Implementation of the Remedial Action Plan and Additional Delineation – Year 5, Former U.S. Military Site, Hopedale, NL

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Executive Summary

Aivek Stantec Limited Partnership (Stantec) was retained by the Newfoundland and Labrador Department of Environment and Conservation (NLDEC) to monitor environmental site remediation, conduct confirmatory sampling and carry out additional delineation during Year 5 of the Implementation of the Remedial Action Plan (RAP) at the Former United States (U.S.) Military Site in Hopedale, Newfoundland and Labrador (NL) (the "Site") (see Drawing No. 121413099-200-EE-01 in Appendix A). The remediation program was carried out in response to a Remedial Action Plan/Risk Management Plan (RAP/RMP) prepared for the Site in 2010 (refer to Stantec Report No. 121410103, dated May 17, 2010).

In 2014, the Government of Newfoundland and Labrador committed funds to support ongoing remediation efforts in Hopedale for three (3) years. The following scope of work was proposed for Year 5 of the Implementation of the RAP:

1. Biopile Maintenance and Monitoring
   - Collect five (5) representative soil samples from the impacted material within the biopile and submit for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH), inorganics, available metals, microbiology and grain size to document baseline petroleum hydrocarbon concentrations and soil characteristics, and to determine requirements for soil augmentation;
   - Supervise the addition of fertilizer/nutrients to the biopile and biopile cover installation; and,
   - Perform biopile maintenance and monitoring, as required.
2. Remediation of Polychlorinated Biphenyl (PCB)-Impacted Soil
   - Supervise the remediation of PCB-impacted soil at the Main Base, in accordance with budget allowances;
   - Collect confirmatory soil samples from the final limits of the excavation(s) and submit for analysis of Total PCBs (rush turnaround time); and,
   - Once confirming results have been received, monitor the backfilling of the excavations with clean fill material (to be sourced from the Community of Hopedale) or site grading, as necessary.
3. Remediation of Metals-Impacted Soil
   - Monitor the remediation of metals-impacted soil at the BMEWS, Main Base and POL Compound sites, in accordance with budget allowances;
   - Collect confirmatory soil samples from the final limits of the excavation(s) and submit for analysis of available metals (rush turnaround time); and,
   - Once confirming results have been received, monitor the backfilling of the excavations with clean fill material (to be sourced from the Community of Hopedale) or site grading, as necessary.

4. Additional Delineation

   - Perform additional delineation of impacts in soil in areas where historical exceedances were found and the extent of impacts were not delineated at Main Base-Area 1, Old Base 1-Area 1, Old Base 1- Area 2, Pit No. 1–Area 1 and Pit No. 1–Area 2 for PCBs, POL Compound-Area 4 for metals and Pit No. 3-Area 1 for petroleum hydrocarbon by placing test pits with the aid of an excavator and/or collecting surface soil samples manually using shovels.
   - by collecting surface soil samples manually using a shovel.
   - Perform additional delineation of petroleum hydrocarbon impacts in soil in areas where historical exceedances were found and the extent of impacts were not delineated including by collecting surface soil samples manually using a shovel.

Stantec personnel were onsite during site remediation between August 19, 2015 and September 1, 2015. The loading of the impacted soil to the ship took place between September 14 and 16, 2015. Remedial activities were undertaken by Sanexen Environmental Services Inc. (Sanexen) of Brossard, Quebec (QC), who engaged Budgell's Equipment and Rentals (Budgell's) of Triton, NL and local hires. Stantec personnel maintained a record of activities while on-site and collected confirmatory soil samples.

The following is a summary of the results of the remedial and on-site activities carried out at the Site in Year 5.

The existing biopile was sampled following NLDEC's standard Certificate of Approval (COA) for soil treatment facilities. Concentrations of TPH in the composite soil samples exceeded 1,000 mg/kg; therefore, the soil required additional treatment before it could be disposed. Biopile maintenance activities, consisting of the addition of specified nutrients and mechanical aeration were carried out following the placement of TPH-impacted soil in the biopile containment cell. The treatability of the biopile was evaluated and the biopile treatment is anticipated to be effective given the observed baseline soil conditions, however several follow-up activities will be required to ensure successful completion, including: monitoring, addition of specified nutrients, irrigation and aeration.

A total of 749 tonnes of PCB-impacted soil was removed from the north and west areas of Main Base-Area 1 and was transported to Saint-Ambroise, QC by sea for PCB destruction. Confirmatory soil sampling was carried out along the limits of the remedial excavation to determine if the soil remaining on-site contained concentrations of PCBs below the residential site specific target level (SSTL) of 9 mg/kg. To meet the SSTL, additional soil removal is required to the north, centre and west of the Main Base-Area 1 excavations in the vicinity of samples 15-MB-BS103, 15-MB-BS104, 15-MB-BS111, 15-MB-BS112, 15-MB-BS114, 15-MB-BS115 and 15-MB-TP102-BS1. PCB-soil removal is also required in the vicinity of samples 22705 (referred to as "Main Base-Area 4"), 6546 (referred to as "Main Base-Area 5") and 13-POLW-BS10 (referred to as "POL West-Area 1") that have not yet been remediated. Sludge removal is required at the septic tank along the northern of the Main Base (referred to as "Main Base-Area 6").

- A total of 201.6 tonnes of metals-impacted soil was removed from impacted areas of the Site and was transported to Chicoutimi, QC for treatment. Confirmatory soil sampling was carried out along the limits of the remedial excavations to determine if soil remaining on-site contained concentrations of metals below the applicable SSTLs. Metals-impacted soil was removed from the following areas:
- BMEWS: 16 tonnes of metals-impacted soil was removed from the area surrounding sample BS1 (referred to as "BMEWS-Area 4") and from the area surrounding sample BS7 (referred to as "BMEWS-Area 5"). To meet the SSTLs, additional soil removal is required in the areas of samples 15-BMEWS-BS401 to 15-BMEWS-BS404, 15-BMEWS-BS501, 15-BMEWS-BS503 and 15-BMEWS-BS504.
- Main Base: 147 tonnes of metals-impacted soil was removed from the area surrounding samples TP-10, MB-TP2 and MB-TP3 (referred to as "Main Base-Area 2"). To meet the SSTLs, additional soil removal is required in the vicinity of samples 15-MB-BS201 to 15-MB-BS206.
- POL Compound: 18 tonnes of metals-impacted soil was removed from the area surrounding sample BS41 (referred to as "POL-Area 3") and from the area surrounding sample BS39 (referred to as "POL-Area 4"). To meet the SSTLs, additional soil removal is required in the vicinity of samples 15-POL-BS301 to 15-POL-BS303, 15-POL-BS401, 15-POL-BS402 and 15-POL-BS404.
- PCB analysis was conducted on three (3) sediment samples and three (3) surface water samples collected from the Swimming Pond and on five (5) soil samples collected from along the main access road to BMEWS and Main Base. PCBs were not detected in the samples collected from the Swimming Pond. Concentrations of PCBs in the soil samples collected from the road did not exceed the residential SSTL of 9 mg/kg.
- Additional delineation in soil was carried out at the areas known as Main Base-Area 1, Old Base 1-Area 1, Old Base 1-Area 2, Mid-Canada Line-Area 1, Pit No. 1–Area 1, Pit No. 1–Area 2, POL Compound-Area 4 and Pit No. 3-Area 1 where historical exceedances were found and the extent of impacts were not delineated. PCBs in samples 15-MB-BS114, 15-MB-BS115 and 15-MB-TP102-BS1 from Main Base-Area 1 and samples 15-P1-TP201-BS1, 15-P1-TP202-BS2 and 15-P1-TP202-BS3 from Pit No. 2-Area 2 exceeded the SSTL. Some metal parameters in samples 15-POL-BS405 to 15-POL-BS407 at POL Compound-Area 4, samples 15-MCL-BS101 to 15-MCL-BS104 and 15-MCL-BS204 at Mid-Canada Line Areas-1 and 2 and sample 15-OB1-BS101 at Old Base 1-Area 1 exceeded the SSTLs. TPH in samples 15-P3-TP101-BS1, 15-P3-TP102-BS1 and 15-P3-TP103-BS1 at Pit No. 3-Area 1 exceeded the ecological SSTL of 1,700 mg/kg.
- Metal debris removed from the PCB remedial excavation at Main Base (1.66 tonnes) was stockpiled on tarps at the Laydown Area at Pit No. 1. This metal was kept separate from the metal debris unearthed at the BMEWS site. Boulders were placed at the entrance to Pit No.1 to block public access over the winter months. PCBs were detected in the swabs collected from the five (5) pieces of metal that were randomly selected for sampling. The results indicate that PCBs are present on the metal surface or in the residual soil on the debris. The metal debris will be transported to an appropriate treatment or recycling facility at a later date (dependent on the results of additional sampling to be carried out following additional surface cleaning).
- As part of the 2010 Human Health and Ecological Risk Assessment (HHERA) and RAP (Stantec, 2010), certain areas with high concentrations of TPH and metals-impacted soil were

selected for remediation in an attempt to achieve area- and site-wide Exposure Point Concentrations (EPCs) that would be less than the applicable SSTLs. As a result, not all soil with concentrations of TPH and metals exceeding the SSTLs would necessarily be remediated. The final area- and site-wide EPCs can only be verified once the site has been fully remediated and confirmatory soil sample results are available to characterize the actual concentrations of chemicals of concern (COCs) remaining on site.

- As part of the current assessment, forecasted EPCs were generated using available confirmatory soil sampling results and predicted confirmatory soil sampling results (based on concentrations of COCs observed in nearby samples) to predict EPCs once areas designated in the 2010 HHERA and RAP have been remediated. A comparison of the historical versus forecasted EPCs indicates a substantial decrease in EPCs as a result of the multi-year remediation program (1 to 2 orders of magnitude); however, some EPCs are forecasted to remain above the SSTLs for the protection of ecological health. This may indicate the need for re-evaluation of the Ecological Risk Assessment with potential additional remediation. These EPCs include:

    - modified TPH - Areas 1 & 2
    - antimony - Area 3
    - cadmium - Areas 1 & 2, Whole Site
    - chromium - Areas 2 & 3, Whole Site
    - lead - Areas 2 & 3

Recommendations

Based on the results of the Year 5 of the Implementation of the RAP program, Stantec makes the following recommendations:

1. Complete the removal of TPH-impacted soil exceeding the ecological SSTL of 1,700 mg/kg in areas specified for remediation at BMEWS (estimated 240 tonnes), Main Base (estimated 530 tonnes) and Pit No. 3 (estimated 7,700 tonnes) as per Table 5.1. Once clean boundaries are obtained, return the site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.
2. Complete the removal of PCB-impacted soil exceeding the residential SSTL of 9 mg/kg at Main Base (estimated 636 tonnes), Old Base 1 (estimated 170 tonnes) and Pit No. 1 (estimated 420 tonnes) as per Table 5.1. Once clean boundaries are obtained, return the Site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.
3. Complete the removal of metals-impacted soil exceeding the ecological SSTLs of 1.3 mg/kg for cadmium, 20 mg/kg for chromium and 75 mg/kg for lead at the Mid-Canada Line (estimated 17 tonnes) as per Table 5.1. Once clean boundaries are obtained, return the Site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.
4. Remove excess soil from the metal debris removed from Main Base and re-sample. The metal debris is currently stockpiled on liners at the Laydown Area. If metal contains PCBs, treat as PCB-impacted waste and transport to an appropriate facility for treatment and disposal; otherwise, transport off-site to a metal recycling facility.
5. Transport un-impacted metal debris from BMEWS off-site to a metal recycling facility. The metal debris is currently stockpiled on liners at the Laydown Area.

6. Monitor concentrations of TPH in the biopile and perform maintenance activities, as necessary. Collect composite soil samples for the laboratory analysis of metals leachability to confirm disposal options.
7. Once site remediation is complete, re-evaluate area- and site-wide EPCs for comparison to the SSTLs.
8. Continue remediation efforts at the Former U.S. Military Site in accordance with the RAP/RMP and the recommendations provided by the Stakeholder Scientific Advisory Working Group.

The statements made in the Executive Summary are subject to the same limitations included in the Closure Section 7.0 and are to be read in conjunction with the remainder of this report.

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1.0 INTRODUCTION

Aivek Stantec Limited Partnership (Stantec) was retained by the Newfoundland and Labrador Department of Environment and Conservation (NLDEC) to monitor environmental site remediation, conduct confirmatory sampling and carry out additional delineation during Year 5 of the Implementation of the Remedial Action Plan (RAP) at the Former United States (U.S.) Military Site in Hopedale, Newfoundland and Labrador (NL) (the "Site") (see Drawing No. 121413099-200-EE-01 in Appendix A). The remediation program was carried out in response to a Remedial Action Plan/Risk Management Plan (RAP/RMP) prepared for the Site in 2010 (refer to Stantec Report No. 121410103, dated May 17, 2010).

The following report describes the work completed during Year 5 of the Implementation of the RAP field program and was prepared specifically and solely for the above project. It presents all of the factual findings and laboratory results of the field work completed at the Site between August and November 2015.

1.1 Site Description and History

The Inuit Community of Hopedale is located on the Labrador coast, 148 air miles to the north of Goose Bay, Labrador and has no outside road access. Coastal boat service is available to the community from mid-summer to late fall.

Construction of a military base and radar site in Hopedale, NL commenced in 1952 and was completed in 1957. The military base and radar site in Hopedale was a station on the United States Air Force (USAF) Pinetree Line and was also the most easterly site on the Mid-Canada Line of antennae stations which had extended across the country. The military base and radar site was one of a series of sites that functioned as a Ballistic Missile Early Warning System (BMEWS) where enemy aircraft penetrating the northeastern approaches to the continent were identified and information was communicated to the United States. It has been reported that, during peak operations, the Site housed up to 300 personnel.

In Hopedale, the Former U.S. Military Site consists of three (3) main hilltop installations located north of the community, with various support sites located along the gravel road that extends from the wharf up to the hilltop sites. The three (3) hilltop installations of the Former U.S. Military Site are elevated between 100 m and 150 m above sea level, and include (from west to east): the BMEWS area, the Main Base and the Mid-Canada Line antennae area.

The military base and radar site in Hopedale were operated from 1957 until 1969 by the United States government. The base was closed down in 1969 and the radome and radar antennae were removed. Portions of the remaining site were operated by Canadian Marconi as a telecommunications site until 1972 and by ITT as a telecommunications site until 1975. The complex was finally closed in 1975. Most of the remaining aboveground structures were demolished and buried in several undocumented locations throughout the Site in the mid-1980s. At that time, limited clean-up efforts were carried out and included the removal and disposal of polychlorinated biphenyl (PCB)-containing transformers. All that currently remains of the Former U.S. Military Site are the foundations and floor slabs of buildings and the foundations and bases of antennae. Two (2) antennae, with associated operations buildings and satellite dishes, are currently being operated by Bell Aliant in the BMEWS area. Four (4) antennae, with associated operations buildings and a helicopter pad, are currently being operated by Nav Canada in the Mid-Canada Line area.

The natural environment in Hopedale is typical of Labrador Coastal Barrens. Bedrock is granite and gneiss, and is largely exposed. Where present, soil cover on the hills is relatively thin (generally < 0.5 m), with accumulations of rock, gravel, sand and organic matter in low lying areas. Deeply incised U-shaped valleys occur in conjunction with steep-sided, rounded mountains and fjords that extend well inland. Large bogs can be found in the low-lying areas.

Drainage from the BMEWS area is in all directions (i.e., to the north, east, south and west), including to the south towards the community's main drinking water supply source, Reservoir Lake (approximately 300 m to the south). Drainage from the Main Base and Mid-Canada Line is in all directions, including to the south and southwest towards the Small Pond Bog, which empties into the stream that flows through the Residential Subdivision and empties into Hopedale Harbour.

During Year 5 of the Implementation of the RAP, remedial activities were carried out in three (3) areas of the Former U.S. Military Site: the BMEWS area, Main Base and the POL Compound. The former Helicopter Pad/Pit No. 1 was used as a staging area for the temporary storage of impacted materials. Test pits were placed at the biopile and additional delineation was also carried out at the Main Base, POL Compound, Old Base 1, Mid-Canada Line, Pit No. 1 and Pit No. 3. At the request of the NLDEC, sediment and surface water samples were collected at the Swimming Pond and soil samples were collected from the roadway to the Site. The locations of these areas in relation to the overall Site are shown on Drawing No. 121413099-200-EE-02 in Appendix A. Sample location plans showing the locations of current samples as well as general site features and sample locations from previous site investigations are provided in Drawing Nos. 121413099-200-EE-03 to 121413099-200-EE-11 in Appendix A.

The BMEWS site has an area of approximately one (1) hectare and is located on top of a hill approximately 800 m northwest of a Residential Subdivision in the Community of Hopedale. The area formerly included four (4) troposcatter antennae (two large and two small) that served as a Ballistic Missile Early Warning System (BMEWS). The area also included operations buildings. Historical photographs indicate the presence of two large aboveground storage tanks in the BMEWS area. All that currently remains in the BMEWS area are the antennae bases (i.e., concrete foundations) and building foundations. Operational telecommunications structures and towers are located in the southwest portion of the BMEWS area. Terrain in the BMEWS area is moderately to steeply sloped and surface drainage (apparent groundwater flow direction) appears to be in all directions. Two drainage courses were identified that could potentially transport water from the BMEWS area to Reservoir Lake. Vegetation in the area is limited and consists of patches of grasses and some low bushes. Bedrock and boulder outcroppings are common in the BMEWS area.

The Main Base (also referred to as "the old base", "the upper site" and the "TACAN site" in previous environmental reports) has an area of approximately 45 hectares and is located on the top of a hill approximately 600 m northeast of a Residential Subdivision in the Community of Hopedale. The Main Base served as the Tactical Air Navigation Site (TACAN) when the Site was operational and included the radar complex, maintenance building, generator building, accommodations buildings and several additional buildings required to service the complex. All that remains of the former site infrastructure are the concrete foundations. Terrain in the vicinity of the Main Base is moderately sloped and surface drainage (apparent groundwater flow direction) appears to be in all directions. There are distinct drainage courses in the Main Base area that drain to the northwest through the former sewage outfall area, to the southeast towards Pit No. 2 and to the southwest. The area consists of gravel, bedrock outcrops and low vegetation and alders.

The POL Compound is located south of the main access road, immediately south of Pit No. 1/Helipad. Previous environmental reports revealed that the area was likely used as a former storage area for petroleum, oil and lubricants (POL). It is believed that waste materials at the Site may have been disposed of by pushing materials into the gully to the south. Terrain at the POL Compound consists of a relatively flat area of exposed bedrock and soil, with a vegetated gully located further south. The area is relatively flat, allowing for water to pool in the area during rainfall events. Surface drainage (apparent groundwater flow direction) is expected to be south/southwest towards Old Dump Pond. Standing water and tar-like debris were previously observed in this area.

Old Base 1 is located on a rock outcrop, southwest of the Main Base area. Old Base 1 formerly consisted of a troposcanner communications dish and possibly an emergency shelter for the United States Air Force (USAF). All that currently remains in the area are the concrete communications dish foundations. During previous environmental investigations, a tar-like spill was discovered flowing down a rock outcrop northeast of the communications dish foundations. The spill material was reported as having very high PCB levels (1,020,000 mg/kg) (ESG, 2006). In 2009, the PCB-impacted tar was removed from the Site. PCB-impacted tar and rock were manually removed from the surface of bedrock using hand scrapers and powered chippers.

Pit No. 3 is located south of the Main Base and east of Pit No. 1/Helipad, on the north side of the main access road. The area is heavily worked and consists of gravel, boulders and bedrock outcroppings with low vegetation and some trees along the perimeter of the pit. Terrain in the area slopes moderately to the southwest. Surface drainage (apparent groundwater flow direction) is expected to be to the southeast towards the Small Pond Bog and the Residential Subdivision.

A Laydown Area was established at the Pit No. 1/Helipad site during Year 1 of the Implementation of the RAP to temporarily store PCB-impacted soil pending shipment out of Hopedale. The Pit No. 1/Helipad area is located off of the main access road. The area is a heavily worked area consisting of gravel and boulders with low vegetation along the perimeter. Terrain in the area is relatively flat, with pooled water along the northwest boundary of the area and a steep drop to the southeast. Surface drainage (apparent groundwater flow direction) is expected to be to the southeast towards Pit No. 3. This area has been identified as a possible former waste site/drum storage area (ESG, 2007).

In 2011, a temporary biopile was constructed adjacent to the community's landfill to receive 5,322 tonnes of total petroleum hydrocarbon (TPH)-impacted soil from the Old School Site in Hopedale, NL (project completed on behalf of the Newfoundland and Labrador Department of Education). *Ex-situ* soil treatment was carried out in the biopile using enhanced natural attenuation. The biopile consists of one (1) containment cell that measures approximately 61 m long by 22 m wide by 2.5 m deep. In 2014, the biopile was sampled following NLDEC's standard Certificate of Approval (COA) for soil treatment facilities and concentrations of TPH in the composite soil samples were below the landfill acceptance criteria of 1,000 mg/kg. Approvals were obtained from the Happy Valley-Goose Bay Government Service Centre (now Service NL) and the Inuit Community Government of Hopedale to dispose of treated soil in the Hopedale landfill. Soil was transported to the landfill on October 7, 2014 and was stockpiled in a designated area for use as landfill cover material. A 450 mm thick layer of soil was left in place at the bottom of the biopile containment cell to minimize the risk of damage to the bottom liner. In 2014 during Year 4 of the implementation of the remedial action plan, approximately 1,700 tonnes of TPH-impacted soil was removed from impacted areas of the Site (BMEWS, the Main Base and the POL Compound) and placed in the biopile containment cell for treatment. Biopile maintenance activities, consisting of the addition of specified nutrients and mechanical aeration, were carried out following the placement of TPH-impacted soil. A cover was placed over the biopile and was secured in place using clean sand. The cell is constructed with impermeable high density polyethylene (HDPE) liners that extend over perimeter berms with an approximate 1:1 slope. An entrance ramp with a 4:1 slope is present along the southeast portion of the cell. The ground surface surrounding the biopile slopes slightly towards the northeast and is covered with grass, shrubs and some trees. The biopile is bordered by the local landfill to the west, a cemetery to the east and undeveloped land to the northeast and south/southwest. A northeast flowing drainage ditch runs around the biopile, through the local landfill and empties into the waters of Black Head Tickle.

1.2 Previous Environmental Investigations

Several environmental assessment reports have been produced (mainly since 1996) relating to potential and actual contamination at and in the vicinity of the Former U.S. Military Site and Residential Subdivision in Hopedale, Labrador. In 2009 and 2010, Stantec conducted a Phase II/III Environmental Site Assessment (ESA), Human Health and Ecological Risk Assessment (HHERA) and Remedial Action Plan/Risk Management Plan (RAP/RMP) at the Former U.S. Military Site and

Residential Subdivision on behalf of the NLDEC (refer to Stantec, 2010). Stantec also supervised limited-remediation of PCB-impacted tar in three (3) areas of the site at that time and the removal of total of three (3) tandem dump truck loads of debris from the stream in the Residential Subdivision (surficial debris) and from test pits excavated in the Residential Subdivision (excavated debris).

For the purposes of the 2010 human health risk assessment, the Site was divided into the following two (2) areas to adequately reflect the expected human exposure time and activities: the "Residential Area" where residents of Hopedale would be expected to spend the majority of their time and the "Former Radar Site" where residents of Hopedale would be expected to occasionally visit for recreational purposes (e.g., berry picking, hunting, walking). Ecological receptors with relatively small home ranges could spend their entire life in one particular portion of the Site; therefore, the Site was divided into three (3) areas for the purposes of risk modelling for ecological receptors with relatively small home ranges. Representative Exposure Point Concentrations (EPCs) were used to evaluate potential risks associated with COCs in the various media. An EPC is an estimate of a reasonable upper limit value for the average chemical concentration in the medium, determined for each exposure unit (USEPA, 1989). The appropriate upper confidence limit (UCL) provides reasonable confidence that the true site average will not be underestimated (USEPA, 1992). The results of the HHERA indicated the potential for adverse risks to human and/or ecological receptors from exposure to TPH, PCBs and/or metals impacts at the Site; therefore, precautionary actions, remedial activities and risk management strategies were recommended for the control of hazards identified at the Site.

Stantec recommended that soil be remediated in certain areas of the Site in order to eliminate unacceptable risks to individual human receptors and to populations of ecological receptors. It was recommended that all soil containing concentrations of chemicals of concern (COCs) in exceedance of site-specific target levels (SSTLs) derived for the protection of human health be remediated (PCB and antimony-impacted soil in the Residential Area and PCB-impacted soil at the Former Radar Site). In 2014, NLDEC requested that Stantec apply the residential SSTL of 9 mg/kg to PCB-impacted soil over the entire site. This decision was made following consultation with the Inuit Community Government of Hopedale (ICGH) based on their potential future plans for residential expansion in certain areas of the Former Radar Site, as well as their concerns with maintaining traditional use of the land around the Former Radar Site.

It was also recommended that selected areas containing concentrations of COCs in exceedance of SSTLs derived for the protection of ecological health (TPH, lead, antimony, chromium and cadmium) be remediated in order to produce area- and site-wide EPCs less than the calculated SSTLs.

The remedial targets applied in the RAP and areas requiring remediation are summarized in Table 1.1. Additional information on how the SSTLs were calculated and how the remedial areas were selected is provided in the 2010 HHERA (Stantec, 2010).

Table 1.1 Summary of Remedial Targets

Chemical of Concern	Remedial Target (mg/kg)	Source	Areas Requiring Remediation
PCBs	9	HHRA	Old Dump Pond* Wharf Area/Pipeline** Residential Subdivision (stream)** BMEWS** Main Base* Old Base1 Pit No. 1
TPH	1,700	ERA	BMEWS* Main Base* Pit No. 3
Metals (Residential Area)	Antimony: 30	HHRA	Old Dump Pond*
Metals (Former Radar Site)	Antimony: 5 Chromium: 20 Cadmium: 1.3 Lead: 75	ERA	BMEWS Main Base Mid-Canada Line POL Compound*

Notes:
* Area partially remediated during Years 1 to 4 of the Implementation of the RAP.
** Area fully remediated during Years 1 to 4 of the Implementation of the RAP.

In the summer of 2010, Stantec conducted additional soil and sediment delineation, soil vapour monitoring, and a preliminary marine sampling program at the Site to address data gaps and/or actions recommended in the 2010 Phase II/III ESA and HHERA report, and recommendations provided through consultation with the Nunatsiavut Government (NG) (refer to Stantec, 2011). Volume estimates were refined for areas requiring soil remediation. Elevated concentrations of PCBs were detected in sediment and fish samples collected from Hopedale Harbour and from select sediment samples collected from freshwater ponds and streams near the Former U.S. Military Base; therefore, a comprehensive marine study was recommended.

A Stakeholder Scientific Advisory Working Group (referred to as the “Stakeholder Committee”) consisting of representatives from the Inuit Community Government of Hopedale (ICGH), NG, Labrador Grenfell Health, the Labrador and Aboriginal Affairs Office, NLDEC and technical advisors was established in 2011 to advise on go-forward work plans at the Site. Based on the remedial options evaluation, the preferred options for soil remediation were as follows:

- PCB-Impacted Soil: Stockpile soil and transport to a licensed soil treatment facility.
- TPH-Impacted Soil: Pre-treat soil in temporary on-site biopile and place soil in the local landfill once treated.
- Metals-Impacted Soil: Stockpile soil and transport to a licensed soil treatment facility.

Priorities were assigned to different areas requiring remediation, with the highest priority assigned to PCB-impacted soil in the Residential Area and PCB-impacted soil located up-gradient of the community water supply source (the BMEWS site), followed by PCB-impacted areas in the remaining areas, then TPH-impacted areas and then metals-impacted areas. Consideration was given to the anticipated soil treatment times for TPH when preparing a go forward work plan.

In 2011, the Government of Newfoundland and Labrador committed funds to support remediation efforts in Hopedale for three (3) years. During each year, site remediation and investigative work was conducted in accordance with NLDEC budget allowances. Between 2011 and 2013, remediation was carried out in the Residential Subdivision, Old Dump Pond, Pipeline/Wharf and BMEWS areas. A total of 2,265.15 tonnes of PCB-impacted soil was transported off-site for treatment and disposal at an approved soil treatment facility in Saint-Ambroise, Québec (QC). With the exception of a strip of un-remediated soil located adjacent to the Old Dump Pond, no further PCB remediation was deemed necessary in these areas in accordance with SSTLs calculated for the Site as part of the HHERA (Stantec, 2010). The calculated SSTLs for PCBs in soil were 9 mg/kg for the Residential Subdivision, the Old Dump Pond area and the Wharf Area/Pipeline area, and 22 mg/kg for the BMEWS area. Remedial activities were described in written reports prepared following each year of Implementation of the RAP (refer to Stantec, 2012, Stantec, 2014a and Stantec, 2014b). During the 2011 to 2013 period, a comprehensive Marine Study was also carried out in Hopedale Harbour and in freshwater lakes surrounding Hopedale. The results of the Marine Study were summarized in a Summary Report on Loadings, Sediment Inventory and Present and Future Outlook for PCB Impacts in Hopedale Harbour report (refer to Stantec, 2014c) and were included in a Human Health Risk Assessment for the Consumption of Country Foods in the Town of Hopedale (Stantec, 2014d). Additional soil delineation was carried out in several areas of the Site in 2014 to refine volume estimates in support of future remediation programs (Stantec, 2014e).

In 2014, the Government of Newfoundland and Labrador committed funds for an additional three (3) years to support ongoing remediation efforts in Hopedale. The following scope of work was recommended for Years 4 to 6 of the Implementation of the RAP:

<u>Year 4 (2014-2015)</u>

- Removal of treated soil from the temporary biopile.
- Remediation of PCB-impacted soil at the Main Base (estimated 1,500 tonnes).
- Remediation of TPH-impacted soil at the Main Base, BMEWS and POL Compound, with associated soil placement in the temporary biopile (estimated 1,700 tonnes).

Year 5 (2015-2016)

- Remediation of impacted soil in areas that were not finished in Year 4, if necessary.
- Remediation of PCB-impacted soil at Old Base 1 and Pit No. 1 (estimated 670 tonnes).
- Remediation of metals-impacted soil at Old Dump Pond, BMEWS, Main Base, Mid-Canada Line and POL Compound (estimated 200 tonnes).
- Biopile maintenance, including soil tilling and nutrient placement.

Year 6 (2016-2017)

- Remediation of impacted soil in areas that were not finished in Year 4 or 5, if necessary.
- Removal of treated soil from the temporary biopile.
- Remediation of TPH-impacted soil at Pit No. 3 (estimated 7,110 tonnes).

Site remediation and investigative work was to be conducted in accordance with annual NLDEC budget allowances. The work scope was meant to be revised each year and was meant to be flexible based on the actual volumes of soil removed from each site and the time required for treatment of TPH-impacted soil in the biopile. The proposed work scope was designed based on the assumption that it would take only 2 years for concentrations of TPH in soil to be reduced below the landfill acceptance criteria of 1,000 mg/kg. The Stakeholder Committee agreed with the above recommendations for the Years 4 to 6 of the Implementation of the RAP.

In 2014, remediation was carried out in the Main Base, BMEWS and POL Compound areas. Remedial activities were described in the written report prepared in 2015 (refer to Stantec, 2015a). A total of 1,513.62 tonnes of PCB-impacted soil was removed from the Main Base area and transported off-site for treatment and disposal at an approved soil treatment facility in Saint-Ambroise, QC. Following remediation, additional soil removal was required along the northern limits of the remedial excavation, in the area of Main Base-Area 4, Main Base-Area 5 and POL West-Area 1 in accordance with the SSTL for PCBs calculated for the Site as part of the HHERA (Stantec, 2010). Sludge removal was also required at the septic tank at Main Base-Area 6. Metal debris removed from the PCB remedial excavation at Main Base (1.66 tonnes) was stockpiled on tarps at the Laydown Area at Pit No. 1. Removed metal debris was to be transported to an appropriate treatment or recycling facility at a later date (dependent on the results of additional sampling to be carried out following additional surface cleaning).

In 2014, the biopile was sampled following NLDEC's standard Certificate of Approval (COA) for soil treatment facilities and concentrations of TPH in the composite soil samples were below the landfill acceptance criteria of 1,000 mg/kg. Approvals were obtained from the Happy Valley-Goose Bay Government Service Centre (now Service NL) and the Inuit Community Government of Hopedale to dispose of treated soil in the Hopedale landfill. Soil was transported to the landfill on October 7, 2014 and was stockpiled in a designated area for use as landfill cover material. A 450 mm thick layer of soil was left in place at the bottom of the biopile containment cell to minimize the risk of damage to the bottom liner. Approximately 1,700 tonnes of TPH-impacted soil was then removed from impacted areas of the Site (BMEWS, the Main Base and the POL Compound) and placed in the biopile containment cell for treatment. Biopile maintenance activities, consisting of the addition of specified nutrients and mechanical aeration, were carried out following the placement of TPH-impacted soil. A cover was placed over the biopile and was secured in place using clean sand. Metal debris removed from the TPH remedial excavations at BMEWS was stockpiled on tarps at the Laydown Area at Pit No. 1 and kept separate from the metal debris unearthed at the Main Base site. Metal debris will be transported to a metal recycling facility at a later date. Following site remediation, additional TPH-impacted soil removal was required based on the SSTL along the southeast sidewall of BMEWS-Area 1, in the area of BMEWS-Area 3, to the east, south and west of Main Base-Area 7 and in the area of Main Base-Area 9. Remediation of TPH-impacted soil at Main Base-Area 7 and at the POL Compound is deemed complete in accordance with the SSTL calculated for the Site as part of the HHERA (Stantec, 2010).

1.3 Scope of Work

The scope of work for Year 5 of the Implementation of the Remedial Action Plan was as follows:

1. Biopile Maintenance and Monitoring

    - Collect five (5) representative soil samples from the impacted material within the biopile and submit for laboratory analysis of TPH/BTEX, inorganics, available metals, microbiology and grain size to document baseline petroleum hydrocarbon concentrations and soil characteristics, and to determine requirements for soil augmentation;
    - Supervise the addition of fertilizer/nutrients to the biopile and biopile cover installation; and,
    - Perform biopile maintenance and monitoring, as required.

2. Remediation of PCB-Impacted Soil

    - Supervise the remediation of PCB-impacted soil at the Main Base, in accordance with budget allowances;
    - Collect confirmatory soil samples from the final limits of the excavation(s) and submit for analysis of Total PCBs (rush turnaround time); and,
    - Once confirming results have been received, monitor the backfilling of the excavations with clean fill material (to be sourced from the Community of Hopedale) or site grading, as necessary.

3. Remediation of Metals-Impacted Soil

    - Monitor the remediation of metals-impacted soil at the BMEWS, Main Base and POL Compound sites, in accordance with budget allowances;
    - Collect confirmatory soil samples from the final limits of the excavation(s) and submit for analysis of available metals (rush turnaround time); and,
    - Once confirming results have been received, monitor the backfilling of the excavations with clean fill material (to be sourced from the Community of Hopedale) or site grading, as necessary.

4. Additional Delineation

   - Perform additional delineation of PCB impacts in soil in areas where historical exceedances were found and the extent of impacts were not delineated including Main Base-Area 1, Old Base 1-Area 1, Old Base 1- Area 2, Pit No. 1–Area 1, Pit No. 1–Area 2 by placing test pits with the aid of an excavator and/or collecting surface soil samples manually using shovels.
   - Perform additional delineation of metals impacts in soil in areas where historical exceedances were found and the extent of impacts were not delineated including POL Compound-Area 4 by collecting surface soil samples manually using a shovel.
   - Perform additional delineation of petroleum hydrocarbon impacts in soil in areas where historical exceedances were found and the extent of impacts were not delineated including Pit No. 3-Area 1 by collecting surface soil samples manually using a shovel.

Backfilling was only completed in areas that were fully remediated in Year 5 in order to reduce the potential for contamination of clean material. Topsoil was not placed in Year 5 due to wet conditions at the time remediation was completed and the increased potential for soil erosion. These items will be completed before the end of the 3-year contract.

Following the tendering process in 2014, Sanexen Environmental Services Inc. (Sanexen) was retained by NLDEC for remedial work at the Former U.S. Military Site and Residential Subdivision during Years 4 to 6 of the Implementation of the RAP. Sanexen was responsible for site preparation, the excavation of impacted soil and debris from specified areas, and the proper disposal of impacted materials (including shipment).

1.4 Regulatory Framework

NLDEC Policy Directive PPD05-01 allows a site owner to use either of two approaches when remediating chemical impacts on a site. These approaches are outlined in the *Guidance Document for the Management of Impacted Sites, Version 2.0* (January 2014). The purpose of this guidance document is to provide a clear process for the management of impacted sites in Newfoundland and Labrador that result in the satisfactory resolution of environmental contamination, which may present an unacceptable risk to human health and ecological receptors. The guidance document incorporates recent scientific and regulatory advances in this area that have resulted from work at the international, national and regional levels.

Remediation of chemical impacts in various site media (e.g., soil, sediment, groundwater, surface water) can be completed using a criteria-based approach or a risk-based approach. Under the criteria-based remedial approach, the defined site impacts are remediated to levels below existing regulatory guidelines for the appropriate media. Under the risk-based remedial approach, the defined site impacts are remediated to levels below site-specific target levels (SSTLs) that are developed for the site during a site-specific human health risk assessment (HHRA) and ecological risk assessment (ERA) (if necessary).

For simple sites and sites with limited impacts, a criteria-based approach to remediation is often applied to guide the extent of removal of impacted media from the site. For more complex sites and sites with extensive impacts from multiple COCs, a human health and/or ecological risk assessment is often completed, based on the actual site conditions and the actual human and ecological usage of the site, to derive SSTLs to determine remedial options or a risk management strategy for the site. Experience at other former Pinetree military sites in Newfoundland and Labrador indicates that a risk-based remedial approach is the most appropriate for a complex site such as the one in Hopedale.

As part of the HHERA (Stantec, 2010), SSTLs were calculated for certain metals, petroleum hydrocarbons and PCBs. Where necessary, SSTLs were derived in accordance with the methods presented in *A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines* (Canadian Council of Ministers of the Environment (CCME), 2006). The specific methods employed to develop the SSTLs are consistent with CCME and Health Canada protocols as referenced above, and with standard human health risk assessment methodologies. The derivation of SSTLs for petroleum hydrocarbons (TPH, BTEX) was made with the aid of Groundwater Services, Inc. (GSI) RBCA Toolkit for Atlantic Canada, Version 2.1. The spreadsheet model is based on the exposure and mass transport equations presented in the appendix of the ASTM PS-104 Standard Provisional Guide for Risk-Based Corrective Action (ASTM, 2000). Table 1.1 in Section 1.2 summarizes the SSTLs applied as remedial targets at the Site.

For the work completed at the biopile, the provincial Guidelines for Construction and Operation of Facilities using Ex-Situ Bioremediation for the Treatment of Petroleum Contaminated Soil (GD-PPD013 rev. 4, dated August 2008) were referenced. "Clean soils" are defined as those having concentrations of benzene, toluene, ethylbenzene and xylene (BTEX) parameters below the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Guidelines (CSQGs) for a commercial site and below 1,000 mg/kg for TPH. Inorganic parameters were also compared to the CCME CSQGs for a commercial site. Landfill facilities in Newfoundland and Labrador typically accept "clean soils" for use as cover material; however, soil acceptance is ultimately at the discretion of the landfill operator. The latest update of the CCME CSQGs was obtained online at http://ceqg-rcqe.ccme.ca/.

2.0 DESCRIPTION OF SITE WORK

Year 5 site remediation activities at the Former U.S. Military Site consisted of site preparation, biopile maintenance activities, the excavation and removal of TPH and PCB-impacted soil (Main Base-Area 1), the excavation and removal of metals-impacted soil (BMEWS-Area 4, BMEWS-Area 5, Main Base-Area 2, POL-Area 3 and POL-Area 4), confirmatory soil sampling, shipment of PCB-impacted soil to an approved soil treatment facility, shipment of metals-impacted soil to an approved soil treatment facility and site reinstatement. Stantec personnel were onsite during site remediation between August 19, 2015 and September 1, 2015. The loading of the impacted soil to the ship took place between September 14 and 16, 2015.

Remedial activities were undertaken by Sanexen Environmental Services Inc. (Sanexen) of Brossard, Quebec (QC) under separate contract to NLDEC. Sanexen engaged Budgell's Equipment and Rentals (Budgell's) of Triton, NL, who provided heavy equipment, including excavators, loaders and dump trucks, equipment operators and labourers. Sanexen supplied a scale system to weigh remediated soil, metal debris and backfill. The scale was installed on a front end loader and was calibrated on-site. Stantec personnel maintained a record of activities while on-site and collected confirmatory soil samples.

Between October 30 and November 1, 2015, Stantec personnel collected additional soil samples from hand-dug or machine excavated test pits at Main Base-Area 1, Old Base 1-Area 1, Old Base 1-Area 2, Pit No. 1–Area 1, Pit No. 1–Area 2, POL Compound-Area 4 and Pit No. 3-Area 1. Due to the shallow depth to bedrock in some areas, an excavator was not deemed necessary for all of the test pit excavations. Sample locations were selected in the field by Stantec personnel. Subsurface conditions encountered in the test pits were logged by Stantec personnel at the time of sampling.

2.1 Biopile Confirmatory Soil Sampling

On August 19, 2015, confirmatory soil sampling was carried out at the biopile to confirm that concentrations of TPH in soil were below the landfill acceptance criteria of 1,000 mg/kg and to document soil characteristics (i.e., microbial content, nutrient concentrations, soil texture, moisture content, pH, etc.) to determine future requirements for soil augmentation. The HDPE cover was removed and test pits were excavated with the aid of a track-mounted excavator supplied and operated by Budgell's. Stantec personnel recorded details of subsurface conditions encountered during excavation and collected confirmatory soil samples.

Soil sampling was carried out following composite soil sampling protocols outlined in NLDEC's standard Certificate of Approval (COA) for soil treatment facilities. Soil samples were collected from fifteen (15) test pits by bulk sample methods over continuous 0.5 m intervals, to a maximum depth of 2.0 m. The test pits were not extended to the bottom of the biopile (approximately 2.5 m deep) in order to prevent damage to the bottom liner. To obtain average petroleum hydrocarbon concentrations within each horizon of the biopile, soil samples from the same depths were combined to form composite samples following the confirmatory sampling protocol provided in NLDEC's standard COA for soil treatment facilities. Two (2) composite samples from the 0.0 m to 0.5 m horizon (15-BP-COMP-A1 and 15-BP-COMP-A2), two (2) composite samples from the 0.5 m to 1.0 m horizon (15-BP-COMP-B1 and 15-BP-COMP-B2), two (2) composite samples from the 1.0 m to 1.5 m horizon (15-BP-COMP-C1 and 15-BP-COMP-C2) and two (2) composite samples from the 1.5 m to 2.0 m horizon (15-BP-COMP-D1 and 15-BP-COMP-D2) were submitted to Maxxam Analytics in St. John's, NL for analysis of petroleum hydrocarbons. The test pit locations are shown on Drawing No. 121413099-200-EE-11 in Appendix A. Photos taken of the biopile are provided in Appendix B.

The results of biopile sampling indicated that concentrations of TPH in soil were greater than the typical landfill acceptance limit of 1,000 mg/kg; therefore, further *in-situ* treatment of the soil is recommended.

2.2 Site Preparation

Nine (9) areas were assigned for remediation in Year 5, but only six (6) areas were remediated as the maximum allowable tonnages for PCB and metals-impacted soil in Year 5 were reached after the completion of six (6) areas. Table 2.1 presents the names that were used to identify the remedial areas during Year 5 of the Implementation of the RAP.

Table 2.1 Assigned Names for Remedial Areas

Assigned Name	Remedial Objective	Impacted Sample Locations
BMEWS-Area 4	Metals	BS1
BMEWS-Area 5	Metals	BS7
Main Base-Area 1	PCBs, TPH	Main Base-Area 1
Main Base-Area 2	Metals	TP10, MB-TP2 and MB-TP3
POL-Area 3	Metals	BS41 and POL-BS10
POL-Area 4	Metals	BS39
MCL-Area 1 (not remediated in 2015)	Metals	MCL-BS10, BS135
MCL-Area 2 (not remediated in 2015)	Metals	BS257

The following site preparations were undertaken prior to the commencement of the Year 5 remedial activities:

- The areas requiring remediation were marked out in the field using survey stakes and spray paint based on the results of previous investigations.
- Prior to the remedial excavation of impacted soil, confirmatory soil sampling was conducted along the limits of the marked out remedial areas in areas that were accessible and shallow. Samples were collected at BMEWS-Area 4 (15-BMEWS-BS401 to 15-BMEWS-BS404), BMEWS-Area 5 (15-BMEWS-BS501 to 15-BMEWS-BS504), Main Base-Area 1 (15-MB-BS101 to 15-MB-BS107), Main Base-Area 2 (15-MB-BS201 to 15-MB-BS206), POL-Area 3 (15-POL-BS301 to 15-POL-BS303), POL-Area 4 (15-POL-BS401 to 15-POL-BS404), Mid-Canada Line-Area 1 (15-MCL-BS101 to 15-MCL-BS104) and Mid-Canada Line-Area 2 (15-MCL-BS201 to 15-MCL-BS204). The samples were collected manually by bulk sample methods. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass

jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics in St. John's, NL and Bedford, NS for analysis of TPH, available metals or PCBs, based on the contaminant of concern. Unsubmitted duplicate samples were shipped to Stantec's office in St. John's, NL to be archived. Sample locations are shown on Drawing Nos. 121413099-200-EE-03 to 121413099-EE-11 in Appendix A.

The following site preparations were undertaken at Pit No. 1 prior to the commencement of the Year 4 and 5 remedial activities:

- Boulders at the entrance to the pit were moved to allow access.
- Crushed stone was used to level the Staging Area that would be used to fill soil bags and the Laydown Areas designated for temporary storage of filled soil bags, pending transportation out of Hopedale. Berms were formed along the southeast (downgradient) limits of the worked areas. The staging and laydown areas were covered with 40 mil HDPE liners.

2.3 Excavation of PCB-Impacted Soil and Confirmatory Sampling

2.3.1 Main Base

The remediation of PCB-impacted soil was carried out at Main Base between August 23 and 24, 2015. Remediation progressed until clean boundaries (i.e., less than the remedial target) were encountered or until the annual tonnage allowance was reached. Soil was removed with a Deere 270D track-mounted excavator, a Deere 50C track-mounted mini-excavator and manually using shovels. Soil was loaded into rock trucks and was transported to the Staging Area at Pit No. 1 where it was loaded into UN-approved Quatrex-27 bulk bags with internal membrane using a Deere 50C track-mounted mini-excavator. Once filled, the soil bags were tied shut and temporarily stacked on liners at the Laydown Area. Photos taken during Year 5 of the Implementation of the RAP are provided in Appendix B.

The excavation of PCB-impacted soil at Main Base began in the southern portion of Main Base-Area 1 and extended up-hill to the northwest and northeast. The results of the initial round of confirmatory soil sampling at Main Base-Area 1 indicated that soil along the PCB/TPH remedial excavation boundary at sample locations 15-MB-BS105 to 15-MB-BS107 contained PCBs below the residential SSTL of 9 mg/kg; however, samples 15-MB-BS103 and 15-MB-BS104 contained PCBs exceeding the SSTL (refer to Section 3.2 for further details). The excavation extended to bedrock. The overburden thickness at Main Base-Area 1 ranged from 0 m (exposed bedrock) to approximately 1.9 m. Groundwater was not encountered in the remedial excavation. During the excavation activities, petroleum hydrocarbon staining on the soil was observed in the northeastern corner of the excavation. Sample 15-MB-BS108 was collected from this area. The concentration of PCBs in sample 15-MB-BS108 did not exceed the SSTL of 9 mg/kg, but the TPH concentration in the sample did exceed the SSTL of 1,700 mg/kg. Sample locations are shown on Drawing No. 121413099-200-EE-04 in Appendix A.

The remediation excavation was halted on August 24, 2015 and the Year 5 tonnage was estimated to be 749 tonnes. The Staging Area was remediated at that time by excavating and bagging bottom liners and the upper layer of soil (approx. 5 cm). A total of 480 bags were filled with PCB-impacted soil during Year 5 of the Implementation of the RAP.

Once the remediation of PCB-impacted soil was completed, confirmatory soil samples were collected along the northeast sidewall of the excavation (15-MB-BS109 to 15-MB-BS112) to verify the concentrations of PCBs in soil remaining on the site. No confirmatory soil sampling was conducted along the southeast, southwest or north-central sidewalls of the excavation due to the presence of exposed bedrock. The confirmatory soil samples were collected by bulk sample methods. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics in Bedford, NS for analysis of PCBs. Unsubmitted duplicate samples were shipped to Stantec's office in St. John's, NL to be archived. Samples 15-MB-BS111 and 15-MB-BS112 contained PCBs and TPH exceeding the SSTLs.

Buried metal debris was encountered in the Main Base-Area 1 remedial excavation. Metal debris consisted of pipes, girders and rebar and other small pieces of metal. Metal encountered in the excavation was manually segregated from the soil. Residual soil was shaken/scraped from the metal and placed in soil bags, then the metal was transported to the Laydown Area where it was weighed and stockpiled on tarps for sampling and temporary storage. The total weight of metal recovered from the Main Base remedial excavation was 2.26 tonnes. This metal was kept separate from the metal unearthed at BMEWS in 2014. On August 27, 2015, Stantec randomly selected five (5) pieces of metal in the Main Base metal stockpile for PCB sampling. Each piece was swabbed over a 10 cm by 10 cm area (i.e., 100 cm^2) using a swab provided by Maxxam Analytics that was saturated with hexane (15-Swab-1 to 15-Swab-5). All swab samples were frozen and shipped on ice in sample coolers to Maxxam Analytics in Bedford, NS for analysis of PCB content.

2.4 Excavation of Metals-Impacted Soil and Confirmatory Sampling

The remediation of metals-impacted soil was carried out at BMEWS-Area 4, BMEWS-Area 5, Main Base-Area 2, POL-Area 3 and POL-Area 4 in Year 5. Remediation progressed in the areas until clean boundaries (i.e., less than the remedial target) were encountered or until the annual tonnage allowance was reached. Soil was removed with a Deere 270D track-mounted excavator and was loaded into rock trucks or tandem dump trucks for transportation to the Staging Area at Pit No. 1. In areas that were difficult to access with heavy machinery and in areas of shallow overburden over bedrock, soil was manually excavated into enviro-bags using shovels and transported to the Staging Area. Photos taken during Year 5 of the Implementation of the RAP are provided in Appendix B.

Confirmatory soil sampling was conducted as remediation progressed to confirm that concentrations of metals in soil remaining at the Site were below the applicable SSTLs.

Confirmatory soil samples were collected from the sidewalls of the excavations. Soils were sampled by bulk sample methods. Sidewall samples were collected just above groundwater, where encountered. In locations were groundwater was not encountered due to the presence of shallow bedrock, sidewall samples were collected just above bedrock. Confirmatory soil sample locations were recorded while in the field in relation to site structures/features. Sample locations are shown on Drawing Nos. 121413099-200-EE-03 to 121413099-200-EE-05 in Appendix A. Where possible, duplicate soil samples were collected at each sample location. The soil samples were visually examined in the field for impacts. The samples were placed into clean glass jars and were placed on ice in sample coolers for transportation. Samples were shipped directly to Maxxam Analytics in St. John's, NL for rush analysis of available metals parameters. Duplicate samples were shipped to Stantec's office in St. John's, NL for archive.

2.4.1 BMEWS

The excavation of metals-impacted soil began at BMEWS at BMEWS-Area 5 on August 29, 2015. The initially staked area was excavated to bedrock, which was encountered at depths ranging from 0.0 m to 0.2 m. Approximately 16 tonnes of metals impacted soil was removed from the excavation. The limits of the BMEWS-Area 5 remedial excavation are shown on Drawing No. 121413099-200-EE-03 in Appendix A. The results of the initial round of confirmatory soil sampling at BMEWS-Area 5 indicated that additional soil removal is required in the vicinity of samples 15-BMEWS-BS501, 15-BMEWS-BS503 and 15-BMEWS-BS504 to meet the SSTLs.

The excavation of metals-impacted soil continued at BMEWS at BMEWS-Area 4 on August 30, 2015. The initially staked area was excavated to bedrock, which was encountered at depths ranging from 0.0 m to 0.15 m. Approximately 20 tonnes of metals impacted soil was removed from the excavation. The limits of the BMEWS-Area 4 remedial excavation are shown on Drawing No. 121413099-200-EE-03 in Appendix A. The results of the initial round of confirmatory soil sampling at BMEWS-Area 4 indicated that additional soil removal is required in the vicinity of samples 15-BMEWS-BS401 to 15-BMEWS-BS404 to meet the SSTLs.

2.4.2 Main Base

The excavation of metals-impacted soil began at Main Base at Main Base-Area 4 on August 25, 2015. The initially staked area was excavated to bedrock, which was encountered at depths ranging from 0.0 m to 0.9 m within the excavation. Approximately 147 tonnes of metals impacted soil was removed from the excavation. The limits of the Main Base-Area 4 remedial excavation are shown on Drawing No. 121413099-200-EE-04 in Appendix A. The results of the initial round of confirmatory soil sampling at Main Base-Area 4 indicated that additional soil removal is required in the vicinity of samples 15-MB-BS201 to 15-MB-BS206 to meet the SSTLs.

2.4.3 POL Compound

The excavation of metals-impacted soil began at the POL Compound at POL-Area 3 on August 30, 2015. The initially staked area was excavated to bedrock, which was encountered at depths ranging from 0.0 m to 0.2 m. Approximately 7 tonnes of metals impacted soil was removed from the excavation. The limits of the POL-Area 3 remedial excavation are shown on Drawing No. 121413099-200-EE-05 in Appendix A. The results of the initial round of confirmatory soil sampling at POL-Area 3 indicated that additional soil removal is required in the vicinity of samples 15-POL-BS301 to 15-POL-BS303 to meet the SSTLs.

The excavation of metals-impacted soil continued at the POL Compound at POL-Area 4 on August 30, 2015. The initially staked area was excavated to bedrock, which was encountered at depths ranging from 0.0 m to 0.2 m. Approximately 11 tonnes of metals impacted soil was removed from the excavation. The limits of the POL-Area 4 remedial excavation are shown on Drawing No. 121413099-200-EE-05 in Appendix A. The results of the initial round of confirmatory soil sampling at POL-Area 4 indicated that additional soil removal is required in the vicinity of samples 15-POL-BS401, 15-POL-BS402 and 15-POL-BS404 to meet the SSTLs.

2.5 Shipment of PCB and Metals-Impacted Soil

One (1) shipment of PCB-impacted soil and metals impacted soil was made during Year 5 of the Implementation of the RAP. The shipment was done using a ship (the Long Island) owned and operated by Ray Berkshire Ltd. of Arnold’s Cove, NL. The soil bags were transported from the Laydown Area to the American Dock (approximately 1 km) using a flatbed truck and rock truck and were loaded onto the ship using a boom. The shipment was loaded between September 14 and 16, 2015 and had an estimated weight of 951 tonnes (749 tonnes of PCB-impacted soil and 202 tonnes of metals-impacted soil). Sanexen provided placards and shipment manifests in accordance with Transportation of Dangerous Goods (TDG) and International Maritime Dangerous Goods (IMDG) codes for the shipment.

The PCB-impacted soil was transported by sea to the Grande-Anse Marine Terminal in Port Saguenay, Quebec (QC) where the soil bags were transferred to B-train tractor trailers and transported approximately 30 km to the Récupère Sol (a division of Benev Capital Inc. (BCI)) thermal treatment facility in Saint-Ambroise, QC. Soil was weighed upon arrival at the facility, for a reported total of 685.1 tonnes. Récupère Sol operates a thermal oxidation treatment unit that operates in accordance with the Quebec Ministry of Sustainable Development, Environment, Wildlife and Parks “<A” Treatment Criteria (i.e., <0.05 mg/kg). The Certificate of Destruction for the PCB-impacted soil removed during Year 5 of the Implementation of the RAP is provided in Appendix F.

The metals-impacted soil was transported by sea to the Grande-Anse Marine Terminal in Port Saguenay, QC where the soil bags were transferred to Parc Environmental AES Inc., a contaminated soil treatment facility, located in Chicoutimi, QC. Soil was weighed upon arrival at the facility, for a reported total of 197.5 tonnes. The Bill of Ladings and Weigh Slips for the metals-impacted soil removed during Year 5 of the Implementation of the RAP is provided in Appendix F.

2.6 Biopile Maintenance

Biopile maintenance activities, consisting of the addition of specified nutrients and mechanical aeration, were completed on August 20, 2015 under the supervision of Stantec personnel. A total of three (3) trenches aligned in a north-south orientation were excavated in parallel succession along the length of the biopile to facilitate the application of nutrients. Each trench measured approximately 1.0 m wide by 1.5 m deep. Excavated soil was temporarily stockpiled in a windrow (i.e., a build-up of material stored along the edge of the newly excavated area) adjacent to the trench from which it was excavated. Caution was taken not to damage the underlying liner during the advancement of each trench. The following nutrients were added evenly to each trench and windrow of excavated soil:

- 29 x 25 kg bags, urea nitrogen fertilizer (46-0-0)
- 3 x 25 kg bags, triple super phosphate fertilizer (0-46-0)
- 2 x 25 kg bags, potassium sulphate fertilizer (0-0-50, plus 17% sulphur)
- 2 x 25 kg bags, ammonium phosphate fertilizer

The trenches were then backfilled with excavated material and the biopile was leveled. Approximately 2:1 slopes were formed along each face of the biopile, as per design specifications. A cover was placed over the containment cell and was secured in place using clean sand. Photos taken of the biopile during Year 5 of the Implementation of the RAP are provided in Appendix B.

2.7 Backfilling and Reinstatement Activities

The Main Base-Area 1 remedial excavation was partially backfilled and levelled following soil removal using approximately 644 tonnes of clean backfill. Backfill consisted of clean 100 mm minus sized material obtained from a local rock pit. The remainder of the remedial areas will be backfilled once remediation is completed during subsequent years of the Implementation of the RAP. Topsoil will also be replaced in selected areas of the Site during subsequent years of the Implementation of the RAP.

The following site closure activities were undertaken at the Site prior to departure:

- The northeast sidewall of the Main Base-Area 1 remedial excavation was sloped as a safety precaution and boulders and barricades were placed along the edge to prevent access.
- The remedial sites were tidied up by removing any debris or equipment.
- Boulders were placed at the entrance to Pit No.1 to block access.
- Public notice signs were installed at the entrance to Pit No. 1 and the Biopile.

2.8 Additional Delineation

2.8.1 Main Base

The field work for the additional delineation for PCBs in soil at Main Base-Area1 was carried out on October 30, 2015 and consisted of the collection of three bulk surface soil samples (15-MB-BS113 to 15-MB-BS116) and the placement of two test pits (15-MB-TP101 and 15-MB-TP102). The surface samples were terminated on bedrock, which was encountered at depths ranging from 0.0 m to 0.03 m. The test pits were also terminated on bedrock at depths of 1.0 m in test pit 15-MB-TP101 and 0.2 m in test pit 15-MB-TP102. See Appendix E for the test pit logs. A sample location plan showing the locations of the soil samples and test pits is provided in Drawing No. 121413099-200-EE-04 in Appendix A. The soil samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics in Bedford, NS for analysis of PCBs. The results of the laboratory analysis indicated that PCBs in samples 15-MB-BS114, 15-MB-BS115 and 15-MB-TP102-BS1 exceeded the SSTLs.

2.8.2 POL Compound

The field work for the additional delineation for metals in soil at POL Compound-Area 4 was carried out on November 1, 2015 and consisted of the collection of three bulk surface soil samples (15-POL-BS405 to 15-POL-BS407). The samples were terminated on bedrock, which was encountered at depths ranging from 0.05 m to 0.2 m. A sample location plan showing the locations of the soil samples is provided in Drawing No. 121413099-200-EE-05 in Appendix A. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics in Bedford, NS for analysis of available metals. The results of the laboratory analysis indicated that some metal parameters in samples 15-POL-BS405 to 15-POL-BS407 exceeded the SSTLs.

2.8.3 Mid-Canada Line

On August 19, 2015, eight (8) confirmatory soil samples (15-MCL-BS101 to 15-MCL-BS104 and 15-MCL-BS201 to 15-MCL-BS204) were initially collected from the presumed limits of the remedial excavations for Areas 1 and 2 at the Mid-Canada Line during Year 5 of the Implementation of the RAP; however, these areas were not remediated during 2015. The samples were terminated on bedrock, which was encountered at depths ranging from 0.05 m to 0.2 m. A sample location plan showing the locations of the soil samples is provided in Drawing No. 121413099-200-EE-07 in Appendix A. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics in Bedford, NS for analysis of available metals. The results of the laboratory analysis indicated that some metal parameters in samples 15-MCL-BS101 to 15-MCL-BS104 and 15-MCL-BS204 exceeded the SSTLs.

2.8.4 Old Base 1

The field work for the additional delineation of PCBs in soil at Old Base-Area 1 and Old Base-Area 2 was carried out on October 30, 2015 and consisted of the collection of three bulk surface soil samples from each area (15-OB1-BS101 to 15-OB1-BS103 and 15-OB1-BS201 to 15-OB1-BS203). The samples were terminated on bedrock, which was encountered at depths ranging from 0.02 m to 0.04 m. A sample location plan showing the locations of the soil samples is provided in Drawing No. 121413099-200-EE-06 in Appendix A. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics in Bedford, NS for analysis of PCBs. The results of the laboratory analysis indicated that some metal parameters in sample 15-OB1-BS101 exceeded the SSTLs.

2.8.5 Pit No. 1

The field work for the additional delineation of PCBs in soil at Pit No. 1-Area 1 and Pit No. 1-Area 2 was carried out on October 31, 2015 and consisted of the placement of seven (7) test pits (15-P1-TP101 to 15-P1-TP102 and 15-P1-TP201 to 15-P1-TP205). The test pits were terminated on boulders or bedrock at depths ranging from 1.2 m in test pit 15-P1-TP201 to 2.1 m in test pit 15-P1-TP204, except for test pit 15-P1-TP203 which was terminated at the maximum reach of the backhoe at 2.6 m. Metal debris (drums) and wood debris was noted in test pits 15-P1-TP101 and 15-P1-TP102 and wood debris was noted in test pit 15-P1-TP201. See Appendix E for the test pit logs. A sample location plan showing the locations of the soil samples is provided in Drawing No. 121413099-200-EE-08 in Appendix A. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics in Bedford, NS for analysis of PCBs. The results of the laboratory analysis indicated that PCBs in samples 15-P1-TP201-BS1, 15-P1-TP202-BS2 and 15-P1-TP202-BS3 exceeded the SSTL.

2.8.6 Pit No. 3

The field work for the additional delineation of petroleum hydrocarbon impacts in soil at Pit No. 3-Area 1 was carried out on November 1, 2015 and consisted of the placement of three (3) test pits (15-P3-TP101 to 15-P3-TP103) and the collection of a sediment sample from a drainage ditch (15-P3-SED1). The test pits were terminated on boulders or bedrock at depths ranging from 0.3 m in test pits 15-P3-TP102 and 15-P3-TP103 to 0.4 m in test pit 15-P3-TP101. No debris was noted within the test pits. See Appendix E for the test pit logs. A sample location plan showing the locations of the soil samples is provided in Drawing No. 121413099-200-EE-09 in Appendix A. The samples were visually examined in the field for any evidence of impacts and were placed in clean glass jars with Teflon liners. Samples were placed on ice in sample coolers which were shipped to Maxxam Analytics in Bedford, NS for analysis of TPH/BTEX. The results of the laboratory analysis indicated that TPH in samples 15-P3-TP101-BS1, 15-P3-TP102-BS1 and 15-P3-TP103-BS1 exceeded the SSTL.

3.0 LABORATORY RESULTS

3.1 Petroleum Hydrocarbons

3.1.1 Biopile

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on nine (9) composite confirmatory soil samples collected from the biopile in August 2015, including one (1) laboratory duplicate sample of 15-BP-COMP-A1 (BTEX and F1 petroleum hydrocarbons only). Results of the laboratory analysis of biopile soil samples for TPH are presented in Table C.1 in Appendix C.

TPH was detected in the eight (8) composite confirmatory soil samples collected from the biopile. The concentrations of TPH ranged from 5,100 mg/kg in sample 15-BP-COMP-D2 to 6,300 mg/kg in 15-BP-COMP-C1, which exceeded the typical landfill acceptance criteria of 1,000 mg/kg. Based on these results, the soil did not yet meet the acceptance criteria for disposal at the local landfill.

Toluene was detected in four (4) soil samples at concentrations ranging from 0.038 mg/kg in sample 15-BP-COMP-D1 to 0.046 mg/kg in sample 15-BP-COMP-A2. The detected toluene concentrations were below the applicable Tier I ESL and Tier I RBSL. Benzene, ethylbenzene and xylenes were not detected in the soil samples.

3.1.2 Main Base

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on five (5) confirmatory soil samples collected from the limits of the Main Base-Area 1 remedial excavation (15-MB-BS108 to 15-MB-BS112). Results of the laboratory analysis of Main Base soil samples for petroleum hydrocarbons are presented in Table C.2 in Appendix C.

TPH was detected in the five (5) confirmatory soil samples collected from Main Base-Area 1 in Year 5. With the exception of toluene, ethylbenzene and xylenes that were detected below the applicable Tier I ESLs and Tier I RBSLs in sample MB-BS112, BTEX parameters were not detected in the Main Base samples. The concentrations of TPH in samples 15-MB-BS108 (15,000 mg/kg), 15-MB-BS111 (7,700 mg/kg) and 15-MB-BS112 (27,000 mg/kg) exceeded the SSTL of 1,700 mg/kg. Main Base-Area 1 was not completely remediated in Year 5 of the Implementation of the RAP; however, clean boundaries along the west have been determined. The extent of TPH impacts in soil exceeding the SSTL at Main Base-Area 1 has not been fully delineated.

3.1.3 Pit No. 3

Petroleum hydrocarbon (TPH/BTEX) analysis was conducted on three (3) soil samples (15-P3-TP101-BS1, 15-P3-TP102-BS1 and 15-P3-TP103-BS1) and one sediment sample (15-P3-SED1) collected from Pit No. 3-Area 1 as part of the additional delineation conducted in

October/November 2015. TPH/BTEX analysis (BTEX and PHC F1 only) was also conducted on one laboratory duplicate sample of sample 15-P3-TP102-BS1. Results of the laboratory analysis of Pit No. 3 soil samples for petroleum hydrocarbons are presented in Table C.3 in Appendix C.

TPH was detected in three (3) soil samples and the sediment sample. With the exception of toluene, ethylbenzene and xylenes that were detected below the applicable Tier I ESLs and Tier I RBSLs in sample 15-P3-TP101-BS1, BTEX parameters were not detected in the samples. The concentrations of TPH in samples 15-P3-TP101-BS1 (9,300 mg/kg), 15-P3-TP102-BS1 (3,400 mg/kg) and 15-P3-TP103-BS1 (4,000 mg/kg) exceeded the SSTL of 1,700 mg/kg. The extent of TPH impacts in soil exceeding the SSTL at Pit No. 3-Area 1 has not been fully delineated.

3.2 Available Metals

3.2.1 Biopile

Available metals analysis was conducted on five (5) composite confirmatory soil samples collected from the biopile in 2015 as part of the treatability study completed this year. Results of the laboratory analysis of biopile soil samples for available metals are presented in Table C.4 in Appendix C.

