



Government of Nunavut

2017 Phase II Environmental Site Assessment

Arviat Tank Farm - Arviat, NU

2 April 2018

307031-00048 – CA-REP-0001

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Project No. 307031-00048 - 2017 Phase II Environmental Site Assessment: Arviat Tank Farm - Arviat, NU

Rev	Description	Originator Approval	Reviewer Approval	Project Manager Approval	Date
0	Issued as final	 M. Lord	 M. Brolsma	 S. Bird	02-Apr-18

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1. Introduction

The Government of Nunavut Petroleum Products Division (PPD) is in the process of assessing the potential for future expansion work at the Arviat Tank Farm in Arviat, Nunavut (NU). As part of the program, PPD retained WorleyParsons Canada Services Ltd. operating as Advisian, to conduct a Phase I and Phase II Environmental Site Assessments (ESAs) concurrently at three areas located in Arviat, including the tank farm, resupply lines, and shore manifold (the Site) (Figure 1).

The purpose of the Phase II ESA was to assess potential soil contamination due to on site and off site operations. The investigation was limited to shallow soil sampling.

This report has been prepared to present the results of the Phase II ESA. The complete Phase I ESA has been provided in Appendix 1 which was used to target areas of concern for the Phase II ESA soil sampling program.

1.1 Summary of Historical Environmental Investigations

In 2016, an environmental site investigation was conducted immediately northeast and east of the tank farm in two potentially contaminated areas observed during a site inspection. During the investigation, two soil samples and three surface water samples were collected. Petroleum hydrocarbon exceedances were observed in two of the surface water samples and one of the soil samples. The report determined that the contamination was not the responsibility of PPD but recommended that an additional site inspection be completed by the Department of Environment to ensure the removal of all hydrocarbons by the responsible party (Government of Nunavut 2016).

The 2017 Phase I ESA (see Appendix 1) conducted concurrently with the Phase II ESA identified nine main areas of potential environmental concern (APECs) associated with either on site or off site operations. A summary of the APECs is provided in Table A.



Table A Area of Potential Environmental Concern (APEC)

APEC	Description	Potential Contaminants of Concern (PCOC)
Current and former tank farm, aviation gas storage and former pump area	Diesel and gasoline fuel has been stored in the tank farm in steel USTs since the 1980s. A liner was installed in 1994/1995 as part of a facility upgrade. It is unknown if the tank farm was previously lined. Integrity testing in 2016 of the aboveground storage tanks (ASTs) identified maintenance requirements for the bases of Tanks #9 and #11 which were completed in 2016. Aviation gasoline is currently stored in drums on pallets with no secondary containment outside of the bermed tank farm area. The pump island was located in the area currently used for aviation drum storage.	PHCs, lead
Service station	Visual evidence during the site visit indicated the potential for leaks beneath the valves connecting the aboveground pipelines to the dispenser building.	PHCs, lead
Tank farm standing water discharge point	Standing water collected within the bermed tank farm is discharged off site. Approval to discharge is obtained annually from the Department of Environment in the Hamlet. A visual inspection is completed prior to individual discharge events.	PHCs, lead
EPLS tank farm	An environmental investigation conducted in 2016 identified hydrocarbon impacts in soil and surface water between the two tank farms. The EPLS tank farm was built in the 1980s and has historically stored petroleum products.	PHCs, lead
EPLS heavy equipment maintenance shop	A warehouse building is currently used for heavy equipment maintenance.	PHCs, metals
Active pipelines	The pipelines leading from the shore manifold to resupply the tank farm with diesel and gasoline fuel. Product is kept in the lines year-round to prevent issues with condensation.	PHCs, lead
Former pipelines	Prior to the upgrade work completed in 1994/1995, a section of the resupply pipelines was previously located underground.	PHCs, lead



APEC	Description	Potential Contaminants of Concern (PCOC)
QEC facility	The power generation facility, owned and operated by the QEC, has five ASTs. A pipeline leads from the tank farm to the QEC facility. A QEC representative indicated that the secondary containment system used at the QEC property for two historical tanks had corroded away and failed inspection. There are two records of diesel P-50 spills since 2000 on the Hazardous Materials Spills Database associated with the QEC power plant. An aerial photograph from 1975 showed five vertical aboveground storage tanks and three horizontal storage tanks on the same facility.	PHCs, lead
Resupply Manifold	The resupply manifold was upgraded in 1994/1995 and previous containment details are unknown.	PHCs, lead
General	There is a history of spills in Arviat, some of which do not have specific locations or responsible parties.	PHCs, lead



2. Scope of Work

Advisian developed a sampling program for the assessment of soil conditions based on the findings of the Phase I ESA and RFP provided by the Government of Nunavut. The Phase II ESA program included the following activities:

- supervising line locating and ground clearance activities;
- completing the advancement of hand augers and test pits:
 - tank farm interior – five hand augers;
 - tank farm surrounding area including service station – six test pits and ten hand augers;
 - pipeline right-of-way's – one test pit and six hand augers; and
 - resupply manifold – four hand augers.
- collecting soil samples for analysis of PHCs and lead including quality control samples; and
- preparation of a Phase II ESA report documenting and detailing the methods and results of the investigation activities.

The RFP provided by the Government of Nunavut did not require groundwater conditions be assessed during the current Phase II ESA. Due to weather and ground disturbance restrictions, the soil assessment was limited to sample depths less than 1.0 metres (m) below ground surface.



3. Site Characteristics

3.1 Site Description

All three investigation areas were located within the Hamlet of Arviat. A general discussion of site topography, geology and hydrogeology was included as part of the Phase I ESA in Appendix 1.

3.2 Facility History

The tank farm is situated in the southeastern part of the Hamlet since the early 1980s. In 1994/1995 the facility was upgraded to include an additional three vertical tanks, the removal of two horizontal tanks, installation of an environmental liner, and the relocation of the on site service station. It was unknown if the tank farm was previously lined. Prior to the upgrade the tank farm consisted of the vertical tanks and eight horizontal tanks. A former pipeline that trended below ground parallel 6th Street (formerly Airport Road) replaced with a new aboveground pipeline approximately 75 m to the east. The resupply manifold near the shore was updated to include a concrete spill basin beneath the valves used for resupply. It is unknown what method was used for containment prior to 1994/1995.

Overall groundwater flow is assumed to be generally northeast towards Hudson Bay, with local groundwater gradients influenced by the distribution of shallow discontinuous permafrost lenses and surface water bodies.

4. Regulatory Framework

Assessment of contaminated sites in Nunavut is regulated by local, territorial and federal government agencies. Generally, remediation guidelines default to federal standards and processes although assessment guidelines specific to Arctic environments have been developed for some chemicals (i.e. hydrocarbon compounds, polychlorinated biphenyls [PCBs]). The following standards are considered the most relevant:

- Canadian Environmental Quality Guidelines: Soil Quality Guidelines for the Protection of Environmental and Human Health (Canadian Council of Ministers of the Environment [CCME] 1999 and updates).
- Canada-Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil (CCME 2008).
- Government of Nunavut, 2014. Environmental Guideline for the Management of Contaminated Sites. December 2014 update. (Government of Nunavut 2014).

4.1 CCME Framework

4.1.1 Tiered Guideline Application

The federal CCME guidelines are based on the following principles:

- a) **Tier 1** assessment guidelines are generic. They were developed using conservative assumptions and default parameters (concerning soil and groundwater characteristics) to protect sites at any sensitivity range. In addition, they also assume the presence of all exposure pathways and receptors within a particular land use; therefore, no pathway may be screened out at this level.
- b) **Tier 2** assessment guidelines are site-specific. At this level, it may be possible to screen out exposure pathways that are not present at a site and/or adjust certain parameters used in the derivation of the values. When applied appropriately, Tier 2 guidelines offer the same level of human health and ecological protection as Tier 1. Selection of the applicable guidelines is governed by land use, soil grain size, and applicability of exposure pathways.
- c) **Tier 3** guidelines are based on site-specific risk assessment where site conditions are unique or particularly sensitive and are generally utilized when a criteria-based approach is not suitable for a site (e.g. large, complex industrial site). Where a criteria-based approach may not be suitable for a site (e.g. pathways of exposure, target chemicals, receptors or other site characteristics differ from those used to develop the criteria-based approaches), site-specific remediation objectives (SSROs) are developed from the results of the risk assessment to establish a concentration corresponding to an acceptable risk to human or ecological receptors.

4.1.2 Particle Size

The CCME has guidelines for two soil types, coarse-grained and fine-grained, which are defined as having median grain size greater or less than 75 micrometres (μm), respectively (CCME 1999 and updates). The soil type distinction is only applicable to petroleum hydrocarbons under the CCME framework.

4.1.3 Surface / Subsurface Soils

The CCME defines surface soils (0–1.5 metres below ground surface (mbgs)) and subsoils (>1.5 mbgs). Where both fine- and coarse-grained strata are present, the dominant soil grain size is determined by the stratum governing horizontal and vertical contaminant migration to a potential receptor.

Under the CCME, for soils below 3.0 mbgs, the ecological direct soil contact exposure pathway can be excluded for PHC F1 through F4. The CCME does not specify whether or not the exposure pathway is operable between 1.5 and 3.0 mbgs but stipulates that it is up to jurisdictional discretion (CCME 2008).

4.2 Applied Guidelines

The Environmental Guideline for the Management of Contaminated Sites (Government of Nunavut 2014) requires that soil analytical results be compared to the following guidelines:

- Canadian Council of Ministers of the Environment (CCME 2007 and updates) Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health for Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), and lead.
- CCME (2008) Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil.

The sites are currently used for industrial purposes; however, the facilities are located in industrial, commercial and parkland zoned areas. Therefore, the applied CCME guidelines are based on the zoning location:

- industrial land use was applied at the tank farm and immediate area;
- commercial land use was applied at the pipeline areas; and
- parkland at the resupply manifold and one location near the tank farm (SS17-32).

The following applicable exposure pathways were considered applicable to the sites:

- human soil ingestion;
- human soil dermal contact;
- environmental soil contact; and
- environmental groundwater check (aquatic life) at the resupply manifold located within 30 m of the Hudson Bay shoreline. The other Site infrastructure is greater than 150 m away from the shoreline.



- Three soil samples were submitted for grain size analysis and were reported as coarse-grained. Consequently, coarse-grained soil guidelines have been applied to the data in this report.

The groundwater check for drinking water was excluded as the shallow groundwater-bearing interval is neither utilized nor suitable for use as a drinking water source. The indoor air inhalation pathways were also excluded as the buildings on site do not include basements or slab-on-grade construction. The buildings are constructed on pilings and are lifted off the ground to minimize potential damage due to differential settling from permafrost. The depth to permafrost is currently unknown.



5. Phase II Environmental Site Assessment Methodology

5.1 Underground Utility Locates

Field activities were carried out in accordance with Government of Nunavut health and safety and Advisian ground disturbance policies. Line locating was conducted by WSP Ltd. of Calgary, Alberta on October 5, 2017. Line locate sketches are shown in Appendix 2.

Underground utilities were found at proposed sampling locations at the service station. Assessment locations were subsequently moved.

5.2 Hand Augering, Test Pitting and Soil Sampling

Seven test pits and 25 hand augers were completed across all Sites between October 9 and 12, 2017. The distribution is summarized below:

- tank farm interior – five boreholes;
- tank farm surrounding area including service station – six test pits and ten boreholes;
- pipeline right-of-way's – one test pit and six boreholes boreholes; and
- resupply manifold – four boreholes.

Sampling locations within the tank farm were limited by the presence of water and/or ice. Sampling depth needed to account for the underlying liner.

Test pits were completed using an excavator owned and operated by Eskimo Point Lumber Supply of Arviat, NU. Boreholes were completed using a hand auger and shovel.

Soil conditions were recorded on Advisian standard borehole logs. Subsurface logs were prepared during hand augering and test pit advancement using terminology from the modified Unified Soil Classification System (ASTM 2000) with selected terminology used from the Canadian System of Soil Classification (SCWG 1998).

Selected photographs taken during the Phase II ESA are provided in the Photograph section and a summary of the soil classification taken during the field program are provided in Section 7. Additional photographs taken during the Phase I ESA are provided in Appendix 1.

Soil samples were submitted for chemical analysis of BTEX, PHC fractions F1 to F4, and lead. Soil samples were collected directly from the hand auger or soil stockpiles from the testpits.

Soil samples were split with a portion being placed in the laboratory-supplied sample jars for potential chemical analysis and the remaining portion being placed into re-sealable plastic bags for combustible



headspace Organic Vapor Analyzer (OVA) analysis. Vapour measurements were collected using an RKI Eagle OVA. The OVA was calibrated for hexane prior to arriving in Arviat and operated in methane elimination mode. Containers used for soil sampling were provided by the laboratory and are detailed in Table B.

Table B Soil Containers for Laboratory Submission

Parameter	Container	Preservative
BTEX/F1	125 mL clear glass	none
F2-F4	125 mL clear glass	none
Lead	125 mL clear glass	none
Grain Size	soil sample bag	none

All pre-cleaned sample bottles were supplied by the laboratory (Maxxam Analytics). All samples were placed on ice, in coolers for transport to Maxxam's Calgary laboratory, along with standard chain-of-custody (COC) documentation. Maxxam is accredited by the Canadian Association for Laboratory Accreditation (CALA).



6. Results and Discussion

6.1 Soil Lithology

Descriptions of the soil lithology encountered at the Site can be found in Table C. The maximum depth of investigation was 1.0 mbgs at test pit locations and varied between 0.1 to 0.8 mbgs at hand auger locations. Soils were typically coarse-grained and moisture content varied between wet to saturated.

Table C **Soil Lithology**

Area	Sample Location	Lithology
Tank Farm	SS17-15, SS17-17	Gravelly sand
	SS17-16, SS17-32	Peat to sand and gravel
	SS17-28	Sand, trace gravel into peat
	SS17-10, SS17-11, SS17-12, SS17-13, SS17-14, SS17-29	Sand and gravel
	SS17-18, SS17-19, SS17-20, SS17-21, SS17-22	Packed gravel road to sand and gravel, trace peat and/or woody debris
	SS17-24, SS17-25, SS17-26, SS17-27	Sand and gravel into peat into sand
	SS17-30	Gravel and sand into peat
Pipeline	SS17-05	Silt, trace gravel
	SS17-06, SS17-07	Peat to sand and gravel
	SS17-08	Gravelly sand
	SS17-09	Sand, trace gravel into peat
	SS17-23	Sand and gravel
	SS17-31	Gravel and sand into peat
Resupply Manifold	SS17-01, SS17-02	Sandy gravel
	SS17-03, SS17-04	Sandy silt to gravelly sand

6.2 Soil Analytical Results

6.2.1 Soil Particle Size

Grain size analysis was completed for three representative samples collected nearby the resupply manifold, pipeline and at the tank farm. The samples were classified as coarse-grained.

Grain size analytical results are shown in Table 1-3.

6.2.2 Petroleum Hydrocarbon Parameters

Petroleum hydrocarbon parameters that exceeded the applied guidelines are summarized by APEC in Table D.

Table D **PHC Parameters Exceeding Guidelines**

APEC	Sample Location	PHC Parameter(s)
Current and former tank farm, aviation gas storage and former pump area	SS17-19	F1, F2, and F3
	SS17-28	F2
Pipeline	SS17-31	F3
Resupply Manifold	SS17-02	F3
	SS17-03	F3
	SS17-04	F3

Analytical results for PHC parameters in soil are presented in Figures 2-4 and Tables 1-3.

6.2.3 Lead

There was no lead in soil exceedances identified during the soil investigation.

6.3 Impacted Soil Volume Estimate

Based on the results of the limited 2017 Phase II ESA and 2016 PPD investigation, a preliminary estimate on the volume of petroleum hydrocarbons impacted soils is provided below. The estimate is subject to the following assumptions and limitations:

- Water and/or ice limited the number of sampling locations within the tank farm to three locations.

- It is unknown if an environmental liner was present under the tank farm prior to the facility upgrades in 1994/1995.
- Limited or no information is currently available on any potentially impacted soils within or under the tank farm area. The volume estimate does not include any allowance for impacted soils within or under this APEC.
- No information is available on the decommissioning of the former pipeline. The volume estimate does not include any allowance for impacted soils associated with this APEC.
- Vertical and horizontal delineation was not achieved in any locations due to auger refusal, safe setback distances from underground utilities and/or site conditions. It was therefore assumed that:
 - vertical soil impacts may reach depths of 1.5 m (based upon local active layer thickness [Forbes et. al. 2014]); and
 - horizontal soil impacts extents laterally to the next known data point.
- The actual extent of any remedial excavations would be based on field screening techniques and laboratory confirmatory analysis results.
- Remedial excavations deeper than 1.5 m would use 1:1 sloping, excluding areas where shoring is used.
- Volume estimates do not include any allowance for off site impacts.
- Volume estimates do not take into consideration fuel ownership responsibility by PPD, QEC and/or EPLS.

Based on the above conditions, there is an estimated 2,600 m³ of soils that have been identified with concentrations exceeding the applied guidelines. The possible areal extents of the identified petroleum hydrocarbon impacts are illustrated on Figures 5 and 6 and summarized in Table 4. Additional delineation is required at these APECs to better determine the extent and estimated volume of PHC impacts.

It is important that the Government of Nunavut understand that this volume estimate does not include an allowance for contaminated soil that may be present under the existing tank farm liner. Based on the findings of the Phase 1 ESA (Appendix 1), a tank farm was present at the site prior to construction of the current facility. Available documentation cannot confirm if an environmental liner was included in the original tank farm construction nor if any environmental impacts existed from the initial tank farm operation prior to the upgrades in 1994/1995.

As such, it is estimated that an additional 10,000 m³ of PHC-impacted soil could be present based on the same calculations and assumptions about depth of impacts described above. There is insufficient information available at this time to further assess the accuracy of this estimate.



7. Field and Laboratory Quality Assurance/Quality Control

A quality assurance/quality control (QA/QC) program was followed to manage and quantify the quality of the investigation results. The program included field procedures, laboratory procedures and the use of QC samples to quantify the results of the program. Three field duplicate samples were submitted as part of this program.

The laboratory QA/QC analyses are included in the laboratory certificates of analysis provided in Appendix 3. The laboratory QA/QC program included calibration checks, surrogate matrix spikes, blanks, and laboratory duplicates during analyses.

In summary, no QA/QC issues were identified that would affect the overall conclusions for the Phase II ESA presented in this report.

8. Conclusions

Phase II ESA activities were conducted between October 5 and 9–12, 2017. The activities included the advancement of seven test pits and 25 hand augers and collection of 36 soil samples at depths ranging up to 1.0 metres below ground surface. A summary of the general conclusions from the soil investigation is as follows:

- grain size analyses indicate that the soil is coarse-grained;
- CCME guidelines were applied to the soil analytical results as follows:
 - industrial land use was applied at the tank farm and immediate area;
 - commercial land use was applied at the pipeline areas; and
 - parkland at the resupply manifold and one location near the tank farm (SS17-32).
- at the tank farm area, one location (SS17-19) exceeded the applied guidelines for PHC F1, F2, and F3 and one location (SS17-28) exceeded for PHC F2;
- in the pipeline area, one location (SS17-31) exceeded the applied guideline for PHC F3,
- at the resupply manifold, three locations (SS17-02, SS17-03, and SS17-04) exceeded the applied guideline for PHC F3;
- soil conditions underneath the tank farm liner and in the immediate vicinity of the pump islands and associated pipelines could not be assessed at this time due to current infrastructure;
- an estimate of 2,600 m³ of soils with concentrations exceeding the applied guidelines were identified; however, further delineation is needed to better quantify this volume; and,
- soil from the area beneath the tank farm could not be accessed for sampling and may contain a significant volume of PHC impacted soil



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9. Closure

We trust that this report satisfies your current requirements and provides suitable documentation for your records. If you have any questions or require further details, please contact the undersigned at any time.

Report Prepared by

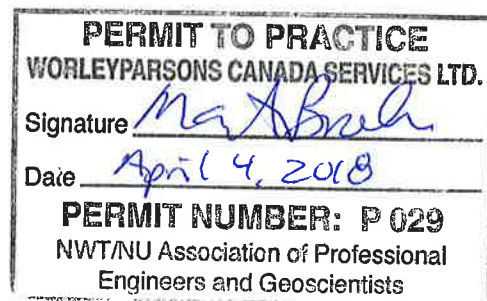
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10. References

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Arviat Tank Farm - Arviat, NU




Figures



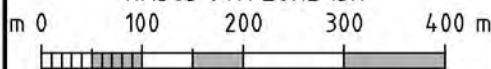


LEGEND

 BOREHOLE LOCATION

GOOGLE IMAGE DATE 7/3/2011

NAD83 UTM ZONE 15N



1:7500

GOVERNMENT OF NUNAVUT 2017 PHASE II ESA - ARVIAT, NU

ASSESSMENT AREAS

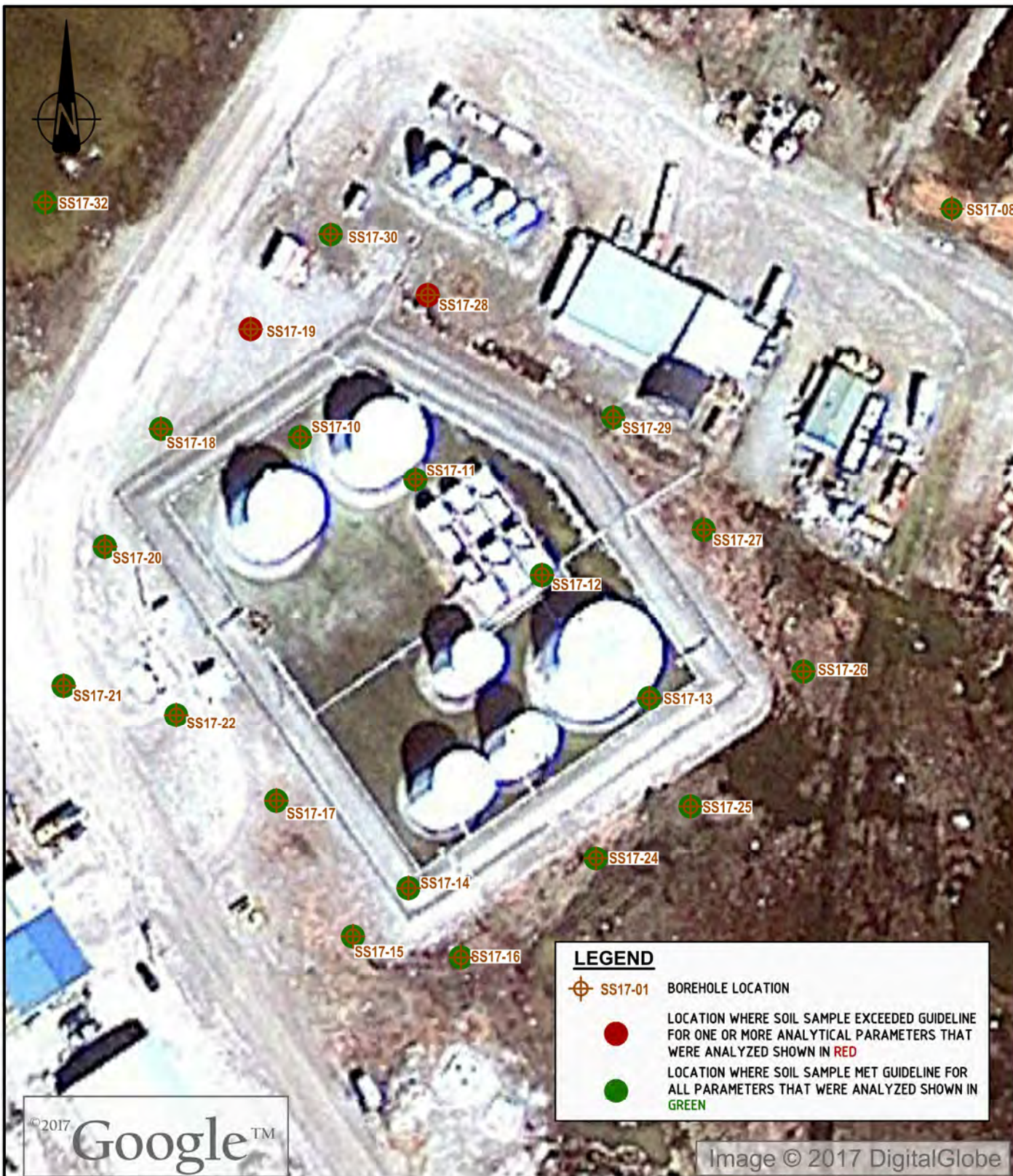
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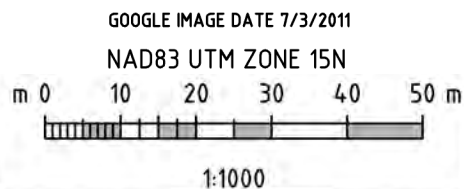
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**TANK FARM AREA SOIL ANALYTICAL RESULTS:
PETROLEUM HYDROCARBONS AND LEAD**



