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Additional Delineation and Updated Remedial Action Plan/Risk Management Plan DFO Light Station Cape Pine, NL (DFRP# 34599)

Prepared for

Public Works and Government Services Canada (PWGSC)
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Final Report

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EXECUTIVE SUMMARY

Stantec Consulting Ltd. (Stantec) was retained by Public Works and Government Services Canada (PWGSC), on behalf of Fisheries and Oceans Canada (DFO), to carry out Additional Delineation and a Remedial Action Plan/Risk Management Plan (RAP/RMP) at the DFO light station LL#6, located at Cape Pine, Newfoundland and Labrador (NL) (DFRP#34599). The location of the site is shown on Drawing No. 121412505-EE-01, Appendix A.

The site is a DFO light station located at Cape Pine on the southern shore of the Avalon Peninsula, approximately 20 km southwest of Trepassey, NL. The investigated site covers an area of approximately 3.15 hectares and is accessible by an 8 km gravel road leading from Provincial Route 10-52. The site is currently used as an active light station with an automated light and foghorn. The site is not staffed by DFO/Canadian Coast Guard (CCG) on a full-time basis. DFO/CCG employees visit the site on an annual basis for inspections and maintenance, as required. The site currently contains a light tower, an equipment building, a foghorn, a VHF trailer and a VHF tower (refer to Drawing No. 121412505-EE-02, Appendix A). Chain link fencing is present around the VHF trailer and tower. Two (2) former light keeper's dwellings are located directly adjacent to the northeast and west of the light tower; these dwellings were transferred to private ownership in 1996.

The current Additional Delineation program was carried out at the Cape Pine light station on November 23, 2012, and included the excavation of six (6) test pits (TP1 to TP6) with associated soil samples and the collection of twenty-three (23) surface soil samples (12-SS1 to 12-SS23). A total of nine (9) confirmatory soil samples collected from test pits TP1 to TP6, twenty-one (21) confirmatory soil samples collected from surface soil, and two (2) field duplicates soil samples were submitted to Maxxam Analytics in St. John's, NL for analysis of metals, metals leachate and general chemistry.

Based on the results of the current Additional Delineation program and previous soil sampling programs, approximately 3,800 m^2 of lead impacted soil exceeding the SSTL (622 mg/kg) has been identified at the site, approximately 800 m^2 of which is leachable. Based on the results of the soil sampling programs completed on the site to date, lead impacts extend to a maximum depth of 0.5 mbgs.

Based on a review of the statistical data, if the areas of the site containing highest concentrations of lead (BS30, BS33, BS34, BS35, BS38, BS40, BS48, BS51, BS54, SS1, SS2, SS5, SS6, SS12, SS13, CPL-20, CLP-23, 12-SS3, 12-SS12, 12-SS13, 12-SS14, and 12-SS15) are remediated, the site EPC would be reduced to 612 mg/kg. This would result in remediating four (4) smaller areas on the site rather than all lead impacted soil in exceedance of the SSTL. Remediating these areas with the highest concentrations of lead would lower the site EPC to below the SSTL and would ensure that lead impacted leachable soils are removed from the areas surrounding residential buildings and partially removed from the area surrounding the light tower. Therefore, unacceptable risks to a residential visitor (toddler) at the site from dermal

contact/ingestion of surface soil will no longer be expected. Therefore, it is estimated that an area of approximately 1,400 m^2 of lead impacted soil is recommended to be remediated from the site, approximately 550 m^2 of which is leachable. Soil remediation would extend to a maximum depth of 0.5 mbgs. As such, an approximately volume of 425 m^3 of non-leachable and 275 m^3 of leachable lead impacted soil is recommended for remediation.

A RAP was updated based on the results of the previous work conducted by PWGSC, Jacques Whitford Limited and Stantec, in conjunction with our current understanding of the site and its future land use requirements.

Four (4) remedial options were evaluated based on the identified remedial objectives:

- Excavation and Off-Site Disposal;
- Soil Washing;
- Limited Soil Excavation and Capping; and,
- Limited Soil Excavation and Fencing.

Stantec conducted an options screening analysis using a two (2) tiered approach involving both Threshold and Balancing criteria. This approach indicated that each technology passed the initial Threshold Screening and that all were carried through to the Balanced Scoring Criteria. In the latter scoring, excavation and off-site disposal ranked the highest followed by the limited soil excavation and capping option. The limited soil excavation and fencing and soil washing options ranked 3rd and 4th respectively.

The excavation and off-site disposal option ranked the highest mainly because this option has a high degree of confidence (proven technology) and because of the limited variables involved in the program, limited permitting and virtual elimination of liability. Removing the areas of the site containing highest concentrations of lead impacted soil (leachable and non-leachable), thereby reducing the site EPC to 612 mg/kg which is lower than the site remedial objective of 622 mg/kg (SSTL), eliminates unacceptable risks to a residential visitor (toddler) at the site from dermal contact/ingestion of surface soil.

The limited soil excavation and capping option ranked second highest mainly because of the limited cost. Despite the lowest costing, limited soil excavation and capping is not the preferred method because the hazards are still present in soil and the option is not reliable over the long term as the addition of a soil/sod cap is not expected to remain in place over time. Based on the site location, high winds and precipitation would likely weather the capping material at the site and therefore annual monitoring and maintenance to ensure the cap remains in place would be required. In addition, a portion of the contaminated area has a moderate-steep slope (east of light tower) and therefore placement of capping material over certain portions of the site may not be esthetically pleasing and it could be difficult to blend with the surroundings. A representative from DFO could likely monitor the cap during maintenance visits to the site; however, would result in annual costs for monitoring and repairing the cap on-going over the life of the facility.

Both the limited soil removal and fencing and soil washing options are viable alternatives for site remediation, however scored lower than the excavation and off-site disposal and soil treatment

remedial option. Costing for the limited soil removal and fencing option, which eliminates the exposure pathway at the site and does not involve extensive excavation and off-site disposal and soil treatment, is lower than the excavation and off-site disposal and soil treatment remedial option; however is not a preferred method because the hazards are still present in soil on the DFO property, requires annual monitoring to ensure the fence remains in adequate condition, and is not reliable over the long term as the level of protection depends on the public adhering to the control measure (*i.e*., not trespassing). Costing for the soil washing option is the highest. Additionally, this method is somewhat complex and would require a pilot test to be completed prior to the application of the technology to determine the effectiveness of the treatment process and the need for modifications to the soil washing unit. Further disadvantages include: the system is temperature sensitive; and some effort would be required from a permitting and regulatory approval standpoint.

The statements made in this Executive Summary text are subject to the limitations included in Section 8.0, and are to be read in conjunction with the remainder of this report.

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1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Public Works and Government Services Canada (PWGSC), on behalf of Fisheries and Oceans Canada (DFO), to carry out Additional Delineation and a Remedial Action Plan/Risk Management Plan (RAP/RMP) at the DFO light station LL#6, located at Cape Pine, Newfoundland and Labrador (NL) (DFRP#34599). The location of the site is shown on Drawing No. 121412505-EE-01, Appendix A. The purpose of the work was to carry out further assessment of previously identified lead impacts on the site, review remedial options evaluation and to update the RAP/RMP. This work was completed to mitigate potential risks to human and ecological receptors as the result of lead impacted soil present at the site.

This report presents a history of previous and current work completed at the site, available remedial/risk management options, and a detailed discussion of each option along with a recommendation for the preferred remedial option. An estimate of liability at the site is provided with this report under separate cover.

1.1 Site Description

The site is a DFO light station located at Cape Pine on the southern shore of the Avalon Peninsula, approximately 20 km southwest of Trepassey, NL (refer to Drawing No. 121412505-EE-01, Appendix A). The investigated site covers an area of approximately 3.15 hectares and is accessible by an 8 km gravel road leading from Provincial Route 10-52. The site is currently used as an active light station with an automated light and foghorn. The site is not staffed by DFO/Canadian Coast Guard (CCG) on a full-time basis. DFO/CCG employees visit the site on an annual basis for inspections and maintenance, as required. The site currently contains a light tower, an equipment building, a foghorn, a VHF trailer and a VHF tower (refer to Drawing No. 121412505-EE-02, Appendix A). Chain link fencing is present around the VHF trailer and tower. Two (2) former light keeper's dwellings are located directly adjacent to the northeast and west of the light tower; these dwellings were transferred to private ownership in 1996.

According to historical information gathered during the Phase III ESA (Jacques Whitford, 2009), the original lighthouse was constructed on the site in 1821. The site has operated as a light station since that time. A foghorn was added to the site in 1935. The site was occupied on a full-time basis prior to automation in 1996 and since has been occupied only on an as-required basis by DFO/CCG personnel for regular inspections and maintenance. In 1997, remediation of debris and foundations was carried out on the site. Soil remediation was carried out in 1997 in the vicinities of former fuel storage tanks north of the light tower and west of the equipment building. Historically, aboveground fuel storage tanks (ASTs) were present to the northeast of the light tower and to the west and north of the equipment building; these tanks are no longer present at the site. Historically, an underground fuel storage tank (UST) was located inside the VHF compound, south of the trailer; it appears that this tank has been removed since 1997, as there was no evidence of fill and vent pipes during the current site investigation.

The site is mainly covered by a thin layer of soil that supports low grasses and shrubs. Gravel covered roadways are present around the site buildings.

The light tower and VHF compound are located on a topographic high that slopes downward to the south and east towards Trepassey Bay. Surface water on the site drains by infiltration or by overland flow. Regional surface water flow is towards Trepassey Bay located to the south and east of the site. Localized groundwater flow on the site is expected to be to the south or east towards Trepassey Bay.

The Cape Pine light station site has a full-time electrical power supply via an aboveground pole line. Historically, a diesel generator was present in the VHF trailer; however, the current status of the generator is unknown, as the inside of the trailer was not accessed during previous site visits.

1.2 Scope of Work

The primary objectives of the current work, as per email request provided by PWGSC in May 2010 and November 2012 are as follows:

- Excavate six (6) test pits using a backhoe to determine sub-surface conditions (*e.g.*, groundwater, bedrock) as well as the vertical extent of metals impacts at the site in anticipation of evaluating remedial options for the site. Collect soil samples at continuous 0.5 m intervals until bedrock or groundwater is encountered. Soil samples collected from 0.5 m below ground surface (mbgs) to 1.0 mbgs will be initially submitted for metals analysis and deeper samples will be subsequently submitted if necessary;
- Manually excavate twenty-two (22) test holes to further delineate lead impacts at the site. Soil samples will be collected from a depth of 0.0 mbgs to 0.5 mbgs. Submit soil samples from thirteen (13) surface soil samples from the manually excavated test holes for analysis of lead. Soil samples from the remaining nine (9) manually excavated test holes will be held pending the analytical results of the initial samples. If the initial analytical results indicate that the metals have not been fully delineated in the area, additional soil samples from the other manually excavated test holes may require analysis;
- One (1) soil sample from each test pit from a depth of 0.0 mbgs to 0.5 mbgs will be submitted for analysis of metals. Depending on the lead concentration in this sample, an additional deeper sample from the test pit may require analysis;
- Seventeen (17) soil samples (*i.e.*, 50% of samples) will be analysed for metals leachability. Samples with the highest lead concentration will be analysed;
- Ten (10) soil samples will be submitted for analysis of general chemistry (including pH) as per PWGSC's request;
- One (1) quality assurance/quality control sample (QA/QC) sample will be collected for every ten (10) samples collected and submitted for metals analysis as required; and,
- Document the results of the Additional Delineation program and prepare an updated RAP/RMP with a review of remedial options evaluation.

1.3 Assessment Standards

The concentrations of available metals in soil on the site were compared to the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (2007 and subsequent updates). The CCME soil guidelines are developed on the basis of land use. The site is currently occupied on an as-required basis by DFO/CCG personnel for annual inspections and maintenance; however two (2) private residential properties are located adjacent to the site. Therefore, the appropriate screening guidelines for this site, have been defined by the residential land use guidelines.

Remedial objectives have been developed for the site as part of a Human Health and Ecological Risk Assessment (HHERA) (Jacques Whitford, 2009) and a Human Health Risk Assessment Re-evaluation (Stantec, 2011). A remedial objective of 622 mg/kg for lead was calculated to be protective (*i.e.*, obtain a hazard quotient of less than 1) of a visiting toddler from neighbouring residential properties that may come into contact or ingest lead present in surface soil on the site. This remedial objective would also mitigate potential risks to ecological receptors identified during the HHERA completed by Jacques Whitford (now Stantec) in 2009. Therefore, concentrations of lead in soil are compared to the site-specific target level (SSTL) of 622 mg/kg.

The metals leachability results were compared to the Newfoundland and Labrador Department of Environment and Conservation (NLDEC) guidelines, as outlined in the Guidance Document "*Leachable Toxic Waste, Testing and Disposal*", issued November, 2003.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS

PWGSC provided Stantec with portions of four (4) reports prepared by PWGSC, the Emergencies Science Division (ESD) of Environment Canada and the Technical Support Services Branch of DFO/CCG in 1995 and 1997 to review. The following reports were previously reviewed for the Cape Pine light station.