The detected concentrations of one (1) or two (2) metal parameters in five (5) soil samples (i.e., 15-BP-COMP-A1, 15-BP-COMP-B1, 15-BP-COMP-B2, 15-BP-COMP-C1 and 15-BP-COMP-D1) exceeded the applicable CCME guidelines for soil at an industrial site. The following exceedances of the CCME guidelines were detected:

- Chromium (guideline of 87 mg/kg) – 15-BP-COMP-A1 (160 mg/kg), 15-BP-COMP-B1 (98 mg/kg), 15-BP-COMP-B2 (90 mg/kg), 15-BP-COMP-D1 (91 mg/kg)
- Copper (guideline of 91 mg/kg) – 15-BP-COMP-A1 (92 mg/kg), 15-BP-COMP-B2 (93 mg/kg)

None of the other detected levels of available metals exceeded the applicable CCME guidelines for soil at an industrial site, where such guidelines exist.

3.2.2 BMEWS

Available metals analysis was conducted on eight (8) confirmatory soil samples (15-BMEWS-BS401 to 15-BMEWS-BS404 and 15-BMEWS-BS501 to 15-BMEWS-BS504) collected from the limits of the remedial excavation for BMEWS-Area 4 and BMEWS-Area 5 during Year 5 of the Implementation of the RAP. Results of the laboratory analysis of the confirmatory soil samples for available metals are presented in Table C.5 in Appendix C.

The detected concentrations of one (1) or more metal parameters in seven (7) soil samples (i.e., 15-BMEWS-BS401 to 15-BMEWS-BS404, 15-BMEWS-BS501, 15-BMEWS-BS503 and 15-BMEWS-BS504) exceeded the SSTLs. The following exceedances of the SSTLs for cadmium, chromium and/or lead were detected:

- Cadmium (SSTL of 1.3 mg/kg) – 15-BMEWS-BS401 (2.3 mg/kg), 15-BMEWS-BS402 (4.9 mg/kg), 15-BMEWS-BS403 (5.1 mg/kg), 15-BMEWS-BS404 (5.6 mg/kg), 15-BMEWS-BS504 (8.8 mg/kg)
- Chromium (SSTL of 20 mg/kg) – 15-BMEWS-BS401 (33 mg/kg), 15-BMEWS-BS402 (33 mg/kg), 15-BMEWS-BS403 (33 mg/kg), 15-BMEWS-BS404 (26 mg/kg), 15-BMEWS-BS501 (35 mg/kg), 15-BMEWS-BS503 (28 mg/kg), 15-BMEWS-BS504 (29 mg/kg)
- Lead (SSTL of 75 mg/kg) – 15-BMEWS-BS403 (100 mg/kg)

None of the other detected levels of available metals exceeded the applicable SSTLs for soil. The extent of metals impacts in soil exceeding the SSTLs at BMEWS-Areas 4 and 5 has not been fully delineated.

3.2.3 Main Base

Available metals analysis was conducted on six (6) confirmatory soil samples (15-MB-BS201 to 15-MB-BS206) collected from the limits of the remedial excavation of Main Base-Area 2 during Year 5 of the Implementation of the RAP. Results of the laboratory analysis of the confirmatory soil samples for available metals are presented in Table C.6 in Appendix C.

The detected concentrations of one (1) or more metal parameters in six (6) soil samples (i.e., 15-MB-BS201 to 15-MB-BS204) exceeded the SSTLs. The following exceedances of the SSTLs for antimony, cadmium, chromium and/or lead were detected:

- Antimony (SSTL of 5 mg/kg) – 15-MB-BS201 (10 mg/kg), 15-MB-BS206 (97 mg/kg)
- Cadmium (SSTL of 1.3 mg/kg) – 15-MB-BS201 (1.7 mg/kg); 15-MB-BS206 (5.1 mg/kg)
- Chromium (SSTL of 20 mg/kg) – 15-MB-BS201 (28 mg/kg), 15-MB-BS202 (65 mg/kg), 15-MB-BS203 (26 mg/kg), 15-MB-BS204 (23 mg/kg), 15-MB-BS205 (100 mg/kg), 15-MB-BS206 (56 mg/kg)
- Lead (SSTL of 75 mg/kg) – 15-MB-BS201 (200 mg/kg), 15-MB-BS206 (430 mg/kg)

None of the other detected levels of available metals exceeded the applicable SSTLs for soil. The extent of metals impacts in soil exceeding the SSTLs at Main Base-Area 2 has not been fully delineated.

3.2.4 POL Compound

Available metals analysis was conducted on seven (7) confirmatory soil samples (15-POL-BS301 to 15-POL-BS303 and 15-POL-BS401 to 15-POL-BS404) collected from the limits of the remedial excavations at POL Compound-Area 3 and POL Compound-Area 4 during Year 5 of the Implementation of the RAP. Available metals analysis was also conducted on three bulk surface soil samples (15-POL-BS405 to 15-POL-BS407) collected from Area 4 as part of the additional delineation in October/November 2015. One laboratory duplicate sample of 15-POL-BS407 was analyzed for metals as well. Results of the laboratory analysis of the confirmatory soil samples for available metals are presented in Table C.7 in Appendix C.

The detected concentrations of one (1) or more metal parameters in 10 soil samples (i.e., 15-POL-BS301 to 15-POL-BS303, 15-POL-BS401 to 15-POL-BS402, 15-POL-BS404 to 15-POL-BS407 and 15-POL-BS407 Lab-Dup) exceeded the SSTLs. The following exceedances of the SSTLs for antimony, cadmium, chromium and/or lead were detected:

- Antimony (SSTL of 5 mg/kg) – 15-POL–BS303 (30 mg/kg), 15-POL–BS401 (16 mg/kg), 15-POL–BS402 (6.5 mg/kg), 15-POL–BS404 (5.3 mg/kg), 15-POL–BS406 (12 mg/kg)
- Cadmium (SSTL of 1.3 mg/kg) – 15-POL–BS303 (3.1 mg/kg)
- Chromium (SSTL of 20 mg/kg) – 15-POL–BS301 (140 mg/kg), 15-POL–BS302 (21 mg/kg), 15-POL–BS303 (150 mg/kg), 15-POL–BS401 (63 mg/kg), 15-POL–BS402 (64 mg/kg), 15-POL–BS404 (21 mg/kg), 15-POL–BS405 (24 mg/kg), 15-POL–BS407 (24 mg/kg), 15-POL–BS407 Lab-Dup (21 mg/kg)
- Lead (SSTL of 75 mg/kg) – 15-POL–BS302 (110 mg/kg), 15-POL–BS303 (530 mg/kg), 15-POL–BS401 (370 mg/kg), 15-POL–BS402 (110 mg/kg), 15-POL–BS404 (430 mg/kg), 15-POL–BS406 (1,300 mg/kg)

None of the other detected levels of available metals exceeded the applicable SSTLs for soil. The extent of metals impacts in soil exceeding the SSTLs at POL Compound–Areas 3 and 4 has not been fully delineated; however, clean boundaries along the south and east have been determined

3.2.5 Mid-Canada Line

Available metals analysis was conducted on eight (8) confirmatory soil samples (15-MCL-BS101 to 15-MCL-BS104 and 15-MCL-BS201 to 15-MCL-BS204) were initially collected from the presumed limits of the remedial excavations for Mid-Canada Line-Area 1 and Mid-Canada Line-Area 2 during Year 5 of the Implementation of the RAP. These areas were not remediated during 2015. Results of the laboratory analysis of the confirmatory soil samples for available metals are presented in Table C.8 in Appendix C.

The detected concentrations of one (1) or more metal parameters in five (5) soil samples (i.e., 15-MCL-BS101 to 15-MCL-BS104 and 15-MCL-BS204) exceeded the SSTLs. The following exceedances of the SSTLs for cadmium, chromium and/or lead were detected:

- Cadmium (SSTL of 1.3 mg/kg) – 15-MCL–BS102 (1.7 mg/kg), 15-MCL–BS103 (2.4 mg/kg), 15-MCL–BS104 (1.9 mg/kg), 15-MCL–BS204 (4.0 mg/kg)
- Chromium (SSTL of 20 mg/kg) – 15-MCL–BS101 (26 mg/kg), 15-MCL–BS102 (28 mg/kg), 15-MCL–BS103 (44 mg/kg), 15-MCL–BS104 (28 mg/kg), 15-MCL–BS204 (31 mg/kg)
- Lead (SSTL of 75 mg/kg) – 15-MCL–BS103 (430 mg/kg), 15-MCL–BS204 (1,000 mg/kg)

None of the other detected levels of available metals exceeded the applicable SSTLs for soil.

The Mid-Canada Line Areas 1 and 2 were not remediated in Year 5 of the Implementation of the RAP; however, clean boundaries along the north and west have been determined in Mid-

Canada Line-Area 2. The extent of metals impacts in soil exceeding the SSTLs at Mid-Canada Line-Area 1 has not been fully delineated.

3.3 PCBs

3.3.1 Main Base

PCB analysis was conducted on 10 confirmatory soil samples (15-MB-BS103 to 15-MB-BS112) collected from the limits of the remedial excavations at Main Base-Area 1 during Year 5 of the Implementation of the RAP. PCB analysis was also conducted on four (4) surface soil samples (15-MB-BS113 to 15-MB-BS116) and two (2) samples from excavated test pits (15-MB-TP101-BS1 and 15-MB-TP102-BS1) collected from Main Base as part of the additional delineation in October/November 2015. Results of the laboratory analysis of PCBs in soil are presented in Table C.9 in Appendix C. The corresponding analytical reports from Maxxam Analytics are presented in Appendix D.

The concentration of PCBs in the following samples exceeded the residential SSTL of 9 mg/kg:

- 15-MB-BS103 - 4,900 mg/kg
- 15-MB-BS104 - 11 mg/kg
- 15-MB-BS111 - 19 mg/kg
- 15-MB-BS112 - 15 mg/kg
- 15-MB-BS114 - 13 mg/kg
- 15-MB-BS115 - 13 mg/kg
- 15-MB-TP102-BS1 - 12 mg/kg

Additional soil removal is required to the north and west of the Main Base-Area 1 excavations, in areas that were not remediated as part of Year 5 of the Implementation of the RAP.

3.3.2 Old Base 1

PCB analysis was conducted on six (6) soil samples collected from Old Base 1-Area 1 (15-OB-BS101 to 15-OB-BS103) and Old Base 1-Area 2 (15-OB-BS201 to 15-OB-BS203) as part of the additional delineation conducted in October/November 2015. Results of the laboratory analysis of PCBs in soil are presented in Table C.10 in Appendix C. The corresponding analytical report from Maxxam Analytics is presented in Appendix D.

The concentration of PCBs in one (1) sample (15-OB-BS101 at 44 mg/kg) exceeded the residential SSTL of 9 mg/kg. The extent of PCB impacts in soil at Old Base 1-Areas 1 and 2 appears to be delineated.

3.3.3 Pit No. 1

PCB analysis was conducted on 20 soil samples collected from test pits excavated at Pit No. 1-Area 1 (15-P1-TP101 to 15-P1-TP102) and Pit No. 1-Area 2 (15-P1-TP201 to 15-P1-TP205) as part of the additional delineation conducted in October/November 2015. PCB analysis was also conducted on one laboratory duplicate sample of sample 15-P1-TP202-BS3. Results of the laboratory analysis of PCBs in soil are presented in Table C.11 in Appendix C. The corresponding analytical report from Maxxam Analytics is presented in Appendix D.

The concentration of PCBs in four (4) samples exceeded the residential SSTL of 9 mg/kg including samples 15-P1-TP201-BS1 (9.1 mg/kg), 15-P1-TP202-BS2 (27 mg/kg), 15-P1-TP202-BS3 (17 mg/kg) and 15-P1-TP202-BS3 Lab-Dup (22 mg/kg). The extent of PCB impacts in soil at Pit No. 1-Area 1 appears to be delineated. The extent of PCB impacts in soil at Pit No. 1-Area 2 appears to be delineated to the southeast and southwest.

3.3.4 Main Access Road

PCB analysis was conducted on five (5) soil samples collected from along the main access road to BMEWS and Main Base during Year 5 of the Implementation of the RAP (15-ROAD-BS1 to 15-ROAD-BS5). Results of the laboratory analysis of PCBs in soil are presented in Table C.12 in Appendix C. The corresponding analytical report from Maxxam Analytics is presented in Appendix D.

The concentrations of PCBs in the samples collected from the roadway ranged from 0.091 mg/kg in sample 15-ROAD-BS1 to 1.7 mg/kg in sample 15-ROAD-BS4 and they did not exceed the residential SSTL of 9 mg/kg.

3.3.5 Swab Samples

PCB analysis was conducted on five (5) swab samples collected from metal unearthed at Main Base-Area 1 (15-SWAB-1 to 15-SWAB-5). Results of the laboratory analysis of the swab samples for total PCB content are presented in Table C.13 in Appendix C. The corresponding analytical report from Maxxam Analytics is presented in Appendix D. For reference, detected concentrations of PCBs were compared to the CCME Recommended Permissible Surface Contamination Criterion recommended for transformer metal components destined for recycling by smelting (10 µg/100 cm^2) (CCME, 1995).

PCBs were detected in the five (5) samples at concentrations ranging from 5.6 µg/100 cm^2 in sample 15-SWAB-4 to 11 µg/100 cm^2 in sample 15-SWAB-5. The concentration in sample 15-SWAB-5 11 µg/100 cm^2 exceeded the CCME criterion for transformer metal components (10 µg/100 cm^2). The results of PCB swab sampling indicate that further soil removal is required from the metal and re-sampling is required. The metal debris is currently stored on liners at the Laydown Area at Pit No. 1.

3.3.6 Swimming Pond

PCB analysis was conducted on three (3) sediment samples (15-POND-SED1 to 15-POND-SED3) and three (3) surface water samples (15-POND-SW1 to 15-POND-SW3) collected from the Swimming Pond during Year 5 of the Implementation of the RAP. Results of the laboratory analysis of PCBs in sediment and surface water are presented in Tables C.14 and C.15 in Appendix C. The corresponding analytical reports from Maxxam Analytics are presented in Appendix D. PCBs were not detected in the sediment samples or the surface water samples.

3.4 Inorganics

3.4.1 Biopile

Inorganics analysis was conducted on five (5) representative composite soil samples collected from the temporary biopile (15-BP-COMP-A1, 15-BP-COMP-B1, 15-BP-COMP-B2, 15-BP-COMP-C1 and 15-BP-COMP-D1). Inorganics analysis was also conducted on two (2) laboratory duplicate samples (15-BP-COMP-A1 Lab-Dup and 15-BP-COMP-D1 Lab-Dup). Results of the laboratory analysis of soil samples for inorganics are presented in Table C.16 in Appenidix C. The corresponding analytical report from Maxxam Analytics is presented in Appendix D.

Concentrations of various inorganic compounds were detected in all five (5) soil samples. Moisture content ranged from 21 to 22 %, nitrate + nitrite concentrations ranged from 4.2 mg/kg to 40 mg/kg and pH values ranged from 7.32 to 7.69. None of the detected concentrations of inorganic parameters exceeded the CCME CSQGs for a commercial site.

3.5 Microbiology

3.5.1 Biopile

Microbiology (hydrocarbanoclast bacteria) analysis was conducted on five (5) representative soil samples collected from the new temporary biopile during soil remediation (15-BP-COMP-A1, 15-BP-COMP-B1, 15-BP-COMP-B2, 15-BP-COMP-C1 and 15-BP-COMP-D1). Results of the laboratory analysis of soil samples for petroleum hydrocarbons are presented in Table C.18 in Appendix C. The corresponding analytical report from Maxxam Analytics is presented in Appendix D.

Hydrocarbanoclast bacteria were detected in the five (5) soil samples at concentrations ranging from 3,900 CFU/g in 15-BP-COMP-A1 to 1,600,000 CFU/g in 15-BP-COMP-B2. There are no applicable guidelines for hydrocarbanoclastes in soil.

3.6 Grain-Size

3.6.1 Biopile

Grain size analysis was conducted on five (5) composite confirmatory soil samples collected from the biopile in 2015. Results of the laboratory analysis of biopile soil samples for available metals are presented in Table C.18 in Appendix C. The corresponding analytical report from Maxxam Analytics, along with particle size distribution curves, is presented in Appendix D.

Results of grain size analysis indicated that the soil samples generally consisted of gravelly sand with some silt and trace clay.

4.0 EVALUATION OF BIOPILE SOIL TREATABILITY

A number of factors affect the performance of a biopile treatment facility. The following sections discuss the anticipated performance and requirements for treatment based on baseline biopile soil sampling results from August 2015.

4.1 Soil Physical Composition

The average clay and silt content in the biopile soils is estimated at 19% based on the five (5) laboratory-analyzed baseline soil samples collected from the biopile in August 2015. This is higher than the average clay and silt content of 11 % observed in November 2011; however, it is still considered relatively low. This low fine-grained material content is considered conducive to biodegradation since it provides adequate permeability to air and bioavailability of contaminants.

4.2 Nutrients

Microorganisms require additional nutrients in order to effectively biodegrade/consume petroleum hydrocarbons. These nutrients mainly include oxygen, water, nitrogen, phosphorus and potassium, but other metals such as iron and manganese are also consumed in less significant quantities. It is recommended to continue with the yearly addition of fertilizers with a carbon : nitrogen : phosphorous : potassium (C:N:P:K) ratio of 100:15:1:1 as stated in the 2014 Invitation to Tender – Years 4 to 6 (Stantec, 2014f).

In addition, moisture content should be maintained at approximately 60% of field moisture capacity to promote optimal biodegradation rates. Assuming a field moisture capacity of 20%, the target moisture content in the biopile is estimated at 12%. The baseline average measured moisture content in the biopile is considered adequate at 12.4%. In order to reach the target concentration of 1,000 mg/kg, biodegradation of total petroleum hydrocarbons will consume approximately 5,000 L of water, which will need to be added evenly and periodically to the soils during treatment as they are tilled/aerated such that the target moisture content is maintained. Soil moisture content should be assessed with tensiometers.

Oxygen supply will largely occur by passive permeation into biopile soils, however mechanical aeration by tilling should be implemented during biopile maintenance, and as required in order to maintain appropriate temperatures during the summer months.

4.3 Biodegradation Indicators

Hydrocarbonocalstic bacteria (HCB) populations ranging between 3,900 and 1,600,000 CFU/g in the five (5) soil samples collected from the biopile are indicative of a healthy petroleum hydrocarbon (PHC) degrading microorganism population. Typically, a minimum initial PHC degrader count of 1,000 CFU/g is considered sufficient to support biodegradation of petroleum hydrocarbons in a biopile.

4.4 Toxicity to Microorganisms

As a general rule, total heavy metal concentrations should not exceed 2,500 mg/kg per metal in soils to be treated in a biopile. With the exception of aluminum and iron, total metal concentrations in the five (5) baseline soil samples collected from the biopile were at least an order of magnitude less than the recommended maximum. In the case of aluminum and iron, the measured concentrations ranged between 7,900 and 9,400 mg/kg, and 13,000 and 19,000 mg/kg, respectively. Although these concentrations exceed the recommended maximum, the relatively high measured pH (7.32 – 7.69) reduces their release potential such that that these higher concentrations of cationic metals may be tolerated by the site microorganisms. The significant TPH-degrading microorganism population measured in the soils also supports this hypothesis.

Maximum and average measured PHC concentrations in the five (5) baseline biopile soil samples, 6,300 mg/kg and 5,617 mg/kg, respectively, are well below the 50,000 mg/kg total PHC threshold for biopile treatment effectiveness.

4.5 Temperature

Aerobic biodegradation of petroleum hydrocarbons in soil is optimal at temperatures ranging from 15 to 45 degrees Celsius (°C). A maximum temperature of 30°C should be maintained by monitoring and aeration as required in order to avoid accidental sterilization of the biopile.

4.6 Treatment Time

Based on an assumed half-life for C10-C16 hydrocarbons of 170 to 230 days (based on a literature review of several biopile treatment studies), a target TPH concentration of 1,000 mg/kg and maximum current concentration of 6,300 mg/kg (based on the 2015 composite samples), soil treatment is expected to take between 18 and 24 months under ideal conditions. Due to the cool climate in the northern Inuit Community of Hopedale, petroleum hydrocarbon degradation is only expected to occur over the summer months.

4.7 Conclusion

The biopile treatment is anticipated to be effective given the observed baseline soil conditions, however several follow-up activities will be required to ensure successful completion, including: monitoring, addition of specified nutrients, irrigation and aeration.

5.0 SUMMARY OF ADDITIONAL SOIL REQUIRING REMEDIATION

As part of the 2010 HHERA and RAP (Stantec, 2010), certain areas with high concentrations of TPH and metals-impacted soil were selected for remediation in an attempt to achieve area- and site-wide EPCs that would be less than the applicable SSTLs. As a result, not all soil with concentrations of TPH and metals exceeding the SSTLs would necessarily be remediated. The final area- and site-wide EPCs can only be verified once the planned areas of remediation at the site have been completed and confirmatory soil sample results are available to characterize the actual concentrations of COCs remaining on site. As stated in Section 1.2, all PCB-impacted soil with concentrations exceeding the residential SSTL of 9 mg/kg is to be remediated from the site; therefore, EPCs for PCBs do not need to be verified once the planned remedial areas are complete.

To date, a number of the areas designated for remediation in the 2010 RAP have been remediated. Confirmatory soil samples have been collected along the limits of these remedial excavations in order to characterize the concentrations of COCs remaining on-site and to be used to re-evaluate area- and site-wide EPCs once the planned site remediation is complete.

The areas designated for remediation in the 2010 RAP that have not yet been remediated or that have been partially remediated are presented in Table 5.1. Revised tonnage estimates are provided for these areas based on the results of additional delineation and site observations (i.e., % soil cover and soil depths). Drawing Nos. 121413099-200-EE-03 to 12141309-200-EE-09 in Appendix A show the estimated limits of the areas of soil requiring remediation. Once these areas are remediated, area- and site-wide EPCs will need to be verified and further risk evaluation may be required.

Table 5.1 Summary of TPH, PCB and Metals-Impacted Soil Requiring Remediation Based on SSTLs and EPCs – BMEWS, Old Base 1, Main Base, Mid-Canada Line, Pit No. 1 and Pit No. 3

Remedial Area	Remedial Objectives	Sample Locations	Area (m^2)	Depth (m)	Weight[1] (tonnes)
BMEWS	TPH	**BMEWS-AREA 1** (between BMEWS-TP2 and 14-BMEWS-BS107)	100	1	100
	TPH	**BMEWS-AREA 3** (BS20, 14-MB-BS301)	70	0.5	35
Old Base 1	PCBs	**OB1-AREA 1** (22577, 22578, 22582, 22583, 22585, 22594, 22609, BS121, BS126, OB1 BS2, OB1-BS6, OB1-BS7, 22576, 22630, BS121, BS122, BS123, BS126, OB1-BS7, 15-OB1-BS101)	1,828	0.05	91
	PCBs	**OB1-AREA 2** (22567)	57	0.05	3
Main Base	PCBs	**MB-AREA 1 Northwest** (6515, 21486, 22408, 22400, 6517, 15-MB-BS104, MB-BS113 15-MB-BS114)	270	0.05	14
	PCBs	**MB-AREA 1 Centre** (15-MB-BS103)	75	0.05	4
	PCBs	**MB-AREA 1 Northeast** (15-MB-BS103, 15-MB-BS104, 150MB-BS111 to 15-MB-BS116, 15-MB-TP102)	182	1	182
	PCBs	**MB-AREA 4** (22705)	25	0.7	18
	PCBs	**MB-AREA 5** (6546)	5	0.1	1
	PCBs	**MB-AREA 6** (Septic Tank)	-	-	3
	PCBs	**POLW-AREA 1** (13-POLW-BS10)	100	0.1	10
	TPH	**MB-AREA 9** (MW-6, MB-TP5, 14-MB-BS902, 14-MB-BS903)	482	0.5	241
	TPH	**MB-AREA 7** (14-MB-BS701, 14-MB-BS702, 14-MB-BS703, 14-MB-BS705)	400	0.4	160
Mid-Canada Line	Cadmium, Chromium, Lead	**MCL-AREA 1** (MCL-BS10, BS135)	110	0.05	6
	Chromium	**MCL-AREA 2** (BS257)	77	0.05	4
Pit No. 1	PCBs	**P1-AREA 1** (TP152-BS1)	54	1.4	76
	PCBs	**P1-AREA 2** (MW18-SS4, 15-P1-TP201, 15-P1-TP202)	94	1.7	160
Pit No. 3	TPH	**P3-AREA 1** (BS239, BS240, BS241, P3-TP2, P3-TP4, P3-TP6, P3-TP7, P3-TP8, TP-161, TP-162, TP-164, TP-165, TP-166, TP-169, BS271, MW27, MW28, MW29, MW30)	4,135	1.0	4,135
	TPH	**P3-AREA 2** (BS237, P3-BS3, P3-BS4)	30	1	54
Old Dump Pond	PCBs	**ODP-AREA 1** (TP-229)	25	0.25	11

Notes:
1. Based on an estimated soil density of 1.8 tonnes/m^3.

5.1 Forecasted EPCs

As part of the current assessment, forecasted EPCs for TPH and metals have been generated for soil that will remain on site once the areas presented in Table 5.1 are remediated. The forecasted values have been generated using actual confirmatory soil sampling results from 2011 to 2015 and assumed confirmatory soil sampling results for the remaining areas yet to be remediated. Forecasted EPCs were generated using ProUCL (Version 5.0), a software package that uses statistical analysis to calculate the appropriate UCL given the specific distribution of the site specific analytical results data. See Appendix G for the ProUCL output. The dataset used to generate Forecasted EPCs was compiled as follows:

1. Compiled all soil sample results from the 2009 (Phase III ESA) investigation to represent site- and area-wide concentrations of COCs.
2. For duplicate samples (field/laboratory duplicates), retained only the highest of the two concentrations in order to prevent the potential for one soil sample to unduly skew the EPC.
3. Removed all 2009 data points that were collected from remediated areas and from areas proposed for future remediation (refer to Table 4.1). Replaced each data point with the following:

    - The average of the confirmatory soil sample results for that area (ODP-PCB area, WH-Shoreline, BMEWS-PCB area, BMEWS-AREA 2, BMEWS-AREA 4, BMEWS-AREA 5, MB-AREA 2, MB-AREA 8, POL-AREA 1, POL-AREA 3 and POL-AREA 4);
    - The average of the sample results for confirmatory soil samples collected from the presumed limits of the areas yet to be remediated (BMEWS-AREA 1, BMEWS-AREA 3, MB-AREA 9, MCL-AREA 1 and MCL-AREA 2);
    - The average of nearby sample results for areas yet to be remediated (OB1-AREA 1, P1-AREA 1, P1-AREA 2, P3-AREA 1, P3-AREA 2); or,
    - A combination of confirmatory soil samples and nearby samples for areas yet to be remediated (MB-AREA 1).

    For example: removed the sample results for BS41 (POL-AREA 3 remedial area) and replaced it with the average of confirmatory sample results for POL-BS301, POL-BS302 and POL-BS303.

4. For remediated areas where sampling was not carried out in 2009-2010 (i.e., impacted areas historically sampled by ESG or discovered during the 2011-2015 delineation programs by Stantec), added one data point to the data set, as follows:

    - The average of the confirmatory soil sample results for that area (Stream and WH-Roadside); or,
    - The average of the sample results for confirmatory soil samples collected from the presumed limits of the area yet to be remediated (MB-AREA 4, MB-AREA 5, MB-AREA 8, POLW-AREA 1 and OB1-AREA 2).

5. Generated Forecasted EPCs using ProUCL Version 5.0. Where concentrations were reported as being non-detectable, a value of ½ the RDL was used in calculations. EPCs were generated using samples collected from < 0.3 metres below the ground surface (mbgs) (ecological depth) and confirmatory soil sample result averages (regardless of depth). EPCs were generated for COCs for the following areas, as defined in the 2010 ERA (Stantec, 2010):

   - Area 1: BMEWS, Valley Drainage Ponds, Reservoir
   - Area 2: Main Base, Pit No. 2, Mid-Canada Line, Old Base 1, Pallet Line
   - Area 3: Pit No. 1, Pit No. 3, Small Pond Bog, POL Compound, Old Dump Pond
   - Whole Site: Includes Areas 1, 2 and 3, above.

A summary of the EPCs presented in the 2010 HHERA (i.e., prior to site remediation) and the Forecasted EPCs once the areas described in Table 5.1 are remediated are presented in Table 5.2.

Table 5.2 Exposure Point Concentrations

COC	SSTL	Source of SSTL	VECs with Potential Unacceptable Risk (2010 HHERA)	Historical EPCs (2010 HHERA) (mg/kg dw)				Forecasted EPCs (mg/kg dw)			
				AREA 1	AREA 2	AREA 3	WHOLE SITE	AREA 1	AREA 2	AREA 3	WHOLE SITE
Modified TPH	1700	ERA	Red fox (Area 1) ***Masked shrew (Area 1, 2, 3)*** Meadow vole (Area 1, 2, 3) American robin (Whole Site) Short-eared owl (Whole Site) Arctic hare (Whole Site)	**106,000**	**18,879**	**8,374**	**19,690**	**3,923**	**1,764**	841	1,245
Antimony	5	ERA	***Masked shrew (Area 3)*** Meadow vole (Area 3) Arctic hare (Whole Site)	-	-	**85**	**12**	-	-	**6.7**	3.2
Cadmium	1.3	ERA	Red fox (Area 2) ***Masked shrew (Area 1, 2)*** Meadow vole (Area 2) American robin (Whole Site) Arctic hare (Whole Site)	**11**	**12**	-	**3.0**	**1.4**	**1.8**	-	**1.4**
Chromium (Total)	20	ERA	Masked shrew (Area 2, 3) Meadow vole (Area 2) ***American robin (Whole site)***	-	**155**	**69**	**109**	-	**21**	**47**	**23**
Lead	75	ERA	Masked shrew (Area 3) ***Arctic robin (Whole site)***	-	**586**	**1,745**	**124**	-	**122**	**291**	69

Bold/Italics = Basis of SSTL. Note: SSTLs were established for the most conservative VEC, but would also be considered protective of all the VECs evaluated.
Bold/Shaded = EPC exceeds SSTL

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

During Year 5 of the Implementation of the RAP at the Former U.S. Military Site in Hopedale, NL, Stantec supervised environmental site remediation and conducted confirmatory soil sampling at Main Base, BMEWS and the POL Compound. Site remediation was carried out in response to recommendations provided in a RAP/RMP prepared by Stantec in 2009, additional delineation program carried out by Stantec in 2010 and 2013, a remediation program in 2014 and a mutually agreeable work plan developed by the Stakeholder Committee.

The following is a summary of remedial and on-site activities carried out at the Site in Year 5.

1. The existing biopile was sampled following NLDEC's standard COA for soil treatment facilities. Concentrations of TPH in the composite soil samples exceeded 1,000 mg/kg; therefore, the soil required additional treatment before it could be disposed. Biopile maintenance activities, consisting of the addition of specified nutrients and mechanical aeration were carried out following the placement of TPH-impacted soil in the biopile containment cell. The treatability of the biopile was evaluated and the biopile treatment is anticipated to be effective given the observed baseline soil conditions, however several follow-up activities will be required to ensure successful completion, including: monitoring, addition of specified nutrients, irrigation, and aeration.
2. A total of 749 tonnes of PCB-impacted soil was removed from the north and west areas of Main Base-Area 1 and was transported to Saint-Ambroise, QC by sea for PCB destruction. Confirmatory soil sampling was carried out along the limits of the remedial excavation to determine if the soil remaining on-site contained concentrations of PCBs below the residential site specific target level (SSTL) of 9 mg/kg. To meet the SSTL, additional soil removal is required to the north, centre and west of the Main Base-Area 1 excavations in the vicinity of samples 15-MB-BS103, 15-MB-BS104, 15-MB-BS111, 15-MB-BS112, 15-MB-BS114, 15-MB-BS115 and 15-MB-TP102-BS1. PCB-soil removal is also required in the vicinity of samples 22705 (referred to as "Main Base-Area 4"), 6546 (referred to as "Main Base-Area 5") and 13-POLW-BS10 (referred to as "POL West-Area 1") that have not yet been remediated. Sludge removal is required at the septic tank along the northern of the Main Base (referred to as "Main Base-Area 6").
3. A total of 201.6 tonnes of metals-impacted soil was removed from impacted areas of the Site and was transported to Chicoutimi, QC for treatment. Confirmatory soil sampling was carried out along the limits of the remedial excavations to determine if soil remaining on-site contained concentrations of metals below the applicable SSTLs. Metals-impacted soil was removed from the following areas:

   - BMEWS: 16 tonnes of metals-impacted soil was removed from the area surrounding sample BS1 (referred to as "BMEWS-Area 4") and from the area surrounding sample BS7 (referred to as "BMEWS-Area 5"). To meet the SSTLs, additional soil removal is required in the areas of samples 15-BMEWS-BS401 to 15-BMEWS-BS404, 15-BMEWS-BS501, 15-BMEWS-BS503 and 15-BMEWS-BS504.

- o Main Base: 147 tonnes of metals-impacted soil was removed from the area surrounding samples TP-10, MB-TP2 and MB-TP3 (referred to as "Main Base-Area 2"). To meet the SSTLs, additional soil removal is required in the vicinity of samples 15-MB-BS201 to 15-MB-BS206.
- o POL Compound: 18 tonnes of metals-impacted soil was removed from the area surrounding sample BS41 (referred to as "POL-Area 3") and from the area surrounding sample BS39 (referred to as "POL-Area 4"). To meet the SSTLs, additional soil removal is required in the vicinity of samples 15-POL-BS301 to 15-POL-BS303, 15-POL-BS401, 15-POL-BS402 and 15-POL-BS404.

4. PCB analysis was conducted on three (3) sediment samples and three (3) surface water samples collected from the Swimming Pond and on five (5) soil samples collected from along the main access road to BMEWS and Main Base. PCBs were not detected in the samples collected from the Swimming Pond. Concentrations of PCBs in the soil samples collected from the road did not exceed the residential SSTL of 9 mg/kg.
5. Additional delineation in soil was carried out at the areas known as Main Base-Area 1, Old Base 1-Area 1, Old Base 1-Area 2, Mid-Canada Line-Area 1, Pit No. 1–Area 1, Pit No. 1–Area 2, POL Compound-Area 4 and Pit No. 3-Area 1 where historical exceedances were found and the extent of impacts were not delineated. PCBs in samples 15-MB-BS114, 15-MB-BS115 and 15-MB-TP102-BS1 from Main Base-Area 1 and samples 15-P1-TP201-BS1, 15-P1-TP202-BS2 and 15-P1-TP202-BS3 from Pit No. 2-Area 2 exceeded the SSTL. Some metal parameters in samples 15-POL-BS405 to 15-POL-BS407 at POL Compound-Area 4, samples 15-MCL-BS101 to 15-MCL-BS104 and 15-MCL-BS204 at Mid-Canada Line Areas-1 and 2 and sample 15-OB1-BS101 at Old Base 1-Area 1 exceeded the SSTLs. TPH in samples 15-P3-TP101-BS1, 15-P3-TP102-BS1 and 15-P3-TP103-BS1 at Pit No. 3-Area 1 exceeded the ecological SSTL of 1,700 mg/kg.
6. Metal debris removed from the PCB remedial excavation at Main Base (1.66 tonnes) was stockpiled on tarps at the Laydown Area at Pit No. 1. This metal was kept separate from the metal debris unearthed at the BMEWS site. Boulders were placed at the entrance to Pit No.1 to block public access over the winter months. PCBs were detected in the swabs collected from the five (5) pieces of metal that were randomly selected for sampling. The results indicate that PCBs are present on the metal surface or in the residual soil on the debris. The metal debris will be transported to an appropriate treatment or recycling facility at a later date (dependent on the results of additional sampling to be carried out following additional surface cleaning).
7. As part of the 2010 Human Health and Ecological Risk Assessment (HHERA) and RAP (Stantec, 2010), certain areas with high concentrations of TPH and metals-impacted soil were selected for remediation in an attempt to achieve area- and site-wide EPCs that would be less than the applicable SSTLs. As a result, not all soil with concentrations of TPH and metals exceeding the SSTLs would necessarily be remediated. The final area- and site-wide EPCs can only be verified once the site has been fully remediated and confirmatory soil sample results are available to characterize the actual concentrations of COCs remaining on site.
8. As part of the current assessment, forecasted EPCs were generated using available confirmatory soil sampling results and predicted confirmatory soil sampling results (based on concentrations of COCs observed in nearby samples) to predict EPCs once areas designated in the 2010 HHERA and RAP have been remediated. A comparison of the historical versus forecasted EPCs indicates a substantial decrease in EPCs as a result of the multi-year remediation program (1 to 2 orders of magnitude); however, some EPCs are forecasted to remain above the SSTLs for the protection of ecological health. This may

indicate the need for re-evaluation of the Ecological Risk Assessment with potential additional remediation. These EPCs include:

- modified TPH - Areas 1 & 2
- antimony - Area 3
- cadmium - Areas 1 & 2, Whole Site
- chromium - Areas 2 & 3, Whole Site
- lead - Areas 2 & 3

6.2 Recommendations

Based on the results of the Year 5 of the Implementation of the RAP program, Stantec makes the following recommendations:

1. Complete the removal of TPH-impacted soil exceeding the ecological SSTL of 1,700 mg/kg in areas specified for remediation at BMEWS (estimated 240 tonnes), Main Base (estimated 530 tonnes) and Pit No. 3 (estimated 7,700 tonnes) as per Table 5.1. Once clean boundaries are obtained, return the site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.
2. Complete the removal of PCB-impacted soil exceeding the residential SSTL of 9 mg/kg at Main Base (estimated 636 tonnes), Old Base 1 (estimated 170 tonnes) and Pit No. 1 (estimated 420 tonnes) as per Table 5.1. Once clean boundaries are obtained, return the Site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.
3. Complete the removal of metals-impacted soil exceeding the ecological SSTLs of 1.3 mg/kg for cadmium, 20 mg/kg for chromium and 75 mg/kg for lead at the Mid-Canada Line (estimated 17 tonnes) as per Table 5.1. Once clean boundaries are obtained, return the Site to its original condition. This will include backfilling, levelling and/or the placement of topsoil, as necessary.
4. Remove excess soil from the metal debris removed from Main Base and re-sample. The metal debris is currently stockpiled on liners at the Laydown Area. If metal contains PCBs, treat as PCB-impacted waste and transport to an appropriate facility for treatment and disposal; otherwise, transport off-site to a metal recycling facility.
5. Transport un-impacted metal debris from BMEWS off-site to a metal recycling facility. The metal debris is currently stockpiled on liners at the Laydown Area.
6. Monitor concentrations of TPH in the biopile and perform maintenance activities, as necessary. Collect composite soil samples for the laboratory analysis of metals leachability to confirm disposal options.
7. Once site remediation is complete, re-evaluate area- and site-wide EPCs for comparison to the SSTLs.
8. Continue remediation efforts at the Former U.S. Military Site in accordance with the RAP/RMP and the recommendations provided by the Stakeholder Scientific Advisory Working Group.

7.0 CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the Site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

This report was prepared by Paula Brennan, M.A.Sc., P.Eng. and Anna Roy, M.A.Sc., P.Eng. and reviewed by Jim Slade, P.Eng., P.Geo.

Respectfully submitted,

AIVEK STANTEC LIMITED PARTNERSHIP

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APPENDIX A

Drawings

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION	SCALE: 1:50,000	DATE: MAR. 18, 2016	REV. No. 0
	DRAWN BY: N.M.	EDITED BY: -	CHECKED BY:
PROJECT TITLE: IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL	DRAWING No: **121413099-200-EE-01**	CAD FILE: 121413099_200-EE-01_15.DWG	
DRAWING TITLE: SITE LOCATION PLAN	Stantec		

FILE NAME: T:\JOBS\121413099\TASK 200_REMEDIAL ACTION PLAN - YEAR 5\121413099_200-EE-01_15.dwg

18MAR16 10:30AM

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION	SCALE: 1:12,000	DATE: AUG 25, 2016	REV. No. 0
	DRAWN BY: S.N.	EDITED BY: A.B.	CHECKED BY: P.B.
PROJECT TITLE: IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL	DRAWING No: **121413099-200-EE-02**	CAD FILE: 121413099_200-EE-02_15.DWG	
DRAWING TITLE: SITE PLAN	Stantec		

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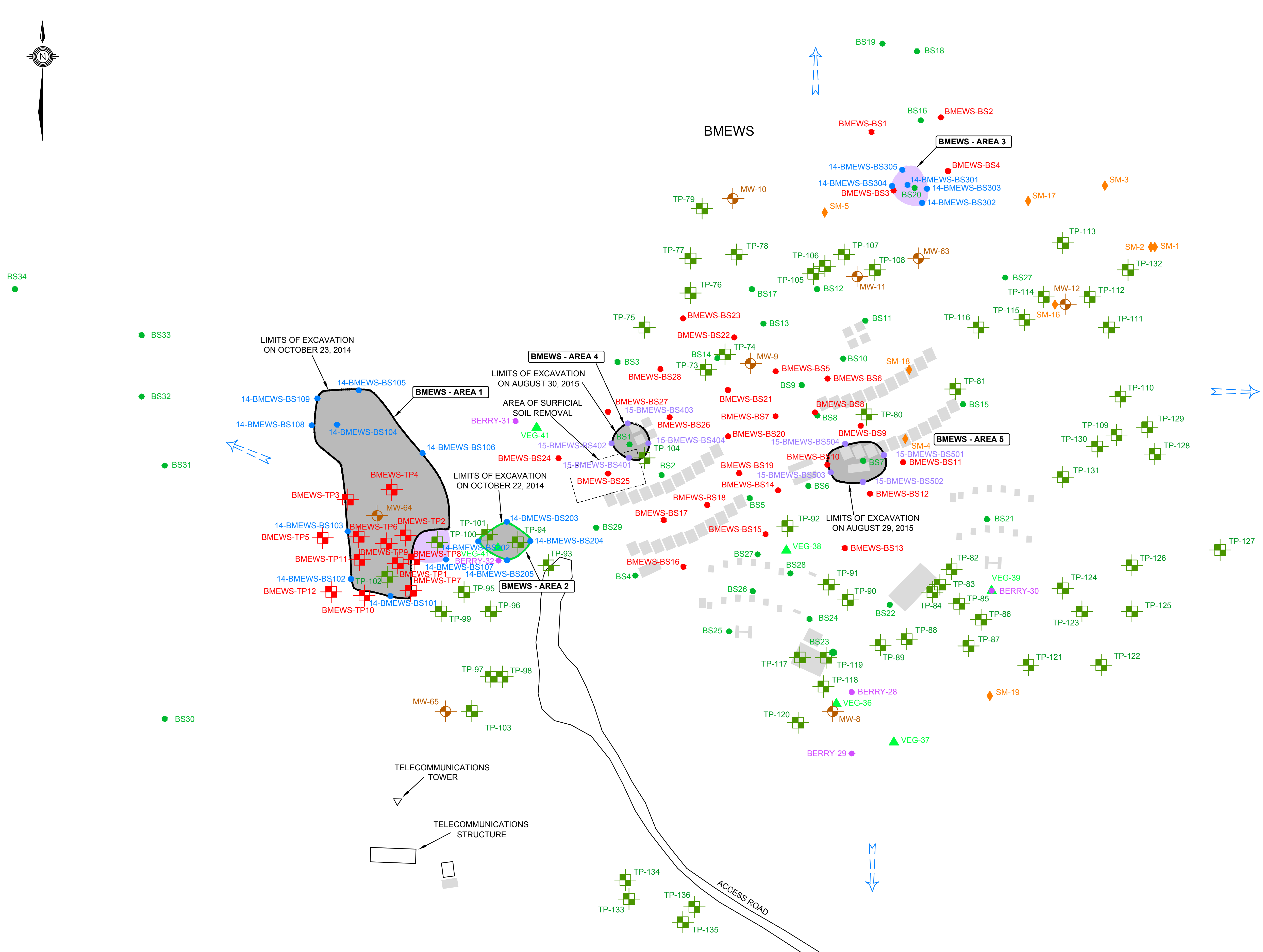
23MAR16 9:05AM



NOTE: LOCATIONS OF MONITOR WELLS AND ASSOCIATED DELINEATION POINTS WERE ADJUSTED ON THIS DRAWING BASED ON GPS COORDINATES RECORDED AS PART OF THE 2014 AND 2015 FIELD PROGRAMS.

LEGEND

- TEST PIT (STANTEC 2010)
- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- BULK SOIL SAMPLE (STANTEC 2015)
- BULK SOIL SAMPLE (STANTEC 2014)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (STANTEC 2009)
- BERRY SAMPLE (STANTEC 2009)
- VEGETATION SAMPLE (STANTEC 2009)
- SMALL MAMMALS (STANTEC 2009)
- INFERRED GROUNDWATER FLOW DIRECTION
- REMEDIAL EXCAVATION
- CONCRETE FOUNDATION
- ESTIMATED AREA OF TPH-IMPACTED SOIL EXCEEDING SSTLs REQUIRING REMOVAL

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

REMEDIATION AREAS AND SAMPLE LOCATION PLAN - BMEWS

Stantec Consulting Ltd.

SCALE:	DATE:	REV. No.
1:1000	MAR. 23, 2016	0
DRAWN BY: S.N.	EDITED BY: -	CHECKED BY: P.B.

DRAWING No:	CAD FILE:
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Stantec

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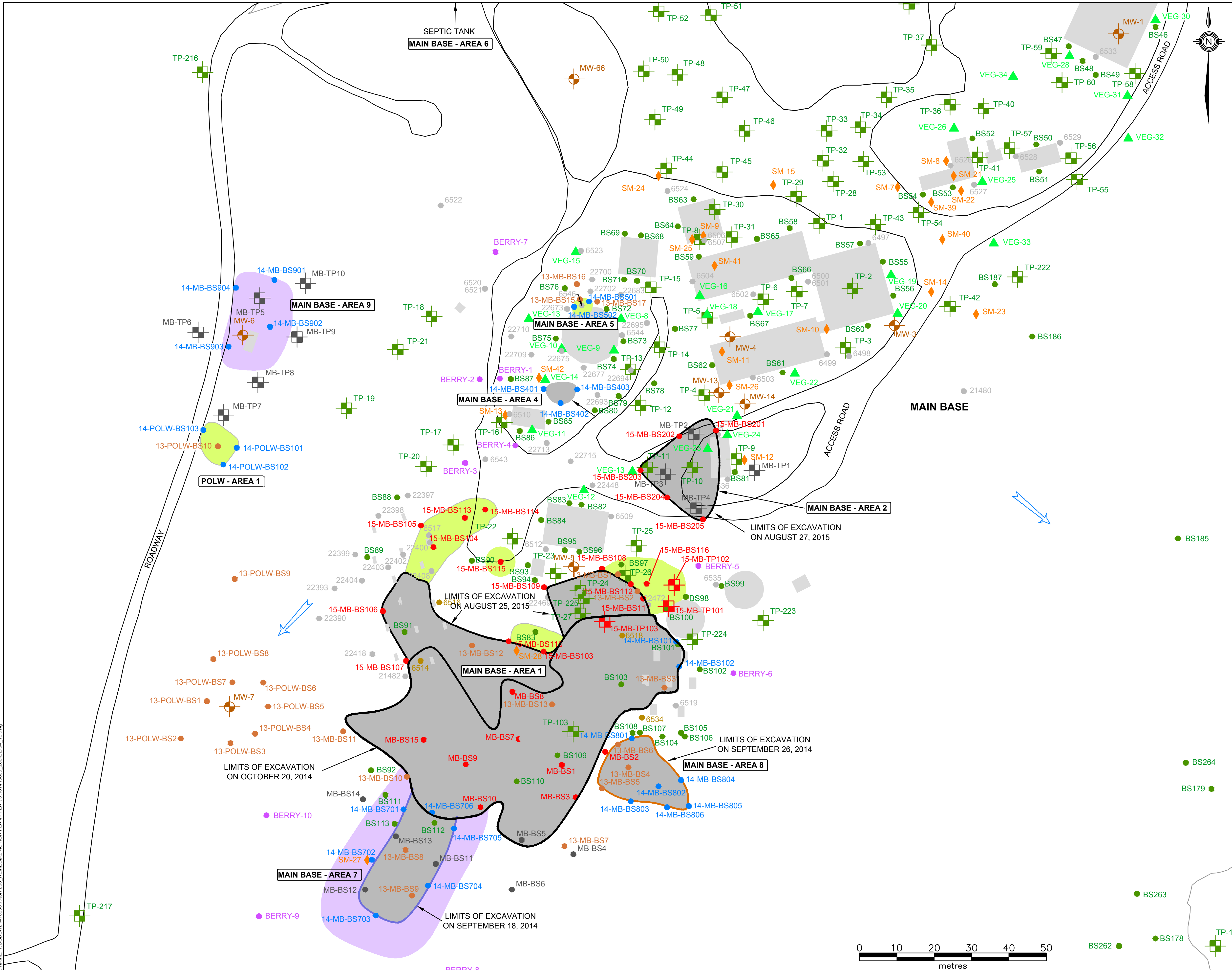

LEGEND

- TEST PIT (STANTEC 2015)
- TEST PIT (STANTEC 2010)
- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- BULK SOIL SAMPLE (STANTEC 2015)
- BULK SOIL SAMPLE (STANTEC 2014)
- BULK SOIL SAMPLE (STANTEC 2013)
- BULK SOIL SAMPLE (STANTEC 2009)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (ESG 2006)
- BULK SOIL SAMPLE (ESG 2004)
- BERRY SAMPLE (STANTEC 2009)
- VEGETATION SAMPLE (STANTEC 2009)
- SMALL MAMMALS (STANTEC 2009)
- — ? — UNKNOWN EXTENT OF IMPACTS
- INFERRED GROUNDWATER FLOW DIRECTION
- REMEDIAL EXCAVATION
- CONCRETE FOUNDATION
- ESTIMATED AREA OF PCB-IMPACTED SOIL EXCEEDING SSTL REQUIRING REMOVAL
- ESTIMATED AREA OF TPH IMPACTED SOIL EXCEEDING SSTLs REQUIRING REMOVAL

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN - YEAR 5 AND ADDITIONAL DELINEATION, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

REMEDIATION AREAS AND SAMPLE LOCATION PLAN - MAIN BASE

Stantec Consulting Ltd.

SCALE: 1:1000	DATE: MAR. 23, 2016	REV. No. 0
DRAWN BY: S.N.	EDITED BY: -	CHECKED BY: P.B.
DRAWING No: 121413099-200-EE-04	CAD FILE: 121413099_200-EE-04_15.DWG	

Stantec

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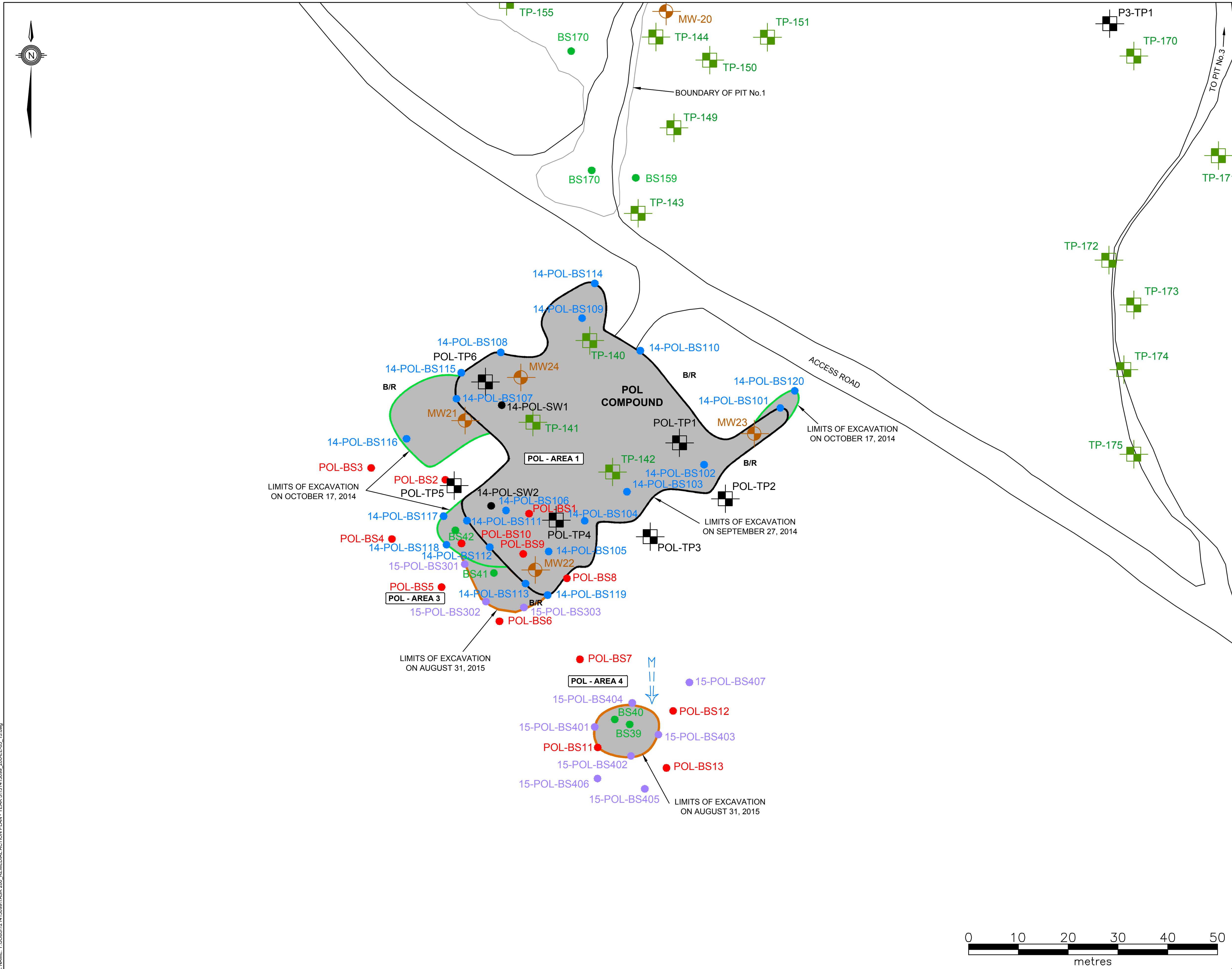

LEGEND

- TEST PIT (STANTEC 2010)
- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- GRAB WATER SAMPLE (STANTEC 2014)
- BULK SOIL SAMPLE (STANTEC 2015)
- BULK SOIL SAMPLE (STANTEC 2014)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (STANTEC 2009)
- INFERRED GROUNDWATER FLOW DIRECTION
- REMEDIAL EXCAVATION
- B/R EXPOSED BEDROCK

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

REMEDIATION AREAS AND SAMPLE LOCATION PLAN - POL COMPOUND

Stantec Consulting Ltd.

SCALE: 1:750	DATE: MAR. 23, 2016	REV. No. 0
DRAWN BY: S.N.	EDITED BY: -	CHECKED BY: P.B.
DRAWING No: 121413099-200-EE-05	CAD FILE: 121413099_200-EE-05_15.DWG	

Stantec

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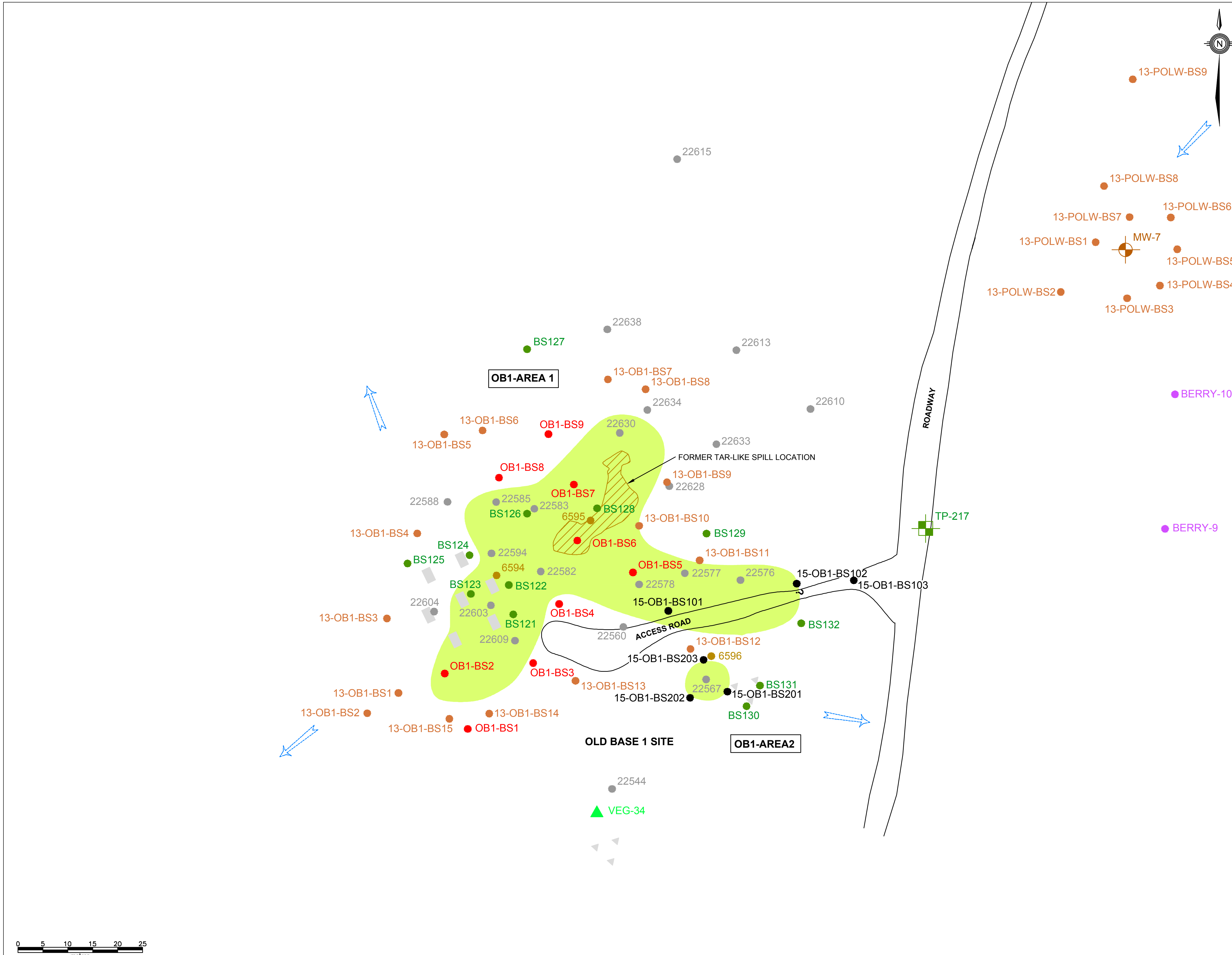

LEGEND

- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- BULK SOIL SAMPLE (STANTEC 2015)
- BULK SOIL SAMPLE (STANTEC 2013)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (STANTEC 2009)
- BULK SOIL SAMPLE (ESG 2006)
- BULK SOIL SAMPLE (ESG 2004)
- BERRY SAMPLE (STANTEC 2009)
- VEGETATION SAMPLE (STANTEC 2009)
- INFERRED GROUNDWATER FLOW DIRECTION
- ? — UNKNOWN EXTENT OF IMPACTS
- ESTIMATED AREA OF PCB IMPACTED SOIL EXCEEDING SSTLs REQUIRING REMOVAL
- CONCRETE FOUNDATION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

SAMPLE LOCATION PLAN - OLD BASE 1

Stantec Consulting Ltd.

SCALE: 1:750	DATE: MAR. 23, 2016	REV. No. 0
DRAWN BY: S.N.	EDITED BY:	CHECKED BY: P.B.
DRAWING No: 121413099_200-EE-06	CAD FILE: 121413099_200-EE-06_15.DWG	

Stantec

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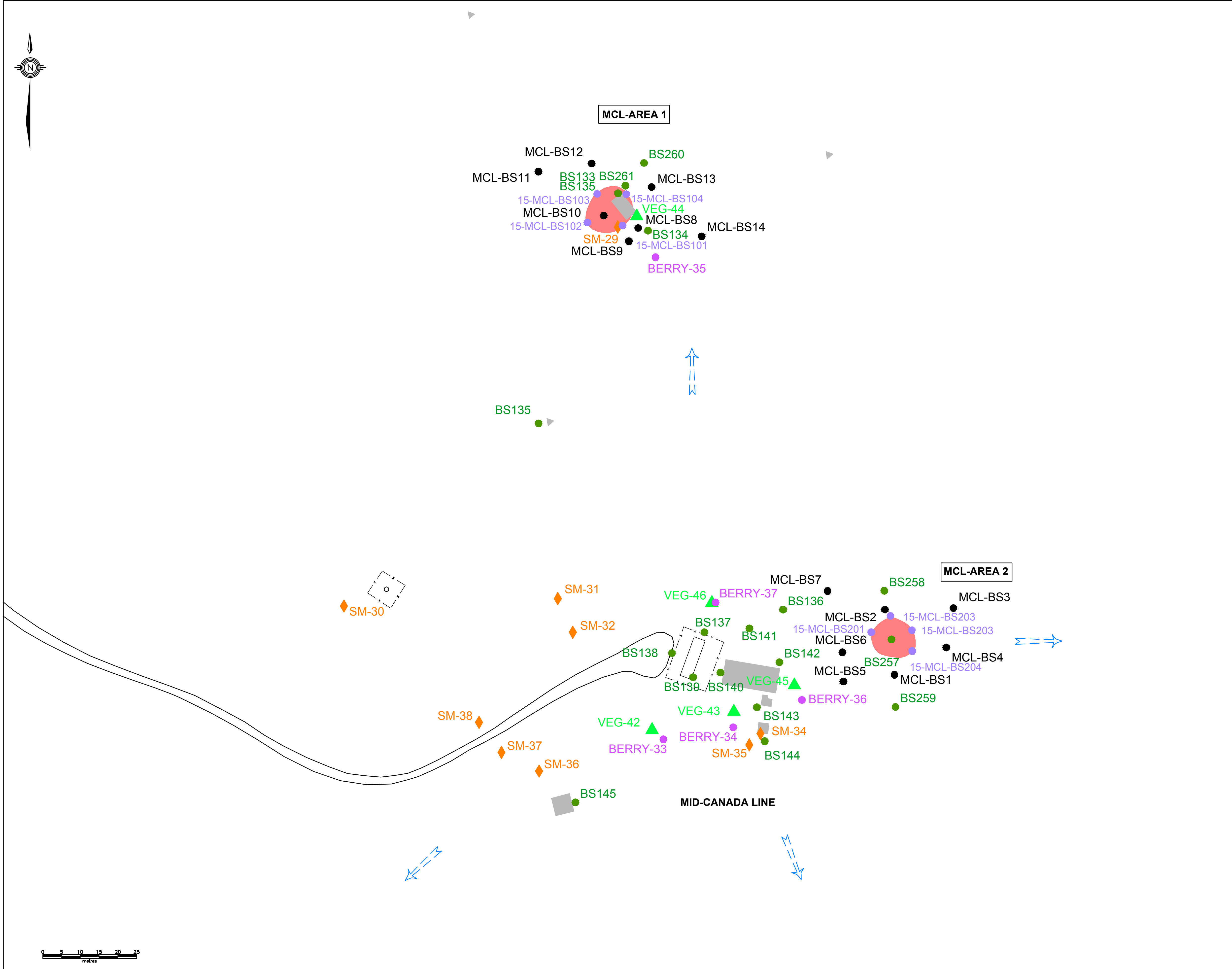

LEGEND

- BULK SOIL SAMPLE (STANTEC 2015)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (STANTEC 2009)
- BERRY SAMPLE (STANTEC 2009)
- VEGETATION SAMPLE (STANTEC 2009)
- SMALL MAMMALS (STANTEC 2009)
- — ? — UNKNOWN EXTENT OF IMPACTS
- CONCRETE FOUNDATION
- INFERRED GROUNDWATER FLOW DIRECTION
- ESTIMATED AREA OF METALS-IMPACTED SOIL EXCEEDING SSTLs REQUIRING REMOVAL

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

SAMPLE LOCATION PLAN - MID-CANADA LINE

Stantec Consulting Ltd.

SCALE: 1:1000	DATE: MAR. 23, 2016	REV. No. 0
DRAWN BY: S.N.	EDITED BY: -	CHECKED BY: P.B.
DRAWING No: 121413099-200-EE-07	CAD FILE: 121413099-200-EE-07_15.dwg	

Stantec

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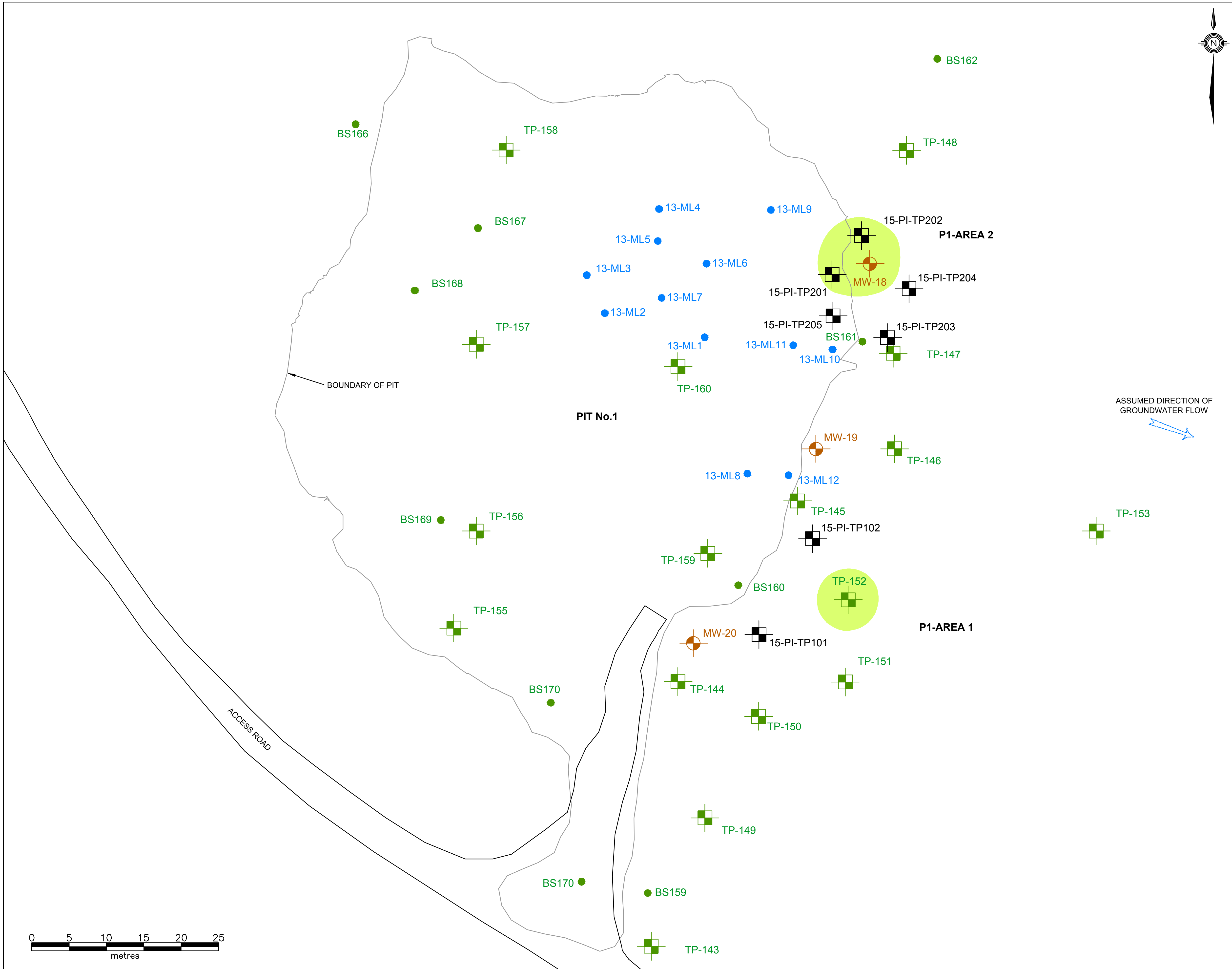

LEGEND

- TEST PIT (STANTEC 2015)
- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- BULK SAMPLE (STANTEC 2009)
- BULK SAMPLE (STANTEC 2013)
- ESTIMATED AREA OF PCB IMPACTED SOIL EXCEEDING SSTLs REQUIRING REMOVAL
- ASSUMED DIRECTION OF GROUNDWATER FLOW

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

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NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

SAMPLE LOCATION PLAN - PIT No. 1

Stantec Consulting Ltd.