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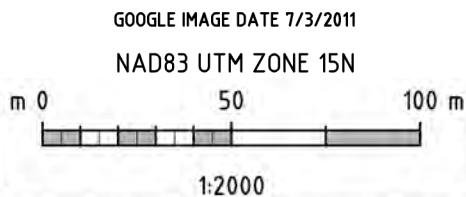
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FIG No. 2	REV B		

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GOVERNMENT OF NUNAVUT
2017 PHASE II ESA - ARVIAT, NU

**PIPELINE SOIL ANALYTICAL RESULTS:
HYDROCARBONS AND LEAD**



Oneway
to zero harm



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WorleyParsons Project No. 307031-00048			
FIG No 3			REV B

*This drawing is prepared for the use of our customer as specified in the accompanying report.
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FILE LOCATION: \\SHARE.WORLEYPARSONS.COM\SHAKE\GOVERNMENT OF NUNAVUT\2017 JOBS\307031-00048 ARVIAT TANK FARM\11 DRAWINGS\11.4_ENV_PLANNING\11.0_FIGURES & MAPS\11.4_CAD_FILES\00048-00-EN-DWG-ARVIATSITE.DWG

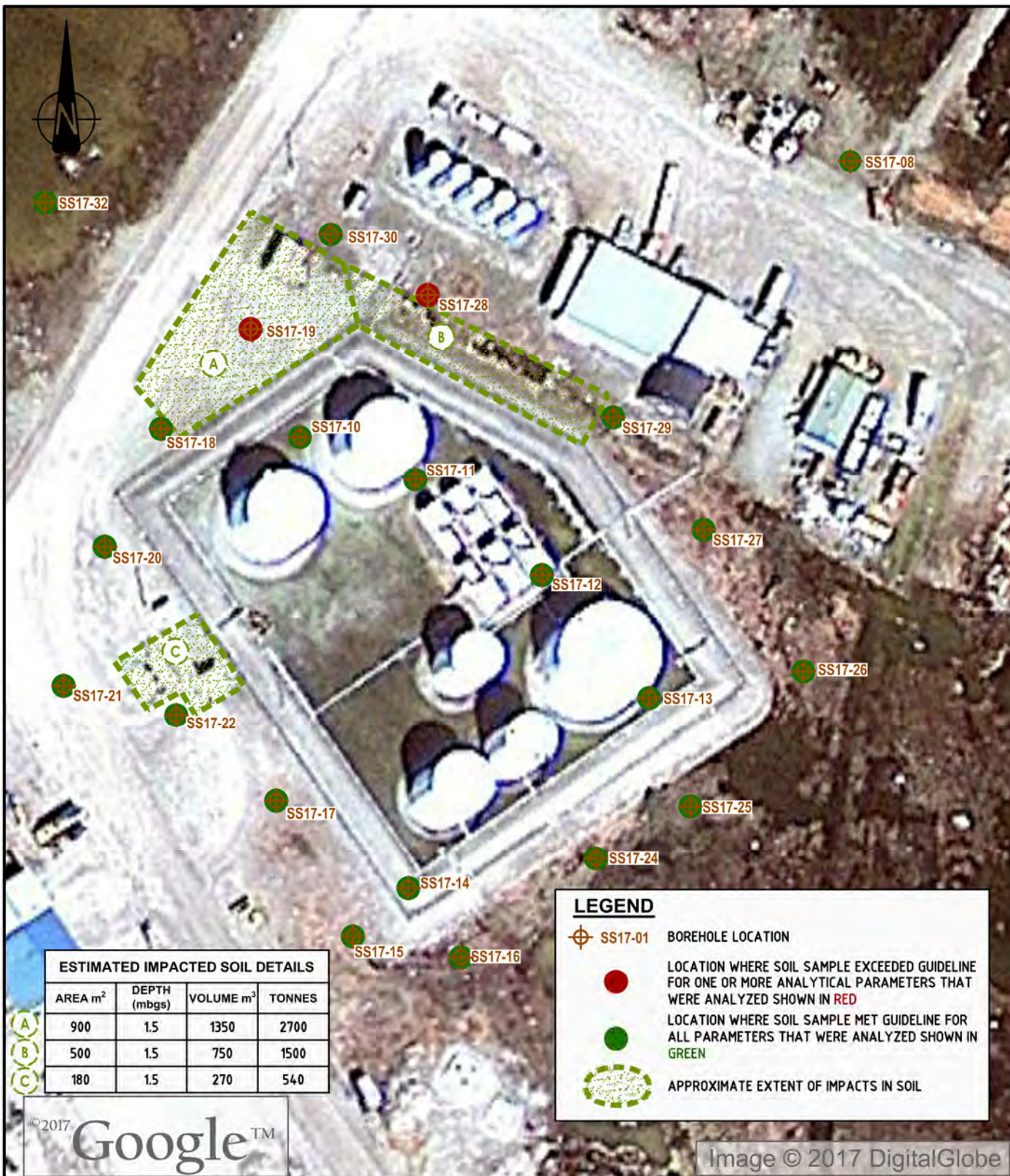
PLOT DATE & TIME: 21/11/2017 12:37:05 PM USER NAME: mira.saford
SAVE DATE & TIME: 21/11/2017 12:34:11 PM ISSUING OFFICE: eCAD



GOVERNMENT OF NUNAVUT 2017 PHASE II ESA - ARVIAT, NU			
RESUPPLY MANIFOLD AND PIPELINE SOIL ANALYTICAL RESULTS: PETROLEUM HYDROCARBONS AND LEAD			
<p>GOOGLE IMAGE DATE 7/3/2011 NAD83 UTM ZONE 15N</p> <p>m 0 50 100 m</p> <p>1:2000</p>	<p>Date: 21-NOV-17 Drawn by: MYT Edited by: MYT App'd by:</p>		<p>WorleyParsons Project No. 307031-00048</p>
	<p>Oneway to zero harm</p>		<p>FIG No. 4 REV B</p>
	<p>Advisian WorleyParsons Group</p> <p><small>*This drawing is prepared for the use of our customer as specified in the accompanying report. WorleyParsons Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing.*</small></p>		

FILE LOCATION: \\SHARE.WORLEYPARSONS.COM\SHAKE\GOVERNMENT OF NUNAVUT\2017 JOBS\307031-00048 ARVIAT TANK FARM\11 DRAWINGS\11.4_ENV_PLANNING\11.4_FIGURES_8_MAPS\11.4_CAD_FILES\00048-00-EN-DWG-ARVIATSITE.DWG

PLOT DATE & TIME: 21/11/2017 12:31:27 PM USER NAME: nira.sahford
SAVE DATE & TIME: 21/11/2017 12:28:35 PM ISSUING OFFICE: eCAD



ESTIMATED IMPACTED SOIL DETAILS				
	AREA m ²	DEPTH (mbgs)	VOLUME m ³	TONNES
(A)	900	1.5	1350	2700
(B)	500	1.5	750	1500
(C)	180	1.5	270	540

LEGEND

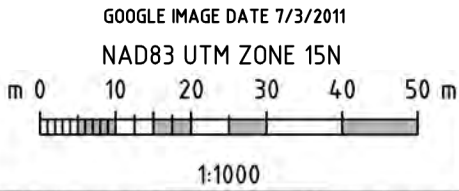
- SS17-01 BOREHOLE LOCATION
- LOCATION WHERE SOIL SAMPLE EXCEEDED GUIDELINE FOR ONE OR MORE ANALYTICAL PARAMETERS THAT WERE ANALYZED SHOWN IN RED
- LOCATION WHERE SOIL SAMPLE MET GUIDELINE FOR ALL PARAMETERS THAT WERE ANALYZED SHOWN IN GREEN
- APPROXIMATE EXTENT OF IMPACTS IN SOIL



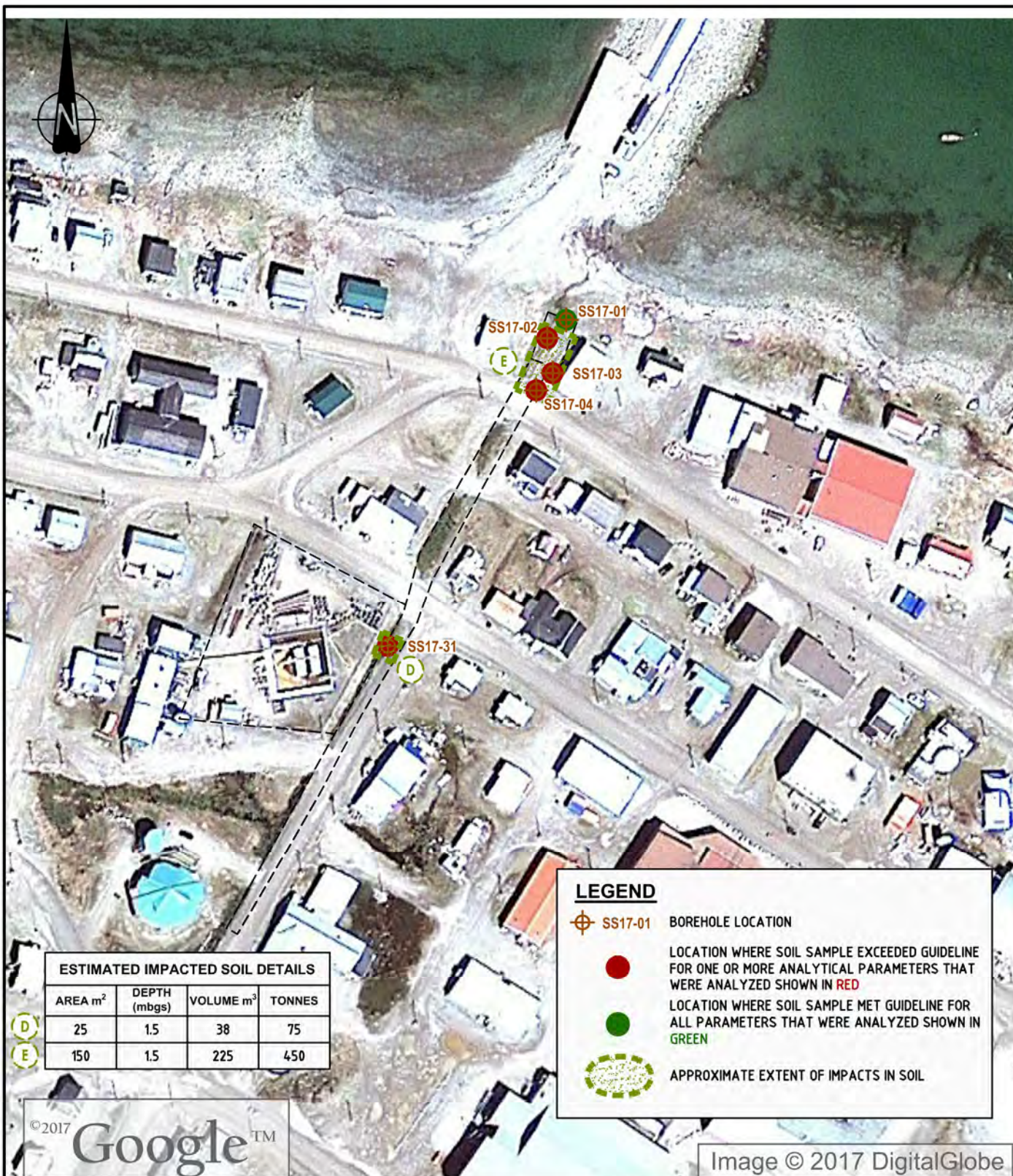
Image © 2017 DigitalGlobe

GOVERNMENT OF NUNAVUT
2017 PHASE II ESA - ARVIAT, NU

**TANK FARM AREA
ESTIMATED AREA OF IMPACTED SOIL**

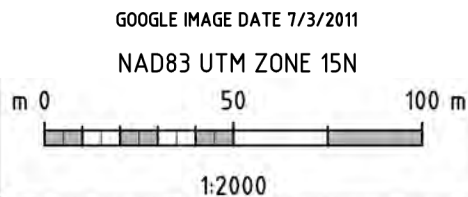


Date: 21-NOV-17	Drawn by: MYT	Edited by: -	App'd by: -
WorleyParsons Project No. 307031-00048			
FIG No. 5	REV A		



GOVERNMENT OF NUNAVUT
2017 PHASE II ESA - ARVIAT, NU

**RESUPPLY MANIFOLD AND PIPELINE AREA
ESTIMATED AREA OF IMPACTED SOIL**



Oneway
to zero harm

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Date: 21-NOV-17	Drawn by: MYT	Edited by: -	App'd by: -
WorleyParsons Project No. 307031-00048			
FIG No. 6	REV A		

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2017 Phase II Environmental Site Assessment
Arviat Tank Farm - Arviat, NU



Tables





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Table 1

**Tank Farm Area Soil Analytical Results:
Petroleum Hydrocarbons (PHCs), Lead and Grain Size**

PROJECT No.: 307031-00048

Sampling Location	Date (dd-mmm-yyyy)	Sample Depth	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes-Total (mg/kg)	PHC F1 (C6-C10) - BTEX (mg/kg)	PHC F2 (C10-C16) (mg/kg)	PHC F3 (C16-C34) (mg/kg)	PHC F4 (C34-C50) (mg/kg)	Lead (mg/kg)	Sieve - Pan (%)	Sieve #200 (>0.075mm) (%)	Texture Class (none)
CCME Commercial Coarse Surface ^{#1}			110	250	300	350	320	260	1700	3300	600	---	---	---
Industrial Zoned Locations														
SS17-10	13-Oct-2017	0.0 - 0.1 m	< 0.0050	0.049	0.19	1.7	< 10	< 10	120	< 50	150	---	---	---
SS17-11	13-Oct-2017	0.0 - 0.1 m	< 0.0050	0.032	0.16	1.4	< 10	< 10	< 50	< 50	28	---	---	---
(Duplicate)	13-Oct-2017	0.0 - 0.1 m	< 0.0050	0.14	0.29	2.4	< 10	< 10	< 50	< 50	37	---	---	---
SS17-12	13-Oct-2017	0.0 - 0.15 m	< 0.0050	0.49	3.5	28	< 10	< 10	66	< 50	13	---	---	---
SS17-13	13-Oct-2017	0.0 - 0.1 m	< 0.0050	0.36	1.4	11	< 10	< 10	53	< 50	5.9	---	---	---
SS17-14	13-Oct-2017	0.0 - 0.1 m	< 0.0050	0.040	0.21	2.0	< 10	< 10	< 50	< 50	120	---	---	---
SS17-15	13-Oct-2017	0.0 - 0.4 m	< 0.0090 ^{#2}	< 0.036 ^{#2}	< 0.018 ^{#2}	< 0.072 ^{#2}	< 18 ^{#2}	41 ^{#2}	580 ^{#2}	100 ^{#2}	7.2	---	---	---
SS17-16	13-Oct-2017	0.0 - 0.4 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	200	< 50	5.7	---	---	---
SS17-17	13-Oct-2017	0.0 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	78	< 50	4.4	3.1	97	COARSE
SS17-18	13-Oct-2017	0.0 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	170	130	< 50	5.3	---	---	---
(Duplicate)	13-Oct-2017	0.0 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	360	190	< 50	4.8	---	---	---
SS17-19	13-Oct-2017	0.0 - 1.0 m	0.057 ^{#3}	2.8	2.3	45	1400 ^{#1}	7100 ^{#1}	1800 ^{#1}	< 50	21	---	---	---
SS17-20	13-Oct-2017	0.0 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	< 50	< 50	3.5	---	---	---
SS17-21	13-Oct-2017	0.0 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	62	< 50	3.1	---	---	---
SS17-22	13-Oct-2017	0.0 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	52	< 50	3.1	---	---	---
SS17-24	14-Oct-2017	0.0 - 0.6 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	380	170	3.6	---	---	---
SS17-25	14-Oct-2017	0.0 - 0.5 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	260	75	2.8	---	---	---
SS17-26	14-Oct-2017	0.0 - 0.4 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	150	< 50	3.3	---	---	---
SS17-27	14-Oct-2017	0.0 - 0.4 m	< 0.014 ^{#2}	< 0.054 ^{#2}	< 0.027 ^{#2}	< 0.11 ^{#2}	< 27 ^{#2}	< 28 ^{#2}	390 ^{#2}	< 140 ^{#2}	10	---	---	---
SS17-28	14-Oct-2017	0.0 - 0.4 m	0.17	2.7	0.14	0.90	290	5300 ^{#1}	1300	59	25	---	---	---
SS17-29	14-Oct-2017	0.0 - 0.1 m	< 0.0050	< 0.020	< 0.010	0.045	< 10	< 10	120	< 50	4.2	---	---	---
SS17-30	14-Oct-2017	0.0 - 0.3 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	63	860	200	30	---	---	---

Relative Percent Difference (RPD) Report														
SS17-11	13-Oct-2017	0.0 - 0.1 m	< 0.0050	0.032	0.16	1.4	< 10	< 10	< 50	< 50	28	---	---	---
(Duplicate)	13-Oct-2017	0.0 - 0.1 m	< 0.0050	0.14	0.29	2.4	< 10	< 10	< 50	< 50	37	---	---	---
RPD(%)			---	126%	58%	53%	---	---	---	---	28%	---	---	---
SS17-18	13-Oct-2017	0.0 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	170	130	< 50	5.3	---	---	---
(Duplicate)	13-Oct-2017	0.0 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	360	190	< 50	4.8	---	---	---
RPD(%)			---	---	---	---	---	72%	38%	---	10%	---	---	---

NOTES:



1. --- in guideline row(s) denotes no criteria for that parameter.
2. --- in detail data row(s) denotes parameter not analyzed.
3. Highlighting indicates parameters above applied guideline/criteria.
4. Highlighting indicates non-detect parameters above applied guideline/criteria.
5. Highlighting indicates parameters at applied guideline/criteria.
6. Superscript ^{#1} denotes values exceeding
(CCME Canadian Environmental Quality Guidelines for Commercial, Coarse-grained Surface soils
with DUA and inhalation pathways excluded, 1999 and updates)
7. Superscript ^{#2} - Detection limits raised due to high moisture content, sample contains => 50% moisture.
8. Superscript ^{#3} - Qualifying ion outside of acceptance criteria. Results are tentatively identified and potentially biased high.



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Table 2

**Pipelines Soil Analytical Results:
Petroleum Hydrocarbons (PHCs), Lead and Grain Size**

PROJECT No.: 307031-00048

Sampling Location	Date (dd-mmm-yyyy)	Sample Depth	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes-Total (mg/kg)	PHC F1 (C6-C10) - BTEX (mg/kg)	PHC F2 (C10-C16) (mg/kg)	PHC F3 (C16-C34) (mg/kg)	PHC F4 (C34-C50) (mg/kg)	Lead (mg/kg)	Sieve - Pan (%)	Sieve #200 (>0.075mm) (%)	Texture Class (none)
CCME Commercial Coarse Surface ^{#1}			110	250	300	350	320	260	1700	3300	260	---	---	---
Commerical Zoned Locations														
SS17-05	12-Oct-2017	0.0 - 0.3 m	< 0.015 ^{#2}	< 0.058 ^{#2}	< 0.029 ^{#2}	< 0.12 ^{#2}	< 29 ^{#2}	79 ^{#2}	1400 ^{#2}	260 ^{#2}	11	---	---	---
SS17-06	12-Oct-2017	0.0 - 0.3 m	< 0.030 ^{#3}	< 0.071 ^{#3}	< 0.022 ^{#3}	< 0.28 ^{#2}	< 25 ^{#3}	48 ^{#3}	1500 ^{#3}	210 ^{#3}	7.6	47	53	COARSE
SS17-07	13-Oct-2017	0.0 - 0.3 m	< 0.0050	< 0.020	0.019	0.18	< 10	< 10	55	< 50	4.6	---	---	---
SS17-08	13-Oct-2017	0.0 - 0.3 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	160	< 50	4.8	---	---	---
SS17-09	13-Oct-2017	0.0 - 0.3 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	240	< 50	6.0	---	---	---
SS17-23A	13-Oct-2017	0.0 - 0.9 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	10	55	< 50	2.4	---	---	---
SS17-23B	13-Oct-2017	0.9 - 1.0 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	< 50	< 50	2.3	---	---	---
SS17-31	14-Oct-2017	0.1 - 0.3m	< 0.0050	< 0.020	0.054	0.25	23	470	1700^{#1}	360	17	---	---	---

NOTES:



1. --- in guideline row(s) denotes no criteria for that parameter.
2. --- in detail data row(s) denotes parameter not analyzed.
3. Highlighting indicates parameters above applied guideline/criteria.
4. Highlighting indicates non-detect parameters above applied guideline/criteria.
5. Highlighting indicates parameters at applied guideline/criteria.
6. Superscript ^{#1} denotes values exceeding
(CCME Canadian Environmental Quality Guidelines for Commercial, Coarse-grained Surface soils
with DUA and inhalation pathways excluded, 1999 and updates)
7. Superscript ^{#2} - Detection limits raised due to high moisture content, sample contains => 50% moisture.
8. Superscript ^{#3} - Detection limits calculated based on method detection limits (MDLs) due to high
moisture content, sample contains => 50% moisture.



