

Michael Brownlee
Sr. Environmental Specialist
PSPC Environmental Services, Western Region
10025 Jasper Avenue
Edmonton, Alberta T5J 1S6
Canada

Arcadis Canada Inc.
329 Churchill Avenue North
Suite 200
Ottawa
Ontario K1Z 5B8
Tel 613 721 0555
Fax 613 721 0029
www.arcadis.com

Subject:

**Former Iqaluit Metal Dump and Community Landfill –
Nunavut Water Board (NWB) 2017 Annual Reporting –
Licence 1BR-MDR1721**

Date:
2018.03.06

Dear Mr. Brownlee:

Contact:
Ryan Fletcher

Arcadis Canada Inc. (Arcadis) was retained by Public Services and Procurement Canada (PSPC) on behalf of Transport Canada (TC) to assemble the information required for the Nunavut Water Board (NWB) annual reporting requirements with regards to the remediation program that took place between July 23, 2017 and October 13, 2017 at the Transport Canada Iqaluit Former Metal Dump and Community Landfill in Nunavut (NU). This letter report comprises the necessary information as detailed in communications to Arcadis from PSPC and Transport Canada (TC).

Phone:
613-703-3122

Email:
ryan.fletcher@arcadis.com

Our ref:
102153-002

REMEDIAL SUMMARY

The remediation program at the former Iqaluit Metal Dump and Community Landfill was completed in accordance with the regulatory requirements as stipulated in the Nunavut Water Board (NWB) Water License 1BR-MDR1721 as well as all applicable regulations dictated by the Federal Government of Canada and the Government of Nunavut.

The project operated over the period of one summer/fall field season starting on July 25, 2017 and ending on October 13, 2017 with all site activities, including mobilization and de-mobilization, taking place within that timeframe. All stated objectives of the remediation program at the former Iqaluit Metal Dump and Community Landfill was successfully completed.

The remediation included the following:

- Proper collection, packaging, transport and off-site disposal of any hazardous waste encountered (i.e., lead amended painted material, asbestos, liquid wastes, hazardous soils, tires, and batteries);
- Construction and closure of an engineered landfill to contain historical, non-hazardous waste debris present on site;
- Consolidation of non-hazardous materials from outlying areas into the main landfill during construction;
- Excavation and consolidation of metal impacted soils from outlying areas and incorporation into the main landfill during construction; and
- Excavation and off-site disposal of impacted sediments from a small drainage channel.

The results of chemical analyses on soil samples procured from the areas formerly impacted by metals and/or petroleum hydrocarbons show that the soil at the final limits of the earthworks meet the clean-up criteria as outlined in the project specifications and applicable CCME commercial land use guidelines – indicating a successful soil clean-up. All non-hazardous material was consolidated and incorporated into the enclosed Zone 1 of the main landfill. All hazardous material was containerized and transported off-site as of October 13, 2017. Areas within AEC 1 and AEC 2 were capped using clean engineered fill. The main landfill, (formerly AEC 3) was constructed successfully as per specification documents. No remediation work remains to be completed on site at the current time. Before and after photographs of the project site are presented in Appendix A.

A final inspection by PSPC and TC personnel was completed after all non-hazardous material had been collected from the field and consolidated in the engineered landfill. Upon completion of the second (of two) site tours, the Crown (as represented by PSPC and TC) accepted the site as fully remediated and the project successfully completed.

WATER USAGE

Water licence 1BR-MDR1721 was granted to TC on July 21, 2017 by the NWB, contingent on the approval of the Performance and Long-Term Monitoring Plan, received on September 25, 2017. The license was issued for a four-year term and is set to expire on July 21, 2021. The licence allowed for the use and diversion of fresh water, up to a maximum of 50 m³ per day.

A maximum of approximately 100 litres (0.1 m³) of water was extracted during the life of the project for on-going environmental surface water sampling. The daily maximum of 50 m³ per day was not exceeded at any time. No other water was utilized, diverted, or modified during the remedial activities at the site. Excavation in drainage channels occurred after temperatures had dropped below freezing, enabling work to proceed without needing to divert or remove water.

As part of the performance monitoring, surface water sampling stations were established on site; their coordinates are presented below in Table 1 (on the following page) and the locations shown on Figure 1 (following text):

Table 1: Summary of Surface Water Monitoring Stations

Performance Monitoring Station #	Surface Water Sample ID	Easting (UTM83)	Northing (UTM83)	Feature
1	LTM1	521750.251	7067946.256	Pond 1
2	LTM2	521800.108	7067986.503	Pond 2
3	LTM3	521836.893	7067795.774	Pond 3
4	LTM4	521860.124	7067686.315	Pond 4
5	LTM5	521915.011	7067718.731	Pond 5
6	LTM6	521936.764	7067744.086	Pond 6
7	LTM7	522027.627	7067865.856	Culvert discharge area - upgradient

PERFORMANCE MONITORING

Performance monitoring, meant to gauge the efficacy of the environmental protection measures put in place during construction, of the receiving water bodies (Ponds 1, 2, and 4-6 shown on Figure 1) was carried out during the remedial activities. The following sections outline both the field chemistry monitoring and laboratory chemical analyses conducted during the remedial activities at the Former Iqaluit Metal Dump and Community Landfill.

Field Chemistry Monitoring

These sample stations correspond with the sample stations to be utilized during the long-term monitoring program in subsequent years (2018 and beyond). During the performance monitoring stage (i.e., during active remediation), each station was monitored on a weekly basis (minimum) for the field parameters of pH, temperature, conductivity, dissolved oxygen, and turbidity using a field calibrated multi-meter (a Horiba U-52 water quality multi-meter). The data was collected at these pre-determined stations, from the same location during each monitoring round. This was done by directly dipping the Horiba into the surface water body and allowing adequate time for all of the parameters to stabilize prior to data collection. Stabilization time varied from one location to another; however, was typically in the range of approximately 5 minutes +/- . The data was stored within the hand-held computer and transferred to a Microsoft Excel spreadsheet.

Based on the results of the field chemistry monitoring, it was determined that no significant change in surface water quality parameters was observed during the construction and remediation program. This indicates that the remedial activities conducted in and around these water bodies had no negative impact on those water bodies.

Laboratory Chemical Analyses

Upon approval of the Performance and Long-Term Monitoring Plan on September 25, 2017, Arcadis (on behalf of PSPC and TC) commenced additional laboratory chemical analyses surface water samples from the site. Two rounds of surface water samples were collected as part of this monitoring on September 21, 2017 and October 3, 2017, during the remediation works. Due to frozen conditions, station LTM-1 was not able to be sampled during the October 3, 2017 monitoring event. Results of these laboratory analyses are provided in Table 2 following the text.

All surface water samples were collected by directly dipping the laboratory supplied containers into the surface water bodies. The containers were filled to the laboratory specified volume and the laboratory specified preservatives were used based on the analyte being tested. Samples were then stored in a cooler on ice and kept below 10 degrees Celsius. The samples were shipped under chain of custody to Maxxam Analytics in Ottawa, Ontario, for analysis.

Based on the results of the surface water laboratory analyses, concentrations for PAH, PCB, PHC, Inorganic, and VOC parameters were at either non-detect concentrations or below the selected EQGs.

The metal analyte iron was reported at concentrations above the selected EQG at LTM1, LTM3, LTM4, LTM5, LTM6, and LTM7 during both sampling rounds. In addition, the metal analyte zinc was also reported above the selected EQG at LTM3 (first round only) and LTM 7 (for both rounds).

The long-term monitoring stations were designed to roughly correspond with stations previously sampled during the environmental assessment stage of the project which occurred from in 2008, 2009, and 2017. The elevated concentrations of lead match the levels reported in historical sampling events in both 2008 and 2009 (Franz, 2010 & Arcadis 2017); indicating that the remedial activities did not have any negative effect on the receiving water bodies.