SCALE: 1:500	DATE: MAR. 23, 2016	REV. No. 0
DRAWN BY: S.N.	EDITED BY: -	CHECKED BY: P.B.

DRAWING No:	CAD FILE:
121413099_200-EE-08	121413099_200-EE-08_15.DWG

Stantec

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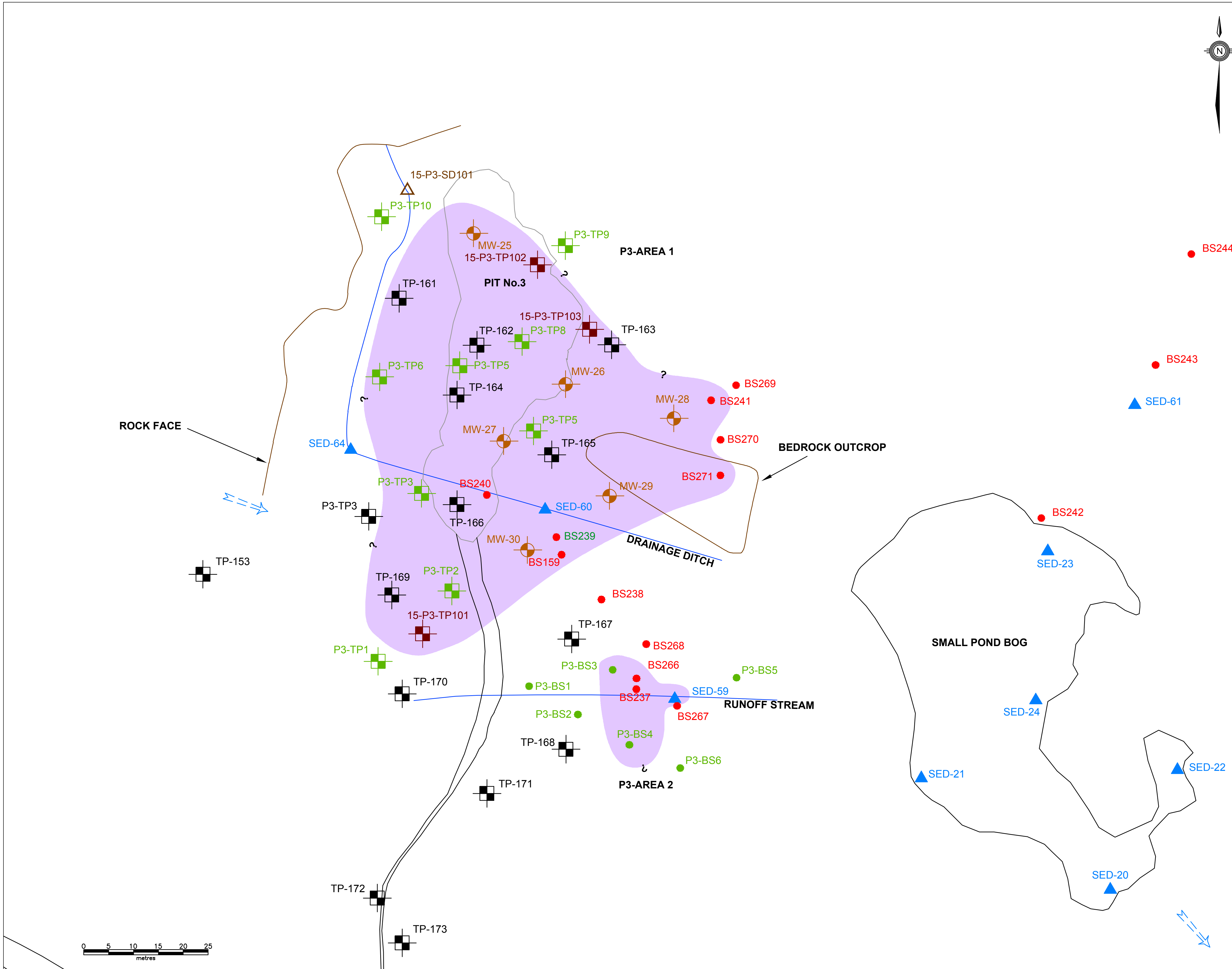

LEGEND

- TEST PIT (STANTEC 2015)
- TEST PIT (STANTEC 2010)
- TEST PIT (STANTEC 2009)
- MONITOR WELL (STANTEC 2009)
- BULK SOIL SAMPLE (STANTEC 2010)
- BULK SOIL SAMPLE (STANTEC 2009)
- SEDIMENT SAMPLE (STANTEC 2009)
- — ? — UNKNOWN EXTENT OF IMPACTS
- ESTIMATED AREA OF TPH IMPACTED SOIL EXCEEDING SSTLs REQUIRING REMOVAL
- INFERRED GROUNDWATER FLOW DIRECTION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT:

NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION

PROJECT TITLE:

IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL

DRAWING TITLE:

SAMPLE LOCATION PLAN - PIT No. 3

Stantec Consulting Ltd.

SCALE: 1:750	DATE: MAR. 23, 2016	REV. No. 0
DRAWN BY: S.N.	EDITED BY: -.	CHECKED BY: P.B.
DRAWING No: 121413099_200-EE-09	CAD FILE: 121413099_200-EE-09_15.DWG	

Stantec

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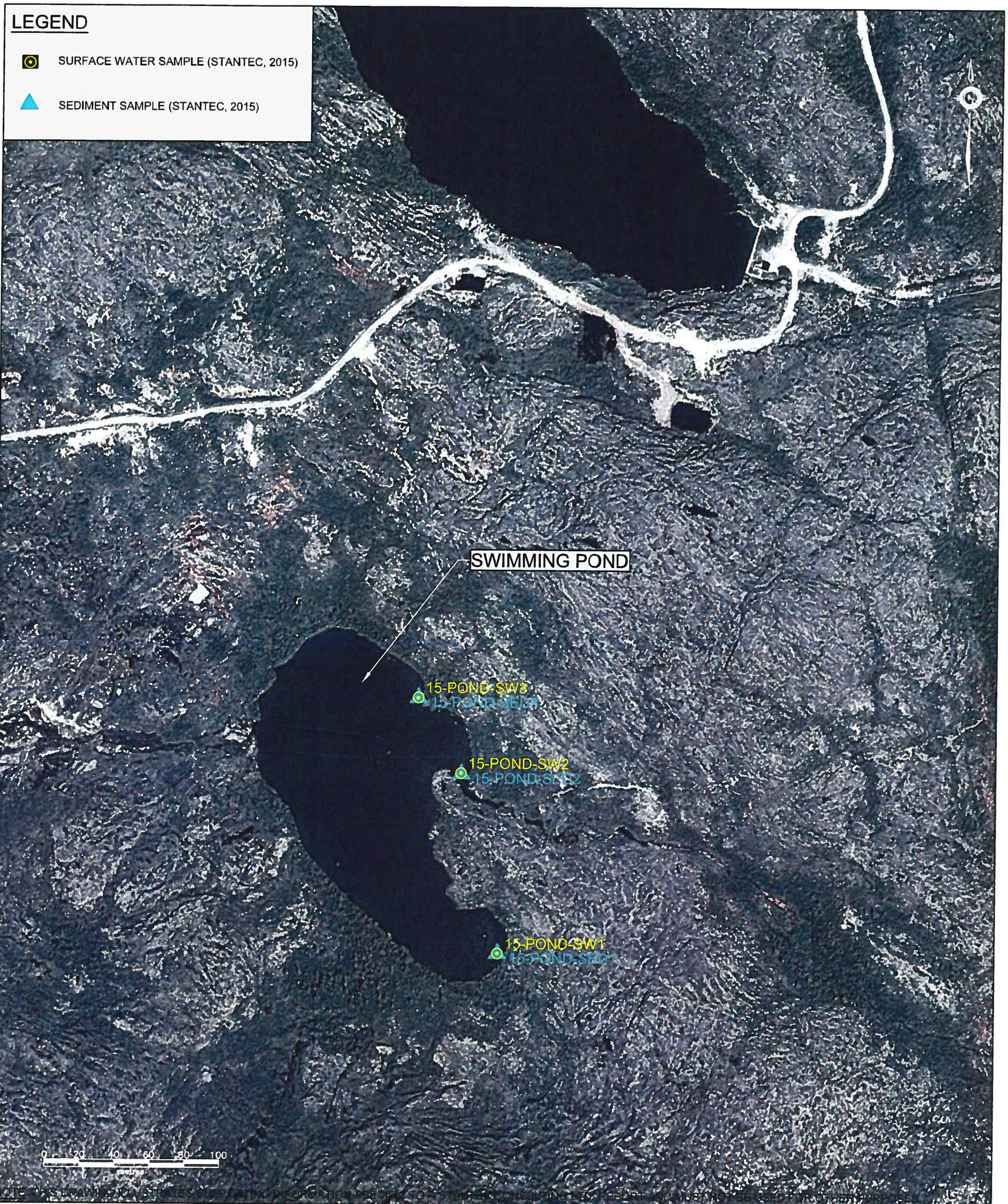

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION	SCALE: 1:3000 · DATE: MAR. 23, 2016 · REV. No. 0
	DRAWN BY: S.N. · EDITED BY: - · CHECKED BY:
PROJECT TITLE: IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL	DRAWING No: 121413099-200-EE-10 · CAD FILE: 121413099_200-EE-10_15.DWG
DRAWING TITLE: SAMPLE LOCATION PLAN - SWIMMING POND	Stantec

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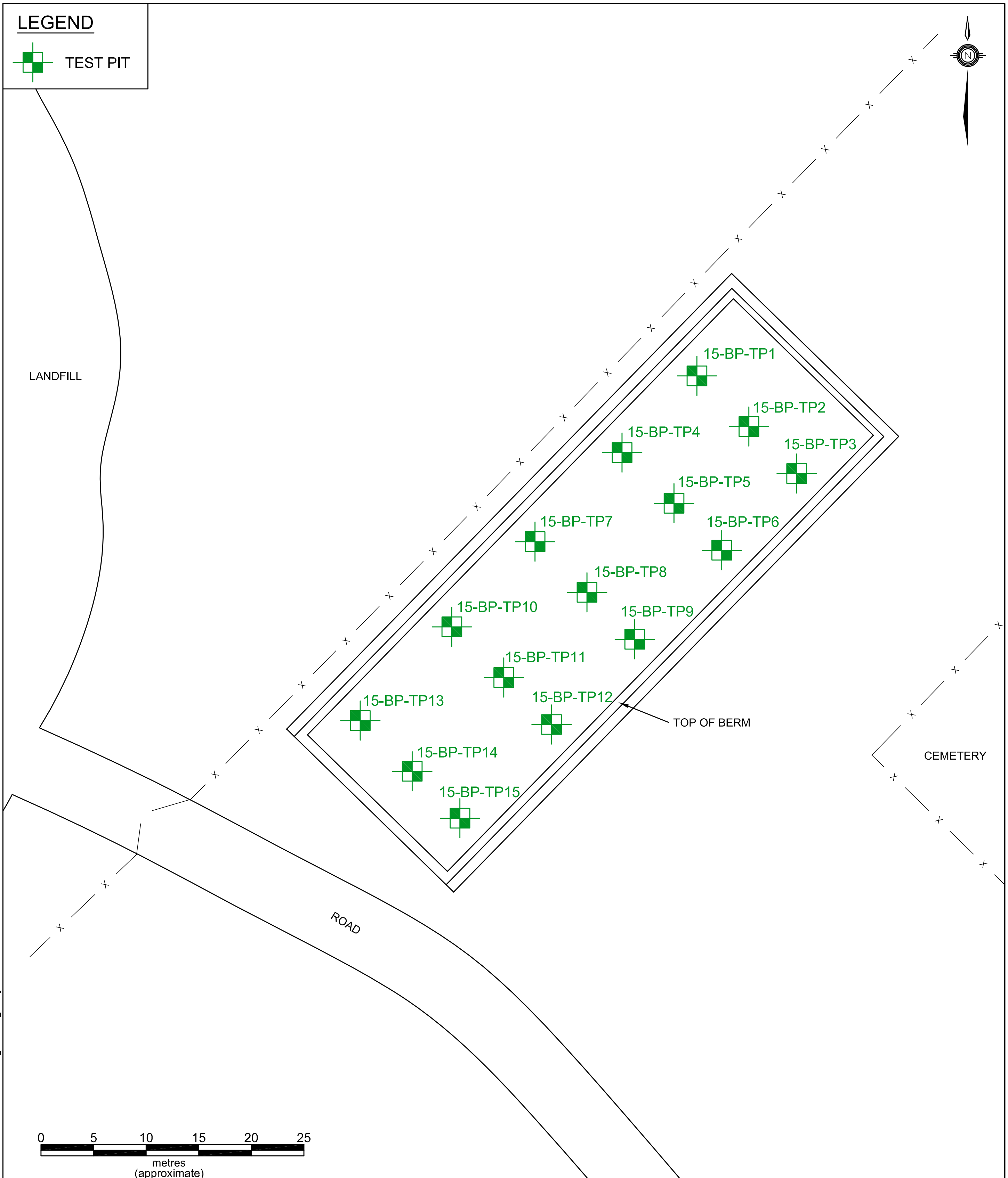

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT AND CONSERVATION	SCALE: 1:500 (approx.)	DATE: MAR. 23, 2016	REV. No. 0
	DRAWN BY: S.N.	EDITED BY: -	CHECKED BY:
PROJECT TITLE: IMPLEMENTATION OF REMEDIAL ACTION PLAN AND ADDITIONAL DELINEATION - YEAR 5, FORMER U.S. MILITARY SITE, HOPEDALE, NL	DRAWING No: **1214130996-200-EE-11**	CAD FILE: 121413099_200-EE-11_15.DWG	
DRAWING TITLE: TEST PIT LOCATION PLAN - BIOPILE	Stantec		

FILE NAME: T:\JOBS\121413099\TASK 200_REMEDIAL ACTION PLAN - YEAR 5\121413099_200-EE-11_15.dwg

23MAR16 9:10AM

APPENDIX B

Site Photographs

Biopile

Photo 1 Biopile in Year 5 prior to soil sampling, August 18, 2015.

Photo 2 Biopile in Year 5 prior to soil sampling, August 18, 2015.

Photo 3 Application of amendments to the biopile, August 20, 2015.

Photo 4 Placing the cover on the biopile, August 29, 2015.

Photo 5 Securing the cover on the biopile, August 29, 2015.

Photo 6 Securing the cover on the biopile, August 29, 2015.

BMEWS

Photo 7 Soil removal at BMEWS-Area 4, August 19, 2015.

Photo 8 Soil removal at BMEWS-Area 4, August 19, 2015.

Photo 9 Soil removal at BMEWS-Area 5, August 29, 2015.

Photo 10 Soil removal at BMEWS-Area 5, August 29, 2015.

Main Base

Photo 11 Main Base looking southeast, August 18, 2015.

Photo 12 Main Base-Area 1 prior to soil removal in Year 5, August 18, 2015.

Photo13 Soil removal at Main Base-Area 1, looking east, August 21, 2015.

Photo 14 Soil removal at Main Base-Area 1, looking west, August 21, 2015.

Photo 15 Soil removal at Main Base-Area 1, looking west, August 24, 2015.

Photo 16 Soil removal at Main Base-Area 1, looking southeast, August 24, 2015.

Photo 17 Soil removal at Main Base-Area 1, looking south, August 24, 2015.

Photo 18 Soil removal at Main Base-Area 1, looking north, August 24, 2015.

Photo 19 Soil removal at Main Base-Area 1, looking east, August 24, 2015.

Photo 20 Soil removal at Main Base-Area 1, looking southeast, August 24, 2015.

Photo 21 Soil removal at Main Base-Area 1, looking west, August 24, 2015.

Photo 22 Soil removal at Main Base-Area 1, August 24, 2015.

Photo 23 Soil removal at Main Base-Area 2, looking east, August 25, 2015.

Photo 24 Soil removal at Main Base-Area 2, looking west, August 25, 2015.

Photo 25 Soil removal at Main Base-Area 2, looking south, August 26, 2015.

Photo 26 Bagging of removed soil at Main Base-Area 2, August 26, 2015.

Photo 27 Remedial excavation backfilled at Main Base-Area 1, September 1, 2015.

Photo 28 Remedial excavation backfilled at Main Base-Area 1 and remedial excavation boundary covered, September 1, 2015 .

Photo 29 Remedial excavation backfilled at Main Base-Area 1, September 1, 2015.

Photo 30 Additional delineation at Main Base-Area 1, October 30, 2015.

Photo 31 Additional delineation at Main Base-Area 1, October 30, 2015

POL Compound

Photo 32 Soil removal at POL-Area 3, looking southeast, August 30, 2015.

Photo 33 POL Compound-Area 3 following soil removal, looking northwest, August 30, 3015.

Photo 34 Soil removal at POL-Area 4, looking southwest, August 30, 2015.

Photo 35 Soil removal at POL-Area 4, looking north, August 30, 2015.

Photo 36 POL Compound-Area 4 following soil removal, looking northwest, August 30, 2015.

Photo 37 POL Compound-Area 4 following soil removal, looking north, August 30, 2015.

Mid-Canada Line

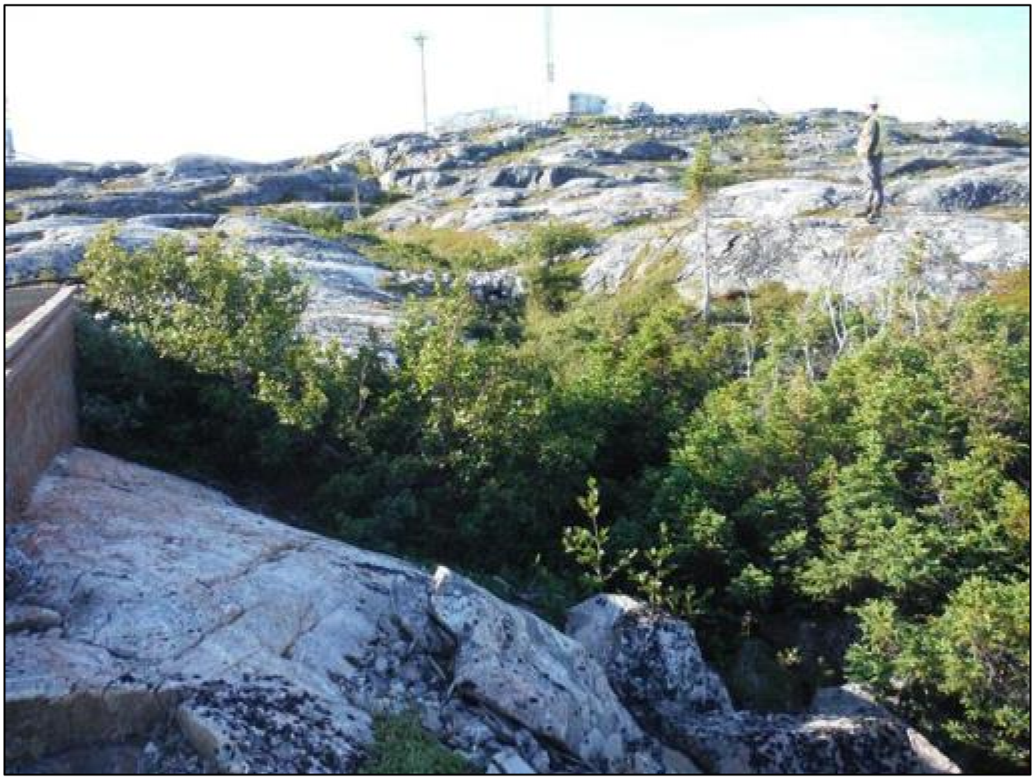

Photo 38 Staking out area for remediation (MCL-Area 1) at Mid-Canada Line (note area was not remediated in Year 5), August 19, 2015.

Photo 39 Staking out area for remediation (MCL-Area 2) at Mid-Canada Line (note area was not remediated in Year 5), August 19, 2015.

Swimming Pond

Photo 40 Swimming Pond looking northwest, August 20, 2015.

Photo 41 Swimming Pond looking southwest, August 20, 2015.

Pit No. 1

Photo 42 Separating metal debris and filling bags with impacted soil at Pit No. 1, August 21, 2015.

Photo 43 Separating metal debris and filling bags with impacted soil at Pit No. 1, August 21, August 21, 2015.

Photo 44 Pit No. 1, transporting filled soil bag at Staging Area, August 21, 2015.

Photo 45 Pit No. 1, Staging Area for the storage of impacted soil bags, August 22, 2015.

Photo 46 Pit No. 1, Staging Area for the storage of impacted soil bags, August 23, 2015.

Photo 47 Pit No. 1, Staging Area for the storage of impacted soil bags, August 23, 2015.

Photo 48 Additional delineation in soil at Pit No. 1, October 31, 2015.

Photo 49 Additional delineation in soil at Pit No. 1, October 31, 2015.

Photo 50 Additional delineation in soil at Pit No. 1, October 31, 2015.

Photo 51 Additional delineation in soil at Pit No. 1, October 31, 2015.

Impacted Soil Shipment

Photo 52 Long Island at the American Dock prior to loading, September 14, 2015.

Photo 53 Loading soil bags, September 14, 2015.

Photo 54 Transport of impacted soil bags by a flat bed truck from Pit No. 1 to the dock, September 14, 2015.

Photo 55 Transfer of PCB-impacted soil bags to the ship's cargo hold, September 14, 2015.

Photo 56 Long Island at the American Dock, September 14, 2015.

Photo 57 Long Island cargo hold, September 15, 2015.

Photo 58 Pit No. 1, Staging Area for the storage of impacted soil bags, September 16, 2015.

Photo 59 Pit No. 1, transferring the impacted soil bags for transport to the dock, September 16, 2015.

Photo 60 Pit No. 1, transferring the impacted soil bags to a flat bed truck for transport to the dock, September 16, 2015.

Photo 61 Metal stored on tarps at Pit No. 1, September 16, 2015.

Photo 62 Long Island cargo hold, September 16, 2015.

APPENDIX C

Laboratory Analytical Results Summary Tables

Table C.1 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Biopile
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Date	Sample Depth (mbgs)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance
			Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C32?[3]	Modified TPH - Tier I[2]	
		Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	-
		RDL (2011)	0.03	0.03	0.03	0.05	3	10	10	15		20	-
		RDL (2012-2014)	0.025	0.025	0.025	0.05	2.5	10	10	15		15	
		RDL (2015)	0.025	0.025	0.025	0.05	2.5	50	50	75		75	
		Landfill acceptance criteria[1]	2.5	10,000	10,000	110	-	-	-	-		1,000	-
2011 Sampling - Stantec													
11-BIOPILE-BS1	6-Nov-11	grab	nd	nd	nd	nd	14	570	91	nd	Yes	670	WFO
11-BIOPILE-BS2	6-Nov-11	grab	nd	nd	nd	nd	9	1,300	210	38	Yes	**1,500**	FO
11-BIOPILE-BS3	6-Nov-11	grab	nd	nd	nd	nd	48	610	89	23	Yes	770	FO
11-BIOPILE-BS4	6-Nov-11	grab	nd	nd	nd	nd	64	1,400	220	41	Yes	**1,700**	FO
11-BIOPILE-BS5	16-Nov-11	grab	nd	nd	nd	nd	6	140	30	nd	Yes	180	FO
2012 Sampling - Stantec													
12-BP-TP1A	14-Jul-12	0.0 - 0.5	nd	nd	0.047	0.15	270	2,600	260	47	Yes	**3,200**	FO
12-BP-TP1B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	260	3,400	340	58	Yes	**4,000**	FO
12-BP-TP2A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	22	710	66	nd	Yes	800	FO
12-BP-TP2B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	49	860	120	nd	Yes	**1,000**	FO
12-BP-TP3A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	910	6,800	650	84	Yes	**8,400**	FO
12-BP-TP3B	14-Jul-12	0.5 - 1.0	nd	nd	nd	0.16	560	4,100	420	81	Yes	**5,200**	FO
12-BP-TP4A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	120	2,300	240	37	Yes	**2,700**	FO
12-BP-TP4B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	100	1,400	150	nd	Yes	**1,700**	FO
12-BP-TP5A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	21	620	83	22	Yes	740	FO
12-BP-TP5B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	30	600	120	nd	Yes	750	WFO
12-BP-TP6A	14-Jul-12	0.0 - 0.5	nd	nd	nd	nd	22	560	60	17	Yes	660	FO
12-BP-TP6B	14-Jul-12	0.5 - 1.0	nd	nd	nd	nd	5	82	nd	nd	Yes	87	WFO
12-BP-COMP A1	21-Oct-12	0.0 - 0.5 (composite)	nd	nd	nd	nd	63	1,500	190	51	Yes	**1,800**	FO
12-BP-COMP A2	21-Oct-12	0.0 - 0.5 (composite)	nd	nd	nd	nd	110	1,100	150	46	Yes	**1,400**	FO
12-BP-COMP B1	21-Oct-12	0.5 - 1.0 (composite)	nd	nd	0.036	0.15	230	1,800	220	45	Yes	**2,300**	FO
12-BP-COMP B2	21-Oct-12	0.5 - 1.0 (composite)	nd	0.058	nd	nd	73	1,200	160	42	Yes	**1,400**	FO
12-BP-COMP C1	21-Oct-12	1.0 - 1.5 (composite)	nd	nd	nd	0.062	120	1,400	170	30	Yes	**1,700**	FO
12-BP-COMP C2	21-Oct-12	1.0 - 1.5 (composite)	nd	nd	nd	nd	140	1,500	200	53	Yes	**1,900**	FO

Notes:

1 = Typical landfill acceptance criteria. BTEX acceptance criteria based on Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQGs) for a Commercial Site (1999 and updates) with coarse grained soil and non-potable groundwater

2 = Modified TPH = Total petroleum hydrocarbons excluding total BTEX

3 = If baseline was not reached at C_{32}, sample may contain carbon fractions >C_{32}

"-" = No applicable guideline or does not apply

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Metres below ground surface

Bold / Shaded Concentration exceeds typical landfill acceptance criteria

Resemblance

FO = Fuel oil fraction

WFO = Weathered fuel oil fraction

Table C.1 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Biopile
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Date	Sample Depth (mbgs)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance
			Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C32?[3]	Modified TPH - Tier I[2]	
		Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	-
		RDL (2011)	0.03	0.03	0.03	0.05	3	10	10	15		20	-
		RDL (2012-2014)	0.025	0.025	0.025	0.05	2.5	10	10	15		15	
		RDL (2015)	0.025	0.025	0.025	0.05	2.5	50	50	75		75	
		Landfill acceptance criteria[1]	2.5	10,000	10,000	110	-	-	-	-		1,000	-
2013 Sampling - Stantec													
13-BP-COMP-A1	18-Aug-13	0.0 - 0.5 (composite)	<0.025	<0.025	<0.025	<0.05	15	420	77	26	Yes	540	WFO
13-BP-COMP-A1 Lab-Dup	18-Aug-13	0.0 - 0.5 (composite)	<0.025	<0.025	<0.025	<0.05	16	420	77	23	Yes	-	-
13-BP-COMP-A2	18-Aug-13	0.0 - 0.5 (composite)	<0.025	<0.025	<0.025	<0.05	12	370	71	25	Yes	480	WFO
13-BP-COMP-B1	18-Aug-13	0.5 - 1.0 (composite)	<0.025	<0.025	<0.025	<0.05	43	720	110	30	Yes	900	WFO
13-BP-COMP-B2	18-Aug-13	0.5 - 1.0 (composite)	<0.025	<0.025	<0.025	<0.05	32	560	83	25	Yes	700	WFO
13-BP-COMP-C1	18-Aug-13	1.0 - 1.5 (composite)	<0.025	<0.025	<0.025	<0.05	17	440	67	20	Yes	540	WFO
13-BP-COMP-C2	18-Aug-13	1.0 - 1.5 (composite)	<0.025	<0.025	<0.025	<0.05	20	370	57	21	Yes	460	WFO
2014 Sampling - Stantec													
14-BP-COMPA1	9-Aug-14	0.0 - 0.5 (composite)	<0.025	<0.025	<0.025	<0.05	7.2	440	71	23	Yes	540	FO
14-BP-COMPA2	9-Aug-14	0.0 - 0.5 (composite)	<0.025	<0.025	<0.025	<0.05	5.6	320	58	23	Yes	410	FO
14-BP-COMPB1	9-Aug-14	0.5 - 1.0 (composite)	<0.025	<0.025	<0.025	<0.05	9.1	560	85	24	Yes	680	FO
14-BP-COMPB2	9-Aug-14	0.5 - 1.0 (composite)	<0.025	<0.025	<0.025	<0.05	11	690	110	22	Yes	840	FO
14-BP-COMPC1	9-Aug-14	1.0 - 1.5 (composite)	<0.025	<0.025	<0.025	<0.05	8.1	500	74	nd	Yes	590	FO
14-BP-COMPC2	9-Aug-14	1.0 - 1.5 (composite)	<0.025	<0.025	<0.025	<0.05	8.9	780	120	26	Yes	930	FO
2015 Sampling - Stantec													
15-BP-COMP-A1	19-Aug-15	0.0 - 0.5 (composite)	<0.025	<0.025	<0.025	<0.05	25	2,000	720	3,000	Yes	**5,800**	WFO/LO
15-BP-COMP-A1 Lab-Dup	19-Aug-15	0.0 - 0.5 (composite)	<0.025	0.04	<0.025	<0.05	28	-	-	-	Yes	-	-
15-BP-COMP-A2	18-Aug-13	0.0 - 0.5 (composite)	<0.025	0.046	<0.025	<0.05	24	2,000	730	2,500	Yes	**5,300**	WFO/LO
15-BP-COMP-B1	18-Aug-13	0.5 - 1.0 (composite)	<0.025	<0.025	<0.025	<0.05	60	2,800	870	1,900	Yes	**5,600**	WFO/LO
15-BP-COMP-B2	18-Aug-13	0.5 - 1.0 (composite)	<0.025	<0.025	<0.025	<0.05	58	2,800	890	1,900	Yes	**5,600**	WFO/LO
15-BP-COMP-C1	18-Aug-13	1.0 - 1.5 (composite)	<0.025	<0.025	<0.025	<0.05	46	3,500	940	1,800	Yes	**6,300**	WFO/LO
15-BP-COMP-C2	18-Aug-13	1.0 - 1.5 (composite)	<0.025	0.04	<0.025	<0.05	48	2,500	740	2,200	Yes	**5,500**	WFO/LO
15-BP-COMP-D1	18-Aug-13	1.5 - 2.0 (composite)	<0.025	0.038	<0.025	<0.05	65	2,600	620	2,000	Yes	**5,300**	WFO/LO
15-BP-COMP-D2	18-Aug-13	1.5 - 2.0 (composite)	<0.025	<0.025	<0.025	<0.05	67	2,700	660	1,600	Yes	**5,100**	WFO/LO

Notes:
1 = Typical landfill acceptance criteria. BTEX acceptance criteria based on Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQGs) for a Commercial Site (1999 and updates) with coarse grained soil and non-potable groundwater
2 = Modified TPH = Total petroleum hydrocarbons excluding total BTEX
3 = If baseline was not reached at C_{32}, sample may contain carbon fractions >C_{32}
"-" = No applicable guideline or does not apply
RDL = Reportable Detection Limit; < ## = Not detected above RDL noted
Lab-Dup = Laboratory duplicate sample
Metres below ground surface
Bold / Shaded Concentration exceeds typical landfill acceptance criteria

Resemblance
FO = Fuel oil fraction
WFO = Weathered fuel oil fraction
LO = Lube oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2009 sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec													
TP3-BS2	0.8 - 0.9	<0.03	<0.03	<0.03	<0.05	<3	320		290	-	**600**	WFO, LO	-
TP6-BS2	0.5 - 0.6	<0.03	<0.03	<0.03	<0.05	<3	3,900		270	-	**4,200**	WFO, LO	-
TP7-BS2	0.6 - 0.8	<0.3	<0.3	0.08	11	490	17,000		3,800	-	**22,000**	FO, LO	-
TP10-BS1	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	2,200		83	-	**2,200**	WFO	-
TP12-BS2	0.8 - 0.9	<0.03	<0.03	<0.03	<0.05	<3	31		81	-	110	FO/LO	-
TP15-BS2	0.4 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	28		130	-	160	LO	-
TP15-BS2-Lab-Dup	0.4 - 0.5	-	-	-	-	-	27		150	-	-	-	-
TP16-BS1	0.1 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	56		110	-	170	FO/LO	-
TP18-BS2	1.3 - 1.4	<0.03	<0.03	<0.03	<0.05	<3	170		350	-	**510**	FO/LO, LO	-
TP21-BS2	0.9 - 1.0	<0.03	<0.03	<0.03	<0.05	<3	210		310	-	**520**	FO/LO, LO	-
TP24-BS2	1.0 - 1.1	<0.03	<0.03	<0.03	<0.05	<3	2,400		290	-	**2,700**	FO/LO, LO	-
TP30-BS2	1.2 - 1.3	<0.03	4.7	<0.03	<0.05	<3	29		160	-	180	LO	-
TP33-BS2	1.7 - 1.8	<0.03	<0.03	<0.03	<0.05	<3	50		200	-	250	LO	-
TP36-BS3	1.4 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	<15		<15	-	<20	NRG	-
TP36-BS3-Lab-Dup	1.4 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	-		-	-	-	-	-
TP37-BS1	0.0 - 0.2	<0.03	0.07	<0.03	<0.05	<3	36		360	-	**400**	LO	-
TP41-BS1	0.6 - 0.8	<0.03	<0.03	<0.03	<0.05	<3	45		380	-	**420**	FO, LO	-
TP42-BS2	1.3 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	170		450	-	**620**	FO, LO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Lab-Dup = laboratory duplicate sample

Resemblance:

FO = Fuel oil fraction; LO = Lube oil fraction; WFO = Weathered fuel oil fraction

FO/LO = One product in fuel oil/lube oil range; NRG = No resemblance to gasoline or diesel

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2009sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec (...continued)													
TP43-BS2	1.5 - 1.7	<0.3	<0.3	<0.3	<0.5	<u>800</u>	22,000		2,300	-	**25,000**	FO, LO	-
TP44-BS2	1.7 - 1.9	<0.03	<0.03	<0.03	<0.05	<3	<15		<15	-	<20	NRG	-
TP52-BS1	0.1 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	<15		20	-	20	PLO	-
TP53-BS1	0.4 - 0.6	<0.03	<0.03	<0.03	<0.05	<3	390		410	-	**800**	WFO, LO	-
TP54-BS2	1.2 - 1.3	<0.03	<0.03	<0.03	<0.05	<3	50		160	-	210	FO, LO	-
TP54-BS2-Lab-Dup	1.2 - 1.3	-	-	-	-	-	46		160	-	-	-	-
TP58-BS2	0.9 - 1.0	<0.03	<0.03	<0.03	<0.05	<3	180		1,200	-	**1,400**	FO/LO, LO	-
TP62-BS1	0.5 - 0.6	<0.03	<0.03	<0.03	<0.05	<3	48		160	-	210	FO/LO, LO	-
TP65-BS1	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	20		69	-	89	PLO	-
TP68-BS2	0.7 - 0.9	<0.03	<0.03	<0.03	<0.05	<3	<15		44	-	44	NRG	-
TP69-BS2	1.3 - 1.4	<0.03	<0.03	<0.03	<0.05	<3	<15		50	-	50	PLO	-
TP214-BS1	0.6 - 0.7	<0.03	<0.03	<0.03	<0.05	<3	20		72	-	92	WFO, LO	-
TP214-BS1 Lab-Dup	0.6 - 0.7	<0.03	<0.03	<0.03	<0.05	<3	-		-	-	-	-	-
TP220-BS2	1.4 - 1.5	<0.03	<0.03	<0.03	<0.05	<3	22		110	-	130	LO	-
TP221-BS2	1.5 - 1.6	<0.03	<0.03	<0.03	<0.05	<3	580		2,000	-	**2,500**	LO	-
TP221-BS2-Lab-Dup	1.5 - 1.6	-	-	-	-	-	610		2,100	-	-	-	-
TP222-BS2	1.6 - 1.7	<0.03	<0.03	<0.03	<0.05	<3	60		300	-	**360**	LO	-
TP223-BS1	0.4 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	<15		49	-	49	NRG	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

<u>Underlined</u> = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Lab-Dup = laboratory duplicate sample

<u>Resemblance</u>

FO = Fuel oil fraction
FO/LO = One product in fuel oil/lube oil range
LO = Lube oil fraction
NRG = No resemblance to gasoline or diesel
PLO = Possible lube oil fraction
WFO = Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2010 sampling)		0.03	0.03	0.03	0.05	3	15		15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2009 Sampling - Stantec (...continued)													
TP224-BS1	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	160		32	-	200	WFO	-
TP225-BS2	1.6 - 1.7	<0.03	0.17	0.04	0.23	230	8,300		180	-	**8,700**	WFO	-
BS48	0.0 - 0.10	<0.03	<0.03	<0.03	<0.05	<3	62		490	-	**550**	LO, ULO	-
BS58	0.0 - 0.20	<0.03	<0.03	<0.03	<0.05	<3	<15		<15	-	<20	NRG	-
BS81	0.0 - 0.12	<0.03	<0.03	<0.03	<0.05	9	1,900		260	-	**2,200**	WFO, PLO	-
BS97	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	33		320	-	**360**	LO	-
BS104	0.0 - 0.05	0.04	0.14	<0.03	<0.05	<3	60		290	-	**350**	FO/LO, LO	-
BS110	0.0 - 0.20	<0.03	<0.03	<0.03	<0.05	<3	67,000		3,700	-	**71,000**	WFO, PLO	-
BS112	0.0 - 0.22	<0.03	<0.03	<0.03	<0.05	<3	9,900		2,100	-	**12,000**	WFO	-
BS265	Not recorded	<0.03	<0.03	<0.03	<0.05	<3	76		670	-	**750**	LO	-
MW1-SS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	270		290	-	**560**	FO/LO LO	-
MW2-SS1	0.0 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	180		500	-	**680**	FO/LO LO	-
MW3-SS1	0.0 - 0.5	<0.03	<0.03	<0.03	<0.05	<3	400		590	-	**990**	WFO, LO	-
MW4-SS1	0.0 - 0.4	<0.03	<0.03	<0.03	<0.05	5	1,400		51	-	**1,500**	WFO, PLO	-
MW5-SS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	4	4,400		330	-	**4,700**	WFO, LO	-
MW6-SS1	0.0 - 0.6	<0.03	<0.03	<0.03	<0.05	40	12,000		460	-	**12,000**	WFO, LO	-
MW14-SS3	1.21 - 1.37	<0.03	<0.03	0.09	0.18	-	-		-	-	**2,000**	G/FO	-
Septic Tank	0.0 - 0.1	<0.03	15	<0.03	0.34	21	3,700		6,700	-	**10,000**	FO/LO, UFO/LO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

<u>Underlined</u> = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

<u>Resemblance</u>

FO = Fuel oil fraction

FO/LO = One product in fuel oil/lube oil range

G/FO = One product in the gasoline/fuel oil range

LO = Lube oil fraction

NRG = Does not resemble gasoline or diesel

UFO/LO = Unidentified compound(s) in fuel/lube oil range

ULO = Unidentified compound(s) in lube oil range

WFO = Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2010 sampling)		0.03	0.03	0.03	0.05	3	10	10	15	-	20	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2010 Sampling - Stantec													
MB-TP5 BS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	<u>9,400</u>	<u>1,900</u>	<u>940</u>	-	**12,000**	WFO	-
MB-TP6 BS1	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	14	12	140	-	160	WFO, LO	-
MB-TP8 BS1	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	57	-	57	NRLO	-
MB-TP9 BS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	65	-	65	NRLO	-
MB-BS1	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	93	<u>73</u>	<u>17,000</u>	-	**17,000**	NRLO	Soil removed
MB-BS5	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	12	<u><10</u>	<u>510</u>	-	**520**	NRLO, FO	Soil removed
MB-BS9	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	<20	-	-
MB-BS10	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	200	-	200	NRLO	Soil removed
MB-BS11	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	60	-	60	NRLO	-
MB-BS13	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	<20	-	-
MB-BS13 Lab-Dup	0.0 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	-	-	-
MB-BS111	0.0 - 0.2	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	19	-	<20	NRLO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

<u>Underlined</u> = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009-2010 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Lab-Dup = laboratory duplicate sample

<u>Resemblance</u>

FO = Fuel oil fraction

LO = Lube oil fraction

NRLO = No resemblance to petroleum products in the lube oil range

WFO = Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2013 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	-	15	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2013 Sampling - Stantec[6]													
13-MB-BS4B	0.25 - 0.5	<0.025	<0.025	<0.025	<0.050	18	14,000	6,900	730	Yes	**21,000**	WFO	Soil removed
13-MB-BS6	0.2 - 0.4	<0.025	<0.025	<0.025	<0.050	<2.5	2,500	3,100	310	Yes	**5,900**	WFO	Soil removed
13-MB-BS8	0.3 - 0.4	<0.025	<0.025	<0.025	<0.050	24	26,000	11,000	880	Yes	**37,000**	WFO	Soil removed
13-MB-BS9	0.0 - 0.3	<0.025	<0.025	<0.025	<0.050	<2.5	1,300	880	120	Yes	**2,300**	WFO	-
13-POLW-BS1	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	<10	<10	<15	Yes	<15	-	-
13-POLW-BS2	0.0 - 0.04	<0.025	<0.025	<0.025	<0.050	<2.5	81	480	150	Yes	**710**	FO/LO	-
13-POLW-BS3	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	710	570	110	Yes	**1,400**	WFO	-
13-POLW-BS5	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	27	75	80	No	180	WFO, LO	-
13-POLW-BS11 (Fld- Dup of 13-POLW-BS5)	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	20	47	93	No	160	WFO, LO	-
13-POLW-BS6	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	110	280	66	Yes	**450**	WFO	-
13-POLW-BS7	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	190	330	120	Yes	**640**	WFO	-
13-POLW-BS9	0.0 - 0.06	<0.025	<0.025	<0.025	<0.050	<2.5	<10	<10	97	No	97	NRLO	-
13-POLW-BS10	0.0 - 0.1	<0.025	<0.025	<0.025	<0.050	<2.5	<10	<10	78	No	78	PLO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

6 = Triple silica gel clean-up performed on samples prior to analysis to remove organic interferences.

"-" = Not analyzed, not applicable or no applicable guideline.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Fld-Dup = field duplicate sample

Resemblance

FO/LO = One product in fuel oil/lube oil range

LO = Lube oil fraction

NRLO = No resemblance to petroleum products in the lube oil range

PLO = Possible lube oil fraction

WFO = Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2014 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	-	15	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2014 Sampling - Stantec[6]													
14-MB-BS701	0.0 - 0.4	<0.025	<0.025	<0.025	<0.050	<2.5	5,000	8,000	1,400	Yes	**14,000**	WFO	-
14-MB-BS702	0.0 - 0.4	<0.025	<0.025	<0.025	<0.050	<2.5	17,000	23,000	2,300	Yes	**42,000**	WFO	-
14-MB-BS703	0.0 - 0.15	<0.025	<0.025	<0.025	<0.050	<2.5	2,000	4,100	520	Yes	**6,600**	WFO	-
14-MB-BS704	0.0 - 0.15	<0.025	<0.025	<0.025	<0.050	<2.5	220	510	350	Yes	**1,100**	WFO, ULO	-
14-MB-BS705	0.0 - 0.4	<0.025	<0.025	<0.025	<0.050	<2.5	2,000	4,100	710	Yes	**6,800**	WFO	-
14-MB-BS801	0.0 - 0.25	<0.025	<0.025	<0.025	<0.050	<2.5	140	410	180	No	**730**	FO/LO, LO	-
14-MB-BS802	0.0 - 0.6	<0.025	<0.025	<0.025	<0.050	<2.5	3,500	3,300	280	Yes	**7,100**	WFO	Soil removed
14-MB-BS803	0.0 - 0.15	<0.025	<0.025	<0.025	<0.050	<2.5	<10	<10	25	Yes	25	ULO	-
14-MB-BS804	0.0 - 0.6	<0.025	0.65	<0.025	<0.050	<2.5	<10	<10	54	Yes	54	NRLO	-
14-MB-BS805	0.0 - 0.6	<0.025	0.29	<0.025	<0.050	<2.5	<10	<10	64	Yes	64	NRLO	-
14-MB-BS806	0.0 - 0.2	<0.050	0.45	<0.050	<0.10	<5	<10	<10	68	Yes	67	NRLO	-
14-MB-BS901	0.0 - 0.6	<0.025	<0.025	<0.025	<0.050	<2.5	960	460	220	Yes	**1,600**	WFO, LO	-
14-MB-BS902	0.0 - 0.25	<0.025	<0.025	<0.025	<0.050	110	15,000	4,600	1,200	Yes	**21,000**	WFO, LO	-
14-MB-BS902 Lab-Dup		<0.025	<0.025	<0.025	<0.050	56	-	-	-	-	-	-	-
14-MB-BS903	0.0 - 0.3	<0.025	<0.025	<0.025	<0.050	30	8,100	1,100	69	Yes	**9,200**	WFO	-
14-FIELD DUP 2 (Fld-Dup of 14-MB-BS903)		<0.025	<0.025	<0.025	<0.050	15	6,400	1,100	96	Yes	**7,700**	WFO	-
14-MB-BS904	0.0 - 0.2	<0.025	<0.025	<0.025	<0.050	13	430	340	260	Yes	**1,000**	WFO, LO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}. Samples are considered to have returned to baseline if the area from C_{32}-C_{36} is less than 10% of the area from C_{10}-C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

6 = Triple silica gel clean-up performed on samples prior to analysis to remove organic interferences.

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted; "-" = Not analyzed, not applicable or no applicable guideline.

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates
Bold = Value exceeds Tier I RBSL for residential land use
Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Fld-Dup = field duplicate sample
Lab-Dup = laboratory duplicate sample

Resemblance

FO/LO = One product in fuel oil/lube oil range
LO = Lube oil fraction
NRLO = No resemblance to petroleum products in the lube oil range
ULO = Unidentified petroleum products in the lube oil range
WFO = Weathered fuel oil fraction

Table C.2 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL (2015 sampling)		0.025	0.025	0.025	0.05	2.5	10	10	15	-	15	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs [2]		0.099	77	30	8.8	-	-	-	-	-	270	-	-
SSTL [3]		-	-	-	-	-	-	-	-	-	1,700	-	-
2015 Sampling - Stantec													
15-MB-BS108	0.0 - 0.10	<0.025	<0.025	<0.025	<0.050	12	<u>9,400</u>	<u>4,100</u>	<u>1,300</u>	Yes	**15,000**	WFO	-
15-MB-BS109	0.0 - 0.10	<0.025	<0.025	<0.025	<0.050	120	25	150	70	No	**370**	FO/LO	-
15-MB-BS110	0.0 - 0.15	<0.025	<0.025	<0.025	<0.050	<2.5	<u><10</u>	<u><10</u>	<u>33</u>	No	33	NRLO	-
15-MB-BS111	1.3 - 1.4	<0.025	<0.025	<0.025	<0.050	<2.5	<u>4,100</u>	<u>2,800</u>	<u>800</u>	Yes	**7,700**	WFO	-
15-MB-BS112	1.8 - 1.9	<0.025	0.19	0.12	0.61	160	18,000	7,400	1,700	Yes	**27,000**	WFO	Soil removed

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for $>C_{32}$. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted; "-" = Not analyzed, not applicable or no applicable guideline.

<u>Underlined</u> = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009-2010 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

<u>Resemblance</u>

FO/LO = One product in fuel oil/lube oil range

NRLO = No resemblance to petroleum products in the lube oil range

WFO = Weathered fuel oil fraction

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Pit No. 3
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL		0.03	0.03	0.03	0.05	3	15		15		20	-	-
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs[2]		0.042	0.35	0.065	8.8	-	-	-	-		270	-	-
SSTL[3]		-	-	-	-	-	-	-	-		1,700	-	-
2009 Sampling - Stantec													
TP161-BS1	0.2 - 0.3	<0.3	<0.3	<0.3	<0.5	1,200 (30)	37,000 (150)		81	-	**39,000** (200)	FO	-
TP161-BS2[4]	0.3 - 1.0	<0.03	<0.03	<0.03	<0.05	-	-		-	-	**1,600**	FO	-
TP162-BS2	1.6 - 1.7	<0.03	<0.03	<0.03	<0.05	190	2,600		36	-	**2,800**	FO	-
TP164-BS1	0.2 - 0.3	<0.03	<0.03	<0.03	<0.09	180	19,000 (75)		180	-	**19,000** (80)	FO	-
TP165-BS2	0.7 - 0.8	<0.03	<0.03	<0.03	<0.05	81	5,200		210	-	**5,500**	FO	-
TP166-BS1	0.5 - 0.6	<0.03	0.07	<0.03	0.08	190	10,000 (75)		48	-	**10,000** (80)	FO	-
TP167-BS1	0.4 - 0.5	<0.03	<0.03	<0.03	<0.05	10	760		39	-	**800**	WFO	-
TP169-BS1	0.2 - 0.3	<0.03	0.48	<0.03	12	470	76,000 (750)		950 (75)	-	**77,000** (800)	FO, ULO	-
TP169-BS2	1.4 - 1.5	<0.03	<0.03	<0.03	0.36	66	280		<15	-	**350**	FO	-
TP170-BS2	1.5 - 1.6	<0.03	<0.03	<0.03	<0.05	<3	<15		<15	-	<20	-	-
TP171-BS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	230		900	-	**1,100**	OP F/L, Possible LO,	-
TP172-BS1	0.0 - 0.3	<0.03	0.20	<0.03	0.16	<3	120		570	-	**700**	FO/LO, LO, UFO/LO	-
TP172-BS1-Lab-Dup	0.0 - 0.3	<0.03	0.15	<0.03	0.27	<3	-		-	-	-	-	-
TP176-BS1	0.6 - 0.7	<0.03	<0.03	<0.03	<0.05	<3	56		590	-	**650**	LO	-
TP176-BS1-Lab-Dup	0.6 - 0.7	<0.03	<0.03	<0.03	<0.05	<3	-		-	-	-	-	-
BS237	0.00 - 0.20	<0.03	<0.03	<0.03	<0.05	<3	24,000 (75)		740	-	**24,000** (80)	WFO	-
BS239	0.00 - 0.20	<0.03	<0.03	<0.03	<0.05	69	6,900		130	-	**7,100**	FO	-
BS240	0.00 - 0.25	<0.03	<0.03	<0.03	0.09	110	4,600		85	-	**4,800**	FO	-
BS241	0.00 - 0.15	<0.03	<0.03	<0.03	<0.05	<3	4,300		140	-	**4,400**	FO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

(#) = Elevated RDL shown in brackets

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted; "-" = Not analyzed, not applicable or no applicable guideline.

Lab-dup = laboratory duplicate sample

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction
WFO = Weathered fuel oil fraction
LO = Lube oil fraction
FO/LO = One product in fuel oil/lube oil range
NRPP = No resemblance to petroleum products
NRLO = No resemblance to products in the lube oil range
UFO/LO = Unidentified compound(s) in fuel/lube oil range
ULO = Unidentified compound(s) in lube oil range

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Pit No. 3
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL		0.03	0.03	0.03	0.05	3	15		15		20	-	-
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs[2]		0.042	0.35	0.065	8.8	-	-	-	-		270	-	-
SSTL[3]		-	-	-	-	-	-	-	-		1,700	-	-
2009 Sampling - Stantec (...continued)													
BS267	Not recorded	<0.03	<0.03	<0.03	<0.05	<3	370		140	-	**510**	WFO	-
BS268	Not recorded	<0.03	<0.03	<0.03	<0.05	<3	720		190	-	**920**	FO, NRLO	-
BS269	Not recorded	<0.03	<0.03	<0.03	<0.05	<3	35		130	-	170	NRPP	-
BS270	Not recorded	<0.03	<0.03	<0.07	<0.09	<3	190		200	-	**400**	FO/LO, UFO/LO	-
BS271	Not recorded	<0.03	<0.03	<0.03	<0.05	<3	5,000		230	-	**5,200**	WFO	-
MW25-SS2[4]	0.61 - 0.76	<0.03	<0.03	<0.03	0.07	-	-		-	-	**10,000**	FO	-
MW26-SS4	2.13 - 2.74	<0.03	<0.03	<0.03	<0.05	<3	19		<15	-	<20	WFO	-
MW27-SS1	0.00 - 0.61	<0.03	<0.03	<0.03	<0.06	270	8,700		140	-	**9,100**	FO	-
MW27-SS3	1.22 - 1.83	<0.03	<0.03	<0.03	<0.05	50	790		42	-	**880**	FO	-
MW28-SS1	0.00 - 0.10	<0.03	<0.03	<0.03	<0.05	9	2,400		500	-	**2,900**	WFO, Possible LO	-
MW29-SS2	0.61 - 1.22	<0.03	0.09	<0.03	0.16	130	8,700		190	-	**9,000**	FO	-
MW30-SS2	0.61 - 1.22	<0.03	0.05	<0.03	0.46	230	6,700		87	-	**7,000**	WFO	-
MW30-SS2 Lab-Dup	0.61 - 1.22	<0.03	0.04	<0.03	0.46	200	-		-	-	**-**	-	-
SED-59[6]	-	<0.03	<0.03	<0.03	<0.05	<3	1,600		360	-	**2,000**	FO/LO, WFO	-
SED-60[6]	-	<0.03	<0.03	<0.03	<0.05	5	1,600		83	-	**1,600**	FO/LO, WFO	-
SED-64[6]	-	<0.1	<0.1	<0.1	<0.3	58 (10)	<15		190	-	240	LO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).
3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)
4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}.
5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).
6 = Sediment sample
# (#) = Elevated RDL shown in brackets
RDL = Reportable Detection Limit; < ## = Not detected above RDL noted; "-" = Not analyzed, not applicable or no applicable guideline.
Lab-dup = laboratory duplicate sample
<u>Underlined</u> = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates (note: F1 and F2 ESLs were not applied to 2009 samples herein)
Bold = Value exceeds Tier I RBSL for residential land use
Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

<u>Resemblance</u>

FO = Fuel oil fraction
WFO = Weathered fuel oil fraction
LO = Lube oil fraction
FO/LO = One product in fuel oil/lube oil range
NRPP = No resemblance to petroleum products
NRLO = No resemblance to products in the lube oil range
UFO/LO = Unidentified compound(s) in fuel/lube oil range
ULO = Unidentified compound(s) in lube oil range

Table C.3 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil - Pit No. 3
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	BTEX Parameters (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)						Resemblance	Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{21})	F3 (C_{21}-C_{32})	Reached Baseline at C_{32}?[4]	Modified TPH[5]		
RDL		0.03	0.03	0.03	0.05	3	15		15		20	-	-
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg		mg/kg	-	-
Tier I ESLs - Plants and Soil Inv. [1]		31	75	55	95	210	150	300		-	-	-	-
Tier I RBSLs[2]		0.042	0.35	0.065	8.8	-	-	-	-		270	-	-
SSTL[3]		-	-	-	-	-	-	-	-		1,700	-	-
2010 Sampling - Stantec													
P3-TP1 BS1	0.0 - 0.3	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	<15	-	<20	-	-
P3-TP2 BS1	0.0 - 0.35	<0.03	<0.03	<0.03	<0.05	230	7,200	720	270	-	**8,400**	WFO	-
P3-TP4 BS1	0.0 - 0.3	<0.03	<0.03	<0.03	0.3	66	16,000	3,900	430	-	**21,000**	WFO	-
P3-TP6 BS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	210	13,000	2,200	200	-	**16,000**	WFO	-
P3-TP7 BS1	0.0 - 0.3	<0.03	0.03	<0.03	0.08	440	14,000	2,900	240	-	**18,000**	FO	-
P3-TP8 BS1	0.0 - 0.5	<0.03	<0.03	<0.03	<0.05	640	4,600	790	56	-	**6,100**	WFO	-
P3-TP10 BS1	0.0 - 0.1	<0.03	<0.03	<0.03	<0.05	<3	32	79	<15	-	110	WFO	-
P3-BS2-10	0.0 - 0.25	<0.03	<0.03	<0.03	<0.05	<3	<10	<10	20	-	<20	NRLO	-
P3-BS3-10	0.0 - 0.25	<0.03	<0.03	<0.03	<0.05	<3	18,000	5,300	580	-	**24,000**	FO	-
P3-BS4-10	0.0 - 0.25	<0.03	<0.03	<0.03	<0.05	53	48,000	7,100	590	-	**56,000**	FO	-
2015 Sampling - Stantec													
15-P3-TP101-BS1	0.4	<0.050	0.83	1.3	39	620	7,600	200	870	Yes	**9,300**	FO/ULO	-
15-P3-TP102-BS1	0.2 - 0.3	<0.025	<0.025	<0.025	<0.050	47	2,800	460	64	Yes	**3,400**	WFO	-
15-P3-TP102-BS1 Lab-Dup	-	<0.025	<0.025	<0.025	<0.050	39	-	-	-	Yes	**-**	-	-
15-P3-TP103-BS1	0.2 - 0.3	<0.025	<0.025	<0.025	<0.050	38	2,900	970	120	Yes	**4,000**	WFO	-
15-P3-SD101	0.15	<0.025	<0.025	<0.025	<0.050	<2.5	220	81	45	Yes	**350**	WFO/ULO	-

Notes:

1 = Atlantic Partnership in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Soil Ecological Screening Levels (ESLs) for the Protection of Plants and Soil Invertebrates; Direct Soil Contact (Table 1a), for a residential site with coarse grained soil (2012, Revised 2015). Screening levels apply to the top 1.5 m of the soil profile.

2= Atlantic PIRI Tier I Risk Based Screening Levels (RBSLs) for a residential site with non-potable groundwater (Table 4a), coarse grained soil and fuel oil impacts (2012, Revised 2015).

3 = Site-specific target level (SSTL) calculated for TPH at the Former Radar Site (Stantec, 2010)

4 = Atlantic Partnership in RBCA Implementation analytical method does not analyze for >C_{32}. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C_{32}.

5 = Modified TPH = TPH C_6 - C_{32} (excluding BTEX).

RDL = Reportable Detection Limit; < ## = Not detected above RDL noted; "-" = Not analyzed, not applicable or no applicable guideline.

