2015 ANNUAL REPORT

REMEDIATION of the CONTWOYTO LAKE FORMER WEATHER STATION, NUNAVUT

Prepared on behalf of licensee:
Indigenous and Northern Affairs Canada

Prepared for:
Nunavut Water Board, Licence 1BR-CLR1419

Prepared by:
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ARCADIS
Infrastructure · Water · Environment · Buildings

March 2016

350600-508

FORMAT OF THIS DOCUMENT

The format of this document is as follows:

Part 1 – Nunavut Water Board Annual Report, a tabular summary

Part 2 – Nunavut Water Board Annual Report, a written summary

Part 2 is formatted as follows:

Executive Summary – An overview of the remedial project
Section 1 – Project summary
Section 2 – Reporting requirements as per Water Licence, Part B, Item 1.
Appendix A – Executive Summary in Inuktitut
Appendix B – Water Licence 1BR-CLR1419
Appendix C – Figures
Appendix D – Photographs

NWB Annual Report **Year being reported** 2015

License No: 1BR-CLR1419 **Issued Date:** May 16, 2014
Expiry Date: May 15, 2019

Project Name: Remediation of Contwoyto Lake former Weather Station

Licensee: Aboriginal Affairs and Northern Development Canada (AAANDC), now referred to as Indigenous and Northern Affairs Canada (INAC)

Mailing Address:
PO Box 2200
Iqaluit, NU
X0A 0H0

Name of Company filing Annual Report (if different from Name of Licensee please clarify relationship between the two entities, if applicable):

Arcadis Canada Inc. was hired by PWGSC to provide: residential engineering services during the remedial work at Contwoyto Lake; and, contract administration support during the project timeframe.

General Background Information on the Project (*optional):

Contwoyto Lake weather station was in operation from the ~1950s until 1982. A Phase III ESA and RAP were completed in 2013. The remedial work began in 2014. Demobilization occurred in 2015. No further work is scheduled at the site. The application for the water license was to conduct remedial work.

Licence Requirements: the licensee must provide the following information in accodance with

Part B Item 1

A summary report of water use and waste disposal activities, including, but not limited to: methods of obtaining water; sewage and greywater management; drill waste management; solid and hazardous waste management.

Water Source(s): Contwoyto Lake

Water Quantity:

15	Quantity Allowable Domestic (cu.m)
0	Actual Quantity Used Domestic (cu.m)
not applicable	Quantity Allowable Drilling (cu.m)
not applicable	Total Quantity Used Drilling (cu.m)

Waste Management and/or Disposal

Solid Waste Disposal
Sewage
Drill Waste
Greywater
Hazardous

Other: Additional details below.

Additional Details:

In 2015, only 5 days were spent on-site for demob. Food waste waste, sewage, and grey water was transported off-site. Non-haz and Hazardous wastes which were segregated and packaged in 2014 were transported off-site via winter road in March 2015.

A list of unauthorized discharges and a summary of follow-up actions taken.

Spill No.: (as reported to the Spill Hot-line)
Date of Spill:
Date of Notification to an Inspector:
Additional Details: (impacts to water, mitigation measures, short/long term monitoring, etc)

No spills reported.

Revisions to the Spill Contingency Plan

SCP submitted and approved - no revision required or proposed

Additional Details:

Revisions to the Abandonment and Restoration Plan

AR plan submitted and approved - no revision required or proposed

Additional Details:

Progressive Reclamation Work Undertaken

Additional Details (i.e., work completed and future works proposed)

The remedial work was completed in 2014 apart from final demobilization as per the RAP. Demob occurred March 25 - 29, 2015. No future work is planned.

Results of the Monitoring Program including:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where sources of water are utilized;

Details attached

Additional Details:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where wastes associated with the licence are deposited;

Details described below

Additional Details:

Untreated, unpainted wood was burnt in 2014.
The temporary storage of waste was at the former camp location. This waste was transported off-site in its entirety in March 2015.

Results of any additional sampling and/or analysis that was requested by an Inspector

No additional sampling requested by an Inspector or the Board

Additional Details: (date of request, analysis of results, data attached, etc)

Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

No additional sampling requested by an Inspector or the Board

Additional Details: (Attached or provided below)

Any responses or follow-up actions on inspection/compliance reports

Inspection Report received by the Licensee (Date):

Additional Details: (Dates of Report, Follow-up by the Licensee)

An inspection by Eva Paul was conducted on July 16, 2014.
A response was sent to PWGSC dated October 30, 2014 for furtherance of information to the NWB. For 2015 calender year, no inspections as of July 1.

Any additional comments or information for the Board to consider

Greywater was not discharged to the environment. Greywater was collected and containerized for off-site transport.
Sewage was not discharged to the environment. Blackwater was collected and containerized for off-site transport.
The remedial work at the Contwoyto Lake former weather station is complete.
A final completion inspection occurred August 13, 2015.

Date Submitted:	March 31, 2016	
Submitted/Prepared by:	Arcadis, Jason Mauchan	
Contact Information:	**Tel:**	613 230 2405
	Fax:	613 230 1403
	email:	jason.mauchan@arcadis.com

GPS Coordinates for water sources utilized

Source Description	Latitude			Longitude		
	° Deg	' Min	" Sec	° Deg	' Min	" Sec
Contwoyto Lake former Weather Station - near shore	65	29	8.5	110	22	37.5
Contwoyto Lake former Weather Station - offshore	65	29	18	110	22	58

GPS Locations of areas of waste disposal

Location Description (type)	Latitude			Longitude		
	° Deg	' Min	" Sec	° Deg	' Min	" Sec
Temporary storage of segregated and packaged materials - shipped out March 2015.	65	29	6	110	22	37

PART 2

EXECUTIVE SUMMARY

ES1 INTRODUCTION

The water licence issued by the Nunavut Water Board (NWB) for the remedial work at the Contwoyto Lake former weather station stipulates in Part B, Section 1, the requirement for the submission of an annual report. This document is intended to fulfill the licensure requirements and provide the NWB with an update as to the status of the remediation program at the Contwoyto Lake former weather station.

The executive summary written in Inuktitut is attached to this document as Appendix A.

ES2 LOCATION

The Contwoyto Lake weather station was located on the northwestern shore of an unnamed island approximately one third of the way northbound on Contwoyto Lake in the Kitikmeot Region of Nunavut. The site is approximately 330 km southeast of Kugluktuk, Nunavut; 400 km northeast of Yellowknife (see Figure 1), Northwest Territories, and 50 km southeast of the Lupin mine site (see Figure 2).

ES3 WATER LICENCE OVERVIEW

Water Licence #1BR-CLR1419, Type B was issued by the Nunavut Water Board (NWB) to Aboriginal Affairs and Northern Development Canada (AANDC)[1] on May 16, 2014. The licence permits the use of fresh water from Contwoyto Lake at a maximum of 15 m^3 per day. The licence expires on May 15, 2019. The licence stipulates various requirements such as recording the volumes of fresh water collected, adhering to the monitoring program, and filing of an annual report.

The volume of fresh water collected from Contwoyto Lake in 2015 as part of remedial operations at the former weather station was 0 litres.

[1] AANDC formally changed their name at the end of the 2015 calendar year to Indigenous and Northern Affairs Canada (INAC) and will be referred to as INAC henceforth.

The water licence is attached as Appendix B.

ES4 TIMELINE

The Contwoyto Lake weather station was originally a small camp built by Pacific Western Airlines (PWA) during the Distant Early Warning (DEW) Line Site construction era c. 1956. PWA operated the site until 1978, when Transport Canada (TC) acquired the site to establish a telecommunications and navigational aid station. A few years later, TC abandoned the site to establish a non-directional beacon (NDB) air navigation aid at the nearby Echo Bay Mines - Lupin Site. In 1984, the Coppermine Hunters and Trappers Organization (HTO) took over responsibility for the site buildings and established it as an outpost camp.