- Environmental Audit/Baseline Site Assessment, Cape Pine Light Station, prepared by PWGSC, 1995; pages 70 to 74 and one (1) drawing.
- Phase II/III Environmental Site Investigation, Cape Pine Light Station, prepared by Emergencies Science Division of Environment Canada, 1995; pages 1 to 13 and two (2) pages of photographs.
- Remedial Action Plan (RAP) of the Powles Head Light Station and the Cape Pine Light station, prepared by the Technical Support Services Branch of DFO/CCG, 1997; pages 1 to 25.
- Environmental Cleanup of the Cape Pine Light Station, prepared by the Technical Support Services Branch of DFO/CCG, 1997; pages 1 to 5, 7 and 9.

Jacques Whitford (now Stantec) and Stantec prepared several reports for the site since 2009, as follows:

- Phase III Environmental Site Assessment, Human Health and Ecological Risk Assessment, DFO Light Station (DFRP # 34599), Cape Pine, NL, prepared by Jacques Whitford, March 2009. Report No. 1042036.04;
- Document Review, Recommendations and Planning, DFO Light Station (DFRP#34599), Cape Pine, NL, prepared by Stantec, March 2010. Report No. 121410882.01;
- Additional Delineation, DFO Light Station, Cape Pine, NL (DFRP#34599), prepared by Stantec, March 2011. Report No. 121411106;
- Human Health Risk Assessment Re-evaluation, DFO Light Station, Cape Pine, NL (DFRP#34599), prepared by Stantec, March 2011. Report No. 121411355; and,
- Remedial Action Plan/Risk Management Plan, DFO Light Station, Cape Pine, NL, prepared by Stantec, March 2011. Report No. 121411355.

The following reports, detailing site specific sub-surface investigations completed at the Cape Pine light station by Jacques Whitford and Stantec, were prepared for PWGSC and are summarized below.

Phase III Environmental Site Assessment and Human Health and Ecological Risk Assessment (2009)

Twenty-two (22) test holes (BS7 to BS14, BS29, BS31 to BS41, BS43, BS44, BS46 and BS47) were manually excavated using a hand-driven soil auger as part of the Phase III ESA. Selected soil samples were analysed for total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX), metals, polycyclic aromatic hydrocarbons (PAHs) and leachable metals. Based on the results of the laboratory analysis, it was determined that concentrations of TPH, PAHs and various metals (barium, copper, lead, nickel and zinc) exceeded the applicable residential/parkland guideline levels. Residential/parkland guidelines were applied to be protective of potential receptors from two (2) residential dwellings adjacent to the light station site.

Human Health Risk Assessment

Based on the results of screening of chemicals in soil against applicable human health pathway specific screening levels, TPH, PAHs and most metals were screened out and only antimony and lead were carried forward in the human health risk assessment (HHRA).

The following receptors were considered in the HHRA:

- Commercial Worker – DFO/CCG (adult) worker.
- Adjacent resident or tourist visitor - toddler.

Based on the qualitative risk evaluation, the conceptual model developed for evaluating the quantitative exposure of the human receptors included:

- Individuals that work at the site (*i.e.,* DFO/CCG worker) that may be exposed to antimony and lead in soil through dermal contact and/or ingestion of soil or contaminated dust particles; and,
- Individuals that may occasionally visit the site (*i.e*., recreational toddler or adult) may be exposed to antimony and lead in soil through dermal contact and/or ingestion.

The conclusions of the HHRA in 2009 were as follows:

- For a DFO/CCG worker on the site, the SSTLs for non-carcinogenic antimony (27 mg/kg) and lead (4,400 mg/kg) were greater than the exposure point concentrations (EPCs), indicating that unacceptable risks are not expected to DFO/CCG workers at the site from antimony or lead in soil at the site;
- For a residential visitor (toddler) on the site, the SSTL developed for antimony (27 mg/kg) was greater than the EPC (8.95 mg/kg), indicating that unacceptable risks are not expected; and,
- For a visitor (toddler) on the site, the EPC (7,820 mg/kg) was greater than the SSTL developed for lead (290 mg/kg), indicating a potential risk from lead in soil.

Ecological Risk Assessment

For the ecological risk assessment (ERA), the following substances were evaluated in soil:

- TPH;
- PAHs; and,
- Trace metals including barium, copper, lead, nickel, and zinc.

The habitat survey indicated that the following mammals and birds were regarded as representative species for the site area:

- Masked Shrew (*Sorex cinerus*);
- Meadow Vole (*Microtus pennsylvanicus*);
- Red Fox (*Vulpes vulpes*);
- American Robin (*Turdus migratorius*);
- Short-eared Owl *(Asio flammeus); and,*
- Herring Gull *(Larus argentatus*).

It should be noted that aquatic ecological receptors that may be present in the ocean surrounding the site were not considered in this ERA because of the separation distance of the impacted soil from the ocean and the absence of a defined plume leading to the marine environment.

The conclusions of the ERA completed for the site in 2009 were as follows:

- All calculated ecological hazard quotients (EHQs) for the Short-Eared Owl and Red Fox were below 1, indicating inconsequential risks;
- Since only fractional exposure to contaminants of concern (COCs) on the site was assessed for the Herring Gull, a target hazard quotient of 0.2 was used. All calculated EHQs for the Herring Gull were below 0.2, indicating inconsequential risks; and,
- Due to the exceedance of the EHQ with respect to the lead for the American Robin, Meadow Vole and Masked Shrew, back calculations were conducted to determine the allowable lead concentration on-site (1,100 mg/kg, 1,450 mg/kg and 5,100 mg/kg, respectively). However, based on the results of the human health risk assessment, the lead SSTL developed for the protection of the residential/parkland visitor (toddler) was 290 mg/kg.

To ensure that all receptors are protected, it was concluded that the maximum allowable lead concentration of 290 mg/kg must be met.

Document Review (2010)

The scope of the document review was to review all existing environmental reports for the property to determine if recommendations can be made based on the existing level of data (*i.e*., move forward with remediation/site-specific risk assessment), or whether there are data gaps (including but not limited to metal leachate data, lack of delineation, all COCs and areas captured, *etc*.) that need to be addressed to finalize a remediation/risk management action plan for the site.

The available site and analytical information from the previous site investigations was considered sufficient to permit the completion of an overall remedial options review and remedial action plan for the site. However, some data gaps were identified during the review of the existing environmental assessment reports that should be addressed in order to refine volume estimates of impacted soil at the site.

- The previous HHERA (Jacques Whitford, 2009) conducted for the site concluded that the exposure pathways (*i.e*., direct ingestion/dermal contact) for groundwater were considered to be incomplete for the site, and the potential presence of petroleum hydrocarbon impacts in groundwater were not carried forward in the risk assessment. However, the actual presence or absence of petroleum hydrocarbon impacts in groundwater has not been evaluated for the site. An investigation to evaluate the presence/absence of petroleum hydrocarbon impacts in groundwater at the site may need to be completed if there are any changes to future land use.
- The previous site investigations included metals leachability analysis for two (2) soil samples with metals exceedances (BS33A and BS38A). Such analysis is required to evaluate possible treatment/disposal options for metals impacted soil, if a remedial option is selected for the site. No leachable metals analysis was conducted in the area of the equipment building or near soil sample BS46A, where remedial/risk management action is required. Because the lead identified in soil samples BS33A and BS38A

exceeded the NLDEC guideline for leachable toxic waste, there is a potential that the lead present in the soil in the area of the equipment building or near soil sample BS46A could also be leachable. To evaluate disposal options for lead impacted soil, in the absence of additional leachability analysis for the area of the equipment building or near soil sample BS46A, it may be assumed that all of the lead impacted soil is leachable.

- During the site investigation conducted by Jacques Whitford in 2008, samples could not be collected in the areas of the VHF tower/trailer due to high voltage equipment operating in this area. Historically, an underground fuel oil storage tank was present in this area. There is a potential for impacts in this area that have not been investigated. If this area is safely accessible, additional sampling should be conducted.
- During the Phase III ESA (Jacques Whitford, 2009), soil samples could not be collected in the areas near the foghorn and south of the equipment building because the foghorn was active and the underground cables could not be located with certainty. There is a potential for impacts in this area that have not been investigated. If this area is safely accessible, and the buried cables can be identified, additional sampling should be conducted.

Additional Delineation (2010)

A total of twenty-seven (27) test holes (CPL-1 to CPL-27) were manually excavated using a hand-driven soil auger in June 2010. Selected soil samples were submitted to Maxxam Analytics in St. John's, NL for analysis of TPH/BTEX, available metals, and leachable metals. The results of the soil sampling program are as follows:

- TPH/BTEX analysis was conducted on nine (9) soil samples. TPH was detected in four (4) soil samples at concentrations ranging from 31 mg/kg in soil sample CPL-1-BS1 to 390 mg/kg in soil sample CPL-23-BS1. None of the detected concentration of TPH exceeded the Health Canada adjusted Tier I RBSL for a commercial site with non-potable groundwater use and coarse grained soil with lube oil impacts (345 mg/kg);
- Available metals analysis was conducted on thirty (30) soil samples, including twenty-seven (27) site soil samples and three (3) field duplicate QA/QC samples. Detected concentrations of lead and zinc exceeded the CCME commercial guidelines. The concentrations of lead detected in seven (7) soil samples exceeded the SSTL (290 mg/kg), ranging from 490 mg/kg in soil sample CPL-18-BS1 to 3,900 mg/kg in soil sample CPL-23-BS1; and,
- Leachate extraction was conducted on eleven (11) soil samples and metals analysis was completed on the leachate. The detected lead concentrations in the leachate from three (3) samples; CPL-20-BS3 (5,200 µg/L), CPL-21-BS1 (5,200 µg/L) and CPL-23-BS1 (17,000 µg/L), exceeded the applicable NLDEC leachate toxicity guideline (5,000 µg/L).

Based on the results of the additional soil sampling program in June 2010, lead impacts at the site to the north and south of the light tower were not fully delineated to the SSTL of 290 mg/kg. An estimated 1,650 m^2 of lead impacted soil was identified on the site exceeding the SSTL. Assuming lead impacts in soil extent to an average depth of 0.5 m, there is 825 m^3 of impacted

soil. Of the 1,650 m^2 of lead impacted soil, 550 m^2 was considered leachable and 1,100 m^2 was considered non-leachable based on the laboratory results.

Health Canada released new toxicity reference values (TRVs) and bioavailability estimates since the previous HHRA was completed for the site in 2009. Stantec recommended that the HHERA be re-evaluated to incorporate the most up-to-date input values released by Health Canada as well as the additional soil metals data.

Human Health Risk Assessment Re-evaluation (2011)

Thirteen (13) test holes (SS1 to SS13) were manually excavated using a hand-driven soil auger as part of the HHRA re-evaluation. All soil samples were analysed for available metals and the four (4) soil samples with the highest lead concentrations were analysed for leachable metals. Based on the results of the laboratory analysis, it was determined that concentrations of arsenic, lead and zinc exceeded the applicable CCME guideline levels for a commercial site.

All metals data collected from the Phase III ESA (Jacques Whitford, 2009), additional delineation (Stantec, 2010) and the current sampling program were screened against applicable pathway-specific (*i.e.,* dermal contact) guidelines and EPCs were calculated for those metals with maximum concentrations exceeding guidelines. Only lead was carried forward in the re-evaluated HHRA. The only exposure scenario considered was a neighbouring residential receptor (toddler) that could come into contact with lead in surface soil through dermal contact/soil ingestion, as this was determined to be the most sensitive receptor/pathway applicable for the site (Jacques Whitford, 2009).

Based on the findings of the re-evaluated HHRA, the new EPC calculated for lead (1,641 mg/kg) exceeded the new SSTL derived in the HHRA for lead (622 mg/kg) indicating that there was a potential for unacceptable risks to a residential visitor (toddler) at the site from dermal contact/ingestion of surface soil. The calculated Hazard Quotient (HQ) was 2.75, thus exceeding the target HQ of 1.0.

It was estimated that the area of lead-impacted soils exceeding the SSTL of 622 mg/kg at the site is approximately 2,500 m^2 (*i.e.,* including an area of 2,450 m^2 adjacent to the light tower and an area of 50 m^2 east of the equipment building). Approximately 500 m^2 of lead impacted soil in the vicinity of the light tower was considered leachable and the remaining 2,000 m^2 was considered non-leachable. Based on the results of the soil sampling, lead impacts were identified to a maximum depth of 0.45 m below ground surface. To ensure all soil containing lead concentrations exceeding the SSTL is removed, it was recommended to excavate the soil to a depth of 0.5 m. Therefore, the approximate volumes of lead contaminated soil exceeding the SSTL were 1000 m^3 (non-leachable) and 250 m^3 (leachable).