DEPOSIT AND DISPOSAL OF WASTE

All waste was either enclosed in the landfill Zone 1 (non-hazardous) or shipped off-site (hazardous) by 17 October 2017. As part of the water licence application, it was estimated that a total of 3629 m³ of bulk items/scrap metal was to be consolidated into the on-site landfill. The actual amount of waste consolidated and incorporated into the landfill design was 1369 m³. In addition, a total of 372 m³ of metal impacted soil was also excavated from outlying areas and consolidated into the main landfill lifts during construction. These items constituted the non-hazardous waste streams.

Impacted sediments were excavated and placed in containment areas that included secondary containment and were allowed to dry. These soils were tested and a total volume of 42.02 m³ was bagged and transported south for disposal at Sol+, Sanexen Services Environnementaux Inc., Sherbrooke, QC.

Material with lead-amended paint was collected, segregated and transported to a temporary work area (TWA) for further processing. This material was further reduced in size using the Hitachi 350 LC excavator and hydraulic shear. The material was then packaged in sea cans for transportation. A total of 171 m³ of lead-amended material was packaged for transportation and disposal south at Solva Rec Environment, 795 Rue Lucien-Beaudin, Saint Jean sur Richelieu, QC, Canada, J2X 5M3.

Various liquids were identified in drums (mostly petroleum hydrocarbons) during the remedial activities at the former Iqaluit Metal Dump and Community Landfill. The drums were drained of their contents and recovered liquids of like type were consolidated and transferred to new drums for transportation off-site to the Qikiqtuaaluk Environmental (Q.E.) facility located at 2027 Iqaluit Lane, Iqaluit, Nunavut for disposal. The total volume of liquids collected, processed, and disposed of was 6,120 litres.

A small quantity of asbestos material (mostly insulation and brake pads from old vehicles) was collected from the debris throughout the site during the remedial activities. A total of 1 m³ of asbestos was collected, packaged and disposed of. Some additional hazardous materials were identified, collected and packaged for disposal, including: 29 fire extinguishers and their powder contents, two propane tanks, nine oxygen cylinders, and one oil solid (tar like) material. All of these items were transferred to the Q.E. facility for disposal. All of these items combined accounted for a total of 3.2 m³ of material.

The following summarizes the hazardous waste disposal as part of this project.

Table 2: Summary of Hazardous Waste Disposal

Description	Disposal
Lead Amended Material	Solva Rec Environment, 795 Rue Lucien-Beaudin, Saint Jean sur Richelieu, QC, Canada, J2X 5M3
Tires	Lafarge Canada Inc.
Batteries	Qikiqtuaaluk Environmental (Q.E.) Environmental
Liquids – various	Currently stored at Qikiqtuaaluk Environmental (Q.E.) Environmental Waste Processing Facility (EWPF) in Iqaluit, NU. To be shipped south autumn 2018 for disposal in January 2019.
Other - including equipment containing PCBs	Currently stored at Qikiqtuaaluk Environmental (Q.E.) Environmental Waste Processing Facility (EWPF) in Iqaluit, NU.
Asbestos Containing Materials and Wastes	In progress – Final disposal facility T.B.D. end of January 2018. Currently stored at Qikiqtuaaluk Environmental (Q.E.) Environmental Waste Processing Facility (EWPF) in Iqaluit, NU.
PCB Contaminated Sediment	Sol+, 10930 rue Sherbrooke Est, Montreal-Est, Quebec, H1B 1B4, 450-649-7484
Hydrocarbon Contaminated Material (HCM)	On treatment pad at Q.E. in Iqaluit, NU to be treated in the Spring of 2018.

Waste disposal manifests are provided in Appendix B of this report.

FUTURE WORK

Based on the provisions outlined in the Performance and Long-Term Monitoring Plan (LTM), as part of the NWB water licence number 1BR-MDR1721 issued July 31, 2017 and associated LTM approval letter dated September 25, 2017, long-term monitoring will be undertaken at the site annually to confirm that the risk management measures implemented as part of the remedial program remain stable and provide the level of protection to human and ecological receptors as modelled in the site specific risk assessment.

Future water use at the site will not be expected to exceed 50 m³ annually and will be extracted in the form of surface water samples for chemical analysis as part of the LTM program. No further waste will be generated or deposited in future years.

Sincerely,

Arcadis Canada Inc.

Ryan Fletcher, C.Tech, EP
Sr. Environmental Technician

Enclosures:

Tables

- 1 Performance Monitoring
- 2 Laboratory Chemical Analysis

Figures

- 1 Long Term Monitoring Sample Locations

Attachments

- A Before and After Photographs
- B Waste Disposal Manifests

TABLES



Table 1: Performance Monitoring LTM 1
TC Iqaluit

	13-Aug-17	14-Aug-17	15-Aug-17	17-Aug-17	18-Aug-17	19-Aug-17	20-Aug-17	21-Aug-17	22-Aug-17	23-Aug-17	24-Aug-17	25-Aug-17	26-Aug-17	27-Aug-17	28-Aug-17	29-Aug-17	30-Aug-17	31-Aug-17	01-Sep-17
C	7.48	11.22	12.89	9.84	10.5	9.52	12.33	11.87	11.42	10.7	8.6	10.06	9.98	10.02	11.35	8.53	9.94	9.02	7.57
pH	6.98	7.57	7.89	7.62	7.54	7.67	7.67	7.66	7.61	7.67	7.81	7.89	8.04	7.97	8.05	7.57	7.81	8.45	7.9
ORPmV	68	66	91	68	68	35	68	87	68	61	75	94	95	95	73	109	91	92	145
mS/cm	5.64	1.2	1.56	1.43	1.61	0.778	1.87	4.92	1.74	2.85	6.76	10.2	7.76	8.98	2.29	3.58	2.94	4.96	4.79
NTU	2.7	0.7	0	1.8	0.9	1.4	0.8	1	0.85	1.2	6.6	7.2	10.3	8.75	18.6	53.6	36.1	0.9	1
mg/L DO	12.15	9.28	9.62	10.99	11.25	12.35	11.07	10.76	11.16	11.56	13.33	12.84	10.46	11.65	10.08	9.55	9.82	12.62	11.48
g/L TDS	3.55	0.766	1	0.913	1.03	0.498	1.19	3.15	1.11	1.82	4.26	6.35	4.89	5.62	1.46	2.29	1.88	3.17	3.06
ppt	3.6	0.5	0.6	0.6	0.7	0.3	0.8	2.7	0.75	1.5	4.4	6.9	4.9	5.9	1.1	2	1.55	2.9	2.9

Table 1: Performance Monitoring LTM 1
TC Iqaluit

	02-Sep-17	03-Sep-17	04-Sep-17	06-Sep-17	07-Sep-17	09-Sep-17	11-Sep-17	14-Sep-17	15-Sep-17
C	8	6.47	4.94	7.15	7	7.13	7.87	5.2	2.87
pH	7.92	7.73	7.53	8.01	7.77	7.77	7.69	7.54	7.66
ORPmV	142	107	73	64	93	101	72	72	101
mS/cm	4.79	3.265	1.74	0.451	2.56	1.27	0.91	0.788	1.08
NTU	11.5	6.2	0.9	0.5	0	0	0.1	0.9	10.6
mg/L DO	12.03	11.87	11.71	13.03	12.97	13.12	13.38	12.6	14.36
g/L TDS	3.07	2.1	1.12	0.293	1.61	0.81	0.583	0.504	0.693
ppt	2.9	1.9	0.9	0.2	1.4	0.6	0.4	0.4	0.6