Underlined = Value exceeds Tier I ESL for the Protection of Plants and Soil Invertebrates

Bold = Value exceeds Tier I RBSL for residential land use

Shaded = Value exceeds SSTL calculated for the Former Radar Site (Stantec, 2010)

Resemblance

FO = Fuel oil fraction

NRLO = No resemblance to products in the lube oil range

ULO = Unidentified compounds in the lube oil range

WFO = Weathered fuel oil fraction

Table C.4 Results of Laboratory Analysis of Available Metals in Soil - Biopile
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	2015 Sampling - Stantec				
				15-BP-COMP-A1	15-BP-COMP-B1	15-BP-COMP-B2	15-BP-COMP-C1	15-BP-COMP-D1
Sample Depth (m):				0.0 - 0.5 (composite)	0.5 - 1.0 (composite)	0.5 - 1.0 (composite)	1.0 - 1.5 (composite)	1.5 - 2.0 (composite)
Aluminum	50	mg/kg	-	9,300	9,400	9,200	9,000	7,900
Antimony	10	mg/kg	40	8.4	5.2	31	22	4.7
Arsenic	2	mg/kg	12	<2.0	<2.0	<2.0	<2.0	<2.0
Barium	2	mg/kg	2,000	86	58	61	56	80
Beryllium	5	mg/kg	8	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	2	mg/kg	-	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	2	mg/kg	-	<50	<50	<50	<50	<50
Cadmium	50	mg/kg	22	1.1	0.72	0.82	0.91	0.97
Chromium	0.3	mg/kg	87	***160***	***98***	***90***	87	***91***
Cobalt	2	mg/kg	300	7.2	6.2	5.4	5.8	5.9
Copper	1	mg/kg	91	***92***	60	***93***	81	71
Iron	2	mg/kg	-	19,000	14,000	13,000	15,000	15,000
Lead	50	mg/kg	600	140	110	82	110	85
Lithium	0.5	mg/kg	-	7.9	7.1	6.6	6.6	6.9
Manganese	2	mg/kg	-	170	140	130	140	150
Mercury	2	mg/kg	50	0.24	0.17	0.18	0.14	0.19
Molybdenum	0.1	mg/kg	40	2.4	<2.0	<2.0	<2.0	<2.0
Nickel	2	mg/kg	89	47	31	28	30	31
Rubidium	2	mg/kg	-	5.9	5.4	5	5.4	4.8
Selenium	2	mg/kg	2.9	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	1	mg/kg	40	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	0.5	mg/kg	-	750	500	550	510	470
Sulphur	5	mg/kg	-	17	19	18	17	15
Thallium	0.1	mg/kg	1	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	2	mg/kg	300	28	11	17	15	25
Uranium	0.1	mg/kg	300	0.63	0.49	0.52	0.5	0.39
Vanadium	2	mg/kg	130	25	24	23	25	21
Zinc	5	mg/kg	360	260	270	320	350	270

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for an Industrial Site (1999 and updates)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)

Table C.5 Results of Laboratory Analysis of Available Metals in Soil - BMEWS
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec									
					BS1	BS2	BS4	BS6	BS7	BS8	BS11	BS15	BS19	BS21
				Sample Depth (m)	0.0 - 0.20	0.0 - 0.24	0.0 - 0.09	0.0 - 0.22	0.0 - 0.12	0.0 - 0.30	0.0 - 0.24	0.0 - 0.20	0.0 - 0.25	0.0 - 0.13
Aluminum	10	mg/kg	-	-	7,300	9,900	7,700	7,700	11,000	6,900	7,800	6,700	8,300	5,100
Antimony	2	mg/kg	20	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	2	mg/kg	12	-	<2	<2	<2	3	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	62	76	47	57	120	15	34	23	37	21
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	0.3	mg/kg	10	1.3	***15***	<0.3	0.3	1.9	***11***	<0.3	1.2	1.2	<0.3	0.4
Chromium	2	mg/kg	64	20	49	46	38	24	43	15	19	22	13	15
Cobalt	1	mg/kg	50	-	6	6	6	6	6	5	6	5	2	4
Copper	2	mg/kg	63	-	30	21	17	40	46	13	13	17	14	16
Iron	50	mg/kg	-	-	11,000	12,000	10,000	11,000	14,000	8,500	11,000	10,000	5,100	8,700
Lead	0.5	mg/kg	140	75	58	6.8	13	30	23	2.4	4.1	15	8.8	9.2
Lithium	2	mg/kg	-	-	12	14	11	8	8	5	8	8	<2	7
Manganese	2	mg/kg	-	-	160	200	140	210	220	84	170	130	55	120
Mercury	0.1	mg/kg	6.6	-	<0.2	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.2	<0.1
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	29	19	23	18	24	12	15	16	5	11
Rubidium	2	mg/kg	-	-	23	26	18	10	19	3	4	8	2	6
Selenium	2	mg/kg	1	-	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	19	45	23	33	110	12	18	12	29	10
Thallium	0.1	mg/kg	1	-	0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1
Tin	2	mg/kg	50	-	17	<2	<2	3	<2	<2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	-	0.2	0.5	0.2	0.3	0.4	0.2	0.3	0.3	2.5	0.1
Vanadium	2	mg/kg	130	-	27	26	23	31	40	19	25	21	8	15
Zinc	5	mg/kg	200	-	***4,800***	56	77	***460***	***1,100***	16	140	***260***	13	120
				Comments:	-	Soil removed	-	-	-	-	-	-	-	-

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)
2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Fld-Dup = field duplicate sample
Lab-Dup = laboratory duplicate sample
Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)
Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of Available Metals in Soil - BMEWS
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec (...continued)									
					BS22	BS25	BS26	BS32	BS34	TP75-BS2	TP79-BS2	TP92-BS1	TP96-BS2	TP101-BS2
				Sample Depth (m)	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15	0.0 - 0.20	0.0 - 0.20	0.6 - 0.7	1.1 - 1.2	0.6 - 0.7	1.0 - 1.1	1.4 - 1.5
Aluminum	10	mg/kg	-	-	6,500	5,800	4,900	10,000	7,100	7,100	12,000	3,500	7,800	6,200
Antimony	2	mg/kg	20	5	5	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	2	mg/kg	12	-	<2	<2	<2	<2	<2	<2	<2	<2	>2	<2
Barium	5	mg/kg	500	-	12	7	8	47	19	25	12	36	17	13
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	0.3	mg/kg	10	1.3	1.1	<0.3	0.7	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4
Chromium	2	mg/kg	64	20	27	17	15	17	16	22	13	11	21	16
Cobalt	1	mg/kg	50	-	7	4	5	2	2	5	2	3	7	4
Copper	2	mg/kg	63	-	57	10	10	46	19	19	23	7	18	22
Iron	50	mg/kg	-	-	8,900	7,900	7,700	14,000	3,500	9,300	4,300	7,800	10,000	8,700
Lead	0.5	mg/kg	140	75	84	2.6	6.4	12	3.6	9.3	2.5	3.2	9.3	6.4
Lithium	2	mg/kg	-	-	5	4	4	4	4	6	3	4	6	5
Manganese	2	mg/kg	-	-	120	85	110	55	31	110	49	86	130	80
Mercury	0.1	mg/kg	6.6	-	0.4	<0.1	<0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	37	16	12	11	7	13	8	8	20	11
Rubidium	2	mg/kg	-	-	3	<2	<2	<2	<2	6	<2	8	5	3
Selenium	2	mg/kg	1	-	**<2**	**<2**	**<2**	**<5**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	17	10	8	28	14	12	8	8	13	9
Thallium	0.1	mg/kg	1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	50	-	<2	<2	<2	7	<2	<2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	-	0.3	0.1	0.2	2.0	2.4	0.4	1.6	0.2	0.3	0.5
Vanadium	2	mg/kg	130	-	16	16	14	21	15	25	23	14	21	19
Zinc	5	mg/kg	200	-	***240***	64	180	***350***	10	***210***	11	19	140	***560***
				Comments:	-	-	-	-	-	-	-	-	-	-

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)
2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Fld-Dup = field duplicate sample
Lab-Dup = laboratory duplicate sample
Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)
Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of Available Metals in Soil - BMEWS
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec (...continued)									
					TP107-BS2	TP109-BS2	TP111-BS2	TP127-BS2	TP131-BS2	MW8-SS1	MW9-SS3	MW10-SS1	MW11-SS1	MW12-SS2
Sample Depth (m)					0.9 - 1.0	1.6 - 1.7	1.1 - 1.2	0.7 - 0.8	0.7 - 0.8	0.0 - 0.6	1.2 - 1.8	0.0 - 0.2	0.0- 0 0.3	0.6 - 1.2
Aluminum	10	mg/kg	-	-	7,100	7,700	8,000	11,000	5,800	5,500	4,400	3,700	8,100	5,800
Antimony	2	mg/kg	20	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	2	mg/kg	12	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	26	14	13	8	29	7	8	10	31	11
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	0.3	mg/kg	10	1.3	0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	2	mg/kg	64	20	20	18	16	17	18	11	10	17	23	14
Cobalt	1	mg/kg	50	-	4	4	4	3	4	4	4	3	5	5
Copper	2	mg/kg	63	-	33	12	12	10	13	14	7	5	21	19
Iron	50	mg/kg	-	-	8,200	9,500	9,100	11,000	8,700	6,300	6,900	9,400	10,000	7,800
Lead	0.5	mg/kg	140	75	20	3.7	3.3	2.5	22	1.4	1.4	2	34	1.8
Lithium	2	mg/kg	-	-	6	6	4	4	7	3	4	4	7	4
Manganese	2	mg/kg	-	-	94	95	86	73	120	66	73	110	140	78
Mercury	0.1	mg/kg	6.6	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	<2	<2	<2	2	<2	<2
Nickel	2	mg/kg	50	-	17	12	18	9	12	10	11	4	15	13
Rubidium	2	mg/kg	-	-	4	3	2	<2	8	<2	<2	3	6	<2
Selenium	2	mg/kg	1	-	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	17	14	13	8	19	9	9	6	22	12
Thallium	0.1	mg/kg	1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	50	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	-	0.4	0.3	0.3	0.4	0.2	0.1	0.1	0.2	0.4	0.2
Vanadium	2	mg/kg	130	-	22	23	21	23	19	14	14	12	25	19
Zinc	5	mg/kg	200	-	***590***	27	***350***	13	120	9	13	***250***	79	17
Comments:					-	-	-	-	-	-	-	-	-	-

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)
2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Fld-Dup = field duplicate sample
Lab-Dup = laboratory duplicate sample
Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)
Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of Available Metals in Soil - BMEWS
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2010 Sampling - Stantec								
					BMEWS-BS9	BMEWS-BS10	BMEWS-BS11	BMEWS-BS111 (Fld-Dup of BMEWS-BS11)	BMEWS-BS12	BMEWS-BS17	BMEWS-BS25	BMEWS-BS26	BMEWS-BS27
				Sample Depth (m)	0.0 - 0.1	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15	0.0 - 0.1	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15
Aluminum	10	mg/kg	-	-	7,200	7,400	7,300	6,700	7,400	6,000	7,000	6,400	9,600
Antimony	2	mg/kg	20	5	<2	<2	<2	<2	<2	<2	5	<2	<2
Arsenic	2	mg/kg	12	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	19	50	41	33	9	10	49	32	12
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	<5	<5	<5	<5	<5	<5	6	<5	<5
Cadmium	0.3	mg/kg	10	1.3	0.5	<0.3	0.6	0.3	0.9	<0.3	0.8	3	1.1
Chromium	2	mg/kg	64	20	18	23	29	27	15	16	32	23	18
Cobalt	1	mg/kg	50	-	5	4	6	5	5	4	6	5	3
Copper	2	mg/kg	63	-	21	14	23	17	26	15	***3,800***	***110***	15
Iron	50	mg/kg	-	-	13,000	8,800	11,000	11,000	9,300	7,600	13,000	12,000	13,000
Lead	0.5	mg/kg	140	75	8.1	10	11	21	20	3.6	***360***	37	10
Lithium	2	mg/kg	-	-	6	7	8	8	5	4	8	8	3
Manganese	2	mg/kg	-	-	130	150	140	140	89	77	160	140	71
Mercury	0.1	mg/kg	6.6	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	11	13	18	16	14	12	20	26	16
Rubidium	2	mg/kg	-	-	4	9	11	9	2	<2	11	7	<2
Selenium	2	mg/kg	1	-	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5
Strontium	5	mg/kg	-	-	16	26	17	13	11	10	17	11	8
Thallium	0.1	mg/kg	1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	50	-	<2	<2	<2	<2	<2	<2	***430***	6	<2
Uranium	0.1	mg/kg	23	-	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.3
Vanadium	2	mg/kg	130	-	27	27	26	24	19	17	25	22	20
Zinc	5	mg/kg	200	-	190	67	160	110	***1,200***	75	***700***	***770***	***320***
				Comments:	-	-	-	-	-	-	-	Soil removed	-

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)
2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Fld-Dup = field duplicate sample
Lab-Dup = laboratory duplicate sample
Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)
Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.5 Results of Laboratory Analysis of Available Metals in Soil - BMEWS
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2015 Sampling - Stantec							
					15-BMEWS-BS401	15-BMEWS-BS402	15-BMEWS-BS403	15-BMEWS-BS404	15-BMEWS-BS501	15-BMEWS-BS502	15-BMEWS-BS503	15-BMEWS-BS504
				Sample Depth (m)	0.0 - 0.1	0.0 - 0.1	0.0 - 0.15	0.0 - 0.03	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2	0.0 - 0.2
Aluminum	10	mg/kg	-	-	8,300	9,400	8,600	8,400	8,800	7,600	8,000	8,300
Antimony	2	mg/kg	20	5	<2.0	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	2	mg/kg	12	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium	5	mg/kg	500	-	80	150	150	51	120	13	51	44
Beryllium	2	mg/kg	4	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	2	mg/kg	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	5	mg/kg	-	-	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	0.3	mg/kg	10	1.3	2.3	4.9	5.1	5.6	0.5	<0.30	<0.30	8.8
Chromium	2	mg/kg	64	20	33	33	33	26	35	16	28	29
Cobalt	1	mg/kg	50	-	5.4	5.9	5.6	6.8	5.6	5	4.7	6.1
Copper	2	mg/kg	63	-	***240***	***230***	***180***	19	23	22	14	23
Iron	50	mg/kg	-	-	18,000	18,000	15,000	17,000	13,000	9,000	11,000	14,000
Lead	0.5	mg/kg	140	75	43	50	100	29	13	3	9.8	18
Lithium	2	mg/kg	-	-	9	9	8.4	9	11	4	8	11
Manganese	2	mg/kg	-	-	190	220	210	230	210	110	160	200
Mercury	0.1	mg/kg	6.6	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Molybdenum	2	mg/kg	10	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	2	mg/kg	50	-	23	25	23	20	20	15	16	23
Rubidium	2	mg/kg	-	-	12	9.9	9	9.9	15	2.4	8.9	11
Selenium	2	mg/kg	1	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	0.5	mg/kg	20	-	<0.50	0.65	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	5	mg/kg	-	-	29	25	27	41	32	20	27	22
Thallium	0.1	mg/kg	1	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	2	mg/kg	50	-	5.3	13	10	<2.0	<2.0	<2.0	<2.0	2.3
Uranium	0.1	mg/kg	23	-	0.37	0.24	0.3	0.3	0.25	0.1	0.31	0.21
Vanadium	2	mg/kg	130	-	30	29	28	27	30	20	27	32
Zinc	5	mg/kg	200	-	***950***	***790***	***2,100***	***3,700***	170	46	81	***990***
				Comments:	-	-	-	-	-	-	-	-

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)
2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Fld-Dup = field duplicate sample
Lab-Dup = laboratory duplicate sample
Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)
Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.6 Results of Laboratory Analysis of Available Metals in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec									
					TP1-BS2	TP1-BS2 Lab-Dup	TP2-BS2	TP7-BS2	TP8-BS2	TP10-BS1	TP12-BS2	TP13-BS2	TP16-BS1	TP17-BS2
				Sample Depth (m)	0.3 - 0.5	0.3 - 0.5	0.3 - 0.8	0.6 - 0.8	0.9 - 1.0	0.0 - 0.2	0.8 - 0.9	1.0 - 1.1	0.1 - 0.3	0.9 - 1.0
Aluminum	10	mg/kg	-	-	7,500	7,300	7,600	6,800	7,400	6,500	7,400	6,500	6,600	9,000
Antimony	2	mg/kg	20	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Arsenic	2	mg/kg	12	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	40	38	29	30	15	45	33	27	43	39
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	<5	<5	<5	<5	<5	<5	<5	<5	6	<5
Cadmium	0.3	mg/kg	10	1.3	<0.3	<0.3	<0.3	<0.3	0.9	<0.3	<0.3	1.0	0.3	<0.3
Chromium	2	mg/kg	64	20	62	57	32	30	14	55	29	19	20	35
Cobalt	1	mg/kg	50	-	7	6	4	6	5	9	6	6	5	8
Copper	2	mg/kg	63	-	23	25	12	21	17	26	26	18	15	31
Iron	50	mg/kg	-	-	11,000	12,000	8,600	10,000	8,900	13,000	12,000	10,000	9,200	15,000
Lead	0.5	mg/kg	140	75	9.3	9.1	7.1	26	23	15	11	70	18	11
Lithium	2	mg/kg	-	-	10	9	8	7	5	10	9	8	6	9
Manganese	2	mg/kg	-	-	160	160	84	130	110	170	130	140	150	220
Mercury	0.1/0.2[3]	mg/kg	6.6	-	0.2	0.2	<0.1	0.1	<0.1	0.1	<0.1	<0.1	0.2	0
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	34	31	19	19	14	28	16	15	16	23
Rubidium	2	mg/kg	-	-	12	10	8	8	3	15	12	8	5	11
Selenium	2	mg/kg	1	-	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**	**<2**
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	37	41	9	16	8	13	9	8	15	28
Thallium	0.1	mg/kg	1	-	0.1	0.1	0.2	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	50	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	-	0.2	0.2	0.4	0.4	0.4	0.5	0.4	0.3	0.4	0.5
Vanadium	2	mg/kg	130	-	20	19	23	18	17	23	26	18	18	29
Zinc	5	mg/kg	200	-	44	39	44	45	81	140	44	170	120	120

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

2 = SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

3 = Elevated RDL due to matrix interferences

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.6 Results of Laboratory Analysis of Available Metals in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec (...continued)									
					TP18-BS2	**TP21-BS2**	**TP23-BS2**	**TP30-BS2**	**TP37-BS2**	**TP41-BS1**	**TP42-BS2**	**TP43-BS2**	**TP44-BS2**	**TP49-BS2**
				Sample Depth (m)	1.3 - 1.4	0.9 - 1.0	0.5 - 0.6	1.2 - 1.3	1.3 - 1.4	0.6 - 0.8	1.3 - 1.5	1.5 - 1.7	1.7 - 1.9	0.8 - 1.1
Aluminum	10	mg/kg	-	-	9,000	8,800	7,100	6,600	5,400	7,100	7,300	8,000	6,000	8,800
Antimony	2	mg/kg	20	5	3	4	<2	<2	3	10	<2	<2	<2	<2
Arsenic	2	mg/kg	12	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	68	93	25	29	26	61	43	44	14	28
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	10	13	<5	7	8	10	<5	14	<5	<5
Cadmium	0.3	mg/kg	10	1.3	0.8	1.4	0.6	1.5	<0.3	0.5	<0.3	2.9	<0.3	<0.3
Chromium	2	mg/kg	64	20	33	28	21	19	15	22	36	34	10	***65***
Cobalt	1	mg/kg	50	-	7	6	5	5	4	4	6	5	4	7
Copper	2	mg/kg	63	-	36	48	23	31	14	***77***	26	24	10	38
Iron	50	mg/kg	-	-	13,000	12,000	11,000	10,000	8,300	9,600	12,000	12,000	7,500	12,000
Lead	0.5	mg/kg	140	75	63	120	9.7	30	28	***580***	14	25	2.1	7.8
Lithium	2	mg/kg	-	-	11	10	9	7	6	9	10	8	5	7
Manganese	2	mg/kg	-	-	220	230	130	140	130	260	150	140	95	230
Mercury	0.1/0.2[3]	mg/kg	6.6	-	0.2	0.1	0.2	0.2	<0.1	0.1	<0.1	0.7	<0.1	0.1
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	22	19	13	14	15	13	21	21	10	34
Rubidium	2	mg/kg	-	-	13	13	8	7	5	7	14	9	4	5
Selenium	2	mg/kg	1	-	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***
Silver	0.5	mg/kg	20	-	<0.5	<0.5	6.0	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	38	56	14	10	16	28	16	14	7	19
Thallium	0.1	mg/kg	1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	50	-	<2	2	<2	<2	<2	2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	-	0.5	0.5	0.5	0.4	0.3	0.6	0.3	0.5	0.5	0.7
Vanadium	2	mg/kg	130	-	27	25	21	17	27	25	22	19	12	21
Zinc	5	mg/kg	200	-	***400***	***550***	98	160	100	170	46	180	26	34

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

2 = SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

3 = Elevated RDL due to matrix interferences

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.6 Results of Laboratory Analysis of Available Metals in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec (...continued)									
					TP57-BS1	TP58-BS2	TP62-BS1	TP65-BS1	TP69-BS2	BS47	BS47 Lab-Dup	BS58	BS59	BS65
				Sample Depth (m)	0.4 - 0.5	0.9 - 1.0	0.5 - 0.6	0.0 - 0.2	1.3 - 1.4	0.0 - 0.10	0.0 - .0.10	0.0 - 0.20	0.0 - 0.20	0.0 - 0.15
Aluminum	10	mg/kg	-	-	7,700	13,000	4,800	7,300	5,700	8,200	7,900	5,600	5,600	4,600
Antimony	2	mg/kg	20	5	<2	8	4	4	7	4	4	<2	<2	<2
Arsenic	2	mg/kg	12	-	<2	<2	***76***	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	42	110	***2,700***	230	26	140	130	17	13	24
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	15	5	26	<5	<5	35	28	<5	<5	6
Cadmium	0.3	mg/kg	10	1.3	0.7	1.3	2.7	0.4	0.6	1.1	1.0	<0.3	<0.3	1.9
Chromium	2	mg/kg	64	20	18	34	13	22	17	30	29	14	13	21
Cobalt	1	mg/kg	50	-	6	9	11	5	4	5	5	5	4	6
Copper	2	mg/kg	63	-	***100***	***66***	***130***	22	35	30	38	13	12	54
Iron	50	mg/kg	-	-	13,000	17,000	27,000	10,000	11,000	11,000	14,000	8,400	7,800	10,000
Lead	0.5	mg/kg	140	75	120	***210***	***840***	31	23	***320***	130	2.5	4.1	120
Lithium	2	mg/kg	-	-	8	16	3	7	4	12	13	7	6	7
Manganese	2	mg/kg	-	-	190	230	2,500	190	140	260	290	120	100	170
Mercury	0.1/0.2[3]	mg/kg	6.6	-	0.1	0.2	0.2	0.2	0.3	<0.1	<0.1	<0.1	<0.1	<0.2[2]
Molybdenum	2	mg/kg	10	-	<2	<2	3	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	14	23	18	15	12	19	18	16	12	18
Rubidium	2	mg/kg	-	-	6	19	4	9	3	11	11	5	4	4
Selenium	2	mg/kg	1	-	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***
Silver	0.5	mg/kg	20	-	<0.5	<0.5	5.8	<0.5	1.3	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	19	25	74	19	15	27	27	8	7	7
Thallium	0.1	mg/kg	1	-	<0.1	0.2	0.5	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	50	-	6	9	3	<2	13	3	2	<2	<2	13
Uranium	0.1	mg/kg	23	-	0.4	0.5	0.9	0.6	0.2	0.5	0.6	0.5	0.5	0.2
Vanadium	2	mg/kg	130	-	26	30	18	19	15	19	18	15	14	14
Zinc	5	mg/kg	200	-	150	***270***	***310***	87	***350***	190	200	23	21	***820***

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

2 = SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

3 = Elevated RDL due to matrix interferences

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.6 Results of Laboratory Analysis of Available Metals in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec (…continued) BS78	BS84	BS92	BS101	BS103	BS265	MW2-SS1	MW4-SS1	Septic Tank
				Sample Depth (m)	0.0 - 0.10	0.0 - 0.10	0.0 - 0.12	0.0 - 0.12	0.0 - 0.15	0.0 - 0.15	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5
Aluminum	10	mg/kg	-	-	5,700	12,000	6,300	4,800	8,200	6,400	7,400	9,100	5,400
Antimony	2	mg/kg	20	5	<2	5	<2	<2	<2	<2	3	<2	***25***
Arsenic	2	mg/kg	12	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	36	85	10	18	16	90	240	24	37
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	7
Boron	5	mg/kg	-	-	<5	40	<5	<5	<5	6	<5	<5	6
Cadmium	0.3	mg/kg	10	1.3	<0.3	1.8	1.8	0.3	0.6	<0.3	0.4	<0.3	5
Chromium	2	mg/kg	64	20	15	40	15	24	15	22	19	24	29
Cobalt	1	mg/kg	50	-	5	8	2	3	3	5	5	7	3
Copper	2	mg/kg	63	-	18	***2,200***	12	11	17	41	15	20	***87***
Iron	50	mg/kg	-	-	12,000	15,000	9,200	9,300	6,300	8,600	13,000	14,000	6,900
Lead	0.5	mg/kg	140	75	21	82	4.4	10	5.1	50	86	11	87
Lithium	2	mg/kg	-	-	7	15	3	5	5	5	14	9	5
Manganese	2	mg/kg	-	-	160	380	45	84	71	120	190	200	80
Mercury	0.1/0.2[3]	mg/kg	6.6	-	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.1	<0.1	1.8
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	13	26	5	12	11	13	10	25	15
Rubidium	2	mg/kg	-	-	5	18	2	7	3	8	28	4	4
Selenium	2	mg/kg	1	-	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	***21***
Strontium	5	mg/kg	-	-	29	33	7	11	13	40	14	15	15
Thallium	0.1	mg/kg	1	-	<0.1	0.1	<0.1	<0.1	<0.1	0.1	0.2	<0.1	<0.1
Tin	2	mg/kg	50	-	<2	6	<2	<2	<2	<2	<2	<2	***250***
Uranium	0.1	mg/kg	23	-	0.4	1.3	0.4	0.7	0.6	0.4	0.2	0.2	0.6
Vanadium	2	mg/kg	130	-	17	40	24	21	17	15	25	24	11
Zinc	5	mg/kg	200	-	***210***	***800***	28	42	35	42	71	42	***1,500***

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

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3 = Elevated RDL due to matrix interferences

RDL = Reportable Detection Limit for routine analysis

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Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.6 Results of Laboratory Analysis of Available Metals in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2010 Sampling - Stantec				2013 Sampling - Stantec		
					MB-TP1 BS1	MB-TP2 BS1	MB-TP3 BS1	MB-TP4 BS1	13-POLW-BS2	13-POLW-BS4	13-POLW-BS9
				Sample Depth (m)	0.0 - 0.15	0.0 - 0.15	0.0 - 0.1	0.0 - 0.3	0.0 - 0.4	0.0 - 0.04	0.0 - 0.06
Aluminum	10	mg/kg	-	-	6,500	11,000	7,500	9,300	11,000	9,900	9,700
Antimony	2	mg/kg	20	5	<2	<2	<2	<2	<2.0	<2.0	<2.0
Arsenic	2	mg/kg	12	-	<2	<2	<2	<2	<2.0	<2.0	<2.0
Barium	5	mg/kg	500	-	24	68	46	55	53	52	79
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2.0	<2.0	<2.0
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2.0	<2.0	<2.0
Boron	5	mg/kg	-	-	<5	<5	<5	<5	<50	<50	<50
Cadmium	0.3	mg/kg	10	1.3	0.3	<0.3	<0.3	0.5	<0.30	<0.30	<0.30
Chromium	2	mg/kg	64	20	27	***100***	42	***78***	23	20	18
Cobalt	1	mg/kg	50	-	6	12	7	8	6.4	6.9	7.9
Copper	2	mg/kg	63	-	22	27	23	38	19	22	28
Iron	50	mg/kg	-	-	9,600	15,000	13,000	16,000	15,000	15,000	17,000
Lead	0.5	mg/kg	140	75	51	14	37	38	13	10	34
Lithium	2	mg/kg	-	-	8	12	11	14	11	12	14
Manganese	2	mg/kg	-	-	130	210	190	240	170	190	220
Mercury	0.1/0.2[3]	mg/kg	6.6	-	0.2	<0.1	<0.1	0.3	<0.10	<0.10	<0.10
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	<2.0	<2.0	<2.0
Nickel	2	mg/kg	50	-	22	***81***	30	40	16	17	17
Rubidium	2	mg/kg	-	-	7	25	16	23	19	22	28
Selenium	2	mg/kg	1	-	<2	<2	<2	<2	<1.0	<1.0	<1.0
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.50
Strontium	5	mg/kg	-	-	9	14	11	12	19	19	8.7
Thallium	0.1	mg/kg	1	-	<0.1	0.2	0.1	0.2	0.15	0.17	0.24
Tin	2	mg/kg	50	-	<2	<2	<2	<2	<2.0	<2.0	<2.0
Uranium	0.1	mg/kg	23	-	0.4	0.3	0.4	0.4	0.69	0.47	0.56
Vanadium	2	mg/kg	130	-	21	32	25	31	35	29	36
Zinc	5	mg/kg	200	-	65	98	***230***	***230***	37	35	44

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

2 = SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

3 = Elevated RDL due to matrix interferences

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.6 Results of Laboratory Analysis of Available Metals in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2015 Sampling - Stantec					
					15-MB-BS201	15-MB-BS202	15-MB-BS203	15-MB-BS204	15-MB-BS205	15-MB-BS206
Sample Depth (m)					0.2 - 0.3	0.0 - 0.2	0.0 - 0.1	0.3 - 0.4	0.8 - 0.9	0.1 - 0.3
Aluminum	10	mg/kg	-	-	9,300	10,000	9,800	7,800	10,000	9,700
Antimony	2	mg/kg	20	5	10	2.3	<2.0	<2.0	<2.0	***97***
Arsenic	2	mg/kg	12	-	<2.0	<2.0	<2.0	<2.0	<2.0	8.4
Barium	5	mg/kg	500	-	74	44	37	30	31	140
Beryllium	2	mg/kg	4	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	2	mg/kg	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	5	mg/kg	-	-	<50	<50	<50	<50	<50	170
Cadmium	0.3	mg/kg	10	1.3	1.7	0.5	<0.30	<0.30	<0.30	5.1
Chromium	2	mg/kg	64	20	28	***65***	26	23	***100***	56
Cobalt	1	mg/kg	50	-	7.9	8.6	4.9	5.7	7.8	11
Copper	2	mg/kg	63	-	43	23	26	21	19	***100***
Iron	50	mg/kg	-	-	16,000	14,000	11,000	11,000	14,000	34,000
Lead	0.5	mg/kg	140	75	***200***	17	16	11	3.9	***430***
Lithium	2	mg/kg	-	-	11	12	7.4	8.5	9.8	9.6
Manganese	2	mg/kg	-	-	260	200	140	160	180	780
Mercury	0.1/0.2[3]	mg/kg	6.6	-	0.41	<0.10	<0.10	<0.10	<0.10	1.2
Molybdenum	2	mg/kg	10	-	<2.0	<2.0	<2.0	<2.0	<2.0	4.2
Nickel	2	mg/kg	50	-	23	46	15	20	***53***	47
Rubidium	2	mg/kg	-	-	15	16	7.3	7.3	11	12
Selenium	2	mg/kg	1	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	0.5	mg/kg	20	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	5	mg/kg	-	-	31	21	27	20	19	35
Thallium	0.1	mg/kg	1	-	0.13	0.13	<0.10	<0.10	0.12	0.18
Tin	2	mg/kg	50	-	8.9	<2.0	<2.0	<2.0	<2.0	15
Uranium	0.1	mg/kg	23	-	0.43	0.34	0.8	0.33	0.44	0.62
Vanadium	2	mg/kg	130	-	30	29	22	20	28	37
Zinc	5	mg/kg	200	-	***450***	140	170	95	27	***990***

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

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3 = Elevated RDL due to matrix interferences

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.7 Results of Laboratory Analysis of Available Metals in Soil - POL Compound
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec			2010 Sampling - Stantec							
					BS39	BS41	TP142-BS1	POL-BS6	POL-BS7	POL-BS8	POL-BS81 (POL-BS8 Field Dup.)	POL-BS10	POL-BS11	POL-BS12	POL-BS13
				Sample Depth (m)	0.0 - 0.08	0.0 - 0.10	0.2 - 0.3	0.0 - 0.1	0.0 - 0.1	0.0 - 0.15	Not recorded	0.0 - 0.1	Not recorded		
Aluminum	10	mg/kg	-	-	7,300	9,100	8,500	14,000	15,000	7,000	6,900	25,000	5,400	6,300	6,400
Antimony	2	mg/kg	20	5	***67***	***120***	2	<2	4	6	5	<2	<2	<2	<2
Arsenic	2	mg/kg	12	-	***15***	9	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	340	300	150	54	72	100	110	70	27	19	17
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	14	27	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	0.3	mg/kg	10	1.3	5.4	5.6	0.8	<0.3	0.3	0.7	0.9	<0.3	<0.3	<0.3	<0.4
Chromium	2	mg/kg	64	20	***74***	***350***	34	26	27	21	19	***650***	22	14	14
Cobalt	1	mg/kg	50	-	11	17	5	8	9	8	7	25	5	5	5
Copper	2	mg/kg	63	-	***320***	***790***	40	62	***69***	***130***	***150***	6	27	18	14
Iron	50	mg/kg	-	-	100,000 (500)	94,000 (500)	10,000	19,000	22,000	27,000	26,000	25,000	9,200	9,500	10,000
Lead	0.5	mg/kg	140	75	***2,100***	***1,900***	51	51	130	***160***	120	1	46	18	8
Lithium	2	mg/kg	-	-	5	6	7	10	11	7	7	35	6	6	6
Manganese	2	mg/kg	-	-	660	470	95	200	220	220	240	320	98	110	110
Mercury	0.1	mg/kg	6.6	-	0.7	0.3 (0.2)	0.4	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Molybdenum	2	mg/kg	10	-	10	***12***	<2	<2	3	<2	<2	<2	<2	<2	<3
Nickel	2	mg/kg	50	-	***63***	***110***	17	19	23	27	22	***340***	19	12	12
Rubidium	2	mg/kg	-	-	8	5	4	11	14	6	6	63	5	3	4
Selenium	2	mg/kg	1	-	***<2***	***<2***	***<2***	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***	***<6***
Silver	0.5	mg/kg	20	-	1.3	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.6
Strontium	5	mg/kg	-	-	22	46	10	13	14	13	14	6	6	8	9
Thallium	0.1	mg/kg	1	-	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.2
Tin	2	mg/kg	50	-	***230***	***550*** (20)	18	24	30	31	41	<2	5	<2	3
Uranium	0.1	mg/kg	23	-	0.3	0.5	0.7	0.9	0.9	0.3	0.3	<0.1	0.3	0.5	0.4
Vanadium	2	mg/kg	130	-	20	28	18	30	30	17	16	55	13	20	17
Zinc	5	mg/kg	200	-	***1,300***	***1,700***	160	67	150	***340***	***340***	83	60	31	28

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.7 Results of Laboratory Analysis of Available Metals in Soil - POL Compound
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2015 Sampling - Stantec						
					15-POL-BS301	15-POL-BS302	15-POL-BS303	15-POL-BS401	15-POL-BS402	15-POL-BS403	15-POL-BS404
				Sample Depth (m)	0.0 - 0.15	0.0 - 0.2	0.0 - 0.2	0.0 - 0.1	0.0 - 0.1	0.0 - 0.2	0.0 - 0.2
Aluminum	10	mg/kg	-	-	9,500	6,300	7,500	8,100	7,000	3,000	2,800
Antimony	2	mg/kg	20	5	<2.0	<2.0	***30***	16	6.5	<2.0	5.3
Arsenic	2	mg/kg	12	-	<2.0	<2.0	8.5	<2.0	<2.0	<2.0	<2.0
Barium	5	mg/kg	500	-	59	48	420	140	330	22	54
Beryllium	2	mg/kg	4	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	2	mg/kg	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	5	mg/kg	-	-	<50	<50	<50	<50	<50	<50	<50
Cadmium	0.3	mg/kg	10	1.3	<0.30	0.86	3.1	0.92	0.55	0.37	0.53
Chromium	2	mg/kg	64	20	***140***	21	***150***	63	64	13	21
Cobalt	1	mg/kg	50	-	12	4.9	11	5.5	4.4	<1.0	2
Copper	2	mg/kg	63	-	16	37	***180***	***150***	***68***	***66***	***530***
Iron	50	mg/kg	-	-	13,000	11,000	48,000	18,000	12,000	9,400	6,900
Lead	0.5	mg/kg	140	75	21	110	***530***	***370***	110	33	***430***
Lithium	2	mg/kg	-	-	14	7	6	9	6	<2.0	<2.0
Manganese	2	mg/kg	-	-	130	130	720	180	110	33	56
Mercury	0.1	mg/kg	6.6	-	<0.10	<0.10	0.35	1.7	0.16	0.14	<0.10
Molybdenum	2	mg/kg	10	-	<2.0	<2.0	4.9	<2.0	<2.0	<2.0	<2.0
Nickel	2	mg/kg	50	-	***70***	19	55	34	33	4.8	8.5
Rubidium	2	mg/kg	-	-	27	3	6.5	5.3	12	<2.0	5
Selenium	2	mg/kg	1	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	0.5	mg/kg	20	-	<0.50	<0.50	0.98	0.59	<0.50	<0.50	<0.50
Strontium	5	mg/kg	-	-	<5.0	13	12	10	14	6.4	<5.0
Thallium	0.1	mg/kg	1	-	0.16	<0.10	<0.10	<0.10	0.11	<0.10	<0.10
Tin	2	mg/kg	50	-	<2.0	3.7	***160***	24	14	7.6	11
Uranium	0.1	mg/kg	23	-	<0.10	0.27	0.42	0.36	0.28	0.51	0.14
Vanadium	2	mg/kg	130	-	36	19	23	24	16	7.1	14
Zinc	5	mg/kg	200	-	49	160	***860***	***250***	150	***820***	120

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)
2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Lab-Dup = laboratory duplicate sample
Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)
Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.7 Results of Laboratory Analysis of Available Metals in Soil - POL Compound
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2015 Sampling - Stantec (...continued)			
					15-POL-BS405	15-POL-BS406	15-POL-BS407	15-POL-BS407 Lab Dup
				Sample Depth (m)	0.0 - 0.15	0.0 - 0.2	0.0 - 0.2	0.0 - 0.1
Aluminum	10	mg/kg	-	-	4,500	5,100	2,000	1,900
Antimony	2	mg/kg	20	5	2.3	12	<2.0	<2.0
Arsenic	2	mg/kg	12	-	<2.0	<2.0	<2.0	<2.0
Barium	5	mg/kg	500	-	240	35	12	12
Beryllium	2	mg/kg	4	-	<2.0	<2.0	<2.0	<2.0
Bismuth	2	mg/kg	-	-	<2.0	<2.0	<2.0	<2.0
Boron	5	mg/kg	-	-	<50	<50	<50	<50
Cadmium	0.3	mg/kg	10	1.3	<0.30	0.34	<0.30	<0.30
Chromium	2	mg/kg	64	20	24	16	24	21
Cobalt	1	mg/kg	50	-	2.2	2	1.4	1.4
Copper	2	mg/kg	63	-	29	45	18	18
Iron	50	mg/kg	-	-	12,000	25,000	5,500	5,000
Lead	0.5	mg/kg	140	75	46	***1,300***	18	21
Lithium	2	mg/kg	-	-	<2.0	<2.0	<2.0	<2.0
Manganese	2	mg/kg	-	-	52	62	26	23
Mercury	0.1	mg/kg	6.6	-	0.12	0.11	<0.10	<0.10
Molybdenum	2	mg/kg	10	-	<2.0	<2.0	<2.0	<2.0
Nickel	2	mg/kg	50	-	12	7.7	6.9	6.3
Rubidium	2	mg/kg	-	-	4.4	2.8	3.6	3.3
Selenium	2	mg/kg	1	-	<1.0	<1.0	<1.0	<1.0
Silver	0.5	mg/kg	20	-	7.2	<0.50	<0.50	<0.50
Strontium	5	mg/kg	-	-	54	9.7	<5.0	<5.0
Thallium	0.1	mg/kg	1	-	<0.10	<0.10	<0.10	<0.10
Tin	2	mg/kg	50	-	12	***430***	2.3	2
Uranium	0.1	mg/kg	23	-	0.28	0.24	0.15	0.13
Vanadium	2	mg/kg	130	-	16	9.6	24	21
Zinc	5	mg/kg	200	-	57	120	18	18

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)
2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Lab-Dup = laboratory duplicate sample
Bold/Italics = Value exceeds applicable generic criteria (i.e., CCME CSQG)
Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.8 Results of Laboratory Analysis of Available Metals in Soil - Mid-Canada Line
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2009 Sampling - Stantec										
					BS135	BS139	BS140	BS142	BS144	BS145	BS257	BS258	BS259	BS260	BS261
				Sample Depth (m)	0.0 - 0.10	0.0 - 0.05	0.0 - 0.05	0.0 - 0.07	0.0 - 0.10	0.0 - 0.05	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15	0.0 - 0.15
Aluminum	10	mg/kg	-	-	7,900	4,700	2,100	6,500	3,900	3,700	10,000	2,800	10,000	7,000	6,200
Antimony	2	mg/kg	20	5	<2	<2	5	2	<2	<2	<2	<2	<2	<2	2
Arsenic	2	mg/kg	12	-	4	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	5	mg/kg	500	-	32	25	17	52	36	13	9	18	21	36	33
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	<5	<5	<5	5	<5	<5	<5	<5	<5	<5	<5
Cadmium	0.3	mg/kg	10	1.3	***13***	4.9	<0.3	0.7	<0.3	<0.3	<0.3	<0.3	<0.3	0.5	1.9
Chromium	2	mg/kg	64	20	***1,200***	15	12	23	14	21	64	6	27	10	23
Cobalt	1	mg/kg	50	-	11	4	5	4	3	3	2	1	4	1	2
Copper	2	mg/kg	63	-	***210***	10	***140***	59	43	21	3	8	9	9	***130***
Iron	50	mg/kg	-	-	15,000	9,200	6,900	8,700	8,500	7,100	33,000	3,200	12,000	4,200	9,300
Lead	0.5	mg/kg	140	75	***3,200*** (5)	16	57	***440***	24	11	4.1	6.0	7.8	8.9	82
Lithium	2	mg/kg	-	-	10	8	3	10	7	5	3	<2	13	2	5
Manganese	2	mg/kg	-	-	270	130	78	250	85	59	25	8	83	22	67
Mercury	0.1	mg/kg	6.6	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.1	0.1
Molybdenum	2	mg/kg	10	-	***81***	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	14	14	13	14	11	14	10	4	14	4	14
Rubidium	2	mg/kg	-	-	6	4	3	13	11	6	4	2	9	2	8
Selenium	2	mg/kg	1	-	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***<2***	***2***
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	64	11	<5	31	<5	<5	<5	9	5	<5	8
Thallium	0.1	mg/kg	1	-	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	50	-	2	<2	23	4	<2	<2	<2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	-	0.6	0.2	0.1	0.7	0.2	0.2	1.4	0.5	0.6	2.5	1.3
Vanadium	2	mg/kg	130	-	19	13	8	19	12	17	39	5	27	13	17
Zinc	5	mg/kg	200	-	***22,000***	84	***470***	***450***	110	44	10	28	34	26	57

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteric (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.8 Results of Laboratory Analysis of Available Metals in Soil - Mid-Canada Line
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2010 Sampling - Stantec								
					MCL-BS1-10	MCL-BS2-10	MCL-BS4-10	MCL-BS6-10	MCL-BS8-10	MCL-BS8-10 Lab-Dup	MCL-BS10-10	MCL-BS12-10	MCL-BS13-10
				Sample Depth (m)	0.0 - 0.15	0.0 - 0.2	0.0 - 0.15	0.0 - 0.15	0.0 - 0.2	0.0 - 0.2	Not recorded		
Aluminum	10	mg/kg	-	-	5,100	2,000	2900	4,600	4,100	3,900	3,100	4,000	3,500
Antimony	2	mg/kg	20	5	<2	<2	<2	9	<2	<2	<2	<2	2
Arsenic	2	mg/kg	12	-	<2	<2	<2	<2	<2	2	<2	<2	<2
Barium	5	mg/kg	500	-	17	10	12	88	99	100	21	16	25
Beryllium	2	mg/kg	4	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bismuth	2	mg/kg	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	5	mg/kg	-	-	<5	<5	<5	10	<5	<5	<5	<5	<5
Cadmium	0.3	mg/kg	10	1.3	<0.3	<0.3	<0.3	5.1	4	4.7	9	0.4	2.2
Chromium	2	mg/kg	64	20	23	11	13	25	30	33	4	11	45
Cobalt	1	mg/kg	50	-	2	<1	1	3	4	5	2	2	1
Copper	2	mg/kg	63	-	7	49	4	***210***	***320***	***200***	31	22	33
Iron	50	mg/kg	-	-	12,000	3,300	5900	7,600	10,000	11,000	5,400	6,000	5,500
Lead	0.5	mg/kg	140	75	7.4	46	6	***310***	83	87	5	19	100
Lithium	2	mg/kg	-	-	4	<2	<2	7	9	8	2	3	<2
Manganese	2	mg/kg	-	-	45	14	22	68	220	280	28	40	21
Mercury	0.1	mg/kg	6.6	-	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1
Molybdenum	2	mg/kg	10	-	<2	<2	<2	<2	2	<2	<2	<2	<2
Nickel	2	mg/kg	50	-	10	3	4	21	8	8	2	4	3
Rubidium	2	mg/kg	-	-	14	4	7	10	5	5	7	6	3
Selenium	2	mg/kg	1	-	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***	***<5***
Silver	0.5	mg/kg	20	-	<0.5	<0.5	<0.5	3.8	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	5	mg/kg	-	-	<5	<5	<5	8	<5	5	<5	10	54
Thallium	0.1	mg/kg	1	-	0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Tin	2	mg/kg	50	-	<2	<2	<2	***62***	<2	<2	<2	<2	<2
Uranium	0.1	mg/kg	23	-	0.4	0.5	0.5	0.4	0.3	0.3	0.3	0.8	0.9
Vanadium	2	mg/kg	130	-	23	9	12	13	12	13	11	14	8
Zinc	5	mg/kg	200	-	20	29	12	***260***	96	110	17	31	100

Notes:
1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)
2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)
RDL = Reportable Detection Limit for routine analysis
< # = Not detected above RDL noted
"-" = indicates value is not available or does not apply
Lab-Dup = laboratory duplicate sample
Bold/Italics = Value exceeds applicable generic criteric (i.e., CCME CSQG)
Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.8 Results of Laboratory Analysis of Available Metals in Soil - Mid-Canada Line
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Generic Criteria[1]	SSTL[2]	2015 Sampling - Stantec							
					15-MCL-BS101	15-MCL-BS102	15-MCL-BS103	15-MCL-BS104	15-MCL-BS201	15-MCL-BS202	15-MCL-BS203	15-MCL-BS204
				Sample Depth (m)	0.0 - 0.2	0.0 - 0.1	0.0 - 0.05	0.0 - 0.1	0.0 - 0.2	0.0 - 0.2	0.0 - 0.1	0.0 - 0.1
Aluminum	10	mg/kg	-	-	9,700	3,000	2,100	4,700	4,100	4,400	3,500	5,900
Antimony	2	mg/kg	20	5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.3
Arsenic	2	mg/kg	12	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	***41***
Barium	5	mg/kg	500	-	21	13	44	15	32	23	23	***1,400***
Beryllium	2	mg/kg	4	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Bismuth	2	mg/kg	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	5	mg/kg	-	-	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	0.3	mg/kg	10	1.3	0.9	1.7	2.4	1.9	0.38	<0.30	<0.30	4.0
Chromium	2	mg/kg	64	20	26	28	44	28	17	13	13	31
Cobalt	1	mg/kg	50	-	2.6	1.2	2.4	2.1	2.5	2.2	2	6.4
Copper	2	mg/kg	63	-	54	9.1	***250***	***260***	26	12	12	***130***
Iron	50	mg/kg	-	-	11,000	4,900	4,900	11,000	7,800	5,400	6,000	8,700
Lead	0.5	mg/kg	140	75	51	9	***430***	54	74	19	17	***1,000***
Lithium	2	mg/kg	-	-	3.1	<2.0	<2.0	4.2	2.7	2.6	2.9	7.1
Manganese	2	mg/kg	-	-	51	22	57	45	80	48	42	85
Mercury	0.1	mg/kg	6.6	-	0.13	<0.10	0.16	<0.10	0.11	0.11	0.12	0.17
Molybdenum	2	mg/kg	10	-	<2.0	<2.0	9.7	<2.0	<2.0	4.2	<2.0	<2.0
Nickel	2	mg/kg	50	-	11	2.7	9.9	5.2	11	7	7.3	14
Rubidium	2	mg/kg	-	-	5.2	8.5	4.7	6.2	4.5	4.5	6.8	11
Selenium	2	mg/kg	1	-	1.7	<1.0	<1.0	1	<1.0	<1.0	<1.0	4.8
Silver	0.5	mg/kg	20	-	<0.50	<0.50	0.77	<0.50	<0.50	<0.50	<0.50	<0.50
Strontium	5	mg/kg	-	-	13	<5.0	38	38	20	11	8.8	26
Thallium	0.1	mg/kg	1	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.1
Tin	2	mg/kg	50	-	<2.0	<2.0	<2.0	<2.0	40	<2.0	<2.0	15
Uranium	0.1	mg/kg	23	-	1.9	0.18	0.26	0.79	0.37	0.45	0.25	0.27
Vanadium	2	mg/kg	130	-	20	11	4.5	23	12	10	12	18
Zinc	5	mg/kg	200	-	48	45	160	53	200	43	33	***290***

Notes:

1 = CCME Canadian Soil Quality Guidelines (CSQGs) for a Residential/Parkland Site (1999 and updates)

2 = SSTL calculated for metals at Former Radar Site (Stantec, 2010)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

"-" = indicates value is not available or does not apply

Lab-Dup = laboratory duplicate sample

Bold/Italics = Value exceeds applicable generic criteric (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for metals at the Former Radar Site (Stantec, 2010)

Table C.9 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
2005 Sampling - ESG			
6497*	0 - 0.1	<0.05	-
6498*	0 - 0.1	<0.05	-
6499*	0 - 0.1	***1.7***	-
6500*	0 - 0.1	<0.05	-
6502*	0 - 0.1	***1.6***	-
6503*	0 - 0.1	<0.05	-
6504	0 - 0.1	0.6	-
6505*	0 - 0.1	<0.05	-
6506*	0 - 0.1	<0.05	-
6507*	0.3	<0.05	-
6508*	0 - 0.1	<0.05	-
6509*	0 - 0.1	***1.8***	-
6510*	0 - 0.1	<0.05	-
6512*	0 - 0.1	<0.05	-
6513*	0 - 0.1	***4.2***	-
6514	0 - 0.1	***12,000***	Soil removed
6515*	0 - 0.1	<0.05	-
6516	0 - 0.1	<0.05	-
6517*	0 - 0.1	<0.05	-
6518	0 - 0.1	***3.5***	Soil removed
6519*	0 - 0.1	***2.2***	-
6520*	0 - 0.1	<0.05	-
6522*	0 - 0.1	<0.05	-
6523*	0 - 0.1	<0.05	-
6524*	0 - 0.1	<0.05	-
6525*	0 - 0.1	<0.05	-
6526*	0 - 0.1	<0.05	-
6527*	0 - 0.1	<0.05	-
6528*	0 - 0.1	<0.05	-
6529*	0 - 0.1	<0.05	-
6530	0 - 0.1	<0.05	-
6532*	0.3	<0.05	-
6533	0 - 0.1	***6.0***	-
6534	0 - 0.1	***4.0***	Soil removed
6535*	0 - 0.1	<0.05	-
6536*	0 - 0.1	<0.05	-
6537*	0.3 - 0.4	<0.05	-
6538*	0 - 0.1	<0.05	-
6539*	0 - 0.1	<0.05	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.9 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
2005 Sampling - ESG (…continued)			
6540*	0.4 - 0.5	<0.05	-
6542*	0 - 0.1	<0.05	-
6543*	0 - 0.1	<0.05	-
6544	0 - 0.1	0.6	-
6545*	0 - 0.1	<0.05	-
6546	0 - 0.1	***33***	-
6597*	0 - 0.1	<0.05	-
6598*	0 - 0.1	<0.05	-
6599*	0 - 0.1	<0.05	-
21480	0 - 0.1	***2.0***	-
21482	0 - 0.1	<0.05	-
21483	0 - 0.1	***2.4***	-
21484	0 - 0.1	***28***	-
21485	0 - 0.1	***2.7***	-
21486	0 - 0.1	***2.1***	-
21558	0 - 0.1	1.0	-
21559	0 - 0.1	<0.05	-
21562	0 - 0.1	***1.4***	-
21563	0 - 0.1	<0.05	-
21566	0 - 0.1	<0.05	-
21567	0 - 0.1	0.6	-
2007 Sampling - ESG			
22390	0 - 0.1	0.6	-
22393	0 - 0.1	0.7	-
22397	0 - 0.1	<0.05	-
22398	0 - 0.1	0.6	-
22399	0 - 0.1	<0.05	-
22400	0 - 0.1	***15.7***	-
22402	0 - 0.1	***6.0***	-
22403	0 - 0.1	***2.0***	-
22404	0 - 0.1	<0.05	-
22408	0 - 0.1	***1.8***	-
22418	0 - 0.1	<0.05	-
22420	0 - 0.1	***33***	-
22424	0 - 0.1	***24.3***	-
22433	0 - 0.1	***9.2***	Soil removed
22434	0 - 0.1	<0.05	Soil removed
22435	0 - 0.1	***15.5***	Soil removed
22439	0 - 0.1	***1.5***	Soil removed
22443	0 - 0.1	***9.6***	Soil removed

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.9 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
2007 Sampling - ESG (…continued)			
22444	0 - 0.1	***1,480***	Soil removed
22448	0 - 0.1	<0.05	-
22469	0 - 0.1	***13.5***	-
22470	0 - 0.1	***22.5***	-
22471	0 - 0.1	***22.4***	-
22472	0 - 0.1	<0.05	-
22474	0 - 0.1	***12.8***	Soil removed
22475	0 - 0.1	***12.7***	Soil removed
22476	0 - 0.1	0.6	Soil removed
22477	0 - 0.1	<0.05	-
22478	0 - 0.1	***73.1***	Soil removed
22479	0 - 0.1	***10.4***	Soil removed
22482	0 - 0.1	***152***	Soil removed
22483	0 - 0.1	***30.6***	Soil removed
22484	0 - 0.1	***56.5***	Soil removed
22485	0 - 0.1	0.6	Soil removed
22488	0 - 0.1	***20,200***	Soil removed
22492	0 - 0.1	***6,370***	Soil removed
22493	0 - 0.1	***44.2***	Soil removed
22494	0 - 0.1	***14.9***	Soil removed
22495	0 - 0.1	***3.4***	-
22496	0 - 0.1	***30.8***	Soil removed
22517	0 - 0.1	***8.1***	-
22537	0 - 0.1	***7.2***	Soil removed
22538	0 - 0.1	***82.5***	Soil removed
22673	0 - 0.1	<0.05	-
22675	0 - 0.1	2.2	-
22677	0 - 0.1	4.6	-
22683	0 - 0.1	1	-
22693	0 - 0.1	1.3	-
22694	0 - 0.1	4.9	-
22695	0 - 0.1	<0.05	-
22700	0 - 0.1	<0.05	-
22705	0 - 0.1	***1,300***	-
22709	0 - 0.1	<0.05	-
22713	0 - 0.1	<0.05	-
22715	0 - 0.1	0.7	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.9 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
		RDL 0.05	-
		Units mg/kg	-
		CCME SQG[1] 1.3	-
		SSTL (Residential Area)[2] 9	-
2009 Sampling - Stantec			
TP7-BS2	0.6 - 0.8	<0.05	-
TP13-BS2	1.0 - 1.1	***2.3***	-
TP16-BS1	0.1 - 0.3	<0.05	-
TP20-BS2	0.4 - 1.3	***6.2***	-
TP21-BS2	0.9 - 1.0	***3.2***	-
TP24-BS2	1.0 - 1.1	<0.05	-
TP31-BS2	0.8 - 0.9	<0.05	-
TP37-BS1	0.0 - 0.2	<0.05	-
TP41-BS1	0.6 - 0.8	0.95	-
TP43-BS2	1.5 - 1.7	<0.05	-
TP52-BS1	0.1 - 0.2	<0.05	-
TP62-BS1	0.5 - 0.6	0.59	-
TP62-BS1-Lab-Dup	0.5 - 0.6	0.56	-
TP68-BS2	0.7 - 0.8	<0.05	-
TP69-BS2	1.3 - 1.4	0.51	-
TP214-BS1	0.6 - 0.7	<0.05	-
TP220-BS2	1.4 - 1.5	***3.4***	-
TP221-BS2	1.5 - 1.6	0.24	-
TP222-BS2	1.6 - 1.7	0.37	-
TP223-BS1	0.4 - 0.5	<0.05	-
TP224-BS1	0.0 - 0.2	<0.05	-
BS43	0.0 - 0.14	***1.7***	-
BS44	0.0 - 0.05	***2.2***	-
BS46	0.0 - 0.15	0.73	-
BS53	0.0 - 0.08	1.3	-
BS57	0.0 - 0.17	0.77	-
BS61	0.0 - 0.15	<0.05	-
BS65	0.0 - 0.15	0.38	-
BS68	0.0 - 0.22	<0.05	-
BS72	0.0 - 0.15	<0.05	-
BS75	0.0 - 0.05	0.30	-
BS76	0.0 - 0.04	0.09	-
BS78	0.0 - 0.10	0.06	-
BS81	0.0 - 0.12	***1.7***	-
BS84	0.0 - 0.10	0.81	-
BS91	0.0 - 0.12	1.3	-
BS95	0.0 - 0.05	***2.3***	-
BS95-Lab-Dup	0.0 - 0.05	***1.8***	-
BS100	0.0 - 0.15	***5.5***	-
BS110	0.0 - 0.20	***53***	Soil removed

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Lab-Dup = Laboratory duplicate sample

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.9 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
2009 Sampling - Stantec (…continued)			
BS113	0.0 - 0.18	***1.4***	Soil removed
BS265	Not recorded	1.1	-
MW1-SS1	0.15 - 0.8	<0.05	-
MW14-SS3	1.2 - 1.4	<0.05	-
Septic Tank	0.0 - 0.1	***72***	-
2010 Sampling - Stantec			
MB-BS1	0.0 - 0.15	***41,000***	Soil removed
MB-BS1 Lab Dup	0.0 - 0.15	***39,000***	Soil removed
MB-BS3	0.0 - 0.15	***650***	Soil removed
MB-BS5	0.0 - 0.15	***1,600***	Soil removed
MB-BS7	0.0 - 0.1	***3.2***	-
MB-BS9	0.0 - 0.1	***6.4***	Soil removed
MB-BS10	0.0 - 0.1	***910***	Soil removed
2013 Sampling - Stantec			
13-MB-BS1	0.0 - 0.3	***12***	Tag No. 16
13-MB-BS2A	0.0 - 0.25	***3.0***	Tag No. 17
13-MB-BS2B	0.25 - 0.5	0.26	Tag No. 17
13-MB-BS2B Lab-Dup		0.33	
13-MB-BS3	0.0 - 0.02	***2.8***	Tag No. 18, Soil removed
13-MB-BS4A	0.15 - 0.25	<0.050	Tag No. 19
13-MB-BS4B	0.25 - 0.5	<0.050	Tag No. 19
13-MB-BS5	0.3 - 0.5	<0.050	Tag No. 20
13-MB-BS6	0.2 - 0.4	<0.050	Tag No. 21
13-MB-BS7	0.0 - 0.05	<0.050	Tag No. 22, Soil removed
13-MB-BS8	0.3 - 0.4	<0.050	Tag No. 23, Soil removed
13-MB-BS9	0.0 - 0.3	<0.050	Tag No. 24
13-MB-BS9 Lab-Dup		<0.050	
13-MB-BS10	0.0 - 0.1	0.28	Tag No. 25
13-MB-BS11	0.0 - 0.1	<0.050	Tag No. 26
13-MB-BS12	0.0 - 0.1	***8,400***	Tag No. 27
13-MB-BS14 (Fld-Dup of 13-MB-BS12)		***8,900***	
13-MB-BS13	0.0 - 0.1	***5,300***	Tag No. 28, Soil removed
13-MB-BS15	0.0 - 0.2	0.17	Tag No. 39
13-MB-BS15 Lab-Dup		0.30	
13-MB-BS16	0.0 - 0.1	0.19	Tag No. 40
13-MB-BS17	0.0 - 0.1	0.16	Tag No. 41
13-POLW-BS1	0.0 - 0.1	0.15	Tag No. 33
13-POLW-BS3	0.0 - 0.1	<0.050	Tag No. 31

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Lab-dup = Laboratory duplicate sample

Fld-Dup = Field duplicate sample

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.9 Results of Laboratory Analysis of PCBs in Soil - Main Base
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
2013 Sampling - Stantec (… continued)			
13-POLW-BS5	0.0 - 0.1	***2.4***	Tag No. 29
13-POLW-BS11 (Fld-Dup of 13-POLW-BS5)		1.2	
13-POLW-BS8	0.0 - 0.05	0.46	Tag No. 36
13-POLW-BS9	0.0 - 0.06	0.36	Tag No. 37
13-POLW-BS10	0.0 - 0.1	***22***	Tag No. 38
2014 Sampling - Stantec			
14-MB-BS101	0.5 - 1.0	0.23	-
14-FIELD DUP3 (Fld-Dup of 14-MB-BS101)		0.12	-
14-MB-BS102	0.5 - 1.0	0.33	-
14-MB-BS401	0.0 - 1.2	0.78	-
14-MB-BS402	0.0 - 0.5	0.52	-
14-MB-BS403	0.0 - 0.6	0.17	-
14-MB-BS501	0.0 - 0.1	<0.05	-
14-MB-BS501 Lab-Dup		0.057	-
14-MB-BS502	0.0 - 0.1	***3.9***	-
14-MB-BS706	0.0 - 0.4	<0.05	-
14-MB-BS706 Lab-Dup		<0.05	-
14-POLW-BS101	0.0 - 0.1	***2.1***	-
14-POLW-BS102	0.0 - 0.15	1.0	-
14-POLW-BS103	0.0 - 0.2	0.67	-
2015 Sampling - Stantec			
15-MB-BS103	0.0 - 0.1	***4,900***	-
15-MB-BS104	0.0 - 0.05	***11***	-
15-MB-BS105	0.0 - 0.1	***2.8***	-
15-MB-BS106	0.0 - 0.1	***1.4***	-
15-MB-BS107	0.0 - 0.05	***1.6***	-
15-MB-BS108	1.2 - 1.4	***3.6***	-
15-MB-BS109	0.0 - 0.1	***2.2***	-
15-MB-BS110	0.0 - 0.15	0.6	-
15-MB-BS111	1.3 - 1.4	***19***	-
15-MB-BS112	1.8 - 1.9	***15***	-
15-MB-BS113	0.0 - 0.02	0.99	-
15-MB-BS114	0.0 - 0.02	***13***	-
15-MB-BS115	0.0 - 0.03	***13***	-
15-MB-BS116	0.0 - 0.02	***8.4***	-
15-MB-TP101-BS1	0.8 - 1.0	0.4	-
15-MB-TP102-BS1	0.0 - 0.2	***12***	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (CSQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis; < # = Not detected above RDL noted

Lab-Dup = Laboratory duplicate sample

Fld-Dup = Field duplicate sample

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at the Residential Area (Stantec, 2010)

Table C.10 Results of Laboratory Analysis of PCBs in Soil - Old Base 1
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	
	Units	mg/kg	
	CCME SQG[1]	1.3	
	SSTL (Residential Area)[2]	9	
2004 Sampling - ESG			
6594*	0 - 0.1	***4.5***	-
6595	0 - 0.1	***84,000***	Tar removed
6596	0 - 0.1	***5.6***	-
2006 Sampling - ESG			
22544	0 - 0.1	***2.6***	-
22560	0 - 0.1	***1.7***	-
22567	0 - 0.1	***10.7***	-
22576	0 - 0.1	***13.8***	-
22577	0 - 0.1	***37.5***	-
22578	0 - 0.1	***59.7***	-
22582	0 - 0.1	***6,540***	-
22583	0 - 0.1	***349***	-
22585	0 - 0.1	***36.2***	-
22586	0 - 0.1	<0.5	-
22588	0 - 0.1	0.9	-
22594	0 - 0.1	***74.9***	-
22603	0 - 0.1	***5.2***	-
22604	0 - 0.1	0.6	-
22609	0 - 0.1	***122***	-
22610	0 - 0.1	0.6	-
22613	0 - 0.1	1.2	-
22615	0 - 0.1	0.5	-
22628	0 - 0.1	***7.1***	-
22630	0 - 0.1	***15.9***	-
22633	0 - 0.1	<0.5	-
22634	0 - 0.1	1	-
22638	0 - 0.1	***7.7***	-
22743	0 - 0.1	***2.6***	-
22748	0 - 0.1	<0.5	-
22755	0 - 0.1	<0.5	-
22765	0 - 0.1	<0.5	-
22768	0 - 0.1	<0.5	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

(#) = Elevated RDL shown in brackets Elevated RDL used due to matrix/co-extractive interference

"*" = Analysis carried out with field test kit

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at Former Radar Site (Stantec, 2010)

Table C.10 Results of Laboratory Analysis of PCBs in Soil - Old Base 1
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	
	Units	mg/kg	
	CCME SQG[1]	1.3	
	SSTL (Residential Area)[2]	9	
2009 Sampling - Stantec			
BS121	0.0 - 0.03	***170***	-
BS122	0.0 - 0.11	***16***	-
BS123	0.0 - 0.05	***13***	-
BS124	0.0 - 0.07	***4.5***	-
BS125	0.0 - 0.05	<0.05	-
BS126	0.0 - 0.02	***230***	-
BS127	0.0 - 0.02	<0.05	-
BS129	0.0 - 0.05	***1.5***	-
BS130	0.0 - 0.03	***2.2***	-
BS130-Lab-Dup	0.0 - 0.03	***2.2***	-
BS131	0.0 - 0.05	***4.7***	-
BS132	0.0 - 0.04	***8.7***	-
2010 Sampling - Stantec			
OB1-BS2	0.0- 0.1	***22***	-
OB1-BS3	0.0 - 0.1	***4.3***	-
OB1-BS4	0.0 - 0.3	***2.0***	-
OB1-BS6	0.0 - 0.1	***210*** (0.1)	-
OB1-BS7	0.0 - 0.1	***13***	-
OB1-BS8	0.0 - 0.1	1.3	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

RDL = Reportable Detection Limit for routine analysis

Lab-Dup = Laboratory duplicate sample

< # = Not detected above RDL noted

(#) = Elevated RDL shown in brackets Elevated RDL used due to matrix/co-extractive interference

"*" = Analysis carried out with field test kit

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at Former Radar Site (Stantec, 2010)

Table C.10 Results of Laboratory Analysis of PCBs in Soil - Old Base 1
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	
	Units	mg/kg	
	CCME SQG[1]	1.3	
	SSTL (Residential Area)[2]	9	
2013 Sampling - Stantec			
13-OB1-BS1	0.0 - 0.1	<0.050	Tag No. 1
13-OB1-BS2	0.0 - 0.1	<0.050	Tag No. 2
13-OB1-BS3	0.0 - 0.1	<0.050	Tag No. 3
13-OB1-BS4	0.0 - 0.25	<0.050	Tag No. 4
13-OB1-BS5	0.0 - 0.2	<0.050	Tag No. 5
13-OB1-BS6	0.0 - 0.1	***2.2***	Tag No. 6
13-OB1-BS7	0.0 - 0.25	***7.3***	Tag No. 7
13-OB1-BS16 (Fld-Dup of 13-OB1-BS7)	0.0 - 0.25	***1.8***	Tag No. 7
13-OB1-BS16 Lab-Dup (Fld-Dup of 13-OB1-BS7)	0.0 - 0.25	***3.4***	Tag No. 7
13-OB1-BS8	0.0 - 0.25	<0.050	Tag No. 8
13-OB1-BS9	0.0 - 0.1	0.12	Tag No. 9
13-OB1-BS10	0.0 - 0.2	<0.050	Tag No. 10
13-OB1-BS11	0.0 - 0.1	***2.5***	Tag No. 11
13-OB1-BS12	0.0 - 0.1	***1.4***	Tag No. 12
13-OB1-BS13	0.0 - 0.1	<0.050	Tag No. 13
13-OB1-BS14	0.0 - 0.1	0.16	Tag No. 14
13-OB1-BS15	0.0 - 0.1	<0.050	Tag No. 15
2015 Sampling - Stantec			
15-OB1-BS101	0.0 - 0.03	***44***	-
15-OB1-BS102	0.0 - 0.02	***3.3***	-
15-OB1-BS103	0.0 - 0.04	***4.6***	-
15-OB1-BS201	0.0 - 0.02	***4.5***	-
15-OB1-BS202	0.0 - 0.02	***6.9***	-
15-OB1-BS203	0.0 - 0.02	***6.1***	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

RDL = Reportable Detection Limit for routine analysis

Fld-Dup = Field duplicate sample

< # = Not detected above RDL noted

(#) = Elevated RDL shown in brackets Elevated RDL used due to matrix/co-extractive interference

"*" = Analysis carried out with field test kit

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs at Former Radar Site (Stantec, 2010)

Table C.11 Results of Laboratory Analysis of PCBs in Soil - Pit No. 1
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	Generic Criteria[1]	1.3	-
	Remedial Target[2]	9	-
2009 Sampling - Stantec			
TP149-BS1	0.2 - 0.3	0.69	-
TP152-BS1	0.2 - 0.3	***20***	-
TP153-BS1	0.7 - 0.8	1.1	-
TP157-BS2	2.1 - 2.2	nd	-
TP160-BS1	0.9 - 1.0	0.28	-
BS161	0.00 - 0.20	0.18	-
BS163	0.00 - 0.10	0.08	-
BS165	0.00 - 0.20	<0.05	-
MW18-SS4	1.83 - 2.44	***11***	-
2013 Sampling - Stantec			
13-ML1	0.0 - 0.1	***2.0***	Soil removed.
13-ML2	0.0 - 0.1	1.3	Soil removed.
13-ML3	0.0 - 0.1	***2.0***	Soil removed.
13-ML4	0.0 - 0.1	***7.3***	Soil removed.
13-ML5	0.0 - 0.1	***1.5***	Soil removed.
13-ML6	0.0 - 0.1	***1.5***	Soil removed.
13-ML7	0.0 - 0.1	0.78	Soil removed.
13-ML8	0.0 - 0.1	0.63	Soil removed.
13-ML9	0.0 - 0.1	***2.4***	Soil removed.
13-ML10	0.0 - 0.1	0.75	Soil removed.
13-ML11	0.0 - 0.1	1.1	Soil removed.
13-ML12	0.0 - 0.1	***2.2***	Soil removed.