Stantec recommended developing a remedial action plan/risk management plan (RAP/RMP) for the site. The RAP/RMP would address mitigating potential risks identified for a residential visitor (toddler) and ecological receptors as a result of lead in surface soil. The areas of lead impacted soil were not fully delineated but the sampling efforts completed at the site to date were considered adequate.

Remedial Action Plan/Risk Management Plan (2011)

Based on all data compiled to date, Stantec presented the following options for mitigating risks to receptors at the site as a result of lead impacted soil:

- Conduct a site remediation program consisting of the removal of the impacted soil to a depth of 0.5 m, transport off-site and disposal at a local landfill for non-leachable material and a hazardous waste treatment facility for leachable material;
- On-site remediation consisting of available soil washing technologies; and,
- Capping the areas of non-leachable impacted soil with a layer of fill, asphalt or concrete and excavate the leachable lead impacted soil and dispose of at an off-site hazardous waste treatment facility.

Following a review of remedial/risk management options, Stantec provided the following recommendations:

- Excavate the estimated 1000 m^3 of non-leachable metals impacted soil and dispose of at an approved municipal landfill. Preferably, soil would be transported to a local landfill. If a local landfill cannot accept the soil, consideration would have to be given to transporting the soil to the Robin Hood Bay facility in St. John's, NL; and,
- Excavate the estimated 250 m^3 of leachable metals impacted soil and dispose of at an approved hazardous waste treatment facility. The only such known facility currently in operation in the province of Newfoundland and Labrador is Universal Environmental Services Inc. (UESI), located in Sunnyside, NL.

3.0 SOIL SAMPLING PROGRAM

3.1 Methodology

The current soil sampling program was carried out at the Cape Pine light station on November 23, 2012, and included the excavation of six (6) test pits (TP1 to TP6) with associated soil samples and the collection of twenty-three (23) surface soil samples (12-SS1 to 12-SS23). Clearances for underground services at the site were obtained by Stantec personnel prior to commencing sub-surface investigations. The field work was conducted in accordance with Stantec's standard operating procedures for sub-surface investigations. Field activities were monitored throughout the duration of work on the site by Stantec personnel. Daily field activities were monitored and recorded. Stantec also documented sub-surface observations during the current Additional Delineation program including the locations of test pits and the depth and location of the confirmatory soil samples. The locations of all samples were measured relative to site infrastructure. The test pit and surface soil sample locations from the current program as well as soil sample locations from previous investigations are shown on Drawing No. 121412505-EE-02 in Appendix A.

3.1.1 Test Pits

Test pits were excavated using a rubber-tire backhoe provided by Ryan's Contracting Ltd., of Trepassey, NL under the supervision of Stantec personnel. Test pit were excavated to depths ranging from 0.5 mbgs in test pit TP6 to 2.4 mbgs in test pit TP2. Test pits were terminated at either groundwater or bedrock. Bedrock was encountered in all test pits at depths ranging from 0.5 mbgs in test pit TP6 to 2.4 mbgs in test pit TP2. Groundwater seepage was not observed at any of the test pit locations. Sub-surface conditions encountered in the test pits were logged by Stantec field personnel at the time of excavation. The details of sub-surface conditions are presented in the Test Pit Records provided in Appendix C.

Soils were sampled from the test pits by bulk sample methods. One (1) to five (5) soil samples were collected from each test pit at 0.5 m intervals. Duplicate soil samples were collected at each sample location. The samples were placed in clean glass jars with aluminum foil under the lids of the duplicate samples. The samples were placed on ice in sample coolers and based on the field observations, site usage and history, and previous sub-surface investigations select soil samples were submitted to Maxxam Analytics for metals, and / or metals leachate, and general chemistry analysis. In general, soil samples from test pits collected from 0.0 mbgs to 1.0 mbgs were analysed for metals and / or general chemistry. Subsequent to available metals analysis, soil samples generally with the highest concentrations of lead were further analysed for metals leachabiltiy.

3.1.2 Surface Soil Sampling

A total of twenty-three (23) surface soil samples (12-SS1 to 12-SS23) were collected manually using a shovel. Surface soil samples were collected at a sampling depth of approximately 0.0 mbgs – 0.15 mbgs, surrounding areas of previously identified contamination, as shown on Drawing No. 121412505-EE-02 in Appendix A.

The soil samples were visually examined in the field for any evidence of impacts. Duplicate soil samples were collected at each sample location. The samples were placed in clean glass jars with aluminum foil under the lids of the duplicate samples. The samples were placed on ice in sample coolers and based on the field observations, site usage and history, select soil samples were submitted to Maxxam Analytics for metals and / or general chemistry analysis. Subsequent to available metals analysis, soil samples generally with the highest concentrations of lead were further analysed for metals leachabiltiy.

3.2 Laboratory Analytical Results

A total of nine (9) confirmatory soil samples collected from test pits TP1 to TP6, twenty-one (21) confirmatory soil samples collected from surface (0.0 mbgs – 0.15 mbgs) soil, and two (2) field duplicate soil samples were submitted to Maxxam Analytics in St. John's, NL for analysis of metals, metals leachate, and general chemistry. Maxxam Analytics is accredited by the Standards Council of Canada (SCC) for each of the analysis methods utilized and has an in-house QA/QC program to govern sample analysis, including replicates.

Disposable nitrile gloves were worn during soil sample collection. Soil samples collected for metals were collected using a shovel and placed into clean 120-mL, laboratory supplied jars. Nitrile gloves were removed and discarded following collection of each sample (new gloves for each sample). Samples were appropriately labeled with project number, date and sample identification at the time of collection and placed in sample coolers.

3.2.1 Metals in Soil

Available metals analysis was conducted on nine (9) soil samples (TP1-BS1, TP1-BS2, TP2-BS1, TP2-BS2, TP3-BS2, TP4-BS1, TP4-BS2, TP5-BS1, and TP5-BS2) collected from test pits TP1 to TP6, twenty-one (21) surface (0.0 mbgs – 0.15 mbgs) soil samples (12-SS1 to 12-SS19, 12-SS21, and 12-SS23), two (2) field QA/QC soil samples (FD-1 and FD-2) and one (1) laboratory duplicate sample (12-SS3 Lab-Dup) during the current investigation. The results of the laboratory analysis for metals are presented in Table D.1 in Appendix D, along with the applicable generic CCME guidelines, SSTLs, and results of previous samples collected from the site. The analytical reports from Maxxam Analytics, for the current and previous sampling programs, are provided in Appendix E. A discussion of QA/QC for field duplicate samples is provided in Section 3.4.

Concentrations of various metals were detected in all soil samples analysed. The detected concentrations of arsenic, barium, copper, lead, tin, and zinc in several soil samples exceed the generic CCME residential guidelines.

The concentrations of lead detected in fourteen (14) soil samples (12-SS3 – 2,000 mg/kg, its Lab-Dup 12-SS3 Lab-Dup – 1,800 mg/kg, 12-SS4 – 1,200 mg/kg, 12-SS6 – 730 mg/kg, 12-SS7 – 920 mg/kg, 12-SS8 – 1,600 mg/kg, 12-SS10 – 820 mg/kg, 12-SS12 – 4,900 mg/kg, 12-SS13 – 1,100 mg/kg, 12-SS14 – 1,200 mg/kg, 12-SS15 – 1,100 mg/kg, its Field Dup FD-2 – 910 mg/kg, TP2-BS1 – 640 mg/kg, and TP4-BS1 – 1,500 mg/kg) exceed the SSTL for lead of 622 mg/kg. None of the remaining concentrations of lead in soil exceeded the applicable SSTL. Exceedances of the SSTL are summarized in Table 3.1, Section 3.3.

3.2.2 Metals Leachability in Soil

Metals leachability analysis (*i.e.*, TCLP-1311 leachability test with metals analysis on the leachate) was conducted on a total of twelve (12) soil samples, which included two (2) soil samples (TP2-BS1 and TP4-BS1) collected from test pits, nine (9) surface (0.0 mbgs – 0.15 mbgs) soil samples (12-SS3, 12-SS4, 12-SS7, 12-SS8, 12-SS10, 12-SS12, 12-SS13, 12-SS14, and 12-SS15) and one (1) laboratory duplicate sample (TP2-BS1 Lab-Dup). The results of the laboratory analysis for leachable metals are presented in Table D.2, in Appendix D. The analytical report from Maxxam Analytics is provided in Appendix E.

Concentrations of various metals were detected in the leachate extracted from all soil samples analysed. None of the detected leachate concentrations exceed the NLDEC guidelines, where such guidelines exist for the current investigation.

3.2.3 General Chemistry in Soil

General chemistry analysis was conducted on four (4) soil samples (TP1-BS1, TP2-BS1, TP4-BS1, and TP5-BS1) collected from test pits, six (6) surface (0.0 mbgs – 0.15 mbgs) soil samples (12-SS2, 12-SS3, 12-SS8, 12-SS11, 12-SS12, 12-SS14), and one (1) laboratory duplicate soil sample (TP1-BS1 Lab-Dup). The results of laboratory analysis for general chemistry in soil are presented in Table D.3, Appendix D.

Concentrations of various general chemistry parameters were detected in the samples analysed. However, only pH values reported exceedances of the CCME guidelines (Range of 6 - 8), they are as follows: 12-SS2 (5.4), 12-SS3 (5.05), 12-SS8 (4.94), 12-SS11 (5.49), 12-SS12 (5.94), 12-SS14 (4.74), TP1-BS1 (5.97), and TP2-BS1 (5.77). While the detected pH values exceeded the generic CCME range, pH values detected in surface (0.0 mbgs to 0.15 mbgs) soil are considered typical of Placic Humo-Ferric Podzol soils in the Trepassey area.

3.3 Soil Exceedances

During previous investigations, various metals (*i.e.*, antimony, arsenic, cobalt, iron, lead, lithium, magnesium, and rubidium) were screened against residential pathway specific guidelines for dermal contact/soil ingestion. Metals that did not exceed the applicable screening guidelines, have EPCs that did not exceed the applicable screening guidelines, were below the background concentrations, are considered major mineral forming elements of low inherent toxicity, or were likely present as a result of sea spray were not carried forward to risk assessment. As such, with the exception of lead, it was determined that metals did not pose unacceptable risks to human and ecological receptors on the site. Refer to Stantec report entitled *"Human Health Risk Assessment Re-Evaluation, DFO Light Station, Cape Pine, NL (DFRP# 34599)",* Report No. 121411355, dated March 31, 2011, for the discussion of the risk assessment process. Therefore, metals that exceeded the generic CCME residential guidelines during the current Additional Delineation program are shown in Table 3.1 for information purposed only. The remainder of this report will address only remediation of lead impacts in soil.

Table 3.1 Soil Sample Exceedances – Current Investigation

Sample No.	Parameter	Concentration (mg/kg)	Referenced Guidelines[1] (mg/kg)
12-SS1	Lead	270	140
12-SS2	Lead	370	140
12-SS3	Copper	130	63
	Lead	**2,000**	140
	Zinc	210	200
12-SS3 Lab-Dup	Copper	110	63
	Lead	1,800	140
	Zinc	220	200
12-SS4	Arsenic	17	17
	Lead	**1,200**	140
12-SS6	Lead	**730**	140
	Zinc	250	200

Sample No.	Parameter	Concentration (mg/kg)	Referenced Guidelines[1] (mg/kg)
12-SS7	Barium	1,400	500
	Copper	290	63
	Lead	**920**	140
	Zinc	2,000	200
12-SS8	Arsenic	24	17
	Lead	**1,600**	140
12-SS9	Lead	190	140
12-SS10	Lead	**820**	140
12-SS11	Lead	340	140
12-SS12	Barium	880	500
	Copper	79	50
	Lead	**4,900**	140
	Tin	76	50
	Zinc	1,400	200
12-SS13	Arsenic	17	17
	Lead	**1,100**	140
	Zinc	220	200
12-SS14	Lead	**1,200**	140
12-SS15	Lead	**1,100**	140
12-SS16	Lead	430	140
12-SS17	Lead	500	140
12-SS18	Lead	190	140
TP1-BS1	Lead	200	140
	Zinc	320	200
TP2-BS1	Lead	**640**	140
	Zinc	250	200
TP4-BS1	Lead	**1,500**	140
	Zinc	700	200
TP5-BS1	Lead	300	140
TP5-BS2	Lead	580	140
FD-1	Lead	270	140
FD-2	Arsenic	20	17
	Lead	910	140

Notes:
1 - CCME Soil Quality Guidelines for a Residential Site (2007) - Metals
Bold = Value exceeds SSTL for lead of 622 mg/kg (Stantec, 2011)

3.4 QA/QC Discussion

As a QA/QC procedure, Stantec collected approximately 10% of samples analysed for a particular parameter (*i.e.*, metals). Two (2) field duplicate samples were collected as part of the current sampling program and are summarized as follows:

- Sample FD-1 is a duplicate of 12-SS1; and,
- Sample FD-2 is a duplicate of 12-SS15.