	13-Aug-17	14-Aug-17	15-Aug-17	17-Aug-17	18-Aug-17	19-Aug-17	20-Aug-17	21-Aug-17	22-Aug-17	23-Aug-17	24-Aug-17	25-Aug-17	26-Aug-17	27-Aug-17	28-Aug-17	29-Aug-17	30-Aug-17	31-Aug-17	01-Sep-17
C	9.04	12.34	13.69	10.69	11.23	9.94	12.41	13.52	11.73	11.82	9.69	11.38	10.7	11.04	11.76	9.79	10.78	8.75	7.49
pH	7.13	7.35	7.7	7.47	7.48	7.43	7.67	7.73	7.58	7.575	7.79	7.95	7.92	7.94	4.76	7.5	6.13	8.59	7.82
ORPmV	58	77	94	74	73	59	71	70	65	72	67	80	91	86	93	108	100.5	88	141
mS/cm	1.16	1.13	1.23	1.11	1.11	1.11	1.25	1.31	1.21	1.18	4.3	5.06	5.03	5.05	4.82	4.59	4.71	4.09	3.75
NTU	5.1	3.5	3.3	5.3	6	5.6	4	8.8	7.2	5	9.5	6	0.8	3.4	2.9	5.2	4.05	0	0
mg/L DO	9.97	9.32	9.05	11.23	10.42	12.28	10.69	10.43	11.36	10.56	12.57	12.24	10.79	11.52	8.73	9.17	8.95	14.71	11.18
g/L TDS	0.745	0.722	0.785	0.711	0.713	0.707	0.799	0.842	0.775	0.756	2.75	3.19	3.17	3.18	3.08	2.94	3.01	2.62	2.4
ppt	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.45	2.4	2.8	2.9	2.85	2.6	2.6	2.6	2.3	2.2

Table 1: Performance Monitoring LTM 2
TC Iqaluit

	02-Sep-17	03-Sep-17	04-Sep-17	06-Sep-17	07-Sep-17	09-Sep-17	11-Sep-17	14-Sep-17	15-Sep-17
C	8.01	6.38	4.75	7.36	7.66	6.88	4.59	4.67	3.12
pH	8.15	7.8	7.45	7.49	7.7	7.57	7.48	7.37	7.57
ORPmV	140	105.5	71	98	87	109	89	84	102
mS/cm	3.81	3.09	2.36	2.25	2.16	1.59	1.17	0.785	1.05
NTU	2	1.1	0.2	0	0.3	1.3	1.1	0.2	2.2
mg/L DO	13.36	12.19	11.02	12.13	10.72	12.17	13.12	12.63	13.65
g/L TDS	2.44	1.98	1.51	1.44	1.38	1.02	0.746	0.503	0.671
ppt	2.2	1.8	1.4	1.2	1.1	0.8	0.6	0.4	0.5

Table 1: Performance Monitoring LTM 3
TC Iqaluit

	13-Aug-17	14-Aug-17	15-Aug-17	17-Aug-17	18-Aug-17	19-Aug-17	20-Aug-17	21-Aug-17	22-Aug-17	23-Aug-17	24-Aug-17	25-Aug-17	26-Aug-17	27-Aug-17	28-Aug-17	29-Aug-17	30-Aug-17	31-Aug-17	01-Sep-17
C	8.67	11.9	15.35	10.61	11.3	10.39	13.2	13.94	12.25	12.17	9.67	11.6	11.22	11.41	11.82	9.64	10.73	8.32	7.47
pH	6.64	7.14	7.6	7.11	7.08	7.15	7.25	7.29	7.17	7.22	7.41	7.37	7.44	7.41	7.44	6.89	7.165	8.14	7.25
ORPmV	88	95	110	96	88	73	91	93	89.5	83	95	109	111	110	109	159	134	109	175
mS/cm	3.89	4.62	5.08	4.46	4.52	4.6	4.73	5.02	4.63	4.81	12.3	13.4	13.2	13.3	13.1	12.2	12.7	11.8	11
NTU	2.7	2.2	3.7	2.6	2.3	2.9	2.6	2.7	2.45	2.8	1.4	1.3	3.1	2.2	1.5	16.3	8.9	0	1
mg/L DO	9.93	8.59	8.51	9.65	9.97	10.98	10.27	10.96	10.12	10.97	12.63	12.62	9.72	11.17	9.75	10.75	10.25	12.73	11.82
g/L TDS	2.49	2.96	3.2	2.86	1.9	2.94	3.03	3.16	2.47	3.05	7.65	8.32	8.2	8.26	8.13	7.57	7.85	7.31	6.84
ppt	2.2	2.5	2.5	2.5	2.5	2.6	2.5	2.6	2.5	2.6	8.8	9.2	9.1	9.15	8.9	8.7	8.8	8.6	8.2

Table 1: Performance Monitoring LTM 3
TC Iqaluit

	02-Sep-17	03-Sep-17	04-Sep-17	06-Sep-17	07-Sep-17	09-Sep-17	11-Sep-17	14-Sep-17	15-Sep-17
C	7.59	6.23	4.87	7.1	7.73	7.41	4.87	4.89	3.33
pH	7.73	7.34	6.95	7.1	7.07	7.25	7.08	6.83	7.16
ORPmV	152	136	121	124	128	138	117	120	133
mS/cm	11.1	9.85	8.6	7.75	8.65	4.91	4.78	3.81	3.93
NTU	6.6	13.45	20.3	9	0	0	0.3	0.4	0
mg/L DO	12.66	12.13	11.6	12.09	12.35	12.23	14.15	13.62	13.67
g/L TDS	6.86	6.14	5.42	7.88	5.45	3.14	3.06	2.44	2.51
ppt	8.2	7.35	6.5	5.4	6	3.1	3.2	2.4	2.6

Table 1: Performance Monitoring LTM 4
TC Iqaluit

	13-Aug-17	14-Aug-17	15-Aug-17	17-Aug-17	18-Aug-17	19-Aug-17	20-Aug-17	21-Aug-17	22-Aug-17	23-Aug-17	24-Aug-17	25-Aug-17	26-Aug-17	27-Aug-17	28-Aug-17	29-Aug-17	30-Aug-17	31-Aug-17	01-Sep-17
C	6.87	10.65	10.45	8.52	9.8	8.73	13.35	14.07	11.58	11.4	10.65	14.17	11.8	12.99	12.02	7.66	9.84	9	6.9
pH	6.65	7.18	7.06	7.09	7.22	7.17	7.28	7.27	7.25	7.22	7.36	7.41	7.16	7.29	7.25	6.95	7.1	8.5	6.9
ORPmV	70	52	36	52	39	26	41	44	40	35	36	36	56	46	49	96	72.5	31	134
mS/cm	0.085	0.096	0.098	0.09	0.095	0.097	0.111	0.117	0.103	0.107	0.122	0.134	0.124	0.129	0.126	0.096	0.111	0.129	0.081
NTU	3.8	3.3	3	3.8	3.1	3.1	3.1	2.6	3.1	2.85	3.2	4.1	6.8	5.45	3.9	7.9	5.9	1.4	0.9
mg/L DO	14.53	13.78	13.47	13.81	13.95	13.6	12.43	10.2	13.19	11.9	12.52	10.93	10.23	10.58	10.57	12.07	11.32	13.14	13.23
g/L TDS	0.055	0.063	0.064	0.059	0.062	0.063	0.072	0.076	0.067	0.07	0.079	0.087	0.081	0.084	0.082	0.062	0.072	0.084	0.052
ppt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1: Performance Monitoring LTM 4
TC Iqaluit

	02-Sep-17	03-Sep-17	04-Sep-17	06-Sep-17	07-Sep-17	09-Sep-17	11-Sep-17	14-Sep-17	15-Sep-17
C	6.86	5.53	4.2	7.15	6.73	7.06	5.21	4.47	2.59
pH	8.37	7.53	6.69	2.27	6.84	7.35	7.05	6.83	7.2
ORPmV	56	71	86	78	87	93	79	83	99
mS/cm	0.088	0.074	0.06	0.073	0.074	0.078	0.073	0.064	0.064
NTU	2.1	5.25	8.4	0	0	0.2	0	0	0
mg/L DO	13.65	13.86	14.07	14.19	14.3	13.74	14.54	14.78	15.67
g/L TDS	0.058	0.049	0.039	0.047	0.048	0.051	0.0417	0.042	0.042
ppt	0	0	0	0	0	0	0	0	0