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs in the Residential Area (Stantec, 2010)

Table C.11 Results of Laboratory Analysis of PCBs in Soil - Pit No. 1
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Comments
	RDL	0.05	-
	Units	mg/kg	-
	Generic Criteria[1]	1.3	-
	Remedial Target[2]	9	-
2015 Sampling - Stantec			
15-P1-TP101-BS1	0.8 - 1.0	0.52	-
15-P1-TP101-BS2	1.9 - 2.0	0.77	-
15-P1-TP102-BS1	0.2 - 0.3	***3.7***	-
15-P1-TP102-BS2	0.9 - 1.0	***2.8***	-
15-P1-TP102-BS3	1.6 - 1.7	***4.0***	-
15-P1-TP201-BS1	0.2 - 0.3	***9.1***	-
15-P1-TP201-BS2	1.0 - 1.2	***6.5***	-
15-P1-TP202-BS1	0.2 - 0.3	***5.6***	-
15-P1-TP202-BS2	1.0 - 1.1	***27***	-
15-P1-TP202-BS3	1.4 - 1.5	***17***	-
15-P1-TP202-BS3 Lab-Dup	-	***22***	-
15-P1-TP203-BS1	0.2 - 0.3	***1.9***	-
15-P1-TP203-BS2	1.0 - 1.1	***1.6***	-
15-P1-TP203-BS3	2.0 - 2.1	1.1	-
15-P1-TP203-BS4	2.5 - 2.6	1.3	-
15-P1-TP204-BS1	0.3 - 0.4	***1.5***	-
15-P1-TP204-BS2	1.0 - 1.2	***6.1***	-
15-P1-TP204-BS3	1.9 - 2.1	***1.4***	-
15-P1-TP205-BS1	0.3 - 0.4	***4.6***	-
15-P1-TP205-BS2	1.0 - 1.2	***3.4***	-
15-P1-TP205-BS3	1.9 - 2.0	***2.5***	-

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Lab-Dup = Laboratory duplicate sample

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Shaded = Value exceeds SSTL calculated for PCBs in the Residential Area (Stantec, 2010)

Table C.12 Results of Laboratory Analysis of PCBs in Soil - Road
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sample Depth (m)	Polychlorinated Biphenyls (PCBs)	Location
	RDL	0.05	-
	Units	mg/kg	-
	CCME SQG[1]	1.3	-
	SSTL (Residential Area)[2]	9	-
2015 Sampling - Stantec			
15-ROAD-BS1	0.0 - 0.05	0.091	Near exit from wharf
15-ROAD-BS2	0.0 - 0.05	0.31	Near intersection to Old Dump Pond
15-ROAD-BS3	0.0 - 0.1	0.48	Near Main Base/BMEWS intersection
15-ROAD-BS4	0.0 - 0.1	***1.7***	Main Base road near Old Base 1
15-ROAD-BS5	0.0 - 0.1	0.69	BMEWs road near intersection to Aliant tower

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Residential/Parkland Site (1999 and updates)

2 = Site-Specific Target Level (SSTL) calculated for PCBs in the Residential Area (Stantec, 2010)

* = Analysis carried out with field test kit

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Bold/Italics = Value exceeds generic criteria (i.e., CCME CSQG)

Table C.13 Results of Laboratory Analysis of PCBs on Metal Debris
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Sampled Media	Polychlorinated Biphenyls (PCBs)
	RDL	5
	Units	µg/100 cm^2
	CCME Recommended Permissible Surface Contamination Criterion[1]	10
2014 Sampling - Stantec		
14-CABLE1	Cable (BMEWS)	<5
14-SWAB1	4 inch diameter steel pipe (Main Base)	**17**
14-SWAB2	8 inch diameter corrugated steel pipe (Main Base)	**14**
14-SWAB3	Steel tank (Main Base)	<5
14-SWAB4	16 x 24 inch piece of steel (Main Base)	<5
14-SWAB5	Electric pole (Main Base)	<5
2015 Sampling - Stantec		
15-SWAB-1	4 inch diameter yellow pipe (Main Base)	5.7
15-SWAB-2	metal angle bar (Main Base)	9.1
15-SWAB-3	8 inch diameter metal pipe (Main Base)	9
15-SWAB-4	12 inch flat metal bar (Main Base)	5.6
15-SWAB-5	2 inch metal piping (Main Base)	**11**

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) PCB Transformer Decontamination Standards and Protocols (1995) - Recommended Permissible Surface Contamination Criterion for transformer metal components destined for recycling by smelting

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Bold/Shaded = Value exceeds the CCME Criterion

Table C.14 Results of Laboratory Analysis of PCBs in Sediment - Swimming Pond
Implementation of the RAP and Additional Delineation - Year 5
Former US Military Site and Residential Subdivision, Hopedale, NL
Project No. 121410103

Sample ID	Polychlorinated Biphenyls (PCBs)
RDL	0.05
Units	mg/kg
Criteria[1]	0.0341
Criteria[2]	0.277
2015 Sampling - Stantec	
15-POND-SED1	<0.05
15-POND-SED2	<0.05
15-POND-SED3	<0.05

Notes:

1 = CCME Interim Sediment Quality Guidelines (ISQGs) for freshwater sediment (1999 and updates)

2 = CCME Probable Effects Levels (PELs) for freshwater sediment (1999 and updates)

RDL = Reportable Detection Limit for routine analysis

< # = Not detected above RDL noted

Table C.15 Results of Laboratory Analysis of PCBs in Surface Water - Swimming Pond
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Sample ID	Polychlorinated Biphenyls (PCBs)
RDL	0.050
Units	µg/L
Criteria[1]	-
2015 Sampling - Stantec	
15-POND-SW1	<0.05
15-POND-SW1 Lab-Dup	<0.05
15-POND-SW2	<0.05
15-POND-SW3	<0.05

Notes:

1 = CCME Water Quality Guidelines for the protection of freshwater aquatic life (1999 and updates)

RDL = Reportable Detection Limit for routine analysis

Lab-dup = Laboratory duplicate sample

< # = Not detected above RDL noted

Table C.16 Results of Laboratory Analysis of Inorganics in Soil - Biopile
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	RDL	Units	Guideline[1]	15-BP-COMP-A1	15-BP-COMP-A1 Lab-Dup	15-BP-COMP-B1	15-BP-COMP-B2	15-BP-COMP-C1	15-BP-COMP-D1	15-BP-COMP-D1 Lab-Dup
Ammonia-N	5	mg/kg	-	320	270	140	200	71	84	-
Chloride (Cl)	5	mg/kg	-	79	-	57	62	38	32	34
Conductivity	1	uS/cm	4,000	700	-	260	290	190	150	150
Moisture [2]	1	%	-	22	-	22	21	22	20	-
Nitrate + Nitrite	0.25	mg/kg	-	40	-	14	16	6.7	4.2	4.5
Nitrite (N)	0.05	mg/kg	-	0.39	-	<0.050	0.057	0.05	0.05	<0.050
Orthophosphate (P)	0.05	mg/kg	-	8.8	-	2	2.2	0.94	0.64	0.65
Soluble (5:1) pH	N/A	-	6 - 8	7.69	-	7.67	7.6	7.39	7.36	7.32
Sulphate (SO_4)	10	mg/kg	-	730	-	53	82	49	34	37

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guideline (SQG) for a Commercial Site (1999 and updates)

2 = Recorded as part of Petroleum Hydrocarbon analysis

"-" = No applicable guideline or not analyzed

RDL = Reportable Detection Limit for routine analysis

<# = Not detected above standard RDL

(#) = Elevated RDL shown in brackets

Lab-Dup = Laboratory duplicate sample

Bold / Shaded = Concentration exceeds CCME CSQG for a commercial site

Table C.17 Results of Laboratory Analysis of Microbiology in Soil - Biopile
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Parameters	Units	Guideline[1]	15-BP-COMP-A1	15-BP-COMP-B1	15-BP-COMP-B2	15-BP-COMP-C1	15-BP-COMP-D1
Hydrocarbanoclastes	CFU/g	-	3,900	44,000	1,600,000	160,000	920,000

Notes:
"-" = No applicable guideline

Table C.18 Results of Laboratory Grain Size Analysis of Soil - Biopile
Implementation of the RAP and Additional Delineation - Year 5
Former U.S. Military Site, Hopedale, NL
Project No. 121413099

Grain Size	RDL	Units	15-BP-COMP-A2	15-BP-COMP-A2 Lab-Dup	15-BP-COMP-B1	15-BP-COMP-B2	15-BP-COMP-C2	15-BP-COMP-D2
< -1 Phi (2 mm)	0.1	%	75 (1)	87	77	86	80	81 (1)
< 0 Phi (1 mm)	0.1	%	66	75	67	74	69	70
< +1 Phi (0.5 mm)	0.1	%	53	58	53	57	54	55
< +2 Phi (0.25 mm)	0.1	%	38	40	37	39	37	38
< +3 Phi (0.12 mm)	0.1	%	27	28	25	26	23	24
< +4 Phi (0.062 mm)	0.1	%	21	21	18	18	17	17
< +5 Phi (0.031 mm)	0.1	%	17	17	15	15	13	13
< +6 Phi (0.016 mm)	0.1	%	14	12	11	11	9	9.2
< +7 Phi (0.0078 mm)	0.1	%	10	8	7	7	6	6
< +8 Phi (0.0039 mm)	0.1	%	8.3	7.1	6.5	6.2	4.9	4.9
< +9 Phi (0.0020 mm)	0.1	%	6.4	6.5	6.2	5.5	4	3.4
Gravel	0.1	%	25	13 (2)	23	14	20	19.0
Sand	0.1	%	55	66	59	68	64	65
Silt	0.1	%	13	13	12	12	12	12
Clay	0.1	%	8.3	7.1	6.5	6.2	4.9	4.9

Notes:
RDL = Reportable Detection Limit for routine analysis
(1) = Sample observation comment: fraction contained a large rock
(2) = Poor duplicate agreement due to sample inhomogeneity.

APPENDIX D

Laboratory Analytical Reports

Your Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Your C.O.C. #: C#5257540101

Attention:Anna Roy

Stantec Consulting Ltd
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2015/08/27
Report #: R3642337
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5G9563
Received: 2015/08/25, 10:15

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 2)	3	2015/08/25	2015/08/26	ATL SOP 00197	Atl. RBCA v3 m
TEH in Soil (PIRI) (2)	2	2015/08/25	2015/08/27	ATL SOP 00197	Atl. RBCA v3 m
Moisture	5	N/A	2015/08/26	ATL SOP-00196	OMOE Handbook 1983 m
VPH in Soil (PIRI)	5	2015/08/25	2015/08/27	ATL SOP 00199	Atl. RBCA v3 m
ModTPH (T1) Calc. for Soil	5	N/A	2015/08/27	N/A	Atl. RBCA v3 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Reported on a dry weight basis.
(2) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Robert Whelan
27 Aug 2015 17:13:14 -02:30

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rob Whelan, Laboratory Manager
Email: RWhelan@maxxam.ca
Phone# (709)754-0203
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B5G9563
Report Date: 2015/08/27

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		AWA362	AWA363	AWA364	AWA365	AWA366		
Sampling Date		2015/08/23	2015/08/23	2015/08/23	2015/08/24	2015/08/24		
COC Number		C#5257540101	C#5257540101	C#5257540101	C#5257540101	C#5257540101		
	UNITS	**MB-BS108**	**MB-BS109**	**MB-BS110**	**MB-BS111**	**MB-BS112**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	28	8.0	22	30	21	1.0	4162350
Petroleum Hydrocarbons								
Benzene	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	4162950
Toluene	mg/kg	<0.025	<0.025	<0.025	<0.025	0.19	0.025	4162950
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	<0.025	0.12	0.025	4162950
Total Xylenes	mg/kg	<0.050	<0.050	<0.050	<0.050	0.61	0.050	4162950
C6 - C10 (less BTEX)	mg/kg	12	120	<2.5	<2.5	160	2.5	4162950
>C10-C16 Hydrocarbons	mg/kg	9400	25	<10	4100	18000	10	4162716
>C16-C21 Hydrocarbons	mg/kg	4100	150	<10	2800	7400	10	4162716
>C21-<C32 Hydrocarbons	mg/kg	1300	70	33	800	1700	15	4162716
Modified TPH (Tier1)	mg/kg	15000	370	33	7700	27000	15	4162472
Reached Baseline at C32	mg/kg	Yes	No	No	Yes	Yes	N/A	4162716
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (2)	COMMENT (3)	COMMENT (1)	COMMENT (1)	N/A	4162716
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	100	101	100	99	100		4162716
n-Dotriacontane - Extractable	%	120	105	102	114	119		4162716
Isobutylbenzene - Volatile	%	102	82	111	100	95		4162950

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Weathered fuel oil fraction.
(2) One product in fuel/lube oil range.
(3) No resemblance to petroleum products in lube oil range.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Job #: B5G9563
Report Date: 2015/08/27

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**
4162716	Isobutylbenzene - Extractable	2015/08/26	99	30 - 130	102	30 - 130	103	%		
4162716	n-Dotriacontane - Extractable	2015/08/26	98	30 - 130	106	30 - 130	102	%		
4162950	Isobutylbenzene - Volatile	2015/08/27			102	60 - 130	93	%		
4162350	Moisture	2015/08/26							2.4	25
4162716	>C10-C16 Hydrocarbons	2015/08/26	94	30 - 130	93	30 - 130	<10	mg/kg	NC	50
4162716	>C16-C21 Hydrocarbons	2015/08/26	99	30 - 130	100	30 - 130	<10	mg/kg	NC	50
4162716	>C21-<C32 Hydrocarbons	2015/08/26	NC	30 - 130	94	30 - 130	<15	mg/kg	16	50
4162950	Benzene	2015/08/27			92	60 - 140	<0.025	mg/kg		
4162950	C6 - C10 (less BTEX)	2015/08/27					<2.5	mg/kg		
4162950	Ethylbenzene	2015/08/27			81	60 - 140	<0.025	mg/kg		
4162950	Toluene	2015/08/27			83	60 - 140	<0.025	mg/kg		
4162950	Total Xylenes	2015/08/27			87	60 - 140	<0.050	mg/kg		

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

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

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B5G9563
Report Date: 2015/08/27

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

VALIDATION SIGNATURE PAGE

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

Rob Whelan, Laboratory Manager

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

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Success Through Science®

Your Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Your C.O.C. #: N/A

Attention:Anna Roy

Stantec Consulting Ltd
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2015/09/09
Report #: R3655944
Version: 5 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5G9646
Received: 2015/08/25, 09:23

Sample Matrix: Soil
Samples Received: 44

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chloride in Soil by Auto. Colourimetry (1)	5	N/A	2015/09/01	ATL SOP 00014	SM 22 4500-Cl- E m
Conductance - soil (1)	5	2015/08/28	2015/08/31	ATL SOP 00004	SM 22 2510B m
TEH in Soil (PIRI) (1, 3)	5	2015/08/27	2015/08/28	ATL SOP 00111	Atl. RBCA v3 m
TEH in Soil (PIRI) (1, 3)	3	2015/08/27	2015/08/29	ATL SOP 00111	Atl. RBCA v3 m
Metals Solids Acid Extr. ICPMS (1)	3	2015/08/27	2015/08/27	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS (1)	21	2015/08/27	2015/08/28	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS (1)	1	2015/08/28	2015/08/28	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS (1)	3	2015/08/28	2015/08/29	ATL SOP 00058	EPA 6020A R1 m
Acid Extractable Metals Analysis by ICP (2)	5	2015/09/02	2015/09/02	CAM SOP-00408	EPA 6010C m
Moisture (1)	21	N/A	2015/08/27	ATL SOP 00001	OMOE Handbook 1983 m
Nitrogen Ammonia - soil (as N) (1)	5	2015/08/27	2015/08/27	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	5	2015/08/31	2015/09/01	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite by auto colourimetry (1)	5	2015/08/31	2015/08/31	ATL SOP 00017	SM 22 4500-NO2- B m
PCBs in soil by GC/ECD (1, 3)	5	2015/08/26	2015/08/27	ATL SOP 00106	EPA 8082A m
PCBs in soil by GC/ECD (1, 3)	8	2015/08/27	2015/08/28	ATL SOP 00106	EPA 8082A m
PCB Aroclor sum (soil) (1)	5	N/A	2015/08/27		Auto Calc.
PCB Aroclor sum (soil) (1)	8	N/A	2015/08/28		Auto Calc.
pH (5:1 DI Water Extract) (1)	5	2015/08/28	2015/08/28	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho by auto Colourimetry (1)	5	2015/08/31	2015/08/31	ATL SOP 00021	EPA 365.2 m
VPH in Soil (PIRI) (1)	8	2015/08/26	2015/08/28	ATL SOP 00119	Atl. RBCA v3 m
Particle size in solids (pipette&sieve) (1, 4)	5	N/A	2015/09/02	ATL SOP 00012	MSAMS 1978 m
Sulphate in Soil by Auto Colourimetry (1)	5	2015/08/31	2015/09/01	ATL SOP 00023	EPA 375.4 R1978 m
ModTPH (T1) Calc. for Soil (1)	8	N/A	2015/09/01	N/A	Atl. RBCA v3 m

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PCBs in water by GC/ECD (1)	3	2015/08/27	2015/08/31	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water) (1)	3	N/A	2015/08/31		Auto Calc.

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Your Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Your C.O.C. #: N/A

Attention:Anna Roy

Stantec Consulting Ltd
141 Kelsey Drive
St. John's, NL
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Report Date: 2015/09/09
Report #: R3655944
Version: 5 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5G9646
Received: 2015/08/25, 09:23

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

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

(1) This test was performed by Maxxam Bedford
(2) This test was performed by Maxxam Analytics Mississauga
(3) Soils are reported on a dry weight basis unless otherwise specified.
(4) Note: Graphical representation of larger fractions (PHI-4, PHI -3 and PHI -2) not applicable unless these optional parameters are specifically requested.

Encryption Key

Rachael Mansfield
09 Sep 2015 16:49:27 -03:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		AWA926	AWA926	AWA927	AWA928			
Sampling Date		2015/08/19	2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A	N/A	N/A	N/A			
	UNITS	**15-BP-COMP-A1**	**15-BP-COMP-A1 Lab-Dup**	**15-BP-COMP-A2**	**15-BP-COMP-B1**	**RDL**	**QC Batch**	**MDL**
Inorganics								
Moisture	%	22		23	22	1.0	4164178	0.20
Petroleum Hydrocarbons								
Benzene	mg/kg	<0.025	<0.025	<0.025	<0.025	0.025	4168228	N/A
Toluene	mg/kg	<0.025	0.040	0.046	<0.025	0.025	4168228	N/A
Ethylbenzene	mg/kg	<0.025	<0.025	<0.025	<0.025	0.025	4168228	0.025
Total Xylenes	mg/kg	<0.050	<0.050	<0.050	<0.050	0.050	4168228	N/A
C6 - C10 (less BTEX)	mg/kg	25	28	24	60	2.5	4168228	N/A
>C10-C16 Hydrocarbons	mg/kg	2000 (1)		2000 (1)	2800 (1)	50	4166161	N/A
>C16-C21 Hydrocarbons	mg/kg	720 (1)		730 (1)	870 (1)	50	4166161	N/A
>C21-<C32 Hydrocarbons	mg/kg	3000 (1)		2500 (1)	1900 (1)	75	4166161	N/A
Modified TPH (Tier1)	mg/kg	5800		5300	5600	75	4162749	N/A
Reached Baseline at C32	mg/kg	No		No	No	N/A	4166161	N/A
Hydrocarbon Resemblance	mg/kg	COMMENT (2)		COMMENT (2)	COMMENT (2)	N/A	4166161	N/A
Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	104		102	113		4166161	
n-Dotriacontane - Extractable	%	65		76	72		4166161	
Isobutylbenzene - Volatile	%	69	85	86	81		4168228	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Elevated TEH RDL(s) due to sample dilution.
(2) Weathered fuel oil fraction. Lube oil fraction.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

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RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		AWA929		AWA930	AWA931	AWA932			
Sampling Date		2015/08/19		2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A		N/A	N/A	N/A			
	UNITS	**15-BP-COMP-B2**	**QC Batch**	**15-BP-COMP-C1**	**15-BP-COMP-C2**	**15-BP-COMP-D1**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	21	4164178	22	20	20	1.0	4164346	0.20
Petroleum Hydrocarbons									
Benzene	mg/kg	<0.025	4168228	<0.025	<0.025	<0.025	0.025	4168228	N/A
Toluene	mg/kg	<0.025	4168228	<0.025	0.040	0.038	0.025	4168228	N/A
Ethylbenzene	mg/kg	<0.025	4168228	<0.025	<0.025	<0.025	0.025	4168228	0.025
Total Xylenes	mg/kg	<0.050	4168228	<0.050	<0.050	<0.050	0.050	4168228	N/A
C6 - C10 (less BTEX)	mg/kg	58	4168228	46	48	65	2.5	4168228	N/A
>C10-C16 Hydrocarbons	mg/kg	2800 (1)	4166161	3500 (1)	2500 (1)	2600 (1)	50	4166161	N/A
>C16-C21 Hydrocarbons	mg/kg	890 (1)	4166161	940 (1)	740 (1)	620 (1)	50	4166161	N/A
>C21-<C32 Hydrocarbons	mg/kg	1900 (1)	4166161	1800 (1)	2200 (1)	2000 (1)	75	4166161	N/A
Modified TPH (Tier1)	mg/kg	5600	4162749	6300	5500	5300	75	4162749	N/A
Reached Baseline at C32	mg/kg	No	4166161	No	No	No	N/A	4166161	N/A
Hydrocarbon Resemblance	mg/kg	COMMENT (2)	4166161	COMMENT (2)	COMMENT (2)	COMMENT (2)	N/A	4166161	N/A
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	111	4166161	127	112	111		4166161	
n-Dotriacontane - Extractable	%	68	4166161	73	68	69		4166161	
Isobutylbenzene - Volatile	%	78	4168228	84	99	76		4168228	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Elevated TEH RDL(s) due to sample dilution.
(2) Weathered fuel oil fraction. Lube oil fraction.

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RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		AWA933			
Sampling Date		2015/08/19			
COC Number		N/A			
	UNITS	**15-BP-COMP-D2**	**RDL**	**QC Batch**	**MDL**
Inorganics					
Moisture	%	21	1.0	4164346	0.20
Petroleum Hydrocarbons					
Benzene	mg/kg	<0.025	0.025	4168228	N/A
Toluene	mg/kg	<0.025	0.025	4168228	N/A
Ethylbenzene	mg/kg	<0.025	0.025	4168228	0.025
Total Xylenes	mg/kg	<0.050	0.050	4168228	N/A
C6 - C10 (less BTEX)	mg/kg	67	2.5	4168228	N/A
>C10-C16 Hydrocarbons	mg/kg	2700 (1)	50	4166161	N/A
>C16-C21 Hydrocarbons	mg/kg	660 (1)	50	4166161	N/A
>C21-<C32 Hydrocarbons	mg/kg	1600 (1)	75	4166161	N/A
Modified TPH (Tier1)	mg/kg	5100	75	4162749	N/A
Reached Baseline at C32	mg/kg	No	N/A	4166161	N/A
Hydrocarbon Resemblance	mg/kg	COMMENT (2)	N/A	4166161	N/A
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	82		4166161	
n-Dotriacontane - Extractable	%	73		4166161	
Isobutylbenzene - Volatile	%	74		4168228	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Elevated TEH RDL(s) due to sample dilution.
(2) Weathered fuel oil fraction. Lube oil fraction.

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RESULTS OF ANALYSES OF SOIL

Maxxam ID		AWA895	AWA896	AWA897	AWA898	AWA899		AWA915			
Sampling Date		2015/08/19	2015/08/19	2015/08/19	2015/08/19	2015/08/19		2015/08/20			
COC Number		N/A	N/A	N/A	N/A	N/A		N/A			
	UNITS	**MB-BS103**	**MB-BS104**	**MB-BS105**	**MB-BS106**	**MB-BS107**	**QC Batch**	**15-ROAD-BS1**	**RDL**	**QC Batch**	**MDL**
Inorganics											
Moisture	%	19	5.6	32	37	20	4164178	9.5	1.0	4164341	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		AWA916	AWA917	AWA918	AWA919	AWA920			
Sampling Date		2015/08/20	2015/08/19	2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A	N/A	N/A	N/A	N/A			
	UNITS	**15-ROAD-BS2**	**15-ROAD-BS3**	**15-ROAD-BS4**	**15-ROAD-BS5**	**15-POND-SED1**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	8.7	9.3	10	11	18	1.0	4164341	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RESULTS OF ANALYSES OF SOIL

Maxxam ID		AWA921	AWA922	AWA926	AWA926	AWA927			
Sampling Date		2015/08/19	2015/08/19	2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A	N/A	N/A	N/A	N/A			
	UNITS	**15-POND-SED2**	**15-POND-SED3**	**15-BP-COMP-A1**	**15-BP-COMP-A1 Lab-Dup**	**15-BP-COMP-A2**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Ammonia-N	mg/kg			320	270		17	4166576	N/A
Chloride (Cl)	mg/kg			79			5.0	4171136	N/A
Conductivity	uS/cm			700			1.0	4171327	N/A
Moisture	%	19	26				1.0	4164341	0.20
Nitrate + Nitrite	mg/kg			40			1.3	4171147	N/A
Nitrite (N)	mg/kg			0.39			0.050	4171151	N/A
Orthophosphate (P)	mg/kg			8.8			0.25	4171146	N/A
Soluble (5:1) pH	pH			7.69			N/A	4168701	N/A
Sulphate (SO4)	mg/kg			730			50	4171143	N/A
< -1 Phi (2 mm)	%					75 (1)	0.10	4170849	N/A
< 0 Phi (1 mm)	%					66	0.10	4170849	N/A
< +1 Phi (0.5 mm)	%					53	0.10	4170849	N/A
< +2 Phi (0.25 mm)	%					38	0.10	4170849	N/A
< +3 Phi (0.12 mm)	%					27	0.10	4170849	N/A
< +4 Phi (0.062 mm)	%					21	0.10	4170849	N/A
< +5 Phi (0.031 mm)	%					17	0.10	4170849	N/A
< +6 Phi (0.016 mm)	%					14	0.10	4170849	N/A
< +7 Phi (0.0078 mm)	%					9.5	0.10	4170849	N/A
< +8 Phi (0.0039 mm)	%					8.3	0.10	4170849	N/A
< +9 Phi (0.0020 mm)	%					6.4	0.10	4170849	N/A
Gravel	%					25	0.10	4170849	N/A
Sand	%					55	0.10	4170849	N/A
Silt	%					13	0.10	4170849	N/A
Clay	%					8.3	0.10	4170849	N/A

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N/A = Not Applicable
(1) Sample observation comment: fraction contained a large rock

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RESULTS OF ANALYSES OF SOIL

Maxxam ID		AWA927		AWA928		AWA929		AWA930			
Sampling Date		2015/08/19		2015/08/19		2015/08/19		2015/08/19			
COC Number		N/A		N/A		N/A		N/A			
	UNITS	**15-BP-COMP-A2 Lab-Dup**	**RDL**	**15-BP-COMP-B1**	**RDL**	**15-BP-COMP-B2**	**RDL**	**15-BP-COMP-C1**	**RDL**	**QC Batch**	**MDL**
Inorganics											
Ammonia-N	mg/kg		17	140	6.7	200	17	71	5.0	4166576	N/A
Chloride (Cl)	mg/kg		5.0	57	5.0	62	5.0	38	5.0	4171136	N/A
Conductivity	uS/cm		1.0	260	1.0	290	1.0	190	1.0	4171327	N/A
Nitrate + Nitrite	mg/kg		1.3	14	0.25	16	0.25	6.7	0.25	4171147	N/A
Nitrite (N)	mg/kg		0.050	<0.050	0.050	0.057	0.050	0.050	0.050	4171151	N/A
Orthophosphate (P)	mg/kg		0.25	2.0	0.050	2.2	0.050	0.94	0.050	4171146	N/A
Soluble (5:1) pH	pH		N/A	7.67	N/A	7.60	N/A	7.39	N/A	4168701	N/A
Sulphate (SO4)	mg/kg		50	53	10	82	10	49	10	4171143	N/A
< -1 Phi (2 mm)	%	87	0.10	77	0.10	86	0.10		0.10	4170849	N/A
< 0 Phi (1 mm)	%	75	0.10	67	0.10	74	0.10		0.10	4170849	N/A
< +1 Phi (0.5 mm)	%	58	0.10	53	0.10	57	0.10		0.10	4170849	N/A
< +2 Phi (0.25 mm)	%	40	0.10	37	0.10	39	0.10		0.10	4170849	N/A
< +3 Phi (0.12 mm)	%	28	0.10	25	0.10	26	0.10		0.10	4170849	N/A
< +4 Phi (0.062 mm)	%	21	0.10	18	0.10	18	0.10		0.10	4170849	N/A
< +5 Phi (0.031 mm)	%	17	0.10	15	0.10	15	0.10		0.10	4170849	N/A
< +6 Phi (0.016 mm)	%	12	0.10	11	0.10	11	0.10		0.10	4170849	N/A
< +7 Phi (0.0078 mm)	%	8.3	0.10	7.1	0.10	7.3	0.10		0.10	4170849	N/A
< +8 Phi (0.0039 mm)	%	7.1	0.10	6.5	0.10	6.2	0.10		0.10	4170849	N/A
< +9 Phi (0.0020 mm)	%	6.5	0.10	6.2	0.10	5.5	0.10		0.10	4170849	N/A
Gravel	%	13 (1)	0.10	23	0.10	14	0.10		0.10	4170849	N/A
Sand	%	66	0.10	59	0.10	68	0.10		0.10	4170849	N/A
Silt	%	13	0.10	12	0.10	12	0.10		0.10	4170849	N/A
Clay	%	7.1	0.10	6.5	0.10	6.2	0.10		0.10	4170849	N/A

RDL = Reportable Detection Limit
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(1) PSA: Poor duplicate agreement due to sample inhomogeneity.

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RESULTS OF ANALYSES OF SOIL

Maxxam ID		AWA931		AWA932	AWA932	AWA933			
Sampling Date		2015/08/19		2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A		N/A	N/A	N/A			
	UNITS	**15-BP-COMP-C2**	**RDL**	**15-BP-COMP-D1**	**15-BP-COMP-D1 Lab-Dup**	**15-BP-COMP-D2**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Ammonia-N	mg/kg		5.0	84			4.9	4166576	N/A
Chloride (Cl)	mg/kg		5.0	32	34		5.0	4171136	N/A
Conductivity	uS/cm		1.0	150	150		1.0	4171327	N/A
Nitrate + Nitrite	mg/kg		0.25	4.2	4.5		0.25	4171147	N/A
Nitrite (N)	mg/kg		0.050	0.050	<0.050		0.050	4171151	N/A
Orthophosphate (P)	mg/kg		0.050	0.64	0.65		0.050	4171146	N/A
Soluble (5:1) pH	pH		N/A	7.36	7.32		N/A	4168701	N/A
Sulphate (SO4)	mg/kg		10	34	37		10	4171143	N/A
< -1 Phi (2 mm)	%	80	0.10			81 (1)	0.10	4170849	N/A
< 0 Phi (1 mm)	%	69	0.10			70	0.10	4170849	N/A
< +1 Phi (0.5 mm)	%	54	0.10			55	0.10	4170849	N/A
< +2 Phi (0.25 mm)	%	37	0.10			38	0.10	4170849	N/A
< +3 Phi (0.12 mm)	%	23	0.10			24	0.10	4170849	N/A
< +4 Phi (0.062 mm)	%	17	0.10			17	0.10	4170849	N/A
< +5 Phi (0.031 mm)	%	13	0.10			13	0.10	4170849	N/A
< +6 Phi (0.016 mm)	%	9.0	0.10			9.2	0.10	4170849	N/A
< +7 Phi (0.0078 mm)	%	5.8	0.10			5.8	0.10	4170849	N/A
< +8 Phi (0.0039 mm)	%	4.9	0.10			4.9	0.10	4170849	N/A
< +9 Phi (0.0020 mm)	%	4.0	0.10			3.4	0.10	4170849	N/A
Gravel	%	20	0.10			19	0.10	4170849	N/A
Sand	%	64	0.10			65	0.10	4170849	N/A
Silt	%	12	0.10			12	0.10	4170849	N/A
Clay	%	4.9	0.10			4.9	0.10	4170849	N/A

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N/A = Not Applicable
(1) Sample observation comment: fraction contained a large rock

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AWA887	AWA888	AWA889	AWA890	AWA891	AWA892			
Sampling Date		2015/08/19	2015/08/19	2015/08/19	2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A	N/A	N/A	N/A	N/A	N/A			
	UNITS	**MCL-BS101**	**MCL-BS102**	**MCL-BS103**	**MCL-BS104**	**MCL-BS201**	**MCL-BS202**	**RDL**	**QC Batch**	**MDL**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	9700	3000	2100	4700	4100	4400	10	4166246	N/A
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Barium (Ba)	mg/kg	21	13	44	15	32	23	5.0	4166246	N/A
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	<50	50	4166246	N/A
Acid Extractable Cadmium (Cd)	mg/kg	0.90	1.7	2.4	1.9	0.38	<0.30	0.30	4166246	N/A
Acid Extractable Chromium (Cr)	mg/kg	26	28	44	28	17	13	2.0	4166246	N/A
Acid Extractable Cobalt (Co)	mg/kg	2.6	1.2	2.4	2.1	2.5	2.2	1.0	4166246	N/A
Acid Extractable Copper (Cu)	mg/kg	54	9.1	250	260	26	12	2.0	4166246	N/A
Acid Extractable Iron (Fe)	mg/kg	11000	4900	4900	11000	7800	5400	50	4166246	N/A
Acid Extractable Lead (Pb)	mg/kg	51	9.0	430	54	74	19	0.50	4166246	N/A
Acid Extractable Lithium (Li)	mg/kg	3.1	<2.0	<2.0	4.2	2.7	2.6	2.0	4166246	N/A
Acid Extractable Manganese (Mn)	mg/kg	51	22	57	45	80	48	2.0	4166246	N/A
Acid Extractable Mercury (Hg)	mg/kg	0.13	<0.10	0.16	<0.10	0.11	0.11	0.10	4166246	N/A
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	9.7	<2.0	<2.0	4.2	2.0	4166246	N/A
Acid Extractable Nickel (Ni)	mg/kg	11	2.7	9.9	5.2	11	7.0	2.0	4166246	N/A
Acid Extractable Rubidium (Rb)	mg/kg	5.2	8.5	4.7	6.2	4.5	4.5	2.0	4166246	N/A
Acid Extractable Selenium (Se)	mg/kg	1.7	<1.0	<1.0	1.0	<1.0	<1.0	1.0	4166246	N/A
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	0.77	<0.50	<0.50	<0.50	0.50	4166246	N/A
Acid Extractable Strontium (Sr)	mg/kg	13	<5.0	38	38	20	11	5.0	4166246	N/A
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4166246	N/A
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	<2.0	40	<2.0	2.0	4166246	N/A
Acid Extractable Uranium (U)	mg/kg	1.9	0.18	0.26	0.79	0.37	0.45	0.10	4166246	N/A
Acid Extractable Vanadium (V)	mg/kg	20	11	4.5	23	12	10	2.0	4166246	N/A
Acid Extractable Zinc (Zn)	mg/kg	48	45	160	53	200	43	5.0	4166246	N/A

RDL = Reportable Detection Limit
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N/A = Not Applicable

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AWA893	AWA894	AWA900	AWA901	AWA902			
Sampling Date		2015/08/19	2015/08/19	2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A	N/A	N/A	N/A	N/A			
	UNITS	**MCL-BS203**	**MCL-BS204**	**BMEWS-BS401**	**BMEWS-BS402**	**BMEWS-BS403**	**RDL**	**QC Batch**	**MDL**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	3500	5900	8300	9400	8600	10	4166246	N/A
Acid Extractable Antimony (Sb)	mg/kg	<2.0	3.3	<2.0	2.0	<2.0	2.0	4166246	N/A
Acid Extractable Arsenic (As)	mg/kg	<2.0	41	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Barium (Ba)	mg/kg	23	1400	80	150	150	5.0	4166246	N/A
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	50	4166246	N/A
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	4.0	2.3	4.9	5.1	0.30	4166246	N/A
Acid Extractable Chromium (Cr)	mg/kg	13	31	33	33	33	2.0	4166246	N/A
Acid Extractable Cobalt (Co)	mg/kg	2.0	6.4	5.4	5.9	5.6	1.0	4166246	N/A
Acid Extractable Copper (Cu)	mg/kg	12	130	240	230	180	2.0	4166246	N/A
Acid Extractable Iron (Fe)	mg/kg	6000	8700	18000	18000	15000	50	4166246	N/A
Acid Extractable Lead (Pb)	mg/kg	17	1000	43	50	100	0.50	4166246	N/A
Acid Extractable Lithium (Li)	mg/kg	2.9	7.1	8.6	9.0	8.4	2.0	4166246	N/A
Acid Extractable Manganese (Mn)	mg/kg	42	85	190	220	210	2.0	4166246	N/A
Acid Extractable Mercury (Hg)	mg/kg	0.12	0.17	<0.10	<0.10	<0.10	0.10	4166246	N/A
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Nickel (Ni)	mg/kg	7.3	14	23	25	23	2.0	4166246	N/A
Acid Extractable Rubidium (Rb)	mg/kg	6.8	11	12	9.9	9.0	2.0	4166246	N/A
Acid Extractable Selenium (Se)	mg/kg	<1.0	4.8	<1.0	<1.0	<1.0	1.0	4166246	N/A
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	0.65	<0.50	0.50	4166246	N/A
Acid Extractable Strontium (Sr)	mg/kg	8.8	26	29	25	27	5.0	4166246	N/A
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.10	<0.10	<0.10	<0.10	0.10	4166246	N/A
Acid Extractable Tin (Sn)	mg/kg	<2.0	15	5.3	13	10	2.0	4166246	N/A
Acid Extractable Uranium (U)	mg/kg	0.25	0.27	0.37	0.24	0.30	0.10	4166246	N/A
Acid Extractable Vanadium (V)	mg/kg	12	18	30	29	28	2.0	4166246	N/A
Acid Extractable Zinc (Zn)	mg/kg	33	290	950	790	2100	5.0	4166246	N/A

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AWA903	AWA904	AWA905		AWA906			
Sampling Date		2015/08/19	2015/08/19	2015/08/19		2015/08/19			
COC Number		N/A	N/A	N/A		N/A			
	UNITS	**BMEWS-BS404**	**BMEWS-BS501**	**BMEWS-BS502**	**QC Batch**	**BMEWS-BS503**	**RDL**	**QC Batch**	**MDL**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	8400	8800	7600	4166246	8000	10	4166183	N/A
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	4166246	<2.0	2.0	4166183	N/A
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	4166246	<2.0	2.0	4166183	N/A
Acid Extractable Barium (Ba)	mg/kg	51	120	13	4166246	51	5.0	4166183	N/A
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	4166246	<2.0	2.0	4166183	N/A
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	4166246	<2.0	2.0	4166183	N/A
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	4166246	<50	50	4166183	N/A
Acid Extractable Cadmium (Cd)	mg/kg	5.6	0.50	<0.30	4166246	<0.30	0.30	4166183	N/A
Acid Extractable Chromium (Cr)	mg/kg	26	35	16	4166246	28	2.0	4166183	N/A
Acid Extractable Cobalt (Co)	mg/kg	6.8	5.6	5.0	4166246	4.7	1.0	4166183	N/A
Acid Extractable Copper (Cu)	mg/kg	19	23	22	4166246	14	2.0	4166183	N/A
Acid Extractable Iron (Fe)	mg/kg	17000	13000	9000	4166246	11000	50	4166183	N/A
Acid Extractable Lead (Pb)	mg/kg	29	13	3.0	4166246	9.8	0.50	4166183	N/A
Acid Extractable Lithium (Li)	mg/kg	8.5	11	4.2	4166246	7.8	2.0	4166183	N/A
Acid Extractable Manganese (Mn)	mg/kg	230	210	110	4166246	160	2.0	4166183	N/A
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	4166246	<0.10	0.10	4166183	N/A
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	4166246	<2.0	2.0	4166183	N/A
Acid Extractable Nickel (Ni)	mg/kg	20	20	15	4166246	16	2.0	4166183	N/A
Acid Extractable Rubidium (Rb)	mg/kg	9.9	15	2.4	4166246	8.9	2.0	4166183	N/A
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	4166246	<1.0	1.0	4166183	N/A
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	4166246	<0.50	0.50	4166183	N/A
Acid Extractable Strontium (Sr)	mg/kg	41	32	20	4166246	27	5.0	4166183	N/A
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	4166246	<0.10	0.10	4166183	N/A
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	4166246	<2.0	2.0	4166183	N/A
Acid Extractable Uranium (U)	mg/kg	0.30	0.25	0.14	4166246	0.31	0.10	4166183	N/A
Acid Extractable Vanadium (V)	mg/kg	27	30	20	4166246	27	2.0	4166183	N/A
Acid Extractable Zinc (Zn)	mg/kg	3700	170	46	4166246	81	5.0	4166183	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AWA907	AWA908		AWA909	AWA910	AWA911			
Sampling Date		2015/08/19	2015/08/20		2015/08/20	2015/08/20	2015/08/20			
COC Number		N/A	N/A		N/A	N/A	N/A			
	UNITS	**BMEWS-BS504**	**POL-BS301**	**QC Batch**	**POL-BS302**	**POL-BS303**	**POL-BS401**	**RDL**	**QC Batch**	**MDL**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	8300	9500	4166183	6300	7500	8100	10	4166246	N/A
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	4166183	<2.0	30	16	2.0	4166246	N/A
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	4166183	<2.0	8.5	<2.0	2.0	4166246	N/A
Acid Extractable Barium (Ba)	mg/kg	44	59	4166183	48	420	140	5.0	4166246	N/A
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	4166183	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	4166183	<2.0	<2.0	<2.0	2.0	4166246	N/A
Acid Extractable Boron (B)	mg/kg	<50	<50	4166183	<50	<50	<50	50	4166246	N/A
Acid Extractable Cadmium (Cd)	mg/kg	8.8	<0.30	4166183	0.86	3.1	0.92	0.30	4166246	N/A
Acid Extractable Chromium (Cr)	mg/kg	29	140	4166183	21	150	63	2.0	4166246	N/A
Acid Extractable Cobalt (Co)	mg/kg	6.1	12	4166183	4.9	11	5.5	1.0	4166246	N/A
Acid Extractable Copper (Cu)	mg/kg	23	16	4166183	37	180	150	2.0	4166246	N/A
Acid Extractable Iron (Fe)	mg/kg	14000	13000	4166183	11000	48000	18000	50	4166246	N/A
Acid Extractable Lead (Pb)	mg/kg	18	21	4166183	110	530	370	0.50	4166246	N/A
Acid Extractable Lithium (Li)	mg/kg	11	14	4166183	7.2	6.1	9.1	2.0	4166246	N/A
Acid Extractable Manganese (Mn)	mg/kg	200	130	4166183	130	720	180	2.0	4166246	N/A
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	4166183	<0.10	0.35	1.7	0.10	4166246	N/A
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	4166183	<2.0	4.9	<2.0	2.0	4166246	N/A
Acid Extractable Nickel (Ni)	mg/kg	23	70	4166183	19	55	34	2.0	4166246	N/A
Acid Extractable Rubidium (Rb)	mg/kg	11	27	4166183	3.0	6.5	5.3	2.0	4166246	N/A
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	4166183	<1.0	<1.0	<1.0	1.0	4166246	N/A
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	4166183	<0.50	0.98	0.59	0.50	4166246	N/A
Acid Extractable Strontium (Sr)	mg/kg	22	<5.0	4166183	13	12	10	5.0	4166246	N/A
Acid Extractable Thallium (Tl)	mg/kg	<0.10	0.16	4166183	<0.10	<0.10	<0.10	0.10	4166246	N/A
Acid Extractable Tin (Sn)	mg/kg	2.3	<2.0	4166183	3.7	160	24	2.0	4166246	N/A
Acid Extractable Uranium (U)	mg/kg	0.21	<0.10	4166183	0.27	0.42	0.36	0.10	4166246	N/A
Acid Extractable Vanadium (V)	mg/kg	32	36	4166183	19	23	24	2.0	4166246	N/A
Acid Extractable Zinc (Zn)	mg/kg	990	49	4166183	160	860	250	5.0	4166246	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AWA912	AWA913		AWA914		AWA926			
Sampling Date		2015/08/20	2015/08/20		2015/08/20		2015/08/19			
COC Number		N/A	N/A		N/A		N/A			
	UNITS	**POL-BS402**	**POL-BS403**	**QC Batch**	**POL-BS404**	**QC Batch**	**15-BP-COMP-A1**	**RDL**	**QC Batch**	**MDL**
Metals										
Acid Extractable Sulphur (S)	ug/g					4174415	750	50	4174415	N/A
Acid Extractable Aluminum (Al)	mg/kg	7000	3000	4166246	2800	4166768	9300	10	4168220	N/A
Acid Extractable Antimony (Sb)	mg/kg	6.5	<2.0	4166246	5.3	4166768	8.4	2.0	4168220	N/A
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	4166246	<2.0	4166768	<2.0	2.0	4168220	N/A
Acid Extractable Barium (Ba)	mg/kg	330	22	4166246	54	4166768	86	5.0	4168220	N/A
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	4166246	<2.0	4166768	<2.0	2.0	4168220	N/A
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	4166246	<2.0	4166768	<2.0	2.0	4168220	N/A
Acid Extractable Boron (B)	mg/kg	<50	<50	4166246	<50	4166768	<50	50	4168220	N/A
Acid Extractable Cadmium (Cd)	mg/kg	0.55	0.37	4166246	0.53	4166768	1.1	0.30	4168220	N/A
Acid Extractable Chromium (Cr)	mg/kg	64	13	4166246	21	4166768	160	2.0	4168220	N/A
Acid Extractable Cobalt (Co)	mg/kg	4.4	<1.0	4166246	2.0	4166768	7.2	1.0	4168220	N/A
Acid Extractable Copper (Cu)	mg/kg	68	66	4166246	530	4166768	92	2.0	4168220	N/A
Acid Extractable Iron (Fe)	mg/kg	12000	9400	4166246	6900	4166768	19000	50	4168220	N/A
Acid Extractable Lead (Pb)	mg/kg	110	33	4166246	430	4166768	140	0.50	4168220	N/A
Acid Extractable Lithium (Li)	mg/kg	6.3	<2.0	4166246	<2.0	4166768	7.9	2.0	4168220	N/A
Acid Extractable Manganese (Mn)	mg/kg	110	33	4166246	56	4166768	170	2.0	4168220	N/A
Acid Extractable Mercury (Hg)	mg/kg	0.16	0.14	4166246	<0.10	4166768	0.24	0.10	4168220	N/A
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	4166246	<2.0	4166768	2.4	2.0	4168220	N/A
Acid Extractable Nickel (Ni)	mg/kg	33	4.8	4166246	8.5	4166768	47	2.0	4168220	N/A
Acid Extractable Rubidium (Rb)	mg/kg	12	<2.0	4166246	5.0	4166768	5.9	2.0	4168220	N/A
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	4166246	<1.0	4166768	<1.0	1.0	4168220	N/A
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	4166246	<0.50	4166768	<0.50	0.50	4168220	N/A
Acid Extractable Strontium (Sr)	mg/kg	14	6.4	4166246	<5.0	4166768	17	5.0	4168220	N/A
Acid Extractable Thallium (Tl)	mg/kg	0.11	<0.10	4166246	<0.10	4166768	<0.10	0.10	4168220	N/A
Acid Extractable Tin (Sn)	mg/kg	14	7.6	4166246	11	4166768	28	2.0	4168220	N/A
Acid Extractable Uranium (U)	mg/kg	0.28	0.51	4166246	0.14	4166768	0.63	0.10	4168220	N/A
Acid Extractable Vanadium (V)	mg/kg	16	7.1	4166246	14	4166768	25	2.0	4168220	N/A
Acid Extractable Zinc (Zn)	mg/kg	150	820	4166246	120	4166768	260	5.0	4168220	N/A

RDL = Reportable Detection Limit
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N/A = Not Applicable

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Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AWA928	AWA929	AWA930		AWA932			
Sampling Date		2015/08/19	2015/08/19	2015/08/19		2015/08/19			
COC Number		N/A	N/A	N/A		N/A			
	UNITS	**15-BP-COMP-B1**	**15-BP-COMP-B2**	**15-BP-COMP-C1**	**QC Batch**	**15-BP-COMP-D1**	**RDL**	**QC Batch**	**MDL**
Metals									
Acid Extractable Sulphur (S)	ug/g	500	550	510	4174415	470	50	4174415	N/A
Acid Extractable Aluminum (Al)	mg/kg	9400	9200	9000	4168313	7900	10	4166520	N/A
Acid Extractable Antimony (Sb)	mg/kg	5.2	31	22	4168313	4.7	2.0	4166520	N/A
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	4168313	<2.0	2.0	4166520	N/A
Acid Extractable Barium (Ba)	mg/kg	58	61	56	4168313	80	5.0	4166520	N/A
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	4168313	<2.0	2.0	4166520	N/A
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	4168313	<2.0	2.0	4166520	N/A
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	4168313	<50	50	4166520	N/A
Acid Extractable Cadmium (Cd)	mg/kg	0.72	0.82	0.91	4168313	0.97	0.30	4166520	N/A
Acid Extractable Chromium (Cr)	mg/kg	98	90	87	4168313	91	2.0	4166520	N/A
Acid Extractable Cobalt (Co)	mg/kg	6.2	5.4	5.8	4168313	5.9	1.0	4166520	N/A
Acid Extractable Copper (Cu)	mg/kg	60	93	81	4168313	71	2.0	4166520	N/A
Acid Extractable Iron (Fe)	mg/kg	14000	13000	15000	4168313	15000	50	4166520	N/A
Acid Extractable Lead (Pb)	mg/kg	110	82	110	4168313	85	0.50	4166520	N/A
Acid Extractable Lithium (Li)	mg/kg	7.1	6.6	6.6	4168313	6.9	2.0	4166520	N/A
Acid Extractable Manganese (Mn)	mg/kg	140	130	140	4168313	150	2.0	4166520	N/A
Acid Extractable Mercury (Hg)	mg/kg	0.17	0.18	0.14	4168313	0.19	0.10	4166520	N/A
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	4168313	<2.0	2.0	4166520	N/A
Acid Extractable Nickel (Ni)	mg/kg	31	28	30	4168313	31	2.0	4166520	N/A
Acid Extractable Rubidium (Rb)	mg/kg	5.4	5.0	5.4	4168313	4.8	2.0	4166520	N/A
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	4168313	<1.0	1.0	4166520	N/A
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	4168313	<0.50	0.50	4166520	N/A
Acid Extractable Strontium (Sr)	mg/kg	19	18	17	4168313	15	5.0	4166520	N/A
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	4168313	<0.10	0.10	4166520	N/A
Acid Extractable Tin (Sn)	mg/kg	11	17	15	4168313	25	2.0	4166520	N/A
Acid Extractable Uranium (U)	mg/kg	0.49	0.52	0.50	4168313	0.39	0.10	4166520	N/A
Acid Extractable Vanadium (V)	mg/kg	24	23	25	4168313	21	2.0	4166520	N/A
Acid Extractable Zinc (Zn)	mg/kg	270	320	350	4168313	270	5.0	4166520	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		AWA895	AWA895	AWA896	AWA897	AWA898	AWA899			
Sampling Date		2015/08/19	2015/08/19	2015/08/19	2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A	N/A	N/A	N/A	N/A	N/A			
	UNITS	**MB-BS103**	**MB-BS103 Lab-Dup**	**MB-BS104**	**MB-BS105**	**MB-BS106**	**MB-BS107**	**RDL**	**QC Batch**	**MDL**
PCBs										
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4164270	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4164270	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4164270	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4164270	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4164270	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4164270	N/A
Aroclor 1260	ug/g	4900	4000	11	2.8	1.4	1.6	0.050	4164270	N/A
Calculated Total PCB	ug/g	4900		11	2.8	1.4	1.6	0.050	4163543	N/A
Surrogate Recovery (%)										
Decachlorobiphenyl	%	126	115	99	100	97	99		4164270	

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

Maxxam ID		AWA915	AWA916	AWA917	AWA918	AWA919			
Sampling Date		2015/08/20	2015/08/20	2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A	N/A	N/A	N/A	N/A			
	UNITS	**15-ROAD-BS1**	**15-ROAD-BS2**	**15-ROAD-BS3**	**15-ROAD-BS4**	**15-ROAD-BS5**	**RDL**	**QC Batch**	**MDL**
PCBs									
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	0.29	0.050	4166607	N/A
Aroclor 1260	ug/g	0.091	0.31	0.48	1.7	0.41	0.050	4166607	N/A
Calculated Total PCB	ug/g	0.091	0.31	0.48	1.7	0.69	0.050	4163543	N/A
Surrogate Recovery (%)									
Decachlorobiphenyl	%	92	92	102	93	103		4166607	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		AWA920	AWA921	AWA922			
Sampling Date		2015/08/19	2015/08/19	2015/08/19			
COC Number		N/A	N/A	N/A			
	UNITS	**15-POND-SED1**	**15-POND-SED2**	**15-POND-SED3**	**RDL**	**QC Batch**	**MDL**
PCBs							
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	0.050	4166607	N/A
Aroclor 1260	ug/g	<0.050	<0.050	<0.050	0.050	4166607	N/A
Calculated Total PCB	ug/g	<0.050	<0.050	<0.050	0.050	4163543	N/A
Surrogate Recovery (%)							
Decachlorobiphenyl	%	93	90	92		4166607	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		AWA923	AWA923	AWA924	AWA925			
Sampling Date		2015/08/20	2015/08/20	2015/08/20	2015/08/20			
COC Number		N/A	N/A	N/A	N/A			
	UNITS	**15-POND-SW1**	**15-POND-SW1 Lab-Dup**	**15-POND-SW2**	**15-POND-SW3**	**RDL**	**QC Batch**	**MDL**
PCBs								
Aroclor 1016	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4167039	N/A
Aroclor 1221	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4167039	N/A
Aroclor 1232	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4167039	N/A
Aroclor 1248	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4167039	N/A
Aroclor 1242	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4167039	N/A
Aroclor 1254	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4167039	N/A
Aroclor 1260	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4167039	N/A
Calculated Total PCB	ug/L	<0.050		<0.050	<0.050	0.050	4162698	N/A
Surrogate Recovery (%)								
Decachlorobiphenyl	%	70	70	65	67		4167039	

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

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TEST SUMMARY

Maxxam ID: AWA887
Sample ID: MCL-BS101
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA888
Sample ID: MCL-BS102
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA889
Sample ID: MCL-BS103
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA890
Sample ID: MCL-BS104
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA891
Sample ID: MCL-BS201
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA892
Sample ID: MCL-BS202
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA893
Sample ID: MCL-BS203
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

TEST SUMMARY

Maxxam ID: AWA894
Sample ID: MCL-BS204
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA895
Sample ID: MB-BS103
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4164270	2015/08/26	2015/08/27	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/27	Automated Statchk

Maxxam ID: AWA895 Dup
Sample ID: MB-BS103
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs in soil by GC/ECD	GC/ECD	4164270	2015/08/26	2015/08/27	Lisa Gates

Maxxam ID: AWA896
Sample ID: MB-BS104
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4164270	2015/08/26	2015/08/27	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/27	Automated Statchk

Maxxam ID: AWA897
Sample ID: MB-BS105
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4164270	2015/08/26	2015/08/27	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/27	Automated Statchk

Maxxam ID: AWA898
Sample ID: MB-BS106
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4164270	2015/08/26	2015/08/27	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/27	Automated Statchk

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TEST SUMMARY

Maxxam ID: AWA899
Sample ID: MB-BS107
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4164270	2015/08/26	2015/08/27	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/27	Automated Statchk

Maxxam ID: AWA900
Sample ID: BMEWS-BS401
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA901
Sample ID: BMEWS-BS402
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA902
Sample ID: BMEWS-BS403
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA903
Sample ID: BMEWS-BS404
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA904
Sample ID: BMEWS-BS501
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA905
Sample ID: BMEWS-BS502
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

TEST SUMMARY

Maxxam ID: AWA906
Sample ID: BMEWS-BS503
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166183	2015/08/27	2015/08/27	Mike Leblanc

Maxxam ID: AWA907
Sample ID: BMEWS-BS504
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166183	2015/08/27	2015/08/27	Mike Leblanc

Maxxam ID: AWA908
Sample ID: POL-BS301
Matrix: Soil

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166183	2015/08/27	2015/08/27	Mike Leblanc

Maxxam ID: AWA909
Sample ID: POL-BS302
Matrix: Soil

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA910
Sample ID: POL-BS303
Matrix: Soil

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA911
Sample ID: POL-BS401
Matrix: Soil

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA912
Sample ID: POL-BS402
Matrix: Soil

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

TEST SUMMARY

Maxxam ID: AWA913 **Collected:** 2015/08/20
Sample ID: POL-BS403 **Shipped:**
Matrix: Soil **Received:** 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166246	2015/08/27	2015/08/28	Mike Leblanc

Maxxam ID: AWA914 **Collected:** 2015/08/20
Sample ID: POL-BS404 **Shipped:**
Matrix: Soil **Received:** 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4166768	2015/08/27	2015/08/28	Bryon Angevine

Maxxam ID: AWA915 **Collected:** 2015/08/20
Sample ID: 15-ROAD-BS1 **Shipped:**
Matrix: Soil **Received:** 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164341	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4166607	2015/08/27	2015/08/28	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/28	Automated Statchk

Maxxam ID: AWA916 **Collected:** 2015/08/20
Sample ID: 15-ROAD-BS2 **Shipped:**
Matrix: Soil **Received:** 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164341	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4166607	2015/08/27	2015/08/28	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/28	Automated Statchk

Maxxam ID: AWA917 **Collected:** 2015/08/19
Sample ID: 15-ROAD-BS3 **Shipped:**
Matrix: Soil **Received:** 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164341	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4166607	2015/08/27	2015/08/28	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/28	Automated Statchk

Maxxam ID: AWA918 **Collected:** 2015/08/19
Sample ID: 15-ROAD-BS4 **Shipped:**
Matrix: Soil **Received:** 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164341	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4166607	2015/08/27	2015/08/28	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/28	Automated Statchk

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

TEST SUMMARY

Maxxam ID: AWA919
Sample ID: 15-ROAD-BS5
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164341	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4166607	2015/08/27	2015/08/28	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/28	Automated Statchk

Maxxam ID: AWA920
Sample ID: 15-POND-SED1
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164341	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4166607	2015/08/27	2015/08/28	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/28	Automated Statchk

Maxxam ID: AWA921
Sample ID: 15-POND-SED2
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164341	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4166607	2015/08/27	2015/08/28	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/28	Automated Statchk

Maxxam ID: AWA922
Sample ID: 15-POND-SED3
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164341	N/A	2015/08/27	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4166607	2015/08/27	2015/08/28	Lisa Gates
PCB Aroclor sum (soil)	CALC	4163543	N/A	2015/08/28	Automated Statchk

Maxxam ID: AWA923
Sample ID: 15-POND-SW1
Matrix: Water

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs in water by GC/ECD	GC/ECD	4167039	2015/08/27	2015/08/31	Lisa Gates
PCB Aroclor sum (water)	CALC	4162698	N/A	2015/08/31	Automated Statchk

Maxxam ID: AWA923 Dup
Sample ID: 15-POND-SW1
Matrix: Water

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs in water by GC/ECD	GC/ECD	4167039	2015/08/27	2015/08/31	Lisa Gates

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

TEST SUMMARY

Maxxam ID: AWA924
Sample ID: 15-POND-SW2
Matrix: Water

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs in water by GC/ECD	GC/ECD	4167039	2015/08/27	2015/08/31	Lisa Gates
PCB Aroclor sum (water)	CALC	4162698	N/A	2015/08/31	Automated Statchk

Maxxam ID: AWA925
Sample ID: 15-POND-SW3
Matrix: Water

Collected: 2015/08/20
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs in water by GC/ECD	GC/ECD	4167039	2015/08/27	2015/08/31	Lisa Gates
PCB Aroclor sum (water)	CALC	4162698	N/A	2015/08/31	Automated Statchk

Maxxam ID: AWA926
Sample ID: 15-BP-COMP-A1
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride in Soil by Auto. Colourimetry	KONE	4171136	N/A	2015/09/01	Arlene Rossiter
Conductance - soil	COND	4171327	2015/08/28	2015/08/31	Tammy Peters
TEH in Soil (PIRI)	GC/FID	4166161	2015/08/27	2015/08/28	Bria Harvey
Metals Solids Acid Extr. ICPMS	ICP/MS	4168220	2015/08/28	2015/08/28	Mike Leblanc
Acid Extractable Metals Analysis by ICP	ICP	4174415	2015/09/02	2015/09/02	Azita Fazaeli
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern
Nitrogen Ammonia - soil (as N)	KONE	4166576	2015/08/27	2015/08/27	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4171147	2015/08/31	2015/09/01	Arlene Rossiter
Nitrogen - Nitrite by auto colourimetry	KONE	4171151	2015/08/31	2015/08/31	Arlene Rossiter
pH (5:1 DI Water Extract)	PH/PH	4168701	2015/08/28	2015/08/28	Tammy Peters
Phosphorus - ortho by auto Colourimetry	KONE	4171146	2015/08/31	2015/08/31	Nancy Rogers
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas
Sulphate in Soil by Auto Colourimetry	KONE	4171143	2015/08/31	2015/09/01	Arlene Rossiter
ModTPH (T1) Calc. for Soil	CALC	4162749	N/A	2015/09/01	Automated Statchk

Maxxam ID: AWA926 Dup
Sample ID: 15-BP-COMP-A1
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen Ammonia - soil (as N)	KONE	4166576	2015/08/27	2015/08/27	Nancy Rogers
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas

Maxxam ID: AWA927
Sample ID: 15-BP-COMP-A2
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
TEH in Soil (PIRI)	GC/FID	4166161	2015/08/27	2015/08/28	Bria Harvey

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TEST SUMMARY

Maxxam ID: AWA927
Sample ID: 15-BP-COMP-A2
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas
Particle size in solids (pipette&sieve)	PSIV	4170849	N/A	2015/09/02	Samantha Lutes
ModTPH (T1) Calc. for Soil	CALC	4162749	N/A	2015/09/01	Automated Statchk

Maxxam ID: AWA927 Dup
Sample ID: 15-BP-COMP-A2
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particle size in solids (pipette&sieve)	PSIV	4170849	N/A	2015/09/02	Samantha Lutes

Maxxam ID: AWA928
Sample ID: 15-BP-COMP-B1
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride in Soil by Auto. Colourimetry	KONE	4171136	N/A	2015/09/01	Arlene Rossiter
Conductance - soil	COND	4171327	2015/08/28	2015/08/31	Tammy Peters
TEH in Soil (PIRI)	GC/FID	4166161	2015/08/27	2015/08/28	Bria Harvey
Metals Solids Acid Extr. ICPMS	ICP/MS	4168313	2015/08/28	2015/08/29	Bryon Angevine
Acid Extractable Metals Analysis by ICP	ICP	4174415	2015/09/02	2015/09/02	Azita Fazaeli
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern
Nitrogen Ammonia - soil (as N)	KONE	4166576	2015/08/27	2015/08/27	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4171147	2015/08/31	2015/09/01	Arlene Rossiter
Nitrogen - Nitrite by auto colourimetry	KONE	4171151	2015/08/31	2015/08/31	Arlene Rossiter
pH (5:1 DI Water Extract)	PH/PH	4168701	2015/08/28	2015/08/28	Tammy Peters
Phosphorus - ortho by auto Colourimetry	KONE	4171146	2015/08/31	2015/08/31	Nancy Rogers
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas
Particle size in solids (pipette&sieve)	PSIV	4170849	N/A	2015/09/02	Samantha Lutes
Sulphate in Soil by Auto Colourimetry	KONE	4171143	2015/08/31	2015/09/01	Arlene Rossiter
ModTPH (T1) Calc. for Soil	CALC	4162749	N/A	2015/09/01	Automated Statchk

Maxxam ID: AWA929
Sample ID: 15-BP-COMP-B2
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride in Soil by Auto. Colourimetry	KONE	4171136	N/A	2015/09/01	Arlene Rossiter
Conductance - soil	COND	4171327	2015/08/28	2015/08/31	Tammy Peters
TEH in Soil (PIRI)	GC/FID	4166161	2015/08/27	2015/08/28	Bria Harvey
Metals Solids Acid Extr. ICPMS	ICP/MS	4168313	2015/08/28	2015/08/29	Bryon Angevine
Acid Extractable Metals Analysis by ICP	ICP	4174415	2015/09/02	2015/09/02	Azita Fazaeli
Moisture	BAL	4164178	N/A	2015/08/27	Julia McGovern

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

TEST SUMMARY

Maxxam ID: AWA929
Sample ID: 15-BP-COMP-B2
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrogen Ammonia - soil (as N)	KONE	4166576	2015/08/27	2015/08/27	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4171147	2015/08/31	2015/09/01	Arlene Rossiter
Nitrogen - Nitrite by auto colourimetry	KONE	4171151	2015/08/31	2015/08/31	Arlene Rossiter
pH (5:1 DI Water Extract)	PH/PH	4168701	2015/08/28	2015/08/28	Tammy Peters
Phosphorus - ortho by auto Colourimetry	KONE	4171146	2015/08/31	2015/08/31	Nancy Rogers
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas
Particle size in solids (pipette&sieve)	PSIV	4170849	N/A	2015/09/02	Samantha Lutes
Sulphate in Soil by Auto Colourimetry	KONE	4171143	2015/08/31	2015/09/01	Arlene Rossiter
ModTPH (T1) Calc. for Soil	CALC	4162749	N/A	2015/09/01	Automated Statchk

Maxxam ID: AWA930
Sample ID: 15-BP-COMP-C1
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride in Soil by Auto. Colourimetry	KONE	4171136	N/A	2015/09/01	Arlene Rossiter
Conductance - soil	COND	4171327	2015/08/28	2015/08/31	Tammy Peters
TEH in Soil (PIRI)	GC/FID	4166161	2015/08/27	2015/08/28	Bria Harvey
Metals Solids Acid Extr. ICPMS	ICP/MS	4168313	2015/08/28	2015/08/29	Bryon Angevine
Acid Extractable Metals Analysis by ICP	ICP	4174415	2015/09/02	2015/09/02	Azita Fazaeli
Moisture	BAL	4164346	N/A	2015/08/27	Julia McGovern
Nitrogen Ammonia - soil (as N)	KONE	4166576	2015/08/27	2015/08/27	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4171147	2015/08/31	2015/09/01	Arlene Rossiter
Nitrogen - Nitrite by auto colourimetry	KONE	4171151	2015/08/31	2015/08/31	Arlene Rossiter
pH (5:1 DI Water Extract)	PH/PH	4168701	2015/08/28	2015/08/28	Tammy Peters
Phosphorus - ortho by auto Colourimetry	KONE	4171146	2015/08/31	2015/08/31	Nancy Rogers
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas
Sulphate in Soil by Auto Colourimetry	KONE	4171143	2015/08/31	2015/09/01	Arlene Rossiter
ModTPH (T1) Calc. for Soil	CALC	4162749	N/A	2015/09/01	Automated Statchk

Maxxam ID: AWA931
Sample ID: 15-BP-COMP-C2
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
TEH in Soil (PIRI)	GC/FID	4166161	2015/08/27	2015/08/29	Bria Harvey
Moisture	BAL	4164346	N/A	2015/08/27	Julia McGovern
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas
Particle size in solids (pipette&sieve)	PSIV	4170849	N/A	2015/09/02	Samantha Lutes
ModTPH (T1) Calc. for Soil	CALC	4162749	N/A	2015/09/01	Automated Statchk

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

TEST SUMMARY

Maxxam ID: AWA932
Sample ID: 15-BP-COMP-D1
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride in Soil by Auto. Colourimetry	KONE	4171136	N/A	2015/09/01	Arlene Rossiter
Conductance - soil	COND	4171327	2015/08/28	2015/08/31	Tammy Peters
TEH in Soil (PIRI)	GC/FID	4166161	2015/08/27	2015/08/29	Bria Harvey
Metals Solids Acid Extr. ICPMS	ICP/MS	4166520	2015/08/27	2015/08/28	Bryon Angevine
Acid Extractable Metals Analysis by ICP	ICP	4174415	2015/09/02	2015/09/02	Azita Fazaeli
Moisture	BAL	4164346	N/A	2015/08/27	Julia McGovern
Nitrogen Ammonia - soil (as N)	KONE	4166576	2015/08/27	2015/08/27	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4171147	2015/08/31	2015/09/01	Arlene Rossiter
Nitrogen - Nitrite by auto colourimetry	KONE	4171151	2015/08/31	2015/08/31	Arlene Rossiter
pH (5:1 DI Water Extract)	PH/PH	4168701	2015/08/28	2015/08/28	Tammy Peters
Phosphorus - ortho by auto Colourimetry	KONE	4171146	2015/08/31	2015/08/31	Nancy Rogers
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas
Sulphate in Soil by Auto Colourimetry	KONE	4171143	2015/08/31	2015/09/01	Arlene Rossiter
ModTPH (T1) Calc. for Soil	CALC	4162749	N/A	2015/09/01	Automated Statchk

Maxxam ID: AWA932 Dup
Sample ID: 15-BP-COMP-D1
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride in Soil by Auto. Colourimetry	KONE	4171136	N/A	2015/09/01	Arlene Rossiter
Conductance - soil	COND	4171327	2015/08/31	2015/08/31	Tammy Peters
Nitrogen - Nitrate + Nitrite	KONE	4171147	2015/08/31	2015/09/01	Arlene Rossiter
Nitrogen - Nitrite by auto colourimetry	KONE	4171151	2015/08/31	2015/08/31	Arlene Rossiter
pH (5:1 DI Water Extract)	PH/PH	4168701	2015/08/28	2015/08/28	Tammy Peters
Phosphorus - ortho by auto Colourimetry	KONE	4171146	2015/08/31	2015/08/31	Nancy Rogers
Sulphate in Soil by Auto Colourimetry	KONE	4171143	2015/08/31	2015/09/01	Arlene Rossiter

Maxxam ID: AWA933
Sample ID: 15-BP-COMP-D2
Matrix: Soil

Collected: 2015/08/19
Shipped:
Received: 2015/08/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
TEH in Soil (PIRI)	GC/FID	4166161	2015/08/27	2015/08/29	Bria Harvey
Moisture	BAL	4164346	N/A	2015/08/27	Julia McGovern
VPH in Soil (PIRI)	PTGC/MS	4168228	2015/08/26	2015/08/28	Leanne Lucas
Particle size in solids (pipette&sieve)	PSIV	4170849	N/A	2015/09/02	Samantha Lutes
ModTPH (T1) Calc. for Soil	CALC	4162749	N/A	2015/09/01	Automated Statchk

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

GENERAL COMMENTS

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

Package 1	7.0°C

Revised report (partial) - Reissued to include results in Excel format. 2015/09/04 MHL

Results relate only to the items tested.

