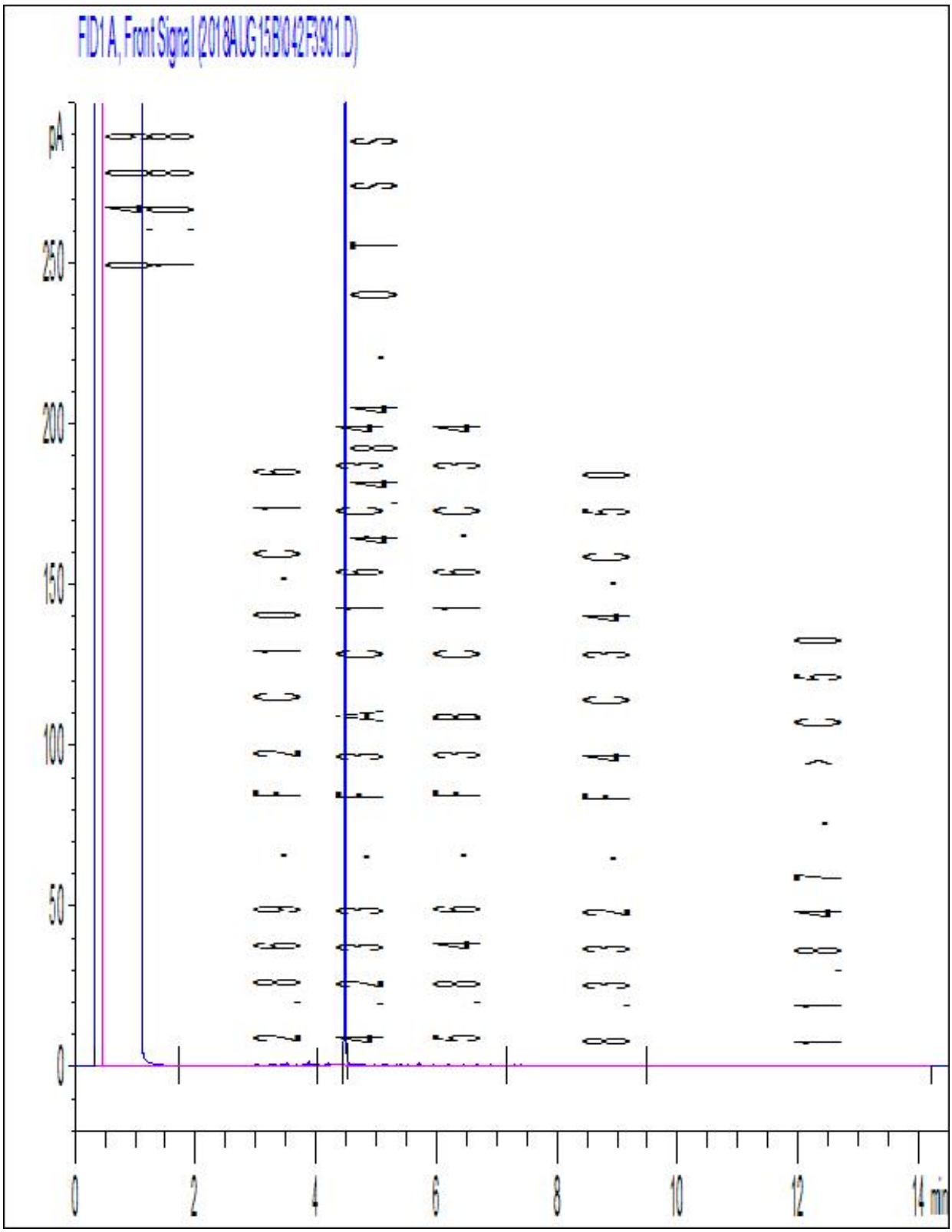


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB942

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: MW-3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