In the 1990s, the Department of Indian and Northern Development (DIAND) conducted inspections of the site. The DIAND reports stated that the site was in poor condition and cleanup was recommended. A combined Phase I and II Environmental Site Assessment (ESA) was conducted in the summer of 2010 by WESA Inc. (WESA). A Phase III ESA and Archaeological Impact Assessment were completed in the summer of 2012 by SENES and Golder Associates (Golders), respectively. These documents, along with a community meeting held in Kugluktuk in January 2013, were the basis of the Remediation Action Plan (RAP) and remedial specifications.

The remedial works began with the mobilization of equipment and material in April 2014. Mobilization involved aircraft from Yellowknife landing at the Lupin mine site with a subsequent winter road constructed to the former weather station island. The summer construction season occurred throughout July and August, 2014. An NWB inspection was conducted on July 16, 2014.

The remedial project concluded in March 2015. At this time, demobilization to Yellowknife of all equipment, materials, and consolidated wastes occurred via the Lupin-Yellowknife winter road. No further remedial works are planned for the former weather station site. No water was collected from Contwoyto Lake during 2015 as part of the remedial project.

ES5 REMEDIATION PROGRAM OVERVIEW

The remediation program during 2014 included, but was not limited to the following:

- Hazardous material abatement, collection, segregation, and packaging for off-site transport

- Demolition of four structures
- Debris collection, consolidation, and packaging for off-site transport
- The excavation of metals-impacted soils
- The excavation and on-site treatment of petroleum hydrocarbon (PHC)-impacted soils
- The backfill and regrading of excavated areas to reinstate former grades across the site

The quantities within the remediation program were as follows:

- 2100 m^3 of PHC-impacted soils excavated and treated
- 84 m^3 of metals-impacted soils excavated and transported off-site
- 13.5 m^3 of hazardous materials consolidated and transported off-site
- 123 m^3 of non-hazardous debris and demolition waste consolidated and transported off-site
- 369 old drums collected and transported off-site.

The remediation program during 2015 included:

- Off-site transport of materials and equipment
- Off-site transport of consolidated and packaged wastes
- Demobilization via winter road March 25 – 29, 2015

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1.0 PROJECT SUMMARY

1.1 BACKGROUND

The Contwoyto Lake weather station operated from c. 1956 to c. 1982. Remedial operations at the site began in the summer of 2014 and were completed in March 2015. As part of the remedial works, a water licence was granted by the Nunavut Water Board (NWB). A copy of the water licence is attached as Appendix B.

1.2 LOCATION

The Contwoyto Lake former weather station site is located at 65°29'6"N, 110°22'38"W. The site is approximately 330 km southeast of Kugluktuk. Yellowknife lies 400 km southwest and the Lupin mine site is 50 km northwest. Figures 1 and Figure 2, attached within Appendix C, show the location of the site relative to these landmarks.

1.3 OPERATIONAL HISTORY

The Contwoyto Lake Weather Station was originally built c. 1956 by PWA during the DEW-Line era. PWA operated the weather station until 1978, when TC acquired the site to establish a telecommunications and navigational aid station. A few years later, TC abandoned the site, for the more economical option of establishing an alternative air navigation aid at the nearby Echo Bay Mines - Lupin Site. In 1984, the Coppermine HTO took over responsibility for the site buildings and established it as an outpost camp.

1.4 REMEDIAL HISTORY

In the 1990s, the Department of Indian and Northern Development (DIAND) conducted inspections of the site. The DIAND reports stated that the site was in poor condition and cleanup was recommended. A combined Phase I and II Environmental Site Assessment (ESA) was conducted in the summer of 2010 by WESA Inc. (WESA). A Phase III ESA and Archaeological Impact Assessment were completed by SENES and Golders respectively, in the summer of 2012. These documents, along with a community meeting held in Kugluktuk in January 2013, were the basis of the Remediation Action Plan (RAP) and remedial specifications. A list of these document titles is included within the reference list (see Section 3.0).

Remedial work began in 2014 with mobilization of equipment and material to the Lupin mine site in April 2014. Mobilization involved Hercules aircraft from Yellowknife landing at the mine site and the subsequent construction of a winter road. The remedial work was completed in 2014 apart from demobilization which occurred in March 2015.

1.5 SUMMARY OF REMEDIATION ACTIVITIES

The 2014 remedial work, completed in accordance with the Remedial Action Plan (RAP), generally included:

- collection, containerization, and packaging of 13.5 m^3 hazardous waste such as batteries, old propane cylinders, paint cans, and building materials such as PCB-amended paints;
- demolition of the existing structures apart from the HTO cabin (Structure 01);
- collection, containerization, and packaging of 123 m^3 of non-hazardous demolition debris and non-hazardous waste debris including drums;
- collection, containerization, and packaging of the formerly used radio tower;
- collection, containerization, and packaging of the wood waste painted with lead or PCB-amended paint;
- excavation and on-site remediation at a treatment cell of 2100 m^3 of soil impacted with petroleum hydrocarbons;
- excavation and consolidation of 84 m^3 of soil impacted with metals;
- collection and off-site transport of 367 drums and drum contents;
- collection, segregation, and burning of 12 m^3 of untreated wood waste; and,
- backfill, regrading, and compaction of excavated areas to reinstate former grades across the site.

The 2015 remedial work, completed in accordance with the Remedial Action Plan (RAP), generally included:

- off-site transport of segregated wastes; and,
- off-site transport of equipment and materials.

Figures and photographs showing the remediation activities are attached as Appendix C and D, respectively. For further details on the program, references are included in Section 3.0.

1.6 THE PROJECT TEAM

Table 1-1 on the following page, presents the project team for the remediation program.

Table 1-1: Project Team

Element	Company/Group	Responsible Persons
Site Custodian	Aboriginal Affairs and Northern Development Canada, Nunavut Region (Iqaluit, NU)	Dele Morakinyo
Owner's Representative	Public Works and Government Services Canada (Yellowknife, NT and Edmonton, AB)	Michael Bernardin
Remediation Contractor	Delta Carter (Yellowknife, NT and Hay River, NT)	Robert Johnson, Shawn Carter
Site Quality Assurance	ARCADIS Canada Inc. (Yellowknife, NT and Richmond Hill, ON)	Charles Gravelle, Jason Mauchan

1.7 COMPARISON CRITERIA

Comparison criteria were utilized during assessment and remedial phases.

The following documents and classifications were used:

PHCs in soil

- Soil quality with respect to PHCs Fraction 1 to Fraction 4 (F1-F4) was compared to *Canada-Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil* (CCME, 2008a) – Tier 1 agricultural land use, coarse-grained soil;
- Soil quality with respect to BTEX was compared to *CCME Canadian Soil Quality Guidelines (CSQG) for the Protection of Environmental and Human Health* – agricultural land use, coarse-grained soil, 2004; and
- The *Abandoned Military Site Remediation Protocol* (AMSRP) Remedial Objectives

Metals in soil

- Soil quality with respect to metals was compared to *CSQG for the Protection of Environmental and Human Health* (CSQG; CCME, 2007) for agricultural land use; and
- The AMSRP which lists the DEW-Line Clean-up Criteria (DCC), Tier I and II

Sediment and Surface Water

- Canadian Freshwater Interim Sediment Quality Guidelines (ISedQG) for the Protection of Aquatic Life
- CCME Canadian Water Quality Guidelines (CWQG)

A summary of the comparison criteria documents for respective media is presented below as Table 1-2.

Table 1-2: Comparison Criteria References

Medium	Comparison
Soil	CCME CSQGs Agricultural (metals, BTEX) CCME CWS Tier 1 coarse grained (PHCs) AMSRP Remedial Objectives (PHCs) AMSRP (DCC[1] metals)
Surface Water	CCME CWQG
Sediment	CCME ISedQG
Vegetation	Background
Drum Contents	Abandoned Military Site Remediation Protocol (AMSRP)
Building Materials	Government of Nunavut (Asbestos) Health Canada (PCBs, Pb)
Grey Water[2]	Water Licence Part D, Item 12

1. DCC metals criteria as per the AMSRP are the same criteria as per Table 1 in the water licence.
2. Grey water produced during 2014 was containerized for off-site transport to Yellowknife. Grey water was not released to the environment.