	13-Aug-17	14-Aug-17	15-Aug-17	17-Aug-17	18-Aug-17	19-Aug-17	20-Aug-17	21-Aug-17	22-Aug-17	23-Aug-17	24-Aug-17	25-Aug-17	26-Aug-17	27-Aug-17	28-Aug-17	29-Aug-17	30-Aug-17	31-Aug-17	01-Sep-17
C	6.64	9.71	9.42	8.28	8.4	7.99	11.29	12.23	9.85	10.11	9.71	12.49	10.38	11.44	10.78	7.16	8.97	8.23	6.69
pH	6.76	7.37	7.27	7.26	7.44	7.42	7.43	7.43	7.44	7.43	7.5	7.55	7.26	7.41	7.5	7.07	7.285	8.1	6.97
ORPmV	59	43	17	37	21	5	23	28	22	17	19	15	42	29	25	88	56.5	46	132
mS/cm	0.074	0.079	0.082	0.08	0.08	0.08	0.088	0.09	0.084	0.085	0.091	0.098	0.096	0.097	0.097	0.083	0.09	0.081	0.074
NTU	3.6	2.7	2.9	4.4	3.5	3.1	3.2	2.7	3.35	2.9	4.5	4.8	10.3	7.55	3.3	7.8	5.55	2.1	2.2
mg/L DO	13.75	13.56	13.79	13.63	14.06	13.11	13.51	10.65	13.79	11.88	13.21	11.41	12.33	11.87	11.75	12.17	11.96	12.83	13.29
g/L TDS	0.048	0.052	0.053	0.052	0.052	0.052	0.057	0.059	0.055	0.056	0.059	0.064	0.062	0.063	0.063	0.054	0.059	0.053	0.048
ppt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1: Performance Monitoring LTM 5
TC Iqaluit

	02-Sep-17	03-Sep-17	04-Sep-17	06-Sep-17	07-Sep-17	09-Sep-17	11-Sep-17	14-Sep-17	15-Sep-17
C	6.65	5.42	4.19	7.15	6.64	7.13	4.93	4.58	2.67
pH	7.83	7.33	6.83	7.51	7.13	7.59	7.24	6.99	7.55
ORPmV	77	79.5	82	69	72	85	70	75	87
mS/cm	0.072	0.066	0.059	0.069	0.07	0.074	0.069	0.063	0.061
NTU	7.7	6.6	5.5	0	0	0	0.4	0	0
mg/L DO	13.26	13.83	14.4	14.08	13.95	13.94	14.59	15.12	15.54
g/L TDS	0.047	0.043	0.038	0.045	0.046	0.048	0.045	0.041	0.04
ppt	0	0	0	0	0	0	0	0	0

	13-Aug-17	14-Aug-17	15-Aug-17	17-Aug-17	18-Aug-17	19-Aug-17	20-Aug-17	21-Aug-17	22-Aug-17	23-Aug-17	24-Aug-17	25-Aug-17	26-Aug-17	27-Aug-17	28-Aug-17	29-Aug-17	30-Aug-17	31-Aug-17	01-Sep-17
C	6.91	10.04	9.7	8.92	9.24	7.05	9.63	10.33	9.44	8.69	9.39	11.27	9.55	10.41	10.95	7.93	9.44	8.11	7.39
pH	7	7.74	7.51	7.44	7.72	7.64	7.63	7.58	7.68	7.61	7.59	7.69	7.55	7.62	7.77	7.21	7.49	7.84	7.22
ORPmV	38	25	-6	21	-1	-14	5	14	2	0	2	1	24	13	3	83	43	57	124
mS/cm	0.073	0.08	0.081	0.082	0.082	0.077	0.08	0.083	0.081	0.08	0.091	0.105	0.092	0.099	0.098	0.086	0.092	0.079	0.074
NTU	4.4	3.9	4.9	5.1	4.7	3.8	3.8	3.9	4.25	3.85	37.6	11.7	9.3	10.5	19	28.4	23.7	4.6	2.2
mg/L DO	13.63	11.98	12.13	12.15	12.73	14.48	14.06	13.31	13.4	13.9	14.66	13.09	11.07	12.08	11.1	11.77	11.44	11.33	12.35
g/L TDS	0.047	0.052	0.053	0.053	0.053	0.05	0.052	0.054	0.053	0.052	0.059	0.068	0.06	0.064	0.063	0.056	0.06	0.051	0.048
ppt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1: Performance Monitoring LTM 6
TC Iqaluit

	02-Sep-17	03-Sep-17	04-Sep-17	06-Sep-17	07-Sep-17	09-Sep-17	11-Sep-17	14-Sep-17	15-Sep-17
C	6.71	5.52	4.33	7.54	7.16	7.5	5.93	5.25	3.49
pH	7.55	7.29	7.03	7.82	7.55	7.92	7.61	7.34	7.94
ORPmV	90	82	74	55	50	70	52	55	70
mS/cm	0.07	0.064	0.058	0.072	0.072	0.077	0.07	0.064	0.061
NTU	37.9	24.15	10.4	0.3	0	1.5	6.7	1.4	2.9
mg/L DO	12.06	13.25	14.44	13.78	12.85	13.72	12.45	14.91	14.57
g/L TDS	0.046	0.042	0.038	0.047	0.047	0.05	0.046	0.042	0.04
ppt	0	0	0	0	0	0	0	0	0

	13-Aug-17	14-Aug-17	15-Aug-17	17-Aug-17	18-Aug-17	19-Aug-17	20-Aug-17	21-Aug-17	22-Aug-17	23-Aug-17	24-Aug-17	25-Aug-17	26-Aug-17	27-Aug-17	28-Aug-17	29-Aug-17	30-Aug-17	31-Aug-17	01-Sep-17
C	7.38	11.03	10.71	9.21	10.1	9.53	12.37	14.17	11.24	11.85	10.23	15.66	13.96	14.81	11.24	7.9	9.57	7.71	6.96
pH	7.37	7.86	7.59	7.58	7.9	7.68	7.56	7.43	7.73	7.555	7.82	7.89	7.74	7.82	7.64	7.58	7.61	7.44	7.35
ORPmV	-12	28	-25	1	28	-2	-6	8	11	3	0	26	25	256	6	80	43	71	122
mS/cm	0.095	0.116	0.115	0.114	0.123	0.111	0.109	0.113	0.12	0.112	0.145	0.222	0.123	0.1725	0.14	0.102	0.121	0.085	0.083
NTU	22.5	4.7	4.9	5.9	4.9	7.1	8.9	48	6.9	27.6	90.3	209	508	358.5	15.8	18	16.9	123	2.3
mg/L DO	14.29	12.51	12.12	11.23	13.11	11.28	10.19	9.14	11.65	10.21	12.07	8.62	8.28	8.45	8.32	11.09	9.71	10.11	11.55
g/L TDS	0.062	0.076	0.075	0.074	0.08	0.072	0.071	0.073	0.076	0.073	0.094	0.144	0.08	0.112	0.091	0.066	0.079	0.055	0.054
ppt	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0

Table 1: Performance Monitoring LTM 7
TC Iqaluit

	02-Sep-17	03-Sep-17	04-Sep-17	06-Sep-17	07-Sep-17	09-Sep-17	11-Sep-17	14-Sep-17	15-Sep-17
C	6.56	5.48	4.4	6.41	6.47	6.41	4.4	4.92	3.46
pH	7.05	7.13	7.21	8.49	7.98	8.46	8.53	7.88	8.49
ORPmV	108	83.5	59	36	38	63	16	25	58
mS/cm	0.081	0.07	0.059	0.073	0.08	0.098	0.089	0.072	0.075
NTU	9.9	18.5	27.1	2.5	0.5	3.1	2.7	2.7	0.7
mg/L DO	10.37	12.15	13.92	15.64	14.65	17.99	17.61	15.51	19.13
g/L TDS	0.052	0.045	0.038	0.048	0.052	0.064	0.058	0.047	0.049
ppt	0	0	0	0	0	0	0	0	0