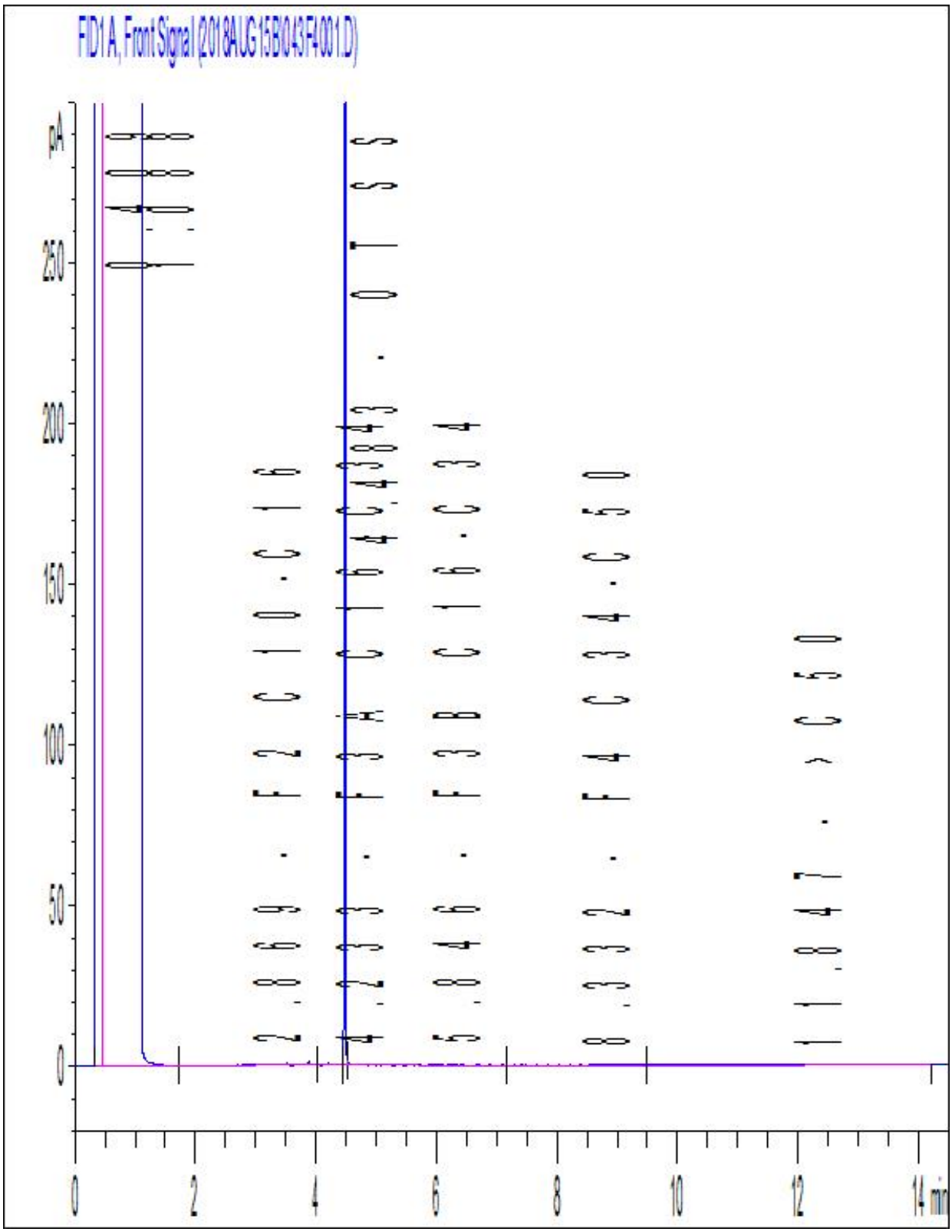


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB943

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: MW-4

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

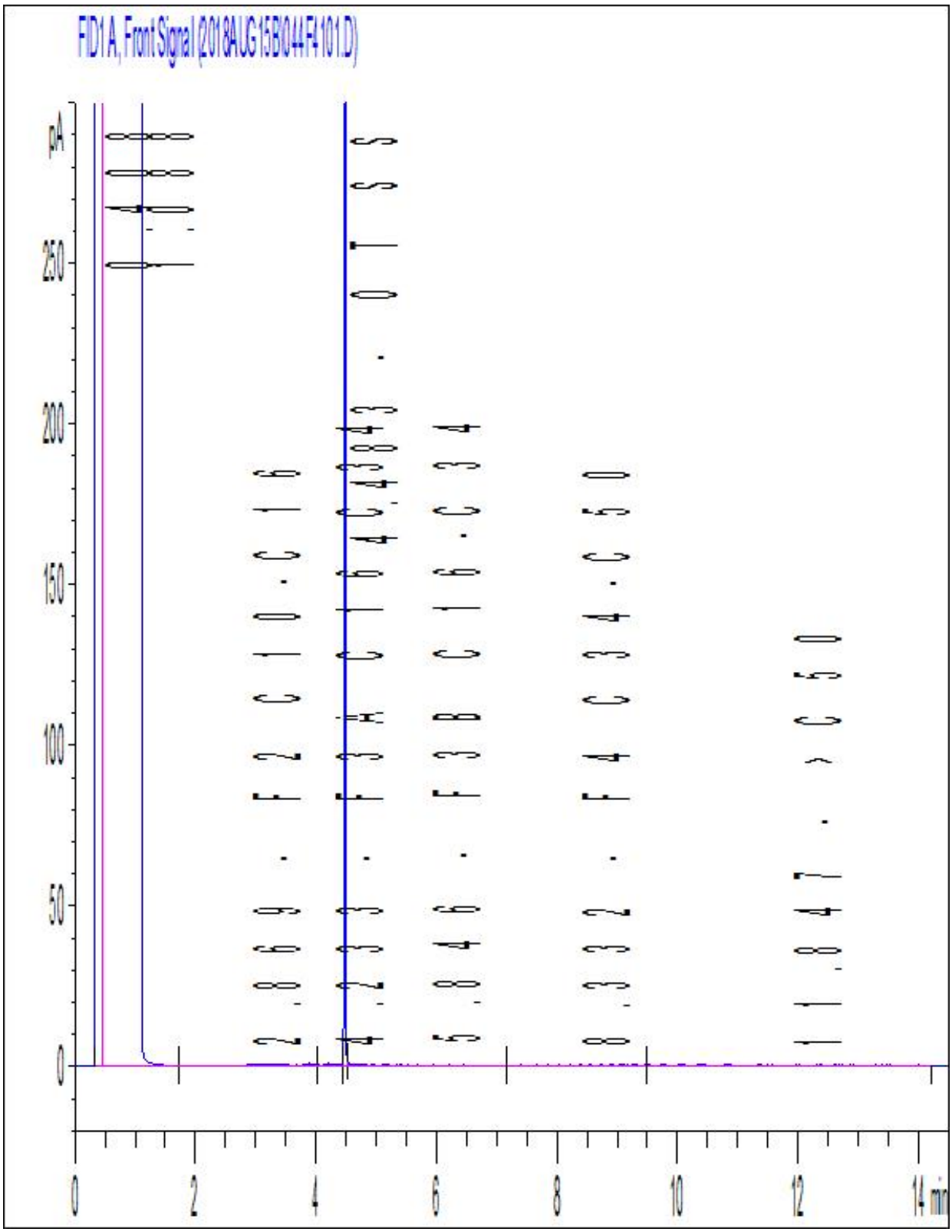


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B8K8119
Report Date: 2018/10/01
Maxxam Sample: HMB944

SLR Consulting (Canada) Ltd.
Client Project #: 209.40585.00000
Project name: FOX-C Ekalugad Fjord
Client ID: DUPLICATE