2.0 ANNUAL REPORT REQUIREMENTS

This section follows the requirements listed in Part B, Item 1, subsection a) through i) of the water licence.

A) SUMMARY OF THE MONITORING PROGRAM DATA GENERATED

The monitoring program as stipulated in Part K, Item 1 is summarized below in Table 2-1.

Table 2-1: Overview of the Monitoring Program

Monitoring Station	Description	Frequency	Parameters
IN1	Fresh water intake	Continuous (during periods of water use)	Volume as per Part C, Item 2
SW1	Retention cell run-off	Prior to discharge	Quality as per Part J, Item 6 and Part D, Item 12
SW2	Effluent discharge at the Treatment Cell	At least once during discharge	Volume as per Part J, Item 5 and Quality as per Part J, Item 6 and Part D, Item 12
MW1 **MW2** **MW3** **MW4**	Groundwater monitoring stations at N, W, S, and E side of treatment cell	Twice per year (once in the spring freshet, once in the summer)	Quality as per Part J, Item 7, and groundwater level

The volume of fresh water collected from Contwoyto Lake during 2014 was monitored using 22 litre (5 gallon) and 205 litre (45 gallon) containers. The status of the individual monitoring stations is summarized on the following page in Table 2-2.

Table 2-2: Data Summary of the Monitoring Program

Monitoring Station	Description	Status	Data
IN1	Fresh water intake	Fresh water collected during remedial operation time period of July and August, 2014.	1.5 m^3 collected in 2014 0 m^3 collected in 2015
SW1	Retention cell run-off	Grey water was containerized in 2014 and transported to Yellowknife for disposal. No grey water produced in 2015.	None
SW2	Effluent discharge at the Treatment Cell	No discharge of water.	None
MW1 **MW2** **MW3** **MW4**	Groundwater monitoring stations at N, W, S, and E side of Treatment Cell	MW1-4 installed on August 9, 2014. Insufficient volume of water in monitoring wells for sample collection. Very minimal groundwater present on the esker. MW1-4 were decommissioned March 27, 2015.	None

A tabular summary of the remedial program as it pertains to the Water Licence is shown above as Part 1 of this document.

B) REVIEW AND ANALYSIS OF MONITORING PROGRAM DATA COLLECTED

In 2014, fresh water from IN1 was collected and used by the remedial contractor for camp water and as a soil additive by mixing in nutrients. During 2014, the volume of fresh water taken from Contwoyto Lake for the remedial program was less than expected. This was chiefly due to minimal volumes being used to mix nutrients for application in the treatment cell. In 2015, no fresh water was collected by the remedial contractor. This was due to the site work being limited to demobilization activities. Throughout the project, drinking water was shipped to site from Yellowknife.

Throughout the remedial project, grey water was not discharged to the environment. The remedial contractor chose to containerize grey water for off-site shipment to Yellowknife. Thus, there is no data for SW1.

Monitoring wells 1 through 4 contained insufficient volume and effluent was not discharged from the treatment cell. Thus, there is no data for SW2, MW1, MW2, MW3, or MW4. The monitoring wells were decommissioned during final demobilization from site.

C) REVIEW AND RECOMMENDATIONS TO THE MONITORING PROGRAM

No recommendations to the monitoring program at the former weather station have been received.

D) SUMMARY OF RESTORATION WORK AND FUTURE WORK PLANNED

A summary of the restoration work completed to date, along with future work planned for the remedial project, is shown below in Table 2-3.

Table 2-3: Summary of Work Completed and Future Work Planned

Item[1]	Description	Completed	Future Work Planned
Hazardous Waste	Wood with PCB-amended paint, wood with Pb-amended paint, old batteries, paint cans, etc.	13.5 m^3 collected and containerized. Transported off-site in March 2015.	None
Non-Hazardous debris and demolition waste	Demolish site structures apart from the HTO cabin. Collect site waste including drums and former radio tower.	123 m^3 of waste containerized in 2014 and transported off-site in March 2015. 369 drums transported off-site.	None
Metals-impacted soils	Excavate and transport off-site.	84 m^3 containerized and transported off-site. Excavation zones were regraded.	None
PHC-impacted soils	Excavate and treat on-site.	2100 m^3 excavated and treated. Excavation zones were regraded.	None.

1. The full list of hazardous and non-hazardous materials is reported in the Phase III ESA (SENES, 2013a)

E) UNAUTHORIZED DISCHARGES

No unauthorized discharges occurred during the 2015 remedial works.

F) TRENCHES AND SUMPS

Trenches and sumps were not constructed as part of the remedial works at the former weather station.

G) INSPECTION REPORTS - DEFICIENCIES AND CORRECTIVE ACTIONS

A water licence inspection was conducted by Eva Paul of INAC on July 16, 2014.

There were five corrective actions for 2014 which required attention in order for the remediation program works to conform to requirements of the Water Licence, namely:

1. Provide GPS co-ordinates of the monitoring wells;
2. Provide GPS co-ordinates for the borrow areas;
3. Discuss the fate of the contact water;
4. Provide drawings (construction and as-built) of the treatment cell (landfarm); and,
5. Provide details with regard to the changes to the camp from the original application.

The inspection report and subsequent response detailing the corrective actions was included within the 2014 Annual Report.

H) EXECUTIVE SUMMARY

An executive summary in both English and Inuktitut is a requirement under Part B, Item 1, subsection H of the licence. The licence stipulates that all plans, reports, or studies conducted under this licence contain an executive summary in both languages.

The Inuktitut executive summary of this report is attached as Appendix A. The English executive summary appears at the front of this document.

I) OTHER DETAILS

No other details were requested by the Nunavut Water Board as of July 1, 2015.

3.0 REFERENCES

Department of Energy, Mines and Resources (DEMR) 1994. Contwoyto Lake, District of Mackenzie, Northwest Territories, Map 76E, Scale 1:250,000.

Aboriginal Affairs and Northern Development Canada (AANDC) 2013. Summary of the Contwoyto Lake Weather Station Draft Remedial Action Plan Community Consultation in Kugluktuk, January 15th, 2013.

Canadian Council of Ministers of the Environment (CCME) 2006. *A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines.*

Canadian Council of Ministers of the Environment (CCME) 2007. *Canadian Soil Quality Guidelines for the Protection of Environment and Human Health, Canadian Environmental Quality Guidelines.*

Canadian Council of Ministers of the Environment (CCME) 2008. *Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil.*

Golder Associates (Golder) 2013. *Archaeological Report for the Contwoyto Lake Former Weather Station, Nunavut*, February 2013.

Indian and Northern Affairs Canada (INAC) 2008. *Abandoned Military Site Remediation Protocol (AMSRP).* Volume I – Main Report.

Public Works and Government Services Canada (PWGSC) 2013. *Specifications for Site Remediation, Contwoyto Remediation Program, Contwoyto Lake, NU*, March 2013.

SENES 2013a. *Phase III Environmental Site Assessment Contwoyto Lake Former Weather Station, Nunavut,* March 2013.

SENES 2013b. *Remediation Action Plan for the Contwoyto Lake Former Weather Station, Nunavut,* March 2013.

Transport Canada (TC) 2001. *Transportation of Dangerous Goods Regulations* (SOR/DOR/2001-286), under Transportation of Dangerous Goods Act (1992.C34).

WESA 2011. *Integrated Phase I and II Environmental Site Assessment, WK 117 – Contwoyto Lake Weather Station,* March 2011.

4.0 LIMITATIONS

Arcadis Canada Inc. (formerly dba SENES Consultants) undertook the work referred to in this report for PWGSC on behalf of INAC. It is intended for the sole, and exclusive use of INAC, its affiliated departments, agencies, companies and partners and their respective insurers, agents, employees and advisors.

Any use, reliance on or decision made by any person other than INAC based on this report is the sole responsibility of such other person. INAC and Arcadis make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The work undertaken by Arcadis with respect to this report and any conclusions made in this report reflect Arcadis's judgment based on the site observations at the time and on information available at the time of the preparation of this report. This report relies upon data collected by others. INAC and Arcadis make no representation or warranty to anyone with regard to these data or information from others which are presented in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on these data referred to in this report. None of these data have been verified and they are subject to the limitations outlined in the reports by others.