**Resupply Manifold and Tank Farm Area Soil Analytical Results:
Petroleum Hydrocarbons (PHCs), Lead and Grain Size**

PROJECT No.: 307031-00048

Sampling Location	Date (dd-mmm-yyyy)	Sample Depth	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes-Total (mg/kg)	PHC F1 (C6-C10) - BTEX (mg/kg)	PHC F2 (C10-C16) (mg/kg)	PHC F3 (C16-C34) (mg/kg)	PHC F4 (C34-C50) (mg/kg)	Lead (mg/kg)	Sieve - Pan (%)	Sieve #200 (>0.075mm) (%)	Texture Class (none)
CCME Residential/Parkland Coarse Surface ^{#1}			31	75	55	95	30	150	300	2800	140	---	---	---
Residential/Parkland Zoned Locations														
SS17-01	12-Oct-2017	0.0 - 0.6 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	10	120	< 50	7.9	12	88	COARSE
SS17-02	12-Oct-2017	0.0 - 0.5 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	12	300 ^{#1}	72	9.1	---	---	---
(Duplicate)	12-Oct-2017	0.0 - 0.5 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	46	1300 ^{#1}	270	15	---	---	---
SS17-03	12-Oct-2017	0.0 - 0.4 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	440 ^{#1}	110	20	---	---	---
SS17-04	12-Oct-2017	0.0 - 0.4 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	630 ^{#1}	160	17	---	---	---
SS17-32	14-Oct-2017	0.0 - 0.8 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	< 10	< 50	< 50	2.9	---	---	---
Relative Percent Difference (RPD) Report														
SS17-02	12-Oct-2017	0.0 - 0.5 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	12	300 ^{#1}	72	9.1	---	---	---
(Duplicate)	12-Oct-2017	0.0 - 0.5 m	< 0.0050	< 0.020	< 0.010	< 0.040	< 10	46	1300 ^{#1}	270	15	---	---	---
RPD(%)			---	---	---	---	---	117%	125%	116%	49%	---	---	---

NOTES:



1. --- in guideline row(s) denotes no criteria for that parameter.
 2. --- in detail data row(s) denotes parameter not analyzed.
 3. Highlighting indicates parameters above applied guideline/criteria.
 4. Highlighting indicates non-detect parameters above applied guideline/criteria.
 5. Highlighting indicates parameters at applied guideline/criteria.
 6. Superscript ^{#1} denotes values exceeding
(CCME Canadian Environmental Quality Guidelines for Residential/Parkland, Coarse-grained
Surface soils with DUA and vapour inhalation pathways excluded, 1999 and updates)
- Benzene:**
Vapour guideline for incremental lifetime cancer risk of 1x10⁻⁵

Table 4
Estimated Area of Impacted Soil

Area	Impacted Soil						Sloping Overburden ^b	
	Minimum Depth (mbgs)	Maximum Depth (mbgs)	Net Depth (m)	Area (m ²)	Volume (m ³)	Tonnes ^a	Volume (m ³)	Tonnes ^a
A	0.0	1.5	1.5	900	1350	2700	36	72
B	0.0	1.5	1.5	500	750	1500	11	23
C	0.0	1.5	1.5	180	270	540	57	115
D	0.0	1.5	1.5	25	38	75	0	0
E	0.0	1.5	1.5	150	225	450	28	56
TOTAL				1755	2633	5265	133	266

Notes:

a - assumes 2 tonnes/m³

b - sloping of 1:1 except Areas A (west and east walls), B (south and north walls), C (northeast wall), D (all walls) and E (east and south walls)

c - estimate is subject to limitations and assumptions listed in Section 6.3



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2017 Phase II Environmental Site Assessment
Arviat Tank Farm - Arviat, NU



Photographs





Photo 1 View from southeast of pump islands of backfilled testpit SS17-22.



Photo 2 View northwest of tank farm of excavator set up at testpit SS17-19.



Photo 3 View of testpit SS17-19 and soil lithology.



Photo 4 View of hand auger SS17-28 adjacent to valve between EPLS facility and Arviat tank farm.



Photo 5 View of hand auger SS17-31 adjacent to pipeline and connection to QEC facility.



Photo 6 View of peat lithology.



Photo 7 View of sandy gravel lithology.



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2017 Phase II Environmental Site Assessment
Arviat Tank Farm - Arviat, NU



Appendices





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Government of Nunavut
2017 Phase II Environmental Site Assessment
Arviat Tank Farm - Arviat, NU



Appendix 1 Phase I Environmental Site Assessment





Government of Nunavut

2017 Phase I Environmental Site Assessment

Arviat Tank Farm, Arviat, NU

2 April 2018

307031-00048 – CA-REP-0002

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Synopsis

WorleyParsons Canada Services Ltd., operating as Advisian, was retained by the Petroleum Products Division (PPD) of the Government of Nunavut to conduct a Phase I Environmental Site Assessment (ESA) of the Arviat tank farm, pipeline and resupply manifold. Arviat is a predominantly Inuit Hamlet located on the western shore of Hudson Bay in the Kivalliq Region of Nunavut, Canada. The tank farm facility serves as the primary storage and distribution location for petroleum products in the community. The facility is resupplied with petroleum products semi-annually by a resupply vessel/fuel barge. Fuel is piped from the barge to a shore manifold and a pipeline transfers the petroleum products to the storage tanks. Approximately 920 metres of pipelines connect the shore manifold to the tank farm facility.

The Arviat tank farm consisted of six vertical tanks, six horizontal tanks, associated infrastructure, and a publically accessible service station. Five of the vertical tanks contained Diesel, one contains Gasoline and the six horizontal tanks are on standby and used for emergencies. Two of the tanks are owned by the Qulliq Energy Corporation (QEC). The tank farm is enclosed by a berm and liner. Drum storage for aviation gas was located immediately adjacent to the tank farm outside of the bermed area. The service station includes two pump islands for diesel and gasoline, underground pipelines, a dispenser building and an operator shack. Sheen was observed on standing water in the area of that service station during the Site visit. The tank farm was originally developed in the late-1970's with eight horizontal tanks, two vertical tanks and the fuel pumps on the western boundary. In 1992 another vertical tank was added to the Site and the horizontal tanks were moved to the south within the berm. The tank farm was upgraded to its current layout and a section of the underground resupply pipelines was moved above-ground to the east in 1994/1995. The pipelines also connect directly to the QEC facility located in the Hamlet and product is sent via the pipelines from the tank farm to the QEC, as needed.

There are two Areas of Potential Environmental Concern (APECs) not owned by the PPD located on adjacent lands:

- the QEC operates the power generation facility for the Hamlet. There were three active and two inactive horizontal tanks at the facility. Historically, five vertical tanks and three horizontal tanks were visible in 1975. In 1980 the horizontal tanks were no longer present and in 1992 only two of the vertical tanks remained. Consistent with interviews conducted and as-built drawings, the two vertical tanks were moved in 1994/1995 to the Arviat tank farm and two of the horizontal tanks at the Arviat tank farm were moved to the QEC facility within a steel berm. A QEC representative indicated that the two historic tanks failed a tank inspection and that the base of the steel berm was damaged. There were two reported spills of diesel associated with the QEC power plant.
- the Eskimo Point Lumber Supply (EPLS) tank farm is located north of the Arviat tank farm, consisted of five vertical tanks since the late 1980's to early 1990's and is connected to the Arviat facility by an above-ground pipeline. A heavy equipment maintenance shop operated by the EPLS was located east of the tank farm. The Government of Nunavut was advised of a contaminated area between the Arviat facility and the EPLS tank farm in 2016. Higher levels of hydrocarbons in water in the vicinity of the valve connecting the two facilities suggested that it was the origin of contamination and travelled downslope (southeast). A soil sample collected near the EPLS valve had a reported ethylbenzene exceedance. An

additional water sample was collected in a second smaller contaminated area on the eastern side of the tank farm and concentrations of hydrocarbons were below the applied guidelines.

Ten APECs were identified during the Phase I ESA. The potential for petroleum hydrocarbon (PHC) and lead contamination exists at the following locations:

- current and former tank farm, aviation gas storage and former pump area;
- service station;
- tank farm standing water discharge point;
- active pipelines;
- former pipelines;
- resupply manifold near the wharf,
- EPLS tank farm;
- EPLS heavy equipment maintenance shop;
- QEC facility and historical tank farm; and
- general

A Phase II ESA is recommended to investigate potential soil impacts associated with the above APECs.

This report is intended to be used in its entirety, and no individual part of the report may be taken as representative of the findings of the report.






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Government of Nunavut
2017 Phase I Environmental Site Assessment
Arviat Tank Farm, Arviat, NU



Project No. 307031-00048-CA-REP-0002 - 2017 Phase I Environmental Site Assessment: Arviat Tank Farm, Arviat, NU

Rev	Description	Originator Approval	Reviewer Approval	Project Manager Approval	Date
0	Issued as final	 M. Lord	 M. Brolsma	 S. Bird	02-Apr-18

Disclaimer

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This report reflects the best judgment of Advisian based on the property conditions observed at the time of the site visit and on information available at the time of preparation of this report. Advisian has exercised reasonable skill, care, and diligence in assessing the information acquired during the preparation of this report, but makes no guarantees or warranties as to the accuracy or completeness of this information. The findings of this report are specific to this property and are based, in part, upon visual observation of the property at the time of the site visit, interviews, and a review of available records, as described in this report. Any information that may have been provided by others is believed to be accurate, but has not been independently verified and cannot be guaranteed. The scope of this project specifically excluded the collection of samples for analytical testing. Unless specifically stated otherwise, the findings cannot be extended to previous or future property conditions, or portions of the property that were unavailable for direct observation. If property conditions or applicable standards change, or if any additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary.

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1. Introduction

WorleyParsons Canada Services Ltd., operating as Advisian was retained by Government of Nunavut (Capital Products Division, PPD) to conduct a Phase I Environmental Site Assessment (ESA) of the Arviat Tank Farm (Above-Ground Bulk Fuel Storage Tank), pipeline, and resupply manifold in Arviat, Nunavut (herein referred to as the Site).

1.1 Purpose

The purpose of the Phase I ESA was to assemble historical and current information to determine the likelihood of environmental contamination at the Site resulting from current and historical Site operations and adjacent land use. Advisian conducted a Phase II ESA concurrent with the Phase I ESA the results of which are provided under separate cover.

1.2 Objectives

Consistent with the Government of Nunavut Environmental Guideline for the Management of Contaminated Sites (Government of Nunavut, 2014) and the Canadian Standards Association (CSA) Standard Z768-01 Phase I Environmental Site Assessment (CSA 2003) and subject to the scope limitations and deviations described in Section 1.3, the objectives of the Phase I ESA were to:

- identify actual and potential environmental contamination based on information collected through records review, a Site visit and interviews;
- estimate the likelihood, type and location of environmental contamination that may be present if identified; and
- evaluate the need for additional assessment and/or remediation measures.

It should be noted that the CSA Standard defines contamination as "the presence of a substance of concern, or a condition, in concentrations above appropriate pre-established criteria in soil, sediment, surface water, groundwater, air, or structures" (CSA 2003).

1.3 Scope of Work

The Phase I ESA was conducted in accordance with the scope of work described in Advisian's proposal, dated September 8, 2017, and applicable standards and guidelines. The scope of work consisted of the following major components:

- historical records review;
- regulatory records review;
- Site visit; and

- interviews.

The default radius of interest for off-site potential or actual environmental contamination was 100 m from the Site boundary unless professional judgment dictated otherwise.

1.3.1 Historical Records Review

The following historical records were reviewed to evaluate if historical Site activities may have contributed to potential or actual environmental contamination:

- aerial photographs;
- historical and current as-built plans supplied by PPD;
- company records; and
- previous environmental reports supplied by PPD.

1.3.2 Regulatory Records Review

The following regulatory records were reviewed to evaluate if historical Site activities may have contributed to potential or actual environmental contamination:

- federal, territorial and private environmental regulatory agency database records as provided by Environmental Risk Information Service (ERIS);
- records on file with the Hamlet of Arviat; and
- records on file with the Hazardous Materials Spill Database with the Environmental Division of Environment and Natural Resources (ENR).

1.3.3 Site Visit

A Site visit was conducted to evaluate:

- current Site operations and land use;
- on-site infrastructure;
- water and wastewater discharges;
- waste management and handling;
- chemical storage and management;
- presence of above-ground and underground storage tanks (ASTs and USTs);

- exterior Site observations;
- presence of water wells and groundwater monitoring wells;
- presence of surface water bodies within 300 m of the Site;
- presence of potential hazardous building materials including polychlorinated biphenyls, asbestos-containing materials, lead, mercury, ozone-depleting substances and urea foam formaldehyde;
- presence of special attention items including pesticides, mould and water damage, unusual or noxious odours and noise/vibration; and
- adjacent land use.

Photographs were obtained to document findings of potential environmental contamination and current conditions of the Site.

1.3.4 Interviews

Interviews were conducted with persons knowledgeable with current and historical Site activities for the Site and neighbouring properties.

1.3.5 Report

The information obtained through the Phase I ESA was evaluated and the findings, including nil findings, were reported as follows:

- any limitations encountered during the Phase I ESA, if applicable;
- a summary of information obtained from the historical and regulatory records review;
- a summary of the activities, materials, processes and operations at the Site and adjacent properties;
- identification of areas of potential or actual on-site and off-site sources of environmental contamination;
- conclusions of the Phase I ESA including a determination of the presence of potential or actual environmental contamination; and,
- recommendations for additional environmental assessment, if applicable.

The Phase I ESA did not include physical sampling of media including air, soil, groundwater, surface water or hazardous building materials. The evaluation for the potential presence of hazardous building materials was based on a visual assessment, interviews, and the age of the on-site buildings, if present.

The professional qualifications of the project team are provided in Appendix 1.

1.4 Scope of Work Deviations and Limitations

Limitations of the data collected during the Phase I ESA include the following:

- data obtained from government and private databases was limited to information reported through registration or supplied by the owner;
- limitations in aerial photography interpretation were largely a function of the scale of the individual photographs. Where possible, aerial photographs with scales of 1:20,000 or smaller were utilized to determine historical land use;
- as the Site visit was conducted in late fall, observations of vegetation vigour and health were limited as senescence had already occurred; and
- the Site was partially covered with snow and ice at the time of the Site visit which limited detailed observation of the ground surface.

1.5 Regulatory Framework

The scope of work for this assessment was based on the general requirements outlined in the Environmental Guideline for the Management of Contaminated Sites (Government of Nunavut 2014) and the Canadian Standards Association (CSA) standard Z768-01 Phase I ESA (CSA 2003). The purpose of a Phase I ESA, as defined in the Environmental Guideline, is to assemble historical and current information to determine the likelihood of contamination existing at a site and help to develop a field-testing program, should one be required. It must meet or exceed the CSA 2003 Standard which states the purpose of a Phase I ESA is to identify actual and potential site contamination involving the evaluation and reporting of existing information collected through records review, site visits, and interviews. The regulatory framework in the CSA 2003 standard is founded on guiding principles based on preventing pollution, protecting human and environmental health and returning contaminated sites to productive use.



2. Site Description

Plot Plan 90-5504 indicates that the Arviat tank farm consisted of a mostly rectangular parcel. The tank farm, located on 6th Street and 12th Avenue in the Hamlet of Arviat, Nunavut, was accessed via roadways and locked gates. The Site is municipally addressed as 600 12 Avenue and legally addressed as Lot 711, Plan 35893.

The Site consists of the following three main areas with associated infrastructure:

- the tank farm, located at 600 12 Avenue, with six vertical ASTs, six horizontal ASTs, a public service station with an operator shack, fuel dispenser building and pump islands for diesel and gasoline, aviation fuel storage in drums, associated pipelines, and equipment storage;
- approximately 900 m of pipelines used to transfer the petroleum products from a resupply vessel/fuel barge to the tank farm and/or to the Qulliq Energy Corp. (QEC), as needed; and
- a resupply manifold which is used to transfer petroleum products from the resupply vessel/fuel barge to the pipelines and tank farm.

The Site is zoned Industrial, Commercial or Parkland depending on where it is located in the Hamlet of Arviat (Hamlet of Arviat 2010). The tank farm and immediate area is zoned Industrial and is bound by industrial warehouses to the north and south, a roadway to the west and vacant land to the east. The pipeline area is zoned community use, or commercial, and is bound by vacant land, commercial business, and institutions. The resupply manifold area is zoned open space, or parkland, and is bound by the Hudson Bay shoreline and commercial properties.

3. Physical Setting

A variety of data sources including maps, reports, publications and imagery were reviewed to determine the physical setting of the Site and surrounding area. A summary of the topography, drainage, surficial and bedrock geology and hydrogeology is provided below:

Table A Physical Setting

Data Source	Results	Reference
Topography	The regional topography slopes easterly towards the Hudson Bay. Site elevations range from 4 metres at the bulk tank farm and 0 m at the resupply manifold. The nearest large surface water body is the Hudson Bay located 30 m northeast from the resupply manifold and 900 m northeast from the tank farm. Marshy, wet areas surrounded the pipeline and tank farm.	Google
Soils	Soils in the Arviat area were comprised primarily of peat, sand, silt, gravels and boulders.	Advisian 2017 Memorial University 2014
Surficial Geology	The area surrounding Arviat was subject to marine inundation, sedimentation and offlap of the Hudson Bay which provided a surficial geology comprising exposed bedrock and reworked glacial, marine, and lacustrine sediments.	Memorial University 2014
Bedrock Geology	The area consists of the inner coastal plain of the Hudson Bay Lowlands which is characterized by glacially formed gravel ridges known as eskers and drumlins.	University of Calgary 2016
Hydrogeology	The area is characterized by small lakes, the Hudson Bay and the presence of low lying permafrost. Regional shallow groundwater is assumed to flow towards Hudson Bay. The water table is visible at surface around the Site or located below ground at shallow depths (<0.5 m). There were no reports of water wells in the Hamlet.	University of Calgary 2016
Site and Hamlet Water Management	Surface water, collected in the eastern half of the tank farm, is discharged as needed to a marsh area immediately adjacent and east of the Site. Two freshwater reservoirs, built west of the Hamlet, are replenished annually by water pumped from Wolf Creek. Wastewater is collected from buildings by sewage trucks and released into a lagoon near the Hamlet landfill which slowly discharges the wastewater into a treatment wetland.	Memorial University 2014 Hamlet of Arviat 2017 Site Visit

4. Records Review

Descriptions of the methodology of the records review including the associated assumptions and limitations are provided in Appendix 2. Copies of the complete record search results are provided in Appendix 3.

4.1 Site Ownership

The Site has been owned by the Government of Nunavut since the late 1990's since the establishment of Nunavut. Prior to Nunavut becoming a Territory, the Site was owned and operated by the Northwest Territories government since construction, according to an interview with PPD.

4.2 Site and Adjacent Property Historical Occupancy

Historical occupancy of the Site and adjacent properties is summarized below. Only the operations/occupancies interpreted as sources of potential contamination were included. PPD was unable to confirm when the tank farm was originally constructed by the Northwest Territories. The Arviat tank farm area was undeveloped in 1975. In 1994/1995 the tank farm was upgraded to include a liner, the removal of two horizontal tanks, the addition of three vertical tanks, and the relocation of the Hamlet service station (A.D. Williams 1994). Prior to the upgrade, the tank farm consisted of eight horizontal tanks, two to three vertical tanks, and a service station located west of the tanks. The pipeline originally located below ground alongside 6 Avenue, previously known as Airport Road, was removed in the late 1980's. The pipeline was moved above-ground to the east to accommodate for future buildings along 6 Avenue. Due to the age of the facilities, there is the potential that leaded gasoline was historically present.

Table B Historical Site and Adjacent Property Occupancy

Address	Occupancy / Usage	Time Frame	Data Source
600 12th Ave, Arviat, NU	Arviat Tank Farm	1980's to Present	Site visit Interview Aerial Photograph
601 11th Ave, Arviat, NU (20 m northeast of tank farm)	EPLS Tank Farm and Heavy Equipment Maintenance Shop	1980's to Present	Site visit Interview Aerial Photograph
501 6 Ave, Arviat, NU (5 m north of pipeline)	Qulliq Energy Corp (formerly NTPC) Historic Tank Farm	1970's to Present	Site visit Interview Aerial Photograph

4.3 Aerial Photographs

Historical aerial photographs were obtained from the National Air Photo Library and Google Earth for decades spanning from the mid-1970's to 2011. A subset of images was selected from the available aerial photographs to represent images representative of the development stages of the Site. Based on the aerial photograph review, it is assumed that the tank farm was first constructed in the 1980's. Copies of the National Air Photo Library aerial photographs are provided in Appendix 4.

4.3.1 Site

The tank farm area was utilized for industrial purposes from the late 1970's to present as a bulk tank farm and service station. The area was undeveloped in 1975 until two vertical ASTs and eight horizontal ASTs were present within a berm in a 1980 aerial photograph. Stored vehicles and two buildings were also visible on the west boundary of the tank farm. A third vertical AST was added in 1992 and the horizontal ASTs were moved to the south. The Site was re-configured in approximately 1994/1995 with the removal of two horizontal ASTs and the addition two vertical ASTs. The buildings west of the tanks were moved and two new buildings were visible south of the rearranged tank farm. An above-ground pipeline trending to the northeast from the tank farm was also visible in 1995. An area of above-ground pipeline near the shore of the Hudson Bay, consistent with the pipeline connected resupply manifold, was visible beginning in 1992. This section of pipeline could not be identified in earlier aerial photographs due to limited picture resolution. The bulk tank farm, service station, pipeline, and resupply manifold all represent on-site sources of potential environmental contamination.

4.3.2 Adjacent Properties

Historically, adjacent land use to the tank farm was industrial with large warehouse buildings to the northeast and south. A tank farm with five vertical tanks, consistent with the present day EPLS tank farm, is located to the northeast of the Site since 1992. The EPLS tank farm represents an off-site source of potential environmental contamination. An additional tank farm located at the current QEC facility, was visible in 1975. Five vertical tanks and three horizontal tanks were visible at the property. In 1980, the horizontal tanks were no longer present and in 1992 only two vertical tanks remained. One of the tanks was located inside a bermed area. In 1998 the vertical tanks were removed and two horizontal tanks were visible within the bermed area.

4.4 Company Records

PPD records made available to Advisian for review included the Operating Manual for the Arviat Tank Farm, select API Inspections of the above-ground storage tanks, a previous environmental report, and plot plans. Interpretation of the significance of the available company records is provided in the relevant sections of this report.

4.5 Environmental Compliance

A search of the Hazardous Materials Spill Database was conducted on September 26, 2017 for the Hamlet of Arviat. There were no reported spill records directly related to Government of Nunavut or the Arviat tank farm.

However, a number of spills did not have location details to verify where the spill had occurred and it is possible limited-quantity spills of heating oil, diesel or gasoline spill have occurred at the Site and were reported with a site description of Arviat only. There were two records of spills on the Hazardous Materials Spills Database associated with the QEC power plant. One record from 2000-06-26 reported 205 L of diesel P-50 spilled inside the steel berm power plant. The second record from 2017-05-26 reported an unknown quantity of spilled diesel P-50.

4.6 Storage Tanks

Based on a review of data sources including aerial photographs, company records, and ERIS, the presence of historical storage tanks at the Site and adjacent properties is summarized below:

Table C Storage Tanks

ASTs / USTs	Location	Time Frame	Status	Data Source
Gasoline AST#10 1,345,363 L steel	West corner of tank farm within lined berm	1980's to Present	Active	Site Visit Plot Plan 90-5504 Aerial Photographs
Diesel AST#11 1,345,363 L steel	North corner of tank farm within lined berm	1980's to Present	Active	Site Visit Plot Plan 90-5504 Aerial Photographs
Diesel AST#12 2,551,313 L steel	East corner of tank farm within lined berm	1980's to Present	Active	Site Visit Plot Plan 90-5504 Aerial Photographs
Diesel AST#9 631,253 L steel	South portion of tank farm within lined berm	1980's to Present	Active	Site Visit Plot Plan 90-5504 Aerial Photographs
Diesel AST#23 986,000 L steel	South portion of tank farm within lined berm	1980's to Present	Active	Site Visit Plot Plan 90-5504 Aerial Photographs
Diesel AST#24 708,000 L steel	South portion of tank farm within lined berm	1980's to Present	Active	Site Visit Plot Plan 90-5504 Aerial Photographs
Diesel and/or Gasoline	Six horizontal tanks in east portion of tank farm within lined berm	1980's to Present	In service	Site Visit Plot Plan 90-5504 Aerial Photographs
Unknown	Approximately 20 m northeast of the Arviat tank farm	1980's to Present	Out of service according to client interview	Site Visit Aerial Photographs

ASTs / USTs	Location	Time Frame	Status	Data Source
Unknown	Northeast corner of historical tank farm layout	1980's to 1994	Relocated within new tank farm layout	Plot Plan 90-5504 Aerial Photographs
Unknown	Northwest corner of historical tank farm layout	1980's to 1994	Relocated within new tank farm layout	Plot Plan 90-5504 Aerial Photographs
Unknown	Southeast corner of historical tank farm layout	1980's to 1994	Relocated within new tank farm layout	Plot Plan 90-5504 Aerial Photographs
Unknown	Six horizontal tanks in southwest corner of historical tank farm layout	1980's to 1994	Relocated within new tank farm layout	Plot Plan 90-5504 Aerial Photographs
Unknown	Two horizontal tanks in southwest corner of historical tank farm layout	1980's to 1994	Removed	Plot Plan 90-5504 Aerial Photographs
Unknown	Five vertical tanks and three horizontal tanks at current QEC facility	1975 to 1990's	Removed	Aerial Photographs
Unknown	Two horizontal tanks at current QEC facility	1990's to Present	No longer utilized	Interview with QEC Representative Aerial Photographs
Diesel	Three horizontal tanks at current QEC facility	2010's to Present	Active	Interview with QEC Representative Aerial Photographs

The Arviat bulk tank farm comprises six vertical above-ground tanks used for storage of diesel and gasoline as well as six horizontal above-ground tanks used for emergency purposes. The tank farm was located within a berm and liner. Two of the tanks, #23 and #24, were owned and maintained by the Qulliq Energy Corporation (QEC), formerly the Northwest Territories Power Corporation (NTPC). The two tanks were moved to the Arviat tank farm in 1994/1995. The Government-owned and operated tanks were cleaned out every five years by a contracting company. The tanks were connected to two primary pipelines used to transport diesel and gasoline from the resupply manifold at the shore of the Hudson Bay to the tank farm and the QEC facility. Resupply occurs semi-annually with product pumped from a barge to the resupply manifold, through the pipeline and to the tank farm. The flow is reversed through gravity drainage and aided by pumps as needed.

when the QEC off-site facility requires product from their two tanks. The pipelines are kept full of product year round to prevent condensation buildup and/or damage within the pipeline.