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
4164270	Decachlorobiphenyl	2015/08/27	124	30 - 130	100	30 - 130	100	%				
4166161	Isobutylbenzene - Extractable	2015/08/28	85	30 - 130	95	30 - 130	90	%				
4166161	n-Dotriacontane - Extractable	2015/08/28	71	30 - 130	91	30 - 130	93	%				
4166607	Decachlorobiphenyl	2015/08/28	77	30 - 130	106	30 - 130	84	%				
4167039	Decachlorobiphenyl	2015/08/31	69	30 - 130	63	30 - 130	65	%				
4168228	Isobutylbenzene - Volatile	2015/08/28	101	60 - 130	100	60 - 130	102	%				
4164270	Aroclor 1016	2015/08/27					<0.050	ug/g	NC	50		
4164270	Aroclor 1221	2015/08/27					<0.050	ug/g	NC	50		
4164270	Aroclor 1232	2015/08/27					<0.050	ug/g	NC	50		
4164270	Aroclor 1242	2015/08/27					<0.050	ug/g	NC	50		
4164270	Aroclor 1248	2015/08/27					<0.050	ug/g	NC	50		
4164270	Aroclor 1254	2015/08/27	NC	30 - 130	106	30 - 130	<0.050	ug/g	NC	50		
4164270	Aroclor 1260	2015/08/27					<0.050	ug/g	21	50		
4166161	>C10-C16 Hydrocarbons	2015/08/28	74	30 - 130	82	30 - 130	<10	mg/kg	NC	50		
4166161	>C16-C21 Hydrocarbons	2015/08/28	81	30 - 130	91	30 - 130	<10	mg/kg	30	50		
4166161	>C21-<C32 Hydrocarbons	2015/08/28	NC	30 - 130	114	30 - 130	<15	mg/kg	22	50		
4166183	Acid Extractable Aluminum (Al)	2015/08/27					<10	mg/kg	2.4	35		
4166183	Acid Extractable Antimony (Sb)	2015/08/27	NC	75 - 125	96	75 - 125	<2.0	mg/kg	NC	35		
4166183	Acid Extractable Arsenic (As)	2015/08/27	125	75 - 125	102	75 - 125	<2.0	mg/kg	13	35		
4166183	Acid Extractable Barium (Ba)	2015/08/27	NC	75 - 125	100	75 - 125	<5.0	mg/kg	4.7	35		
4166183	Acid Extractable Beryllium (Be)	2015/08/27	105	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35		
4166183	Acid Extractable Bismuth (Bi)	2015/08/27	97	75 - 125	97	75 - 125	<2.0	mg/kg	NC	35		
4166183	Acid Extractable Boron (B)	2015/08/27	90	75 - 125	100	75 - 125	<50	mg/kg	NC	35		
4166183	Acid Extractable Cadmium (Cd)	2015/08/27	100	75 - 125	100	75 - 125	<0.30	mg/kg	NC	35		
4166183	Acid Extractable Chromium (Cr)	2015/08/27	105	75 - 125	101	75 - 125	<2.0	mg/kg	5.4	35		
4166183	Acid Extractable Cobalt (Co)	2015/08/27	102	75 - 125	101	75 - 125	<1.0	mg/kg	5.9	35		
4166183	Acid Extractable Copper (Cu)	2015/08/27	NC	75 - 125	101	75 - 125	<2.0	mg/kg	2.9	35		
4166183	Acid Extractable Iron (Fe)	2015/08/27					<50	mg/kg	6.8	35		
4166183	Acid Extractable Lead (Pb)	2015/08/27	NC	75 - 125	100	75 - 125	<0.50	mg/kg	7.9	35		
4166183	Acid Extractable Lithium (Li)	2015/08/27	105	75 - 125	102	75 - 125	<2.0	mg/kg	6.0	35		
4166183	Acid Extractable Manganese (Mn)	2015/08/27	NC	75 - 125	101	75 - 125	<2.0	mg/kg	5.9	35		

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
4166183	Acid Extractable Mercury (Hg)	2015/08/27	95	75 - 125	100	75 - 125	<0.10	mg/kg	NC	35		
4166183	Acid Extractable Molybdenum (Mo)	2015/08/27	NC	75 - 125	101	75 - 125	<2.0	mg/kg	6.7	35		
4166183	Acid Extractable Nickel (Ni)	2015/08/27	105	75 - 125	102	75 - 125	<2.0	mg/kg	3.3	35		
4166183	Acid Extractable Rubidium (Rb)	2015/08/27	96	75 - 125	99	75 - 125	<2.0	mg/kg	NC	35		
4166183	Acid Extractable Selenium (Se)	2015/08/27	100	75 - 125	104	75 - 125	<1.0	mg/kg	8.0	35		
4166183	Acid Extractable Silver (Ag)	2015/08/27	99	75 - 125	99	75 - 125	<0.50	mg/kg	NC	35		
4166183	Acid Extractable Strontium (Sr)	2015/08/27	102	75 - 125	100	75 - 125	<5.0	mg/kg	NC	35		
4166183	Acid Extractable Thallium (Tl)	2015/08/27	96	75 - 125	97	75 - 125	<0.10	mg/kg	NC	35		
4166183	Acid Extractable Tin (Sn)	2015/08/27	87	75 - 125	93	75 - 125	<2.0	mg/kg	NC	35		
4166183	Acid Extractable Uranium (U)	2015/08/27	99	75 - 125	101	75 - 125	<0.10	mg/kg	0.24	35		
4166183	Acid Extractable Vanadium (V)	2015/08/27	NC	75 - 125	104	75 - 125	<2.0	mg/kg	2.3	35		
4166183	Acid Extractable Zinc (Zn)	2015/08/27	NC	75 - 125	97	75 - 125	<5.0	mg/kg	20	35		
4166246	Acid Extractable Aluminum (Al)	2015/08/28					<10	mg/kg	3.3	35		
4166246	Acid Extractable Antimony (Sb)	2015/08/28	94	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35		
4166246	Acid Extractable Arsenic (As)	2015/08/28	107	75 - 125	102	75 - 125	<2.0	mg/kg	3.0	35		
4166246	Acid Extractable Barium (Ba)	2015/08/28	103	75 - 125	102	75 - 125	<5.0	mg/kg	NC	35		
4166246	Acid Extractable Beryllium (Be)	2015/08/28	104	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35		
4166246	Acid Extractable Bismuth (Bi)	2015/08/28	102	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35		
4166246	Acid Extractable Boron (B)	2015/08/28	97	75 - 125	118	75 - 125	<50	mg/kg	NC	35		
4166246	Acid Extractable Cadmium (Cd)	2015/08/28	103	75 - 125	102	75 - 125	<0.30	mg/kg	NC	35		
4166246	Acid Extractable Chromium (Cr)	2015/08/28	104	75 - 125	101	75 - 125	<2.0	mg/kg	1.1	35		
4166246	Acid Extractable Cobalt (Co)	2015/08/28	101	75 - 125	100	75 - 125	<1.0	mg/kg	3.3	35		
4166246	Acid Extractable Copper (Cu)	2015/08/28	NC	75 - 125	100	75 - 125	<2.0	mg/kg	5.0	35		
4166246	Acid Extractable Iron (Fe)	2015/08/28					<50	mg/kg	3.3	35		
4166246	Acid Extractable Lead (Pb)	2015/08/28	101	75 - 125	99	75 - 125	<0.50	mg/kg	4.7	35		
4166246	Acid Extractable Lithium (Li)	2015/08/28	102	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35		
4166246	Acid Extractable Manganese (Mn)	2015/08/28	NC	75 - 125	103	75 - 125	<2.0	mg/kg	5.7	35		
4166246	Acid Extractable Mercury (Hg)	2015/08/28	99	75 - 125	103	75 - 125	<0.10	mg/kg	NC	35		
4166246	Acid Extractable Molybdenum (Mo)	2015/08/28	101	75 - 125	98	75 - 125	<2.0	mg/kg	NC	35		
4166246	Acid Extractable Nickel (Ni)	2015/08/28	103	75 - 125	102	75 - 125	<2.0	mg/kg	1.6	35		
4166246	Acid Extractable Rubidium (Rb)	2015/08/28	103	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
4166246	Acid Extractable Selenium (Se)	2015/08/28	105	75 - 125	105	75 - 125	<1.0	mg/kg	NC	35		
4166246	Acid Extractable Silver (Ag)	2015/08/28	102	75 - 125	98	75 - 125	<0.50	mg/kg	NC	35		
4166246	Acid Extractable Strontium (Sr)	2015/08/28	110	75 - 125	100	75 - 125	<5.0	mg/kg	NC	35		
4166246	Acid Extractable Thallium (Tl)	2015/08/28	101	75 - 125	101	75 - 125	<0.10	mg/kg	NC	35		
4166246	Acid Extractable Tin (Sn)	2015/08/28	101	75 - 125	98	75 - 125	<2.0	mg/kg	NC	35		
4166246	Acid Extractable Uranium (U)	2015/08/28	102	75 - 125	100	75 - 125	<0.10	mg/kg	9.4	35		
4166246	Acid Extractable Vanadium (V)	2015/08/28	NC	75 - 125	101	75 - 125	<2.0	mg/kg	3.5	35		
4166246	Acid Extractable Zinc (Zn)	2015/08/28	NC	75 - 125	99	75 - 125	<5.0	mg/kg	1.9	35		
4166520	Acid Extractable Aluminum (Al)	2015/08/28					<10	mg/kg	3.9	35		
4166520	Acid Extractable Antimony (Sb)	2015/08/28	97	75 - 125	98	75 - 125	<2.0	mg/kg	NC	35		
4166520	Acid Extractable Arsenic (As)	2015/08/28	102	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35		
4166520	Acid Extractable Barium (Ba)	2015/08/28	117	75 - 125	99	75 - 125	<5.0	mg/kg	NC	35		
4166520	Acid Extractable Beryllium (Be)	2015/08/28	110	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35		
4166520	Acid Extractable Bismuth (Bi)	2015/08/28	102	75 - 125	98	75 - 125	<2.0	mg/kg	NC	35		
4166520	Acid Extractable Boron (B)	2015/08/28	100	75 - 125	101	75 - 125	<50	mg/kg	NC	35		
4166520	Acid Extractable Cadmium (Cd)	2015/08/28	101	75 - 125	99	75 - 125	<0.30	mg/kg	NC	35		
4166520	Acid Extractable Chromium (Cr)	2015/08/28	NC	75 - 125	99	75 - 125	<2.0	mg/kg	4.3	35		
4166520	Acid Extractable Cobalt (Co)	2015/08/28	101	75 - 125	100	75 - 125	<1.0	mg/kg	0.078	35		
4166520	Acid Extractable Copper (Cu)	2015/08/28	NC	75 - 125	98	75 - 125	<2.0	mg/kg	11	35		
4166520	Acid Extractable Iron (Fe)	2015/08/28					<50	mg/kg	6.0	35		
4166520	Acid Extractable Lead (Pb)	2015/08/28	NC	75 - 125	98	75 - 125	<0.50	mg/kg	0.96	35		
4166520	Acid Extractable Lithium (Li)	2015/08/28	106	75 - 125	101	75 - 125	<2.0	mg/kg	4.3	35		
4166520	Acid Extractable Manganese (Mn)	2015/08/28	NC	75 - 125	98	75 - 125	<2.0	mg/kg	10	35		
4166520	Acid Extractable Mercury (Hg)	2015/08/28	98	75 - 125	99	75 - 125	<0.10	mg/kg	NC	35		
4166520	Acid Extractable Molybdenum (Mo)	2015/08/28	106	75 - 125	105	75 - 125	<2.0	mg/kg	NC	35		
4166520	Acid Extractable Nickel (Ni)	2015/08/28	NC	75 - 125	100	75 - 125	<2.0	mg/kg	0.060	35		
4166520	Acid Extractable Rubidium (Rb)	2015/08/28	99	75 - 125	98	75 - 125	<2.0	mg/kg	NC	35		
4166520	Acid Extractable Selenium (Se)	2015/08/28	102	75 - 125	101	75 - 125	<1.0	mg/kg	NC	35		
4166520	Acid Extractable Silver (Ag)	2015/08/28	101	75 - 125	99	75 - 125	<0.50	mg/kg	NC	35		
4166520	Acid Extractable Strontium (Sr)	2015/08/28	95	75 - 125	96	75 - 125	<5.0	mg/kg	NC	35		
4166520	Acid Extractable Thallium (Tl)	2015/08/28	100	75 - 125	95	75 - 125	<0.10	mg/kg	NC	35		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
4166520	Acid Extractable Tin (Sn)	2015/08/28	93	75 - 125	99	75 - 125	<2.0	mg/kg	NC	35		
4166520	Acid Extractable Uranium (U)	2015/08/28	103	75 - 125	99	75 - 125	<0.10	mg/kg	NC	35		
4166520	Acid Extractable Vanadium (V)	2015/08/28	NC	75 - 125	100	75 - 125	<2.0	mg/kg	2.5	35		
4166520	Acid Extractable Zinc (Zn)	2015/08/28	NC	75 - 125	96	75 - 125	<5.0	mg/kg	5.3	35		
4166576	Ammonia-N	2015/08/27	108	75 - 125			<0.25	mg/kg	18	30		
4166607	Aroclor 1016	2015/08/28					<0.050	ug/g	NC	50		
4166607	Aroclor 1221	2015/08/28					<0.050	ug/g	NC	50		
4166607	Aroclor 1232	2015/08/28					<0.050	ug/g	NC	50		
4166607	Aroclor 1242	2015/08/28					<0.050	ug/g	NC	50		
4166607	Aroclor 1248	2015/08/28					<0.050	ug/g	NC	50		
4166607	Aroclor 1254	2015/08/28	NC	30 - 130	115	30 - 130	<0.050	ug/g	NC	50		
4166607	Aroclor 1260	2015/08/28					<0.050	ug/g	0.86	50		
4166768	Acid Extractable Aluminum (Al)	2015/08/28					<10	mg/kg	9.3	35		
4166768	Acid Extractable Antimony (Sb)	2015/08/28	97	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35		
4166768	Acid Extractable Arsenic (As)	2015/08/28	104	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35		
4166768	Acid Extractable Barium (Ba)	2015/08/28	NC	75 - 125	103	75 - 125	<5.0	mg/kg	NC	35		
4166768	Acid Extractable Beryllium (Be)	2015/08/28	109	75 - 125	106	75 - 125	<2.0	mg/kg	NC	35		
4166768	Acid Extractable Bismuth (Bi)	2015/08/28	100	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35		
4166768	Acid Extractable Boron (B)	2015/08/28	99	75 - 125	100	75 - 125	<50	mg/kg	NC	35		
4166768	Acid Extractable Cadmium (Cd)	2015/08/28	101	75 - 125	100	75 - 125	<0.30	mg/kg	NC	35		
4166768	Acid Extractable Chromium (Cr)	2015/08/28	93	75 - 125	100	75 - 125	<2.0	mg/kg	28	35		
4166768	Acid Extractable Cobalt (Co)	2015/08/28	100	75 - 125	100	75 - 125	<1.0	mg/kg	NC	35		
4166768	Acid Extractable Copper (Cu)	2015/08/28	93	75 - 125	99	75 - 125	<2.0	mg/kg	65 (1)	35		
4166768	Acid Extractable Iron (Fe)	2015/08/28					<50	mg/kg	13	35		
4166768	Acid Extractable Lead (Pb)	2015/08/28	102	75 - 125	101	75 - 125	<0.50	mg/kg	2.2	35		
4166768	Acid Extractable Lithium (Li)	2015/08/28	101	75 - 125	103	75 - 125	<2.0	mg/kg	13	35		
4166768	Acid Extractable Manganese (Mn)	2015/08/28	NC	75 - 125	98	75 - 125	<2.0	mg/kg	4.7	35		
4166768	Acid Extractable Mercury (Hg)	2015/08/28	96	75 - 125	100	75 - 125	<0.10	mg/kg	NC	35		
4166768	Acid Extractable Molybdenum (Mo)	2015/08/28	95	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35		
4166768	Acid Extractable Nickel (Ni)	2015/08/28	96	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35		
4166768	Acid Extractable Rubidium (Rb)	2015/08/28	97	75 - 125	99	75 - 125	<2.0	mg/kg	14	35		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
4166768	Acid Extractable Selenium (Se)	2015/08/28	102	75 - 125	102	75 - 125	<1.0	mg/kg	NC	35		
4166768	Acid Extractable Silver (Ag)	2015/08/28	100	75 - 125	98	75 - 125	<0.50	mg/kg	NC	35		
4166768	Acid Extractable Strontium (Sr)	2015/08/28	90	75 - 125	99	75 - 125	<5.0	mg/kg	NC	35		
4166768	Acid Extractable Thallium (Tl)	2015/08/28	98	75 - 125	98	75 - 125	<0.10	mg/kg	NC	35		
4166768	Acid Extractable Tin (Sn)	2015/08/28	101	75 - 125	96	75 - 125	<2.0	mg/kg	NC	35		
4166768	Acid Extractable Uranium (U)	2015/08/28	102	75 - 125	101	75 - 125	<0.10	mg/kg	NC	35		
4166768	Acid Extractable Vanadium (V)	2015/08/28	NC	75 - 125	101	75 - 125	<2.0	mg/kg	27	35		
4166768	Acid Extractable Zinc (Zn)	2015/08/28	94	75 - 125	96	75 - 125	<5.0	mg/kg	NC	35		
4167039	Aroclor 1016	2015/08/31					<0.050	ug/L	NC	40		
4167039	Aroclor 1221	2015/08/31					<0.050	ug/L	NC	40		
4167039	Aroclor 1232	2015/08/31					<0.050	ug/L	NC	40		
4167039	Aroclor 1242	2015/08/31					<0.050	ug/L	NC	40		
4167039	Aroclor 1248	2015/08/31					<0.050	ug/L	NC	40		
4167039	Aroclor 1254	2015/08/31	76	30 - 130	85	30 - 130	<0.050	ug/L	NC	40		
4167039	Aroclor 1260	2015/08/31					<0.050	ug/L	NC	40		
4168220	Acid Extractable Aluminum (Al)	2015/08/28					<10	mg/kg	2.2	35		
4168220	Acid Extractable Antimony (Sb)	2015/08/28	101	75 - 125	99	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Arsenic (As)	2015/08/28	103	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Barium (Ba)	2015/08/28	108	75 - 125	102	75 - 125	<5.0	mg/kg	NC	35		
4168220	Acid Extractable Beryllium (Be)	2015/08/28	107	75 - 125	105	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Bismuth (Bi)	2015/08/28	101	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Boron (B)	2015/08/28	99	75 - 125	106	75 - 125	<50	mg/kg	NC	35		
4168220	Acid Extractable Cadmium (Cd)	2015/08/28	102	75 - 125	101	75 - 125	<0.30	mg/kg	NC	35		
4168220	Acid Extractable Chromium (Cr)	2015/08/28	105	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Cobalt (Co)	2015/08/28	102	75 - 125	101	75 - 125	<1.0	mg/kg	NC	35		
4168220	Acid Extractable Copper (Cu)	2015/08/28	101	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Iron (Fe)	2015/08/28					<50	mg/kg	1.8	35		
4168220	Acid Extractable Lead (Pb)	2015/08/28	102	75 - 125	101	75 - 125	<0.50	mg/kg	NC	35		
4168220	Acid Extractable Lithium (Li)	2015/08/28	107	75 - 125	105	75 - 125	<2.0	mg/kg	2.1	35		
4168220	Acid Extractable Manganese (Mn)	2015/08/28	NC	75 - 125	101	75 - 125	<2.0	mg/kg	5.4	35		
4168220	Acid Extractable Mercury (Hg)	2015/08/28	98	75 - 125	101	75 - 125	<0.10	mg/kg	NC	35		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
4168220	Acid Extractable Molybdenum (Mo)	2015/08/28	101	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Nickel (Ni)	2015/08/28	104	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Rubidium (Rb)	2015/08/28	101	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Selenium (Se)	2015/08/28	102	75 - 125	101	75 - 125	<1.0	mg/kg	NC	35		
4168220	Acid Extractable Silver (Ag)	2015/08/28	104	75 - 125	99	75 - 125	<0.50	mg/kg	NC	35		
4168220	Acid Extractable Strontium (Sr)	2015/08/28	NC	75 - 125	102	75 - 125	<5.0	mg/kg	6.8	35		
4168220	Acid Extractable Thallium (Tl)	2015/08/28	101	75 - 125	97	75 - 125	<0.10	mg/kg	NC	35		
4168220	Acid Extractable Tin (Sn)	2015/08/28	96	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Uranium (U)	2015/08/28	104	75 - 125	102	75 - 125	<0.10	mg/kg	NC	35		
4168220	Acid Extractable Vanadium (V)	2015/08/28	105	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35		
4168220	Acid Extractable Zinc (Zn)	2015/08/28	102	75 - 125	102	75 - 125	<5.0	mg/kg	NC	35		
4168228	Benzene	2015/08/28	77	60 - 130	96	60 - 140	<0.025	mg/kg	NC	50		
4168228	C6 - C10 (less BTEX)	2015/08/28					<2.5	mg/kg	12	50		
4168228	Ethylbenzene	2015/08/28	86	60 - 130	105	60 - 140	<0.025	mg/kg	NC	50		
4168228	Toluene	2015/08/28	89	60 - 130	96	60 - 140	<0.025	mg/kg	NC	50		
4168228	Total Xylenes	2015/08/28	101	60 - 130	104	60 - 140	<0.050	mg/kg	NC	50		
4168313	Acid Extractable Aluminum (Al)	2015/08/29					<10	mg/kg	2.4	35		
4168313	Acid Extractable Antimony (Sb)	2015/08/29	104	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35		
4168313	Acid Extractable Arsenic (As)	2015/08/29	99	75 - 125	99	75 - 125	<2.0	mg/kg	NC	35		
4168313	Acid Extractable Barium (Ba)	2015/08/29	100	75 - 125	102	75 - 125	<5.0	mg/kg	NC	35		
4168313	Acid Extractable Beryllium (Be)	2015/08/29	103	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35		
4168313	Acid Extractable Bismuth (Bi)	2015/08/29	101	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35		
4168313	Acid Extractable Boron (B)	2015/08/29	NC	75 - 125	99	75 - 125	<50	mg/kg	NC	35		
4168313	Acid Extractable Cadmium (Cd)	2015/08/29	99	75 - 125	99	75 - 125	<0.30	mg/kg	NC	35		
4168313	Acid Extractable Chromium (Cr)	2015/08/29	98	75 - 125	98	75 - 125	<2.0	mg/kg	0.63	35		
4168313	Acid Extractable Cobalt (Co)	2015/08/29	94	75 - 125	96	75 - 125	<1.0	mg/kg	NC	35		
4168313	Acid Extractable Copper (Cu)	2015/08/29	93	75 - 125	94	75 - 125	<2.0	mg/kg	NC	35		
4168313	Acid Extractable Iron (Fe)	2015/08/29					<50	mg/kg	1.3	35		
4168313	Acid Extractable Lead (Pb)	2015/08/29	100	75 - 125	102	75 - 125	<0.50	mg/kg	0.14	35		
4168313	Acid Extractable Lithium (Li)	2015/08/29	108	75 - 125	100	75 - 125	<2.0	mg/kg	2.6	35		
4168313	Acid Extractable Manganese (Mn)	2015/08/29	NC	75 - 125	102	75 - 125	<2.0	mg/kg	4.0	35		

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Maxxam Job #: B5G9646
Report Date: 2015/09/09

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
4168313	Acid Extractable Mercury (Hg)	2015/08/29	96	75 - 125	103	75 - 125	<0.10	mg/kg				
4168313	Acid Extractable Molybdenum (Mo)	2015/08/29	101	75 - 125	97	75 - 125	<2.0	mg/kg	NC	35		
4168313	Acid Extractable Nickel (Ni)	2015/08/29	94	75 - 125	96	75 - 125	<2.0	mg/kg	NC	35		
4168313	Acid Extractable Rubidium (Rb)	2015/08/29	101	75 - 125	103	75 - 125	<2.0	mg/kg	0.45	35		
4168313	Acid Extractable Selenium (Se)	2015/08/29	97	75 - 125	96	75 - 125	<1.0	mg/kg	NC	35		
4168313	Acid Extractable Silver (Ag)	2015/08/29	102	75 - 125	101	75 - 125	<0.50	mg/kg	NC	35		
4168313	Acid Extractable Strontium (Sr)	2015/08/29	NC	75 - 125	103	75 - 125	<5.0	mg/kg	8.2	35		
4168313	Acid Extractable Thallium (Tl)	2015/08/29	102	75 - 125	103	75 - 125	<0.10	mg/kg	NC	35		
4168313	Acid Extractable Tin (Sn)	2015/08/29	102	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35		
4168313	Acid Extractable Uranium (U)	2015/08/29	102	75 - 125	103	75 - 125	<0.10	mg/kg	23	35		
4168313	Acid Extractable Vanadium (V)	2015/08/29	99	75 - 125	98	75 - 125	<2.0	mg/kg	0.85	35		
4168313	Acid Extractable Zinc (Zn)	2015/08/29	94	75 - 125	94	75 - 125	<5.0	mg/kg	NC	35		
4168701	Soluble (5:1) pH	2015/08/28							0.54	N/A		
4170849	Clay	2015/09/02							15	35		
4170849	Gravel	2015/09/02							60 (2)	35		
4170849	Sand	2015/09/02							19	35		
4170849	Silt	2015/09/02							7.1	35		
4171136	Chloride (Cl)	2015/09/01	100	80 - 120			<5.0	mg/kg	6.0	35		
4171143	Sulphate (SO4)	2015/09/01	149 (3)	80 - 120			<10	mg/kg	NC	25		
4171146	Orthophosphate (P)	2015/08/31	NC	80 - 120			<0.050	mg/kg	1.2	25		
4171147	Nitrate + Nitrite	2015/09/01	104	80 - 120			<0.25	mg/kg	8.5	35		
4171151	Nitrite (N)	2015/08/31	77	70 - 130			<0.050	mg/kg	NC	35		
4171327	Conductivity	2015/08/31			100	N/A	<1.0	uS/cm	0.67	35	1.4, RDL=1.0	uS/cm

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		Leachate Blank	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	Value	UNITS
4174415	Acid Extractable Sulphur (S)	2015/09/02	NC	75 - 125	97	80 - 120	<50	ug/g				

N/A = Not Applicable

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

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Poor RPD due to sample inhomogeneity. Result confirmed by repeat digestion and analysis.

(2) PSA: Poor duplicate agreement due to sample inhomogeneity.

(3) Elevated spike recovery due to sample matrix. Recovery confirmed with repeat extraction and analysis.

Maxxam Job #: B5G9646
Report Date: 2015/09/09

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

Eric Dearman, Scientific Specialist

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

Mike MacGillivray, Scientific Specialist (Inorganics)

Rose MacDonald, Scientific Specialist (Organics)

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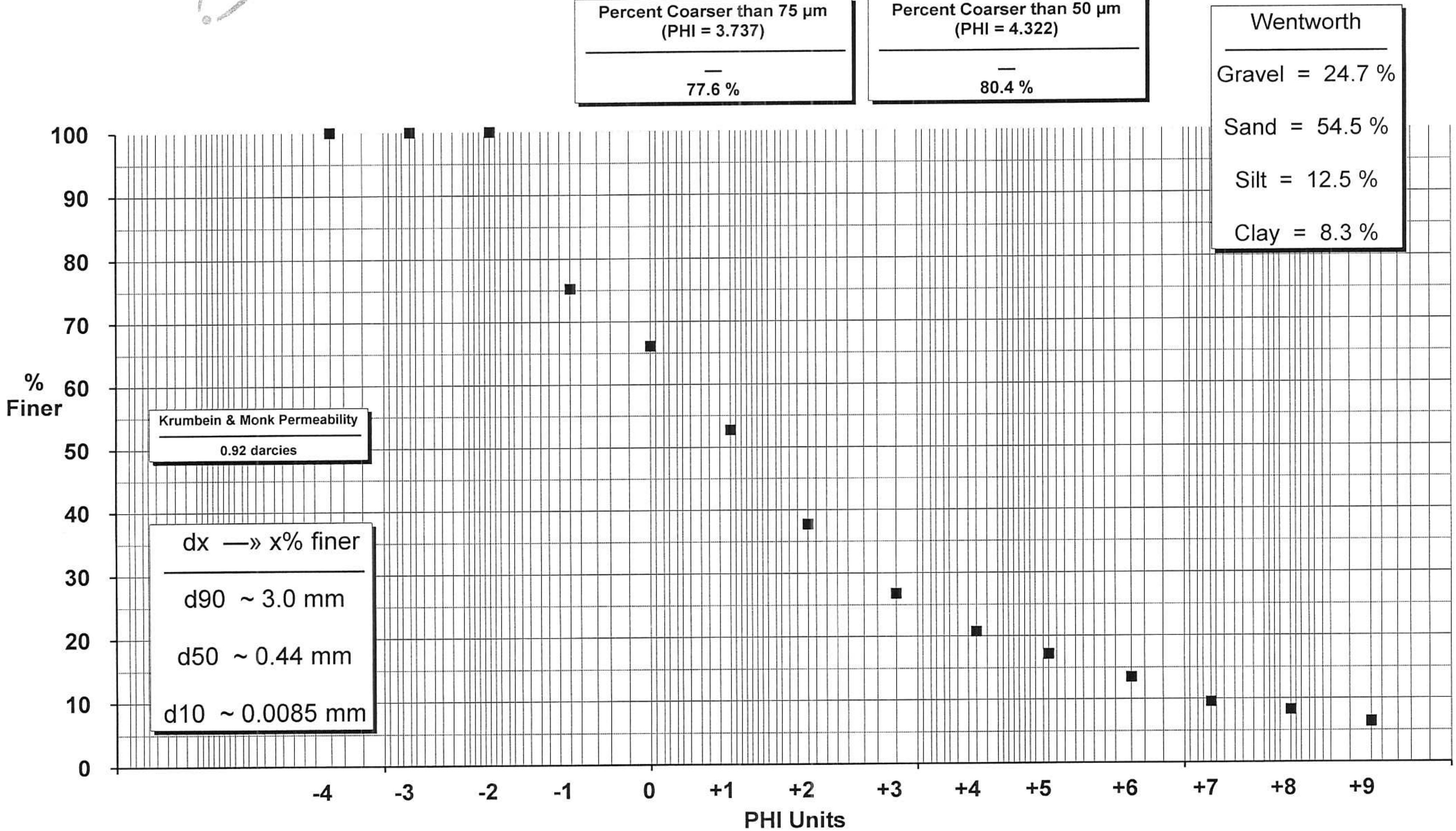
Maxxam ID: AWA927-01

15-BP-COMP-A2

Percent Coarser than 75 µm (PHI = 3.737)	Percent Coarser than 50 µm (PHI = 4.322)
77.6 %	80.4 %



Approved

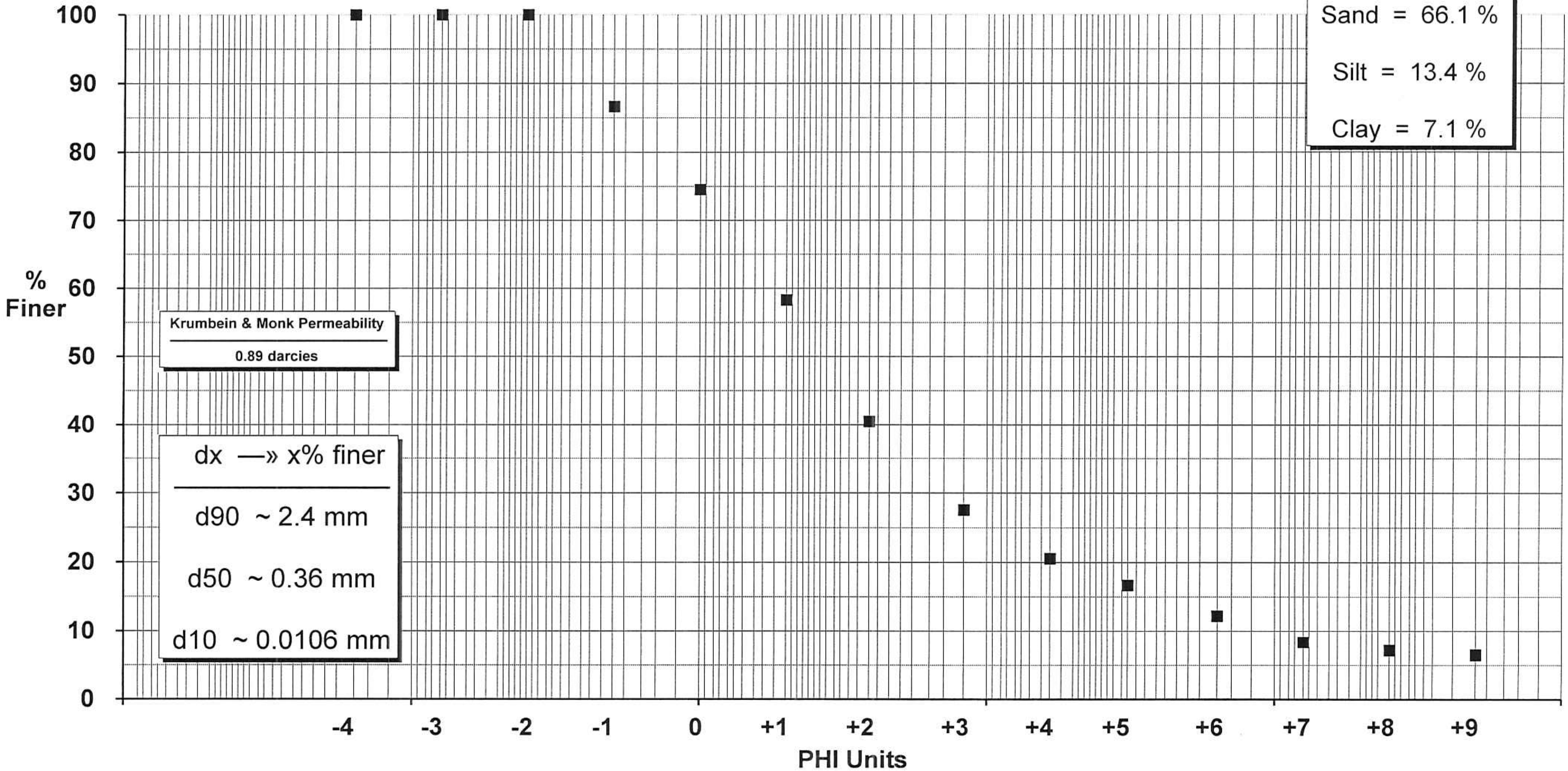
Maxxam ID: AWA927-01:D1

15-BP-COMP-A2 :D1

Percent Coarser than 75 µm (PHI = 3.737)
77.6 %

Percent Coarser than 50 µm (PHI = 4.322)
80.7 %

Wentworth
Gravel = 13.4 %
Sand = 66.1 %
Silt = 13.4 %
Clay = 7.1 %



Krumbein & Monk Permeability
0.89 darcies

dx —» x% finer
d90 ~ 2.4 mm
d50 ~ 0.36 mm
d10 ~ 0.0106 mm

Approved

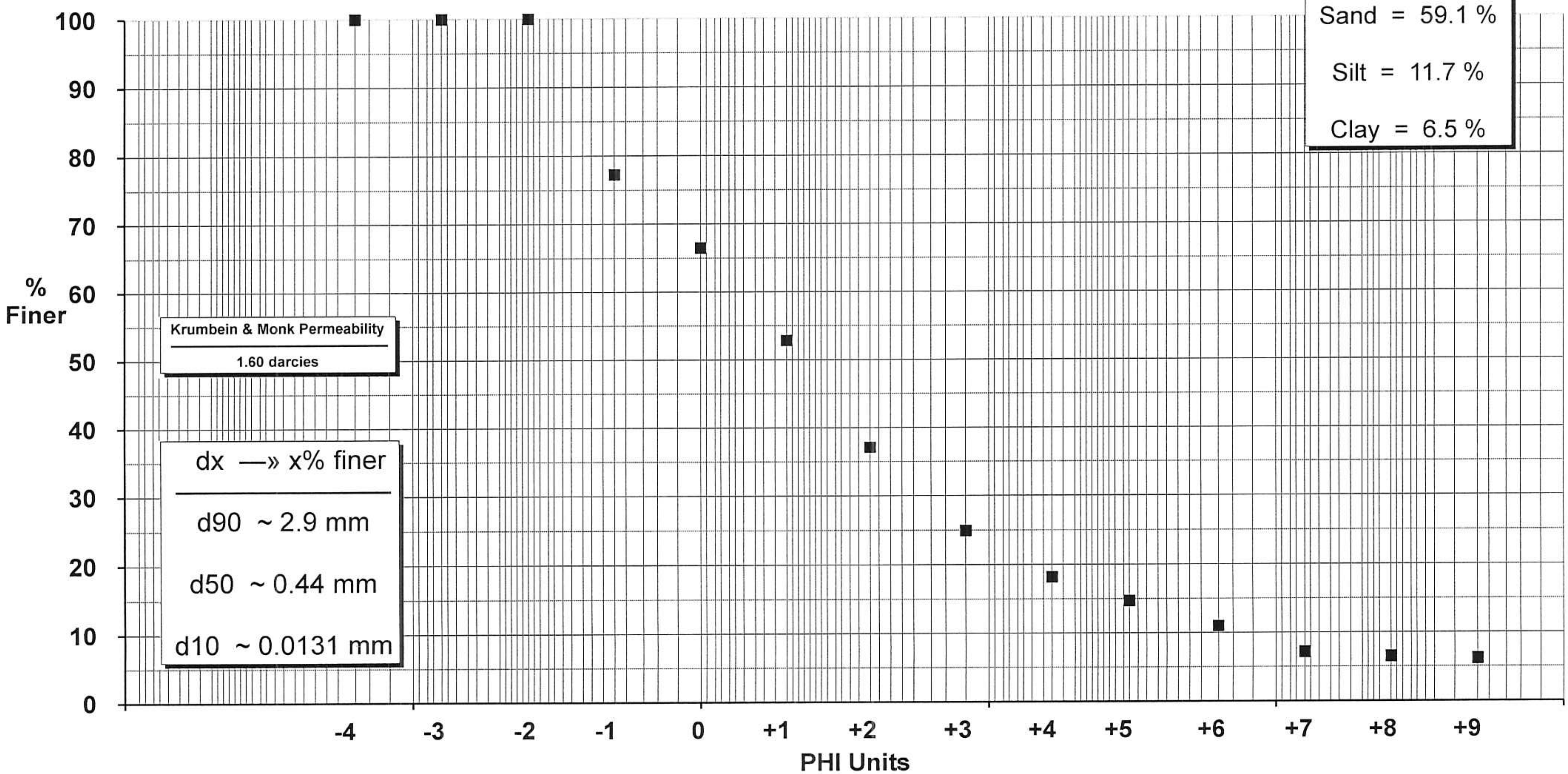
Maxxam

Maxxam ID: AWA928-01

15-BP-COMP-B1

Percent Coarser than 75 µm (PHI = 3.737)	Percent Coarser than 50 µm (PHI = 4.322)
80.0 %	82.9 %

Wentworth
Gravel = 22.7 %
Sand = 59.1 %
Silt = 11.7 %
Clay = 6.5 %



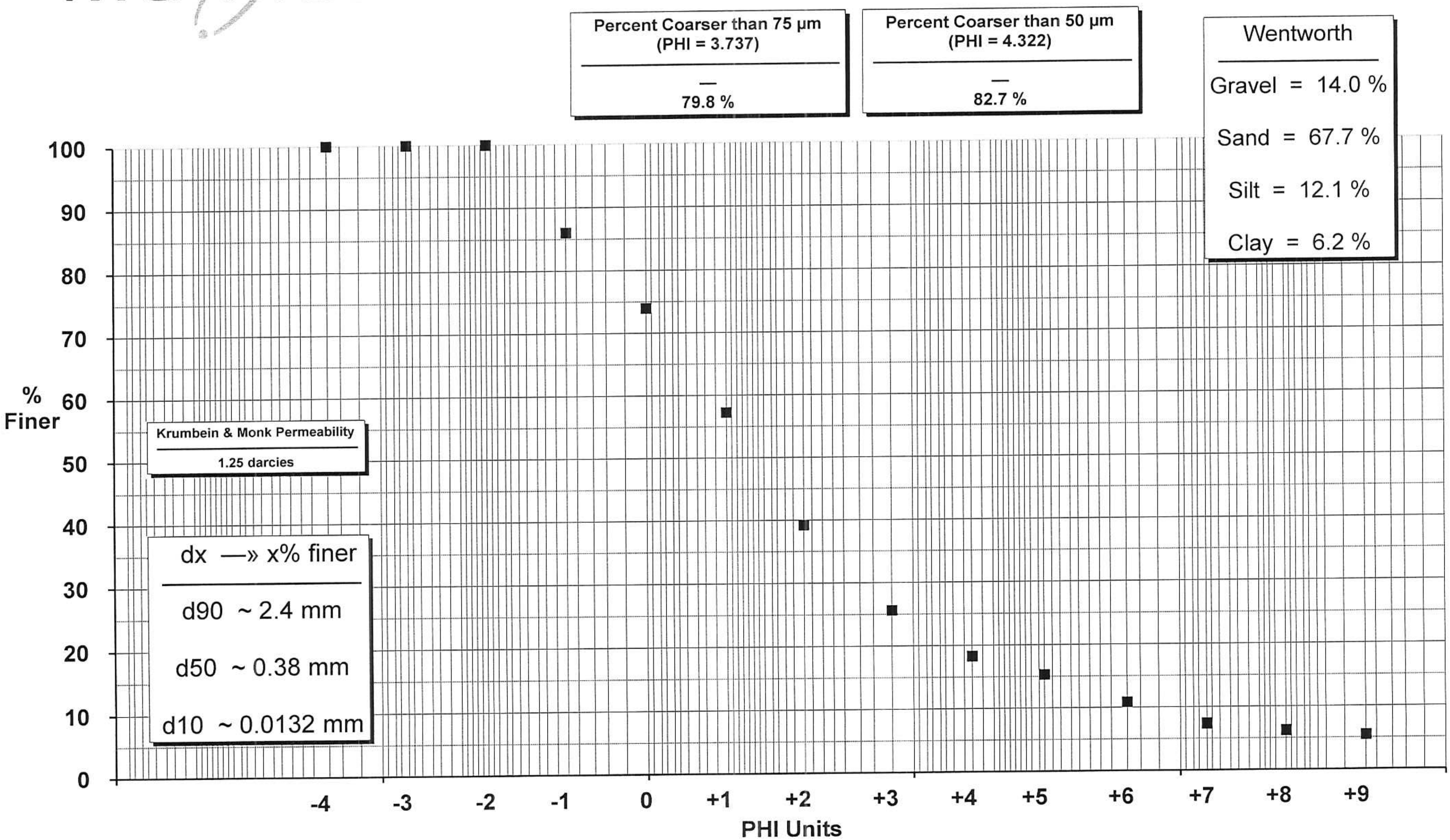
Krumbein & Monk Permeability
1.60 darcies

dx —» x% finer
d90 ~ 2.9 mm
d50 ~ 0.44 mm
d10 ~ 0.0131 mm

Approved

Maxxam ID: AWA929-01

15-BP-COMP-B2

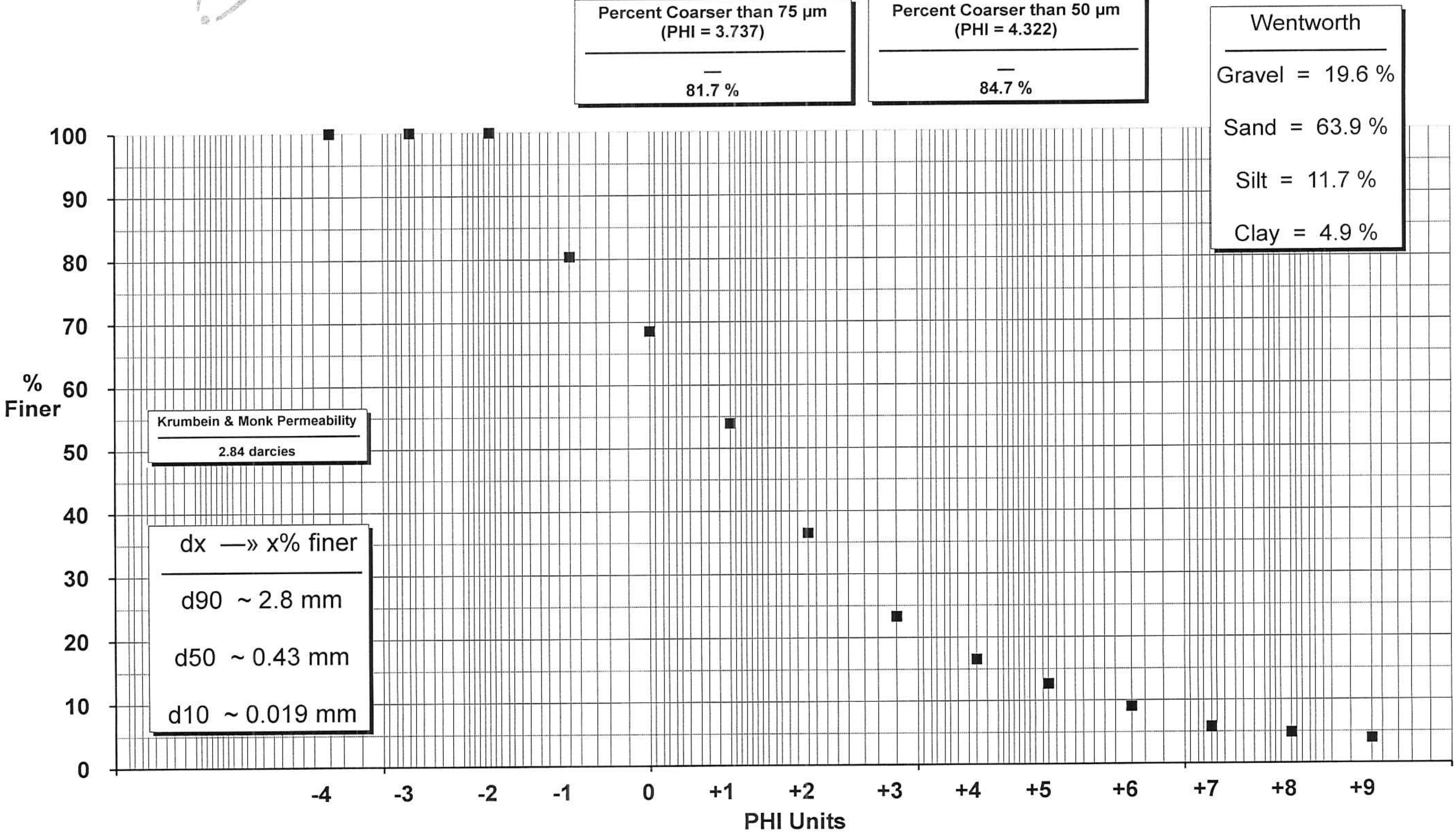


Approved

Maxxam ID: AWA931-01

15-BP-COMP-C2

Percent Coarser than 75 µm (PHI = 3.737)	Percent Coarser than 50 µm (PHI = 4.322)
81.7 %	84.7 %



Approved

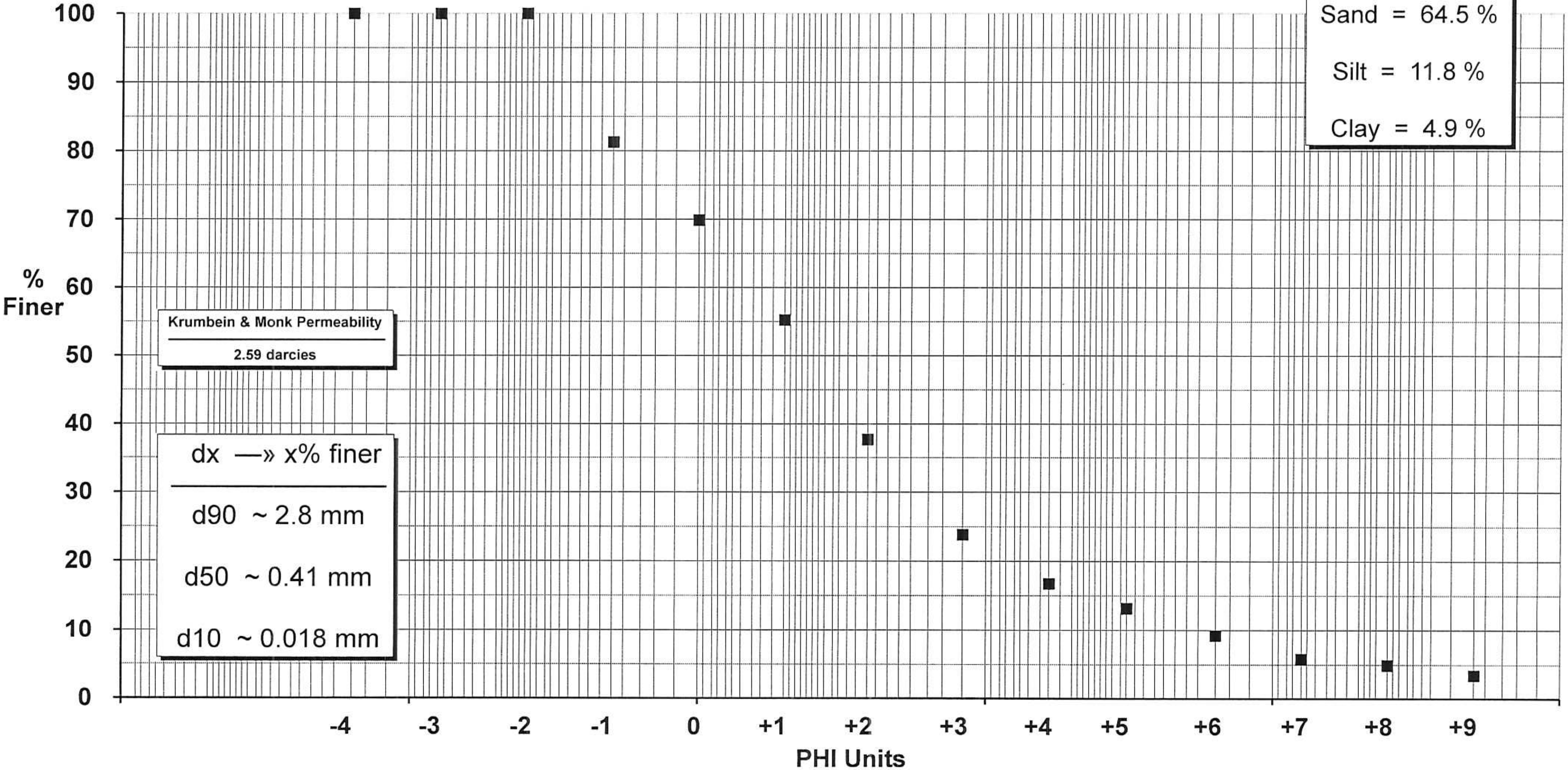
Maxxam ID: AWA933-01

15-BP-COMP-D2

Percent Coarser than 75 µm (PHI = 3.737)	Percent Coarser than 50 µm (PHI = 4.322)
81.4 %	84.4 %

Wentworth

- Gravel = 18.7 %
- Sand = 64.5 %
- Silt = 11.8 %
- Clay = 4.9 %



Krumbein & Monk Permeability

2.59 darcies

dx —» x% finer

- d90 ~ 2.8 mm
- d50 ~ 0.41 mm
- d10 ~ 0.018 mm

Approved

Your Project #: B5G9646
Your C.O.C. #: N/A

Attention:MICHELLE HILL

Maxxam Analytics
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2015/09/04
Report #: R2045373
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B550293
Received: 2015/08/27, 12:00

Sample Matrix: SOIL
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Hydrocarbonoclastes (MPN)***	5	N/A	2015/08/28	QUE SOP-00309	

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

*** This analysis is not subject to MDDELCC accreditation.

Encryption Key Alain Lemieux
09 Sep 2015 12:36:35 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alain Lemieux, Project Manager
Email: ALemieux@maxxam.ca
Phone# (514)448-9001 Ext:6451
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B550293
Report Date: 2015/09/04

Maxxam Analytics
Client Project #: B5G9646

MICROBIOLOGY (SOIL)

Maxxam ID		BH1025	BH1026		BH1027		BH1028		
Sampling Date		2015/08/19	2015/08/19		2015/08/19		2015/08/19		
	Units	**15-BP-COMP-A 1 (AWA926)**	**15-BP-COMP-B 1 (AWA928)**	**RDL**	**15-BP-COMP-B 2 (AWA929)**	**RDL**	**15-BP-COMP-C1 (AWA930)**	**RDL**	**QC Batch**
MICROBIOLGICAL TESTS									
Hydrocarbonoclast bacteria	/g	3900	44000	200	1600000	2000	160000	200	1500160

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		BH1029		
Sampling Date		2015/08/19		
	Units	**15-BP-COMP-D 1 (AWA932)**	**RDL**	**QC Batch**
MICROBIOLGICAL TESTS				
Hydrocarbonoclast bacteria	/g	920000	2000	1500160

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytique 2690, Avenue Dalton, Sainte-Foy, Québec G1P 3S4 Tél.: (418) 658-5784 Télécopieur: (418) 658-6594

GENERAL COMMENTS

All results are calculated on a dry weight basis except where not applicable.

Condition of sample(s) upon receipt:
Hydrocarbonoclastes (MPN): Holding time already past.: BH1025, BH1026, BH1027, BH1028, BH1029
Hydrocarbon source: diesel. Results are expressed in MPN / g (wet weight).

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytique 2690, Avenue Dalton, Sainte-Foy, Québec G1P 3S4 Tél.: (418) 658-5784 Télécopieur: (418) 658-6594

VALIDATION SIGNATURE PAGE

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

Frédéric Gagné, B. Sc., Microbiologist

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Your Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Your C.O.C. #: 525754-01-01

Attention:Anna Roy

Stantec Consulting Ltd
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2015/08/28
Report #: R3643568
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5H1854
Received: 2015/08/27, 09:41

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Moisture (1)	5	N/A	2015/08/28	ATL SOP 00001	OMOE Handbook 1983 m
PCBs in soil by GC/ECD (1, 2)	5	2015/08/27	2015/08/28	ATL SOP 00106	EPA 8082A m
PCB Aroclor sum (soil) (1)	5	N/A	2015/08/28		Auto Calc.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Bedford
(2) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key Ali Tooke Frances (Ali) Tooke
28 Aug 2015 14:51:30 -03:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289
==
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Maxxam Job #: B5H1854
Report Date: 2015/08/28

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

RESULTS OF ANALYSES OF SOIL

Maxxam ID		AWL071	AWL072	AWL073	AWL074	AWL075		
Sampling Date		2015/08/23	2015/08/23	2015/08/23	2015/08/24	2015/08/24		
COC Number		525754-01-01	525754-01-01	525754-01-01	525754-01-01	525754-01-01		
	UNITS	**MB-BS108**	**MB-BS109**	**MB-BS110**	**MB-BS111**	**MB-BS112**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	31	11	17	42	19	1.0	4166223

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B5H1854
Report Date: 2015/08/28

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		AWL071	AWL071	AWL072	AWL073	AWL074	AWL075		
Sampling Date		2015/08/23	2015/08/23	2015/08/23	2015/08/23	2015/08/24	2015/08/24		
COC Number		525754-01-01	525754-01-01	525754-01-01	525754-01-01	525754-01-01	525754-01-01		
	UNITS	**MB-BS108**	**MB-BS108 Lab-Dup**	**MB-BS109**	**MB-BS110**	**MB-BS111**	**MB-BS112**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4166607
Aroclor 1260	ug/g	3.6	3.7	2.2	0.60	19	15	0.050	4166607
Calculated Total PCB	ug/g	3.6		2.2	0.60	19	15	0.050	4166408
Surrogate Recovery (%)									
Decachlorobiphenyl	%	87	75	83	90	90	75		4166607

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B5H1854
Report Date: 2015/08/28

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

GENERAL COMMENTS

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

Package 1	6.4°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B5H1854
Report Date: 2015/08/28

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**
4166607	Decachlorobiphenyl	2015/08/28	77	30 - 130	106	30 - 130	84	%		
4166607	Aroclor 1016	2015/08/28					<0.050	ug/g	NC	50
4166607	Aroclor 1221	2015/08/28					<0.050	ug/g	NC	50
4166607	Aroclor 1232	2015/08/28					<0.050	ug/g	NC	50
4166607	Aroclor 1242	2015/08/28					<0.050	ug/g	NC	50
4166607	Aroclor 1248	2015/08/28					<0.050	ug/g	NC	50
4166607	Aroclor 1254	2015/08/28	NC	30 - 130	115	30 - 130	<0.050	ug/g	NC	50
4166607	Aroclor 1260	2015/08/28					<0.050	ug/g	0.86	50

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

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

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B5H1854
Report Date: 2015/08/28

Stantec Consulting Ltd
Client Project #: 121413099.600
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

VALIDATION SIGNATURE PAGE

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

Philippe Deveau

Phil Deveau

RoseMarie MacDonald

Rose MacDonald, Scientific Specialist (Organics)

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

Your Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Your C.O.C. #: 526971-01-01

Attention:Anna Roy

Stantec Consulting Ltd
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2015/09/08
Report #: R3654025
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5H5383
Received: 2015/09/01, 09:52

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS (1)	6	2015/09/03	2015/09/04	ATL SOP 00058	EPA 6020A R1 m

Sample Matrix: Swab
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PCBs on swabs by GC/ECD (1, 2)	5	2015/09/01	2015/09/02	ATL SOP 00109	EPA 8082A m
PCB Aroclor sum (swabs) (1)	5	N/A	2015/09/02		Auto Calc.

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

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

(1) This test was performed by Maxxam Bedford
(2) Non accredited test method. Best laboratory practices and all routine QC procedures were employed.

Encryption Key

Rachael Mansfield
08 Sep 2015 10:46:08 -03:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==

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Maxxam Job #: B5H5383
Report Date: 2015/09/08

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AXD647	AXD648	AXD649	AXD650	AXD651	AXD652			
Sampling Date		2015/08/25	2015/08/25	2015/08/25	2015/08/25	2015/08/25	2015/08/25			
	UNITS	**MB-BS 201**	**MB-BS 202**	**MB-BS 203**	**MB-BS 204**	**MB-BS 205**	**MB-BS 206**	**RDL**	**QC Batch**	**MDL**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	9300	10000	9800	7800	10000	9700	10	4176257	N/A
Acid Extractable Antimony (Sb)	mg/kg	10	2.3	<2.0	<2.0	<2.0	97	2.0	4176257	N/A
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	8.4	2.0	4176257	N/A
Acid Extractable Barium (Ba)	mg/kg	74	44	37	30	31	140	5.0	4176257	N/A
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4176257	N/A
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4176257	N/A
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	<50	170	50	4176257	N/A
Acid Extractable Cadmium (Cd)	mg/kg	1.7	0.50	<0.30	<0.30	<0.30	5.1	0.30	4176257	N/A
Acid Extractable Chromium (Cr)	mg/kg	28	65	26	23	100	56	2.0	4176257	N/A
Acid Extractable Cobalt (Co)	mg/kg	7.9	8.6	4.9	5.7	7.8	11	1.0	4176257	N/A
Acid Extractable Copper (Cu)	mg/kg	43	23	26	21	19	100	2.0	4176257	N/A
Acid Extractable Iron (Fe)	mg/kg	16000	14000	11000	11000	14000	34000	50	4176257	N/A
Acid Extractable Lead (Pb)	mg/kg	200	17	16	11	3.9	430	0.50	4176257	N/A
Acid Extractable Lithium (Li)	mg/kg	11	12	7.4	8.5	9.8	9.6	2.0	4176257	N/A
Acid Extractable Manganese (Mn)	mg/kg	260	200	140	160	180	780	2.0	4176257	N/A
Acid Extractable Mercury (Hg)	mg/kg	0.41	<0.10	<0.10	<0.10	<0.10	1.2	0.10	4176257	N/A
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	4.2	2.0	4176257	N/A
Acid Extractable Nickel (Ni)	mg/kg	23	46	15	20	53	47	2.0	4176257	N/A
Acid Extractable Rubidium (Rb)	mg/kg	15	16	7.3	7.3	11	12	2.0	4176257	N/A
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4176257	N/A
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	4176257	N/A
Acid Extractable Strontium (Sr)	mg/kg	31	21	27	20	19	35	5.0	4176257	N/A
Acid Extractable Thallium (Tl)	mg/kg	0.13	0.13	<0.10	<0.10	0.12	0.18	0.10	4176257	N/A
Acid Extractable Tin (Sn)	mg/kg	8.9	<2.0	<2.0	<2.0	<2.0	15	2.0	4176257	N/A
Acid Extractable Uranium (U)	mg/kg	0.43	0.34	0.80	0.33	0.44	0.62	0.10	4176257	N/A
Acid Extractable Vanadium (V)	mg/kg	30	29	22	20	28	37	2.0	4176257	N/A
Acid Extractable Zinc (Zn)	mg/kg	450	140	170	95	27	990	5.0	4176257	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax: 709-754-8612 www.maxxamanalytics.com

Maxxam Job #: B5H5383
Report Date: 2015/09/08

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

POLYCHLORINATED BIPHENYLS BY GC-ECD (SWAB)

Maxxam ID		AXD653	AXD654	AXD655	AXD656	AXD665			
Sampling Date		2015/08/27	2015/08/27	2015/08/27	2015/08/27	2015/08/27			
COC Number						526971-01-01			
	UNITS	**15-SWAB-1**	**15-SWAB-2**	**15-SWAB-3**	**15-SWAB-4**	**15-SWAB-5**	**RDL**	**QC Batch**	**MDL**
PCBs									
Aroclor 1016	ug	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4172837	N/A
Aroclor 1221	ug	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4172837	N/A
Aroclor 1232	ug	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4172837	N/A
Aroclor 1248	ug	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4172837	N/A
Aroclor 1242	ug	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4172837	N/A
Aroclor 1254	ug	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	4172837	N/A
Aroclor 1260	ug	5.7	9.1	9.0	5.6	11	5.0	4172837	N/A
Calculated Total PCB	ug	5.7	9.1	9.0	5.6	11	5.0	4172827	N/A
Surrogate Recovery (%)									
Decachlorobiphenyl	%	82	77	82	78	84		4172837	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B5H5383
Report Date: 2015/09/08

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

TEST SUMMARY

Maxxam ID: AXD647
Sample ID: MB-BS 201
Matrix: Soil

Collected: 2015/08/25
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4176257	2015/09/03	2015/09/04	Mike Leblanc

Maxxam ID: AXD648
Sample ID: MB-BS 202
Matrix: Soil

Collected: 2015/08/25
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4176257	2015/09/03	2015/09/04	Mike Leblanc

Maxxam ID: AXD649
Sample ID: MB-BS 203
Matrix: Soil

Collected: 2015/08/25
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4176257	2015/09/03	2015/09/04	Mike Leblanc

Maxxam ID: AXD650
Sample ID: MB-BS 204
Matrix: Soil

Collected: 2015/08/25
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4176257	2015/09/03	2015/09/04	Mike Leblanc

Maxxam ID: AXD651
Sample ID: MB-BS 205
Matrix: Soil

Collected: 2015/08/25
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4176257	2015/09/03	2015/09/04	Mike Leblanc

Maxxam ID: AXD652
Sample ID: MB-BS 206
Matrix: Soil

Collected: 2015/08/25
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4176257	2015/09/03	2015/09/04	Mike Leblanc

Maxxam ID: AXD653
Sample ID: 15-SWAB-1
Matrix: Swab

Collected: 2015/08/27
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs on swabs by GC/ECD	GC/ECD	4172837	2015/09/01	2015/09/02	Lisa Gates
PCB Aroclor sum (swabs)	CALC	4172827	N/A	2015/09/02	Automated Statchk

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Maxxam Job #: B5H5383
Report Date: 2015/09/08

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

TEST SUMMARY

Maxxam ID: AXD654
Sample ID: 15-SWAB-2
Matrix: Swab

Collected: 2015/08/27
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs on swabs by GC/ECD	GC/ECD	4172837	2015/09/01	2015/09/02	Lisa Gates
PCB Aroclor sum (swabs)	CALC	4172827	N/A	2015/09/02	Automated Statchk

Maxxam ID: AXD655
Sample ID: 15-SWAB-3
Matrix: Swab

Collected: 2015/08/27
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs on swabs by GC/ECD	GC/ECD	4172837	2015/09/01	2015/09/02	Lisa Gates
PCB Aroclor sum (swabs)	CALC	4172827	N/A	2015/09/02	Automated Statchk

Maxxam ID: AXD656
Sample ID: 15-SWAB-4
Matrix: Swab

Collected: 2015/08/27
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs on swabs by GC/ECD	GC/ECD	4172837	2015/09/01	2015/09/02	Lisa Gates
PCB Aroclor sum (swabs)	CALC	4172827	N/A	2015/09/02	Automated Statchk

Maxxam ID: AXD665
Sample ID: 15-SWAB-5
Matrix: Swab

Collected: 2015/08/27
Shipped:
Received: 2015/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs on swabs by GC/ECD	GC/ECD	4172837	2015/09/01	2015/09/02	Lisa Gates
PCB Aroclor sum (swabs)	CALC	4172827	N/A	2015/09/02	Automated Statchk

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Maxxam Job #: B5H5383
Report Date: 2015/09/08

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

GENERAL COMMENTS

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

Package 1	3.3°C

Results relate only to the items tested.