Nothing in this report is intended to constitute or provide a legal opinion.

APPENDIX A

EXECUTIVE SUMMARY IN INUKTITUT

APPENDIX B

WATER LICENCE

NUNAVUT WATER BOARD
WATER LICENCE RENEWAL

Licence No. 1BR-CLR1419

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT (DIAND)
(Licensee)

P.O. BOX 2200 IQALUIT, NUNAVUT, X0A 0H0
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water or dispose of waste for a period subject to restrictions and conditions contained within this Licence Amendment/Renewal:

Licence Number/Type:	**1BR-CLR1419** TYPE "B"
Water Management Area:	BACK WATERSHED (31)
Location:	KITIKMEOT REGION, NUNAVUT
Classification:	INDUSTRIAL UNDERTAKING (REMEDIATION)
Purpose:	USE OF WATER AND DEPOSIT OF WASTE
Quantity of Water use not to Exceed:	FIFTEEN (15) CUBIC METRES PER DAY
Date of Licence Issuance:	MAY 16, 2014
Expiry of Licence:	MAY 15, 2019

This Licence Amendment/Renewal issued and recorded at Gjoa Haven, Nunavut, includes and is subject to the annexed conditions.

Thomas Kabloona,
Nunavut Water Board
Chair

PART A. SCOPE, DEFINITIONS AND ENFORCEMENT

1. Scope

This Licence allows for the use of water and disposal of waste for an undertaking classified as an Industrial Undertaking, as per Schedule 1 of the *Regulations*, at the Contwoyto Lake Former Weather Station Remediation Project, located approximately 330 km southeast of the community of Kugluktuk and 180 km southwest of the community of Bathurst Inlet, within the Kitikmeot Region of Nunavut (generally located at the following geographic coordinates: *Latitude*: 65° 28' 58.34" N, *Longitude*: 110° 22' 05.25" W).

a. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing *Regulations* are amended by the Governor in Council under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and

b. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

"**Act**" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"**Addendum**" means the supplemental text that is added to a full plan or report usually included at the end of the document and is not intended to require a full resubmission of the revised report;

"**Amendment**" means a change to original terms and conditions of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

"**Analyst**" means an Analyst designated by the Minister under Section 85 (1) of the *Act*;

"**Appurtenant Undertaking**" means an undertaking in relation to which a use of water or a deposit of waste is permitted by a licence issued by the Board;

"**Board**" means the Nunavut Water Board established under the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"**Borrow Sources**" mean sources of aggregates used for backfilling of excavations and for purposes described in the Water Licence Application received on November 18, 2013;

"**Effluent**" means treated or untreated liquid waste material that is discharged into the environment from a structure such as a settling pond, landfarm or a treatment plant;

"**Engineer**" means a professional engineer registered to practice in Nunavut in accordance with the *Consolidation of Engineers and Geoscientists Act S. Nu 2008, c.2* and the *Engineering and Geoscience Professions Act S.N.W.T. 2006, c.16 Amended by S.N.W.T. 2009, c.12*;

"**Final Discharge Point**" means the point at which the Licensee no longer exerts care and/or control over the quality and/or quantity of the effluent from a treatment process;

"**Greywater**" means all liquid wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet wastes;

"**Hazardous Waste**" means waste classified as "hazardous" by Nunavut Territorial or Federal Legislation, or as "dangerous goods" under the *Transportation of Dangerous Goods Act* at the time of clean-up;

"**High Water Mark**" means the usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land (ref. Department of Fisheries and Oceans Canada, Operational Statement: Mineral Exploration Activities);

"**Inspector**" means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

"**Landfarm Facility**" means the facility designed and constructed to bio-remediate Type B soil at the Contwoyto Lake, Former Weather Station Remediation Project site;

"**Licensee**" means the holder of this Licence;

"**Modification**" means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"**Monitoring Program**" means a program established to collect data on surface water and groundwater quality to assess impacts to the environment of an appurtenant undertaking;

"**Nunavut Land Claims Agreement *(NLCA)***" means the *"Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada"*, including its preamble and schedules, and any amendments to that agreement made pursuant to it;

"**Regulations**" means the *Nunavut Waters Regulations SOR/2013-69 18th April, 2013*;

"**Sewage**" means all toilet wastes and greywater;

"**Sewage Treatment Facility**" comprises the area and engineered structures designed for the containment and/or treatment of sewage generated at the Contwoyto Lake, Former Weather Station Remediation Project site, as described in the Application received November 18, 2013;

"**Solid Waste**" means non-hazardous waste and Type-A soil;

"**Spill Contingency Plan**" means a Plan developed to deal with unforeseen petroleum and hazardous materials events that may occur during the operations conducted under the Licence;

"**Sump**" means an excavation in impermeable soil for the purpose of catching or storing water or waste;

"**Tier I Soil**" means soil containing contaminant concentrations within the types and ranges defined as DCC Tier I in Appendix E of the NTI Agreement, including its preamble and schedules, and any amendment to that agreement made pursuant to it (see **Error! Reference source not found.**);

"**Tier II Soil**" means soil containing contaminant concentrations within the types and ranges defined as DCC Tier II in Appendix E of the NTI Agreement including its preamble and schedules, and any amendments to that agreement made pursuant to it (see **Error! Reference source not found.**);

"**Toilet Wastes**" means all human excreta and associated products, but does not include greywater;

"**Type A Soil**" means soil contaminated with hydrocarbons in which the primary petroleum product present in the soil as determined by laboratory analysis consists of lubricating oil and grease (F3 – F4 Fractions);

"**Type B Soil**" means soil contaminated with hydrocarbons in which the primary petroleum product present in the soil as determined by laboratory analysis consists of fuel oil and/or diesel fuel and/or gasoline (F1 – F2 Fractions);

"**Waste**" means, as defined in S.4 of the *Act*, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means;

"**Water" or "Waters**" means waters as defined in section 4 of the Act;

"**Water Supply Facility**" consists of intake structure, transport equipment, and other infrastructure designed to collect and supply water for the Contwoyto Lake Former Weather Station Remediation Project site, as described in the Application received on November 18, 2013;

"**Waste Disposal Facilities**" means all facilities designated for the disposal and/or treatment of waste, including the Sewage Treatment Facility and Landfarm Facility as described in the Application received on November 18, 2013.

3. **Enforcement**

   a. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

   b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and

   c. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the Licensee, Inspectors appointed under the *Act,* hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

PART B. GENERAL CONDITIONS

1. The Licensee shall file an Annual Report on the Appurtenant Undertaking with the Board no later than March 31 of the year following the calendar year being reported, containing the following information:

   a. Tabular summaries for all data and information generated under the Monitoring Program;

   b. A review and analysis of data collected during the Monitoring Program and a brief description of any future studies planned by the Licensee;

   c. The results of any review conducted and any recommendations regarding any changes to the Monitoring Program and/or remediation requirements;

   d. A summary of any abandonment and restoration work undertaken during the year and an outline of any work anticipated for the next year;

   e. A list of unauthorized discharges and summary of follow-up actions taken;

   f. If applicable, a description of any trenches and sumps excavated, including the following: GPS coordinates, dimensions, depth below active layer, and secondary containment features;

   g. A brief summary of work done to address any concerns of deficiencies listed in the inspection reports and/or compliance reports prepared by an Inspector;

h. An executive summary in English and Inuktitut of all plans, reports, or studies conducted under this Licence; and

i. Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

2. The Licensee shall notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.

3. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and direction. The Board may alter or modify a Plan if necessary to achieve the legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.

4. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board in writing.

5. The Licensee shall review the Plans referred to in this Licence, as required by changes in operation and/or technology, and modify the Plan accordingly. Revisions to the Plans shall be submitted in the form of an Addendum to be included with the Annual Report.

6. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and conditions imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

7. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

(a) **Manager of Licensing:**
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: licensing@nwb-oen.ca

(b) **Inspector Contact:**
Manager of Field Operations, AANDC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

8. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.

9. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the NWB is received and acknowledged by the Manager of Licensing.

10. This Licence is assignable as provided for in Section 44 of the *Act*.

PART C. CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain water from Contwoyto Lake for all purposes described in the Application. The maximum quantity of water allowed for all purposes under this Licence shall not exceed fifteen (15) cubic metres per day.

2. The Licensee shall install flow meters or other such devices, or implement suitable methods required for measuring volumes of water.

3. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that there is no entrainment of fish and shall withdraw water at a rate such that fish do not become impinged on the screen.

4. The Licensee shall not remove any material from below the ordinary high water mark of any water body unless authorized.

5. If the Licensee requires water in sufficient volume that the source water body may be drawn down, the Licensee shall, at least thirty (30) days prior to commencement of the use of water, submit to the Board for approval in writing, the following: volume required, hydrological overview of the water body, details of impacts, and proposed mitigation measures.

6. Sediment and erosion control measures shall be implemented prior to and maintained during the undertaking to prevent entry of sediment into water.

PART D. CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall locate areas designated for waste disposal at a minimum distance of thirty-one (31) metres from the ordinary high water mark of any water body such that the quality, quantity or flow of water is not impaired, unless otherwise approved by the Board in writing.

2. The Licensee shall not practice on-site land filling of domestic waste, unless otherwise approved by the Board in writing.

3. The Licensee is authorized to dispose of all acceptable food waste, paper waste and untreated wood products in an incinerator.

4. The Licensee shall not open burn plastics, wood treated with preservatives, electric wire, Styrofoam, asbestos or painted wood to prevent the deposition of waste materials of incomplete combustion and/or leachate from contaminated ash residual, from impacting any surrounding waters, unless otherwise approved by the Board in writing.

5. The Licensee shall provide to the Board documented authorization from all communities in Nunavut receiving wastes from the Contwoyto Lake, Former Weather Station Remediation Project prior to any backhauling and disposal of wastes to those communities.

6. The Licensee shall backhaul and dispose of all hazardous wastes, waste oil and non-combustible waste generated through the course of the operation at a licensed waste disposal site.

7. The Licensee shall maintain records of all waste backhauled and records of confirmation of proper disposal of backhauled waste and include this information within the Annual Report, under Part B, Item 1. These records shall be made available to an Inspector upon request.

8. The Licensee shall direct all greywater to the on-site treatment system (Bio Barrier Membrane) and hold such waste until on-site testing confirms that water quality criteria specified in PART D, Item 12 have been met, following which the waste may be discharged to the natural environment.

9. The Licensee shall direct all Sewage generated from camp operations to the Sewage Treatment Facilities described in the Application, or as otherwise approved by the Board in writing.

10. The Licensee shall direct all Type B, light hydrocarbon contaminated soil to the appropriate onsite Landfarm Facility for treatment in accordance with the Remedial Action Plan, or as otherwise approved by the Board in writing.

11. The Licensee shall collect and temporarily store in preparation for future disposal all water generated from the storage and segregation of solid waste, demolition rinse water resulting from decontamination processes or procedures and water derived from borrow pits, quarry sites, and excavation activities.

12. The Licensee shall ensure that all contact water, including water associated with the dewatering of contaminated soil areas and/or water within the perimeter of the Landfarm Facility, solid waste segregation and storage area(s), demolition rinse water, water from Borrow Sources, and seepage from monitoring program stations, meet the following Effluent discharge criteria prior to being released to the receiving environment:

Parameter	Maximum Allowable Concentration (mg/L)
pH	6.5 to 9 (pH units)
Oil and Grease	15 and no visible sheen
Arsenic (total)	0.1
Benzene	0.37
Cadmium (dissolved)	0.01
Chromium (dissolved)	0.1
Cobalt (dissolved)	0.05
Copper (dissolved)	0.2
Ethylbenzene	0.09
Lead (total)	0.001
Mercury (total)	0.0006
Nickel (dissolved)	0.2
PCB (total)	1.0
Phenols	0.03
Toluene	0.002
TSS	50
Zinc (total)	0.5
TSS	50

13. If the effluent referred to in Part D, Item 12 does not meet the discharge criteria stipulated in this Licence, it shall be considered hazardous waste and disposed off-site at an approved facility, or as otherwise approved by the Board in writing.

14. The discharge location for all treated effluents described in Part D, Item 12 shall be located at a minimum of thirty-one (31) metres from the ordinary high water mark of any water body and where direct flow into a water body is not possible and no additional impacts are created.

15. The Licensee shall sample and provide, as part of its Annual Report, the results of laboratory analyses carried out on materials from potential Borrow Sources prior to use as construction materials. Borrow Sources containing materials that possess acid generating and metal leaching characteristics cannot be used as construction materials for the remediation projects.

16. All water collected from excavated areas, including borrow pits, shall be pumped to an area as described in Part D, Item 11, or as otherwise approved by the Board in writing.

17. The Licensee shall provide proper storage, transport, and disposal off-site at an approved facility of all non-hazardous and hazardous waste materials identified in the Application, including Tier II Soil, items contaminated with heavy metals, and waste oil generated through construction and remediation activities, or as otherwise approved by the Board in writing.

18. The Licensee shall not mix or blend soils that exceed the maximum levels of Tier II

criteria for the expressed purpose of attaining the specific limits of Tier I as listed under Table 1.

19. The Licensee shall dispose of all soils containing substances in excess of Tier II criteria, as indicated in Table 1, by collection, containment, and shipment off-site to a licensed disposal facility.

20. The Licensee shall dispose of any material coated with Polychlorinated Biphenyl (PCB) – amended paints, hazardous materials, and soils containing contaminants in excess of Canadian Environmental Protection Act (CEPA) Guidelines, off-site at an approved treatment facility, in accordance with the Application received.

21. The Licensee shall, prior to the removal of any treated soil from the Landfarm Facility, confirm with the Government of Nunavut, Environmental Protection Service that soils have been treated to meet all legislatively-required treatment objectives.

22. The Licensee shall provide at least fifteen (15) days written notice to the Inspector prior to any planned discharges from the Landfarm Facility. The notice shall include:

    a. Estimated discharge volume;
    b. Effluent quality or results of monitoring under PART K, Item 6; and
    c. Proposed location for the discharge.

PART E. CONDITIONS APPLYING TO THE UNDERTAKING

1. The Licensee shall use material from Borrow Sources for the purposes specified in the "Contwoyto Lake Former Weather Station – Remedial Action Plan" dated March 2013 (revised October 2013), provided that those Borrow Sources are approved by an Inspector, free of contaminants and satisfies the requirement of Part D, Item 15. The Licensee shall provide to the NWB all permits related to Borrow Sources along with the GPS coordinates for their locations when they are confirmed.

2. The Licensee shall, upon failure of any constructed facilities, repair such facilities immediately to the appropriate standards, as recommended by an Engineer.

3. The Licensee shall implement proper handling, storage, and transportation procedures for hazardous materials during clean-up activities.

4. The Licensee shall minimize disturbance to terrain, permafrost, and drainage during extraction of granular material, development, and closure of site infrastructure, movement of contractor's equipment and personnel around the site and removal of site debris.

5. The Licensee shall implement sediment and erosion control measures prior to and during the operation to prevent entry of sediment into water.

6. All sites affected by construction or removal activities shall be stabilized, landscaped as

necessary, and suitable erosion control measures implemented to minimize sediment deposition into watercourses located on or adjacent to the site.

7. The Licensee shall restore and stabilize all areas affected by the undertaking upon completion of the work.

8. The Licensee shall not deposit any waste in any body of water, or on the banks thereof, which may impair the quality, quantity, or flow of water.

9. The Licensee dispose of all scrap metal, discarded machinery and parts, and other bulky material in a manner that conforms to the Remedial Action Plan that was submitted with the Licence Application.

PART F. CONDITIONS FOR CAMPS, ACCESS INFRASTRUCTURES AND OPERATIONS

1. The Licensee shall not erect camps or store material on the surface of frozen streams or lakes including the immediate banks except what is for immediate use. Camps shall be located such as to minimize impacts on surface drainage.