Prior to a series of upgrades completed in 1994/1995 the tank farm consisted of two vertical tanks and eight horizontal tanks. A third vertical tank was added in the late 1980's. The upgrade included placing a liner below the tank farm, re-orientating the facility, moving two of the eight horizontal tanks to the QEC facility, receiving two vertical tanks from the QEC and adding one Government-owned and operated vertical tank. It was unknown if the tank farm was lined prior to the upgrade.

An adjacent tank farm, operated by the EPLS, is located approximately 20 m to the northeast of the facility. The EPLS facility consisted of five vertical storage tanks within a berm. The facility was present beginning in the late 1980's to early 1990's but it was unknown if a liner was installed during the tank farm construction. According to a PPD representative, the EPLS tank farm has not been used for the past two years. There is an above-ground pipeline that connected the PPD facility to the EPLS tank farm and was historically used to transfer product.

The QEC facility, located adjacent to the pipeline corridor within the Hamlet, consisted of three active horizontal tanks and two inactive horizontal tanks. Historically the facility had five vertical tanks and three horizontal tanks. According to a QEC representative, the three active vertical tanks were added to the QEC facility in 2010's (QEC 2017).

4.7 Previous Environmental Reports

A previous environmental report (Government of Nunavut 2016) on file with the Government for the Site and the EPLS adjacent property was reviewed by Advisian with the relevant results are summarized below:

Table D Previous Environmental Reports

Address	Title	Conclusions
Arviat Tank Facility	Environmental Assessment, Arviat Above-ground Storage Tank Facility	Field and lab observations indicated that free hydrocarbons exist at the Site but based on volume reconciliation, lines test, and known historical spills within the Hamlet, PPD was not liable for the contamination of the subject area.

Based on the environmental report reviewed, there is a potential for localized contamination to exist between the tank farm and the adjacent EPLS tank farm and southeast of the tank farm where standing water is pumped off-site.

In 2016, visual evidence of contamination was observed northeast between the Arviat tank farm and the EPLS tank farm. Disturbance to the pipeline support for the EPLS line and a strong odour around the line was identified. An additional contaminated area was observed outside the eastern tank berm in the location where standing water is discharged to from within the tank berm. An inspection of the resupply manifold indicated



that the pipeline was bending under the weight of snow build-up. Both the diesel and gas pipelines passed inspection by Absolute Petroleum and there was no evidence of leaks in either line.

Water collected directly downstream of the EPLS pipeline and valve had concentrations of toluene, xylenes (total), petroleum hydrocarbons (PHC) F1 and F2 that exceeded the applied guidelines. The water sampled collected downstream of the PPD resupply pipelines exceeded guidelines for toluene. Based on water samples collected from the spill area, higher levels of hydrocarbons taken in the vicinity of the valve suggest that it was the origin of contamination and travelled downslope (southeast). An additional water sample collected on the eastern side of the tank farm had reported concentrations of hydrocarbons below the applied guidelines. A soil sample taken in the area of the EPLS valve had a reported ethylbenzene concentration that exceeded the applied guideline.

Based on volume reconciliation there was no unaccounted product and PPD determined that there was no cause to believe that the contamination was due to Government of Nunavut products. It was recommended that an additional inspection be completed by unbiased parties and that EPLS conduct its own investigation into its small tank farm.



5. Site Visit

Advisian conducted a Site visit on October 5, 2017. The Site and adjacent properties were assessed for the presence of potential or actual environmental contamination. Characteristics reported herein reflect conditions present on the Site on the date of the Site visit. Weather conditions during the site visit were favourable for visual assessment of the Site; however pooling water throughout the bermed tank farm limited visual inspection of ground conditions. Interviews with representatives from PPD, QEC, the Hamlet Senior Administrator Officer and a local citizen were conducted at the time of the Site visit. A selection of the photographs taken during the Site visit is included in Appendix 5.

5.1 General Site Description

The Site consists of three main areas including the tank farm, pipelines and a resupply manifold. Associated infrastructure, Site access and surface conditions are listed below.

The tank farm, used to bulk store and disperse petroleum products, consisted of:

- six vertical ASTs, six horizontal ASTs, a public service station with an operator shack, fuel dispenser building and pump islands for diesel and gasoline, aviation fuel storage in drums, associated pipelines, and equipment storage;
- a roadway bordered the western and southern property boundary and connected to the service station;
- access to the interior of the tank farm was by foot through locked gates;
- the interior of the tank farm consisted of sandy gravel fill with grassy vegetation with approximately 60% of the tank farm being covered in frozen ponded water;
- the surface of the service station and area immediately west of the tank farm was packed sandy gravel fill used for vehicle traffic; and
- the area immediately north and east of the tank farm was comprised primarily of arctic marshlands with surface water bodies throughout.

The pipeline areas, used to transfer petroleum products from the resupply manifold to the tank farm and/or to the QEC as needed, consisted of:

- approximately 430 m of underground pipelines and 470 m of above-ground pipelines;
- the pipeline areas were accessible by foot from adjacent roadways and properties;
- sections of the above-ground pipeline were covered with a gravel packed material and surrounded by arctic marshlands with surface water bodies throughout; and
- the section underground pipeline was covered with packed gravel roadways used for vehicle traffic and surrounded by institutional, commercial and residential buildings.

The resupply manifold, used to receive and transfer petroleum products from the resupply vessel/fuel barge to the pipelines, area consisted of:

- a concrete spill basin with pipeline connections;
- the resupply manifold was accessible by foot from the adjacent roadway to the southwest; and
- was located approximately 30 m southwest of the Hudson Bay shoreline and surrounded by arctic vegetation.

5.2 Site Operations

The Site was developed for industrial use and processes were split into three major areas. The primary tank farm was used for the storage of diesel and gasoline fuel. The six horizontal tanks within the bermed facility were standby tanks used for emergency purposes. Two of the vertical tanks containing diesel belong to and were maintained by the QEC. The remaining four vertical tanks were owned and operated by the PPD. One of the tanks contained gasoline and the remaining three contained diesel. A service station, available to the general public for refueling diesel and gasoline, was located immediately southwest of the bermed tank farm. Above-ground pipelines connect the tanks to a dispenser building where product is transferred to underground pipelines then to the pump islands. There was also an operator shack located nearby the dispenser building which is used for service station sales.

Product was shipped to the tank farm via the resupply manifold located near the Hudson Bay shoreline and pipelines which connect the two facilities. Resupply occurred semi-annually and the pipeline was kept full year round to prevent condensation in the pipelines. A barge with floater hoses was connected to the resupply manifold and product was pumped through the pipelines to the tanks. Product can also be transferred from the Arviat tank farm to QEC facility as needed by reversing the flow in the pipelines by using gravity drainage and pumps. A pipeline corridor was shown on a Pipeline Routing Plan west of the current above-ground section of pipeline. On-site PPD representatives could not verify if the pipe had existed or been removed. An attempt to locate the line was conducted during the Site visit and no evidence of the pipeline was found. As reported by the resident, the tank farm was first built in the mid-1980's with the pipeline originally trending underneath the main road. In the mid-1990's a section of the underground pipeline was removed and made above-ground to the east. The tank farm changed orientation at this time as well. Prior to the mid-1990's the pump island used to be a single nozzle to the west of the tank farm, in the current area of drum storage. This was consistent with available aerial photographs and as-built drawings.

The Arviat tank farm also had an above-ground pipeline connected to the adjacent EPLS tank farm to the northeast. An interview with PPD personnel indicated that the EPLS tank farm has not been in use for the past two years. This was unable to be verified by EPLS during the Site visit. It is assumed that either diesel or gasoline was historically transferred from the Arviat tank farm to the EPLS tank farm via the pipeline as needed.

5.3 On-site Buildings and Structures

Two buildings, a dispenser building and an operator shack, were located at the tank farm. Both buildings were constructed in the mid-1990's with an approximate area of 8 by 11 metres. Both buildings were elevated



above-ground and had a steel floor with no evidence of staining present. The operator shack was used by the tank farm operators for the sale and tracking of fuel from the pump islands. The dispenser building received product from the tank farm by above-ground pipelines and transferred it to underground pipelines which fed directly to the pump islands. Both buildings and pump islands were located outside of the bermed and lined storage tank area. Heavy equipment, three seacans and pallets of aviation gas stored in drums were present in the south and western part of the Site outside of the bermed and lined tank farm. The resupply manifold consisted of a concrete spill basin set below the valves that connect the pipeline to the hose from a barge used for fuel transfer.

5.4 Water and Waste Water Discharges

5.4.1 Discharges to Drains, Ditches or Streams

Site topography sloped southeast and it was assumed that storm water would migrate in that direction prior to subsurface infiltration. Arctic marshlands were present immediately east of the tank farm and it was confirmed by PPD that pooling water within the bermed tank farm is discharged into the marshland after visual inspection. PPD also verified that approval for discharge was obtained annually from the Department of Environment in the Hamlet prior to pumping standing water. The area surrounding the above-ground section of pipeline was arctic marshland with surface water bodies throughout. It was assumed that storm water would migrate towards the surface water bodies prior to subsurface infiltration. The resupply manifold was located 30 m southeast of the Hudson Bay shoreline and it was assumed that storm water would migrate in that direction into the Bay.

5.4.2 Leach Field, Septic Tanks or Cesspools

No evidence of current or past presence of leach fields, septic tanks or cesspools was observed at the Site.

5.5 Waste Management and Handling

5.5.1 Solid Non-Hazardous Waste

Solid non-hazardous material and waste generated at the Site was stored in a drum located adjacent to the pump islands. The Site representative indicated that solid non-hazardous waste was removed on an as-needed basis for disposal at the Hamlet landfill.

5.5.2 Hazardous Waste and Chemical Storage

Hazardous waste was collected in drums at the resupply manifold and tank farm. Hazardous waste may be generated through cleaning of the tanks and resupply manifold or collected standing water. After the waste was collected, the drums were either stored within the bermed tank farm, adjacent but outside of the berm, or adjacent to the resupply manifold prior to being shipped via barge or ice road to a designated disposal facility. The storage areas outside of the bermed tank farm are considered potential sources of contamination as there is no secondary containment system in place for the drums.

Chemicals, including aviation gas, were stored in drums on pallets. There was no method of secondary containment and the area was considered a potential source of contamination. There was no method in place to manage vegetation within the tank farm at the time of the Site visit.

5.5.3 Storage Tanks

Six vertical tanks used for storage of gasoline and diesel were located within the bermed and lined tank farm. Two of these tanks were owned and maintained by the QEC. Six additional horizontal standby tanks used for emergency purposes were located within the tank farm. A recent API inspection of tanks #9 and #11 identified deficiencies in the base of the tanks which were subsequently upgraded in 2016. Please refer to Section 4.6 Storage Tanks for additional details about the currently active tanks located within the tank farm. The tanks are considered to be a potential source of contamination.

5.6 Exterior Observations

Evidence of the following was observed at the time of the Site visit:

- depressions in the ground immediately below the pipeline valves connected to the dispenser building; and
- rust discoloration in pooling surface water immediately below the horizontal tanks within the tank farm.

Additional evidence of stained soil or ground surfaces was not observed at the time of the Site visit. However, as noted above, the interior of the tank farm was partially snow and ice covered with limited detailed observation of the ground surface. The tanks are considered to be a potential source of contamination.

5.6.1 Wells

No groundwater monitoring wells or water supply wells was reported or observed on Site.

5.6.2 Indications of Fills Sites, Landfills or Dumping

No evidence of current or past presence of fill sites, landfills or dumping were observed on Site.

5.7 Hazardous Building Materials

The two on Site buildings were constructed in the late 1980's. The presence of polychlorinated biphenyls, asbestos-containing materials, lead, mercury, ozone-depleting substances, urea foam formaldehyde insulation and mould were not observed nor considered a source of environmental contamination at the Site. No intrusive testing was complete as part of the scope of work.

5.8 Special Attention Items

Evidence of the following was not observed at the time of the Site visit:

- pest control chemicals;
- unusual or noxious odours; and
- unusual noise or vibration.

5.9 Adjacent Properties

Observations were made of current land use activities and environmental conditions on adjacent and neighbouring properties to identify off-site sources of potential contamination. A summary of the current land use is provided below.

Table E Adjacent Property Land Use

Address	Direction	Distance	Land Use	Observation / Comments
601 11th Ave	Northeast	20 m	Industrial	Above-ground tank farm with five vertical tanks and heavy equipment maintenance warehouse
No address	East	50 m	Industrial	Waste and drum storage
No address	Southeast	Adjacent	Undeveloped	Arctic marsh
601, 603, and 605 12 th Avenue	Southwest	20 m	Industrial	Heavy equipment storage and warehouses
501 6th Street	North	5 m	Industrial	Power generation facility

The area surrounding the tank farm is zoned Industrial and is used primarily for heavy equipment storage and maintenance. Debris and waste was stored at various properties surrounding the tank farm in distances ranging from 5 m to 150 m. A tank farm and heavy equipment maintenance shop, owned and operated by the EPLS, located 20 m northeast of the tank farm is considered potential off Site sources of contamination due to the nature of the industrial operations and the historical presence of contamination in the area (see Section 4.7 for additional details).

The area surrounding the pipeline right-of-way was primarily dominated by Arctic marshes, community or government buildings, or roadways with the exception of the Qulliq Energy Corporation facility. The pipeline connects directly the facility and based on an interview with a health, safety and environmental representative for the QEC, the base of the historical tank berm constructed of steel was corroded (QEC 2017). The QEC facility is considered a potential source of off Site contamination to the pipeline right-of-way.

The area surrounding the resupply manifold was split evenly between residential and commercial properties and undeveloped shoreline. There was no evidence of potential sources of off Site contamination in the area.



6. Conclusions and Recommendations

The Phase I ESA identified evidence of potential and actual environmental contamination associated with current operations and historical operations at the Site and surrounding properties as summarized below. A Phase II ESA is recommended to investigate soil impacts associated with the below areas of potential environmental concern (APECs).

Table F Summary of Areas of Actual and/or Potential Environmental Concern

Environmental Concern	Description	Rationale
1	Current and former tank farm, aviation gas storage and former pump area	Diesel and gasoline fuel has been stored in the tank farm in steel USTs since the 1980s. A liner was installed in 1994/1995 as part of a facility upgrade. It is unknown if the tank farm was previously lined. Integrity testing in 2016 of the ASTs identified maintenance requirements for the bases of Tanks #9 and #11 which were completed in 2016. Aviation gasoline is currently stored in on pallets drums with no secondary containment, outside of the bermed tank farm area. The former pump island was located in the area currently used for aviation drum storage. There is potential contamination from hydrocarbons and/or lead.
2	Service Station	Visual evidence during the Site visit indicated the potential for leaks beneath the valves connecting the above-ground pipelines to the dispenser building. There is potential contamination from hydrocarbon and/or lead.
3	Tank farm standing water discharge point	Standing water collected within the bermed tank farm is discharged off-site. Approval to discharge is obtained annually from the Department of Environment in the Hamlet. A visual inspection is completed prior to individual discharge events. There is potential contamination from hydrocarbon and/or lead.
4	EPLS tank farm	An environmental investigation conducted in 2016 identified hydrocarbon impacts in soil and surface water between the two tank farms. The EPLS tank farm was built in the 1980's and has historically stored petroleum products. There is potential contamination from hydrocarbon and/or lead.
5	EPLS heavy equipment maintenance shop	A warehouse building is currently used for heavy equipment maintenance. There is the potential for soil contamination from solvents, hydrocarbons or metals associated with the Site activities.
6	Active Pipeline	The pipelines currently resupply the tank farm with diesel and gasoline fuel semi-annually. Product is kept in the lines year round to prevent issues with condensation. There is potential contamination from hydrocarbon and/or lead.



Environmental Concern	Description	Rationale
7	Former Pipelines	Prior to the upgrade work completed in 1994/1995, a section of the resupply pipelines was previously located underground. There is potential contamination from hydrocarbon and/or lead.
8	QEC facility and former tank farm	The power generation facility, owned and operated by the QEC, has five ASTs. A pipeline leads from the tank farm to the QEC facility. A QEC representative indicated that the secondary containment system used at the QEC property for two historical tanks had corroded away and failed inspection. There are two records of diesel P-50 spills since 2000 on the Hazardous Materials Spills Database associated with the QEC power plant. An aerial photograph from 1975 showed five vertical above-ground storage tanks and three horizontal storage tanks on the same facility. There is potential contamination from hydrocarbon and/or lead.
9	Resupply Manifold	The resupply manifold was upgraded in 1994/1995 and previous containment details are unknown. There is potential contamination from hydrocarbon and/or lead from leaks during resupplies.
10	General	There is a history of spills in Arviat, some of which do not have specific locations or responsible parties. There is potential contamination from hydrocarbon and/or lead.



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7. Closure

We trust that this report satisfies your current requirements and provides suitable documentation for your records. If you have any questions or require further details, please contact the undersigned at any time.

Report Prepared by

Melissa Lord, C.E.T.

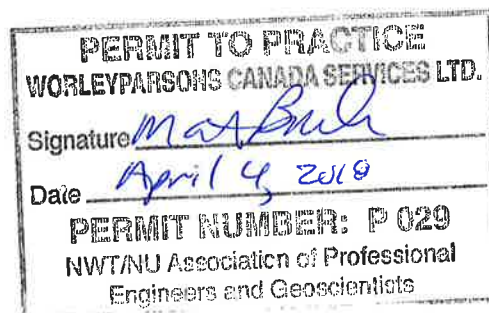
Environmental Technologist

Senior Review by



Masten Brolsma, B.Sc., P.Eng. (NT)

Principal Environmental Engineer



Advisian, Americas

8. Bibliography

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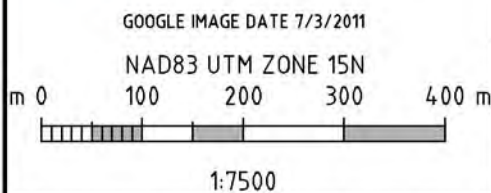
Figures





LEGEND

ASSESSMENT AREAS



GOVERNMENT OF NUNAVUT 2017 PHASE I ESA - ARVIAT, NU

ASSESSMENT AREAS

Date: 09-NOV-17	Drawn by: MYT	Edited by: -	App't by:
WorleyParsons Project No: 307031-00048			
FIG No: 1			REV: A

Oneway
to zero harm

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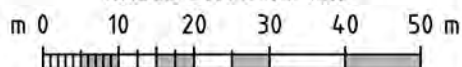
APEC



APEC AREA

GOOGLE IMAGE DATE 7/3/2011

NAD83 UTM ZONE 15N



1:1000

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

- 1 CURRENT AND FORMER TANK FARM, AVIATION GAS STORAGE AND FORMER PIPELINE
- 2 GAS STATION
- 3 WATER DISCHARGE LOCATION
- 4 EPLS TANK FARM
- 5 EPLS HEAVY EQUIPMENT MAINTENANCE SHOP

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AREAS OF POTENTIAL ENVIRONMENTAL CONCERN TANK FARM AREA

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Date: 21-NOV-17	Drawn by: MYT	Edited by: MYT	Appr'd by:
WorleyParsons Project No: 307031-00048			
FIG No	2A		REV B

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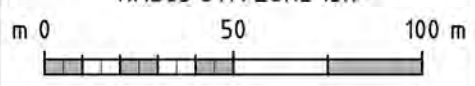
AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

- 6 ACTIVE PIPELINES
- 7 FORMER PIPELINES

LEGEND

- 5 APEC
- APEC AREA

GOOGLE IMAGE DATE 7/3/2011
NAD83 UTM ZONE 15N



1:2000

GOVERNMENT OF NUNAVUT
2017 PHASE I ESA - ARVIAT, NU

**AREAS OF POTENTIAL ENVIRONMENTAL CONCERN
PIPELINES**



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WorleyParsons Project No: 307031-00048			
FIG No: 2B		REV: B	

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SAVE DATE & TIME: 21/11/2017 12:45:16 PM ISSUING OFFICE: eCAD



AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

- 6 ACTIVE PIPELINES
- 8 QEC FACILITY
- 9 RESUPPLY MANIFOLD

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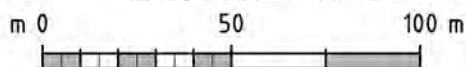
Image © 2017 DigitalGlobe

LEGEND

- 5 APEC
- APEC AREA

GOOGLE IMAGE DATE 7/3/2011

NAD83 UTM ZONE 15N



1:2000

GOVERNMENT OF NUNAVUT
2017 PHASE I ESA - ARVIAT, NU

**AREAS OF POTENTIAL ENVIRONMENTAL CONCERN
RESUPPLY MANIFOLD AND QEC AREA**

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to zero harm

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WorleyParsons Project No: 307031-00048			
FIG No: 2C	REV: B		

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Appendices





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Arviat Tank Farm, Arviat, NU



Appendix 1 Professional Qualifications



Appendix 1 Assessor Qualifications

Masten Brolsma – Technical Reviewer

Masten Brolsma provided overall direction to the project team, quality assurance oversight, and technical guidance.

Masten has been a Principal Environmental Engineer with Advisian / WorleyParsons since 2012. He has over 25 years of experience working in environmental consulting and industry. Masten holds a Bachelor of Science degree in Environmental Engineering from Montana Tech of the University of Montana and is a Professional Engineer in Alberta and the Northwest Territories / Nunavut. He has been a site assessor or senior reviewer for Phase I and II environmental site assessments (ESAs) for acquisition due diligence, refinancing and divestiture purposes. His expertise is in contaminated site portfolio management. Currently, he provides technical guidance in managing and remediating contaminated sites in the Prairies and the Western Arctic.

Melissa Lord – Field Technologist and Report Writer

Melissa Lord conducted the regulatory and historical records review, site visits and authored the report.

Melissa is an Environmental Technologist with experience in planning and supervising in different environmental programs at a variety of industrial, upstream and downstream oil and gas, and urban sites. Work includes conducting Phase I ESAs, aquatic pathway assessments, groundwater and surface water monitoring and sampling programs, Phase II ESAs, excavations, hydraulic conductivity testing, quality control and sample submission, and report writing.



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Appendix 2

Records Review Methodology



Appendix 2 Records Review Methodology

1. Historical Records Review

1.1 Aerial Photographs

Historical aerial photographs were reviewed as part of the Phase I ESA. Select historical aerial photographs were reviewed in greater detail to support the identification of historical and current site infrastructure and activities that may pose an environmental contamination risk to the tank farm, pipeline and resupply manifold. In addition, land use, receptors (i.e. surface water bodies, residences), topography, and disturbance sizes were noted. Aerial photographs were obtained from the National Air Photo Library (2017) spanning the mid-1970's to the mid-1990's. Additional aerial photographs spanning the early 2000's to the early 2010's were obtained from Google Earth.