The relative percent difference (RPD) is used to evaluate sample result variability for duplicate samples and is calculated by the following equation:

$$RPD = \left[\frac{|S1 - S2|}{S3}\right] \times 100$$

where: *RPD = relative percent difference*
S1 = original soil sample concentration
S2 = duplicate soil sample concentration
S3 = average concentration = (S1 + S2)/2

RPD values are not used to evaluate those compounds that are present at concentrations less than five times the reportable detection limit (RDL). There are no firm guidelines for the degree of correlation expected between duplicates due to natural heterogeneity in soil type (*e.g*. grain size, clay fraction) and contaminant distribution. However, the laboratory data is considered to indicate an acceptable duplicate correlation. Acceptable Relative Percent Difference (RPD) limits are considered 35% for metals in soil, 25% for metals in water, 50% for organics in soil, 40% for organics in water. Results of the QA/QC sampling are provided in Table 3.2.

Table 3.2 Summary of QA/QC Sampling

Duplicate Type	Sample	Range of %RPD	Number of Analytes within ±40% RPD	Acceptable Duplicate Correlation
Field Duplicates	FD-1 - Metals	0% to 24%	27 of 27	Yes
	FD-2 - Metals	0% to 67%	22 of 27	No
Laboratory Duplicates	12-SS3 Lab-Dup - Metals	0% to 90%	25 of 27	No

RPDs greater than 40% were observed in the FD-2 and 12-SS3 Lab-Dup samples for metals. The differences between the results of site samples and field duplicate samples are likely a result of sample inhomogeneity and are not considered to have compromised the field program and generally confirm the representativeness of the sampling procedures. With the exception of one (1) analyte (Barium), RPDs in laboratory duplicate sample 12-SS3 Lab-Dup were within acceptable limits.

For the FD-1 field duplicate sample submitted for metals analysis, the duplicate results agree reasonably closely with their corresponding samples.

3.5 Contaminant Distribution

A discussion of the extent of lead contamination (*i.e*., 3,000 m^2 of non-leachable soil and 800 m^2 of leachable soil exceeding the SSTL) based on the results of the current soil sampling program and previous soil sampling programs (Jacques Whitford 2009, Stantec 2010, and Stantec 2011) is provided in Table 3.3.

Table 3.3 Extent of Contamination – Lead in Soil

Issue	Comment	Recommendation
Horizontal Extent of Contamination	Based on current and previous sampling results, it is estimated that approximately 3,800 m^2 of soil on the site is impacted with lead concentrations exceeding the SSTL of 622 mg/kg. This estimate includes 2,510 m^2 in the vicinity of the light tower area, 1,100 m^2 in the vicinity of the eastern residential property, 140 m^2 in the vicinity of the western residential property, and 50 m^2 in the vicinity of the equipment building. Impacted areas are shown on Drawing No. 121412505-EE-03 in Appendix A.	The samples were collected in suspected "worst case" locations, and therefore, it is assumed that the maximum concentrations have been identified. The horizontal extents of available and leachable lead contamination on the site have been sufficiently delineated.
Off-site impacts	Concentrations of lead exceeding the SSTL were detected in soils located at the property boundaries with the adjacent residential properties to the east and west of the light tower. It is likely that lead impacts in soil are the results of scraping off former lead paint on the site structures. It is estimated that of the 3,800 m^2 identified, 1,240 m^2 is present on the off-site properties.	No further action with regards to delineation of off-site impacts is recommended. The off-site extents of available and leachable lead contamination on the site have been sufficiently delineated.
Vertical Extent of Contamination	The soil cover in the identified areas of lead impacts is not expected to exceed an average depth of 0.5 m.	No further vertical delineation is recommended. The vertical extents of available and leachable lead contamination on the site have been sufficiently delineated.

Approximately 3,800 m^2 of soil on the site (DFO property and adjacent residential properties) has been identified as impacted with lead concentrations greater than the SSTL of 622 mg/kg. Assuming the metals impacts in soil extend to an average depth of 0.5 mbgs, the approximate volume of lead contaminated soil exceeding the SSTL is 1,900 m^3. The estimated extents of lead impacts in soil are presented on Drawing No. 121412505-EE-03 in Appendix A. Note that metals impacts in soils extend to neighbouring residential properties to the east and west of the light tower.

4.0 PROPOSED REMEDIAL OPTIONS

4.1 Lead Impacted Soil

Based on the results of the current Additional Delineation program and previous soil sampling programs, approximately 3,800 m^2 of lead impacted soil exceeding the SSTL has been identified at the site, approximately 800 m^2 of which is leachable. Based on the results of the soil sampling programs completed on the site to date, lead impacts extend to a maximum depth of 0.5 mbgs. In general, the highest lead concentrations are in the vicinity of the former light keeper's dwellings and the light tower. Removing leachable metals impacted material is not a provincial regulatory requirement; however, since leachable and non-leachable metals have different regulations for disposal, the extent of both types of impacts has been evaluated. The total extent of leachable and non-leachable lead impacted soil is shown on Drawing Nos. 121412505-EE-03/04. Table 4.1 summarizes the extent of lead impacted soil identified at the

site exceeding the SSTL and Table 4.2 summarizes the extent of lead contamination on each individual land parcel.

Table 4.1 Lead Impacted Soil (non-leachable and leachable)

COC	Max Concentration	Current EPC	Guideline	Location	Area[3] (m^2)	Volume [4] (m^3)	Tonnage [5] (tons)
Lead (non-leachable)	12,000 mg/kg	1,486 mg/kg	622 mg/kg[1]	Light tower, private dwellings and equipment building	3,000	1,500	3,000
Lead (leachable)	130,000 µg/L	n/a	5,000 µg/L[2]	Light tower and private dwellings	800	400	800

Notes:
1. Site-specific Target Level (SSTL) derived by Stantec (2011) for the protection of a visitor (*i.e.*, toddler) from neighbouring residential properties.
2. NLDEC guideline, 2003.
3. Area of soil exceeding the SSTL.
4. Based on 0.5 m depth of impacted soil.
5. Based on the assumption of 2.0 tonnes/m^3.
n/a = not applicable

Table 4.2 Lead Impacted Soil (non-leachable and leachable) - Distribution

Location		Area[1] (m^2)	Volume [2] (m^3)	Tonnage [3] (tonnes)
DFO Property	Non-leachable	1,975	987.5	1,975
	Leachable	550	275	550
Property of Ricky J. Myrick (East of Light Tower)	Non-leachable	950	475	950
	Leachable	150	75	150
Property of Ricky J. Myrick (West of Light Tower)	Non-leachable	75	37.5	75
	Leachable	100	50	100

Notes:
1. Area of soil exceeding the SSTL.
2. Based on 0.5 m depth of impacted soil.
3. Based on the assumption of 2.0 tonnes/m^3.
n/a = not applicable

4.2 Statistical Analysis

The ESA process results in positively biased data because the majority of samples are collected at locations where contamination is expected, or to delineate known areas of contamination. As a result, relatively few samples are usually taken from areas of the site where human impacts have been minor or negligible, and the data will tend to overstate or over-represent the true presence and concentration of COCs in soil. In addition to this inherent source of conservatism, an additional layer of conservatism is introduced through statistical analysis of the data (*i.e.*, the selection of the appropriate statistic to represent the EPC value). The primary purpose of the statistical analysis is to determine representative EPCs for estimating potential risks associated

with COCs in soil. The 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).

Pro UCL, Version 4.1 (USEPA, 2007) was used to determine representative EPCs. ProUCL calculates the appropriate UCL given the specific distribution of the site specific analytical data and recommends the most appropriate EPC to use based on the data distribution. It should be noted that this software was not used in the original HHERA (Jacques Whitford, 2009). The EPCs used in the original HHERA were based on the 95th percentile.

In the case of laboratory and field duplicate samples, the sample with the highest concentration was used in the calculation of the EPC. This prevents the potential for one soil sample to unduly skew the EPC.

A summary of the statistics of the metals data used in the original HHERA, the re-evaluated HHRA and the current program is provided in Table 4.3. It should be noted that only soil samples collected from the property owned by DFO were included in the original and re-evaluated HHRA. Soil samples from the DFO property and the two (2) adjacent properties were included in the most recent (December, 2012) calculation, and therefore, the current EPC is considered to more accurately represent lead concentrations on the site.

Table 4.3 Summary of Statistics Used in HHRA

Receptor	COC	Number of Samples	Average Soil Concentration (mg/kg)	Maximum Soil Concentration (mg/kg)	EPC (mg/kg)	SSTL (mg/kg)	Comments
Residential Visitor (toddler)	Lead	**Original HHRA (2009)**					
		12	1,987	12,000	7,820	290	EPC based on 95th Percentile
		Re-evaluated HHRA (2011)					
		52	1,120	12,000	1,641	622	EPC based on 95 %Gamma UCL
		Additional Delineation (2012)					
		95	1,152	12,000	1,486	622	EPC based on 95% Gamma UCL

Based on a review of the statistical data, if the areas of the site containing highest concentrations of lead (BS30, BS33, BS34, BS35, BS38, BS40, BS48, BS51, BS54, SS1, SS2, SS5, SS6, SS12, SS13, CPL-20, CLP-23, 12-SS3, 12-SS12, 12-SS13, 12-SS14, and 12-SS15) are remediated, the site EPC would be reduced to 612 mg/kg (see Appendix F for ProUCL outputs). This would result in remediating four (4) smaller areas on the site rather than all lead impacted soil in exceedance of the SSTL. Remediating these areas with the highest concentrations of lead would lower the site EPC to below the SSTL and would ensure that lead

impacted leachable soils are removed from the areas surrounding residential buildings and partially removed from the area surrounding the light tower. Therefore, unacceptable risks to a residential visitor (toddler) at the site from dermal contact/ingestion of surface soil will no longer be expected and the overall volume of soil requiring remediation would be reduced. The recommended area for remediation is shown on Drawing No. 121412505-EE-04, Appendix A.

It is estimated that an area of approximately 1,400 m^2 of lead impacted soil is recommended to be remediated from the site, approximately 550 m^2 of which is leachable as shown on Drawing No. 121412505-EE-04, Appendix A. Soil remediation would extend to a maximum depth of 0.5 mbgs. As such, an approximately volume of 425 m^3 of non-leachable and 275 m^3 of leachable lead impacted soil is recommended for remediation. Table 4.4 summarizes the extent of lead impacted soil identified at the site requiring remediation and Table 4.5 summarizes the extent of remediation suggested on each individual land parcel.

Table 4.4 Lead Impacted Soil (non-leachable and leachable) Requiring Remediation

COC	Max Concentration	Current EPC	Guideline	Location	Area[3] (m^2)	Volume [4] (m^3)	Tonnage [5] (tonnes)
Lead (non-leachable)	12,000 mg/kg	1,486 mg/kg	622 mg/kg[1]	Light tower, private dwellings and equipment building	850	425	850
Lead (leachable)	130,000 µg/L	n/a	5,000 µg/L[2]	Light tower and private dwellings	550	275	550

Notes:
1. Site-specific Target Level (SSTL) derived by Stantec (2011) for the protection of a visitor (*i.e.*, toddler) from neighbouring residential properties.
2. NLDEC guideline, 2003.
3. Area of soil exceeding the SSTL.
4. Based on 0.5 m depth of impacted soil.
5. Based on the assumption of 2.0 tonnes/m^3.
n/a = not applicable

Table 4.5 Lead Impacted Soil (non-leachable and leachable) Requiring Remediation - Distribution

Location		Area[1] (m^2)	Volume [2] (m^3)	Tonnage [3] (tonnes)
DFO Property	Non-leachable	800	400	800
	Leachable	300	150	300
Property of Ricky J. Myrick (East of Light Tower)	Non-leachable	50	25	50
	Leachable	150	75	150
Property of Ricky J. Myrick (West of Light Tower)	Non-leachable	n/a	n/a	n/a
	Leachable	100	50	100

Notes:
1. Area of soil exceeding the SSTL (Stantec 2011).
2. Based on 0.5 m depth of impacted soil.
3. Based on the assumption of 2.0 tonnes/m^3.
n/a = not applicable

Section 5.0 and the Remedial Options Evaluation spreadsheet, provided in Appendix G, provide a further discussion of remedial options for mitigating risks to receptors at the site as a result of lead impacted soil.

5.0 DETAILED REMEDIAL OPTIONS

Potential remedial options were evaluated against a variety of criteria to assist in choosing the most appropriate alternatives and have been limited to technically-proven and commercially available technologies. As a minimum, the options must meet two (2) fundamental criteria:

- Eliminate potential for adverse risks identified in the risk assessments; and,
- Compliance with applicable regulations and regulatory requirements.

Based on the criteria listed above, the remedial options were evaluated against the following criteria:

- Effectiveness;
- Feasibility;
- Timeline;
- Cost; and,
- Other miscellaneous considerations.

5.1 Remedial Options

A description of the proposed remedial options is provided in the following section and in a Remedial Options Evaluation spreadsheet, provided in Appendix G.