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Maxxam Job #: B5H5383
Report Date: 2015/09/08

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4172837	Decachlorobiphenyl	2015/09/02			87	30 - 130	86	%		
4172837	Aroclor 1016	2015/09/02					<5.0	ug		
4172837	Aroclor 1221	2015/09/02					<5.0	ug		
4172837	Aroclor 1232	2015/09/02					<5.0	ug		
4172837	Aroclor 1242	2015/09/02					<5.0	ug		
4172837	Aroclor 1248	2015/09/02					<5.0	ug		
4172837	Aroclor 1254	2015/09/02					<5.0	ug		
4172837	Aroclor 1260	2015/09/02			121	30 - 130	<5.0	ug		
4176257	Acid Extractable Aluminum (Al)	2015/09/04					<10	mg/kg	4.3	35
4176257	Acid Extractable Antimony (Sb)	2015/09/04	91	75 - 125	99	75 - 125	<2.0	mg/kg	NC	35
4176257	Acid Extractable Arsenic (As)	2015/09/04	98	75 - 125	97	75 - 125	<2.0	mg/kg	NC	35
4176257	Acid Extractable Barium (Ba)	2015/09/04	NC	75 - 125	97	75 - 125	<5.0	mg/kg	3.9	35
4176257	Acid Extractable Beryllium (Be)	2015/09/04	98	75 - 125	95	75 - 125	<2.0	mg/kg	NC	35
4176257	Acid Extractable Bismuth (Bi)	2015/09/04	99	75 - 125	97	75 - 125	<2.0	mg/kg	NC	35
4176257	Acid Extractable Boron (B)	2015/09/04	87	75 - 125	92	75 - 125	<50	mg/kg	NC	35
4176257	Acid Extractable Cadmium (Cd)	2015/09/04	98	75 - 125	100	75 - 125	<0.30	mg/kg	NC	35
4176257	Acid Extractable Chromium (Cr)	2015/09/04	NC	75 - 125	96	75 - 125	<2.0	mg/kg	3.3	35
4176257	Acid Extractable Cobalt (Co)	2015/09/04	101	75 - 125	98	75 - 125	<1.0	mg/kg	5.5	35
4176257	Acid Extractable Copper (Cu)	2015/09/04	99	75 - 125	97	75 - 125	<2.0	mg/kg	12	35
4176257	Acid Extractable Iron (Fe)	2015/09/04					<50	mg/kg	6.9	35
4176257	Acid Extractable Lead (Pb)	2015/09/04	97	75 - 125	96	75 - 125	<0.50	mg/kg	20	35
4176257	Acid Extractable Lithium (Li)	2015/09/04	100	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35
4176257	Acid Extractable Manganese (Mn)	2015/09/04	NC	75 - 125	97	75 - 125	<2.0	mg/kg	3.8	35
4176257	Acid Extractable Mercury (Hg)	2015/09/04	94	75 - 125	97	75 - 125	<0.10	mg/kg	NC	35
4176257	Acid Extractable Molybdenum (Mo)	2015/09/04	101	75 - 125	95	75 - 125	<2.0	mg/kg	NC	35
4176257	Acid Extractable Nickel (Ni)	2015/09/04	99	75 - 125	98	75 - 125	<2.0	mg/kg	0.24	35
4176257	Acid Extractable Rubidium (Rb)	2015/09/04	97	75 - 125	96	75 - 125	<2.0	mg/kg	7.0	35
4176257	Acid Extractable Selenium (Se)	2015/09/04	98	75 - 125	99	75 - 125	<1.0	mg/kg	NC	35
4176257	Acid Extractable Silver (Ag)	2015/09/04	98	75 - 125	100	75 - 125	<0.50	mg/kg	NC	35
4176257	Acid Extractable Strontium (Sr)	2015/09/04	103	75 - 125	101	75 - 125	<5.0	mg/kg	NC	35
4176257	Acid Extractable Thallium (Tl)	2015/09/04	98	75 - 125	98	75 - 125	<0.10	mg/kg	NC	35

Maxxam Job #: B5H5383
Report Date: 2015/09/08

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**UNITS**	**Value (%)**	**QC Limits**
4176257	Acid Extractable Tin (Sn)	2015/09/04	101	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35
4176257	Acid Extractable Uranium (U)	2015/09/04	101	75 - 125	99	75 - 125	<0.10	mg/kg	9.5	35
4176257	Acid Extractable Vanadium (V)	2015/09/04	NC	75 - 125	96	75 - 125	<2.0	mg/kg	9.7	35
4176257	Acid Extractable Zinc (Zn)	2015/09/04	NC	75 - 125	99	75 - 125	<5.0	mg/kg	5.2	35

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

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Job #: B5H5383
Report Date: 2015/09/08

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE REMEDIATION YEAR 5
Sampler Initials: SF

VALIDATION SIGNATURE PAGE

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

Mike MacGillivray, Scientific Specialist (Inorganics)

Rose MacDonald, Scientific Specialist (Organics)

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

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Your Project #: 121413099
Site Location: HOPEDALE YR 5
Your C.O.C. #: B144792

Attention:Anna Roy

Stantec Consulting Ltd
141 Kelsey Drive
St. John's, NL
A1B 0L2

Report Date: 2015/11/10
Report #: R3758685
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5M4800
Received: 2015/11/03, 13:45

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1, 3)	2	2015/11/06	2015/11/07	ATL SOP 00111	Atl. RBCA v3 m
TEH in Soil (PIRI) (1, 3)	2	2015/11/06	2015/11/10	ATL SOP 00111	Atl. RBCA v3 m
Moisture	4	N/A	2015/11/05	ATL SOP-00196	OMOE Handbook 1983 m
VPH in Soil (PIRI) (2)	4	2015/11/09	2015/11/10	ATL SOP 00199	Atl. RBCA v3 m
ModTPH (T1) Calc. for Soil	4	N/A	2015/11/10	N/A	Atl. RBCA v3 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Bedford
(2) Reported on a dry weight basis.
(3) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Robert Whelan
10 Nov 2015 16:50:02 -03:30

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rob Whelan, Laboratory Manager
Email: RWhelan@maxxam.ca
Phone# (709)754-0203
==
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Maxxam Job #: B5M4800
Report Date: 2015/11/10

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		BGW594	BGW594		BGW595	BGW595			
Sampling Date		2015/11/01	2015/11/01		2015/11/01	2015/11/01			
COC Number		B144792	B144792		B144792	B144792			
	UNITS	**15-P3-TP101-BS1**	**15-P3-TP101-BS1 Lab-Dup**	**RDL**	**15-P3-TP102-BS1**	**15-P3-TP102-BS1 Lab-Dup**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	84	84	1.0	16		1.0	4257760	0.20
Petroleum Hydrocarbons									
Benzene	mg/kg	<0.050		0.050	<0.025	<0.025	0.025	4264617	N/A
Toluene	mg/kg	0.83		0.050	<0.025	<0.025	0.025	4264617	N/A
Ethylbenzene	mg/kg	1.3		0.050	<0.025	<0.025	0.025	4264617	0.025
Total Xylenes	mg/kg	39		0.10	<0.050	<0.050	0.050	4264617	N/A
C6 - C10 (less BTEX)	mg/kg	620		5.0	47	39	2.5	4264617	N/A
>C10-C16 Hydrocarbons	mg/kg	7600		10	2800		10	4262036	N/A
>C16-C21 Hydrocarbons	mg/kg	200		10	460		10	4262036	N/A
>C21-<C32 Hydrocarbons	mg/kg	870		15	64		15	4262036	N/A
Modified TPH (Tier1)	mg/kg	9300		15	3400		15	4256657	N/A
Reached Baseline at C32	mg/kg	Yes		N/A	Yes		N/A	4262036	N/A
Hydrocarbon Resemblance	mg/kg	COMMENT (1)		N/A	COMMENT (2)		N/A	4262036	N/A
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	117			100			4262036	
n-Dotriacontane - Extractable	%	115 (3)			101			4262036	
Isobutylbenzene - Volatile	%	162 (4)			111	117		4264617	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Fuel oil fraction. Unidentified compound(s) in lube oil range.
(2) Weathered fuel oil fraction.
(3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.
(4) Elevated VPH RDL(s) due to sample dilution. Surrogate recovery not within acceptance limits; moisture exceeds 50%.

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Maxxam Job #: B5M4800
Report Date: 2015/11/10

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: AR

RBCA HYDROCARBONS IN SOIL (SOIL)

Maxxam ID		BGW596	BGW597			
Sampling Date		2015/11/01	2015/11/01			
COC Number		B144792	B144792			
	UNITS	**15-P3-TP103-BS1**	**15-P3-SD101**	**RDL**	**QC Batch**	**MDL**
Inorganics						
Moisture	%	22	37	1.0	4257760	0.20
Petroleum Hydrocarbons						
Benzene	mg/kg	<0.025	<0.025	0.025	4264617	N/A
Toluene	mg/kg	<0.025	<0.025	0.025	4264617	N/A
Ethylbenzene	mg/kg	<0.025	<0.025	0.025	4264617	0.025
Total Xylenes	mg/kg	<0.050	<0.050	0.050	4264617	N/A
C6 - C10 (less BTEX)	mg/kg	38	<2.5	2.5	4264617	N/A
>C10-C16 Hydrocarbons	mg/kg	2900	220	10	4262036	N/A
>C16-C21 Hydrocarbons	mg/kg	970	81	10	4262036	N/A
>C21-<C32 Hydrocarbons	mg/kg	120	45	15	4262036	N/A
Modified TPH (Tier1)	mg/kg	4000	350	15	4256657	N/A
Reached Baseline at C32	mg/kg	Yes	Yes	N/A	4262036	N/A
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	COMMENT (2)	N/A	4262036	N/A
Surrogate Recovery (%)						
Isobutylbenzene - Extractable	%	97	128		4262036	
n-Dotriacontane - Extractable	%	99	128 (3)		4262036	
Isobutylbenzene - Volatile	%	118	128		4264617	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Weathered fuel oil fraction.
(2) Weathered fuel oil fraction. Unidentified compound(s) in lube oil range.
(3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

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Maxxam Job #: B5M4800
Report Date: 2015/11/10

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: AR

TEST SUMMARY

Maxxam ID: BGW594
Sample ID: 15-P3-TP101-BS1
Matrix: Soil

Collected: 2015/11/01
Shipped:
Received: 2015/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
TEH in Soil (PIRI)	GC/FID	4262036	2015/11/06	2015/11/10	Crystal Matthews
Moisture	BAL	4257760	N/A	2015/11/05	Annette Clarke
VPH in Soil (PIRI)	PTGC/MS	4264617	2015/11/09	2015/11/10	Matthew Cloutier
ModTPH (T1) Calc. for Soil	CALC	4256657	N/A	2015/11/10	Automated Statchk

Maxxam ID: BGW594 Dup
Sample ID: 15-P3-TP101-BS1
Matrix: Soil

Collected: 2015/11/01
Shipped:
Received: 2015/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4257760	N/A	2015/11/05	Annette Clarke

Maxxam ID: BGW595
Sample ID: 15-P3-TP102-BS1
Matrix: Soil

Collected: 2015/11/01
Shipped:
Received: 2015/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
TEH in Soil (PIRI)	GC/FID	4262036	2015/11/06	2015/11/07	Crystal Matthews
Moisture	BAL	4257760	N/A	2015/11/05	Annette Clarke
VPH in Soil (PIRI)	PTGC/MS	4264617	2015/11/09	2015/11/10	Matthew Cloutier
ModTPH (T1) Calc. for Soil	CALC	4256657	N/A	2015/11/10	Automated Statchk

Maxxam ID: BGW595 Dup
Sample ID: 15-P3-TP102-BS1
Matrix: Soil

Collected: 2015/11/01
Shipped:
Received: 2015/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VPH in Soil (PIRI)	PTGC/MS	4264617	2015/11/09	2015/11/10	Matthew Cloutier

Maxxam ID: BGW596
Sample ID: 15-P3-TP103-BS1
Matrix: Soil

Collected: 2015/11/01
Shipped:
Received: 2015/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
TEH in Soil (PIRI)	GC/FID	4262036	2015/11/06	2015/11/07	Crystal Matthews
Moisture	BAL	4257760	N/A	2015/11/05	Annette Clarke
VPH in Soil (PIRI)	PTGC/MS	4264617	2015/11/09	2015/11/10	Matthew Cloutier
ModTPH (T1) Calc. for Soil	CALC	4256657	N/A	2015/11/10	Automated Statchk

Maxxam ID: BGW597
Sample ID: 15-P3-SD101
Matrix: Soil

Collected: 2015/11/01
Shipped:
Received: 2015/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
TEH in Soil (PIRI)	GC/FID	4262036	2015/11/06	2015/11/10	Crystal Matthews

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TEST SUMMARY

Maxxam ID: BGW597
Sample ID: 15-P3-SD101
Matrix: Soil

Collected: 2015/11/01
Shipped:
Received: 2015/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4257760	N/A	2015/11/05	Annette Clarke
VPH in Soil (PIRI)	PTGC/MS	4264617	2015/11/09	2015/11/10	Matthew Cloutier
ModTPH (T1) Calc. for Soil	CALC	4256657	N/A	2015/11/10	Automated Statchk

Maxxam Job #: B5M4800
Report Date: 2015/11/10

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: AR

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B5M4800
Report Date: 2015/11/10

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: AR

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4262036	Isobutylbenzene - Extractable	2015/11/06	89	30 - 130	97	30 - 130	95	%		
4262036	n-Dotriacontane - Extractable	2015/11/06	96	30 - 130	100	30 - 130	103	%		
4264617	Isobutylbenzene - Volatile	2015/11/10			94	60 - 130	104	%		
4257760	Moisture	2015/11/05							0.36	25
4262036	>C10-C16 Hydrocarbons	2015/11/06	76	30 - 130	85	30 - 130	<10	mg/kg	NC	50
4262036	>C16-C21 Hydrocarbons	2015/11/06	93	30 - 130	101	30 - 130	<10	mg/kg	NC	50
4262036	>C21-<C32 Hydrocarbons	2015/11/06	105	30 - 130	116	30 - 130	<15	mg/kg	NC	50
4264617	Benzene	2015/11/10			98	60 - 140	<0.025	mg/kg	NC	50
4264617	C6 - C10 (less BTEX)	2015/11/10					<2.5	mg/kg	18	50
4264617	Ethylbenzene	2015/11/10			95	60 - 140	<0.025	mg/kg	NC	50
4264617	Toluene	2015/11/10			95	60 - 140	<0.025	mg/kg	NC	50
4264617	Total Xylenes	2015/11/10			94	60 - 140	<0.050	mg/kg	NC	50

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

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

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

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

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B5M4800
Report Date: 2015/11/10

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: AR

VALIDATION SIGNATURE PAGE

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

RoseMarie MacDonald

Rosemarie MacDonald, Scientific Specialist (Organics)

Rob Whelan, Laboratory Manager

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

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Your Project #: 121413099
Site Location: HOPEDALE YR 5

Attention:Anna Roy

Stantec Consulting Ltd
141 Kelsey Drive
St. John's, NL
A1B 0L2

Your C.O.C. #: B 144810, B 144816, B 144793, B 144792

Report Date: 2015/11/12
Report #: R3763297
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5M5795
Received: 2015/11/04, 10:39

Sample Matrix: Soil
Samples Received: 35

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS (1)	3	2015/11/10	2015/11/10	ATL SOP 00058	EPA 6020A R1 m
Moisture (1)	32	N/A	2015/11/09	ATL SOP 00001	OMOE Handbook 1983 m
PCBs in soil by GC/ECD (1, 2)	31	2015/11/06	2015/11/10	ATL SOP 00106	EPA 8082A m
PCBs in soil by GC/ECD (1, 2)	1	2015/11/06	2015/11/12	ATL SOP 00106	EPA 8082A m
PCB Aroclor sum (soil) (1)	31	N/A	2015/11/10		Auto Calc.
PCB Aroclor sum (soil) (1)	1	N/A	2015/11/12		Auto Calc.

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

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

(1) This test was performed by Maxxam Bedford
(2) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Rachael Mansfield
12 Nov 2015 12:38:06 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289
==
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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

RESULTS OF ANALYSES OF SOIL

Maxxam ID		BHB864	BHB865	BHB866	BHB867	BHB868			
Sampling Date		2015/10/30	2015/10/30	2015/10/30	2015/10/30	2015/10/30			
COC Number		B 144810	B 144810	B 144810	B 144810	B 144810			
	UNITS	**15-OB1-BS201**	**15-OB1-BS202**	**15-OB1-BS203**	**15-OB1-BS101**	**15-OB1-BS102**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	18	33	13	12	13	1.0	4261387	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		BHB869	BHB870	BHB871	BHB872	BHB873			
Sampling Date		2015/10/30	2015/10/30	2015/10/30	2015/10/30	2015/10/30			
COC Number		B 144810	B 144810	B 144810	B 144810	B 144810			
	UNITS	**15-OB1-BS103**	**15-MB-BS113**	**15-MB-BS114**	**15-MB-BS115**	**15-MB-TP101-BS1**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	17	20	41	12	25	1.0	4261387	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		BHB906	BHB907	BHB908	BHB909	BHB910			
Sampling Date		2015/10/30	2015/10/30	2015/10/31	2015/10/31	2015/10/31			
COC Number		B 144816	B 144816	B 144816	B 144816	B 144816			
	UNITS	**15-MB-TP102-BS1**	**15-MB-BS116**	**15-P1-TP101-BS2**	**15-P1-TP102-BS1**	**15-P1-TP102-BS2**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	22	12	28	49	27	1.0	4261387	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		BHB911	BHB912	BHB913	BHB946	BHB947			
Sampling Date		2015/10/31	2015/10/31	2015/10/31	2015/10/31	2015/10/31			
COC Number		B 144816	B 144816	B 144816	B 144793	B 144793			
	UNITS	**15-P1-TP102-BS3**	**15-P1-TP201-BS1**	**15-P1-TP201-BS2**	**15-P1-TP202-BS1**	**15-P1-TP202-BS2**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	35	33	36	34	46	1.0	4261387	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		BHB948	BHB949	BHB950	BHB951	BHB952			
Sampling Date		2015/10/31	2015/10/31	2015/10/31	2015/10/31	2015/10/31			
COC Number		B 144793	B 144793	B 144793	B 144793	B 144793			
	UNITS	**15-P1-TP202-BS3**	**15-P1-TP203-BS1**	**15-P1-TP203-BS2**	**15-P1-TP203-BS3**	**15-P1-TP203-BS4**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	45	19	25	29	33	1.0	4261387	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

RESULTS OF ANALYSES OF SOIL

Maxxam ID		BHB953	BHB954	BHB955	BHC039	BHC040			
Sampling Date		2015/10/31	2015/10/31	2015/10/31	2015/10/31	2015/10/31			
COC Number		B 144793	B 144793	B 144793	B 144792	B 144792			
	UNITS	**15-P1-TP204-BS1**	**15-P1-TP204-BS2**	**15-P1-TP204-BS3**	**15-P1-TP205-BS1**	**15-P1-TP205-BS2**	**RDL**	**QC Batch**	**MDL**
Inorganics									
Moisture	%	34	43	29	26	21	1.0	4261387	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		BHC041	BHC045			
Sampling Date		2015/10/31	2015/10/31			
COC Number		B 144792	B 144792			
	UNITS	**15-P1-TP205-BS3**	**15-P1-TP101-BS1**	**RDL**	**QC Batch**	**MDL**
Inorganics						
Moisture	%	22	26	1.0	4261387	0.20

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		BHC042	BHC043	BHC044	BHC044			
Sampling Date		2015/11/01	2015/11/01	2015/11/01	2015/11/01			
COC Number		B 144792	B 144792	B 144792	B 144792			
	UNITS	**15-POL-BS405**	**15-POL-BS406**	**15-POL-BS407**	**15-POL-BS407 Lab-Dup**	**RDL**	**QC Batch**	**MDL**
Metals								
Acid Extractable Aluminum (Al)	mg/kg	4500	5100	2000	1900	10	4265467	N/A
Acid Extractable Antimony (Sb)	mg/kg	2.3	12	<2.0	<2.0	2.0	4265467	N/A
Acid Extractable Arsenic (As)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	4265467	N/A
Acid Extractable Barium (Ba)	mg/kg	240	35	12	12	5.0	4265467	N/A
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	4265467	N/A
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	4265467	N/A
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	50	4265467	N/A
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.34	<0.30	<0.30	0.30	4265467	N/A
Acid Extractable Chromium (Cr)	mg/kg	24	16	24	21	2.0	4265467	N/A
Acid Extractable Cobalt (Co)	mg/kg	2.2	2.0	1.4	1.4	1.0	4265467	N/A
Acid Extractable Copper (Cu)	mg/kg	29	45	18	18	2.0	4265467	N/A
Acid Extractable Iron (Fe)	mg/kg	12000	25000	5500	5000	50	4265467	N/A
Acid Extractable Lead (Pb)	mg/kg	46	1300	18	21	0.50	4265467	N/A
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	4265467	N/A
Acid Extractable Manganese (Mn)	mg/kg	52	62	26	23	2.0	4265467	N/A
Acid Extractable Mercury (Hg)	mg/kg	0.12	0.11	<0.10	<0.10	0.10	4265467	N/A
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	4265467	N/A
Acid Extractable Nickel (Ni)	mg/kg	12	7.7	6.9	6.3	2.0	4265467	N/A
Acid Extractable Rubidium (Rb)	mg/kg	4.4	2.8	3.6	3.3	2.0	4265467	N/A
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	1.0	4265467	N/A
Acid Extractable Silver (Ag)	mg/kg	7.2	<0.50	<0.50	<0.50	0.50	4265467	N/A
Acid Extractable Strontium (Sr)	mg/kg	54	9.7	<5.0	<5.0	5.0	4265467	N/A
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	<0.10	0.10	4265467	N/A
Acid Extractable Tin (Sn)	mg/kg	12	430	2.3	2.0	2.0	4265467	N/A
Acid Extractable Uranium (U)	mg/kg	0.28	0.24	0.15	0.13	0.10	4265467	N/A
Acid Extractable Vanadium (V)	mg/kg	16	9.6	24	21	2.0	4265467	N/A
Acid Extractable Zinc (Zn)	mg/kg	57	120	18	18	5.0	4265467	N/A

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

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		BHB864	BHB864	BHB865	BHB866	BHB867			
Sampling Date		2015/10/30	2015/10/30	2015/10/30	2015/10/30	2015/10/30			
COC Number		B 144810	B 144810	B 144810	B 144810	B 144810			
	UNITS	**15-OB1-BS201**	**15-OB1-BS201 Lab-Dup**	**15-OB1-BS202**	**15-OB1-BS203**	**15-OB1-BS101**	**RDL**	**QC Batch**	**MDL**
PCBs									
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1260	ug/g	4.5	5.5	6.9	6.1	44	0.050	4262162	N/A
Calculated Total PCB	ug/g	4.5		6.9	6.1	44	0.050	4259616	N/A
Surrogate Recovery (%)									
Decachlorobiphenyl	%	84	82	98	85	100		4262162	

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

Maxxam ID		BHB868	BHB869	BHB870	BHB871	BHB872			
Sampling Date		2015/10/30	2015/10/30	2015/10/30	2015/10/30	2015/10/30			
COC Number		B 144810	B 144810	B 144810	B 144810	B 144810			
	UNITS	**15-OB1-BS102**	**15-OB1-BS103**	**15-MB-BS113**	**15-MB-BS114**	**15-MB-BS115**	**RDL**	**QC Batch**	**MDL**
PCBs									
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1260	ug/g	3.3	4.6	0.99	13	13	0.050	4262162	N/A
Calculated Total PCB	ug/g	3.3	4.6	0.99	13	13	0.050	4259616	N/A
Surrogate Recovery (%)									
Decachlorobiphenyl	%	100	106	105	101	105		4262162	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		BHB873	BHB906	BHB907	BHB908	BHB909			
Sampling Date		2015/10/30	2015/10/30	2015/10/30	2015/10/31	2015/10/31			
COC Number		B 144810	B 144816	B 144816	B 144816	B 144816			
	UNITS	**15-MB-TP101-BS1**	**15-MB-TP102-BS1**	**15-MB-BS116**	**15-P1-TP101-BS2**	**15-P1-TP102-BS1**	**RDL**	**QC Batch**	**MDL**
PCBs									
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1260	ug/g	0.40	12	8.4	0.77	3.7	0.050	4262162	N/A
Calculated Total PCB	ug/g	0.40	12	8.4	0.77	3.7	0.050	4259616	N/A
Surrogate Recovery (%)									
Decachlorobiphenyl	%	104	112	92	112	104		4262162	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		BHB910	BHB911	BHB912	BHB913			
Sampling Date		2015/10/31	2015/10/31	2015/10/31	2015/10/31			
COC Number		B 144816	B 144816	B 144816	B 144816			
	UNITS	**15-P1-TP102-BS2**	**15-P1-TP102-BS3**	**15-P1-TP201-BS1**	**15-P1-TP201-BS2**	**RDL**	**QC Batch**	**MDL**
PCBs								
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262162	N/A
Aroclor 1260	ug/g	2.8	4.0	9.1	6.5	0.050	4262162	N/A
Calculated Total PCB	ug/g	2.8	4.0	9.1	6.5	0.050	4259616	N/A
Surrogate Recovery (%)								
Decachlorobiphenyl	%	110	106	107	110		4262162	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		BHB946	BHB947		BHB948	BHB948			
Sampling Date		2015/10/31	2015/10/31		2015/10/31	2015/10/31			
COC Number		B 144793	B 144793		B 144793	B 144793			
	UNITS	**15-P1-TP202-BS1**	**15-P1-TP202-BS2**	**QC Batch**	**15-P1-TP202-BS3**	**15-P1-TP202-BS3 Lab-Dup**	**RDL**	**QC Batch**	**MDL**
PCBs									
Aroclor 1016	ug/g	<0.050	<0.050	4262162	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1221	ug/g	<0.050	<0.050	4262162	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1232	ug/g	<0.050	<0.050	4262162	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1248	ug/g	<0.050	<0.050	4262162	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1242	ug/g	<0.050	<0.050	4262162	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1254	ug/g	<0.050	<0.050	4262162	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1260	ug/g	5.6	27	4262162	17	22	0.050	4262178	N/A
Calculated Total PCB	ug/g	5.6	27	4259616	17		0.050	4259616	N/A
Surrogate Recovery (%)									
Decachlorobiphenyl	%	104	93	4262162	93	96		4262178	

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

Maxxam ID		BHB949	BHB950	BHB951	BHB952			
Sampling Date		2015/10/31	2015/10/31	2015/10/31	2015/10/31			
COC Number		B 144793	B 144793	B 144793	B 144793			
	UNITS	**15-P1-TP203-BS1**	**15-P1-TP203-BS2**	**15-P1-TP203-BS3**	**15-P1-TP203-BS4**	**RDL**	**QC Batch**	**MDL**
PCBs								
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1260	ug/g	1.9	1.6	1.1	1.3	0.050	4262178	N/A
Calculated Total PCB	ug/g	1.9	1.6	1.1	1.3	0.050	4259616	N/A
Surrogate Recovery (%)								
Decachlorobiphenyl	%	98	99	101	102		4262178	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		BHB953	BHB954	BHB955	BHC039			
Sampling Date		2015/10/31	2015/10/31	2015/10/31	2015/10/31			
COC Number		B 144793	B 144793	B 144793	B 144792			
	UNITS	**15-P1-TP204-BS1**	**15-P1-TP204-BS2**	**15-P1-TP204-BS3**	**15-P1-TP205-BS1**	**RDL**	**QC Batch**	**MDL**
PCBs								
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1260	ug/g	1.5	6.1	1.4	4.6	0.050	4262178	N/A
Calculated Total PCB	ug/g	1.5	6.1	1.4	4.6	0.050	4259616	N/A
Surrogate Recovery (%)								
Decachlorobiphenyl	%	103	97	103	103		4262178	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		BHC040	BHC041	BHC045			
Sampling Date		2015/10/31	2015/10/31	2015/10/31			
COC Number		B 144792	B 144792	B 144792			
	UNITS	**15-P1-TP205-BS2**	**15-P1-TP205-BS3**	**15-P1-TP101-BS1**	**RDL**	**QC Batch**	**MDL**
PCBs							
Aroclor 1016	ug/g	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1221	ug/g	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1232	ug/g	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1248	ug/g	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1242	ug/g	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1254	ug/g	<0.050	<0.050	<0.050	0.050	4262178	N/A
Aroclor 1260	ug/g	3.4	2.5	0.52	0.050	4262178	N/A
Calculated Total PCB	ug/g	3.4	2.5	0.52	0.050	4259616	N/A
Surrogate Recovery (%)							
Decachlorobiphenyl	%	103	96	105		4262178	

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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TEST SUMMARY

Maxxam ID: BHB864
Sample ID: 15-OB1-BS201
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB864 Dup
Sample ID: 15-OB1-BS201
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates

Maxxam ID: BHB865
Sample ID: 15-OB1-BS202
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB866
Sample ID: 15-OB1-BS203
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB867
Sample ID: 15-OB1-BS101
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/12	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/12	Automated Statchk

Maxxam ID: BHB868
Sample ID: 15-OB1-BS102
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates

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Sampler Initials: JG

TEST SUMMARY

Maxxam ID: BHB868 **Collected:** 2015/10/30
Sample ID: 15-OB1-BS102 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB869 **Collected:** 2015/10/30
Sample ID: 15-OB1-BS103 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB870 **Collected:** 2015/10/30
Sample ID: 15-MB-BS113 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB871 **Collected:** 2015/10/30
Sample ID: 15-MB-BS114 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB872 **Collected:** 2015/10/30
Sample ID: 15-MB-BS115 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB873 **Collected:** 2015/10/30
Sample ID: 15-MB-TP101-BS1 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates

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Client Project #: 121413099
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TEST SUMMARY

Maxxam ID: BHB873
Sample ID: 15-MB-TP101-BS1
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB906
Sample ID: 15-MB-TP102-BS1
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB907
Sample ID: 15-MB-BS116
Matrix: Soil

Collected: 2015/10/30
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB908
Sample ID: 15-P1-TP101-BS2
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB909
Sample ID: 15-P1-TP102-BS1
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB910
Sample ID: 15-P1-TP102-BS2
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates

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TEST SUMMARY

Maxxam ID: BHB910
Sample ID: 15-P1-TP102-BS2
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB911
Sample ID: 15-P1-TP102-BS3
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB912
Sample ID: 15-P1-TP201-BS1
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB913
Sample ID: 15-P1-TP201-BS2
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB946
Sample ID: 15-P1-TP202-BS1
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB947
Sample ID: 15-P1-TP202-BS2
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262162	2015/11/06	2015/11/10	Lisa Gates

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Report Date: 2015/11/12

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Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

TEST SUMMARY

Maxxam ID: BHB947 **Collected:** 2015/10/31
Sample ID: 15-P1-TP202-BS2 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB948 **Collected:** 2015/10/31
Sample ID: 15-P1-TP202-BS3 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB948 Dup **Collected:** 2015/10/31
Sample ID: 15-P1-TP202-BS3 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates

Maxxam ID: BHB949 **Collected:** 2015/10/31
Sample ID: 15-P1-TP203-BS1 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB950 **Collected:** 2015/10/31
Sample ID: 15-P1-TP203-BS2 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB951 **Collected:** 2015/10/31
Sample ID: 15-P1-TP203-BS3 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

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Sampler Initials: JG

TEST SUMMARY

Maxxam ID: BHB952
Sample ID: 15-P1-TP203-BS4
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB953
Sample ID: 15-P1-TP204-BS1
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB954
Sample ID: 15-P1-TP204-BS2
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHB955
Sample ID: 15-P1-TP204-BS3
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHC039
Sample ID: 15-P1-TP205-BS1
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

TEST SUMMARY

Maxxam ID: BHC040 **Collected:** 2015/10/31
Sample ID: 15-P1-TP205-BS2 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHC041 **Collected:** 2015/10/31
Sample ID: 15-P1-TP205-BS3 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

Maxxam ID: BHC042 **Collected:** 2015/11/01
Sample ID: 15-POL-BS405 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4265467	2015/11/10	2015/11/10	Bryon Angevine

Maxxam ID: BHC043 **Collected:** 2015/11/01
Sample ID: 15-POL-BS406 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4265467	2015/11/10	2015/11/10	Bryon Angevine

Maxxam ID: BHC044 **Collected:** 2015/11/01
Sample ID: 15-POL-BS407 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4265467	2015/11/10	2015/11/10	Bryon Angevine

Maxxam ID: BHC044 Dup **Collected:** 2015/11/01
Sample ID: 15-POL-BS407 **Shipped:**
Matrix: Soil **Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Solids Acid Extr. ICPMS	ICP/MS	4265467	2015/11/10	2015/11/10	Bryon Angevine

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

TEST SUMMARY

Maxxam ID: BHC045
Sample ID: 15-P1-TP101-BS1
Matrix: Soil

Collected: 2015/10/31
Shipped:
Received: 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4261387	N/A	2015/11/09	Julia McGovern
PCBs in soil by GC/ECD	GC/ECD	4262178	2015/11/06	2015/11/10	Lisa Gates
PCB Aroclor sum (soil)	CALC	4259616	N/A	2015/11/10	Automated Statchk

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Stantec Consulting Ltd
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Sampler Initials: JG

GENERAL COMMENTS

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

Package 1	3.0°C
Package 2	6.3°C
Package 3	10.0°C

Results relate only to the items tested.

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4262162	Decachlorobiphenyl	2015/11/10	86	30 - 130	103	30 - 130	104	%		
4262178	Decachlorobiphenyl	2015/11/10	97	30 - 130	101	30 - 130	102	%		
4262162	Aroclor 1016	2015/11/10					<0.050	ug/g	NC	50
4262162	Aroclor 1221	2015/11/10					<0.050	ug/g	NC	50
4262162	Aroclor 1232	2015/11/10					<0.050	ug/g	NC	50
4262162	Aroclor 1242	2015/11/10					<0.050	ug/g	NC	50
4262162	Aroclor 1248	2015/11/10					<0.050	ug/g	NC	50
4262162	Aroclor 1254	2015/11/10	NC	30 - 130	109	30 - 130	<0.050	ug/g	NC	50
4262162	Aroclor 1260	2015/11/10					<0.050	ug/g	20	50
4262178	Aroclor 1016	2015/11/10					<0.050	ug/g	NC	50
4262178	Aroclor 1221	2015/11/10					<0.050	ug/g	NC	50
4262178	Aroclor 1232	2015/11/10					<0.050	ug/g	NC	50
4262178	Aroclor 1242	2015/11/10					<0.050	ug/g	NC	50
4262178	Aroclor 1248	2015/11/10					<0.050	ug/g	NC	50
4262178	Aroclor 1254	2015/11/10	NC	30 - 130	106	30 - 130	<0.050	ug/g	NC	50
4262178	Aroclor 1260	2015/11/10					<0.050	ug/g	22	50
4265467	Acid Extractable Aluminum (Al)	2015/11/10					<10	mg/kg	8.7	35
4265467	Acid Extractable Antimony (Sb)	2015/11/10	91	75 - 125	101	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Arsenic (As)	2015/11/10	100	75 - 125	104	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Barium (Ba)	2015/11/10	100	75 - 125	102	75 - 125	<5.0	mg/kg	NC	35
4265467	Acid Extractable Beryllium (Be)	2015/11/10	103	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Bismuth (Bi)	2015/11/10	102	75 - 125	98	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Boron (B)	2015/11/10	101	75 - 125	115	75 - 125	<50	mg/kg	NC	35
4265467	Acid Extractable Cadmium (Cd)	2015/11/10	101	75 - 125	101	75 - 125	<0.30	mg/kg	NC	35
4265467	Acid Extractable Chromium (Cr)	2015/11/10	101	75 - 125	104	75 - 125	<2.0	mg/kg	11	35
4265467	Acid Extractable Cobalt (Co)	2015/11/10	102	75 - 125	103	75 - 125	<1.0	mg/kg	NC	35
4265467	Acid Extractable Copper (Cu)	2015/11/10	101	75 - 125	103	75 - 125	<2.0	mg/kg	0.62	35
4265467	Acid Extractable Iron (Fe)	2015/11/10					<50	mg/kg	10	35
4265467	Acid Extractable Lead (Pb)	2015/11/10	96	75 - 125	99	75 - 125	<0.50	mg/kg	12	35
4265467	Acid Extractable Lithium (Li)	2015/11/10	102	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Manganese (Mn)	2015/11/10	NC	75 - 125	104	75 - 125	<2.0	mg/kg	14	35

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4265467	Acid Extractable Mercury (Hg)	2015/11/10	96	75 - 125	102	75 - 125	<0.10	mg/kg	NC	35
4265467	Acid Extractable Molybdenum (Mo)	2015/11/10	98	75 - 125	102	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Nickel (Ni)	2015/11/10	104	75 - 125	105	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Rubidium (Rb)	2015/11/10	103	75 - 125	103	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Selenium (Se)	2015/11/10	103	75 - 125	105	75 - 125	<1.0	mg/kg	NC	35
4265467	Acid Extractable Silver (Ag)	2015/11/10	103	75 - 125	102	75 - 125	<0.50	mg/kg	NC	35
4265467	Acid Extractable Strontium (Sr)	2015/11/10	105	75 - 125	103	75 - 125	<5.0	mg/kg	NC	35
4265467	Acid Extractable Thallium (Tl)	2015/11/10	102	75 - 125	100	75 - 125	<0.10	mg/kg	NC	35
4265467	Acid Extractable Tin (Sn)	2015/11/10	88	75 - 125	100	75 - 125	<2.0	mg/kg	NC	35
4265467	Acid Extractable Uranium (U)	2015/11/10	102	75 - 125	102	75 - 125	<0.10	mg/kg	NC	35
4265467	Acid Extractable Vanadium (V)	2015/11/10	97	75 - 125	105	75 - 125	<2.0	mg/kg	13	35
4265467	Acid Extractable Zinc (Zn)	2015/11/10	99	75 - 125	104	75 - 125	<5.0	mg/kg	NC	35

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

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B5M5795
Report Date: 2015/11/12

Stantec Consulting Ltd
Client Project #: 121413099
Site Location: HOPEDALE YR 5
Sampler Initials: JG

VALIDATION SIGNATURE PAGE

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

Kevin G. MacDonald

Kevin MacDonald, Inorganics Supervisor

RoseMarie MacDonald

Rosemarie MacDonald, Scientific Specialist (Organics)

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

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APPENDIX E

Symbols and Terms, Test Pit Logs

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

Rootmat	- vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
Topsoil	- mixture of soil and humus capable of supporting vegetative growth
Peat	- mixture of visible and invisible fragments of decayed organic matter
Till	- unstratified glacial deposit which may range from clay to boulders
Fill	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

Desiccated	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	- having cracks, and hence a blocky structure
Varved	- composed of regular alternating layers of silt and clay
Stratified	- composed of alternating successions of different soil types, e.g. silt and sand
Layer	- > 75 mm in thickness
Seam	- 2 mm to 75 mm in thickness
Parting	- < 2 mm in thickness

Terminology describing soil types:
The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):
Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

Terminology describing compactness of cohesionless soils:
The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on page 3. A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

Terminology describing consistency of cohesive soils:
The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained Shear Strength		Approximate SPT N-Value
	kips/sq.ft.	kPa	
Very Soft	<0.25	<12.5	<2
Soft	0.25 - 0.5	12.5 - 25	2-4
Firm	0.5 - 1.0	25 - 50	4-8
Stiff	1.0 - 2.0	50 – 100	8-15
Very Stiff	2.0 - 4.0	100 - 200	15-30
Hard	>4.0	>200	>30

ROCK DESCRIPTION

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	*Very Poor Quality*
25-50	*Poor Quality*
50-75	*Fair Quality*
75-90	*Good Quality*
90-100	*Excellent Quality*

Alternate (Colloquial) Rock Mass Quality	
Very Severely Fractured	*Crushed*
Severely Fractured	*Shattered or Very Blocky*
Fractured	*Blocky*
Moderately Jointed	*Sound*
Intact	*Very Sound*

RQD (Rock Quality Designation) denotes the percentage of intact and sound rock retrieved from a borehole of any orientation. All pieces of intact and sound rock core equal to or greater than 100 mm (4 in.) long are summed and divided by the total length of the core run. RQD is determined in accordance with ASTM D6032.

SCR (Solid Core Recovery) denotes the percentage of solid core (cylindrical) retrieved from a borehole of any orientation. All pieces of solid (cylindrical) core are summed and divided by the total length of the core run (It excludes all portions of core pieces that are not fully cylindrical as well as crushed or rubble zones).

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of natural occurring fractures.

Terminology describing rock with respect to discontinuity and bedding spacing:

Spacing (mm)	Discontinuities	Bedding
>6000	*Extremely Wide*	-
2000-6000	*Very Wide*	*Very Thick*
600-2000	*Wide*	*Thick*
200-600	*Moderate*	*Medium*
60-200	*Close*	*Thin*
20-60	*Very Close*	*Very Thin*
<20	*Extremely Close*	*Laminated*
<6	-	*Thinly Laminated*

Terminology describing rock strength:

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	<1
Very Weak	R1	1 – 5
Weak	R2	5 – 25
Medium Strong	R3	25 – 50
Strong	R4	50 – 100
Very Strong	R5	100 – 250
Extremely Strong	R6	>250

Terminology describing rock weathering:

Term	Symbol	Description
Fresh	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
Slightly	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discolored.
Moderately	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	W6	All the rock converted to soil. Structure and fabric destroyed.

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.

Boulders Cobbles Gravel	Sand	Silt	Clay	Organics	Asphalt	Concrete	Fill	Igneous Bedrock	Meta-morphic Bedrock	Sedi-mentary Bedrock

SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
BS	Bulk sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT

▼ measured in standpipe, piezometer, or well

▽ inferred

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE

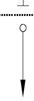
Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to ‘A’ size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_U	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

TEST PIT RECORD

Stantec

CLIENT: NLDEC
PROJECT: Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION: Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-30-15
WATER LEVEL: N/A
TEST PIT No.: 15-MB-TP101
PROJECT No.: 121413099
DATUM: N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown sandy SILT with gravel; frequent cobbles and trace organics: FILL			BS	1	0	-	-	-	-	-	-	-
1		End of Test Pit Terminated on bedrock at 1.0 mbgs. Groundwater seepage not observed.												
2														
3														
4														
5														

TEST PIT RECORD

Stantec

CLIENT NLDEC
PROJECT Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-30-15 WATER LEVEL N/A

TEST PIT No. 15-MB-TP102
PROJECT No. 121413099
DATUM N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND with gravel; trace organics; occasional metal debris: FILL			BS	1	0	-	-	-	-	-	-	-
		End of Test Pit Terminated on bedrock at 0.2 mbgs. Groundwater seepage not observed.												
1														
2														
3														
4														
5														

TEST PIT RECORD

Stantec

CLIENT NLDEC
PROJECT Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-31-15 WATER LEVEL N/A

TEST PIT No. 15-P1-TP101
PROJECT No. 121413099
DATUM N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND and gravel; Frequent organics, wood and cobbles; occasional debris (crushed drums): FILL												
1					BS	1	0	-	-	-	-	-	-	-
2					BS	2	0	-	-	-	-	-	-	-
2		End of Test Pit Terminated on bedrock at 2.0 mbgs. Groundwater seepage not observed.												
3														
4														
5														

TEST PIT RECORD

CLIENT NLDEC
PROJECT Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-31-15 WATER LEVEL N/A

TEST PIT No. 15-P1-TP102
PROJECT No. 121413099
DATUM N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND with gravel and organics; Frequent cobbles; occasional debris (crushed drums, yellow-painted steel pipe): FILL			BS	1	0	-	-	-	-	-	-	-
1					BS	2	0	-	-	-	-	-	-	-
					BS	3	0	-	-	-	-	-	-	-
2		End of Test Pit Terminated on boulders at 2.0 mbgs. Groundwater seepage not observed.												
3														
4														
5														

Stantec

TEST PIT RECORD

CLIENT: NLDEC
PROJECT: Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION: Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-31-15
WATER LEVEL: N/A
TEST PIT No.: 15-P1-TP201
PROJECT No.: 121413099
DATUM: N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND with organics; Frequent cobbles, occasional wood: FILL			BS	1	0	-	-	-	-	-	-	-
1					BS	2	0	-	-	-	-	-	-	-
		End of Test Pit Terminated on boulders at 1.2 mbgs. Groundwater seepage not observed.												
2														
3														
4														
5														

TEST PIT RECORD

Stantec

CLIENT NLDEC
PROJECT Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-31-15 WATER LEVEL N/A

TEST PIT No. 15-P1-TP202
PROJECT No. 121413099
DATUM N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND with gravel and organics; Frequent cobbles; occasional wood: FILL			BS	1	0	-	-	-	-	-	-	-
1					BS	2	0	-	-	-	-	-	-	-
					BS	3	0	-	-	-	-	-	-	-
		End of Test Pit Terminated on boulders at 1.5 mbgs. Groundwater seepage not observed.												
2														
3														
4														
5														

TEST PIT RECORD

Stantec

CLIENT NLDEC
PROJECT Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-31-15 WATER LEVEL N/A

TEST PIT No. 15-P1-TP203
PROJECT No. 121413099
DATUM N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND with gravel and organics; Frequent cobbles; Occasional wood and debris (crushed drums): FILL Minor clay observed at 2.6 mbgs.			BS	1	0	-	-	-	-	-	-	-
1					BS	2	0	-	-	-	-	-	-	-
2					BS	3	0	-	-	-	-	-	-	-
					BS	4	0	-	-	-	-	-	-	-
3		End of Test Pit Terminated at maximum reach of backhoe at 2.6 mbgs. Groundwater seepage not observed.												
4														
5														

TEST PIT RECORD

Stantec

CLIENT NLDEC
PROJECT Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-31-15 WATER LEVEL N/A

TEST PIT No. 15-P1-TP204
PROJECT No. 121413099
DATUM N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND with gravel and organics; Frequent cobbles; occasional debris (crushed drums, steel, mat): FILL Minor clay observed above boulders at 2.1 mbgs.			BS	1	0	-	-	-	-	-	-	-
1					BS	2	0	-	-	-	-	-	-	-
2					BS	3	0	-	-	-	-	-	-	-
		End of Test Pit Terminated on boulders at 2.1 mbgs. Groundwater seepage not observed.												
3														
4														
5														

TEST PIT RECORD

Stantec

CLIENT: NLDEC
PROJECT: Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION: Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 10-31-15
WATER LEVEL: N/A
TEST PIT No.: 15-P1-TP205
PROJECT No.: 121413099
DATUM: N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Blast rock (boulders) and silty SAND with gravel and organics; Occasional debris (glass): FILL Minor clay observed above boulders or bedrock at 2.0 mbgs.			BS	1	0	-	-	-	-	-	-	-
1					BS	2	0	-	-	-	-	-	-	-
2					BS	3	0	-	-	-	-	-	-	-
2		End of Test Pit Terminated on boulders or bedrock at 2.0 mbgs. Groundwater seepage not observed.												
3														
4														
5														

TEST PIT RECORD

Stantec

CLIENT	NLDEC		
PROJECT	Implementation of the Remedial Action Plan and Additional Delineation - Year 5	TEST PIT No.	15-P3-TP101
LOCATION	Former U.S. Military Site, Hopedale, NL	PROJECT No.	121413099
DATES (mm-dd-yy): DUG	11-1-15	WATER LEVEL	N/A
		DATUM	N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: HYDROCARBON ODOUR	SAMPLES: OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm): TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown organic PEAT.			BS	1	0	-	-	9300	nd	0.83	1.30	39.00
		End of Hand-Dug Test Pit Groundwater seepage observed at 0.3 mbgs.												
1														
2														
3														
4														
5														

TEST PIT RECORD

Stantec

CLIENT NLDEC
PROJECT Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 11-1-15
WATER LEVEL N/A

TEST PIT No. 15-P3-TP102
PROJECT No. 121413099
DATUM N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: HYDROCARBON ODOUR	SAMPLES: OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm): TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND: FILL			BS	1	1	-	-	3400	nd	nd	nd	nd
		End of Hand-Dug Test Pit Groundwater seepage not observed.												
1														
2														
3														
4														
5														

Stantec

TEST PIT RECORD

CLIENT: NLDEC
PROJECT: Implementation of the Remedial Action Plan and Additional Delineation - Year 5
LOCATION: Former U.S. Military Site, Hopedale, NL
DATES (mm-dd-yy): DUG 11-1-15
WATER LEVEL: N/A

TEST PIT No. 15-P3-TP103
PROJECT No. 121413099
DATUM N/A

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: HYDROCARBON ODOUR	SAMPLES: OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm): TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND: FILL			BS	1	0	-	-	4000	nd	nd	nd	nd
		End of Hand-Dug Test Pit Groundwater seepage not observed.												
1														
2														
3														
4														
5														

APPENDIX F

PCB Destruction Certificate

Metal-Impacted Soil Bill of Ladings/Weigh Slips

RECUPERE SOL

Certificate of Destruction

Saint-Ambroise October 26, 2015

Generator :
Government of NL

P.O. Box 8700
St. JonhNL A1B 6J6

Contact : Christa Curnew

Advisor :
Sanexen Services Environnementaux In

9935, Avenue Catania, Entrée 1 - Bureau 2
Brossard (Québec J4Z 3V4

Contact : Mario Leathead

We confirm treatment of your soils at our plant located in the industrial park of Saint-Ambroise. The soils were managed and treated in compliance with our Certificate of Authorization delivered by the Quebec Ministry of Sustainable Development, Environment and the Fight against Climate Change :

Permit : **Thermal treatment of PCB and other organochloride impacted soils, issued on October 27, 1997**

Permit Ref. No. : **7610-02-01-0603816**
1142129

Treatment service : **Thermal**
Soils impacted with : **PCB**
Treatment criteria : **<A In reference to the standards set by the Ministry of the Sustainable Development, Environment and Parks of the Province of Quebec, Canada (<0.05 mg/kg)**

Récupère Sol File No. : **120595.3**

Destruction Certificate No. : **120595.3-d1**

Volume of Soil Treated (kg) : **685100**

Yours truly,

Éloi Côté, Eng
Process Engineer

80 des Mélèzes St., St. Ambroise, Quebec, Canada, G7P 2N4
Tel.: (418) 695-3302 Fax : (418) 695-3303

Bilan des arrivages

23-sept.-15

# Dossier	Heure d'entrée	Générateur	Contaminant	No. Billet pesée RSI	No. Manifeste	Transporteur	# imm.	Camionneur	Poid net (kg)
21-sept.-15									
120595.3	15:25	HopeDade (sanexen)	BPC	33700	PC55433-9	Transport F. Gilbert	RB3071P	Luc Turcotte	40750
120595.3	15:37	HopeDale (Sanexen)	BPC	33701	PC55434-7	Transport F. Gilbert	RB3073P	Benoit Girard	41540
									82290
22-sept.-15									
120595.3	08:15	HopeDale (Sanexen)	BPC	33702	PC55435-4	Transport F. Gilbert	L354671	Real Jean	37530
120595.3	10:17	HopeDale (Sanexen)	BPC	33703	PC55440-4	Transport F. Gilbert	L631251	Luc Turcotte	34880
120595.3	10:40	HopeDale (Sanexen)	BPC	33704	PC55443-8	Transport Jules Savard	L513230	Jean-Francois Lavoie	40610
120595.3	10:48	HopeDale (Sanexen)	BPC	33705	PC55442-0	Transport Jules Savard	L568832	Simon-Pierre Tremblay	39740
120595.3	11:03	HopeDale (Sanexen)	BPC	33706	PC55441-2	Transport Jules Savard	L400135	Jonathan Beaudoin	41260
120595.3	11:48	HopeDale (Sanexen)	BPC	33707	PC55445-3	Transport Jules Savard	L517589	Julie Tremblay	40790
120595.3	12:14	HopeDale (Sanexen)	BPC	33708	PC55444-6	Transport Jules Savard	L400103	Gérome Jameaux	40790
120595.3	13:30	HopeDale (Sanexen)	BPC	33709	PC55436-2	Transport F. Gilbert	L631251	Luc Turcotte	35640
120595.3	14:07	HopeDale (Sanexen)	BPC	33710	PC55446-1	Transport Jules Savard	L513230	Jean-Francois Lavoie	39740
120595.3	14:26	HopeDale (Sanexen)	BPC	33711	PC55447-9	Transport Jules Savard	L568832	Simon-Pierre Tremblay	40240
120595.3	15:18	HopeDale (Sanexen)	BPC	33712	PC55448-7	Transport Jules Savard	L400135	Jonathan Beaudoin	39740
									430960
23-sept.-15									
120595.3	09:14	HopeDale (Sanexen)	BPC	33713	PC55438-8	Transport F. Gilbert	L513266	Luc Turcotte	40570
120595.3	09:58	HopeDale (Sanexen)	BPC	33714	PC55427-1	Transport Jules Savard	L513230	Jean-Francois Lavoie	40530
120595.3	10:35	HopeDale (Sanexen)	BPC	33715	PC55426-3	Transport Jules Savard	L640223	Steve Forgues	38840
120595.3	12:40	HopeDale (Sanexen)	BPC	33716	PC55439-6	Transport F. Gilbert	L513266	Luc Turcotte	11520
120595.3	12:46	HopeDale (Sanexen)	BPC	33717	PC55437-0	Transport F. Gilbert	L591839	Guillaume Gagné	40390
									171850
								Total général:	**685100**

Matrec

Rapport de transactions par provenance
Période du 2015/09/01 au 2015/09/28

Billet	Réf.	Date	Camion	Client	Contrat	Matière	Brut	Tare	Net
Terre-Neuve									
3696	A-9661	2015/09/22 15:21	LMREXC	1035 - Sanexen Services Environnei	Sanexen - # PE-15-18	Sols contaminés	49720	19430	30.29
3697	A-9660	2015/09/22 15:22	LMREXC	1035 - Sanexen Services Environnei	Sanexen - # PE-15-18	Sols contaminés	40000	16730	23.27
3698	A-9659	2015/09/22 15:22	LMREXC	1035 - Sanexen Services Environnei	Sanexen - # PE-15-18	Sols contaminés	48810	19520	29.29
3699	A-9658	2015/09/22 15:23	LMREXC	1035 - Sanexen Services Environnei	Sanexen - # PE-15-18	Sols contaminés	41070	16800	24.27
3708	A-9662	2015/09/22 07:00	FGILBERT	1035 - Sanexen Services Environnei	Sanexen - # PE-15-18	Sols contaminés	33600	15370	18.23
3709	A-9663	2015/09/22 07:01	LMREXC	1035 - Sanexen Services Environnei	Sanexen - # PE-15-18	Sols contaminés	40370	16660	23.71
3710	A-9664	2015/09/22 07:01	LMREXC	1035 - Sanexen Services Environnei	Sanexen - # PE-15-18	Sols contaminés	45960	19370	26.59
3711	A-9665	2015/09/22 07:02	FGILBERT	1035 - Sanexen Services Environnei	Sanexen - # PE-15-18	Sols contaminés	38980	17130	21.85
Total Terre-Neuve: 8 billets)							**338510**	**141010**	**197.50**
Totaux							**338510**	**141010**	**197.50**

CONNAISSEMENT / BILL OF LADING

Référence
Reference

BE-0005

SANEXEN
SERVICES ENVIRONNEMENTAUX INC.

9935, avenue de Catania
Entrée 1, bureau 200
Brossard (Québec) J4Z 3V4

9935 Catania Avenue
Entrance 1, Suite 200
Brossard (Quebec) J4Z 3V4

Tel.: 450-466-2123
Fax: 450-466-2240

~~NIR : R536070-7~~

Générateur / Expéditeur Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.	Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.	Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.
NewFoundland and Labrador Department of Environment and convservation	Transport F. Gilbert Ltée	AES (Matrec)
Nom de l'entreprise / Company name	Nom de l'entreprise / Company name	Nom de l'entreprise / Company name
P.O. Box 8700, St-John's, NL, A1B 4J6	150 route des Routiers	1555 route Dorval
Adresse postale / Mailing address	Adresse postale / Mailing address	Adresse postale / Mailing address
US Former Military Base	Chicoutimi (Quebec) G7H 5B1	Larouche (Quebec) G0W 1Z0
Adresse de lieu de l'expédition / Shipping site adress	Ville / City · Code postal / Postal Code	Ville / City · Code postal / Postal Code
Hopedale, NL A0P 1G0	418-698-4848	418 549-8074
Ville / City · Code postal / Postal Code	Téléphone / Telephone No.	Téléphone / Telephone No.
709-729-2648	gilles.tremblay@groupegilbert.com	Raynald.perron@matrec.ca
Téléphone / Telephone No.	Courriel / E-mail	Courriel / E-mail
christacurnew@gov.nl.ca	Gilles Tremblay	Raynald Perron
Courriel / E-mail	Responsable / Person in charge	Responsable / Person in charge
Christa Curnew		
Responsable / Person in charge		

Véhicule/Vehicle

1ère rem.-wagon Trailer-Rail car No. 1	Nº d'immatriculation Registration No.	Prov.	2e rem.-wagon Trailer-Rail car No. 2	Nº d'immatriculation Registration No.	Prov.
	LE94791	QC			

UN	Appellation réglementaire / Shipping name	Classe/ Class	Description	G.E./ P.G.	Masse Totale/ Total weight	Unités/ Units Kg ou/or L	Nº/ No.	Contenant/ Pack. type	Code prov. Prov. code	État Phys./ Phys. State	MDR / HW
N/R	Soil Contaminated with Metals	N/R	Soil	N/R	18150	kg	18	Quatrex Bags	N/R	S	no

Manutention spéciale / Special handling ☐ **Ci-joint / Attached** ☐ **Ci-contre / As follows** **Placard:**

EN CAS D'URGENCE / IN CASE OF EMERGENCY (24 HEURES / HOURS) APPELER / CALL : CANUTEC 1 613 996-6666 /

Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par l'appellation réglementaire adéquate et qu'il est convenablement classifié, emballé et muni d'indications de danger - marchandises dangereuses et à tous égards bien conditionné pour être transporté conformément au Règlement sur le transport des marchandises dangereuses.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Générateur / Expéditeur - Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Signature: [signature] Date: 15/09/22	Signature: [signature] Date:	Signature: Date:
Nom complet / Full name: BENOIT NANTEL	Nom complet / Full name:	Nom complet / Full name:

F-15728 A

Parc Environnemental AES inc.

TPS : 143267300RT0001
TVQ : 1022949591TQ0001

PE-15-18

LIEU D'ENFOUISSEMENT DE SOLS CONTAMINÉS

SITE : 1555, Route Dorval
Larouche (Québec) G0W 1Z0

ADM. : 3199, boul. Talbot
Chicoutimi (Québec) G7H 5B1
Tél. : 418 549-8074 • Téléc. : 418 549-7973

CLIENT

Nom: SANEXEN
Adresse: 9935 AV. DE CATANIA
BROSSARD P.Q Tél.: 514-609-1542
Contact : MARIO LEATHEAD
N de projet :

TÉMOIN DE CHARGEMENT

Compagnie :
Signature * :
Date et heure :
Endroit du chargement :
N de projet :

QUANTITÉ

14:43:15 14:43:15
ID : 9662
Poids : 33600 kg

14:51:50 22-09-2015
ID : 9662
Gross 33600 kg
Tare 15370 kg
Net 18230 kg

TYPE D'ARRIVAGE

[X] SOL : Évaluer le % de matières résiduelles
_____ % (max. 25%)

[ ] DÉCHET SPÉCIAL : Joindre une copie du certificat d'autorisation

GÉNÉRATEUR

Nom: MID CANADA LINE
Adresse: BASE DE L'ARMÉE AMÉRICAINE
TERRE-NEUVE Tél.:
Contact :
Provenance : LABRADOR
N de projet :

AUTRES SERVICES

[ ] En dehors des heures d'opération :
[ ] Décontamination :
[ ] Aide au déchargement :
[ ] Échantil. / analyse :
[ ] Autres :

Signature du transporteur * :

TRANSPORT

Transporteur : ~~LTEE~~ R FERNAND GILBERT
Immatriculation ou n d'unité : L 354 671
Chauffeur : RÉAL JEAN
Signature * : Réal Jean

[ ] 10 roues [X] Semi-remorque [ ] Bi-train
[ ] 12 roues [ ] Conteneur #:
[ ] Autre :

ACCEPTATION AU SITE

	Entreposage	Enfouissement
Date et heure :		22/9/2015
Localisation :		cellule 1
Responsable :	Daniel	Chauvinet

FQ 4.3.3. * Je, soussigné, reconnais avoir pris connaissance des présentes, ainsi que des conditions apparaissant au verso des présentes, et je m'engage à les respecter. ICLT-73945

1 - Blanche: DOSSIER 2 - Jaune: CLIENT 3 - Rose: TRANSPORTEUR 4 - Or: COMPTABILITÉ

A- 09662

CONNAISSEMENT / BILL OF LADING

Référence / Reference	BE-00068

SANEXEN SERVICES ENVIRONNEMENTAUX INC.

9935, avenue de Catania
Entrée 1, bureau 200
Brossard (Québec) J4Z 3V4

9935 Catania Avenue
Entrance 1, Suite 200
Brossard (Quebec) J4Z 3V4

Tel.: 450-466-2123
Fax: 450-466-2240

~~NIR : R536070-7~~

Générateur / Expéditeur Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.:
Nom de l'entreprise / Company name: NewFoundland and Labrador Department of Environment and convservation	Nom de l'entreprise / Company name: Transport F. Gilbert Ltée	Nom de l'entreprise / Company name: AES (Matrec)
Adresse postale / Mailing address: P.O. Box 8700, St-John's, NL, A1B 4J6	Adresse postale / Mailing address: 150 route des Routiers	Adresse postale / Mailing address: 1555 route Dorval
Adresse de lieu de l'expédition / Shipping site adress: US Former Military Base	Ville / City: Chicoutimi (Quebec) — Code postal / Postal Code: G7H 5B1	Ville / City: Larouche (Quebec) — Code postal / Postal Code: G0W 1Z0
Ville / City: Hopedale, NL — Code postal / Postal Code: A0P 1G0	Téléphone / Telephone No.: 418-698-4848	Téléphone / Telephone No.: 418 549-8074
Téléphone / Telephone No.: 709-729-2648	Courriel / E-mail: gilles.tremblay@groupegilbert.com	Courriel / E-mail: Raynald.perron@matrec.ca
Courriel / E-mail: christacurnew@gov.nl.ca	Responsable / Person in charge: Gilles Tremblay	Responsable / Person in charge: Raynald Perron
Responsable / Person in charge: Christa Curnew		

Véhicule/Vehicle

1re rem.-wagon Trailer-Rail car No. 1	Nº d'immatriculation Registration No.	Prov.	2e rem.-wagon Trailer-Rail car No. 2	Nº d'immatriculation Registration No.	Prov.

UN	Appellation réglementaire / Shipping name	Classe/ Class	Description	G.E./ P.G.	Masse Totale/ Total weight	Unités/ Units Kg ou/or L	Nº/ No.	Contenant/ Pack. type	Code prov. Prov. code	État Phys./ Phys. State	MDR / HW
N/R	Soil Contaminated with Metals	N/R	Soil	N/R	22320	kg	17	Quatrex Bags	N/R	S	no

Manutention spéciale / Special handling ☐ **Ci-joint / Attached** ☐ **Ci-contre / As follows** **Placard:** ________

EN CAS D'URGENCE / IN CASE OF EMERGENCY (24 HEURES / HOURS) APPELER / CALL : CANUTEC 1 613 996-6666 / ________

Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par l'appellation réglementaire adéquate et qu'il est convenablement classifié, emballé et muni d'indications de danger - marchandises dangereuses et à tous égards bien conditionné pour être transporté conformément au Règlement sur le transport des marchandises dangereuses.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Générateur / Expéditeur - Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Signature: [signature] Date: 15/09/22	Signature: [signature] Date: 22/09/2015	Signature: Date:
Nom complet / Full name: BENOIT NANTEL	Nom complet / Full name: Luc Torath	Nom complet / Full name:

F-15728 A

Parc Environnemental AES inc.

TPS : 143267300RT0001
TVQ : 1022949591TQ0001

LIEU D'ENFOUISSEMENT DE SOLS CONTAMINÉS

SITE : 1555, Route Dorval
Larouche (Québec) G0W 1Z0

ADM. : 3199, boul. Talbot
Chicoutimi (Québec) G7H 5B1
Tél. : 418 549-8074 • Téléc. : 418 549-7973

PE-15-11

CLIENT

Nom: SANEXEN
Adresse: 1735 AVE. DE CATANIA
BROSSARD P.Q. Tél.: 514-609-7549
Contact : MARIO LEATHEAD
N de projet :

TÉMOIN DE CHARGEMENT

Compagnie :
Signature * :
Date et heure :
Endroit du chargement :
N de projet :

QUANTITÉ

09:50:50 09:50:50
ID : 9665
Poids : 38980 kg

10:08:39 23-09-2015
ID : 9665
Gross 38980 kg
Tare 17130 kg
Net 21850 kg

TYPE D'ARRIVAGE

[X] SOL : Évaluer le % de matières résiduelles
_____ % (max. 25%)

[ ] DÉCHET SPÉCIAL : Joindre une copie du certificat d'autorisation

GÉNÉRATEUR

Nom: MID CANADA LINE
Adresse: BASE DE L'ARMÉE AMÉRICAINE
TERRE-NEUVE Tél.:
Contact :
Provenance : LABRADOR
N de projet :

AUTRES SERVICES

[ ] En dehors des heures d'opération :
[ ] Décontamination :
[ ] Aide au déchargement :
[ ] Échantil. / analyse :
[ ] Autres :

Signature du transporteur * :

TRANSPORT

Transporteur : TRANSPORT F. GILBERT
Immatriculation ou n d'unité : BE 74 29
Chauffeur : GUILLAUME GAGNÉ
Signature * : Guillaume Gagné

[ ] 10 roues [X] Semi-remorque [ ] Bi-train
[ ] 12 roues [ ] Conteneur #:
[ ] Autre :

ACCEPTATION AU SITE

	Entreposage	Enfouissement
Date et heure :		23/9/2015
Localisation :		Cellule 1
Responsable :	Daniel	Chauinard

FQ 4.3.3. * Je, soussigné, reconnais avoir pris connaissance des présentes, ainsi que des conditions apparaissant au verso des présentes, et je m'engage à les respecter. ICLT-73945

1 - Blanche: DOSSIER 2 - Jaune: CLIENT 3 - Rose: TRANSPORTEUR 4 - Or: COMPTABILITÉ

A-09665

CONNAISSEMENT / BILL OF LADING

Référence
Reference

BE-0003

SANEXEN SERVICES ENVIRONNEMENTAUX INC.

9935, avenue de Catania
Entrée 1, bureau 200
Brossard (Québec) J4Z 3V4

9935 Catania Avenue
Entrance 1, Suite 200
Brossard (Quebec) J4Z 3V4

Tel.: 450-466-2123
Fax: 450-466-2240

~~NIR : R536070-7-~~

Générateur / Expéditeur Generator / Shipper (Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.)	Transporteur / Carrier (Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.)	Destinataire / Receiver (Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.)
Nom de l'entreprise / Company name: NewFoundland and Labrador Department of Environment and convservation	Nom de l'entreprise / Company name: Transport F. Gilbert Ltée	Nom de l'entreprise / Company name: AES (Matrec)
Adresse postale / Mailing address: P.O. Box 8700, St-John's, NL, A1B 4J6	Adresse postale / Mailing address: 150 route des Routiers	Adresse postale / Mailing address: 1555 route Dorval
Adresse de lieu de l'expédition / Shipping site adress: US Former Military Base	Ville / City: Chicoutimi (Quebec) — Code postal / Postal Code: G7H 5B1	Ville / City: Larouche (Quebec) — Code postal / Postal Code: G0W 1Z0
Ville / City: Hopedale, NL — Code postal / Postal Code: A0P 1G0	Téléphone / Telephone No.: 418-698-4848	Téléphone / Telephone No.: 418 549-8074
Téléphone / Telephone No.: 709-729-2648	Courriel / E-mail: gilles.tremblay@groupegilbert.com	Courriel / E-mail: Raynald.perron@matrec.ca
Courriel / E-mail: christacurnew@gov.nl.ca	Responsable / Person in charge: Gilles Tremblay	Responsable / Person in charge: Raynald Perron
Responsable / Person in charge: Christa Curnew		

Véhicule/Vehicle

1ère rem.-wagon Trailer-Rail car No. 1	Nº d'immatriculation Registration No.	Prov.	2e rem.-wagon Trailer-Rail car No. 2	Nº d'immatriculation Registration No.	Prov.
	RC 7742N	Q			

UN	Appellation réglementaire / Shipping name	Classe/ Class	Description	G.E./ P.G.	Masse Totale/ Total weight	Unités/ Units Kg ou/or L	Nº/ No.	Contenant/ Pack. type	Code prov. Prov. code	État Phys./ Phys. State	MDR / HW
N/R	Soil Contaminated with Metals	N/R	Soil	N/R	24480	kg	20	Quatrex Bags	N/R	S	no

Manutention spéciale / Special handling ☐ Ci-joint / Attached ☐ Ci-contre / As follows Placard: ____

EN CAS D'URGENCE / IN CASE OF EMERGENCY (24 HEURES / HOURS) APPELER / CALL : CANUTEC 1 613 996-6666 / ____

Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par l'appellation réglementaire adéquate et qu'il est convenablement classifié, emballé et muni d'indications de danger - marchandises dangereuses et à tous égards bien conditionné pour être transporté conformément au Règlement sur le transport des marchandises dangereuses.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Générateur / Expéditeur - Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Signature: [signature] Date: 15/09/22	Signature: [signature] Date: 22/09/15	Signature: Date:
Nom complet / Full name: Bernd Nantel	Nom complet / Full name: Steeve Sosseville	Nom complet / Full name:

F-1572B A

Parc Environnemental AES inc.