Table 2: Surface Water Inorganics
Former Iqaluit Metal Dump and Community Landfill
Laboratory Chemical Analysis

Area ID	CCME Freshwater ¹	CCME Marine ²	Long Term Monitoring		RPD (%)	Long Term Monitoring													RPD (%)
Station ID			LTM1	DUP 1		LTM2	LTM2	LTM3	LTM3	LTM4	LTM4	LTM5	LTM5	LTM6	LTM6	LTM7	LTM7	DUP2	
Date			21-Sep-17			21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17		
Parameter (ug/L)																			
Total Ammonia-N*	73,000-3,260	-	<0.050	<0.050	nc	<0.050	<0.050	<0.050	0.16	<0.050	<0.050	0.05	<0.050	<0.050	<0.050	0.44	0.46	0.45	2.2%
Fluoride (F-)		-	0.23	0.22	4.4%	0.1	0.1	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc
pH (field)	6.5-9	7-8.7	7.67	7.63	0.5%	7.67	6.64	7.54	6.79	7.64	7.43	7.61	7.41	7.63	7.37	7.31	7.23	7.22	0.1%
Dissolved Sulphate (SO4)	-	-	480	490	2.1%	46	83	280	420	39	5	5.1	5.7	3.5	3.4	5	7.8	7.7	1.3%
Sulphide	-	-	-	-	nc	-	<0.020	-	<0.020	-	<0.020	-	<0.020	-	<0.020	-	<0.020	<0.020	nc
Total Cyanide (CN)	-	-	-	-	nc	-	<0.0050	-	<0.0050	-	<0.0050	-	<0.0050	-	<0.0050	-	<0.0050	<0.0050	nc
WAD Cyanide (Free)	5	-	<1	<1	nc	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	-	nc
Dissolved Chloride (Cl)	120000	-	3600	3700	2.7%	280	47	1600	63	240	9.6	8.1	11	7.7	10	5.5	14	15	6.9%
Nitrite (N)	-	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Nitrate (N)	60	-	0.13	<0.10	nc	<0.10	0.18	<0.10	2.06	0.31	0.5	0.35	0.45	0.11	<0.10	0.36	0.23	0.23	0%
Nitrate + Nitrite (N)	-	-	0.13	<0.10	nc	<0.10	0.18	<0.10	2.06	0.31	0.5	0.35	0.45	0.11	<0.10	0.36	0.23	0.23	0%
Mercury	0.026	0.016	<0.01	<0.01	nc	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	nc

All units in ug/L, unless otherwise noted.

Notes:

- 1 =
- Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Freshwater.
- 2 =
- Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Marine.
- 3 =
- Guideline is hardness dependent
- *
- Total Ammonia Guideline varies based on pH and temperature of sample. See table in CCME, Water Quality Guidelines for the Protection of Aquatic Life. Freshwater. No guideline for marine waters.
- nc
- not calculable

Table 2: Surface Water Poly Aromatic Hydrocarbons (PAHs)
Former Iqaluit Metal Dump and Community Landfill
Laboratory Chemical Analysis

Area ID	CCME AW Freshwater ¹	CCME AW Marine ²	Long Term Monitoring		RPD (%)	Long Term Monitoring													RPD (%)
Station ID			LTM1 21-Sep-17	DUP 1		LTM2 21-Sep-17	LTM2 3-Oct-17	LTM3 21-Sep-17	LTM3 3-Oct-17	LTM4 21-Sep-17	LTM4 3-Oct-17	LTM5 21-Sep-17	LTM5 3-Oct-17	LTM6 21-Sep-17	LTM6 3-Oct-17	LTM7 21-Sep-17	LTM7 3-Oct-17	DUP2	
Date																			
Parameter (ug/L)																			
Acenaphthene	5.8	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Acridine	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	0.012	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Benzo(a)anthracene	0.018	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Benzo(a)pyrene	0.015	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Fluoranthene	0.04	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Fluorene	3	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Naphthalene	1.1	1.4	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Phenanthrene	0.4	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Pyrene	0.025	-	<0.010	<0.010	nc	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc

All units in ug/L, unless otherwise noted.

- Notes:
- 1 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Freshwater.
 - 2 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Marine.
 - 3 = Guideline is hardness dependent
 - nc= not calculable

Table 2: Surface Water Polycholorinated Biphenyls (PCBs)
Former Iqaluit Metal Dump and Community Landfill
Laboratory Chemical Analysis

Area ID	CCME AW Freshwater ¹	CCME AW Marine ²	Long Term Monitoring			RPD (%)	Long Term Monitoring												RPD (%)
Station ID			LTM1 21-Sep-17	DUP 1	LTM2 21-Sep-17		LTM2 3-Oct-17	LTM3 21-Sep-17	LTM3 3-Oct-17	LTM4 21-Sep-17	LTM4 3-Oct-17	LTM5 21-Sep-17	LTM5 3-Oct-17	LTM6 21-Sep-17	LTM6 3-Oct-17	LTM7 21-Sep-17	LTM7 3-Oct-17	DUP2	
Date																			
Parameter (ug/L)																			
Aroclor 1016	-	-	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	
Aroclor 1221	-	-	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	
Aroclor 1232	-	-	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	
Aroclor 1242	-	-	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	
Aroclor 1248	-	-	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	
Aroclor 1254	-	-	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	
Aroclor 1260	-	-	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	
Aroclor 1262	-	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	nc	
Aroclor 1268	-	-	-	-	nc	-	-	-	-	-	-	-	-	-	-	-	-	nc	
Polychlorinated biphenyls	*	*	<0.05	<0.05	nc	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	nc	

All units in ug/L, unless otherwise noted.

- Notes:**
- 1 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Freshwater.
 - 2 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Marine.
 - 3 = Guideline is hardness dependent
 - * This guideline has been withdrawn. A water quality guideline is not recommended. Environmental exposure is predominantly via sediment, soil, and/or tissue, therefore, the reader is referred to the respective guidelines for these media.
 - * Indicates detection.
 - nc not calculable

Table 2: Surface Water Petroleum Hydrocarbons (PHCs)
Former Iqaluit Metal Dump and Community Landfill
Laboratory Chemical Analysis

Maxxam ID	CCME Freshwater ¹	CCME Marine ²	Long Term Monitoring		RPD (%)	Long Term Monitoring														RPD (%)
Station ID			LTM1 21-Sep-17	DUP 1		LTM2 21-Sep-17	LTM2 3-Oct-17	LTM3 21-Sep-17	LTM3 3-Oct-17	LTM4 21-Sep-17	LTM4 3-Oct-17	LTM5 21-Sep-17	LTM5 3-Oct-17	LTM6 21-Sep-17	LTM6 3-Oct-17	LTM7 21-Sep-17	LTM7 3-Oct-17	DUP2		
Date																				
Parameter (ug/L)																				
Benzene	370	110	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	
Ethylbenzene	90	25	<0.20	<0.20	nc	<0.20	<0.20	<0.20	0.69	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	
Toluene	2	215	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	
o-Xylene	-	-	<0.20	<0.20	nc	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	
m+p-Xylene	-	-	<0.40	<0.40	nc	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	nc	
Xylenes (total)	-	-	<0.40	<0.40	nc	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	nc	
F1 (C6-C10)	-	-	<25	<25	nc	<25	<25	<25	56	<25	<25	<25	<25	<25	<25	<25	<25	<25	nc	
F1 (C6-C10) minus BTEX	-	-	<25	<25	nc	<25	<25	<25	56	<25	<25	<25	<25	<25	<25	<25	<25	<25	nc	
F2 (C10-C16)	-	-	<100	<100	nc	<100	<100	<100	220	<100	<100	<100	<100	<100	<100	<100	<100	<100	nc	
F3 (C16-C34)	-	-	<200	<200	nc	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	nc	
F4 (C34-C50)	-	-	<200	<200	nc	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	nc	
Reached Baseline at C50	-	-	Yes	Yes	nc	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	nc	

All units in ug/L, unless otherwise noted.