5.1.1 Excavation and Off-Site Disposal

This option would involve the excavation of non-leachable lead impacted soil (850 m^2) from areas of the site containing highest concentrations of lead, loading aboard dump trucks and transporting soil to a landfill facility for disposal. Preferably, a local landfill would be chosen for disposal, based on approval from the landfill operator and Government of Newfoundland and Labrador - Service Newfoundland (Service NL). The closest such operational landfill is located in St. John's, NL (Robin Hood Bay). A discussion with Service NL in March 2011 indicated that consideration would be given to allow for the disposal of non-leachable lead impacted soil as cover material in a recently closed landfill in Trepassey, NL. This would have to be confirmed with Service NL at the time of remedial planning. Soil impacted with leachable lead (550 m^2) will have to be disposed of at an approved hazardous waste treatment facility. UESI is approved to accept soil impacted with leachable metals. This facility is located in Sunnyside, NL, approximately 200 km from the site. Following remediation, confirmatory soil samples would be collected from the extents of the remedial excavation and compared to the SSTL prior to

backfilling to ensure that the levels of lead remaining in the soil are not posing a potential unacceptable risk to human or ecological receptors.

If the impacted soil is to be stockpiled on the site, prior to removal from the site, it is recommended to have a PVC liner beneath the soil to avoid potential contamination of other areas of the site. In addition, during rainy periods, it is recommended to keep the stockpiled impacted soil covered. This option is summarized in Table 5.1 and in a Remedial Options Evaluation spreadsheet, provided in Appendix G.

Table 5.1 Excavation and Off-Site Disposal

Criteria	Comment
Effectiveness	This option is effective because it removes the identified hazard (*i.e.*, areas of impacted soil containing the highest concentrations of lead) from the site, therefore reducing the site EPC to a level where potential risks to human and ecological receptors would no longer be expected on the site.
Feasibility	This is a relatively straight forward process that involves the use of typical and readily available heavy equipment such as excavators, backhoes and tandem dump trucks.
Timeline	The timeline for this option is considered moderate and is dependent on the number of dump trucks utilized. It is anticipated that remediation could be complete in approximately three (3) weeks.
Costs	Costs for this option are considered to be moderate as compared to other remedial options. Costs to be considered are landfill tipping fees (typically low for non-leachable waste), contractor fees, consultant fees for on-site supervision and reporting and laboratory fees for confirmatory soil sampling. Tipping fees for leachable waste are generally much higher than non-leachable soil (approximately $250/tonne).
Other considerations	The site is located at the end of an 8.0 km gravel access road. The dump truck traffic associated with this option would potentially damage the road and some repairs may be necessary following remediation.

5.1.2 Soil Washing

Soil washing would involve the use of mobile soil washing equipment on the site. A mobile soil treatment unit is offered by CleanEarth Technologies Inc., located in Enfield, Nova Scotia (NS). This patented process has been completed at similar DFO light station sites in other jurisdictions in Atlantic Canada. This process treats contaminated soil through the physical separation of particles from each other based on characteristics such as size, shape, density and solubility. It operates on the principal that contaminants are associated with certain size fractions of soil particles and that these contaminants can be dissolved or suspended in a wash solution, removed by separating out silt particles from the bulk of the material or separated through physical differences between the contaminant and the soil. This option is summarized in Table 5.2 and in a Remedial Options Evaluation spreadsheet, provided in Appendix G.

Table 5.2 Soil Washing

Criteria	Comment
Effectiveness	This process has proven to be capable of reducing the concentrations of contaminants (particularly metals) in soil on similar DFO sites in other jurisdictions. This process has not been tested in NL. Approximately 90 – 95% of the impacted soil would be treated and the remainder (*i.e.*, residual) would still require disposal at a treatment facility.
Feasibility	A treatment unit would have to be mobilized to the site from NS for this option. The treatment unit could be brought in on a flatbed trailer and, and due to the site layout, space restrictions would not be a concern. This option cannot be carried out in the winter months.
Timeline	The timeline considered for this option is dependent on availability of the mobile unit. The technology available is based in NS and it is the only one of its kind known in the region. Availability of the mobile unit is based on a first come, first served basis, therefore, a unit may not be available when desired. Once on site, the unit would take 4-5 days to set up, 4-5 days to treat impacted soil and 4-5 days to dismantle. Based on a discussion with a CleanEarth representative, an average processing time of 80-100 tonnes/hour can be assumed, based on soil type. Prior to initiating site remediation, necessary provincial permitting (certificate of approval from NLDEC) would be required. The time line for such approval is unknown and could vary from weeks to as many as four (4) months.
Costs	Costs for this option are considered to be high. Costs would be associated with mobilizing the treatment unit from NS and associated operational charges, consultant fees for supervision, project management, reporting and laboratory costs for confirmatory soil sampling. An operational cost of $100/ton can be assumed. Also, it is estimated that 5 – 10% of the impacted soil identified would still have to be disposed of at a waste treatment facility following the treatment process.
Other considerations	This process would still involve a disposal method for the water used in the treatment process and the residual portion of the treated soil that does not meet the remedial objective and concentrated paint chips, which combined account for approximately 5 – 10% of treated soil. The treatability (*i.e.*, physical and chemical properties) of the soil would have to be determined prior to implementing this method.

5.1.3 Limited Soil Excavation and Capping

This option would involve capping select impacted areas of non-leachable lead impacted soil (*i.e.*, areas of the site containing high concentrations of lead) with a layer such as clay, asphalt or soil. Typically, for material such as clay and asphalt, a minimum 0.3 m of capping material is required, whereas if soil is used as the capping material a minimum of 0.5 m is required; however, approval regarding minimum capping depth would be required from Service NL prior to beginning site work. Based on the results of the current soil sampling program and previous investigations, a minimum of 850 m^2 of ground surface would require capping and sodding. In general, the highest concentrations of lead are present in close proximity to on-site structures (dwellings and light tower) and therefore cannot be capped. As such, an area of approximately 550 m^2 of leachable lead impacted soil, which is present surrounding the two (2) residential dwellings and in the vicinity of the light tower, would require soil removal. In an effort to minimize changes to the site appearance, clay or soil is recommended rather than asphalt, and the backfill/sod would be placed in such a way to conform to the surrounding natural and rugged environment. This option is summarized in Table 5.3 and in a Remedial Options Evaluation spreadsheet, provided in Appendix G.

Table 5.3 Limited Soil Excavation and Capping

Criteria	Comment
Effectiveness	This option is effective in that it removes the identified hazard (*i.e.*, areas of impacted soil containing the highest concentrations of lead) from the site that cannot be capped due to close proximity to on-site structures and eliminates the dermal contact exposure pathway between the hazard and the receptor in areas where capping is feasible because contaminants would be beneath a layer of non-contaminated capping material. Therefore, the site EPC is reduced to a level where potential risks to human and ecological receptors would no longer be expected on the site.
Feasibility	This is a relatively straight forward process that involves the use of typical and readily available heavy equipment such as excavators and tandem dump trucks. Also, capping materials are readily available.
Timeline	The timeline for this option is considered moderate. It is anticipated that remediation could be complete within approximately three (3) weeks, dependent on the amount of heavy equipment used.
Costs	Costs for this option are considered to be relatively low. Costs to be considered are landfill tipping fees, capping materials, contractor fees, consultant fees for on-site supervision and reporting. Tipping fees for leachable waste are generally much higher than non-leachable soil (approximately $250/tonne). Cost savings would be achieved by decreasing the amount of contaminated soil requiring removal and transportation to a soil treatment facility.
Other considerations	Because the entire site is not contaminated, and site remediation is only recommended in specified areas, placement of capping material over a portion of the site may not be esthetically pleasing and it could be difficult to blend with the surroundings. A portion of the contaminated area has a moderate-steep slope (east of light tower). Due to the exposure to high winds and precipitation at the site, annual monitoring of the material would be required to ensure it stays in adequate condition. The contaminated soil is still present on the site and could potentially hinder any future development or divestiture of the site.

5.1.4 Limited Soil Excavation and Fencing

This option involves removing leachable and non-leachable lead impacted soil (BS24, BS30, and 12-SS10) on the west residential property to the SSTL, removing leachable and non-leachable lead impacted soil on the east residential property with the highest lead concentrations (BS45, BS48, BS51, BS52, BS54, 12-SS3, 12-SS4, and 12-SS8) so that the east residential property EPC is below the SSTL, fencing the DFO property and removing leachable and non-leachable lead impacted soil located on the DFO property in the vicinity of soil samples CPL-20 and BS34 (*i.e.*, on the road) that cannot be fenced.

Remediating these areas would ensure all lead impacted soil exceeding the SSTL on the west residential property is removed, all leachable lead impacted soil is removed from the area surrounding the east residential dwelling and the area containing highest concentrations of lead on the east residential property are removed, thereby reducing the east property EPC to 544 mg/kg, which is below the site remedial objective of 622 mg/kg (SSTL). Therefore, the exposure pathway on the DFO property is eliminated and unacceptable risks to a residential visitor (toddler) at the residential properties from dermal contact/ingestion of surface soil will no longer be expected.

Soil impacted with leachable lead on the east, west and DFO property will have to be disposed of at an approved hazardous waste treatment facility (UESI located in Sunnyside, NL). Based on the results of the current soil sampling program and previous investigations, a minimum of 510 m^2 of non-leachable soil would require excavation (*i.e.*, 75 m^2 on the west residential

property, 420 m^2 on the east residential property, and 15 m^2 on the DFO property). In addition, an area of approximately 270 m^2 of leachable lead impacted soil (*i.e.*, 100 m^2 on the west residential property, 150 m^2 on the east residential property, and 20 m^2 on the DFO property), would also require soil removal. Table 5.4 and the Remedial Options Evaluation spreadsheet, provided in Appendix G, summarize passive engineered controls.

Table 5.4 Limited Soil Excavation and Fencing

Criteria	Comment
Effectiveness	This option is effective in that it removes lead impacted soil in exceedance on the SSTL of the west residential property, removes the identified hazard (*i.e.*, areas of impacted soil containing the highest concentrations of lead) from the east residential property, and eliminates the exposure pathway by fencing the areas of the DFO site in exceedance of the SSTL so that potential risks to human and ecological receptors would no longer be expected on either of the two (2) residential properties or the DFO site. However, physical barriers and public signage are not reliable over the long term as the level of protection depends on the public adhering to the control measure (*i.e.*, not trespassing).
Feasibility	This is a relatively straight forward process that involves the use of typical and readily available heavy equipment such as excavators and tandem dump trucks and a local fencing and/or a signage company. It should also be noted that communicating the hazards that exist on the site with current landowners is required. This option is better carried out in the spring/summer, when ground surfaces are not frozen.
Timeline	The timeline for this option is considered low to moderate. It is anticipated that soil removal and construction/installation could be complete within approximately two (2) weeks.
Costs	Costs for this option are considered to be moderate. Costs to be considered are landfill tipping fees, contractor fees, consultant fees for on-site supervision and reporting. Tipping fees for leachable waste are generally much higher than non-leachable soil (approximately $250/tonne). Cost savings would be achieved by decreasing the amount of contaminated soil requiring removal and transportation to a soil treatment facility.
Other considerations	Public notices are often ineffective. Because the entire site is not contaminated, fencing portions of the DFO site may not be esthetically pleasing as it would not blend with the surroundings. Due to the exposure to high winds at the site, regular monitoring and maintenance of the fencing would be required to ensure it stays in adequate condition (*i.e.*, upright and provides the intended physical barrier). The contaminated soil is still present on the site and could potentially hinder any future development or divestiture of the site.

5.1.5 In-Situ Treatment

In situ treatment is not a widely used remediation option for lead impacted soil in Atlantic Canada. This option has not been practiced by Stantec in Atlantic Canada and reports from other jurisdictions indicate it is not an effective means of treating lead impacted soil. At this time, the technology is not available (through contractors practicing this method) in Atlantic Canada, and therefore, in-situ treatment of lead impacted soil was not further evaluated as a remedial option for the site.

5.2 Estimated Cost of Remedial Options

The following summary table (Table 5.5) includes a cost estimate for each of the four (4) remedial options analysed for the Cape Pine light station site. These cost estimates are based

on Stantec's experience on similar remediation projects in NL. No site specific quotations have been obtained from remediation contractors during the preparation of these estimates. The estimates provided are not a quotation from Stantec for the completion of this remediation work. In three (3) of the four (4) remedial options, leachable lead impacted soil would be excavated and removed from the site and, it is assumed that metals impacts do not extend beyond 0.5 mbgs. Each cost includes the estimated Stantec fees.

Table 5.5 Summary Table of Cost Estimates for Each of the Four Remedial Options

Remediation Option / Cost Item	Excavation and Off-Site Disposal	Soil Washing	Limited Soil Excavation and Capping	Limited Soil Excavation and Fencing
Leachable Soil (550 m^3)	$196,035	$363,100	$211,750	$97,720
Non-Leachable Soil (850 m^3)	$107,465		$46,750	$67,280
Fencing	-	-	-	$137,700
Laboratory	$2,000	$2,000	$2,000	$2,000
Stantec	$34,500	$25,900	$31,500	$26,300
Total	**$340,000**	**$391,000**	**$292,000**	**$331,000**
Notes: Costs are estimates only.				