2. The Licensee shall conduct all activities in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake corrective measures in the event of any impacts on surface drainage.

3. Winter lake and stream crossings, including ice bridges, shall be constructed entirely of water, ice, or snow, and shall be removed prior to spring break-up.

4. With respect to access road, pad construction or other earthworks, the deposition of debris or sediment into or onto any water body is prohibited. These materials shall be disposed a distance of at least thirty-one (31) metres from the ordinary high water mark in such a fashion that they do not enter the water.

PART G. CONDITIONS APPLYING TO DRILLING OPERATIONS

1. The Licensee is authorized to drill for the purpose of installing monitoring wells, thermistors, or other monitoring equipment.

2. The Licensee shall restore all drill holes and disturbed areas to natural conditions immediately upon completion of the projects. The restoration of drill holes must include the removal of any drill casing materials and the capping of holes with a permanent seal.

PART H. CONDITIONS APPLYING TO CONSTRUCTION AND MODIFICATIONS

1. The Licensee shall provide to the Board for review, within sixty (60) days prior to the construction of the Landfarm Facility, complete for-construction engineering design drawings, signed and stamped by an Engineer. These designs shall consider siting, operation, monitoring, sampling, and analytical methods, decommissioning, and closure options and plans for the proposed facility.

2. The Licensee shall provide to the Board, within ninety (90) days of completion of construction, as-built plans and drawings of the facilities referred to in this Licence. These plans and drawings shall be stamped by an Engineer.

3. The Licensee may, without written consent from the Board, carry out Modifications to the Water Supply Facilities and Waste Disposal Facilities provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

    a. the Licensee has notified the Board in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
    b. such Modifications do not place the Licensee in contravention of the Licence or the *Act*;
    c. such Modifications are consistent with the NIRB Screening Decision;
    d. the Board has not, during the sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and
    e. the Board has not rejected the proposed Modifications.

4. Modifications for which all of the conditions referred to in PART H, Item 3 have not been met can be carried out only with written approval from the Board.

5. The Licensee shall provide as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modification. These plans and drawings shall be stamped by an Engineer.

PART I. CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. The Licensee shall implement the "Contwoyto Lake Weather Station Remediation - Spill Contingency Plan" dated as effective from October 10, 2012 to March 31, 2016, that was approved by the Board and submitted as additional information with the Application.

2. The Licensee shall submit together with the 2014 Annual Report, an Addendum to the Plan referred to in PART I, Item 1, in the format set out by the Consolidation of Spill Contingency Planning and Reporting Regulations, R-068-93, to address minor issues identified by AANDC during the review of the original plan, including:

    a. The modification of the effective date to account for the five (5) year term of the licence;
    b. The addition of the locations of any spill kits on site in the Plan; and
    c. The addition of the fax number for AANDC's Manager of Field Operations

(867-979-6445).

3. The Licensee shall prevent any chemicals, petroleum products or wastes associated with the project from entering water. All sumps and fuel caches shall be located at a distance of at least thirty one (31) metres from the ordinary high water mark of any adjacent water body and inspected on a regular basis.

4. The Licensee shall conduct any equipment maintenance and servicing in designated areas and shall implement special procedures (such as the use of drip pans) to manage motor fluids and other waste and contain potential spills.

5. If during the term of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:

   a. Employ the approved Spill Contingency Plan;

   b. Report the spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and

   c. For each spill occurrence, submit to the Inspector, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean up the spill site.

PART J. CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION OR TEMPORARY CLOSING

1. The Board has approved the Plan entitled "Contwoyto Lake Former Weather Station – Remedial Action Plan" dated March 2013 (revised October 15, 2013) and received as part of the Application.

2. The Licensee shall complete all restoration work for the temporary camp facilities and waste disposal activities not included under PART J, Item 1, prior to the expiry of this Licence.

3. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.

4. The Licensee shall backfill and restore all sumps to the pre-existing natural contours of the land.

5. The Licensee shall remove from the site, all infrastructure and site materials, including all fuel caches, drums, barrels, buildings and contents, docks, water pumps and lines, material and equipment prior to the expiry of this Licence.

6. In order to promote growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.

7. Areas that have been contaminated by hydrocarbons from normal fuel transfer procedures shall be reclaimed to meet objectives as outlined in the Government of Nunavut's *Environmental Guideline for Contaminated Site Remediation*, 2010. The use of reclaimed soils for the purpose of back fill or general site grading may be carried out only upon consultation and approval by the Government of Nunavut, Department of Environment and an Inspector.

8. The Licensee shall contour and stabilize all disturbed areas to a pre-disturbed state upon completion of work.

PART K. CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall maintain Monitoring Program Stations at the following locations:

Monitoring Station ID	Description	Frequency	Parameters
IN1	Freshwater intake monitoring station	Continuous (during periods of water use)	Volume in accordance with Part C, Item 2
SW1	Monitoring station located within the run-off water retention cell	Prior to discharge	Quality in accordance with Part J, Item 6 and Part D, Item 12
SW2	Effluent discharge point for the Landfarm Facility	At least once during discharge	Volume in accordance with Part J, Item 5 Quality in accordance with Part J, Item 6 and Part D, Item 12
MW1	Groundwater monitoring station located approximately 3 m outside landfarm berm on the west-side of the Landfarm Facility and northwest of MW3.	Twice per year (Once during spring freshet and once during mid-summer)	Quality in accordance with Part J, Item 7 Static groundwater level in accordance with Part J, Item 8
MW2	Groundwater monitoring station located approximately 3 m outside landfarm berm on the north-side of the Landfarm Facility and north-east of MW3.	Twice per year (Once during spring freshet and once during mid-summer)	Quality in accordance with Part J, Item 7 Static groundwater level in accordance with Part J, Item 8

MW3	Groundwater monitoring station located approximately 3 m outside landfarm berm on the south-side of the Landfarm Facility and southwest of MW2.	Twice per year (Once during spring freshet and once during mid-summer)	Quality in accordance with Part J, Item 7 Static groundwater level in accordance with Part J, Item 8
MW4	Groundwater monitoring station located approximately 3 m outside landfarm berm on the east-side of the Landfarm Facility and southeast of MW3.	Twice per year (Once during spring freshet and once during mid-summer)	Quality in accordance with Part J, Item 7 Static groundwater level in accordance with Part J, Item 8

2. The Licensee shall confirm the locations and GPS coordinates for all Monitoring Program Stations referred to in PART K, Item 1 with an Inspector.

3. The Licensee shall measure and record the volume of all soil from all locations entering the Landfarm Facility.

4. The Licensee shall assess and record the concentration of F1 – F4 fractions in petroleum hydrocarbon contaminated soil entering the Landfarm Facility from all sources, as per the CCME *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil.*

5. The Licensee shall record the volume of all Effluent discharged from the Landfarm Facility at Monitoring Program Station SW2.

6. The Licensee shall sample prior to discharge at Monitoring Program Station SW1 and analyze for the following parameters:

pH
Total Suspended Solids
Nitrate – Nitrite
Total Phenols
Total Hardness
Sodium
Magnesium
Chloride
Total Copper
Total Iron
Total Mercury
Total Zinc
Total Aluminum
Total Cobalt
Conductivity
Ammonia Nitrogen
Oil and Grease (visual)
Sulphate
Total Alkalinity
Potassium
Calcium
Total Cadmium
Total Chromium
Total Lead
Total Nickel
Total Phosphorous
Total Manganese
Total Arsenic
Total Petroleum Hydrocarbons (TPH)
Polycyclic Aromatic Hydrocarbons (PAH)
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)

7. The Licensee shall sample twice per year, once during spring freshet and once during mid-summer, at Monitoring Program Stations MW1, MW2, MW3, and MW4, and analyze for the parameters listed under PART K, Item 6.

8. During sampling events conducted under PART K, Item 7, the Licensee shall monitor the static depth to the groundwater level at Monitoring Program Stations MW1, MW2, MW3, and MW4.