Notes:

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- 2 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Marine.
- 3 = Guideline is hardness dependent
- nc not calculable

Table 2: Surface Water Volatile Organic Compounds (VOCs)
Former Iqaluit Metal Dump and Community Landfill
Laboratory Chemical Analysis

Maxxam ID	CCME AW Freshwater ¹	CCME AW Marine ²	Long Term Monitoring		RPD (%)	Long Term Monitoring													RPD (%)
Station ID			LTM1	DUP 1		LTM2	LTM2	LTM3	LTM3	LTM4	LTM4	LTM5	LTM5	LTM6	LTM6	LTM7	LTM7	DUP2	
Date			21-Sep-17			21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	21-Sep-17	3-Oct-17	3-Oct-17	
Parameter (ug/L)																			
Acetone	-	-	<10	<10	nc	<10	-	<10	-	<10	-	<10	-	<10	-	<10	-	-	nc
Benzene	370	110	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
Bromodichloromethane	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
Bromoform	-	-	<0.2	<0.20	nc	0.26	-	0.3	-	0.26	-	<0.20	-	<0.20	-	<0.20	-	-	nc
Bromomethane	-	-	<0.5	<0.5	nc	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	-	nc
Carbon tetrachloride	13.3	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
Chlorobenzene	1.3	25	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
Chloroform	1.8	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
1,2-Dichlorobenzene	0.7	42	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
1,3-Dichlorobenzene	150	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
1,4-Dichlorobenzene	26	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
1,1-Dichloroethane	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
1,2-Dichloroethane	100	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
1,1-Dichloroethene	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
cis-1,2-Dichloroethene	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
trans-1,2-Dichloroethene	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
Dichloromethane	98.1	-	<0.5	<0.5	nc	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	<0.5	-	-	nc
1,2-Dichloropropane	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
cis-1,3-Dichloropropene	-	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
trans-1,3-Dichloropropene	-	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
Ethylbenzene	90	25	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
Ethylene dibromide	-	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
Hexachlorobenzene	-	-	<0.03	<0.03	nc	<0.03	-	<0.03	-	<0.03	-	<0.03	-	<0.03	-	<0.03	-	-	nc
Methyl ethyl ketone	-	-	<5	<5	nc	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	-	nc
Methyl isobutyl ketone	-	-	<5	<5	nc	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	-	nc
Methyl-tert-butylether	10000	5000	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
Styrene	72	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
1,1,1,2-Tetrachloroethane	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
1,1,2,2-Tetrachloroethane	-	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
Tetrachloroethene	111	-	1.4	<0.10	nc	<0.10	-	<0.10	-	<0.10	-	<0.10	-	<0.10	-	<0.10	-	-	nc
Toluene	2	215	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
1,1,1-Trichloroethane	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
1,1,2-Trichloroethane	-	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
Trichloroethene	21	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
Vinyl chloride	-	-	<0.2	<0.2	nc	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	-	nc
m+p-Xylene	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
o-Xylene	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc
Xylenes (total)	-	-	<0.1	<0.1	nc	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	-	nc

All units in ug/L, unless otherwise noted.

- Notes:
- 1 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Freshwater.
 - 2 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Marine.
 - 3 = Guideline is hardness dependent
 - nc not calculable

Table 2: Surface Water Metals
Former Iqaluit Metal Dump and Community Landfill
Laboratory Chemical Analysis

Area ID	CCME		LTM1			LTM2		LTM3		LTM4		LTM5		LTM6	LTM7			DUP2	RPD
Station ID Date	Freshwater ¹	CCME Marine ²	LTM 1 2017-09-21	DUP 1 2017-09-21	RPD	LTM 2 2017-09-21	LTM2 2017-10-03	LTM 3 2017-09-21	LTM3 2017-10-03	LTM 4 2017-09-21	LTM4 2017-10-03	LTM 5 2017-09-21	LTM5 2017-10-03	LTM 6 2017-09-21	LTM6 2017-10-03	LTM 7 2017-09-21	LTM7 2017-10-03		
Aluminum pH>6.5	100	-	149	157	5.2%	62.9	50.7	<15	122	9.9	14.4	17.5	20.8	9.4	34.7	26.3	60.9	66.2	8.3%
Antimony	-	-	<5.0	<5.0	nc	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc
Arsenic	5	12.5	<1.0	<1.0	nc	<0.10	<0.10	<0.50	0.6	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	0.17	0.17	0.0%
Beryllium	-	-	<1.0	<1.0	nc	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc
Boron	-	1500	797	886	10.6%	113	195	482	588	71	<50	<50	<50	<50	<50	<50	<50	<50	nc
Cadmium	See Note 3		<0.10	<0.10	nc	<0.010	0.111	<0.050	0.017	0.021	0.04	0.035	0.043	0.025	0.043	<0.010	0.013	0.019	37.5%
Chromium	8.9	56	<10	<10	nc	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	nc
Cobalt	-	-	<2.0	<2.0	nc	<0.20	0.33	<1.0	0.54	<0.20	<0.20	<0.20	0.22	<0.20	0.26	<0.20	0.56	0.62	10.2%
Copper	See Note 3		<5.0	<5.0	nc	2.75	3.31	<2.5	2.52	0.53	0.72	0.68	0.77	<0.50	0.74	0.82	1.3	1.38	6.0%
Iron	300	-	6070	5140	16.6%	197	162	337	4440	484	488	793	463	679	740	1140	1830	1880	2.7%
Lead	See Note 3		<2.0	<2.0	nc	0.64	2.31	<1.0	12.9	<0.20	<0.20	0.26	<0.20	<0.20	<0.20	0.21	0.61	0.62	1.6%
Manganese			49	27	57.9%	9.7	123	32.6	764	35.5	63.7	47.3	76.5	32.3	69.6	53.1	230	237	3.0%
Molybdenum	73	-	<10	<10	nc	<1.0	<1.0	<5.0	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	nc
Nickel	See Note 3		<10	<10	nc	<1.0	1.3	<5.0	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	nc
Selenium	1	-	<1.0	<1.0	nc	<0.10	<0.10	<0.50	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc
Silver	0.25	-	<0.20	<0.20	nc	<0.020	<0.020	<0.10	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	nc
Strontium			1370	1450	5.7%	114	113	640	575	109	32.8	30.1	53.9	29.4	32.8	50.6	73.5	83.2	12.4%
Thallium	0.8	-	<0.10	<0.10	nc	<0.010	<0.010	<0.050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Tin			<50	<50	nc	<5.0	<5.0	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	nc
Titanium			<50	<50	nc	<5.0	<5.0	<25	8.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	nc
Uranium	15	-	<1.0	<1.0	nc	0.11	<0.10	<0.50	0.29	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc
Vanadium	-	-	<50	<50	nc	<5.0	<5.0	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	nc
Zinc	30	-	<50	<50	nc	<5.0	14.7	68	18.4	<5.0	5.3	5.7	28	14.4	9.1	40.8	223	254	13.0%
Zirconium	-	-	<1.0	<1.0	nc	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc
Calcium			86.1	89	3.3%	11.3	17.7	45.1	111	14.7	14.3	11.3	14.3	11.1	12.4	13.2	21.7	22.5	3.6%
Magnesium			194	208	7.0%	16.4	9.6	90.9	29.8	14.7	3.07	2.49	3.26	2.17	2.82	2.77	4.44	4.61	3.8%
Potassium			70.2	75.1	6.7%	6.87	4.69	34.3	11.8	5.13	0.75	0.481	0.852	0.454	0.732	0.77	3.11	3.14	1.0%
Sodium			1570	1670	6.2%	147	62.2	764	91.3	122	5.54	4.22	7.01	4.03	4.95	3.79	6.97	7.35	5.3%
Sulphur			186	188	1.1%	19.4	27.4	106	155	14.2	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.1	nc