1.2 Government of Nunavut Provided Documentation

Documentation provided by the Government of Nunavut included the Operation and Maintenance manual for the Arviat tank farm, an Environmental Site Assessment and select tank inspection reports. The documents were reviewed in detail to support the identification of historical and current site infrastructure and activities that may pose an environmental contamination risk to the tank farm, pipeline and resupply manifold.

2. Regulatory Records Review

2.1 Environmental Risk Information Services (ERIS)

Searches of 19 federal, territorial, and private environmental regulatory agency database listings in addition to a land title search were performed by ERIS as part of the Phase I ESA. The purpose of the searches was to identify publicly accessible environmental and related records for the Arviat tank farm and area. The default ERIS search radius was 250 m.

2.2 Hazardous Materials Spill Database

A search of the Hazardous Materials Spill Database was conducted. Environmental and Natural Resources maintains a database of hazardous materials spills report to the Territory. The database was searched for records within the Hamlet of Arviat.

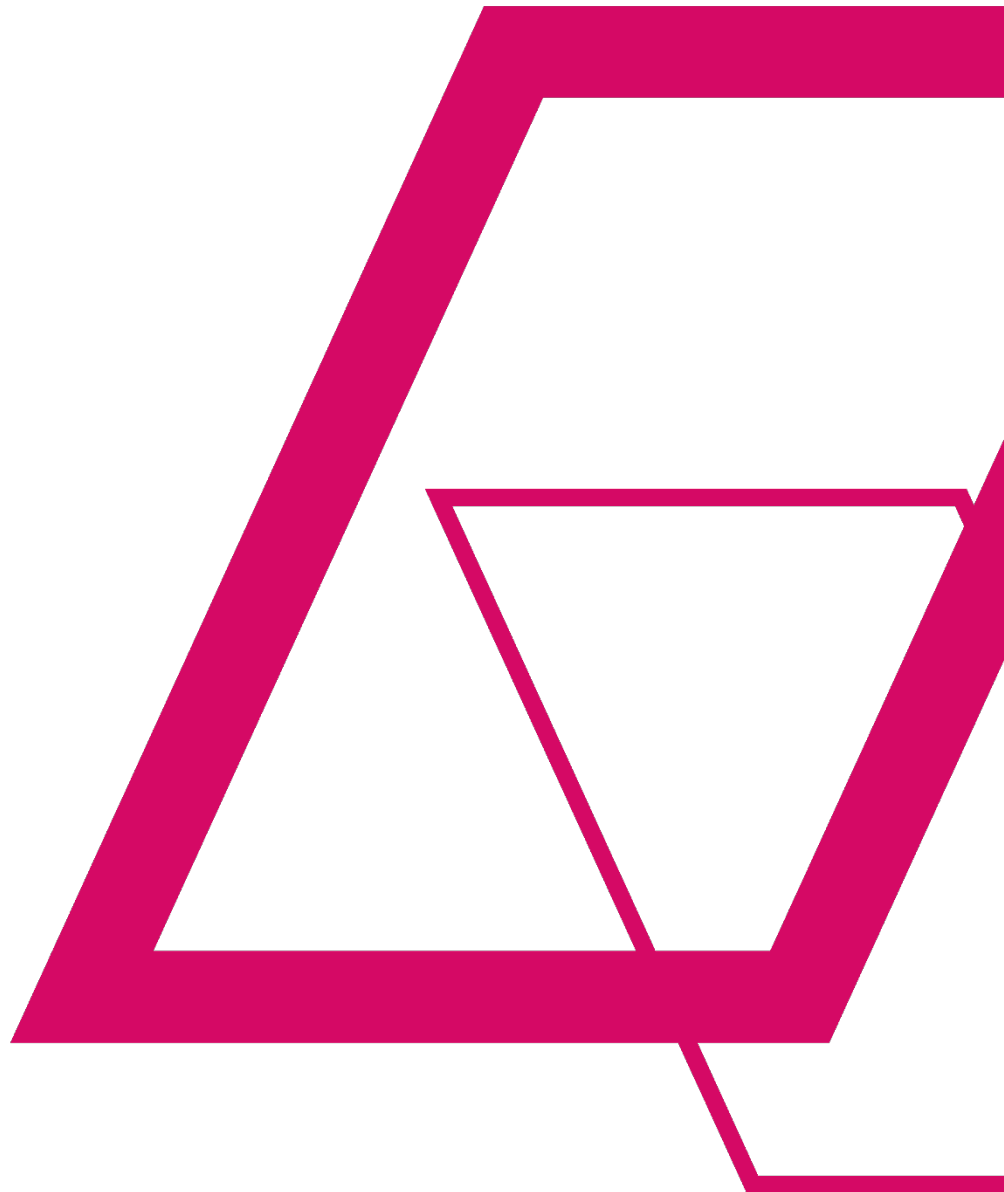


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Arviat Tank Farm, Arviat, NU



Appendix 3 Records Search Results





Hazardous Materials Spill Database

Environment Division of ENR

Scotia 6, 5102-50th Avenue; Yellowknife, NT X1A 3S8

Phone: (867) 873-7654 Fax: (867) 873-0221

Sorted By: SpillNo for the year 2017
(s):

Spill No.	Date	Ter	Region	Location	Site Description	Commodity	Quantity	Source	Agency
2000164	2000-06-26	NU	KEE	Arviat	Inside Steel Berm Power Plant	Diesel P-50	205 L	PL	GN
2001317	2001-10-09	NU	KEE	Arviat	Lot 357	Fuel Oil P-50	364 L	PL	GN
2001325	2001-10-16	NU	KEE	Arviat	Old Historical Society House	Heating Fuel	455 L	PL	GN
2002522	2002-09-20	NU	KEE	Arviat	Unit 174 A	Diesel Fuel	0 L	PL	GN
2003427	2003-06-12	NU	KEE	Arviat	Back of Arena	Heating Fuel	100 L	PL	GN
2004400	2004-06-18	NU	KEE	Arviat	Abandoned House End of Town	Heating Fuel	1137 L	PL	GN
2007374	2007-08-03	NU	KEE	Arviat	Airport	Jet A	1 L	PL	GN
2008110	2008-03-31	NU	KEE	Arviat	M. Tommy Owljoot House	Heating Fuel	80 L	PL	GN
2008381	2008-08-06	NU	KEE	Arviat	Wolfcreek Pumphouse	Heating Fuel P-50	22 L	PL	GN
2009218	2009-05-18	NU	KEE	Arviat	389A GN Staff Housing Unit	Heating Fuel	26 L	PL	GN
2012033	2012-02-21	NU	KEE	Arviat	Arviat, house of Sam Alagalak	Raw Sewage	400 L	PL	GN
2013183	2013-06-03	NU	KEE	Arviat	Arviat High School	Heating Fuel	300 L	PL	GN
2014134	2014-05-01	NU	KEE	Arviat	404 A&B 5th Street	Heating Fuel	450 L	PL	GN
2015062	2015-02-23	NU	KEE	Arviat	Arviat, QEC power plant area	Propylene Glycol 50%	1600 L	PL	GN
2015146	2015-04-10	NU	KEE	Arviat	Arviat NU, Unit 228/800-7th Ave, 5-plex	Heating Fuel #2	1058 L	PL	GN
2015227	2015-05-27	NU	KEE	Arviat	803 1st Avenue	P-50	205 L	PL	GN
2015244	2015-06-08	NU	KEE	Arviat	Arviat, 801, 1st Ave	Heating Fuel	0 L	PL	GN
2015319	2015-07-29	NU	KEE	Arviat	Arviat Elementary School	Heating fuel	100 L	PL	GN
2017146	2017-05-04	NU	KEE	Arviat	700 E - 9th Ave / 385 E	No 2 heating fuel oil	100 L	PL	GN
2017177	2017-05-26	NU	KEE	Arviat	QEC Arviat Power Plant	P-50 Diesel	0 L	PL	GN
2017194	2017-06-02	NU	KEE	Arviat	Arviat Health Centre Heat Trace	Dowfrost Heat Transfer Fluid	0 L	PL	GN
2017229	2017-06-29	NU	KEE	Arviat	Arviat	P50 Heating Fuel	70 L	PL	GN
2017302	2017-08-17	NU	KEE	Arviat	Arviat, 701 1st Avenue	Heating fuel	100 L	PL	GN
2017304	2017-08-18	NU	KEE	Arviat	Arviat, Fuel deliver staging area	Gasoline	200 L	PL	GN
2017315	2017-08-29	NU	KEE	Arviat	Unit 614, 407 6th Avenue, Arviat, NT, 61 06 31.05N 94 03 55.82W	P-50 home heating fuel	300 L	PL	GN

Total Spills on this Report: 25

This report contains information regarding spills that were reported to the NWT 24-Hour Spill Line. The absence of information on any particular location in no way guarantees that contamination has not occurred at that location.

LEGEND

Region: BAF - Baffin DEH - Deh Cho INU - Inuvik KEE - Keewatin KIT - Kitikmeot NSL - North Slave SAH - Sahtu SSL - South Slave	Source: AIR - Aircraft DRUM - Drum or Barrel MV - Marine Vessel NS - Natural Seepage OTH - Other Transportation PL - Pipe or Line RT - Rail Train SL - Sewage Lagoon ST< - Storage Tank <4000 litres ST> - Storage Tank >4000 litres TP - Tailings Pond TRU - Truck UK - Unknown WELL - Wet Wells, Flaring Boom	Agency: CCG - Canadian Coast Guard EP - Environment Canada GN - Government of Nunavut GNWT - Government of Northwest Territories ILA - Inuvialuit Land Administration INAC - Indian and Northern Affairs Canada NEB - National Energy Board
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Hazardous Materials Spill Database

Environment Division of ENR

Scotia 6, 5102-50th Avenue; Yellowknife, NT X1A 3S8

Phone: (867) 873-7654 Fax: (867) 873-0221

Sorted By: SpillNo for the year 2017
(s):

Spill No.	Date	Ter	Region	Location	Site Description	Commodity	Quantity	Source	Agency
1999126	1999-09-30	NU	KEE	Arviat	Unit #175A	Heating Fuel	1136 L	ST<	GN
2000042	2000-10-12	NU	KEE	Arviat	Domestic Dump	Fuel Oil	455 L	ST<	GN
2000045	2000-02-28	NU	KEE	Arviat	School Fuel Tank	Heating Fuel P-50	20 L	ST<	GN
2001044	2001-02-19	NU	KEE	Arviat	Northern Store Property	Diesel Fuel	1100 L	ST<	GN
2001108	2001-04-06	NU	KEE	Arviat	Apartment Number 174D & 174C NCC Housing Units	Fuel Oil	568 L	ST<	GN
2001168	2001-05-30	NU	KEE	Arviat	Lot 106/118	Heating Fuel	568 L	ST<	GN
2002582	2002-11-27	NU	KEE	Arviat	Lot 009 Unit #635	Heating Fuel	568 L	ST<	GN
2003340	2003-05-16	NU	KEE	Arviat	House 704	Heating Fuel	0 L	ST<	GN
2004410	2004-06-22	NU	KEE	Arviat	Unit 385 E	Fuel Oil	0 L	ST<	GN
2004523	2004-08-05	NU	KEE	Arviat	Lot 275	Heating Oil	10 L	ST<	GN
2005261	2005-05-26	NU	KEE	Arviat	Unit #523-524	Heating Fuel	500 L	ST<	GN
2005270	2005-05-27	NU	KEE	Arviat	Manager's Residence at Northern Store	Diesel Fuel	700 L	ST<	GN
2005306	2005-06-16	NU	KEE	Arviat	Unit 393 Lot #442	Fuel Oil	68 L	ST<	GN
2005531	2005-11-10	NU	KEE	Arviat	Left of Wildlife Office	Heating Fuel	1200 L	ST<	GN
2006395	2006-10-16	NU	KEE	Arviat	Lot 545	P50 Heating Fuel	1137 L	ST<	GN
2007225	2007-05-16	NU	KEE	Arviat	House 669	Heating Fuel	80 L	ST<	GN
2007226	2007-05-29	NU	KEE	Arviat	House 370 (new 413)	Fuel Oil	75 L	ST<	GN
2007230	2007-05-31	NU	KEE	Arviat	Shared Care Child Care	Heating Fuel	100 L	ST<	GN
2007255	2007-06-07	NU	KEE	Arviat	Peter Mangark's House	Heating Fuel	0 L	ST<	GN
2007274	2007-06-18	NU	KEE	Arviat	House 683	Heating Fuel	0 L	ST<	GN
2007277	2007-06-19	NU	KEE	Arviat	Public House 226 A, B, C, D, E	Fuel Oil	100 L	ST<	GN
2007289	2007-06-25	NU	KEE	Arviat	601 A, B, C, D House	Fuel Oil	46 L	ST<	GN
2007406	2007-08-03	NU	KEE	Arviat	NWC Staff Residence 106B Duplex	Diesel Fuel	25 L	ST<	GN
2007415	2007-08-30	NU	KEE	Arviat	Arena	Fuel Oil	700 L	ST<	GN
2008142	2008-04-14	NU	KEE	Arviat	GN Unit 393F/729E	Diesel Fuel	4 L	ST<	GN
2008155	2008-04-23	NU	KEE	Arviat	House 739	Heating Oil	200 L	ST<	GN
2008167	2008-04-30	NU	KEE	Arviat	House 675	Heating Oil	20 L	ST<	GN
2008203	2008-05-14	NU	KEE	Arviat	32-579 to 522	Heating Fuel	1137 L	ST<	GN
2008204	2008-05-14	NU	KEE	Arviat	32-576 to 32-517	Heating Fuel	1137 L	ST<	GN
2008253	2008-05-29	NU	KEE	Arviat	House 125	Fuel Oil	30 L	ST<	GN
2008254	2008-05-28	NU	KEE	Arviat	Behind House 291	Fuel Oil	20 L	ST<	GN
2008284	2008-06-13	NU	KEE	Arviat	Behind Arctic College Building	Heating Fuel	0 L	ST<	GN
2008304	2008-06-23	NU	KEE	Arviat	House 825	Fuel Oil	100 L	ST<	GN
2008334	2008-07-15	NU	KEE	Arviat	Bldg. 4012 West Side	Heating Fuel	600 L	ST<	GN
2008391	2008-08-11	NU	KEE	Arviat	School Shop Building #71-403	Heating Fuel	20 L	ST<	GN
2008440	2008-09-12	NU	KEE	Arviat	House 535	Heating Fuel	300 L	ST<	GN
2008521	2008-10-27	NU	KEE	Arviat	Behind Arctic College Main Office	Heating Fuel P-50	0 L	ST<	GN
2009042	2009-01-30	NU	KEE	Arviat	House 329	Heating Fuel	50 L	ST<	GN
2009122	2009-04-02	NU	KEE	Arviat	Lot 525B (New Number 683)	Heating Fuel	10 L	ST<	GN
2009182	2009-05-04	NU	KEE	Arviat	House 684	Heating Fuel	150 L	ST<	GN
2009283	2009-06-11	NU	KEE	Arviat	RKD Building	Heating Fuel	30 L	ST<	GN
2009309	2009-06-22	NU	KEE	Arviat	Northern Store	Heating Oil	2 L	ST<	GN
2009331	2009-07-06	NU	KEE	Arviat	House 692	Heating Fuel	150 L	ST<	GN
2009332	2009-07-06	NU	KEE	Arviat	Duplex 534	Heating Fuel	200 L	ST<	GN
2009475	2009-10-15	NU	KEE	Arviat	Firehall	Heating Fuel	40 L	ST<	GN
2010068	2010-03-12	NU	KEE	Arviat	Lot 81	Heating Fuel	1000 L	ST<	GN
2010135	2010-04-28	NU	KEE	Arviat	Health Centre 113635	Fuel Oil	46 L	ST<	GN
2010146	2010-05-03	NU	KEE	Arviat	House #186	Heating Fuel	200 L	ST<	GN
2010148	2010-05-04	NU	KEE	Arviat	Arviat	Heating Diesel Fuel	750 L	ST<	GN
2010165	2010-05-12	NU	KEE	Arviat	Lot 644 Arviat, Nunavut	Heating Diesel Fuel	100 L	ST<	GN
2010237	2010-06-15	NU	KEE	Arviat	Lot 655 (SK234), Building 234, Arviat	Heating Diesel Fuel	1000 L	ST<	GN
2010247	2010-06-21	NU	KEE	Arviat	Arviat	Heating Oil	30 L	ST<	GN
2010250	2010-06-23	NU	KEE	Arviat	Lot SK138, Hamlet 5-Bay Parking Garage, Arviat	Heating Diesel Fuel	25 L	ST<	GN
2010263	2010-06-30	NU	KEE	Arviat	Arviat Lot 597	Heating Diesel Fuel	100 L	ST<	GN
2010302	2010-07-16	NU	KEE	Arviat	Arviat Hamlet Office Building Lot 98	Heating Diesel Fuel	0 L	ST<	GN
2010304	2010-07-17	NU	KEE	Arviat	Arviat Hamlet Staff House on Lot 412	Heating Diesel Fuel	45 L	ST<	GN
2010319	2010-07-29	NU	KEE	Arviat	Arviat Lot 491	Heating Diesel Fuel	0 L	ST<	GN
2011195	2011-05-30	NU	KEE	Arviat	Arviat Housing Association Office/Garage Building	Heating Oil	200 L	ST<	GN
2011219	2011-06-13	NU	KEE	Arviat	Arviat, House 736	Heating Fuel	50 L	ST<	GN
2011413	2011-10-20	NU	KEE	Arviat	Arviat Fire Hall	Heating Fuel	70 L	ST<	GN
2011416	2011-10-24	NU	KEE	Arviat	Arviat, 5-Plex, Unit 380E on Lot 664E	Heating Fuel	50 L	ST<	GN
2011434	2011-11-08	NU	KEE	Arviat	Unit 391C, Arviat NU	Heating Fuel Oil	38 L	ST<	GN
2012125	2012-04-03	NU	KEE	Arviat	House 571	Heating Fuel	60 L	ST<	GN
2012180	2012-05-11	NU	KEE	Arviat	Arviat	P-50	10 L	ST<	GN
2012232	2012-06-12	NU	KEE	Arviat	Hamlet Garage	P-50/EK-35	100 L	ST<	GN
2012263	2012-06-25	NU	KEE	Arviat	Arviat	Fuel Oil	92 L	ST<	GN
2012442	2012-11-13	NU	KEE	Arviat	Shared Child Care Building	Sewage	400 L	ST<	GN
2013187	2013-06-04	NU	KEE	Arviat	Lot 493	Heating Fuel	15 L	ST<	GN

2013241	2013-07-08	NU	KEE	Arviat	Bay 2 Garage	Heating Fuel	50 L	ST<	GN
2014141	2014-05-06	NU	KEE	Arviat	Arviat, 716th Avenue (old house 393)	Heating Fuel	730 L	ST<	GN
2014207	2014-06-11	NU	KEE	Arviat	Arctic College Administration Building	P50	3 L	ST<	GN
2014239	2014-06-26	NU	KEE	Arviat	Arviat, 400 8th Avenue	Heating Fuel	0 L	ST<	GN
2014266	2014-07-19	NU	KEE	Arviat	Arviat, At 706-D 9th Avenue	Heating Fuel	300 L	ST<	GN
2014303	2014-08-19	NU	KEE	Arviat	700 9th Street	Heating Fuel	50 L	ST<	GN
2014345	2014-09-25	NU	KEE	Arviat	702 1st Avenue	Heating Fuel	0 L	ST<	GN
2014358	2014-10-06	NU	KEE	Arviat	403 9th Ave	Heating Fuel	60 L	ST<	GN
2014373	2014-10-14	NU	KEE	Arviat	403 7th Ave	Heating Fuel	75 L	ST<	GN
2015216	2015-05-22	NU	KEE	Arviat	Arviat, 707 5th Ave	heating fuel	100 L	ST<	GN
2015413	2015-09-28	NU	KEE	Arviat	400 6th Avenue unit604, 61 6 33N 94 4 1W	Heating Fuel	50 L	ST<	GN
2015414	2015-09-30	NU	KEE	Arviat	Middle School	Heating Fuel	0 L	ST<	GN
2015447	2015-10-29	NU	KEE	Arviat	Arviat, NU. Unit # 240 / 705 - 9 th Ave.	Heating Fuel # 2	170 L	ST<	GN
2016127	2016-04-19	NU	KEE	Arviat	Arviat, 802 10th Avenue, unit 271	No.2 Home heating fuel	0 L	ST<	GN
2016173	2016-05-16	NU	KEE	Arviat	Southwest of the Northern Store	Diesel	100 L	ST<	GN
2016193	2016-05-26	NU	KEE	Arviat	Arviat, 801 8th Street	Heating Oil	100 L	ST<	GN
2016194	2016-05-26	NU	KEE	Arviat	801- 8th Street	Heating Fuel	100 L	ST<	GN
2017053	2017-02-23	NU	KEE	Arviat	New water treatment plant	Fuel	14 L	ST<	GN
2017163	2017-05-15	NU	KEE	Arviat	Alliance Church	Heting fuel	0 L	ST<	GN
2017211	2017-06-16	NU	KEE	Arviat	Arviat Paolei Hotel	Heating Fuel	0 L	ST<	GN
2017227	2017-06-28	NU	KEE	Arviat	Shoreline by RCMP	Fuel	13 L	ST<	GN

Total Spills on this Report: 89

This report contains information regarding spills that were reported to the NWT 24-Hour Spill Line. The absence of information on any particular location in no way guarantees that contamination has not occurred at that location.

LEGEND

Region: BAF - Baffin DEH - Deh Cho INU - Inuvik KEE - Keewatin KIT - Kitikmeot NSL - North Slave SAH - Sahtu SSL - South Slave	Source: AIR - Aircraft DRUM - Drum or Barrel MV - Marine Vessel NS - Natural Seepage OTH - Other Transportation PL - Pipe or Line RT - Rail Train SL - Sewage Lagoon ST< - Storage Tank <4000 litres ST> - Storage Tank >4000 litres TP - Tailings Pond TRU - Truck UK - Unknown WELL - Wet Wells, Flaring Boom	Agency: CCG - Canadian Coast Guard EP - Environment Canada GN - Government of Nunavut GNWT - Government of Northwest Territories ILA - Inuvialuit Land Administration INAC - Indian and Northern Affairs Canada NEB - National Energy Board
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Hazardous Materials Spill Database

Environment Division of ENR

Scotia 6, 5102-50th Avenue; Yellowknife, NT X1A 3S8

Phone: (867) 873-7654 Fax: (867) 873-0221

Sorted By: SpillNo for the year 2017
(s):

Spill No.	Date	Ter	Region	Location	Site Description	Commodity	Quantity	Source	Agency
2000151	2000-05-15	NU	KEE	Arviat	Airport Road Going Towards Town	ATF	20 L	TRU	GN
2008146	2008-04-18	NU	KEE	Arviat	Aiport Apron	Diesel Fuel	20 L	TRU	GN
2009392	2009-08-12	NU	KEE	Arviat	Inside Delivery Truck	Floor Sealant	1 L	TRU	GN
2011020	2011-02-03	NU	KEE	Arviat	House 729A, Arviat NU	Power Steering Fluid	15 L	TRU	GN
2013091	2013-03-19	NU	KEE	Arviat	Near the Arctic College	Hydraulic Fluid	60 L	TRU	GN
2013274	2013-08-02	NU	KEE	Arviat	Arviat	Hydraulic Oil	200 L	TRU	GN
2017192	2017-06-01	NU	KEE	Arviat	Arviat Health Centre Fuel Tank	Heating Fuel	100 L	TRU	GN
2017193	2017-06-01	NU	KEE	Arviat	John Amalukuaq High School Fuel Tank	Heating Fuel	100 L	TRU	GN

Total Spills on this Report: 8

This report contains information regarding spills that were reported to the NWT 24-Hour Spill Line. The absence of information on any particular location in no way guarantees that contamination has not occurred at that location.