9. The Licensee shall sample the Effluent discharged from Monitoring Program Station SW2 at least once during a particular discharge event to verify compliance with the Effluent quality limits under PART D, Item 12, and to analyze for the parameters listed under PART K, Item 6.

10. The Licensee shall maintain at least two groundwater monitoring wells down-gradient of the Landfarm Facility.

11. The Licensee shall maintain at least one groundwater monitoring well up-gradient of the Landfarm Facility for background data collection.

12. The Licensee shall sample soil being treated in the Landfarm Facility no less frequently than every four (4) months during the period of active land treatment to monitor contaminant levels until analytical results are below acceptable levels as determined under PART D, Item 18.

13. The Licensee shall determine the GPS coordinates of all locations where remediated soil is deposited.

14. The Licensee shall record the date, amount, soil quality, and final destination of all treated soil removed from the Landfarm Facility under PART D, Item 211.

15. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board in writing.

16. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

17. The Licensee shall submit to the Board for information, at least ninety (90) days prior to releasing any Effluent, a Quality Assurance/Quality Control Plan that conforms to the guidance document *Quality Assurance (QA) and Quality Control (QC) Guidelines For Use by Class "B" Licensees in Collecting Representative Water Samples in the Field and for Submission of a QAQC Plan* (INAC, 1996). The Plan shall be acceptable to an accredited laboratory and include a covering letter from the accredited laboratory confirming acceptance of the Plan for analyses to be performed under the Licence.

18. The Licensee shall include in the Annual Report, as required under PART B, Item 1, all monitoring data, analyses, and information required by PART K.

19. Modifications to the Monitoring Program may be made only upon written request and subsequent approval of the Board in writing.

20. The Licensee shall determine the GPS co-ordinates (in degrees, minutes, and seconds of latitude and longitude) of all locations where sources of water are utilized for all purposes.

21. The Licensee shall determine the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations where wastes associated with camp operations are deposited.

22. If there is a need for long-term monitoring, the Licensee shall submit to the Board for approval, at least sixty (60) days prior to initiating any long-term monitoring activities, a Post-closure Monitoring Plan for the project sites. The plan shall include information pertaining to the long-term monitoring of the Waste Disposal Facilities, stability of the sites, and the need for thermal and groundwater monitoring.

Table 1. Tier I and Tier II – DEW Line Clean-up Criteria (DCC)[a]

Aboriginal Affairs and Northern Development Canada[b]
Abandoned Military Site Remediation Protocol

Substance	DCC Tier I[c]	DCC Tier II[d]
Arsenic	-	30
Cadmium	-	5.0
Chromium	-	250
Cobalt	-	50
Copper	-	100
Lead	200	500
Mercury	-	2.0
Nickel	-	100
Zinc	-	500
PCB's	1.0	5.0

Note: soil criteria are given in 'parts per million' (ppm).

a. Formerly known as *Indian and Northern Affairs Canada.*

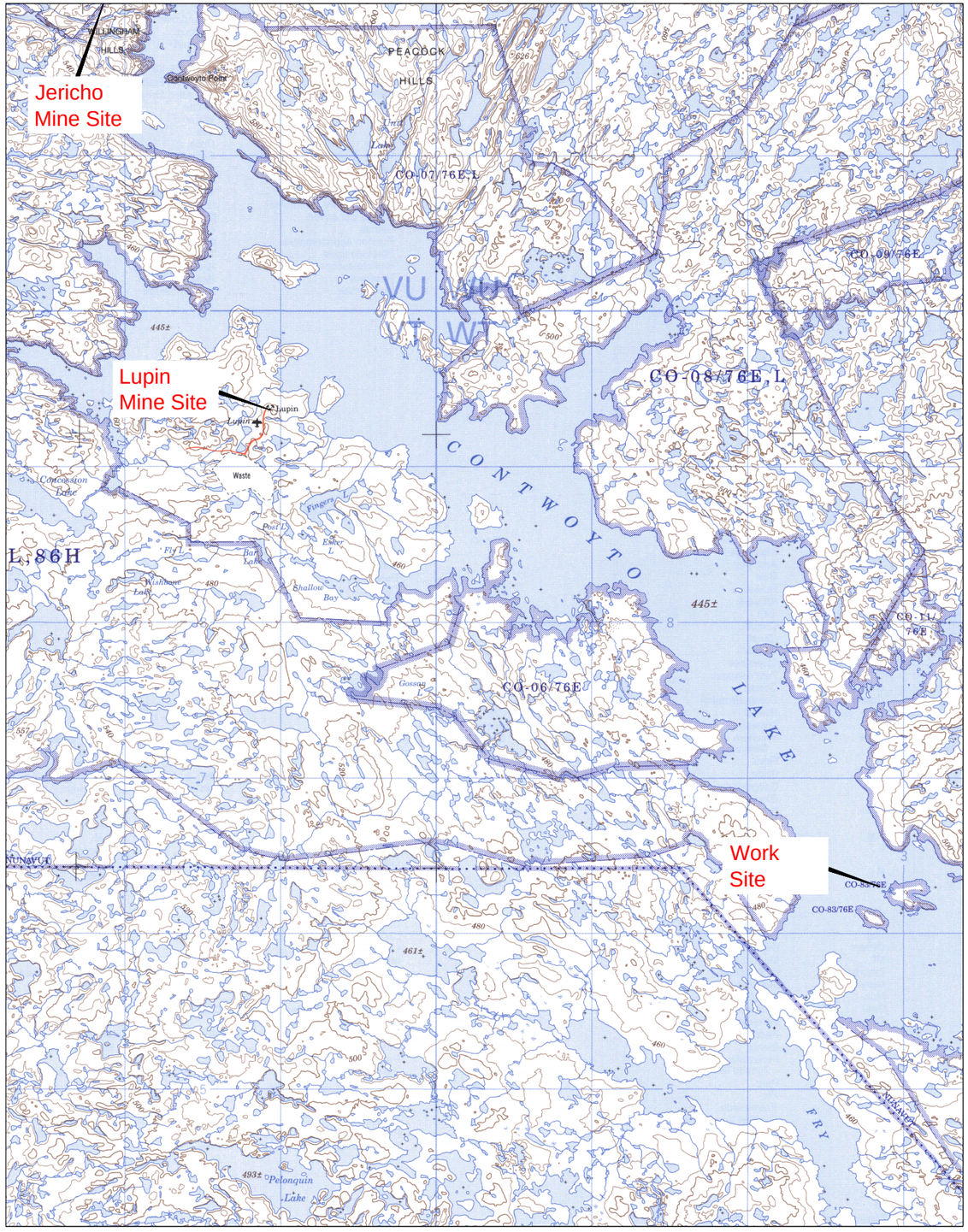
b. These criteria were adopted specifically for the cleanup of Arctic DEW Line Sites from the 1991 versions of the Quebec Soil Contamination Indicators and the Canadian Council of Ministers of the Environment Interim Canadian Environmental Criteria for Contaminated Sites.

c. Soils containing lead and/or PCBs at concentrations in excess of DCC I, but less than DCC II, may be landfilled.