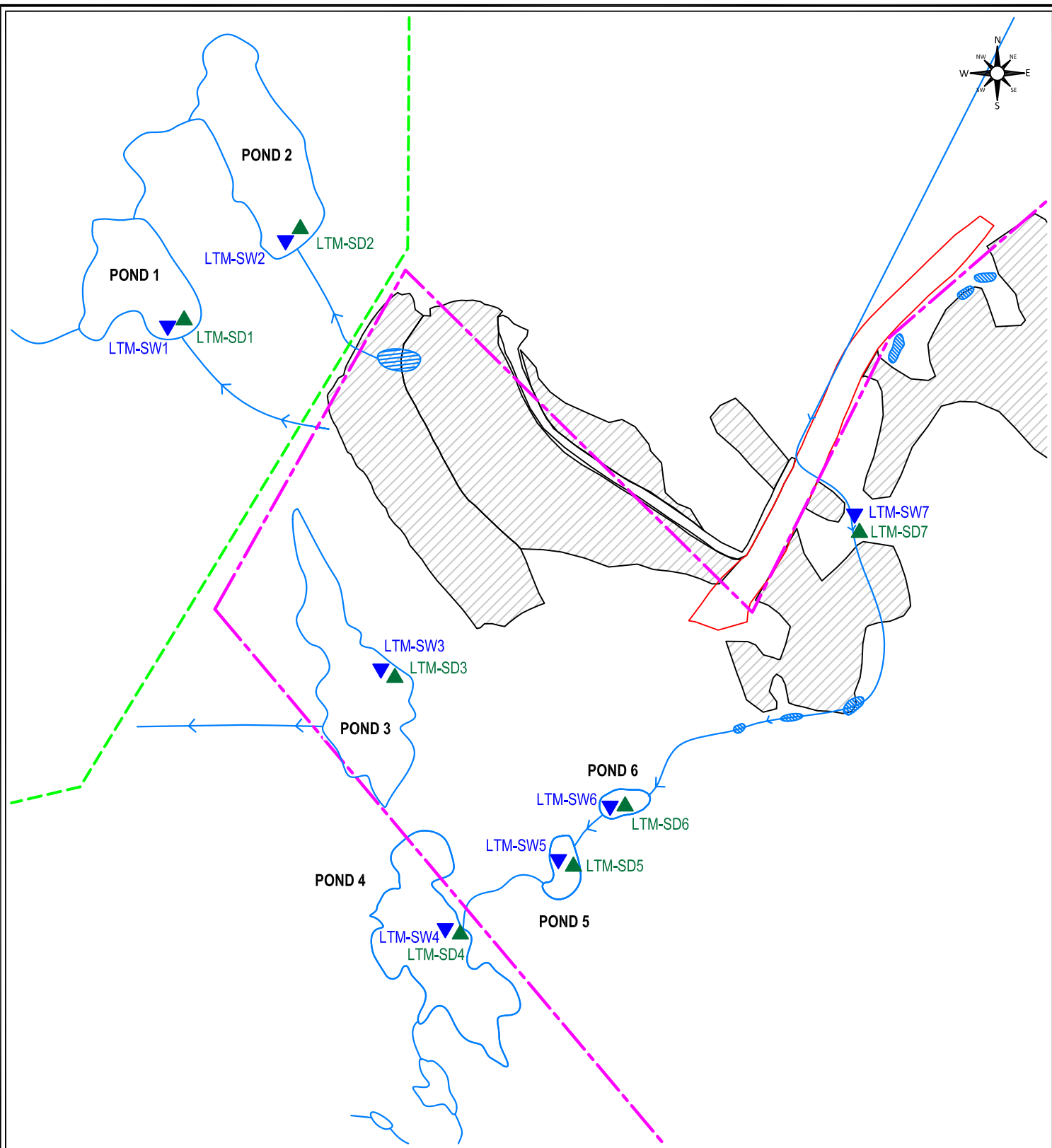
All units in ug/L, unless otherwise noted.

- Notes:
- 1 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Freshwater.
 - 2 = Canadian Council of Ministers of the Environment (CCME), Water Quality Guidelines for the Protection of Aquatic Life. Marine.
 - 3 = Guideline is hardness dependent
 - 20 = Indicates freshwater. Exceedance of freshwater CCME WQG

FIGURES



TO BE PRINTED IN COLOUR ON 8.5"x11" PAPER ONLY - DO NOT SCALE



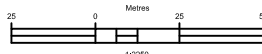
Legend

- POOLING WATER
- PROPERTY BOUNDARY
- PARK BOUNDARY
- STREAM/DRAINAGE

- EXTENT OF COMPLETED LANDFILL & CAPPING
- ACCESS ROAD

LONG TERM MONITORING SAMPLES

- LTM-SW4 SURFACE WATER SAMPLE STATION
- LTM-SD4 SEDIMENT SAMPLE STATION



Title:

LONG TERM MONITORING SAMPLE LOCATIONS

Project:

**FORMER IQALUIT METAL DUMP AND COMMUNITY LANDFILL -
NUNAVUT WATER BOARD (NWB) 2017 ANNUAL REPORTING**

Client:

PSPC - TRANSPORT CANADA



Date:

MARCH 2018

FIGURE 1

updated
on: 21-Feb-18

by rfletcher

Z:\Ottawa\FEI\Projects\2017\102153-000 TC Iqaluit\Figures\1-CAD\Remedial Reporting\NWB and NIRB
Reporting\102153-000_LTM Locations.dwg(layout)

ATTACHMENT A

Before and After Photographs





Photo: 1
31 July 2017

Description:
(Before)

Overview of
southeast of Main
Landfill prior to
remediation
operations

Location:
AEC 3 –
Photo Stn 1
looking
northwest



Photo: 2
23 September 2017

Description:
(After)

Overview of
southeast of Main
Landfill, final filling
and grading
operations

Location:
AEC 3 –
Photo Stn 1
looking
northwest



Photo: 1
31 July 2017

Description:
(Before)

Overview of
southwest of Main
Landfill prior to
remediation
operations

Location:
AEC 3 –
Photo Stn 4
looking
northeast



Photo: 2
26 September 2017

Description:
(After)

Overview of
southwest of Main
Landfill

Location:
AEC 3 –
Photo Stn 4
looking
northeast



Photo: 1
31 July 2017

Description:
(Before)

Overview of west
of Main Landfill
prior to
remediation
operations

Location:
AEC 3 –
Photo Stn 5
looking
northeast



Photo: 2
23 September 2017

Description:
(After)

Overview of west of
Main Landfill

Location:
AEC 3 –
Photo Stn 5
looking
northeast



Photo: 1
31 July 2017

Description:

(Before)

Overview of west of
Main Landfill
prior to
remediation
operations

Location:

AEC 3 –
Photo Stn 6
looking east



Photo: 2
23 September 2017

Description:

(After)

Overview of west of
Main Landfill

Location:

AEC 3 –
Photo Stn 6
looking east



Photo: 1
October 2016

Description:
(Before)
Overview AEC 2
vehicle dump

Location:
AEC 2



Photo: 2
28 September 2017

Description:
(After)
Overview of AEC 2
cap

Location:
AEC 2



Photo: 1
October 2016

Description:
(Before)
Overview AEC 2
vehicle dump

Location:
AEC 2



Photo: 2
28 September 2017

Description:
(After)
Overview of AEC 2
drainage

Location:
AEC 2



Photo: 1
October 2016

Description:
(Before)

Overview AEC 1

Location:
AEC 1



Photo: 2
28 September 2017

Description:
(After)

Overview of AEC 1
after capping

Location:
AEC 1



Photo: 1
October 2016

Description:
(Before)

Overview AEC 3,
north end

Location:
AEC 3



Photo: 2
28 September 2017

Description:
(After)

Overview of AEC 3
north end after
capping

Location:
AEC 3

ATTACHMENT B

Waste Manifests





Certificate of Storage, Transfer & Disposal

HAZARDOUS WASTE RECEIVER (NUR# 300001)