LEGEND

Region: BAF - Baffin DEH - Deh Cho INU - Inuvik KEE - Keewatin KIT - Kitikmeot NSL - North Slave SAH - Sahtu SSL - South Slave	Source: AIR - Aircraft DRUM - Drum or Barrel MV - Marine Vessel NS - Natural Seepage OTH - Other Transportation PL - Pipe or Line RT - Rail Train SL - Sewage Lagoon ST< - Storage Tank <4000 litres ST> - Storage Tank >4000 litres TP - Tailings Pond TRU - Truck UK - Unknown WELL - Wet Wells, Flaring Boom	Agency: CCG - Canadian Coast Guard EP - Environment Canada GN - Government of Nunavut GNWT - Government of Northwest Territories ILA - Inuvialuit Land Administration INAC - Indian and Northern Affairs Canada NEB - National Energy Board
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Designation	Permitted Uses	Conditional Uses	Setbacks (Minimum)	Maximum Height	Other Provisions	Zoning	
Residential	Dwelling, Single Detached Unit Dwelling, Semi-Detached or Duplex Dwelling, Rowhouse Park Accessory building, structure or use, subject to Section 5.1	Net and Brushed Craft Studio Day Care Centre Dwelling, Multi-Unit Dwelling, Multi-Storey Residential Care Facility Home Occupation Secondary Suite Utility Installation	Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Rear, backing onto an OS Zone = 2.5 metres (8 feet) Side (Exterior) = 4 metres (13 feet) Side (Interior) = 6 metres, (20 feet), or as required by the Fire Marshal	8.5 metres (28 feet)	Despite the provisions of Section 6.3(a), for semi-detached dwellings or rowhouse dwellings located on corner, adjacent lots, the side yard where units are attached may be reduced to zero. Parking or storage of a commercial vehicle having a gross vehicle weight of 4,500 kg or construction equipment, including bulldozers, graders, backhoes, and other vehicles is not permitted. The following provisions will apply to Secondary Suites: <ul style="list-style-type: none">The suite forms part of a single unit or semi-detached dwelling;The suite is structurally attached to or located within the principal dwelling;AndThe suite does not exceed a floor area of 20% of the principal dwelling, or 60 m² of gross floor area, whichever is less.	R	
Community Use	Community Hall or Centre Day Care Facility Educational Facility Emergency and Protective Services Government Office Group Home Health Care Facility Place of Assembly Place of Worship Post Office Recreation Facility Residential Care Facility Any accessory building, utility, structure or use, subject to Section 5.1	Community Communications Facility Community Festival Utility Installations	Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 6 metres (20 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	10.7 metres (35 feet)	A covered or screened area for garbage and trade waste is required.	CU	
Community Care	Adult Daycare Child Daycare Counselling Service Elder Care Family Violence Support Food Bank Housing Support Job Training Mental Health Services Nursing Home Palliative Care Senior Center Social Services Substance Abuse Treatment Youth Shelter	Mental Health Services Child Daycare (not for-profit) Non-hospitalized long-term residential care facility Long-term residential care facility	Floor = 9 metres (30 feet) Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 4 metres (13 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	13 metres (43 feet)	No covered or screened areas for garbage and trade waste is required, nor a disposal storage is permitted.	CC	
Commercial	Automotive Gas Bar Breakfast Stand Business Services Car Wash Commercial Recreation Convenience Store Craft Studio Custom Workshop Dry Cleaning Hotel	Medical Facility Office Parking lot Personal Service Establishment Restaurant Retail Store Service shop Shoe Shine Tobacco Shop Tutoring Vending Machine Washroom	Dwelling unit(s) in a non-residential building provided that the dwelling unit(s) are above the ground floor Home Occupation Utility Installation	Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 6 metres (20 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	10.7 metres (35 feet)	A covered or screened area for garbage and trade waste is required.	C
Open Space	Beach Shack Bait Storage Boat Mountain, camp, or estate Park/playground Shed to store equipment for traditional, cultural, and recreational activities taking place in the Open Space Snow Fence Sports field Temporary Outdoor Storage of wealth equipment during school Washroom facility	Communications Facility Dog Trench	Floor = 10 metres (33 feet) Front = 10 metres (33 feet) Rear = 10 metres (33 feet) Side (Interior) = 10 metres (33 feet), or as required by the Fire Marshal	3.1 metres (10 feet)	The maximum gross floor area is 25 sq. m.	OS	
Light Industrial	Accessory Gas Bar Automotive Repair, Sales and/or Parts Business Services Car Wash Commercial Recreation Convenience Store Craft Studio Custom Workshop Dry Cleaning Hotel	Automotive Garage Business and Development Centre Business and Retail Store Car Wash Commercial Recreation Convenience Store Craft Studio Custom Workshop Dry Cleaning Hotel	Storage staging and landing site with associated supporting infrastructure Outdoor Storage Processing and Transfer Facility (Non-Foodstuff)	Floor = 6 metres (20 feet) Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 6 metres (20 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	13 metres (43 feet)	Only one operation unit is permitted on a lot. Where an interior or rear yard abuts a Residential, Community Use, Community CU, Commercial or Open Space Zone, the minimum yard requirement shall be a minimum of 10 m. Outdoor storage shall not be permitted within any minimum front or side yard. Outdoor storage shall be located no less than any public street or walking trail through the use of appropriate visual screening.	M1
Heavy Industrial	Commercial Land Use Fuel Distribution Facility Heavy Equipment and Vehicle Trade Manufacturing Plant Outdoor Storage Vehicle Processing and Transfer Facility Any accessory building, structure or use, subject to Section 5.1	Commercial Land Use Fuel Distribution Facility Heavy Equipment and Vehicle Trade Manufacturing Plant Outdoor Storage Vehicle Processing and Transfer Facility Any accessory building, structure or use, subject to Section 5.1	Floor = 6 metres (20 feet) Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 6 metres (20 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	13 metres (43 feet)	Only one operation unit is permitted on a lot. Where an interior or rear yard abuts a Residential, Community Use, Community CU, Commercial or Open Space Zone, the minimum yard requirement shall be 12 m.	M2	
Transportation	Airport Commercial uses related to aircraft services and travel Communications Facility Docking, loading and off-loading of ships Fuel Storage Facility	Airport Communications Facility Docking, loading and off-loading of ships Fuel Storage Facility	Floor = 6 metres (20 feet) Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 6 metres (20 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	13 metres (43 feet)	Any development within the Transportation Influence Zone as indicated on the General Land Use Map shall be subject to the approval of both City Councils. No development shall occur within 150 metres (+/- 492 feet) of the Non-Directional Beacon Site.	T	
Horticultural	Dog Trench Temporary Tenting or Camping	Beach Shack Bait Storage Boat Mountain, camp, or estate Park/playground Shed to store equipment for traditional, cultural, and recreational activities taking place in the Open Space Snow Fence Sports field Temporary Outdoor Storage of wealth equipment during school Washroom facility	Floor = 6 metres (20 feet) Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 6 metres (20 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	13 metres (43 feet)	Any development within the Transportation Influence Zone as indicated on the Land Use Map shall be subject to the approval of both City Councils. No development is permitted within 200 metres (656 feet) of a wind turbine. No development is permitted within 100 metres (328 feet) of an Archaeological or Paleontological Site.	H	
Waste Disposal	Waste Disposal Site Sewage Disposal Site	Waste Disposal Site Sewage Disposal Site	Floor = 6 metres (20 feet) Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 6 metres (20 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	13 metres (43 feet)	No residential development or commercial development involving food storage, handling or preparation shall be permitted within 400 metres (1476 feet) of a Waste Disposal Site.	WD	
Municipal Reserve	The Municipal Reserve Zone identifies lands that may be interesting for future redevelopment. No development is permitted in the MR Zone unless of temporary nature, subject to Council approval.	The Municipal Reserve Zone identifies lands that may be interesting for future redevelopment. No development is permitted in the MR Zone unless of temporary nature, subject to Council approval.	Floor = 6 metres (20 feet) Front = 6 metres (20 feet) Rear = 6 metres (20 feet) Side (Interior) = 6 metres (20 feet) Side (Exterior) = 6 metres (20 feet), or as required by the Fire Marshal	13 metres (43 feet)	No development shall be permitted for housing on lands zoned MR in the area of the Municipal Reserve. Any new development in the MR zone must be first reviewed and approved by the City Council. The City Council will also be responsible for ensuring the satisfaction of the health impacts. We will need prior to issuing the subject lands to permit development. No development shall be permitted for housing within the 450 m radius of the Municipal Reserve. Any new development in the MR zone must be first reviewed and approved by the City Council. The City Council will also be responsible for ensuring the satisfaction of the health impacts. We will need prior to issuing the subject lands to permit development. No development shall be permitted within the 400 m "Protective Development"	MR	



DATABASE REPORT

Project Property: *Arviat Tank Farm Phase I Environmental
Site Assessment
600 12 Ave
Arviat NU X0C0E0
407048-13730*

Project No: *20171008003*

Report Type: *Standard Report NT,NU*

Order No: *20171008003*

Requested by: *WorleyParsons Canada*

Date Completed: *October 12, 2017*

**Environmental Risk
Information Services**
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www.erisinfo.com

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Reliance on information in Report: This report DOES NOT replace a full Phase I Environmental Site Assessment but is solely intended to be used as a database review of environmental records.

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Executive Summary

Property Information:

Project Property: *Arviat Tank Farm Phase I Environmental Site Assessment
600 12 Ave Arviat NU X0C0E0*

Project No: *407048-13730*

Coordinates:

Latitude: *61.102714*
Longitude: *-94.066432*
UTM Northing: *6,774,696.65*
UTM Easting: *442,509.25*
UTM Zone: *UTM Zone 15V*

Elevation: *13 FT
4.00 M*

Order Information:

Order No: *20171008003*
Date Requested: *October 8, 2017*
Requested by: *WorleyParsons Canada*
Report Type: *Standard Report NT,NU*

Historical/Products:

Land Title Search *Title Search*

Executive Summary: Report Summary

<i>Database</i>	<i>Name</i>	<i>Searched</i>	<i>Project Property</i>	<i>Within 0.25 km</i>	<i>Total</i>
AUWR	<i>Automobile Wrecking & Supplies</i>	Y	0	0	0
CFST	<i>Crown Land Fuel Storage Tanks</i>	Y	0	0	0
CNG	<i>Compressed Natural Gas Stations</i>	Y	0	0	0
EHS	<i>ERIS Historical Searches</i>	Y	0	0	0
FCON	<i>Federal Convictions</i>	Y	0	0	0
FCS	<i>Contaminated Sites on Federal Land</i>	Y	0	0	0
GHG	<i>Greenhouse Gas Emissions from Large Facilities</i>	Y	0	0	0
IAFT	<i>Indian & Northern Affairs Fuel Tanks</i>	Y	0	0	0
MINE	<i>Canadian Mine Locations</i>	Y	0	0	0
MNR	<i>Mineral Occurrences</i>	Y	0	0	0
NATE	<i>National Analysis of Trends in Emergencies System (NATES)</i>	Y	0	0	0
NDSP	<i>National Defense & Canadian Forces Spills</i>	Y	0	0	0
NDWD	<i>National Defence & Canadian Forces Waste Disposal Sites</i>	Y	0	0	0
NEBI	<i>National Energy Board Pipeline Incidents</i>	Y	0	0	0
NEBW	<i>National Energy Board Wells</i>	Y	0	0	0
NEES	<i>National Environmental Emergencies System (NEES)</i>	Y	0	0	0
NPCB	<i>National PCB Inventory</i>	Y	0	0	0
NPRI	<i>National Pollutant Release Inventory</i>	Y	0	0	0
OGW	<i>Oil and Gas Wells</i>	Y	0	0	0
RST	<i>Retail Fuel Storage Tanks</i>	Y	0	0	0
SCT	<i>Scott's Manufacturing Directory</i>	Y	0	0	0
SPL	<i>Spills</i>	Y	0	0	0
Total:			0	0	0

Executive Summary: Site Report Summary - Project Property

<i>Map Key</i>	<i>DB</i>	<i>Company/Site Name</i>	<i>Address</i>	<i>Dir/Dist (m)</i>	<i>Elev diff (m)</i>	<i>Page Number</i>
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No records found in the selected databases for the project property.

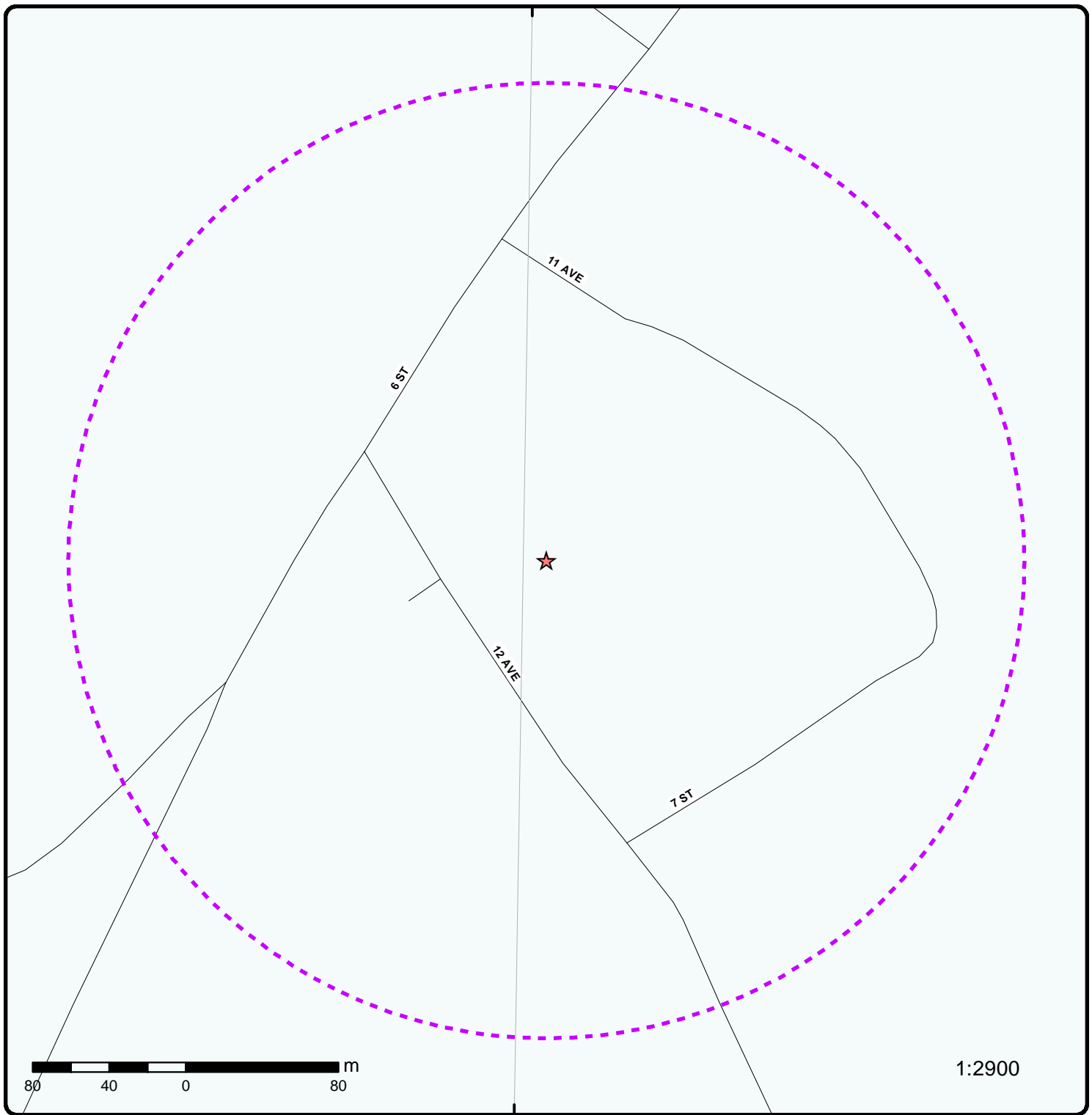
Executive Summary: Site Report Summary - Surrounding Properties

<i>Map Key</i>	<i>DB</i>	<i>Company/Site Name</i>	<i>Address</i>	<i>Dir/Dist (m)</i>	<i>Elev Diff (m)</i>	<i>Page Number</i>
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No records found in the selected databases for the surrounding properties.

Executive Summary: Summary By Data Source

No records found in the selected databases for the project property or surrounding properties.



★ Project Property	Expressway	Industrial and Resource - Regions	National Park
Buffer Outline	Principal Highway	Main Line	Provincial or Territorial Park
△ Eris Sites with Higher Elevation	Secondary Highway	Sidetrack	Other Park
□ Eris Sites with Same Elevation	Major Road	Transit Line	Golf Course or Driving Range
▽ Eris Sites with Lower Elevation	Local road	Abandoned Line	Park or Sports Field
○ Eris Sites with Unknown Elevation	Trail		Other Recreation Area
	Proposed Road		
	Ferry Route/Ice Road		

94°4'30"W

94°3'W

N 9° 19'

N 61° 6'



250 125 0 250 m

1:10000

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Aerial

Address: 600 12 Ave, Arviat, NU, X0C0E0

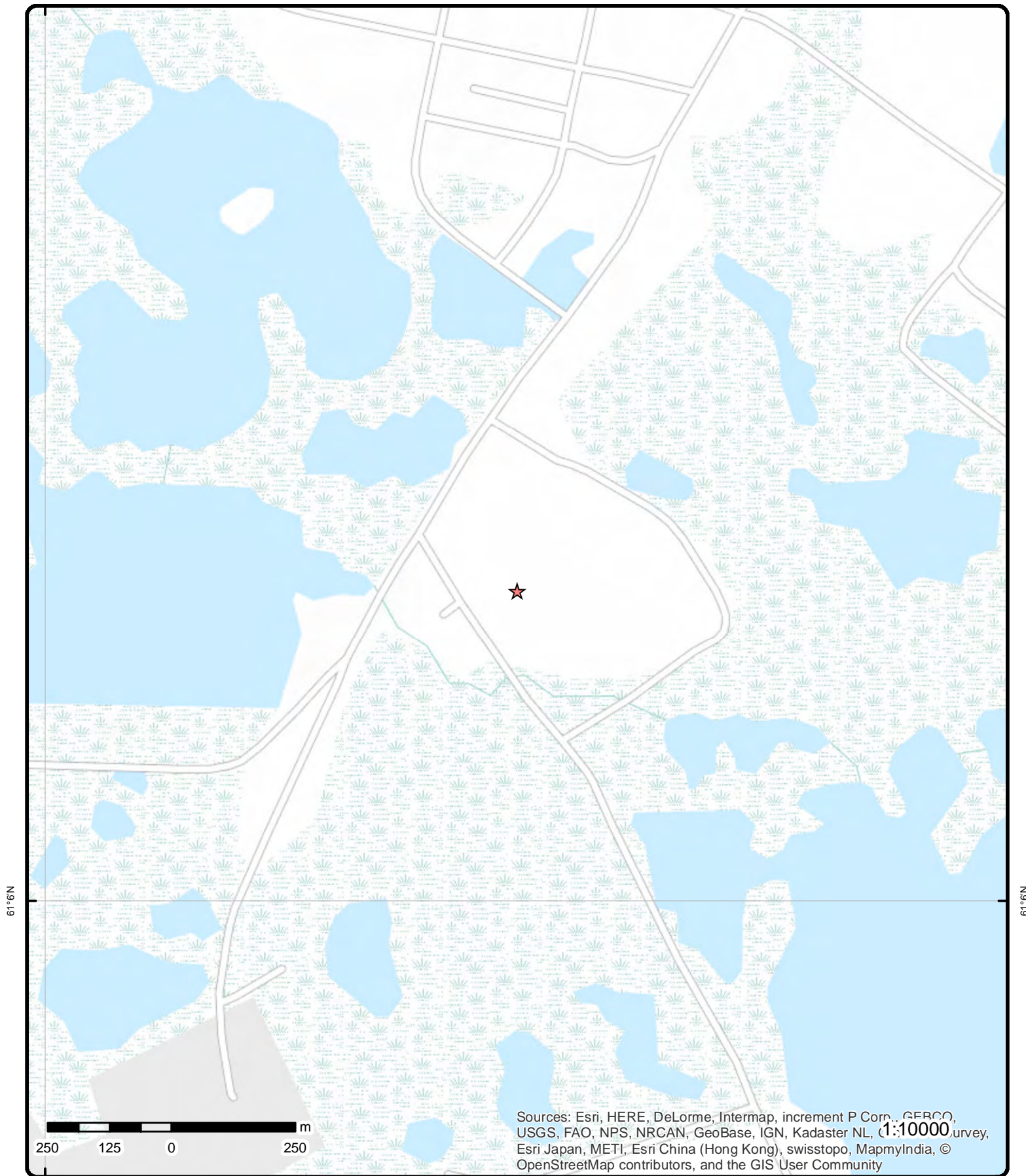
Source: ESRI World Imagery

Order No: 20171008003

ERIS
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Topographic Map

Address: 600 12 Ave, Arviat, NU, X0C0E0

Source: ESRI World Topographic Map

Order No: 20171008003



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Detail Report

<i>Map Key</i>	<i>Number of Records</i>	<i>Direction/ Distance (m)</i>	<i>Elevation (m)</i>	<i>Site</i>	<i>DB</i>
----------------	------------------------------	------------------------------------	--------------------------	-------------	-----------

No records found in the selected databases for the project property or surrounding properties.