5.2.1 Options Analysis Framework

In order to effectively consider and identify available and appropriate technologies and remedial approaches, a two-tier assessment framework has been adopted. The method considers two (2) broad criteria, Threshold Criteria, and Balancing Criteria. The Threshold Criteria has five (5) general subcategories:

- Meets remedial objectives of remediating soil containing the highest concentrations of lead to the SSTL of 622 mg/kg, therefore reducing the site EPC to the SSTL of lower;
- Compliance with applicable regulations or requirements (federal, provincial and municipal);
- Implementation (commercially proven, available, applicable to site and logistically viable);
- Applicability to site conditions (efficiently operate in the site conditions and climate); and,
- Logistically viable to implement.

Balancing Criteria is also broken into five broad subcategories:

- Effectiveness of Technology;
- Technical Complexity;
- Estimated Remedial Timeline;
- Regulator Acceptance/Permitting Requirements; and;
- Stakeholder/Airport Operations Acceptance.

All potential approaches and methods must fully meet the Threshold Criteria. Those that do not meet the requirements of the Threshold Criteria are dropped from further consideration under the Balancing Criteria. Threshold Criteria elements are given a “yes” (does meet criteria) or “no” (does not meet criteria) rating. Any single “no” value for the threshold sub-criteria causes the technique/approach to “fail”. Balancing Criteria are given a relative rating as compared to other potential options. The Threshold and Balancing screening and evaluation for the site is presented in Tables 5.6 and 5.7.

Table 5.6 Threshold Screening of Options – Remediating Soil Containing the Highest Concentrations of Lead

Option	Grade	Meets Remedial Objective	Compliance with Applicable Regulations or Requirements	Implementability	Applicable to site	Logistics
Excavation and Off-Site Disposal	Pass	Yes	Yes	yes	yes	yes
Soil Washing	Pass	Yes	Yes	yes	yes	yes
Limited Soil Excavation and Capping	Pass	Yes	Yes	yes	yes	yes
Limited Soil Excavation and Fencing	Pass	Yes	Yes	yes	yes	yes
Notes: "yes"= meets the Threshold Criteria requirements; "no" = does not meet the Threshold Criteria requirements						

Table 5.7 Balance Scoring Criteria – Remediating Soil Containing the Highest Concentrations of Lead

Option	Effectiveness of Technology [1]	Technical Complexity [2]	Estimated Remedial Timeline [3]	Regulator Acceptance / Permitting Requirements [4]	Stakeholder / Light Station Operations Acceptance [5]	Total Benefit	Relative Benefit Points [6]	Estimated Cost ($1000)	Cost/Net Benefit Ratio	Overall Ranking
	A	B	C	D	E	F=A+B+C +D+E	G	H	I=H/G	J
Excavation and Off-site Disposal	5	5	1	5	5	21	**100**	**340**	**3.4**	**1**
Soil Washing	3	1	3	3	5	15	**71**	**391**	**5.5**	**4**
Limited Soil Excavation and Capping	3	3	3	3	5	17	**81**	**292**	**3.6**	**2**
Limited Soil Excavation and Fencing	3	3	3	5	3	17	**81**	**331**	**4.1**	**3**

Option	Effectiveness of Technology[1]	Technical Complexity[2]	Estimated Remedial Timeline[3]	Regulator Acceptance / Permitting Requirements[4]	Stakeholder / Light Station Operations Acceptance[5]	Total Benefit	Relative Benefit Points[6]	Estimated Cost ($1000)	Cost/Net Benefit Ratio	Overall Ranking

Notes:

1. Effectiveness of Technology
   Scale: 1 = Not effective; 3 = Moderately effective; 5 = Completely effective
2. Technical Complexity
   Scale 1 = Technically complex; 3 = Moderately Complex; 5 = Simple (Limited system components)
3. Estimated Remedial Timeline
   Scale 1 = 3 weeks + ; 3 = 2-3 weeks (reasonable confidence); 5 = 1-2 weeks (high confidence)
4. Regulator Acceptance / Permitting Requirements
   Scale 1 = Requires extensive permitting; 3 = Requires minor permitting; 5 = No permitting required
5. Stakeholder / Airport Operations Acceptance
   Scale 1 = Requires special handling/stockpiling – interferes with light station operations; 3 = Limited (sporadic) interference of light station operations; 5 = No interference with light station operations
6. Relative Benefit calculated by dividing total benefit of option by the maximum benefit option (x100%)
7. Estimated Costs: values taken from Table 5.5.
8. Lowest Cost/Net Benefit Ratio is the Preferred Option

5.3 Recommended Remedial Options

5.3.1 Threshold and Balanced Screening Evaluation

The Threshold Screening took each of the four (4) viable remediation options for the site and compared them relatively and to a number of basic criteria to ensure the implementation of the technology was valid and applicable to the site. The Balanced Scoring Table compared each technology to method specific criteria as they related to the Cape Pine light station site, such as remedial time frame, technical logistics and complexity of the option etc. The scoring was undertaken in keeping with the most important factors for the screening process which relate to PWGSCs principle of fiscal responsibility to the public of time, cost and effectiveness.

Once the scoring of each option was complete, the total benefit or total number of points was established per option (refer to Table 5.7). These values were then divided by the maximum number of points assigned to one option multiplied by 100, giving the relative benefit points per option. The cost per net benefit ratio was then calculated by dividing the total estimated cost of the option by the relative benefit point obtained by the option. The options were then ranked from 1 to 4 based on the value of the cost/net benefit ratio. The option with the lowest ratio was the preferred option.

5.3.2 Recommended Remedial Option

The excavation and off-site disposal option ranked the highest. The limited soil removal and capping, limited soil removal and fencing and soil washing options ranked 2nd, 3rd and 4th, respectively.

The excavation and off-site disposal remedial method ranked the highest (relative benefit, cost/net benefit ratio and overall ranking) and has been employed successfully on numerous sites in NL and it is anticipated the technology will be accepted by NLDEC. The method assumes the treatment facility accepting the soil is approved by the department for disposal of leachable lead impacts. The primary advantage of this option is the removal of lead impacted soil from the site (leachable and non-leachable) containing highest concentrations of lead, thereby reducing the site EPC to 612 mg/kg which is lower than the site remedial objective of 622 mg/kg (SSTL), and eliminating unacceptable risks to a residential visitor (toddler) at the site from dermal contact/ingestion of surface soil. This is a relatively straight forward process that involves the use of typical and readily available equipment. Costing for excavation and off-site disposal and soil treatment is higher than limited soil removal and capping and the limited soil removal and fencing options, however, this disadvantage is outweighed because lead impacted soil is removed and additional monitoring is not required.

The limited soil excavation and capping option ranked second highest mainly because of the limited cost. Despite the lowest costing, limited soil excavation and capping is not the preferred method because the hazards are still present in soil and the option is not reliable over the long term as the addition of a soil/sod cap is not expected to remain in place over time. Based on the site location, high winds and precipitation would likely weather the capping material at the site and therefore annual monitoring and maintenance to ensure the cap remains in place would be required. In addition, a portion of the contaminated area has a moderate-steep slope (east of light tower) and therefore placement of capping material over certain portions of the site may not be esthetically pleasing and it could be difficult to blend with the surroundings. A representative from DFO could likely monitor the cap during maintenance visits to the site; however, would result in annual costs for monitoring and repairing the cap on-going over the life of the facility.

Both the limited soil removal and fencing and soil washing options are viable alternatives for site remediation, however scored lower than the excavation and off-site disposal and soil treatment remedial option. Costing for the limited soil removal and fencing option, which eliminates the exposure pathway at the site and does not involve extensive excavation and off-site disposal and soil treatment, is lower than the excavation and off-site disposal and soil treatment remedial option; however is not a preferred method because the hazards are still present in soil on the DFO property, requires annual monitoring to ensure the fence remains in adequate condition, and is not reliable over the long term as the level of protection depends on the public adhering to the control measure (*i.e.*, not trespassing). Costing for the soil washing option is the highest. Additionally, this method is somewhat complex and would require a pilot test to be completed prior to the application of the technology to determine the effectiveness of the treatment process and the need for modifications to the soil washing unit. Further disadvantages include: the system is temperature sensitive; and some effort would be required from a permitting and regulatory approval standpoint.

Based on the detailed remedial analysis presented above, Stantec recommends the excavation and off-site disposal remedial option for the Cape Pine light station.

6.0 RECOMMENDATIONS

Based on the current Additional Delineation program, the re-evaluated HHRA (Stantec, 2011), the 2010 Additional Delineation Program, and the Phase III ESA and HHERA (Jacques Whitford, 2009), it is recommended that soil remediation be completed at the site to mitigate potential risks to human and ecological receptors as a result of the lead-impacted soil.

Based on a review of the statistical data, if the areas of the site containing highest concentrations of lead (BS30, BS33, BS34, BS35, BS38, BS40, BS48, BS51, BS54, SS1, SS2, SS5, SS6, SS12, SS13, CPL-20, CLP-23, 12-SS3, 12-SS12, 12-SS13, 12-SS14, and 12-SS15) are removed, the site EPC would be reduced to 612 mg/kg. This would result in remediating four (4) smaller areas on the site rather than all lead impacted soil in exceedance of the SSTL. Remediating these areas with the highest concentrations of lead would lower the site EPC to below the SSTL (622 mg/kg) and would ensure that lead impacted leachable soils are removed from the areas surrounding residential buildings and partially removed from the area surrounding the light tower. Therefore, unacceptable risks to a residential visitor (toddler) at the site from dermal contact/ingestion of surface soil will no longer be expected.

As such, Stantec recommends the following:

- Excavate the estimated 850 m^2 (425 m^3) of non-leachable metals impacted soil and dispose of it at an approved municipal landfill. Preferably, soil would be transported to a local landfill. If a local landfill cannot accept the soil, consideration would have to be given to transporting the soil to Robin Hood Bay facility in St. John's, NL.
- Excavate the estimated 550 m^2 (275 m^3) of leachable metals impacted soil and dispose of at an approved hazardous waste treatment facility. The only such known facility currently in operation in NL is UESI, located in Sunnyside, NL.

The remedial excavation would then have to be backfilled with clean imported material and topped with sod. Confirmatory soil samples would have to be collected from the remedial excavation prior to backfilling to ensure that the levels of lead remaining in the soil are not posing a potential unacceptable risk to human or ecological receptors. Prior to any remedial activities at the site, it is recommended to clearly mark out the areas of leachable and non-leachable to be excavated in the field.

A discussion of liabilities at the site and associated costs with the recommended remedial option are provided in a letter with this report. Should PWGSC/DFO wish to pursue a different remedial option; a more thorough, quantitative cost estimate can be prepared upon request.

7.0 HEALTH AND SAFETY REQUIREMENTS

Any personnel engaged in construction and/or excavation on the site should be advised of the potential risks associated with dermal contact or ingestion of soil that contains COCs.

A site-specific Health and Safety plan should be prepared to provide appropriate protection against all known and potential hazards that may be encountered during activities associated with completing a site remediation. The plan will describe the potential hazards at the sites, identify the personnel responsible for health and safety, and outline the health and safety procedures and equipment required for activities at the site to minimize the potential hazards to all personnel.

8.0 CLOSURE

This report has been prepared for the sole benefit of PWGSC. The report may not be relied upon by any other person or entity without the express written consent of Stantec and PWGSC.

Any use which a third party makes of this report, or any reliance on decisions made based on it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The information contained in this report is based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices at the time the work was performed. The conclusions presented herein represent the best technical judgment of Stantec based on the information obtained from the specific sampling locations. Selective destructive testing was undertaken during this assessment subject to the limitations described in this report.

In addition, analysis has been carried out for 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 cannot warrant against undiscovered environmental liabilities.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that this information be brought to our attention so that we may re-assess the information presented herein.

This report was prepared by Jonathan Murphy, P.Eng., and Jacqueline Gillis, B.Sc., B.Eng., and reviewed by Kelly Johnson, Ph.D., and Robert MacLeod, M.Sc, P.Geo.

Respectfully submitted,

STANTEC CONSULTING LTD.