Date
2017-11-23
Certificate number
17-005

Client Information

Company name:	Kudlik Construction Ltd.
Generator no.:	na
Mailing address:	PO Box 727, 1519 Federal Road Iqaluit, NU X0A 0H0
Contact name:	Jean-David Laberge
Telephone no.:	(418) 933-5351
Project no.:	QE17-124-2
Purchase Order:	2017093

Shipping Site Information

Site address:	Old Metal Dump via TWA Iqaluit, NU
Contact name:	same
Telephone no.:	same

Description of wastes	Quantity	Type of package	Package condition	Lab results received (y/n)
PHC Impacted Soil	81m ³	Bulk	Na	y
PHC Impacted Water	4,520L	Bulk	Na	n
Metals Contaminated Soils	42.02	Big Bags	Good	y
LCP on metal	4.75	20' Marine container	Good	n
Tires	300	Bulk	Na	n
Lead Batteries	18	Battery Quatrex	Good	n
Miscellaneous Waste Liquids	1600L	Drums	Good	n
Miscellaneous Wastes Solid	3.2m ³	Quatrex Bags	Good	n
Asbestos Containing Debris	1m ³	6mil bags	Good	n

The undersigned hereby certifies that the wastes listed above were received at QE's Environmental Waste Processing Facility and will be disposed of in accordance with QE's Hazardous Waste Management Facility registration (NUF400006) and all applicable laws and regulations.

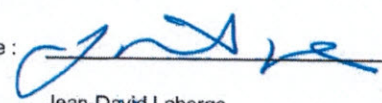
QE

Signature: 

Name: Olivier Simard

Title: Project Manager

CLIENT

Signature: 

Name: Jean-David Laberge

Title: Project Manager

N° REÇU PROVISOIRE
TEMPORARY RECEIPT NO.

Marchand Merchant	
Alfred Traut	Hydromineral
(867) 222-894	(Olive)

CHARGEMENT / LOADING		REMARQUES / REMARKS		DÉCHARGEMENT / UNLOADING	
				Latéral reçu le _____	
Représentant Marchand / Merchant Representative				Latéral received on _____	
				Représentant Marchand / Merchant Representative	
Représentant Transporteur / Carrier Representative				Représentant Transporteur / Carrier Representative	

Certificat de traitement des matières résiduelles dangereuses

Nom du client:

Qikiqtaaluk Environnemental

Adresse:

P.O. Box, 1228

Iqaluit, NU, CANADA

X0A 0H0

Tel.:

Fax:

Description du produit	Code	Qte	Format	Poids KG
Steel contaminated equipment	L01-0.0-S	1,00	UNITE	4 900,00

Ce document certifie que les produits mentionné au bon de connaissance de Solva-Rec Environnement Inc. ci-haut mentionné ont été reçu et que la disposition de ces produits se fera selon les normes environnementales en vigueur pour le traitement des matières résiduelles dangereuses.

This document certifies that the products mentioned in the Solva-Rec Environnement Inc. bill of lading number listed above were receiving and disposed of in accordance with environmental laws now in effect for the treatment of dangerous residual materials.


Gabriel Chabot, Chimiste



04/12/2017

Date

795 rue Lucien-Beaudin, Saint Jean sur Richelieu, QC, Canada J2X 5M3



(450) 347-3008



(450) 347-1270



www.solva-rec.com

Certificat de traitement des matières résiduelles dangereuses

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Qikiqtaaluk Environnemental

Adresse:

P.O. Box, 1228

Iqaluit, NU, CANADA

X0A 0H0

Tel.:

Fax:

Description du produit	Code	Qte	Format	Poids KG
Steel contaminated equipment	L01-0.0-S	1,00	UNITE	5 070,00

Ce document certifie que les produits mentionné au bon de connaissance de Solva-Rec Environnement Inc. ci-haut mentionné ont été reçu et que la disposition de ces produits se fera selon les normes environnementales en vigueur pour le traitement des matières résiduelles dangereuses.

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Gabriel Chabot, Chimiste



05/12/2017

Date

795 rue Lucien-Beaudin, Saint Jean sur Richelieu, QC, Canada J2X 5M3



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Certificat de traitement des matières résiduelles dangereuses

Nom du client:

Qikiqtaaluk Environnemental

Adresse:

P.O. Box, 1228
Iqaluit, NU, CANADA
X0A 0H0

Tel.:

Fax:

Description du produit	Code	Qte	Format	Poids KG
Steel contaminated equipment	L01-0.0-S	1,00	UNITE	5 070,00

Ce document certifie que les produits mentionné au bon de connaissance de Solva-Rec Environnement Inc. ci-haut mentionné ont été reçu et que la disposition de ces produits se fera selon les normes environnementales en vigueur pour le traitement des matières résiduelles dangereuses.

This document certifies that the products mentioned in the Solva-Rec Environnement Inc. bill of lading number listed above were receiving and disposed of in accordance with environmental laws now in effect for the treatment of dangerous residual materials.


Gabriel Chabot, Chimiste



06/12/2017

795 rue Lucien-Beaudin, Saint Jean sur Richelieu, QC, Canada J2X 5M3



(450) 347-3008



(450) 347-1270



www.solva-rec.com

Certificat de traitement des matières résiduelles dangereuses

Nom du client:

Qikiqtaaluk Environnemental

Adresse:

P.O. Box, 1228

Iqaluit, NU, CANADA

X0A 0H0

Tel.:

Fax:

Description du produit	Code	Qte	Format	Poids KG
Steel contaminated equipment	L01-0.0-S	1,00	UNITE	6 090,00

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Gabriel Chabot, Chimiste



07/12/2017

Date

795 rue Lucien-Beaudin, Saint Jean sur Richelieu, QC, Canada J2X 5M3



(450) 347-3008



(450) 347-1270



www.solva-rec.com

PRODUIT

PNEU

TRANSPORTEUR

• COMPAGNIE : *Recuperation
MARIO HART*

• CHAUFFEUR (SIGNATURE) :

André Bouché

• LAFARGE (SIGNATURE) :

D. Paymont

DATE :

14 dec 2017

No. Seq:

761

2017-12-14

72 MH

PNEU / TIRE

Gross 21720 kg 10:10:10

Tare 14950 kg 10:48:22

NET

6770 kg

SOL^{MC}

SANEXEN

SERVICES ENVIRONNEMENTAUX INC.

10930, rue Sherbrooke Est
Montréal-Est (Québec) H1B 1B4
450 649-7484

Client

QIKIQTALUK ENVIRONMENTAL
9935 RUE DE CHÂTEAUNEUF
BROSSARD, QC

Provenance

2027 IQALUIT LANE
NUNAVUT

Contrat 1171 QIKIQTALUK ENVIRONMENTAL

Produit À ÉCHANTILLONNER

Par Préposée balance

BRUT (kg)	TARE (kg)	NET (kg)	Cumulatif (t.m.)
44160	20380	23780	23.78 / 93.88

Billet 4455

Date 2017-12-04 12:12:39

Plaque 642861
MBL
DANIEL

Manifeste 4148

Type Entrée

Lot 0
NON CARAC

Signature



SOL^{INC}

SANEXEN

SERVICES ENVIRONNEMENTAUX INC.

10930, rue Sherbrooke Est
Montréal-Est (Québec) H1B 1B4
450 649-7484

Billet 4458

Date 2017-12-05 11:32:25

Plaque 633806
MBL
GHYSLAIN

Client

QIKIQTALUK ENVIRONNEMENTAL
9935 RUE DE CHÂTEAUNEUF
BROSSARD, QC

Provenance

2027 IQALUIT LANE
NUNAVUT

Manifeste 4150

Type Entrée

Lot 0
NON CARAC

Contrat 1171 QIKIQTALUK ENVIRONNEMENTAL

Signature

Produit À ÉCHANTILLONNER

Par Préposée balance

BRUT (kg)	TARE (kg)	NET (kg)	Cumulatif (t.m.)
49050	20390	28660	28.66 / 28.66

A. Ghyslain