Unplottable Summary

Total: 66 Unplottable sites

DB	Company Name/Site Name	Address	City	Postal
NATE	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NATE	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NATE	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NATE	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NATE	ARVIAT GAS STATION		ARVIAT NU	
NATE	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NATE	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NEES	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NEES	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NEES	ARVIAT GAS STATION		ARVIAT NU	
NEES	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NEES	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NEES	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
NEES	HAMLET OF ARVIAT		HAMLET OF ARVIAT NU	
SPL		Tank Farm	Arviat NU	
SPL		Tank Farm	Arviat NU	
SPL		Naujaat Tank Farm	- NU	
SPL		Near Intersection of Airport Road & North Part of Tank Farm	Arviat NU	
SPL		NWTPC Tank Farm	Arviat NU	

SPL	POL Tank Farm	Arviat NU
SPL	Tank Farm	Arviat NU
SPL	Tank Farm	Arviat NU
SPL	Gas Station/Tank Farm	Arviat NU
SPL	Tank Farm	Arviat NU
SPL	NWTPC Tank Farm	Arviat NU
SPL	Tank Farm	Arviat NU
SPL	Tank Farm	Arviat NU
SPL	Tank Farm In Town	Arviat NU
SPL	Arviat Health Centre Fuel Tank	Arviat NU
SPL	Arviat	Arviat NU
SPL	Arviat Paolei Hotel	Arviat NU
SPL	QEC Arviat Power Plant	Arviat NU
SPL	Arviat, 404 A 5th Street	Arviat NU
SPL	QEC Arviat Power Plant Site Yard	Arviat NU
SPL	Arviat High School	Arviat NU
SPL	Arviat	Arviat NU
SPL	Arviat	Arviat NU
SPL	Arviat, 5-Plex, Unit 380E on Lot 664E	Arviat NU
SPL	Arviat, RCMP shed on lot 590 G	Arviat NU
SPL	Arviat, QEC power plant area	Arviat NU
SPL	Arviat, 801, 1st Ave	Arviat NU
SPL	Arviat	Arviat NU

SPL	Arviat. At 706-D 9th Avenue	Arviat NU
SPL	Unit 391C, Arviat NU	Arviat NU
SPL	Arviat Fire Hall	Arviat NU
SPL	Arviat Elementary School	Arviat NU
SPL	Arviat, 716th Avenue (old house 393)	Arviat NU
SPL	Arviat, house of Sam Alagalak	Arviat NU
SPL	Arviat	Arviat NU
SPL	4 Miles East of Arviat (Ice Flow on Hudson Bay)	Arviat NU
SPL	Arviat, House 736	Arviat NU
SPL	Arviat Housing Association Office/Garage Building	Arviat NU
SPL	Arviat	- NU
SPL	House 729A, Arviat NU	Arviat NU
SPL	Arviat Lot 491	Arviat NU
SPL	Arviat RCMP Detachment	Arviat NU
SPL	Arviat Hamlet Staff House on Lot 412	Arviat NU
SPL	Arviat Hamlet Office Building Lot 98	Arviat NU
SPL	Arviat Lot 597	Arviat NU
SPL	Lot SK138, Hamlet 5-Bay Parking Garage, Arviat	Arviat NU
SPL	Arviat	Arviat NU
SPL	Lot 655 (SK234), Building 234, Arviat	Arviat NU
SPL	Lot 644 Arviat, Nunavut	Arviat NU
SPL	Arviat	Arviat NU
SPL	Arviat	Arviat NU
SPL	Gennill River, 60 Miles South of Arviat	- NU

Unplottable Report

Site: HAMLET OF ARVIAT
HAMLET OF ARVIAT NU

Database:
NATE

File No.: 4463-5
Reported By: Environment Canada
Material Reaction:: N
Spill Date: 910612
Lead Agency: Province
Basin:: Western Hudson Bay Drainage
Air:: N
DOE on Scene: N
Land:: Y
Fresh Water:: N
Ground Water:: N
Salt Water:: N
Other Environment:: N
Waterbody::
Cause:: Other
Reason:: Intent
Source:: Other Storage Facilities
Sector:: Government
Ship No.:
Ship Name:
Clean Up By:: polluter
Disposal Method:: other
Recovery %: 100.00
Act Invoked:: None
Enforcement Resp::
Fish Kill:: N
Oiled Birds:: N
Other Kill:: N
Vegetation Damage:: N
Property Damage:: N
Drinking Water:: N
Income Loss:: N
Other Consequences:: N
No. of Injuries:: 0
No. of Evacuations:: 0
Fine::
No. of Dead:: 0
Cleanup Cost::
Material: waste oil nos
Amount (ton):: 0.30
Volume (L):: 315
Concentration::
Phase::
Additional Info:: CARELESS STORAGE OF WASTE MATERIALS

Site: HAMLET OF ARVIAT
HAMLET OF ARVIAT NU

Database:
NATE

File No.: 4463-5
Reported By: Environment Canada
Material Reaction:: N
Spill Date: 910108
Lead Agency: Province
Basin:: Western Hudson Bay Drainage
Air:: N
DOE on Scene: N

Land:: Y
Fresh Water:: N
Ground Water:: N
Salt Water:: N
Other Environment:: N
Waterbody::
Cause:: Pipe Leak
Reason:: Damage by Equipment
Source:: Pipeline
Sector:: Government
Ship No.::
Ship Name::
Clean Up By:: polluter
Disposal Method:: landfill
Recovery %:: 100.00
Act Invoked:: None
Enforcement Resp::
Fish Kill:: N
Oiled Birds:: N
Other Kill:: N
Vegetation Damage:: N
Property Damage:: N
Drinking Water:: N
Income Loss:: N
Other Consequences:: N
No. of Injuries:: 0
No. of Evacuations:: 0
Fine::
No. of Dead:: 0
Cleanup Cost::
Material:: fuel oil no. 2
Amount (ton):: 1.00
Volume (L):: 1200
Concentration::
Phase::
Additional Info::

Site: HAMLET OF ARVIAT
 HAMLET OF ARVIAT NU

Database:
 NATE

File No.: 4463-5
Reported By: Environment Canada
Material Reaction:: N
Spill Date: 910517
Lead Agency: Province
Basin:: Western Hudson Bay Drainage
Air:: N
DOE on Scene: N
Land:: Y
Fresh Water:: N
Ground Water:: N
Salt Water:: N
Other Environment:: N
Waterbody::
Cause:: Pipe Leak
Reason:: Material Failure
Source:: Other Storage Facilities
Sector:: Government
Ship No.::
Ship Name::
Clean Up By:: polluter
Disposal Method:: landfill
Recovery %::
Act Invoked:: None
Enforcement Resp::
Fish Kill:: N
Oiled Birds:: N
Other Kill:: N

Vegetation Damage:: N
Property Damage:: N
Drinking Water:: N
Income Loss:: N
Other Consequences:: N
No. of Injuries:: 0
No. of Evacuations:: 0
Fine::
No. of Dead:: 0
Cleanup Cost::
Material:: fuel oil no. 2
Amount (ton):: 1.90
Volume (L):: 2250
Concentration::
Phase::
Additional Info:: LEAK IN PROGRESS FOR A MONTH

Site: HAMLET OF ARVIAT
 HAMLET OF ARVIAT NU

Database:
 NATE

File No.: 4463-5
Reported By: Environment Canada
Material Reaction:: N
Spill Date: 910612
Lead Agency: Province
Basin:: Western Hudson Bay Drainage
Air:: N
DOE on Scene: N
Land:: Y
Fresh Water:: N
Ground Water:: N
Salt Water:: N
Other Environment:: N
Waterbody::
Cause:: Other
Reason:: Intent
Source:: Other Storage Facilities
Sector:: Government
Ship No.:
Ship Name:
Clean Up By:: polluter
Disposal Method:: other
Recovery %:: 100.00
Act Invoked:: None
Enforcement Resp::
Fish Kill:: N
Oiled Birds:: N
Other Kill:: N
Vegetation Damage:: N
Property Damage:: N
Drinking Water:: N
Income Loss:: N
Other Consequences:: N
No. of Injuries:: 0
No. of Evacuations:: 0
Fine::
No. of Dead:: 0
Cleanup Cost::
Material:: fuel oil no. 2
Amount (ton):: 0.90
Volume (L):: 1102.5
Concentration::
Phase::
Additional Info:: CARELESS STORAGE OF WASTE MATERIALS

Site: ARVIAT GAS STATION

Database:
 NATE

ARVIAT NU

File No.: 44635A
Reported By: Other
Material Reaction:: N
Spill Date: 910415
Lead Agency: Polluter
Basin:: Western Hudson Bay Drainage
Air:: N
DOE on Scene: N
Land:: Y
Fresh Water:: N
Ground Water:: N
Salt Water:: N
Other Environment:: N
Waterbody::
Cause:: Discharge
Reason:: Damage by Equipment
Source:: Service Station
Sector:: Service Industry
Ship No.:
Ship Name::
Clean Up By::
Disposal Method:: temporary storage
Recovery %::
Act Invoked::
Enforcement Resp::
Fish Kill:: N
Oiled Birds:: N
Other Kill:: N
Vegetation Damage:: N
Property Damage:: N
Drinking Water:: N
Income Loss:: N
Other Consequences:: N
No. of Injuries:: 0
No. of Evacuations:: 0
Fine::
No. of Dead:: 0
Cleanup Cost::
Material:: gasoline
Amount (ton):: 0.36
Volume (L):: 450
Concentration::
Phase::
Additional Info:: SNOWBLOWER RAN OVER HOSE AT GAS STATION

Site: HAMLET OF ARVIAT
HAMLET OF ARVIAT NU

Database:
NATE

File No.: 4463-5
Reported By: Environment Canada
Material Reaction:: N
Spill Date: 910612
Lead Agency: Province
Basin:: Western Hudson Bay Drainage
Air:: N
DOE on Scene: N
Land:: Y
Fresh Water:: N
Ground Water:: N
Salt Water:: N
Other Environment:: N
Waterbody::
Cause:: Other
Reason:: Intent
Source:: Other Storage Facilities
Sector:: Government

Ship No.:
Ship Name:
Clean Up By:: polluter
Disposal Method:: other
Recovery %:: 100.00
Act Invoked:: None
Enforcement Resp::
Fish Kill:: N
Oiled Birds:: N
Other Kill:: N
Vegetation Damage:: N
Property Damage:: N
Drinking Water:: N
Income Loss:: N
Other Consequences:: N
No. of Injuries:: 0
No. of Evacuations:: 0
Fine::
No. of Dead:: 0
Cleanup Cost::
Material:: sulfuric acid
Amount (ton)::
Volume (L)::
Concentration::
Phase::
Additional Info:: CARELESS STORAGE OF WASTE MATERIALS

Site: HAMLET OF ARVIAT
 HAMLET OF ARVIAT NU

Database:
 NATE

File No.: 4463-5
Reported By: Environment Canada
Material Reaction:: N
Spill Date: 910612
Lead Agency: Province
Basin:: Western Hudson Bay Drainage
Air:: N
DOE on Scene: N
Land:: Y
Fresh Water:: N
Ground Water:: N
Salt Water:: N
Other Environment:: N
Waterbody::
Cause:: Other
Reason:: Intent
Source:: Other Storage Facilities
Sector:: Government
Ship No.:
Ship Name:
Clean Up By:: polluter
Disposal Method:: other
Recovery %:: 100.00
Act Invoked:: None
Enforcement Resp::
Fish Kill:: N
Oiled Birds:: N
Other Kill:: N
Vegetation Damage:: N
Property Damage:: N
Drinking Water:: N
Income Loss:: N
Other Consequences:: N
No. of Injuries:: 0
No. of Evacuations:: 0
Fine::
No. of Dead:: 0
Cleanup Cost::

Material:: varsol
Amount (ton)::
Volume (L)::
Concentration::
Phase::
Additional Info:: CARELESS STORAGE OF WASTE MATERIALS

Site: HAMLET OF ARVIAT
HAMLET OF ARVIAT NU

Database:
NEES

Incident Date: 6/12/91
Contaminant: waste oil nos
Amount:: 0.3
Units:: Tonnes (Metric)
Quantity::
Cause:: Other
Source:: Other Storage Facilities
Reason:: Intent
Sector:: Government

Site: HAMLET OF ARVIAT
HAMLET OF ARVIAT NU

Database:
NEES

Incident Date: 1/8/91
Contaminant: fuel oil no. 2
Amount:: 1
Units:: Tonnes (Metric)
Quantity::
Cause:: Pipe Leak
Source:: Pipeline
Reason:: Damage by Equipment
Sector:: Government

Site: ARVIAT GAS STATION
ARVIAT NU

Database:
NEES

Incident Date: 4/15/91
Contaminant: gasoline
Amount:: 0.36
Units:: Tonnes (Metric)
Quantity::
Cause:: Discharge
Source:: Service Station
Reason:: Damage by Equipment
Sector:: Service Industry

Site: HAMLET OF ARVIAT
HAMLET OF ARVIAT NU

Database:
NEES

Incident Date: 5/17/91
Contaminant: fuel oil no. 2
Amount:: 1.9
Units:: Tonnes (Metric)
Quantity::
Cause:: Pipe Leak
Source:: Other Storage Facilities
Reason:: Material Failure
Sector:: Government

Site: HAMLET OF ARVIAT
HAMLET OF ARVIAT NU

Database:
NEES

Incident Date: 6/12/91
Contaminant: fuel oil no. 2
Amount:: 0.9
Units:: Tonnes (Metric)
Quantity::
Cause:: Other
Source:: Other Storage Facilities
Reason:: Intent
Sector:: Government

Site: **HAMLET OF ARVIAT**
HAMLET OF ARVIAT NU

Database:
NEES

Incident Date: 6/12/91
Contaminant: sulfuric acid
Amount::
Units::
Quantity::
Cause:: Other
Source:: Other Storage Facilities
Reason:: Intent
Sector:: Government

Site: **HAMLET OF ARVIAT**
HAMLET OF ARVIAT NU

Database:
NEES

Incident Date: 6/12/91
Contaminant: varsol
Amount::
Units::
Quantity::
Cause:: Other
Source:: Other Storage Facilities
Reason:: Intent
Sector:: Government

Site:
Tank Farm Arviat NU

Database:
SPL

Spill No:	1975051	Source:	Storage Tank >4000 litres
Spill Date:	1975-02-24	Agency:	
Commodity:	Fuel Oil	Location:	Arviat
Quantity(L/KG):	22730 L	Region:	Keewatin
Description:	Tank Farm		

Site:
Tank Farm Arviat NU

Database:
SPL

Spill No:	1974038	Source:	Storage Tank >4000 litres
Spill Date:	1974-01-01	Agency:	
Commodity:	Fuel Oil	Location:	Arviat
Quantity(L/KG):	0 L	Region:	Keewatin
Description:	Tank Farm		

Site:
Naujaat Tank Farm - NU

Database:
SPL

Spill No:	2015490	Source:	Truck
Spill Date:	2015-12-03	Agency:	National Energy Board
Commodity:	P-50	Location:	-
Quantity(L/KG):	50 L	Region:	Keewatin
Description:	Naujaat Tank Farm		

Site:	Near Intersection of Airport Road & North Part of Tank Farm	Arviat NU	Database: SPL
Spill No:	2002307	Source:	Drum or Barrel
Spill Date:	2002-05-08	Agency:	Government of Nunavut
Commodity:	Heating Oil	Location:	Arviat
Quantity(L/KG):	205 L	Region:	Keewatin
Description:	Near Intersection of Airport Road & North Part of Tank Farm		

Site:	NWTPC Tank Farm	Arviat NU	Database: SPL
Spill No:	1994177	Source:	Storage Tank >4000 litres
Spill Date:	1994-01-01	Agency:	Government of Northwest Territories
Commodity:	Diesel P-50	Location:	Arviat
Quantity(L/KG):	0 L	Region:	Keewatin
Description:	NWTPC Tank Farm		

Site:	POL Tank Farm	Arviat NU	Database: SPL
Spill No:	1994133	Source:	Storage Tank >4000 litres
Spill Date:	1994-01-01	Agency:	Government of Northwest Territories
Commodity:	Gasoline/Fuel	Location:	Arviat
Quantity(L/KG):	0 L	Region:	Keewatin
Description:	POL Tank Farm		

Site:	Tank Farm	Arviat NU	Database: SPL
Spill No:	1993015	Source:	Storage Tank >4000 litres
Spill Date:	1993-02-18	Agency:	Government of Northwest Territories
Commodity:	Heating Fuel P-50	Location:	Arviat
Quantity(L/KG):	400 L	Region:	Keewatin
Description:	Tank Farm		

Site:	Tank Farm	Arviat NU	Database: SPL
Spill No:	1991061	Source:	Pipe or Line
Spill Date:	1991-05-13	Agency:	Government of Northwest Territories
Commodity:	Fuel Oil	Location:	Arviat
Quantity(L/KG):	521 L	Region:	Keewatin
Description:	Tank Farm		

Site:	Gas Station/Tank Farm	Arviat NU	Database: SPL
Spill No:	1991041	Source:	Pipe or Line
Spill Date:	1991-04-15	Agency:	Government of Northwest Territories
Commodity:	Gasoline	Location:	Arviat
Quantity(L/KG):	454 L	Region:	Keewatin
Description:	Gas Station/Tank Farm		

Site:	Tank Farm	Arviat NU	Database: SPL
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Spill No: 1991002
Spill Date: 1991-01-08
Commodity: Fuel Oil P-50
Quantity(L/KG): 1200 L
Description: Tank Farm

Source: Pipe or Line
Agency: Government of Northwest Territories
Location: Arviat
Region: Keewatin

Site: NWTPC Tank Farm Arviat NU

Database:
[SPL](#)

Spill No: 1989116
Spill Date: 1989-08-03
Commodity: Diesel Fuel
Quantity(L/KG): 1000 L
Description: NWTPC Tank Farm

Source: Pipe or Line
Agency: Government of Northwest Territories
Location: Arviat
Region: Keewatin

Site: Tank Farm Arviat NU

Database:
[SPL](#)

Spill No: 1987069
Spill Date: 1987-07-17
Commodity: Diesel P-50
Quantity(L/KG): 91 L
Description: Tank Farm

Source: Storage Tank >4000 litres
Agency: Environmental Protection Service
Location: Arviat
Region: Keewatin

Site: Tank Farm Arviat NU

Database:
[SPL](#)

Spill No: 1987066
Spill Date: 1987-07-16
Commodity: Diesel Fuel
Quantity(L/KG): 8118 L
Description: Tank Farm

Source: Pipe or Line
Agency: Environmental Protection Service
Location: Arviat
Region: Keewatin

Site: Tank Farm In Town Arviat NU

Database:
[SPL](#)

Spill No: 1979053
Spill Date: 1979-10-23
Commodity: Diesel P-50
Quantity(L/KG): 4546 L
Description: Tank Farm In Town

Source: Storage Tank >4000 litres
Agency:
Location: Arviat
Region: Keewatin

Site: Arviat Health Centre Fuel Tank Arviat NU

Database:
[SPL](#)

Spill No: 2017192
Spill Date: 2017-06-01
Commodity: Heating Fuel
Quantity(L/KG): 100 L
Description: Arviat Health Centre Fuel Tank

Source: Truck
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: Arviat Arviat NU

Database:
[SPL](#)

Spill No: 2017229
Spill Date: 2017-06-29
Commodity: P50 Heating Fuel
Quantity(L/KG): 70 L
Description: Arviat

Source: Pipe or Line
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: <i>Arviat Paolei Hotel Arviat NU</i>		Database: <i>SPL</i>	
Spill No:	2017211	Source:	Storage Tank <4000 litres
Spill Date:	2017-06-16	Agency:	Government of Nunavut
Commodity:	Heating Fuel	Location:	Arviat
Quantity(L/KG):	0 L	Region:	Keewatin
Description:	Arviat Paolei Hotel		
Site: <i>QEC Arviat Power Plant Arviat NU</i>		Database: <i>SPL</i>	
Spill No:	2017177	Source:	Pipe or Line
Spill Date:	2017-05-26	Agency:	Government of Nunavut
Commodity:	P-50 Diesel	Location:	Arviat
Quantity(L/KG):	0 L	Region:	Keewatin
Description:	QEC Arviat Power Plant		
Site: <i>Arviat, 404 A 5th Street Arviat NU</i>		Database: <i>SPL</i>	
Spill No:	2016225	Source:	Drum or Barrel
Spill Date:	2016-06-17	Agency:	Government of Nunavut
Commodity:	Heating Fuel	Location:	Arviat
Quantity(L/KG):	200 L	Region:	Keewatin
Description:	Arviat, 404 A 5th Street		
Site: <i>QEC Arviat Power Plant Site Yard Arviat NU</i>		Database: <i>SPL</i>	
Spill No:	2014331	Source:	Drum or Barrel
Spill Date:	2014-09-16	Agency:	Government of Nunavut
Commodity:	Lube Oil	Location:	Arviat
Quantity(L/KG):	205 L	Region:	Keewatin
Description:	QEC Arviat Power Plant Site Yard		
Site: <i>Arviat High School Arviat NU</i>		Database: <i>SPL</i>	
Spill No:	2013183	Source:	Pipe or Line
Spill Date:	2013-06-03	Agency:	Government of Nunavut
Commodity:	Heating Fuel	Location:	Arviat
Quantity(L/KG):	300 L	Region:	Keewatin
Description:	Arviat High School		
Site: <i>Arviat Arviat NU</i>		Database: <i>SPL</i>	
Spill No:	2013274	Source:	Truck
Spill Date:	2013-08-02	Agency:	Government of Nunavut
Commodity:	Hydraulic Oil	Location:	Arviat
Quantity(L/KG):	200 L	Region:	Keewatin
Description:	Arviat		
Site: <i>Arviat Arviat NU</i>		Database: <i>SPL</i>	
Spill No:	2014200	Source:	Drum or Barrel
Spill Date:	2014-06-04	Agency:	Government of Nunavut
Commodity:	Jet-A-1	Location:	Arviat

Quantity(L/KG): 136 L
Description: Arviat

Region: Keewatin

Site: Arviat, 5-Plex, Unit 380E on Lot 664E Arviat NU **Database:** SPL

Spill No: 2011416
Spill Date: 2011-10-24
Commodity: Heating Fuel
Quantity(L/KG): 50 L
Description: Arviat, 5-Plex, Unit 380E on Lot 664E

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: Arviat, RCMP shed on lot 590 G Arviat NU **Database:** SPL

Spill No: 2011425
Spill Date: 2011-11-01
Commodity: Heating Fuel
Quantity(L/KG): 50 L
Description: Arviat, RCMP shed on lot 590 G

Source: Storage Tank <4000 litres
Agency: Environmental Protection Service
Location: Arviat
Region: Keewatin

Site: Arviat, QEC power plant area Arviat NU **Database:** SPL

Spill No: 2015062
Spill Date: 2015-02-23
Commodity: Propylene Glycol 50%
Quantity(L/KG): 1600 L
Description: Arviat, QEC power plant area

Source: Pipe or Line
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: Arviat, 801, 1st Ave Arviat NU **Database:** SPL

Spill No: 2015244
Spill Date: 2015-06-08
Commodity: Heating Fuel
Quantity(L/KG): 0 L
Description: Arviat, 801, 1st Ave

Source: Pipe or Line
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: Arviat Arviat NU **Database:** SPL

Spill No: 2012180
Spill Date: 2012-05-11
Commodity: P-50
Quantity(L/KG): 10 L
Description: Arviat

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: Arviat. At 706-D 9th Avenue Arviat NU **Database:** SPL

Spill No: 2014266
Spill Date: 2014-07-19
Commodity: Heating Fuel
Quantity(L/KG): 300 L
Description: Arviat. At 706-D 9th Avenue

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: Unit 391C, Arviat NU Arviat NU **Database:** SPL

Spill No:	2011434	Source:	Storage Tank <4000 litres
Spill Date:	2011-11-08	Agency:	Government of Nunavut
Commodity:	Heating Fuel Oil	Location:	Arviat
Quantity(L/KG):	38 L	Region:	Keewatin
Description:	Unit 391C, Arviat NU		

Site: *Arviat Fire Hall Arviat NU* **Database:** [SPL](#)

Spill No:	2011413	Source:	Storage Tank <4000 litres
Spill Date:	2011-10-20	Agency:	Government of Nunavut
Commodity:	Heating Fuel	Location:	Arviat
Quantity(L/KG):	70 L	Region:	Keewatin
Description:	Arviat Fire Hall		

Site: *Arviat Elementary School Arviat NU* **Database:** [SPL](#)

Spill No:	2015319	Source:	Pipe or Line
Spill Date:	2015-07-29	Agency:	Government of Nunavut
Commodity:	Heating fuel	Location:	Arviat
Quantity(L/KG):	100 L	Region:	Keewatin
Description:	Arviat Elementary School		

Site: *Arviat, 716th Avenue (old house 393) Arviat NU* **Database:** [SPL](#)

Spill No:	2014141	Source:	Storage Tank <4000 litres
Spill Date:	2014-05-06	Agency:	Government of Nunavut
Commodity:	Heating Fuel	Location:	Arviat
Quantity(L/KG):	730 L	Region:	Keewatin
Description:	Arviat, 716th Avenue (old house 393)		

Site: *Arviat, house of Sam Alagalak Arviat NU* **Database:** [SPL](#)

Spill No:	2012033	Source:	Pipe or Line
Spill Date:	2012-02-21	Agency:	Government of Nunavut
Commodity:	Raw Sewage	Location:	Arviat
Quantity(L/KG):	400 L	Region:	Keewatin
Description:	Arviat, house of Sam Alagalak		

Site: *Arviat Arviat NU* **Database:** [SPL](#)

Spill No:	2012263	Source:	Storage Tank <4000 litres
Spill Date:	2012-06-25	Agency:	Government of Nunavut
Commodity:	Fuel Oil	Location:	Arviat
Quantity(L/KG):	92 L	Region:	Keewatin
Description:	Arviat		

Site: *4 Miles East of Arviat (Ice Flow on Hudson Bay) Arviat NU* **Database:** [SPL](#)