Jacqueline Gillis, B.Sc., B.Eng., EIT

Robert MacLeod, M.Sc., P.Geo.
Senior Principle

PROVINCE OF NEWFOUNDLAND AND LABRADOR
PEG Newfoundland and Labrador
PERMIT HOLDER
This Permit Allows
STANTEC CONSULTING LTD.
To practice Professional Engineering in Newfoundland and Labrador.
Permit No. as issued by PEG 50291
which is valid for the year 2013

9.0 REFERENCES

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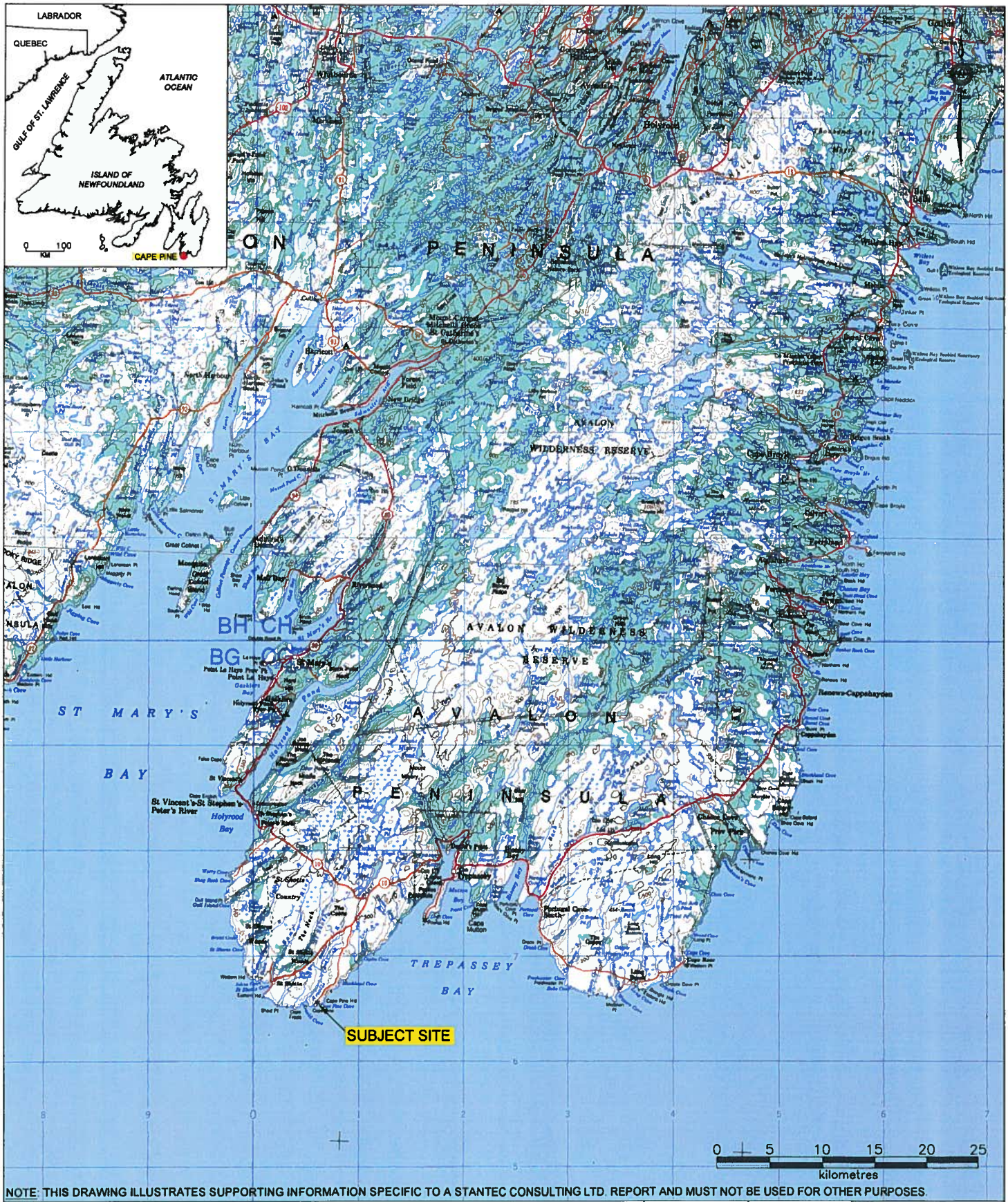
APPENDIX A

Drawings



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

CLIENT: Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

PROJECT TITLE: ADDITIONAL DELINEATION AND UPDATED REMEDIAL ACTION PLAN / RISK MANAGEMENT PLAN, DFO LIGHT STATION, CAPE PINE, NL (DFRP#34599)

DRAWING TITLE: SITE LOCATION PLAN

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EDITED BY: -	REV. No. 0
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Stantec

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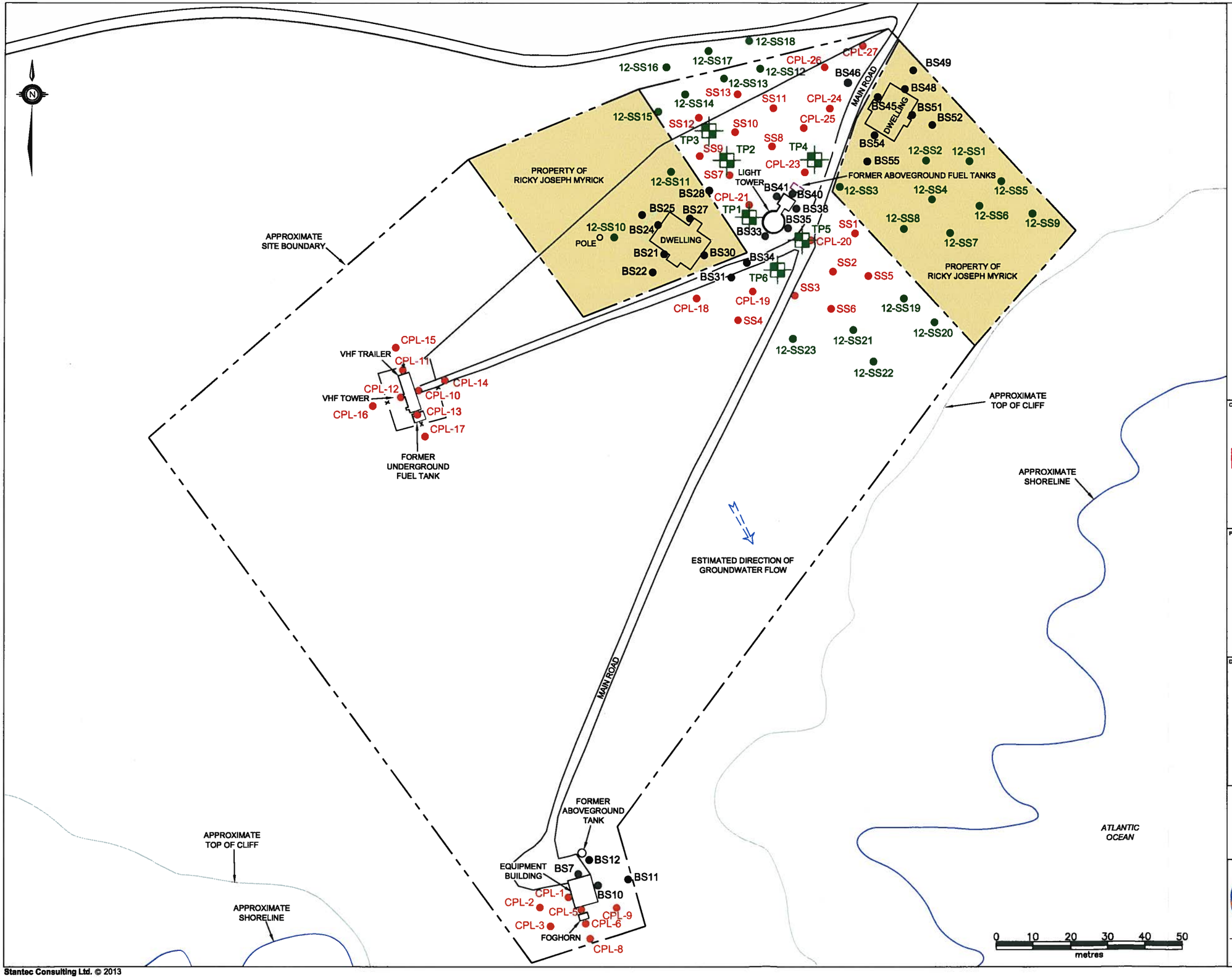

LEGEND

- SOIL SAMPLING LOCATION FOR METALS (2008)
- SOIL SAMPLING LOCATION (2010)
- SOIL SAMPLING LOCATION (2012)
- TEST PIT (2012)
- RESIDENTIAL PROPERTY

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

CLIENT:

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

PROJECT TITLE:

ADDITIONAL DELINEATION AND UPDATED REMEDIAL ACTION PLAN / RISK MANAGEMENT PLAN, DFO LIGHT STATION, CAPE PINE, NL (DFRP#34599)

DRAWING TITLE:

SAMPLE LOCATION PLAN

Stantec Consulting Ltd.

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EDITED BY: N.M.	REV. No. 0
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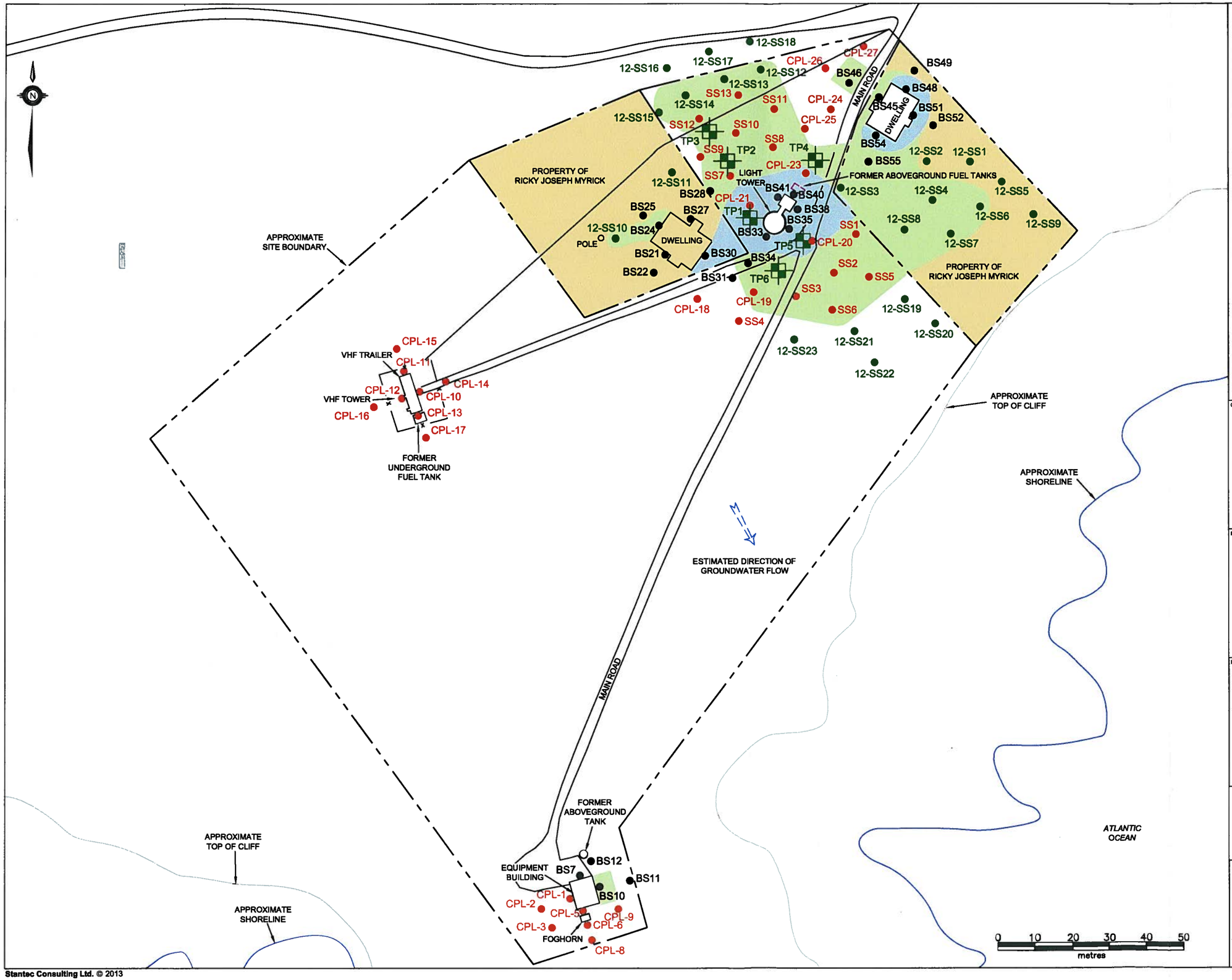

LEGEND

- SOIL SAMPLING LOCATION FOR METALS (2008)
- SOIL SAMPLING LOCATION (2010)
- SOIL SAMPLING LOCATION (2012)
- TEST PIT (2012)
- APPROXIMATE EXTENT OF AREA WITH LEAD CONCENTRATION IN SOIL EXCEEDING SSTL (622 Mg/Kg)(AREA ≈ 3,000 m²) - NON-LEACHABLE
- APPROXIMATE EXTENT OF AREA WITH LEAD CONCENTRATIONS IN LEACHATE EXCEEDING NLDEC GUIDELINE (5.0 Mg/L) (AREA ≈ 780 m²)
- RESIDENTIAL PROPERTY

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

CLIENT:

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

PROJECT TITLE:

ADDITIONAL DELINEATION AND UPDATED REMEDIAL ACTION PLAN / RISK MANAGEMENT PLAN, DFO LIGHT STATION, CAPE PINE, NL (DFRP#34599)

DRAWING TITLE:

EXCEEDANCE PLAN

Stantec Consulting Ltd.