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

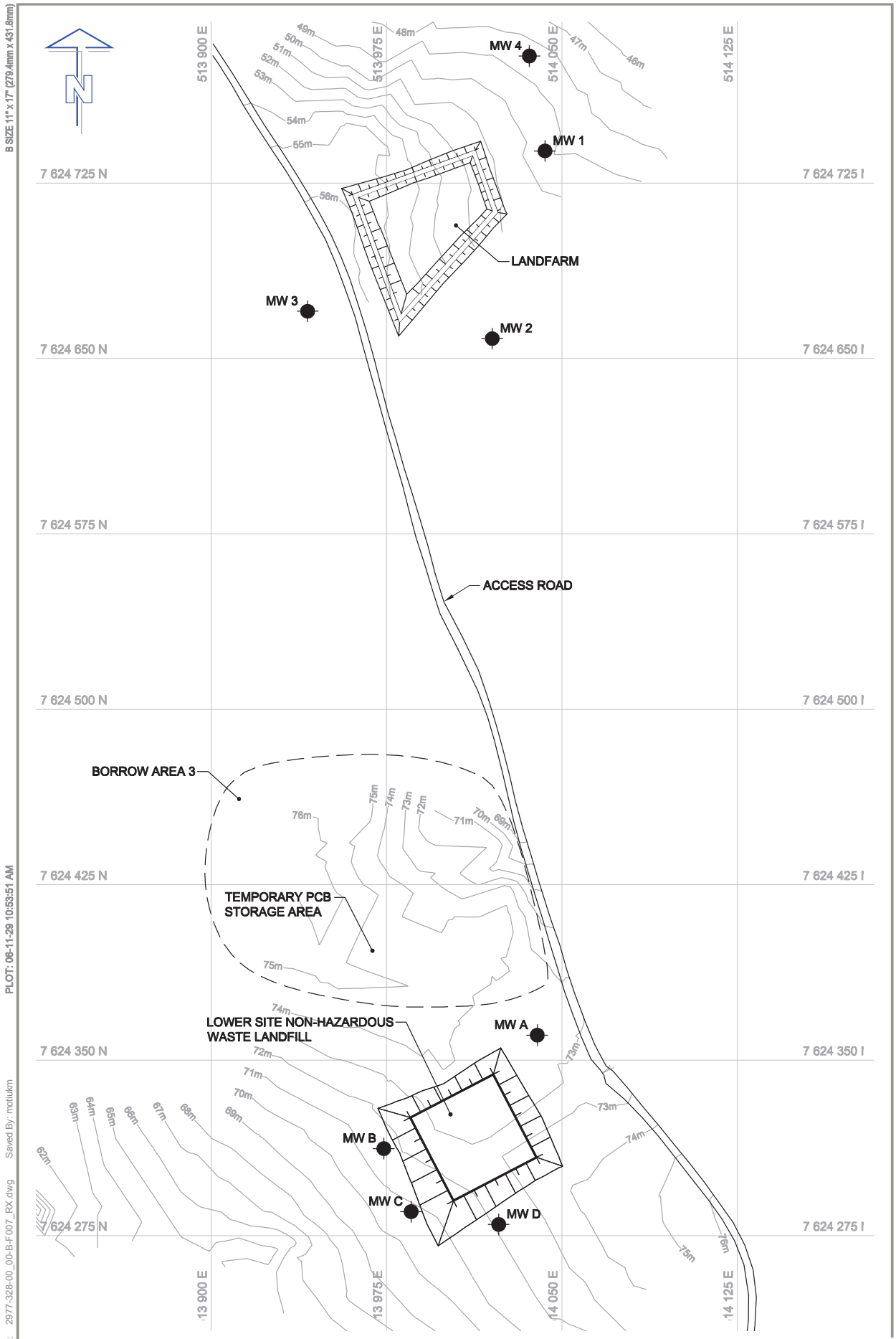


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

APPENDIX D
Figures from 2008 and 2009 UMA Reports (from Arcadis, 2017)

Crown-Indigenous Relations and Northern Affairs Canada
Contaminants and Remediation Division

FOX-C Ekalugad Fjord Long Term Monitoring Event
Qikiqtaaluk Region, Nunavut
SLR Project No.: 209.40585.00000



B SIZE 11" x 17" (279.4mm x 431.8mm)