Spill No:	2013005	Source:	Aircraft
Spill Date:	2013-01-10	Agency:	Indian and Northern Affairs Canada
Commodity:	Helicopter	Location:	Arviat
Quantity(L/KG):	0 L	Region:	Keewatin
Description:	4 Miles East of Arviat (Ice Flow on Hudson Bay)		

Site: *Arviat, House 736 Arviat NU* **Database:** [SPL](#)

Spill No: 2011219 **Source:** Storage Tank <4000 litres
Spill Date: 2011-06-13 **Agency:** Government of Nunavut
Commodity: Heating Fuel **Location:** Arviat
Quantity(L/KG): 50 L **Region:** Keewatin
Description: Arviat, House 736

Site: *Arviat Housing Association Office/Garage Building Arviat NU* **Database:** [SPL](#)

Spill No: 2011195 **Source:** Storage Tank <4000 litres
Spill Date: 2011-05-30 **Agency:** Government of Nunavut
Commodity: Heating Oil **Location:** Arviat
Quantity(L/KG): 200 L **Region:** Keewatin
Description: Arviat Housing Association Office/Garage Building

Site: *Arviat - NU* **Database:** [SPL](#)

Spill No: 2011148 **Source:** Storage Tank <4000 litres
Spill Date: 2011-05-11 **Agency:** Government of Nunavut
Commodity: Heating Fuel **Location:** -
Quantity(L/KG): 20 L **Region:** Keewatin
Description: Arviat

Site: *House 729A, Arviat NU Arviat NU* **Database:** [SPL](#)

Spill No: 2011020 **Source:** Truck
Spill Date: 2011-02-03 **Agency:** Government of Nunavut
Commodity: Power Steering Fluid **Location:** Arviat
Quantity(L/KG): 15 L **Region:** Keewatin
Description: House 729A, Arviat NU

Site: *Arviat Lot 491 Arviat NU* **Database:** [SPL](#)

Spill No: 2010319 **Source:** Storage Tank <4000 litres
Spill Date: 2010-07-29 **Agency:** Government of Nunavut
Commodity: Heating Diesel Fuel **Location:** Arviat
Quantity(L/KG): 0 L **Region:** Keewatin
Description: Arviat Lot 491

Site: *Arviat RCMP Detachment Arviat NU* **Database:** [SPL](#)

Spill No: 2010307 **Source:** Pipe or Line
Spill Date: 2010-07-20 **Agency:** Environmental Protection Service
Commodity: Heating Fuel **Location:** Arviat
Quantity(L/KG): 0 L **Region:** Keewatin
Description: Arviat RCMP Detachment

Site: *Arviat Hamlet Staff House on Lot 412 Arviat NU* **Database:** [SPL](#)

Spill No: 2010304
Spill Date: 2010-07-17
Commodity: Heating Diesel Fuel
Quantity(L/KG): 45 L
Description: Arviat Hamlet Staff House on Lot 412

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: **Arviat Hamlet Office Building Lot 98 Arviat NU**

Database:
SPL

Spill No: 2010302
Spill Date: 2010-07-16
Commodity: Heating Diesel Fuel
Quantity(L/KG): 0 L
Description: Arviat Hamlet Office Building Lot 98

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: **Arviat Lot 597 Arviat NU**

Database:
SPL

Spill No: 2010263
Spill Date: 2010-06-30
Commodity: Heating Diesel Fuel
Quantity(L/KG): 100 L
Description: Arviat Lot 597

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: **Lot SK138, Hamlet 5-Bay Parking Garage, Arviat Arviat NU**

Database:
SPL

Spill No: 2010250
Spill Date: 2010-06-23
Commodity: Heating Diesel Fuel
Quantity(L/KG): 25 L
Description: Lot SK138, Hamlet 5-Bay Parking Garage, Arviat

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: **Arviat Arviat NU**

Database:
SPL

Spill No: 2010247
Spill Date: 2010-06-21
Commodity: Heating Oil
Quantity(L/KG): 30 L
Description: Arviat

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: **Lot 655 (SK234), Building 234, Arviat Arviat NU**

Database:
SPL

Spill No: 2010237
Spill Date: 2010-06-15
Commodity: Heating Diesel Fuel
Quantity(L/KG): 1000 L
Description: Lot 655 (SK234), Building 234, Arviat

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

Site: **Lot 644 Arviat, Nunavut Arviat NU**

Database:
SPL

Spill No: 2010165
Spill Date: 2010-05-12
Commodity: Heating Diesel Fuel
Quantity(L/KG): 100 L
Description: Lot 644 Arviat, Nunavut

Source: Storage Tank <4000 litres
Agency: Government of Nunavut
Location: Arviat
Region: Keewatin

<u>Site:</u>	Arviat Arviat NU		Database: SPL
Spill No:	2010148	Source:	Storage Tank <4000 litres
Spill Date:	2010-05-04	Agency:	Government of Nunavut
Commodity:	Heating Diesel Fuel	Location:	Arviat
Quantity(L/KG):	750 L	Region:	Keewatin
Description:	Arviat		

<u>Site:</u>	Arviat Arviat NU		Database: SPL
Spill No:	1996003	Source:	Storage Tank <4000 litres
Spill Date:	1996-01-10	Agency:	Government of Northwest Territories
Commodity:	Diesel P-50	Location:	Arviat
Quantity(L/KG):	1136 L	Region:	Keewatin
Description:	Arviat		

<u>Site:</u>	Gennill River, 60 Miles South of Arviat - NU		Database: SPL
Spill No:	1990021	Source:	Storage Tank <4000 litres
Spill Date:	1990-02-20	Agency:	Indian and Northern Affairs Canada
Commodity:	Diesel Fuel	Location:	-
Quantity(L/KG):	23 L	Region:	Keewatin
Description:	Gennill River, 60 Miles South of Arviat		

Appendix: Database Descriptions

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

Automobile Wrecking & Supplies:

Private

[AUWR](#)

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

Government Publication Date: 1999-May 2017

Crown Land Fuel Storage Tanks:

Territorial

[CFST](#)

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

Government Publication Date: Oct 1997-Jun 2009

Compressed Natural Gas Stations:

Private

[CNG](#)

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

Government Publication Date: Dec 31, 2012

ERIS Historical Searches:

Private

[EHS](#)

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

Government Publication Date: 1999-Aug 2016

Federal Convictions:

Federal

[FCON](#)

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

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land:

Federal

[FCS](#)

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

Government Publication Date: Jun 2000-Mar 2017

Greenhouse Gas Emissions from Large Facilities:

Federal

[GHG](#)

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

Government Publication Date: 2013-Dec 2015

Indian & Northern Affairs Fuel Tanks:

Federal

[IAFT](#)

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

Government Publication Date: 1950-Aug 2003*

Canadian Mine Locations:

Private

MINE

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

Government Publication Date: 1998-2009*

Mineral Occurrences:

Territorial

MNR

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

Government Publication Date: 1900-Mar 2017

National Analysis of Trends in Emergencies System (NATES):

Federal

NATE

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

Government Publication Date: 1974-1994*

National Defense & Canadian Forces Spills:

Federal

NDSP

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

Government Publication Date: Mar 1999-Aug 2010

National Defence & Canadian Forces Waste Disposal Sites:

Federal

NDWD

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

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents:

Federal

NEBI

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

Government Publication Date: 2008 -Jun 2017

National Energy Board Wells:

Federal

NEBW

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

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES):

Federal

NEES

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

Government Publication Date: 1974-2003*

National PCB Inventory:

Federal

NPCB

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

Government Publication Date: 1988-2008*

National Pollutant Release Inventory:

Federal

NPRI

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

Government Publication Date: 1993-2014

Oil and Gas Wells:

Private

OGW

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

Government Publication Date: 1988-May 2017

Retail Fuel Storage Tanks:

Private

RST

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

Government Publication Date: 1999-May 2017

Scott's Manufacturing Directory:

Private

SCT

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

Government Publication Date: 1992-Mar 2011*

Spills:

Territorial

SPL

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

Government Publication Date: Jun 30, 2017

Definitions

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

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

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

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

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

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

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

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

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

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

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

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



CERTIFIED BY THE REGISTRAR OF LANDS IN ACCORDANCE WITH THE NUNAVUT LAND TITLES ACT.
CERTIFIÉE PAR LE REGISTRATEUR CONFORMÉMENT À LA LOI DU NUNAVUT DES TITRES DU BIENS-FONDS.

Title No. / *Certificat* N^o 62393

Fee Simple

PROPERTY DESCRIPTION / *BIENS-FONDS*

**LOT 711
PLAN 3589
ARVIAT**

TITLE DATE / *DATE DU CERTIFICAT* (YYYY-MM-DD)

2015-10-13

Title Type
Genre du titre: Fee Simple

Grant/Patent/Notification
Instrument(s): 136982

Concession de la Couronne:
Pursuant To Instrument(s): 136982
En vertu de:

Continues From Titles(s):
Titre(s) précédent(s):

Wholly Cancelling Instrument(s):
Instrument(s) d'annulation
entièrement(s):

Partially Cancelling Instrument(s):
Instrument(s) d'annulation
partiellement(s):

Wholly Cancels Titles(s):
Titre(s) annulé(s) entièrement(s):

Partially Cancels Titles(s):
Titre(s) annulé(s) partiellement(s):

This certificate certifies that **COMMISSIONER OF NUNAVUT** is (are) now the owner(s) of an estate in fee simple of and in the above-noted property.

Ce certificat atteste que **COMMISSIONER OF NUNAVUT** est (sont) actuellement le(s) propriétaire(s) d'un domaine en fief simple sur le(s) bien(s)-fonds susmentionné

Name: COMMISSIONER OF NUNAVUT
GOVERNMENT OF NUNAVUT DEPARTMENT OF COMMUNITY AND

Address: GOVERNMENT SERVICES PO BOX 490 RANKIN INLET, NUNAVUT X0C 0G0
CANADA

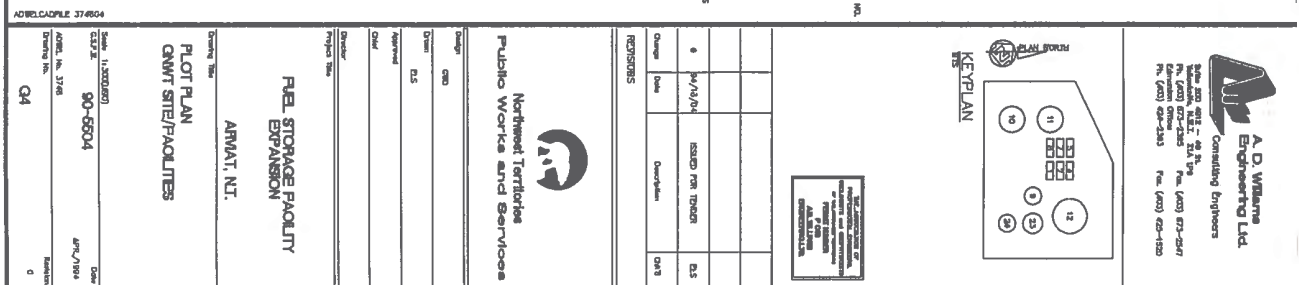
subject to the provisions of the *Land Titles Act*, the following encumbrances and interests:
sous réserve de la Loi sur les titres de biens-fonds, et des charges et intérêts suivants:

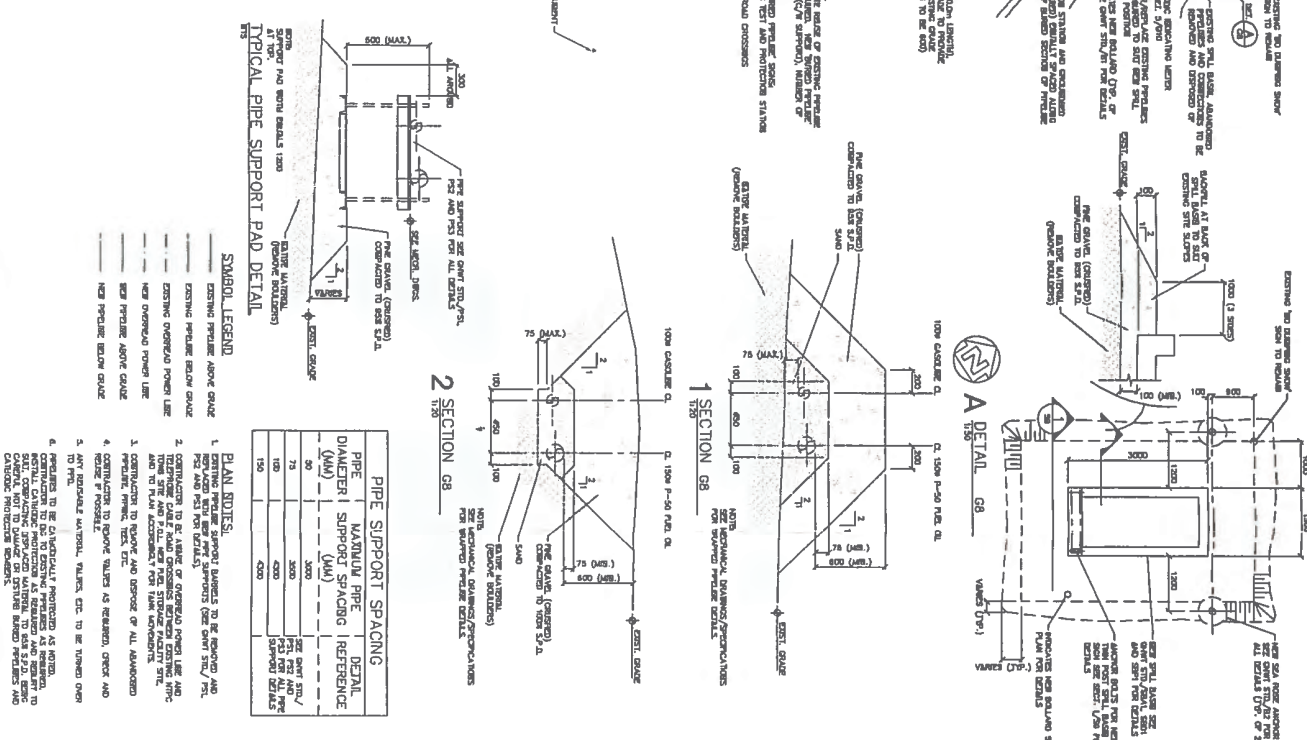
Encumbrances, Liens and Interests / *Charges, Priviléges et Intérêts*

Registration No. <i>Enregistrement</i>	Date Registered <i>Date</i> <i>d'enregistrement</i>	Nature <i>Genre</i>	Date Discharged <i>Date</i> <i>d'enregistrement</i>	Discharge Instrument No. <i>Enregistrement</i>
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Certificate created/*Certificat crée*: 2015-10-19 12:38 / Copyright © 2014 Government of Nunavut





[illegible]



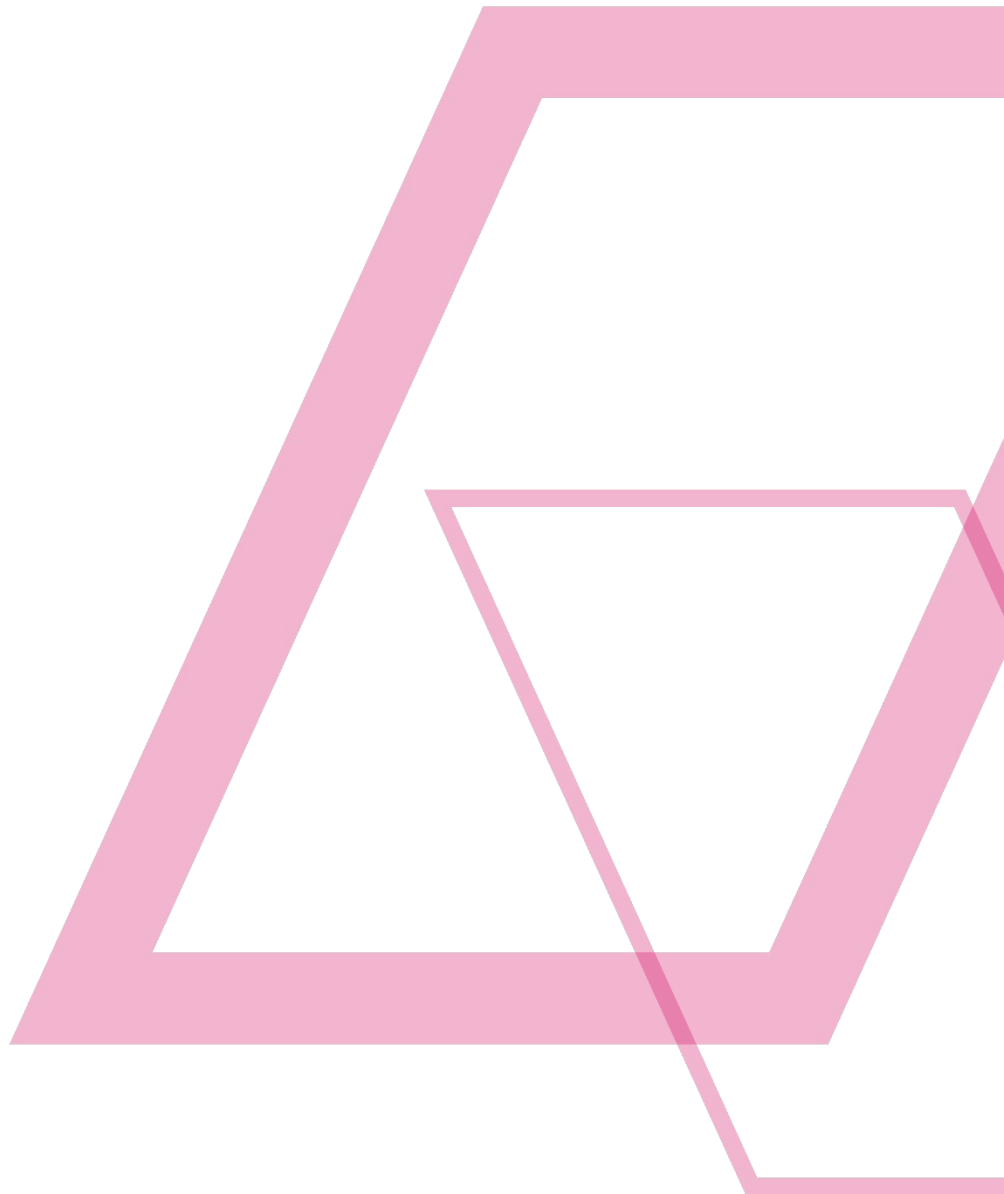
Advisian

WorleyParsons Group

Government of Nunavut
2017 Phase I Environmental Site Assessment
Arviat Tank Farm, Arviat, NU



Appendix 4 Aerial Photographs





Advisian

WorleyParsons Group

Client
Phase I Environmental Site
Assessment
Calgary, AB

Appendix D: Aerial Photographs





1975 AERIAL PHOTOGRAPH
ARVIAT TANK FARM PHASE I ENVIRONMENTAL SITE ASSESSMENT
600 12th Ave
Arviat, Nunavut X0C

PREPARED FOR: Government of Nunavut

SCALE: 1:6,000

DRAWN BY: Melissa Lord

DATE: 11/2/2017

PROJ. #: 307031-00048



Advisian
WorleyParsons Group

1980 AERIAL PHOTOGRAPH
ARVIAT TANK FARM PHASE I ENVIRONMENTAL SITE ASSESSMENT
600 12th Ave
Arviat, Nunavut X0C

PREPARED FOR: Government of Nunavut

SCALE: 1:20,000

DRAWN BY: Melissa Lord

DATE: 11/2/2017

PROJ. #: 307031-00048



Advisian
WorleyParsons Group

1984 AERIAL PHOTOGRAPH
ARVIAT TANK FARM PHASE I ENVIRONMENTAL SITE ASSESSMENT
600 12th Ave
Arviat, Nunavut X0C

PREPARED FOR: Government of Nunavut

SCALE: 1:5,000

DRAWN BY: Melissa Lord

DATE: 11/2/2017

PROJ. #: 307031-00048



Advisian
WorleyParsons Group

1992 AERIAL PHOTOGRAPH
ARVIAT TANK FARM PHASE I ENVIRONMENTAL SITE ASSESSMENT
600 12th Ave
Arviat, Nunavut X0C

PREPARED FOR: Government of Nunavut

SCALE: 1:15,000

DRAWN BY: Melissa Lord

DATE: 11/2/2017

PROJ. #: 307031-00048



Advisian
WorleyParsons Group

1995 AERIAL PHOTOGRAPH
ARVIAT TANK FARM PHASE I ENVIRONMENTAL SITE ASSESSMENT
600 12th Ave
Arviat, Nunavut X0C

PREPARED FOR: Government of Nunavut

SCALE: 1:12,000

DRAWN BY: Melissa Lord

DATE: 11/2/2017

PROJ. #: 307031-00048



Advisian
WorleyParsons Group

1998 AERIAL PHOTOGRAPH
ARVIAT TANK FARM PHASE I ENVIRONMENTAL SITE ASSESSMENT
600 12th Ave
Arviat, Nunavut X0C

PREPARED FOR: Government of Nunavut

SCALE: 1:10,000

DRAWN BY: Melissa Lord

DATE: 11/2/2017

PROJ. #: 307031-00048



Advisian
WorleyParsons Group

Government of Nunavut
2017 Phase I Environmental Site Assessment
Arviat Tank Farm, Arviat, NU



Appendix 5 Site Photographs





1 : Arviat tank farm and pipeline connected to Eskimo Point Lumber Supply tank farm.



2 : Aboveground gasoline and diesel tanks and pipelines at Arviat tank farm.



3 : Stored drums, pooling water and aboveground diesel tanks at Arviat tank farm.



4 : Aboveground pipelines and berm in Arviat tank farm.



5 : Connection between aboveground tank and pipeline at Arviat tank farm.



6 : Discoloration on tank and pooling surface water below horizontal emergency tanks.



7 : Exposed liner beneath the tank farm berm.



8 : Pooling water in area used to discharge standing water off site.



9 : Resupply pipelines entering tank farm.



10 : On site aviation gas in drums and equipment storage area.



11 : On site stored drums and sea cans.



12 : Connection between Arviat tank farm and Eskimo Point Lumber Supply tank farm.



13 : Resupply pipelines and adjacent land use.



14 : Surface water body in area where standing water is pumped off site and adjacent land use.



15 : Heavy equipment storage and aboveground pipeline connection.



16 : Gas station with two pump islands, dispenser building and operator shack.



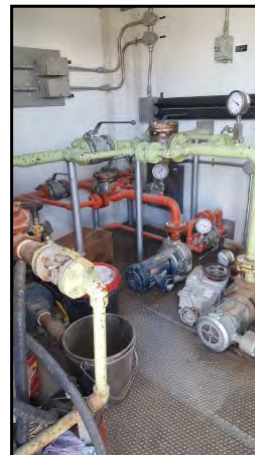
17 : Pump islands and light pole.



18 : Drums and heating oil tank at dispenser building.



19 : Dispenser building.



20 : Interior of dispenser building.



21 : Spill kits, stored drums and resupply hose.



22 : Aboveground pipeline connection to dispenser building.



23 : Depressions below pipeline connections behind dispenser building.



24 : Sheen observed on ice at gas station.



25 : Eskimo Point Lumber Supply tank farm and stored materials.



26 : Eskimo Point Lumber Supply maintenance shop, heavy equipment and drum storage.



27 : Warehouses and heavy equipment adjacent to site.



28 : Qulliq Energy Corp. facility.



29 : Pipeline connection between Qulliq Energy Corp. facility and resupply pipelines.



30 : Buried and aboveground section of resupply pipelines.



31 : Buried section of resupply pipelines.



32 : Uncovered section of buried resupply pipelines.



33 : Buried section of resupply pipelines and adjacent land use.



34 : Stored piping adjacent to resupply pipelines.



35 : Resupply manifold and pipelines.



36 : Resupply manifold, spill basin and pipelines.



37 : Resupply manifold and adjacent land use.



38 : Resupply barge and hose.