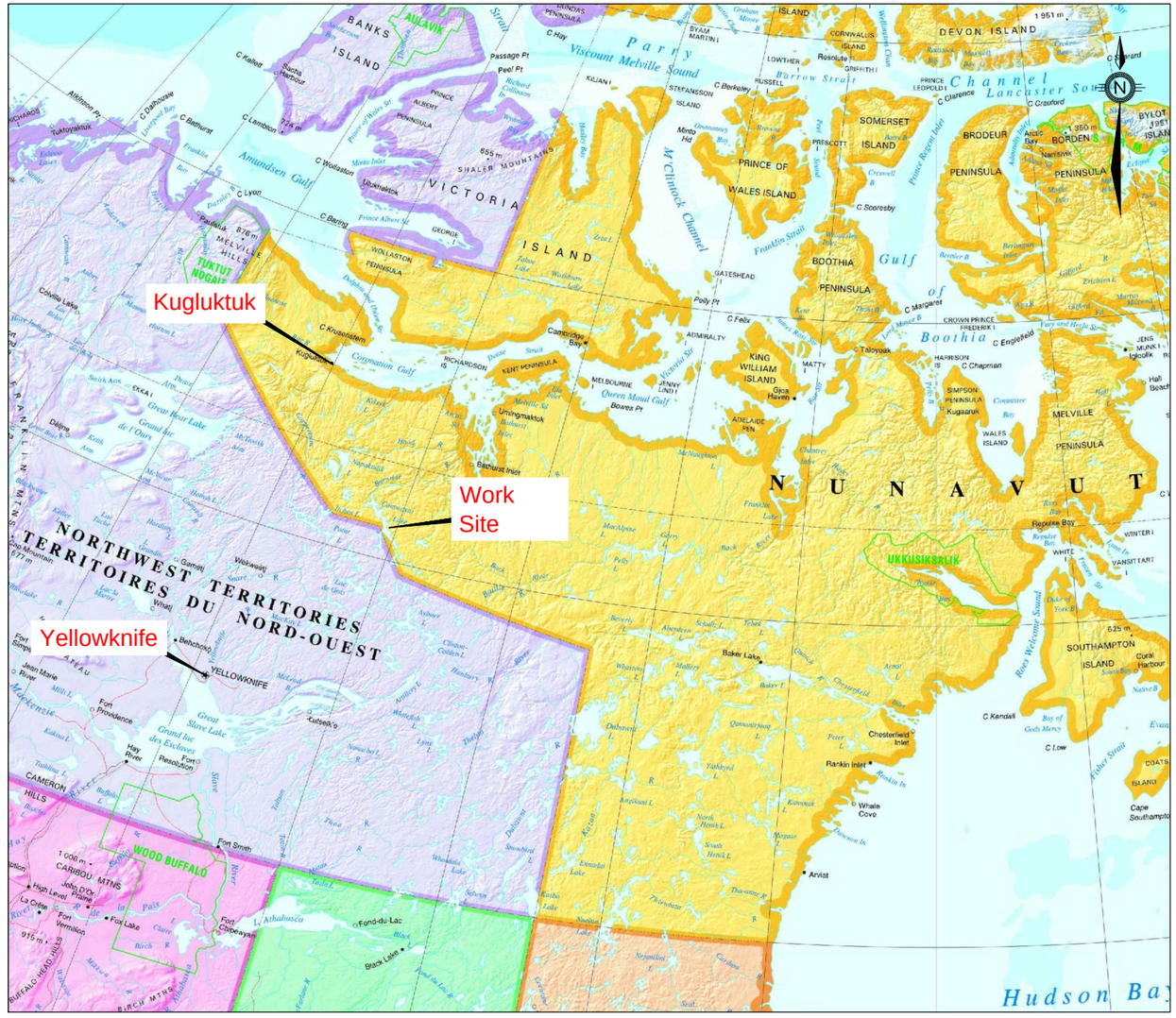
d. Soils containing one or more substrates in excess of DCC II must be containerized (i.e. removed in a manner which precludes contact with the Arctic ecosystem).

APPENDIX C

FIGURES



GENERAL SITE LOCATION



KEY PLAN

ARCADIS

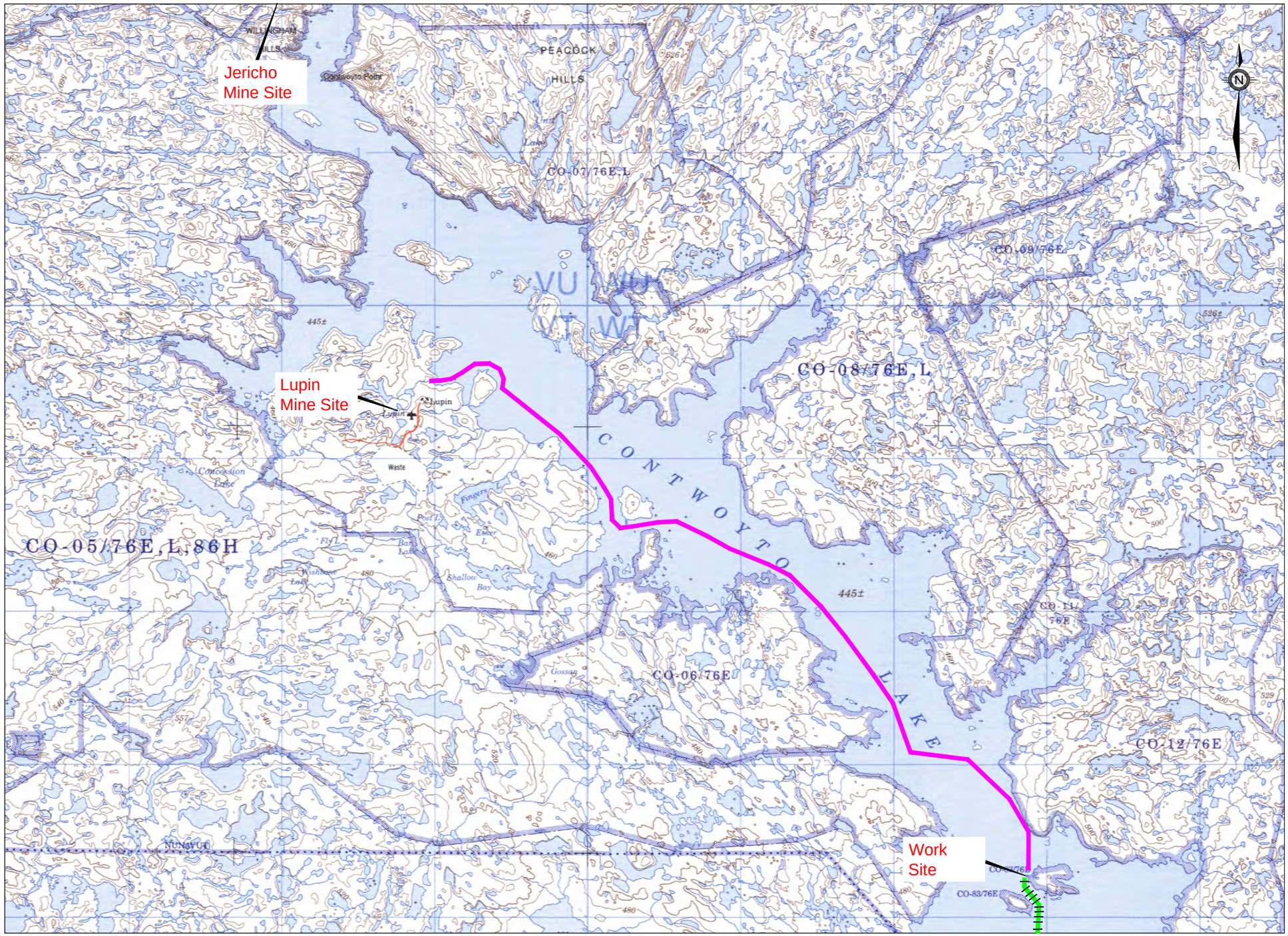
PWGSC

CONTWOYTO LAKE REMEDIATION PROJECT

LOCATION PLAN

Drawn By: P.A.F.	Approved By: J.M.	Project No: 350600-508
Date: NOV. 2015	Scale: N.T.S.	Drawing No: FIGURE 1

Nov 03, 2015 – 10:07am – USER jsedore
Z:\350000 Series\350600-508 Contwoyto Lake\Remed\NOV 2015\350600-508 Fig 1.dwg



LEGEND:

- MOBILIZATION ROUTE VIA LUPIN RUNWAY (APRIL 2014)
- DEMOBILIZATION ROUTE TO YELLOWKNIFE VIA WINTER ROAD (MARCH 2015)

ARCADIS

PWGSC

CONTWOYTO LAKE REMEDIATION PROJECT

WINTER ROAD ROUTE

Drawn By: P.A.F.	Approved By: J.M.	Project No: 350600-508
Date: NOV. 2015	Scale: N.T.S.	Drawing No: FIGURE 2

Feb 17, 2016 - 8:40am - USER jsedore
Z:\350000 Series\350600-508 Contwoyto Lake\Remed\NOV 2015\350600-508 Fig 1.dwg