PLOT: 06-11-29 10:53:51 AM

UMA FILE NAME: 2977-328-00_00-B-F007_RX.dwg Saved By: motiukm

SCALE 1:1501

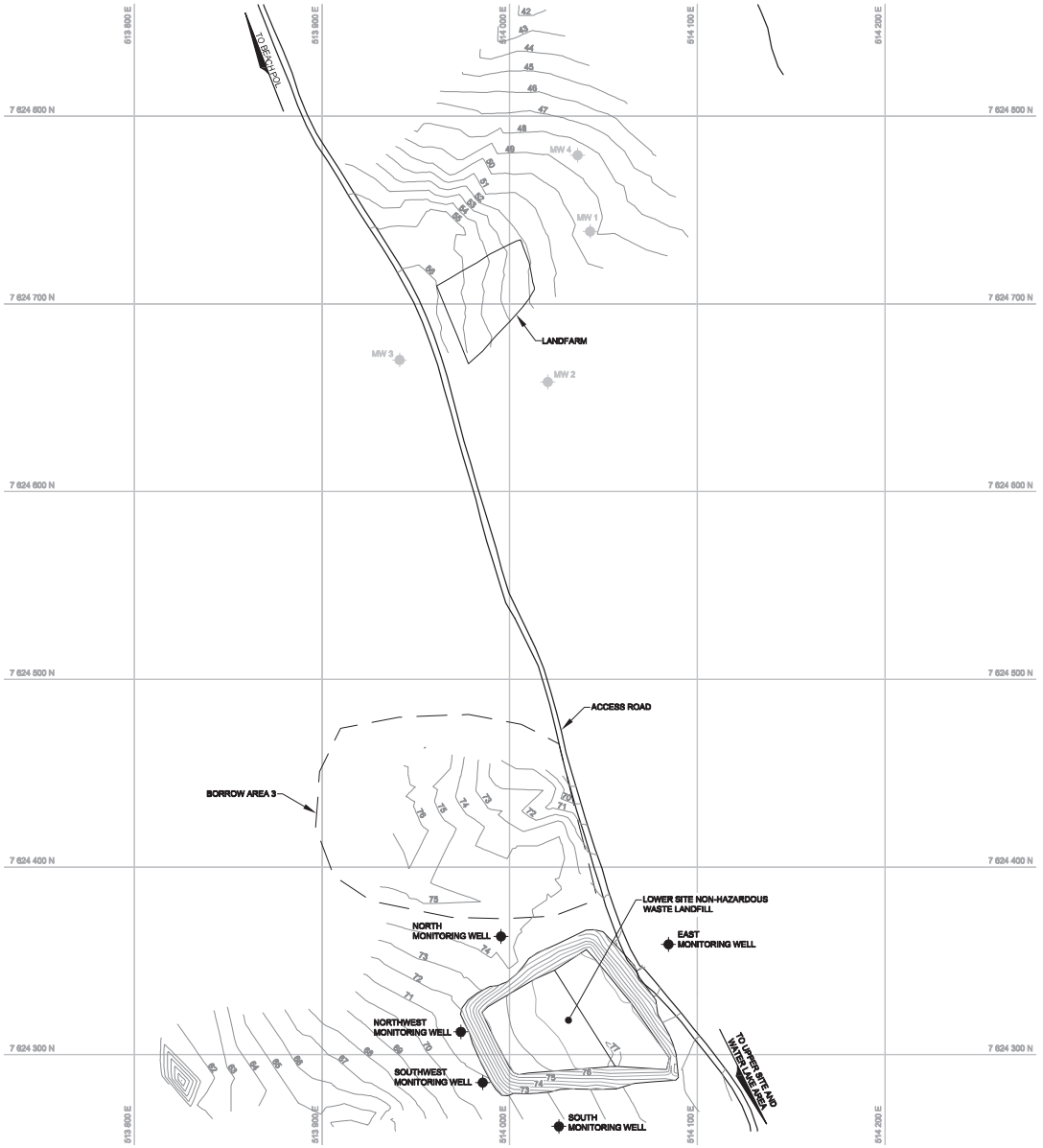
LEGEND:

MW 2 MONITORING WELL

Public Works and Government Services Canada
FOX - C Ekalugad Fiord - Monitoring Services

Landfarm and Landfill
2006 Field Season
Figure - 3.0

UMA | AECOM



GENERAL NOTES:

1. GROUND CONTOURS ARE SHOWN AT AN INTERVAL OF 1m.
2. LANDFILL CONTOURS ARE SHOWN AT AN INTERVAL OF 0.5m.

LEGEND:

- GROUND CONTOURS
- LANDFILL CONTOURS
- MONITORING WELL LOCATION
- FORMER MONITORING WELL LOCATION

0 25 50 m SCALE 1:2500

Public Works and Government Services Canada
FOX - C Ekalugad Fiord - Monitoring
FOX-C 2008 Services

Lower Site Landfill Area
Site Plan
Figure 5.0

AECOM

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UMA FILE NAME: 2977-328-04_00-B-F005_RD.dwg Saved By: chadb PLOT: 09/04/22 1:35:16 PM B SIZE 11" x 17" (279.4mm x 431.8mm)

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