TPS : 143267300RT0001
TVQ : 1022949591TQ0001

PE-15-18

LIEU D'ENFOUISSEMENT DE SOLS CONTAMINÉS

SITE : 1555, Route Dorval
Larouche (Québec) G0W 1Z0

ADM. : 3199, boul. Talbot
Chicoutimi (Québec) G7H 5B1
Tél. : 418 549-8074 • Téléc. : 418 549-7973

CLIENT

Nom: SANEXEN
Adresse: 9935 AV. DE CATAWIA
BROSSARD P.Q. Tél.: 514-609-9542
Contact : MARIO LEATHEAD
N de projet :

TÉMOIN DE CHARGEMENT

Compagnie :
Signature * :
Date et heure :
Endroit du chargement :
N de projet :

QUANTITÉ

09:44:32 09:44:32
ID : 9658
Poids : 41070 kg

10:01:49 22-09-2015
ID : 9658
Gross 41070 kg
Tare 16800 kg
Net 24270 kg

TYPE D'ARRIVAGE

☒ SOL : Évaluer le % de matières résiduelles
_____ % (max. 25%)

☐ DÉCHET SPÉCIAL : Joindre une copie du certificat d'autorisation

GÉNÉRATEUR

Nom: MID-CANADA LINE
Adresse: BASE DE L'ARMÉE AMÉRICAINE
TERRE-NEUVE Tél.:
Contact :
Provenance : LABRADOR
N de projet :

AUTRES SERVICES

☐ En dehors des heures d'opération :
☐ Décontamination :
☐ Aide au déchargement :
☐ Échantil. / analyse :
☐ Autres :

Signature du transporteur * :

TRANSPORT

Transporteur : LMR
Immatriculation ou n d'unité : L 352 398
Chauffeur : STEEVE SASVILLE
Signature * :

☐ 10 roues ☒ Semi-remorque ☐ Bi-train
☐ 12 roues ☐ Conteneur #:
☐ Autre :

ACCEPTATION AU SITE

	Entreposage	Enfouissement
Date et heure :		22/9/2015
Localisation :		Cellule 1
Responsable :	Daniel Chaumont	

FQ 4.3.3. * Je, soussigné, reconnais avoir pris connaissance des présentes, ainsi que des conditions apparaissant au verso des présentes, et je m'engage à les respecter. ICLT-73945

1 - Blanche: DOSSIER 2 - Jaune: CLIENT 3 - Rose: TRANSPORTEUR 4 - Or: COMPTABILITÉ

A- 09658

CONNAISSEMENT / BILL OF LADING

Référence / Reference: BE-000~~3~~ 7

Générateur / Expéditeur / Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:
Nom de l'entreprise / Company name: NewFoundland and Labrador Department of Environment and convservation	Nom de l'entreprise / Company name: Transport F. Gilbert Ltée	Nom de l'entreprise / Company name: AES (Matrec)
Adresse postale / Mailing address: P.O. Box 8700, St-John's, NL, A1B 4J6	Adresse postale / Mailing address: 150 route des Routiers	Adresse postale / Mailing address: 1555 route Dorval
Adresse de lieu de l'expédition / Shipping site adress: US Former Military Base	Ville / City: Chicoutimi (Quebec) — Code postal / Postal Code: G7H 5B1	Ville / City: Larouche (Quebec) — Code postal / Postal Code: G0W 1Z0
Ville / City: Hopedale, NL — Code postal / Postal Code: A0P 1G0	Téléphone / Telephone No.: 418-698-4848	Téléphone / Telephone No.: 418 549-8074
Téléphone / Telephone No.: 709-729-2648	Courriel / E-mail: gilles.tremblay@groupegilbert.com	Courriel / E-mail: Raynald.perron@matrec.ca
Courriel / E-mail: christacurnew@gov.nl.ca	Responsable / Person in charge: Gilles Tremblay	Responsable / Person in charge: Raynald Perron
Responsable / Person in charge: Christa Curnew		

SANEXEN SERVICES ENVIRONNEMENTAUX INC.

9935, avenue de Catania
Entrée 1, bureau 200
Brossard (Québec) J4Z 3V4

9935 Catania Avenue
Entrance 1, Suite 200
Brossard (Quebec) J4Z 3V4

Tel.: 450-466-2123
Fax: 450-466-2240

~~NIR : R536070-7~~

Véhicule/Vehicle

1ère rem.-wagon Trailer-Rail car No. 1	Nº d'immatriculation Registration No.	Prov.	2e rem.-wagon Trailer-Rail car No. 2	Nº d'immatriculation Registration No.	Prov.

UN	Appellation réglementaire / Shipping name	Classe/ Class	Description	G.E./ P.G.	Masse Totale/ Total weight	Unités/ Units Kg et/or L	Nº/ No.	Contenant/ Pack. type	Code prov. Prov. code	État Phys./ Phys. State	MDR / HW
N/R	Soil Contaminated with Metals	N/R	Soil	N/R	26900	kg	24	Quatrex Bags	N/R	S	no

Manutention spéciale / Special handling ☐ **Ci-joint / Attached** ☐ **Ci-contre / As follows** **Placard:** ____

EN CAS D'URGENCE / IN CASE OF EMERGENCY (24 HEURES / HOURS) APPELER / CALL : CANUTEC 1 613 996-6666 / ____

Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par l'appellation réglementaire adéquate et qu'il est convenablement classifié, emballé et muni d'indications de danger - marchandises dangereuses et à tous égards bien conditionné pour être transporté conformément au Règlement sur le transport des marchandises dangereuses.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Générateur / Expéditeur - Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Signature: [signature] Date: 15/09/22	Signature: Serge Dufour Date:	Signature: Date:
Nom complet / Full name: BENOIT MANTEL	Nom complet / Full name:	Nom complet / Full name:

F-15728 A

Parc Environnemental AES inc.

TPS : 143267300RT0001
TVQ : 1022949591TQ0001

LIEU D'ENFOUISSEMENT DE SOLS CONTAMINÉS

SITE : 1555, Route Dorval
Larouche (Québec) G0W 1Z0

ADM. : 3199, boul. Talbot
Chicoutimi (Québec) G7H 5B1
Tél. : 418 549-8074 • Téléc. : 418 549-7973

PE-15-18

CLIENT

Nom: SANEXEN

Adresse: 9735 AVE. DE CATANIA

BROSSARD P.Q. Tél.: 514-609-9543

Contact : MARIO LEATHEAD

N de projet :

TÉMOIN DE CHARGEMENT

Compagnie :

Signature * :

Date et heure :

Endroit du chargement :

N de projet :

QUANTITÉ

15:36:39 15:36:39
ID : 9664
Poids : 45960 kg

15:45:01 22-09-2015
ID : 9664
Gross 45960 kg
Tare 19370 kg
Net 26590 kg

TYPE D'ARRIVAGE

[X] SOL : Évaluer le % de matières résiduelles ______ % (max. 25%)

[ ] DÉCHET SPÉCIAL : Joindre une copie du certificat d'autorisation

GÉNÉRATEUR

Nom: MID CANADA LINE

Adresse: BASE DE L'ARMÉE AMÉRICAINE

TERRE-NEUVE Tél.:

Contact :

Provenance : LABRADOR

N de projet :

AUTRES SERVICES

[ ] En dehors des heures d'opération :

[ ] Décontamination :

[ ] Aide au déchargement :

[ ] Échantil. / analyse :

[ ] Autres :

Signature du transporteur * :

TRANSPORT

Transporteur : LMR

Immatriculation ou n d'unité : L 568 899

Chauffeur : SERGE DUFOUR

Signature * : Serge Dufour

[ ] 10 roues [X] Semi-remorque [ ] Bi-train

[ ] 12 roues [ ] Conteneur #:

[ ] Autre :

ACCEPTATION AU SITE

	Entreposage	Enfouissement
Date et heure :		22/9/2015
Localisation :		cellule 1
Responsable :	Daniel Chouinard	

FQ 4.3.3. * Je, soussigné, reconnais avoir pris connaissance des présentes, ainsi que des conditions apparaissant au verso des présentes, et je m'engage à les respecter. ICLT-73945

1 - Blanche: DOSSIER 2 - Jaune: CLIENT 3 - Rose: TRANSPORTEUR 4 - Or: COMPTABILITÉ

A- 09664

CONNAISSEMENT / BILL OF LADING

Référence / Reference: BE-0006

SANEXEN SERVICES ENVIRONNEMENTAUX INC.

9935, avenue de Catania
Entrée 1, bureau 200
Brossard (Québec) J4Z 3V4

9935 Catania Avenue
Entrance 1, Suite 200
Brossard (Quebec) J4Z 3V4

Tel.: 450-466-2123
Fax: 450-466-2240

~~NIR : R536070-7~~

Générateur / Expéditeur — Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:
Nom de l'entreprise / Company name: NewFoundland and Labrador Department of Environment and convservation	Nom de l'entreprise / Company name: Transport F. Gilbert Ltée	Nom de l'entreprise / Company name: AES (Matrec)
Adresse postale / Mailing address: P.O. Box 8700, St-John's, NL, A1B 4J6	Adresse postale / Mailing address: 150 route des Routiers	Adresse postale / Mailing address: 1555 route Dorval
Adresse de lieu de l'expédition / Shipping site adress: US Former Military Base	Ville / City: Chicoutimi (Quebec) — Code postal / Postal Code: G7H 5B1	Ville / City: Larouche (Quebec) — Code postal / Postal Code: G0W 1Z0
Ville / City: Hopedale, NL — Code postal / Postal Code: A0P 1G0	Téléphone / Telephone No.: 418-698-4848 418-590-2096	Téléphone / Telephone No.: 418 549-8074
Téléphone / Telephone No.: 709-729-2648	Courriel / E-mail: gilles.tremblay@groupegilbert.com	Courriel / E-mail: Raynald.perron@matrec.ca
Courriel / E-mail: christacurnew@gov.nl.ca	Responsable / Person in charge: Gilles Tremblay	Responsable / Person in charge: Raynald Perron
Responsable / Person in charge: Christa Curnew		

Véhicule/Vehicle

1ʳᵉ rem.-wagon / Trailer-Rail car No. 1	Nº d'immatriculation / Registration No.	Prov.	2ᵉ rem.-wagon / Trailer-Rail car No. 2	Nº d'immatriculation / Registration No.	Prov.

UN	Appellation réglementaire / Shipping name	Classe/ Class	Description	G.E./ P.G.	Masse Totale/ Total weight	Unités/ Units Kg et/or L	Nº/ No.	Contenant/ Pack. type	Code prov. Prov. code	État Phys./ Phys. State	MDR / HW
N/R	Soil Contaminated with Metals	N/R	Soil	N/R	23800	kg	20	Quatrex Bags	N/R	S	no

Manutention spéciale / Special handling ☐ Ci-joint / Attached ☐ Ci-contre / As follows Placard: ____

EN CAS D'URGENCE / IN CASE OF EMERGENCY (24 HEURES / HOURS) APPELER / CALL : CANUTEC 1 613 996-6666 / ____

Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par l'appellation réglementaire adéquate et qu'il est convenablement classifié, emballé et muni d'indications de danger - marchandises dangereuses et à tous égards bien conditionné pour être transporté conformément au Règlement sur le transport des marchandises dangereuses.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Générateur / Expéditeur - Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Signature: [signature] Date: 15/09/22	Signature: [signature] Date: 22/09/15	Signature: Date:
Nom complet / Full name: BENOIT WANTEL	Nom complet / Full name: Steeve Sasseville	Nom complet / Full name:

F-15728 A

Parc Environnemental AES inc.

TPS : 143267300RT0001
TVQ : 1022949591TQ0001

PE-15-18

LIEU D'ENFOUISSEMENT DE SOLS CONTAMINÉS

SITE : 1555, Route Dorval
Larouche (Québec) G0W 1Z0

ADM. : 3199, boul. Talbot
Chicoutimi (Québec) G7H 5B1
Tél. : 418 549-8074 • Téléc. : 418 549-7973

CLIENT

Nom: ANEKEN

Adresse: 7935 AV. DE CATANIA

BROSSARD P.Q. Tél.: 514-609-7542

Contact : MARIO LEATHEAD

N de projet :

TÉMOIN DE CHARGEMENT

Compagnie :

Signature * :

Date et heure :

Endroit du chargement :

N de projet :

QUANTITÉ

15:35:30 15:35:38
ID : 9663
Poids : 40370 kg

15:41:26 22-09-2015
ID : 9663
Gross 40370 kg
Tare 16660 kg
Net 23710 kg

TYPE D'ARRIVAGE

[X] SOL : Évaluer le % de matières résiduelles
_____ % (max. 25%)

[ ] DÉCHET SPÉCIAL : Joindre une copie du certificat d'autorisation

GÉNÉRATEUR

Nom: MID CANADA LINE

Adresse: BASE DE L'ARMÉE AMÉRICAINE

TERRE-NEUVE Tél.:

Contact :

Provenance : LABRADOR

N de projet :

AUTRES SERVICES

[ ] En dehors des heures d'opération :

[ ] Décontamination :

[ ] Aide au déchargement :

[ ] Échantil. / analyse :

[ ] Autres :

Signature du transporteur * :

TRANSPORT

Transporteur : LMR

Immatriculation ou n d'unité : L 253 298

Chauffeur : STEEVE SASUILLE

Signature * :

[ ] 10 roues [X] Semi-remorque [ ] Bi-train

[ ] 12 roues [ ] Conteneur #:

[ ] Autre :

ACCEPTATION AU SITE

	Entreposage	Enfouissement
Date et heure :		22/9/2015
Localisation :		cellule 1
Responsable :		Daniel Chevenard

FQ 4.3.3. * Je, soussigné, reconnais avoir pris connaissance des présentes, ainsi que des conditions apparaissant au verso des présentes, et je m'engage à les respecter. ICLT-73945

1 - Blanche: DOSSIER 2 - Jaune: CLIENT 3 - Rose: TRANSPORTEUR 4 - Or: COMPTABILITÉ

A-09663

CONNAISSEMENT / BILL OF LADING

Référence / Reference: BE-0002

SANEXEN
SERVICES ENVIRONNEMENTAUX INC.

9935, avenue de Catania
Entrée 1, bureau 200
Brossard (Québec) J4Z 3V4

9935 Catania Avenue
Entrance 1, Suite 200
Brossard (Quebec) J4Z 3V4

Tel.: 450-466-2123
Fax: 450-466-2240

~~NIR : R536070-7~~

Générateur / Expéditeur – Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:
Nom de l'entreprise / Company name: NewFoundland and Labrador Department of Environment and convservation	Nom de l'entreprise / Company name: Transport F. Gilbert Ltée	Nom de l'entreprise / Company name: AES (Matrec)
Adresse postale / Mailing address: P.O. Box 8700, St-John's, NL, A1B 4J6	Adresse postale / Mailing address: 150 route des Routiers	Adresse postale / Mailing address: 1555 route Dorval
Adresse de lieu de l'expédition / Shipping site adress: US Former Military Base	Ville / City: Chicoutimi (Quebec) — Code postal / Postal Code: G7H 5B1	Ville / City: Larouche (Quebec) — Code postal / Postal Code: G0W 1Z0
Ville / City: Hopedale, NL — Code postal / Postal Code: A0P 1G0	Téléphone / Telephone No.: 418-698-4848	Téléphone / Telephone No.: 418 549-8074
Téléphone / Telephone No.: 709-729-2648	Courriel / E-mail: gilles.tremblay@groupegilbert.com	Courriel / E-mail: Raynald.perron@matrec.ca
Courriel / E-mail: christacurnew@gov.nl.ca	Responsable / Person in charge: Gilles Tremblay	Responsable / Person in charge: Raynald Perron
Responsable / Person in charge: Christa Curnew		

Véhicule/Vehicle

1ère rem.-wagon Trailer-Rail car No. 1	Nº d'immatriculation Registration No.	Prov.	2e rem.-wagon Trailer-Rail car No. 2	Nº d'immatriculation Registration No.	Prov.
	RC 46731A	QC			

UN	Appellation réglementaire / Shipping name	Classe/ Class	Description	G.E./ P.G.	Masse Totale/ Total weight	Unités/ Units Kg et/or L	Nº/ No.	Contenant/ Pack. type	Code prov. Prov. code	État Phys./ Phys. State	MDR / HW
N/R	Soil Contaminated with Metals	N/R	Soil	N/R	24200	kg	22	Quatrex Bags	N/R	S	no

Manutention spéciale / Special handling ☐ **Ci-joint / Attached** ☐ **Ci-contre / As follows** **Placard:** ______

EN CAS D'URGENCE / IN CASE OF EMERGENCY (24 HEURES / HOURS) APPELER / CALL : CANUTEC 1 613 996-6666 / ______

Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par l'appellation réglementaire adéquate et qu'il est convenablement classifié, emballé et muni d'indications de danger - marchandises dangereuses et à tous égards bien conditionné pour être transporté conformément au Règlement sur le transport des marchandises dangereuses.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Générateur / Expéditeur - Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Signature: [signature] Date: 15/09/22	Signature: Serge Dufour Date:	Signature: Date:
Nom complet / Full name:	Nom complet / Full name:	Nom complet / Full name:

F-15728 A

Parc Environnemental AES inc.

TPS : 143267300RT0001
TVQ : 1022949591TQ0001

LIEU D'ENFOUISSEMENT DE SOLS CONTAMINÉS

SITE : 1555, Route Dorval
Larouche (Québec) G0W 1Z0

ADM. : 3199, boul. Talbot
Chicoutimi (Québec) G7H 5B1
Tél. : 418 549-8074 • Téléc. : 418 549-7973

PE-15-18

CLIENT

Nom: BANEXEN
Adresse: 7,935 Av. De Catania
Brossard P.Q. Tél.: 514-609-7547
Contact : Mario Leathead
N de projet :

QUANTITÉ

09:47:48 09:47:48
10:03:38 26599-2015
Poids : 48810 kg
Gross 48810 kg
Tare 19520 kg
Net 29290 kg

GÉNÉRATEUR

Nom: Mid.-Canada Line
Adresse: Base De L'Armée Américaine
Terre-Neuve Tél.:
Contact :
Provenance : Labrador
N de projet :

TRANSPORT

Transporteur : LMR
Immatriculation ou n d'unité : L 568 899
Chauffeur : Serge Dufour
Signature * : Serge Dufour

☐ 10 roues ☒ Semi-remorque ☐ Bi-train
☐ 12 roues ☐ Conteneur #:
☐ Autre :

TÉMOIN DE CHARGEMENT

Compagnie :
Signature * :
Date et heure :
Endroit du chargement :
N de projet :

TYPE D'ARRIVAGE

☒ SOL : Évaluer le % de matières résiduelles
_______ % (max. 25%)

☐ DÉCHET SPÉCIAL : Joindre une copie du certificat d'autorisation

AUTRES SERVICES

☐ En dehors des heures d'opération :
☐ Décontamination :
☐ Aide au déchargement :
☐ Échantil. / analyse :
☐ Autres :

Signature du transporteur * :

ACCEPTATION AU SITE

	Entreposage	Enfouissement
Date et heure :		22/9/2015
Localisation :		Cellule 1
Responsable :	Daniel Chouinard	

FQ 4.3.3. * Je, soussigné, reconnais avoir pris connaissance des présentes, ainsi que des conditions apparaissant au verso des présentes, et je m'engage à les respecter. ICLT-73945

1 - Blanche: DOSSIER 2 - Jaune: CLIENT 3 - Rose: TRANSPORTEUR 4 - Or: COMPTABILITÉ

A-09659

CONNAISSEMENT / BILL OF LADING

Référence / Reference: BE-0004

Générateur / Expéditeur — Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:	Nº d'immatriculation - id. provincial / Registration No. / Provincial ID No.:
Nom de l'entreprise / Company name: NewFoundland and Labrador Department of Environment and convservation	Nom de l'entreprise / Company name: Transport F. Gilbert Ltée	Nom de l'entreprise / Company name: AES (Matrec)
Adresse postale / Mailing address: P.O. Box 8700, St-John's, NL, A1B 4J6	Adresse postale / Mailing address: 150 route des Routiers	Adresse postale / Mailing address: 1555 route Dorval
Adresse de lieu de l'expédition / Shipping site adress: US Former Military Base	Ville / City: Chicoutimi (Quebec) — Code postal / Postal Code: G7H 5B1	Ville / City: Larouche (Quebec) — Code postal / Postal Code: G0W 1Z0
Ville / City: Hopedale, NL — Code postal / Postal Code: A0P 1G0	Téléphone / Telephone No.: 418-698-4848	Téléphone / Telephone No.: 418 549-8074
Téléphone / Telephone No.: 709-729-2648	Courriel / E-mail: gilles.tremblay@groupegilbert.com	Courriel / E-mail: Raynald.perron@matrec.ca
Courriel / E-mail: christacurnew@gov.nl.ca	Responsable / Person in charge: Gilles Tremblay	Responsable / Person in charge: Raynald Perron
Responsable / Person in charge: Christa Curnew		

SANEXEN SERVICES ENVIRONNEMENTAUX INC.

9935, avenue de Catania
Entrée 1, bureau 200
Brossard (Québec) J4Z 3V4

9935 Catania Avenue
Entrance 1, Suite 200
Brossard (Quebec) J4Z 3V4

Tel.: 450-466-2123
Fax: 450-466-2240

~~NIR : R536070-7-~~

Véhicule/Vehicle

1ère rem.-wagon / Trailer-Rail car No. 1	Nº d'immatriculation / Registration No.	Prov.	2e rem.-wagon / Trailer-Rail car No. 2	Nº d'immatriculation / Registration No.	Prov.
	RL4673A	QC			

UN	Appellation réglementaire / Shipping name	Classe/ Class	Description	G.E./ P.G.	Masse Totale/ Total weight	Unités/ Units Kg ou/or L	Nº/ No.	Contenant/ Pack. type	Code prov. Prov. code	État Phys./ Phys. State	MDR / HW
N/R	Soil Contaminated with Metals	N/R	Soil	N/R	30480	kg	24	Quatrex Bags	N/R	S	no

Manutention spéciale / Special handling ☐ **Ci-joint / Attached** ☐ **Ci-contre / As follows** **Placard:** ____________

EN CAS D'URGENCE / IN CASE OF EMERGENCY (24 HEURES / HOURS) APPELER / CALL : CANUTEC 1 613 996-6666 / ____________

Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par l'appellation réglementaire adéquate et qu'il est convenablement classifié, emballé et muni d'indications de danger - marchandises dangereuses et à tous égards bien conditionné pour être transporté conformément au Règlement sur le transport des marchandises dangereuses.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Générateur / Expéditeur - Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Signature: [signature] Date: 15/09/22	Signature: Serge Dufour Date:	Signature: Date:
Nom complet / Full name: BENOIT NANTEL	Nom complet / Full name:	Nom complet / Full name:

F-15728 A

Parc Environnemental AES inc.

TPS : 143267300RT0001
TVQ : 1022949591TQ0001

PE-15-18

LIEU D'ENFOUISSEMENT DE SOLS CONTAMINÉS

SITE : 1555, Route Dorval
Larouche (Québec) G0W 1Z0

ADM. : 3199, boul. Talbot
Chicoutimi (Québec) G7H 5B1
Tél. : 418 549-8074 • Téléc. : 418 549-7973

CLIENT

Nom: SANEXEN
Adresse: 7235 Av. De Catania
Brossard P.Q. Tél.: 514-609-7542
Contact : Mario Leathead
N de projet :

TÉMOIN DE CHARGEMENT

Compagnie :
Signature * :
Date et heure :
Endroit du chargement :
N de projet :

QUANTITÉ

13:02:18 13:02:18
ID : 9661
Puids : 49720 kg

13:11:17 22-09-2015
ID : 9661
Gross 49720 kg
Tare 19430 kg
Net 30290 kg

TYPE D'ARRIVAGE

☒ SOL : Évaluer le % de matières résiduelles ______ % (max. 25%)

☐ DÉCHET SPÉCIAL : Joindre une copie du certificat d'autorisation

GÉNÉRATEUR

Nom: Mid Canada Line
Adresse: Base De L'Armée Americaine
Terre-Neuve Tél.:
Contact :
Provenance : Labrador
N de projet :

AUTRES SERVICES

☐ En dehors des heures d'opération :
☐ Décontamination :
☐ Aide au déchargement :
☐ Échantil. / analyse :
☐ Autres :

Signature du transporteur * :

TRANSPORT

Transporteur : LMR
Immatriculation ou n d'unité : L 568 877
Chauffeur : Serge Dufour
Signature * : Serge Dufour

☐ 10 roues ☒ Semi-remorque ☐ Bi-train
☐ 12 roues ☐ Conteneur #:
☐ Autre :

ACCEPTATION AU SITE

	Entreposage	Enfouissement
Date et heure :		22/9/2015
Localisation :		cellule 1
Responsable :		Daniel Chouinard

FQ 4.3.3. * Je, soussigné, reconnais avoir pris connaissance des présentes, ainsi que des conditions apparaissant au verso des présentes, et je m'engage à les respecter. ICLT-73945

1 - Blanche: DOSSIER 2 - Jaune: CLIENT 3 - Rose: TRANSPORTEUR 4 - Or: COMPTABILITÉ

A-09661

CONNAISSEMENT / BILL OF LADING

Référence / Reference: BE-0001

SANEXEN SERVICES ENVIRONNEMENTAUX INC.
9935, avenue de Catania
Entrée 1, bureau 200
Brossard (Québec) J4Z 3V4

9935 Catania Avenue
Entrance 1, Suite 200
Brossard (Quebec) J4Z 3V4

Tel.: 450-466-2123
Fax: 450-466-2240

~~NIR : R536070-7-~~

Générateur / Expéditeur Generator / Shipper (Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.)	Transporteur / Carrier (Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.)	Destinataire / Receiver (Nº d'immatriculation - id. provincial Registration No. / Provincial ID No.)
Nom de l'entreprise / Company name: NewFoundland and Labrador Department of Environment and convservation	Nom de l'entreprise / Company name: Transport F. Gilbert Ltée	Nom de l'entreprise / Company name: AES (Matrec)
Adresse postale / Mailing address: P.O. Box 8700, St-John's, NL, A1B 4J6	Adresse postale / Mailing address: 150 route des Routiers	Adresse postale / Mailing address: 1555 route Dorval
Adresse de lieu de l'expédition / Shipping site adress: US Former Military Base	Ville / City: Chicoutimi (Quebec) — Code postal / Postal Code: G7H 5B1	Ville / City: Larouche (Quebec) — Code postal / Postal Code: G0W 1Z0
Ville / City: Hopedale, NL — Code postal / Postal Code: A0P 1G0	Téléphone / Telephone No.: 418-698-4848	Téléphone / Telephone No.: 418 549-8074
Téléphone / Telephone No.: 709-729-2648	Courriel / E-mail: gilles.tremblay@groupegilbert.com	Courriel / E-mail: Raynald.perron@matrec.ca
Courriel / E-mail: christacurnew@gov.nl.ca	Responsable / Person in charge: Gilles Tremblay	Responsable / Person in charge: Raynald Perron
Responsable / Person in charge: Christa Curnew		

Véhicule/Vehicle

1ère rem.-wagon Trailer-Rail car No. 1	Nº d'immatriculation Registration No.	Prov.	2e rem.-wagon Trailer-Rail car No. 2	Nº d'immatriculation Registration No.	Prov.
	RL 7742V	QC			

UN	Appellation réglementaire / Shipping name	Classe/ Class	Description	G.E./ P.G.	Masse Totale/ Total weight	Unités/ Units Kg ou/or L	Nº/ No.	Contenant/ Pack. type	Code prov. Prov. code	État Phys./ Phys. State	MDR / HW
N/R	Soil Contaminated with Metals	N/R	Soil	N/R	24500	kg	18	Quatrex Bags	N/R	S	no

Manutention spéciale / Special handling ☐ **Ci-joint / Attached** ☐ **Ci-contre / As follows** **Placard:** ____

EN CAS D'URGENCE / IN CASE OF EMERGENCY (24 HEURES / HOURS) APPELER / CALL : CANUTEC 1 613 996-6666 / ____

Je déclare que le contenu de ce chargement est décrit ci-dessus de façon complète et exacte par l'appellation réglementaire adéquate et qu'il est convenablement classifié, emballé et muni d'indications de danger - marchandises dangereuses et à tous égards bien conditionné pour être transporté conformément au Règlement sur le transport des marchandises dangereuses.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.

Générateur / Expéditeur - Generator / Shipper	Transporteur / Carrier	Destinataire / Receiver
Signature: [signature] Date: 15/09/22	Signature: [signature] Date: 22/09/15	Signature: Date:
Nom complet / Full name:	Nom complet / Full name: Steeve Sasseville	Nom complet / Full name:

F-1572B A

Parc Environnemental AES inc.

TPS : 143267300RT0001
TVQ : 1022949591TQ0001

PE-15-18

LIEU D'ENFOUISSEMENT DE SOLS CONTAMINÉS

SITE : 1555, Route Dorval
Larouche (Québec) G0W 1Z0

ADM. : 3199, boul. Talbot
Chicoutimi (Québec) G7H 5B1
Tél. : 418 549-8074 • Téléc. : 418 549-7973

CLIENT

Nom: SANEXEN
Adresse: 1935 AV. DE CATANIA
BROSSARD P.Q. Tél.: 514-601-5547
Contact : MARIO LEATHEAD
N de projet :

TÉMOIN DE CHARGEMENT

Compagnie :
Signature * :
Date et heure :
Endroit du chargement :
N de projet :

QUANTITÉ

13:00:21 13:00:21
ID : 9660
Poids : 40000 kg

13:07:49 22-09-2015
ID : 9660
Gross 40000 kg
Tare 16730 kg
Net 23270 kg

TYPE D'ARRIVAGE

☒ SOL : Évaluer le % de matières résiduelles
_____ % (max. 25%)

☐ DÉCHET SPÉCIAL : Joindre une copie du certificat d'autorisation

GÉNÉRATEUR

Nom: MID CANADA LINE
Adresse: BASE DE L'ARMÉE AMERICAINE
TERR. NEUVE Tél.:
Contact :
Provenance : LABRADOR
N de projet :

AUTRES SERVICES

☐ En dehors des heures d'opération :
☐ Décontamination :
☐ Aide au déchargement :
☐ Échantil. / analyse :
☐ Autres :

Signature du transporteur * :

TRANSPORT

Transporteur : LMR
Immatriculation ou n d'unité : L 357 298
Chauffeur : Steeve Sauvillée
Signature * :

☐ 10 roues ☒ Semi-remorque ☐ Bi-train
☐ 12 roues ☐ Conteneur #:
☐ Autre :

ACCEPTATION AU SITE

	Entreposage	Enfouissement
Date et heure :		22/9/2015
Localisation :		Cellule 1
Responsable :	Daniel Tremblay	

FQ 4.3.3. * Je, soussigné, reconnais avoir pris connaissance des présentes, ainsi que des conditions apparaissant au verso des présentes, et je m'engage à les respecter. ICLT-73945

1 - Blanche: DOSSIER 2 - Jaune: CLIENT 3 - Rose: TRANSPORTEUR 4 - Or: COMPTABILITÉ

A- 09660

APPENDIX G

ProUCL Output

ProUCL Output

Forecasted EPCs – Area 1

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	3/31/2016 10:19:48 AM
From File	input_area1.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cadmium

General Statistics

Total Number of Observations	17	Number of Distinct Observations	8
Number of Detects	10	Number of Non-Detects	7
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.3	Minimum Non-Detect	0.3
Maximum Detect	4.475	Maximum Non-Detect	0.3
Variance Detects	1.643	Percent Non-Detects	41.18%
Mean Detects	1.398	SD Detects	1.282
Median Detects	1.15	CV Detects	0.917
Skewness Detects	1.732	Kurtosis Detects	3.336
Mean of Logged Detects	-0.0205	SD of Logged Detects	0.904

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.816	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.261	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.28	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.946	Standard Error of Mean	0.276
SD	1.078	95% KM (BCA) UCL	1.401
95% KM (t) UCL	1.427	95% KM (Percentile Bootstrap) UCL	1.415
95% KM (z) UCL	1.399	95% KM Bootstrap t UCL	1.794
90% KM Chebyshev UCL	1.772	95% KM Chebyshev UCL	2.147
97.5% KM Chebyshev UCL	2.666	99% KM Chebyshev UCL	3.687

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.292	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.165	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.271	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.553	k star (bias corrected MLE)	1.154
Theta hat (MLE)	0.9	Theta star (bias corrected MLE)	1.211

nu hat (MLE)	31.07	nu star (bias corrected)	23.08
MLE Mean (bias corrected)	1.398	MLE Sd (bias corrected)	1.301

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.77	nu hat (KM)	26.17
Approximate Chi Square Value (26.17, α)	15.51	Adjusted Chi Square Value (26.17, β)	14.66
95% Gamma Approximate KM-UCL (use when n>=50)	1.595	95% Gamma Adjusted KM-UCL (use when n<50)	1.689

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.826
Maximum	4.475	Median	0.3
SD	1.191	CV	1.442
k hat (MLE)	0.385	k star (bias corrected MLE)	0.357
Theta hat (MLE)	2.143	Theta star (bias corrected MLE)	2.316
nu hat (MLE)	13.11	nu star (bias corrected)	12.13
MLE Mean (bias corrected)	0.826	MLE Sd (bias corrected)	1.383
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (12.13, α)	5.31	Adjusted Chi Square Value (12.13, β)	4.845
95% Gamma Approximate UCL (use when n>=50)	1.887	95% Gamma Adjusted UCL (use when n<50)	2.068

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.864	Mean in Log Scale	-1.029
SD in Original Scale	1.165	SD in Log Scale	1.484
95% t UCL (assumes normality of ROS data)	1.358	95% Percentile Bootstrap UCL	1.351
95% BCA Bootstrap UCL	1.51	95% Bootstrap t UCL	1.732
95% H-UCL (Log ROS)	3.874		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.508	95% H-UCL (KM -Log)	1.527
KM SD (logged)	0.879	95% Critical H Value (KM-Log)	2.482
KM Standard Error of Mean (logged)	0.225		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.884	Mean in Log Scale	-0.793
SD in Original Scale	1.151	SD in Log Scale	1.169
95% t UCL (Assumes normality)	1.371	95% H-Stat UCL	2.109

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.427	95% KM (Percentile Bootstrap) UCL	1.415

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

TPH

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
Number of Detects	10	Number of Non-Detects	1
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	72	Minimum Non-Detect	20
Maximum Detect	5800	Maximum Non-Detect	20
Variance Detects	3098352	Percent Non-Detects	9.091%
Mean Detects	802.7	SD Detects	1760
Median Detects	261.1	CV Detects	2.193
Skewness Detects	3.133	Kurtosis Detects	9.865
Mean of Logged Detects	5.701	SD of Logged Detects	1.181

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.431	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.47	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.28	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	731.5	Standard Error of Mean	511.1
SD	1608	95% KM (BCA) UCL	1746
95% KM (t) UCL	1658	95% KM (Percentile Bootstrap) UCL	1735
95% KM (z) UCL	1572	95% KM Bootstrap t UCL	9282
90% KM Chebyshev UCL	2265	95% KM Chebyshev UCL	2959
97.5% KM Chebyshev UCL	3923	99% KM Chebyshev UCL	5816

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.632	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.767	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.369	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.278	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.622	k star (bias corrected MLE)	0.502
Theta hat (MLE)	1289	Theta star (bias corrected MLE)	1598
nu hat (MLE)	12.45	nu star (bias corrected)	10.05
MLE Mean (bias corrected)	802.7	MLE Sd (bias corrected)	1132

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.207	nu hat (KM)	4.553
Approximate Chi Square Value (4.55, α)	0.951	Adjusted Chi Square Value (4.55, β)	0.716
95% Gamma Approximate KM-UCL (use when n>=50)	3500	95% Gamma Adjusted KM-UCL (use when n<50)	4650

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	729.7
Maximum	5800	Median	250
SD	1687	CV	2.312
k hat (MLE)	0.365	k star (bias corrected MLE)	0.326
Theta hat (MLE)	1998	Theta star (bias corrected MLE)	2237
nu hat (MLE)	8.033	nu star (bias corrected)	7.176
MLE Mean (bias corrected)	729.7	MLE Sd (bias corrected)	1278
		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (7.18, α)	2.268	Adjusted Chi Square Value (7.18, β)	1.845
95% Gamma Approximate UCL (use when n>=50)	2309	95% Gamma Adjusted UCL (use when n<50)	2838

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.821	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.238	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	731.6	Mean in Log Scale	5.461
SD in Original Scale	1686	SD in Log Scale	1.373
95% t UCL (assumes normality of ROS data)	1653	95% Percentile Bootstrap UCL	1719
95% BCA Bootstrap UCL	2266	95% Bootstrap t UCL	9396
95% H-UCL (Log ROS)	3089		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	5.455	95% H-UCL (KM -Log)	2570
KM SD (logged)	1.321	95% Critical H Value (KM-Log)	3.648
KM Standard Error of Mean (logged)	0.42		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	730.6	Mean in Log Scale	5.392
SD in Original Scale	1687	SD in Log Scale	1.518
95% t UCL (Assumes normality)	1652	95% H-Stat UCL	4909

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	3923

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL Output

Forecasted EPCs – Area 2

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	3/31/2016 9:57:05 AM
From File	input_area2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cadmium

General Statistics

Total Number of Observations	40	Number of Distinct Observations	13
Number of Detects	16	Number of Non-Detects	24
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	0.3	Minimum Non-Detect	0.3
Maximum Detect	11	Maximum Non-Detect	0.3
Variance Detects	9.91	Percent Non-Detects	60%
Mean Detects	2.493	SD Detects	3.148
Median Detects	1.508	CV Detects	1.263
Skewness Detects	2.086	Kurtosis Detects	3.557
Mean of Logged Detects	0.351	SD of Logged Detects	1.058

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.664	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.387	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.222	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1.177	Standard Error of Mean	0.36
SD	2.207	95% KM (BCA) UCL	1.795
95% KM (t) UCL	1.784	95% KM (Percentile Bootstrap) UCL	1.842
95% KM (z) UCL	1.77	95% KM Bootstrap t UCL	2.596
90% KM Chebyshev UCL	2.258	95% KM Chebyshev UCL	2.748
97.5% KM Chebyshev UCL	3.428	99% KM Chebyshev UCL	4.763

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.878	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.763	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.282	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.221	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.023	k star (bias corrected MLE)	0.873
Theta hat (MLE)	2.437	Theta star (bias corrected MLE)	2.856

nu hat (MLE)	32.73	nu star (bias corrected)	27.93
MLE Mean (bias corrected)	2.493	MLE Sd (bias corrected)	2.668

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.285	nu hat (KM)	22.76
Approximate Chi Square Value (22.76, α)	12.91	Adjusted Chi Square Value (22.76, β)	12.63
95% Gamma Approximate KM-UCL (use when n>=50)	2.075	95% Gamma Adjusted KM-UCL (use when n<50)	2.121

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.003
Maximum	11	Median	0.01
SD	2.308	CV	2.301
k hat (MLE)	0.268	k star (bias corrected MLE)	0.264
Theta hat (MLE)	3.75	Theta star (bias corrected MLE)	3.798
nu hat (MLE)	21.4	nu star (bias corrected)	21.13
MLE Mean (bias corrected)	1.003	MLE Sd (bias corrected)	1.952
		Adjusted Level of Significance (β)	0.044
Approximate Chi Square Value (21.13, α)	11.69	Adjusted Chi Square Value (21.13, β)	11.43
95% Gamma Approximate UCL (use when n>=50)	1.813	95% Gamma Adjusted UCL (use when n<50)	1.855

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.935	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.204	Lilliefors GOF Test
5% Lilliefors Critical Value	0.222	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.054	Mean in Log Scale	-1.616
SD in Original Scale	2.287	SD in Log Scale	1.999
95% t UCL (assumes normality of ROS data)	1.663	95% Percentile Bootstrap UCL	1.682
95% BCA Bootstrap UCL	1.904	95% Bootstrap t UCL	2.528
95% H-UCL (Log ROS)	4.909		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.582	95% H-UCL (KM -Log)	1.354
KM SD (logged)	1	95% Critical H Value (KM-Log)	2.408
KM Standard Error of Mean (logged)	0.163		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.087	Mean in Log Scale	-0.998
SD in Original Scale	2.272	SD in Log Scale	1.294
95% t UCL (Assumes normality)	1.692	95% H-Stat UCL	1.512

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	1.795

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chromium

General Statistics

Total Number of Observations	40	Number of Distinct Observations	25
		Number of Missing Observations	0
Minimum	5	Mean	18.34
Maximum	49.67	Median	15.5
SD	8.818	Std. Error of Mean	1.394
Coefficient of Variation	0.481	Skewness	1.468

Normal GOF Test

Shapiro Wilk Test Statistic	0.9	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.148	Lilliefors GOF Test
5% Lilliefors Critical Value	0.14	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	20.69	95% Adjusted-CLT UCL (Chen-1995)	20.98
		95% Modified-t UCL (Johnson-1978)	20.74

Gamma GOF Test

A-D Test Statistic	0.307	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.11	Kolmogrov-Smirnoff Gamma GOF Test
5% K-S Critical Value	0.14	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.941	k star (bias corrected MLE)	4.587
Theta hat (MLE)	3.712	Theta star (bias corrected MLE)	3.999
nu hat (MLE)	395.3	nu star (bias corrected)	367
MLE Mean (bias corrected)	18.34	MLE Sd (bias corrected)	8.564

		Approximate Chi Square Value (0.05)	323.6
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	322

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	20.8	95% Adjusted Gamma UCL (use when n<50)	20.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.984	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.94	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0871	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.14	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.609	Mean of logged Data	2.805
Maximum of Logged Data	3.905	SD of logged Data	0.469

Assuming Lognormal Distribution

95% H-UCL	21.27	90% Chebyshev (MVUE) UCL	22.65
95% Chebyshev (MVUE) UCL	24.58	97.5% Chebyshev (MVUE) UCL	27.26
99% Chebyshev (MVUE) UCL	32.53		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	20.64	95% Jackknife UCL	20.69
95% Standard Bootstrap UCL	20.55	95% Bootstrap-t UCL	21.07
95% Hall's Bootstrap UCL	21.35	95% Percentile Bootstrap UCL	20.67
95% BCA Bootstrap UCL	21		
90% Chebyshev(Mean, Sd) UCL	22.52	95% Chebyshev(Mean, Sd) UCL	24.42
97.5% Chebyshev(Mean, Sd) UCL	27.05	99% Chebyshev(Mean, Sd) UCL	32.21

Suggested UCL to Use

95% Adjusted Gamma UCL	20.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Lead

General Statistics

Total Number of Observations	40	Number of Distinct Observations	34
		Number of Missing Observations	0
Minimum	1.5	Mean	57.14

Maximum	440	Median	19.5
SD	93.71	Std. Error of Mean	14.82
Coefficient of Variation	1.64	Skewness	2.735

Normal GOF Test

Shapiro Wilk Test Statistic	0.622	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.285	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.14	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	82.11	95% Adjusted-CLT UCL (Chen-1995)	88.36
		95% Modified-t UCL (Johnson-1978)	83.18

Gamma GOF Test

A-D Test Statistic	1.237	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.805	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.162	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.147	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.58	k star (bias corrected MLE)	0.553
Theta hat (MLE)	98.6	Theta star (bias corrected MLE)	103.4
nu hat (MLE)	46.36	nu star (bias corrected)	44.22
MLE Mean (bias corrected)	57.14	MLE Sd (bias corrected)	76.86
		Approximate Chi Square Value (0.05)	29.97
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	29.53

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	84.32	95% Adjusted Gamma UCL (use when n<50)	85.57

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.94	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.1	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.14	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.405	Mean of logged Data	2.974
Maximum of Logged Data	6.087	SD of logged Data	1.532

Assuming Lognormal Distribution

95% H-UCL	135.1	90% Chebyshev (MVUE) UCL	116.4
95% Chebyshev (MVUE) UCL	142.1	97.5% Chebyshev (MVUE) UCL	177.8

99% Chebyshev (MVUE) UCL	247.8		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	81.51	95% Jackknife UCL	82.11
95% Standard Bootstrap UCL	81.71	95% Bootstrap-t UCL	98.98
95% Hall's Bootstrap UCL	95.08	95% Percentile Bootstrap UCL	82.72
95% BCA Bootstrap UCL	91.31		
90% Chebyshev(Mean, Sd) UCL	101.6	95% Chebyshev(Mean, Sd) UCL	121.7
97.5% Chebyshev(Mean, Sd) UCL	149.7	99% Chebyshev(Mean, Sd) UCL	204.6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	121.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

TPH

General Statistics

Total Number of Observations	48	Number of Distinct Observations	39
Number of Detects	42	Number of Non-Detects	6
Number of Distinct Detects	39	Number of Distinct Non-Detects	2
Minimum Detect	20	Minimum Non-Detect	20
Maximum Detect	5134	Maximum Non-Detect	200
Variance Detects	2088212	Percent Non-Detects	12.5%
Mean Detects	1012	SD Detects	1445
Median Detects	485	CV Detects	1.429
Skewness Detects	2.145	Kurtosis Detects	3.711
Mean of Logged Detects	5.956	SD of Logged Detects	1.568

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.636	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.942	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.262	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	888.4	Standard Error of Mean	200.8
SD	1375	95% KM (BCA) UCL	1238
95% KM (t) UCL	1225	95% KM (Percentile Bootstrap) UCL	1227
95% KM (z) UCL	1219	95% KM Bootstrap t UCL	1324
90% KM Chebyshev UCL	1491	95% KM Chebyshev UCL	1764

97.5% KM Chebyshev UCL	2143	99% KM Chebyshev UCL	2887

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.651	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.8	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.11	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.143	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.636	k star (bias corrected MLE)	0.607
Theta hat (MLE)	1590	Theta star (bias corrected MLE)	1668
nu hat (MLE)	53.44	nu star (bias corrected)	50.95
MLE Mean (bias corrected)	1012	MLE Sd (bias corrected)	1299

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.418	nu hat (KM)	40.09
Approximate Chi Square Value (40.09, α)	26.58	Adjusted Chi Square Value (40.09, β)	26.24
95% Gamma Approximate KM-UCL (use when n>=50)	1340	95% Gamma Adjusted KM-UCL (use when n<50)	1357

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	885.1
Maximum	5134	Median	355
SD	1391	CV	1.572
k hat (MLE)	0.318	k star (bias corrected MLE)	0.312
Theta hat (MLE)	2785	Theta star (bias corrected MLE)	2839
nu hat (MLE)	30.51	nu star (bias corrected)	29.93
MLE Mean (bias corrected)	885.1	MLE Sd (bias corrected)	1585
		Adjusted Level of Significance (β)	0.045
Approximate Chi Square Value (29.93, α)	18.44	Adjusted Chi Square Value (29.93, β)	18.16
95% Gamma Approximate UCL (use when n>=50)	1437	95% Gamma Adjusted UCL (use when n<50)	1459

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.942	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0949	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	887.3	Mean in Log Scale	5.54
SD in Original Scale	1390	SD in Log Scale	1.857
95% t UCL (assumes normality of ROS data)	1224	95% Percentile Bootstrap UCL	1222
95% BCA Bootstrap UCL	1299	95% Bootstrap t UCL	1365

95% H-UCL (Log ROS)	3593

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	5.601	95% H-UCL (KM -Log)	2757
KM SD (logged)	1.734	95% Critical H Value (KM-Log)	3.236
KM Standard Error of Mean (logged)	0.254		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	888.2	Mean in Log Scale	5.547
SD in Original Scale	1389	SD in Log Scale	1.853
95% t UCL (Assumes normality)	1225	95% H-Stat UCL	3573

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	1764	95% GROS Adjusted Gamma UCL	1459
95% Adjusted Gamma KM-UCL	1357		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL Output

Forecasted EPCs – Area3

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	3/31/2016 11:38:28 AM
From File	input_area3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Total Number of Observations	12	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	9
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	7.2	Minimum Non-Detect	2
Maximum Detect	14	Maximum Non-Detect	2
Variance Detects	11.56	Percent Non-Detects	75%
Mean Detects	10.62	SD Detects	3.4
Median Detects	10.67	CV Detects	0.32
Skewness Detects	-0.0588	Kurtosis Detects	N/A
Mean of Logged Detects	2.327	SD of Logged Detects	0.334

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	4.156	Standard Error of Mean	1.408
SD	3.983	95% KM (BCA) UCL	N/A
95% KM (t) UCL	6.685	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	6.472	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	8.38	95% KM Chebyshev UCL	10.29
97.5% KM Chebyshev UCL	12.95	99% KM Chebyshev UCL	18.17

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	13.98	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.76	Theta star (bias corrected MLE)	N/A

nu hat (MLE)	83.87	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.088	nu hat (KM)	26.12
		Adjusted Level of Significance (β)	0.029
Approximate Chi Square Value (26.12, α)	15.47	Adjusted Chi Square Value (26.12, β)	14.23
95% Gamma Approximate KM-UCL (use when n>=50)	7.015	95% Gamma Adjusted KM-UCL (use when n<50)	7.626

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.989	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.511	Mean in Log Scale	1.143
SD in Original Scale	4.133	SD in Log Scale	0.901
95% t UCL (assumes normality of ROS data)	6.653	95% Percentile Bootstrap UCL	6.493
95% BCA Bootstrap UCL	6.815	95% Bootstrap t UCL	8.248
95% H-UCL (Log ROS)	9.91		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.102	95% H-UCL (KM -Log)	6.633
KM SD (logged)	0.72	95% Critical H Value (KM-Log)	2.445
KM Standard Error of Mean (logged)	0.255		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.406	Mean in Log Scale	0.582
SD in Original Scale	4.587	SD in Log Scale	1.062
95% t UCL (Assumes normality)	5.784	95% H-Stat UCL	8.291

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	6.685	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chromium

General Statistics			
Total Number of Observations	12	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	5	Mean	27.74
Maximum	103.7	Median	23
SD	26.49	Std. Error of Mean	7.646
Coefficient of Variation	0.955	Skewness	2.422

Normal GOF Test		
Shapiro Wilk Test Statistic	0.721	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	41.48	95% Adjusted-CLT UCL (Chen-1995)	46.03
		95% Modified-t UCL (Johnson-1978)	42.37

Gamma GOF Test		
A-D Test Statistic	0.388	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.183	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.249	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics			
k hat (MLE)	1.761	k star (bias corrected MLE)	1.376
Theta hat (MLE)	15.76	Theta star (bias corrected MLE)	20.16
nu hat (MLE)	42.26	nu star (bias corrected)	33.02
MLE Mean (bias corrected)	27.74	MLE Sd (bias corrected)	23.65
		Approximate Chi Square Value (0.05)	20.89
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	19.42

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	43.87	95% Adjusted Gamma UCL (use when n<50)	47.17

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.609	Mean of logged Data	3.013
Maximum of Logged Data	4.641	SD of logged Data	0.804

Assuming Lognormal Distribution

95% H-UCL	52.49	90% Chebyshev (MVUE) UCL	47.1
95% Chebyshev (MVUE) UCL	56.11	97.5% Chebyshev (MVUE) UCL	68.63
99% Chebyshev (MVUE) UCL	93.22		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	40.32	95% Jackknife UCL	41.48
95% Standard Bootstrap UCL	39.79	95% Bootstrap-t UCL	56.1
95% Hall's Bootstrap UCL	91.69	95% Percentile Bootstrap UCL	42.08
95% BCA Bootstrap UCL	46.85		
90% Chebyshev(Mean, Sd) UCL	50.68	95% Chebyshev(Mean, Sd) UCL	61.07
97.5% Chebyshev(Mean, Sd) UCL	75.49	99% Chebyshev(Mean, Sd) UCL	103.8

Suggested UCL to Use

95% Adjusted Gamma UCL	47.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Lead

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	0.9	Mean	46.37
Maximum	235.8	Median	9.85
SD	85.18	Std. Error of Mean	24.59
Coefficient of Variation	1.837	Skewness	2.034

Normal GOF Test

Shapiro Wilk Test Statistic	0.543	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.446	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	90.53	95% Adjusted-CLT UCL (Chen-1995)	102.2

95% Modified-t UCL (Johnson-1978)	92.94

Gamma GOF Test

A-D Test Statistic	1.17	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.787	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.32	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.259	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.49	k star (bias corrected MLE)	0.423
Theta hat (MLE)	94.71	Theta star (bias corrected MLE)	109.7
nu hat (MLE)	11.75	nu star (bias corrected)	10.15
MLE Mean (bias corrected)	46.37	MLE Sd (bias corrected)	71.32
		Approximate Chi Square Value (0.05)	4.034
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	3.466

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	116.7	95% Adjusted Gamma UCL (use when n<50)	135.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.2	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.105	Mean of logged Data	2.535
Maximum of Logged Data	5.463	SD of logged Data	1.633

Assuming Lognormal Distribution

95% H-UCL	373.1	90% Chebyshev (MVUE) UCL	99.25
95% Chebyshev (MVUE) UCL	126.6	97.5% Chebyshev (MVUE) UCL	164.5
99% Chebyshev (MVUE) UCL	239		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	86.82	95% Jackknife UCL	90.53
95% Standard Bootstrap UCL	85.24	95% Bootstrap-t UCL	486
95% Hall's Bootstrap UCL	394.4	95% Percentile Bootstrap UCL	85.24
95% BCA Bootstrap UCL	101.3		
90% Chebyshev(Mean, Sd) UCL	120.1	95% Chebyshev(Mean, Sd) UCL	153.6
97.5% Chebyshev(Mean, Sd) UCL	199.9	99% Chebyshev(Mean, Sd) UCL	291

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL 291

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

TPH

General Statistics

Total Number of Observations	39	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	39	Mean	557.4
Maximum	2000	Median	552.5
SD	406.2	Std. Error of Mean	65.05
Coefficient of Variation	0.729	Skewness	1.884

Normal GOF Test

Shapiro Wilk Test Statistic	0.801	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.939	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.292	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.142	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	667.1	95% Adjusted-CLT UCL (Chen-1995)	685.4
		95% Modified-t UCL (Johnson-1978)	670.4

Gamma GOF Test

A-D Test Statistic	1.421	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.2	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.143	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.092	k star (bias corrected MLE)	1.948
Theta hat (MLE)	266.4	Theta star (bias corrected MLE)	286.1
nu hat (MLE)	163.2	nu star (bias corrected)	152
MLE Mean (bias corrected)	557.4	MLE Sd (bias corrected)	399.4
		Approximate Chi Square Value (0.05)	124.5
Adjusted Level of Significance	0.0437	Adjusted Chi Square Value	123.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	680.6	95% Adjusted Gamma UCL (use when n<50)	686

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.939	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.212	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.142	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.664	Mean of logged Data	6.066
Maximum of Logged Data	7.601	SD of logged Data	0.8

Assuming Lognormal Distribution

95% H-UCL	788.4	90% Chebyshev (MVUE) UCL	838.5
95% Chebyshev (MVUE) UCL	952.4	97.5% Chebyshev (MVUE) UCL	1110
99% Chebyshev (MVUE) UCL	1421		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	664.4	95% Jackknife UCL	667.1
95% Standard Bootstrap UCL	663.3	95% Bootstrap-t UCL	708.4
95% Hall's Bootstrap UCL	705.6	95% Percentile Bootstrap UCL	671.5
95% BCA Bootstrap UCL	693.4		
90% Chebyshev(Mean, Sd) UCL	752.6	95% Chebyshev(Mean, Sd) UCL	841
97.5% Chebyshev(Mean, Sd) UCL	963.6	99% Chebyshev(Mean, Sd) UCL	1205

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	841

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

ProUCL Output

Forecasted EPCs – Whole Site

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	3/31/2016 11:45:12 AM
From File	input_wholesite.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

General Statistics

Total Number of Observations	69	Number of Distinct Observations	11
Number of Detects	17	Number of Non-Detects	52
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	1.25	Minimum Non-Detect	2
Maximum Detect	18.72	Maximum Non-Detect	2
Variance Detects	22.41	Percent Non-Detects	75.36%
Mean Detects	5.612	SD Detects	4.734
Median Detects	4	CV Detects	0.843
Skewness Detects	1.782	Kurtosis Detects	2.913
Mean of Logged Detects	1.451	SD of Logged Detects	0.747

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.791	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.257	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.215	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	2.447	Standard Error of Mean	0.373
SD	2.914	95% KM (BCA) UCL	3.34
95% KM (t) UCL	3.069	95% KM (Percentile Bootstrap) UCL	3.209
95% KM (z) UCL	3.061	95% KM Bootstrap t UCL	3.38
90% KM Chebyshev UCL	3.566	95% KM Chebyshev UCL	4.072
97.5% KM Chebyshev UCL	4.776	99% KM Chebyshev UCL	6.157

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.458	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.173	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.212	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.974	k star (bias corrected MLE)	1.664
Theta hat (MLE)	2.844	Theta star (bias corrected MLE)	3.372

nu hat (MLE)	67.1	nu star (bias corrected)	56.59
MLE Mean (bias corrected)	5.612	MLE Sd (bias corrected)	4.35

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.705	nu hat (KM)	97.34
Approximate Chi Square Value (97.34, α)	75.58	Adjusted Chi Square Value (97.34, β)	75.17
95% Gamma Approximate KM-UCL (use when n>=50)	3.152	95% Gamma Adjusted KM-UCL (use when n<50)	3.169

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.6
Maximum	18.72	Median	0.01
SD	3.304	CV	2.065
k hat (MLE)	0.252	k star (bias corrected MLE)	0.251
Theta hat (MLE)	6.34	Theta star (bias corrected MLE)	6.373
nu hat (MLE)	34.83	nu star (bias corrected)	34.65
MLE Mean (bias corrected)	1.6	MLE Sd (bias corrected)	3.193
		Adjusted Level of Significance (β)	0.0465
Approximate Chi Square Value (34.65, α)	22.18	Adjusted Chi Square Value (34.65, β)	21.97
95% Gamma Approximate UCL (use when n>=50)	2.499	95% Gamma Adjusted UCL (use when n<50)	2.524

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.972	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.122	Lilliefors GOF Test
5% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.251	Mean in Log Scale	0.289
SD in Original Scale	3.068	SD in Log Scale	0.995
95% t UCL (assumes normality of ROS data)	2.867	95% Percentile Bootstrap UCL	2.932
95% BCA Bootstrap UCL	3.022	95% Bootstrap t UCL	3.157
95% H-UCL (Log ROS)	2.874		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	0.613	95% H-UCL (KM -Log)	2.561
KM SD (logged)	0.608	95% Critical H Value (KM-Log)	1.945
KM Standard Error of Mean (logged)	0.0993		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.136	Mean in Log Scale	0.357
SD in Original Scale	3.046	SD in Log Scale	0.727
95% t UCL (Assumes normality)	2.748	95% H-Stat UCL	2.228

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	3.069	95% GROS Approximate Gamma UCL	2.499
95% Approximate Gamma KM-UCL	3.152		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cadmium

General Statistics

Total Number of Observations	69	Number of Distinct Observations	18
Number of Detects	28	Number of Non-Detects	41
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	0.3	Minimum Non-Detect	0.3
Maximum Detect	11	Maximum Non-Detect	0.3
Variance Detects	6.42	Percent Non-Detects	59.42%
Mean Detects	1.994	SD Detects	2.534
Median Detects	1.2	CV Detects	1.271
Skewness Detects	2.633	Kurtosis Detects	6.919
Mean of Logged Detects	0.186	SD of Logged Detects	0.972

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.632	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.336	Lilliefors GOF Test
5% Lilliefors Critical Value	0.167	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.987	Standard Error of Mean	0.219
SD	1.79	95% KM (BCA) UCL	1.41
95% KM (t) UCL	1.353	95% KM (Percentile Bootstrap) UCL	1.379
95% KM (z) UCL	1.348	95% KM Bootstrap t UCL	1.659
90% KM Chebyshev UCL	1.646	95% KM Chebyshev UCL	1.944
97.5% KM Chebyshev UCL	2.358	99% KM Chebyshev UCL	3.171

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.149	Anderson-Darling GOF Test
5% A-D Critical Value	0.771	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.216	Kolmogrov-Smirnoff GOF
5% K-S Critical Value	0.17	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.129	k star (bias corrected MLE)	1.032
Theta hat (MLE)	1.766	Theta star (bias corrected MLE)	1.933
nu hat (MLE)	63.21	nu star (bias corrected)	57.77
MLE Mean (bias corrected)	1.994	MLE Sd (bias corrected)	1.963

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.304	nu hat (KM)	41.99
Approximate Chi Square Value (41.99, α)	28.13	Adjusted Chi Square Value (41.99, β)	27.89
95% Gamma Approximate KM-UCL (use when n>=50)	1.473	95% Gamma Adjusted KM-UCL (use when n<50)	1.486

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.815
Maximum	11	Median	0.01
SD	1.874	CV	2.299
k hat (MLE)	0.283	k star (bias corrected MLE)	0.281
Theta hat (MLE)	2.876	Theta star (bias corrected MLE)	2.904
nu hat (MLE)	39.1	nu star (bias corrected)	38.73
MLE Mean (bias corrected)	0.815	MLE Sd (bias corrected)	1.538
		Adjusted Level of Significance (β)	0.0465
Approximate Chi Square Value (38.73, α)	25.48	Adjusted Chi Square Value (38.73, β)	25.25
95% Gamma Approximate UCL (use when n>=50)	1.239	95% Gamma Adjusted UCL (use when n<50)	1.25

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.871	Mean in Log Scale	-1.549
SD in Original Scale	1.851	SD in Log Scale	1.792
95% t UCL (assumes normality of ROS data)	1.243	95% Percentile Bootstrap UCL	1.258
95% BCA Bootstrap UCL	1.385	95% Bootstrap t UCL	1.542
95% H-UCL (Log ROS)	1.889		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.64	95% H-UCL (KM -Log)	1.022
KM SD (logged)	0.914	95% Critical H Value (KM-Log)	2.205
KM Standard Error of Mean (logged)	0.112		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.898	Mean in Log Scale	-1.052
SD in Original Scale	1.839	SD in Log Scale	1.199
95% t UCL (Assumes normality)	1.267	95% H-Stat UCL	0.98

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.353	95% KM (% Bootstrap) UCL	1.379

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chromium

General Statistics

Total Number of Observations	69	Number of Distinct Observations	32
		Number of Missing Observations	0
Minimum	5	Mean	20.49
Maximum	103.7	Median	17
SD	13.5	Std. Error of Mean	1.625
Coefficient of Variation	0.659	Skewness	3.742

Normal GOF Test

Shapiro Wilk Test Statistic	0.711	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.107	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	23.2	95% Adjusted-CLT UCL (Chen-1995)	23.95
		95% Modified-t UCL (Johnson-1978)	23.32

Gamma GOF Test

A-D Test Statistic	0.977	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.111	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.108	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.73	k star (bias corrected MLE)	3.578
Theta hat (MLE)	5.493	Theta star (bias corrected MLE)	5.728
nu hat (MLE)	514.7	nu star (bias corrected)	493.7
MLE Mean (bias corrected)	20.49	MLE Sd (bias corrected)	10.83
		Approximate Chi Square Value (0.05)	443.2
Adjusted Level of Significance	0.0465	Adjusted Chi Square Value	442.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	22.83	95% Adjusted Gamma UCL (use when n<50)	22.88

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.48	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0791	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.107	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.609	Mean of logged Data	2.88
Maximum of Logged Data	4.641	SD of logged Data	0.515

Assuming Lognormal Distribution

95% H-UCL	22.87	90% Chebyshev (MVUE) UCL	24.27
95% Chebyshev (MVUE) UCL	26.08	97.5% Chebyshev (MVUE) UCL	28.58
99% Chebyshev (MVUE) UCL	33.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	23.16	95% Jackknife UCL	23.2
95% Standard Bootstrap UCL	23.15	95% Bootstrap-t UCL	24.6
95% Hall's Bootstrap UCL	27.55	95% Percentile Bootstrap UCL	23.36
95% BCA Bootstrap UCL	24.08		
90% Chebyshev(Mean, Sd) UCL	25.37	95% Chebyshev(Mean, Sd) UCL	27.57
97.5% Chebyshev(Mean, Sd) UCL	30.64	99% Chebyshev(Mean, Sd) UCL	36.66

Suggested UCL to Use

95% H-UCL	22.87

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Lead

General Statistics

Total Number of Observations	69	Number of Distinct Observations	60
		Number of Missing Observations	0
Minimum	0.9	Mean	45.47
Maximum	440	Median	11
SD	81.28	Std. Error of Mean	9.785
Coefficient of Variation	1.788	Skewness	3.004

Normal GOF Test

Shapiro Wilk Test Statistic	0.582	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.107	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	61.78	95% Adjusted-CLT UCL (Chen-1995)	65.34
		95% Modified-t UCL (Johnson-1978)	62.37

Gamma GOF Test

A-D Test Statistic	2.863	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.811	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.174	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.562	k star (bias corrected MLE)	0.547
Theta hat (MLE)	80.95	Theta star (bias corrected MLE)	83.14
nu hat (MLE)	77.5	nu star (bias corrected)	75.47
MLE Mean (bias corrected)	45.47	MLE Sd (bias corrected)	61.48
		Approximate Chi Square Value (0.05)	56.46
Adjusted Level of Significance	0.0465	Adjusted Chi Square Value	56.11

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	60.77	95% Adjusted Gamma UCL (use when n<50)	61.15

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0843	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0891	**Lilliefors Lognormal GOF Test**

5% Lilliefors Critical Value	0.107	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.105	Mean of logged Data	2.706
Maximum of Logged Data	6.087	SD of logged Data	1.491

Assuming Lognormal Distribution

95% H-UCL	69.17	90% Chebyshev (MVUE) UCL	76.13
95% Chebyshev (MVUE) UCL	90.68	97.5% Chebyshev (MVUE) UCL	110.9
99% Chebyshev (MVUE) UCL	150.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	61.56	95% Jackknife UCL	61.78
95% Standard Bootstrap UCL	61.4	95% Bootstrap-t UCL	70.46
95% Hall's Bootstrap UCL	67.09	95% Percentile Bootstrap UCL	62.93
95% BCA Bootstrap UCL	65.38		
90% Chebyshev(Mean, Sd) UCL	74.82	95% Chebyshev(Mean, Sd) UCL	88.12
97.5% Chebyshev(Mean, Sd) UCL	106.6	99% Chebyshev(Mean, Sd) UCL	142.8

Suggested UCL to Use

95% H-UCL	69.17

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

TPH

General Statistics

Total Number of Observations	98	Number of Distinct Observations	59
Number of Detects	91	Number of Non-Detects	7
Number of Distinct Detects	59	Number of Distinct Non-Detects	2
Minimum Detect	20	Minimum Non-Detect	20
Maximum Detect	5800	Maximum Non-Detect	200
Variance Detects	1377145	Percent Non-Detects	7.143%
Mean Detects	794	SD Detects	1174
Median Detects	510	CV Detects	1.478
Skewness Detects	3.04	Kurtosis Detects	9.112

Mean of Logged Detects	5.975	SD of Logged Detects	1.242

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.575	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.0929	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	739.2	Standard Error of Mean	116
SD	1142	95% KM (BCA) UCL	951.2
95% KM (t) UCL	931.8	95% KM (Percentile Bootstrap) UCL	941.8
95% KM (z) UCL	930	95% KM Bootstrap t UCL	998.3
90% KM Chebyshev UCL	1087	95% KM Chebyshev UCL	1245
97.5% KM Chebyshev UCL	1464	99% KM Chebyshev UCL	1893

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.505	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.79	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.185	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.0971	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.84	k star (bias corrected MLE)	0.82
Theta hat (MLE)	945.1	Theta star (bias corrected MLE)	968.6
nu hat (MLE)	152.9	nu star (bias corrected)	149.2
MLE Mean (bias corrected)	794	MLE Sd (bias corrected)	877

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.419	nu hat (KM)	82.15
Approximate Chi Square Value (82.15, α)	62.26	Adjusted Chi Square Value (82.15, β)	62.01
95% Gamma Approximate KM-UCL (use when n>=50)	975.3	95% Gamma Adjusted KM-UCL (use when n<50)	979.4

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	737.3
Maximum	5800	Median	400
SD	1149	CV	1.558
k hat (MLE)	0.464	k star (bias corrected MLE)	0.457
Theta hat (MLE)	1588	Theta star (bias corrected MLE)	1613
nu hat (MLE)	91.02	nu star (bias corrected)	89.57
MLE Mean (bias corrected)	737.3	MLE Sd (bias corrected)	1091
		Adjusted Level of Significance (β)	0.0476

Approximate Chi Square Value (89.57, α)	68.75	Adjusted Chi Square Value (89.57, β)	68.48
95% Gamma Approximate UCL (use when n>=50)	960.5	95% Gamma Adjusted UCL (use when n<50)	964.3

Lognormal GOF Test on Detected Observations Only

Lilliefors Test Statistic	0.106	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.0929	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	739.4	Mean in Log Scale	5.782
SD in Original Scale	1148	SD in Log Scale	1.392
95% t UCL (assumes normality of ROS data)	932	95% Percentile Bootstrap UCL	944
95% BCA Bootstrap UCL	980.4	95% Bootstrap t UCL	992.1
95% H-UCL (Log ROS)	1247		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	738.9	Mean in Log Scale	5.736
SD in Original Scale	1148	SD in Log Scale	1.492
95% t UCL (Assumes normality)	931.5	95% H-Stat UCL	1439

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 1245

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.