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EDITED BY: N.M.	REV. No. 0
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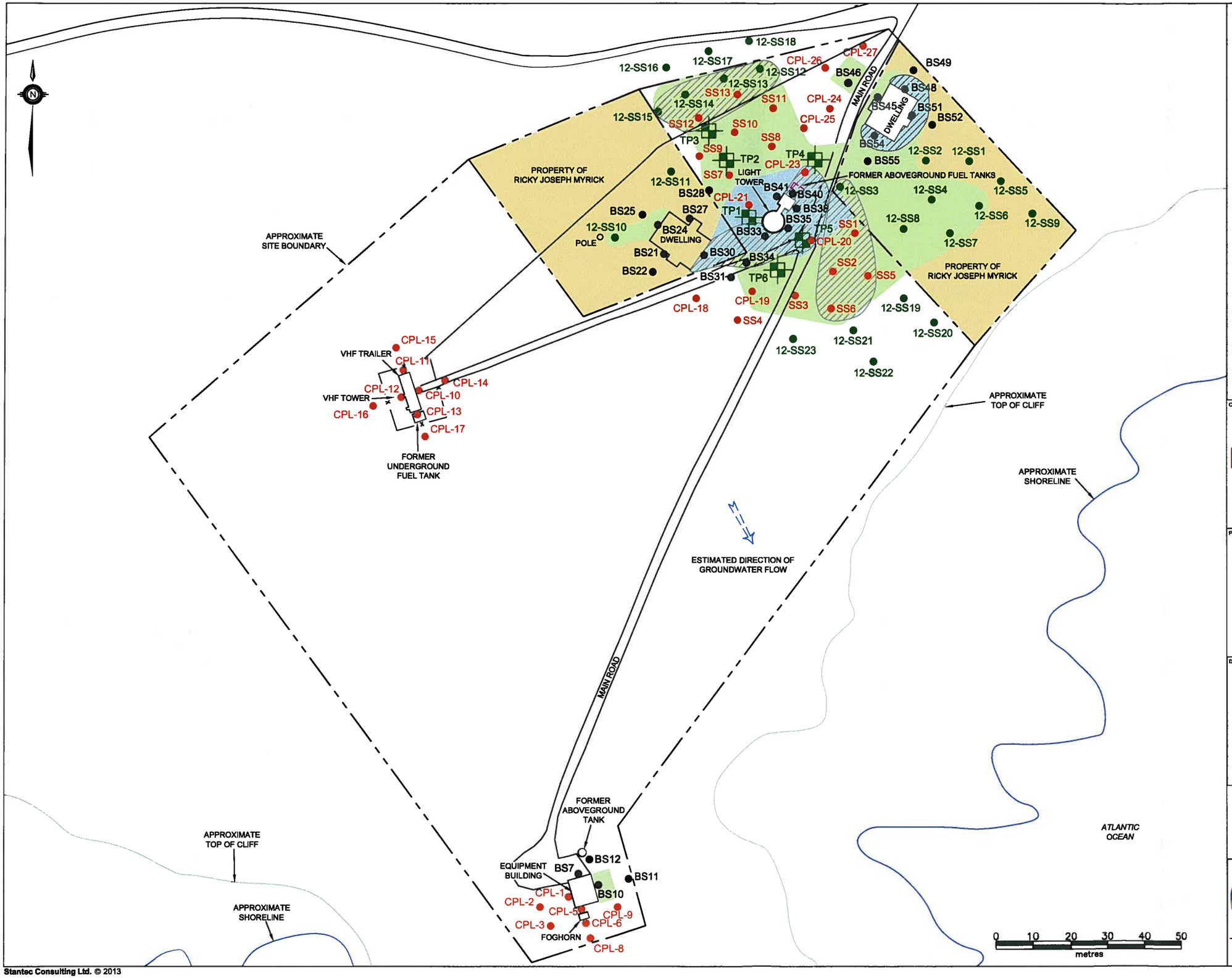


LEGEND

- SOIL SAMPLING LOCATION FOR METALS (2008)
- SOIL SAMPLING LOCATION (2010)
- SOIL SAMPLING LOCATION (2012)
- TEST PIT (2012)
- APPROXIMATE EXTENT OF AREA WITH LEAD CONCENTRATION IN SOIL EXCEEDING SSTL (622 Mg/Kg)(AREA ≈ 3,000 m²) - NON-LEACHABLE
- APPROXIMATE EXTENT OF AREA WITH LEAD CONCENTRATIONS IN LEACHATE EXCEEDING NLDEC GUIDELINE (5.0 Mg/L) (AREA ≈ 780 m²)
- PROPOSED AREAS FOR REMEDIATION (AREA ≈ 1,380 m²)
- RESIDENTIAL PROPERTY

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

CLIENT:

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

PROJECT TITLE:

ADDITIONAL DELINEATION AND UPDATED REMEDIAL ACTION PLAN / RISK MANAGEMENT PLAN, DFO LIGHT STATION, CAPE PINE, NL (DFRP#34599)

DRAWING TITLE:

PROPOSED REMEDIATION PLAN

Stantec Consulting Ltd.

SCALE: 1:1000	DATE: APR. 3, 2013
DRAWN BY: N.M.	CHECKED BY:
EDITED BY: -	REV. No: 0
DRAWING No: 121412505-EE-04	
CAD FILE: 121412505-EE-04.DWG	

Stantec

03APR13 12:30PM

APPENDIX B

Photographs

Photo 1. Light tower and adjacent east dwelling, looking northeast.

Photo 2. Equipment building, looking south.

Photo 3. East residential dwelling, looking northeast.

Photo 4. East residential dwelling and steep to moderate slope east of the light tower, looking northeast.

Photo 5. Light tower and adjacent east residential dwelling, looking north.

Photo 6. East residential dwelling, looking north.

Photo 7. Light tower and adjacent west residential dwelling, looking southwest.

Photo 8. Light tower and adjacent west residential dwelling, looking southeast.

Photo 9. Light tower and adjacent west residential dwelling, looking southwest.

Photo 10. Adjacent west residential dwelling and VHF tower, looking southwest.

Photo 11. Light tower, looking northwest.

Photo 12. Test Pit TP2 and adjacent west residential dwelling, looking southwest.

Photo 13. Light tower and Test Pit TP6, looking north.

Photo 14. Test pit TP1 and adjacent east dwelling, looking northeast.

Photo 15. Test pit TP4 following backfilling, looking south.

Photo 16. Ground surface west of the light tower, looking north.

APPENDIX C

Symbols and Terms and Test Pit Records

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

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). The classification excludes particles larger than 76 mm (3 inches). 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 76 mm, visible organic matter, 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 N-Value (also known as N-Index). 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	Undrained Shear Strength	
	kips/sq.ft.	kPa
Very Soft	<0.25	<12.5
Soft	0.25 - 0.5	12.5 - 25
Firm	0.5 - 1.0	25 - 50
Stiff	1.0 - 2.0	50 – 100
Very Stiff	2.0 - 4.0	100 - 200
Hard	>4.0	>200

ROCK DESCRIPTION

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	*Very Poor Quality - Very Severely Fractured, Crushed*
25-50	*Poor Quality- Severely Fractured, Shattered or Very Blocky*
50-75	*Fair Quality - Fractured, Blocky*
75-90	*Good Quality - Moderately Jointed, Sound*
90-100	*Excellent Quality - Intact, Very Sound*

Rock quality classification is based on a modified core recovery percentage (RQD) in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on N-size core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from *in situ* fractures. The terminology describing rock mass quality based on RQD is subjective and is underlain by the presumption that sound strong rock is of higher engineering value than fractured weak rock.

Terminology describing rock mass:

Spacing (mm)	Joint Classification	Bedding, Laminations, Bands
> 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 discolouration along major discontinuities
Slightly Weathered	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discoloured.
Moderately Weathered	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly Weathered	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely Weathered	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.

Solid Core Recovery (SCR):
Solid core recovery is defined as the cumulative length of all solid (at full diameter) core in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

Fracture Index (FI):
Fracture Index is defined as the number of naturally occurring fractures occurring per 0.3 m length of core. The Fracture Index is reported as a simple count of fractures. For > 25 fractures / 0.3 m length, the Fracture Index is reported as >25.

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
WS	Wash 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 (or total core recovery - TCR) 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

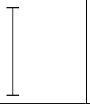
Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration 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 value 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 (305 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

CLIENT **Public Works & Government Services Canada**
PROJECT **Additional Delineation and Updated Remedial Action Plan / Risk Management Plan**
LOCATION **DFO Light Station, Cape Pine, NL (DFRP#34599)**
DATES (mm-dd-yy): DUG **11-22-12** WATER LEVEL **N/A**

TEST PIT No. **TP1**
PROJECT No. **121412505**
DATUM **Assumed**

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		Sod cover over dark brown sand and gravel with silt and cobbles and organics			BS	1	-							
					BS	2	-							
1		Grey sand and gravel with silt and cobbles			BS	3	-							
					BS	4	-							
2		End of Test Pit Test Pit terminated at 2.0 mbgs due to refusal on probable boulders or bedrock. Groundwater seepage not observed.												
3														
4														
5														

TEST PIT RECORD

CLIENT **Public Works & Government Services Canada**
PROJECT **Additional Delineation and Updated Remedial Action Plan / Risk Management Plan**
LOCATION **DFO Light Station, Cape Pine, NL (DFRP#34599)**
DATES (mm-dd-yy): DUG **11-22-12** WATER LEVEL **N/A**

TEST PIT No. **TP2**
PROJECT No. **121412505**
DATUM **Assumed**

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		Loose, brown black silty sand and gravel intermixed with topsoil			BS	1	-							
					BS	2	-							
1		Dense, grey silty sand and gravel with cobbles			BS	3	-							
					BS	4	-							
2					BS	5								
		End of Test Pit Test Pit terminated at 2.4 mbgs due to refusal on probable boulders or bedrock. Groundwater seepage not observed.												
3														
4														
5														

TEST PIT RECORD

CLIENT **Public Works & Government Services Canada**
PROJECT **Additional Delineation and Updated Remedial Action Plan / Risk Management Plan**
LOCATION **DFO Light Station, Cape Pine, NL (DFRP#34599)**
DATES (mm-dd-yy): DUG **11-22-12** WATER LEVEL **N/A**

TEST PIT No. **TP3**
PROJECT No. **121412505**
DATUM **Assumed**

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		Gravel over black organic soil												
					BS	1	-							
1					BS	2	-							
		Dense, greysih white silty sand and gravel with some cobbles			BS	3	-							
2		End of Test Pit Test Pit terminated at 2.0 mbgs due to refusal on probable boulders or bedrock. Groundwater seepage not observed.												
3														
4														
5														

TEST PIT RECORD

CLIENT **Public Works & Government Services Canada**
PROJECT **Additional Delineation and Updated Remedial Action Plan / Risk Management Plan**
LOCATION **DFO Light Station, Cape Pine, NL (DFRP#34599)**
DATES (mm-dd-yy): DUG **11-22-12** WATER LEVEL **N/A**

TEST PIT No. **TP4**
PROJECT No. **121412505**
DATUM **Assumed**

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		Sod over dark brown sand and gravel with silt, cobbles and organics			BS	1	-							
					BS	2	-							
1		Grey sand and gravel with silt and cobbles			BS	3	-							
					BS	4	-							
2		End of Test Pit Test Pit terminated at 2.0 mbgs due to refusal on probable boulders or bedrock. Groundwater seepage not observed.												
3														
4														
5														

TEST PIT RECORD

CLIENT **Public Works & Government Services Canada**
PROJECT **Additional Delineation and Updated Remedial Action Plan / Risk Management Plan**
LOCATION **DFO Light Station, Cape Pine, NL (DFRP#34599)**
DATES (mm-dd-yy): DUG **11-22-12** WATER LEVEL **N/A**

TEST PIT No. **TP5**
PROJECT No. **121412505**
DATUM **Assumed**

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		Loose, brown and grey silty sand and gravel with cobbles and some organics			BS	1	-							
					BS	2	-							
1		End of Test Pit Test Pit terminated at 1.0 mbgs due to refusal on probable boulders or bedrock. Groundwater seepage not observed.												
2														
3														
4														
5														

TEST PIT RECORD

CLIENT **Public Works & Government Services Canada**
PROJECT **Additional Delineation and Updated Remedial Action Plan / Risk Management Plan**
LOCATION **DFO Light Station, Cape Pine, NL (DFRP#34599)**
DATES (mm-dd-yy): DUG **11-22-12** WATER LEVEL **N/A**

TEST PIT No. **TP6**
PROJECT No. **121412505**
DATUM **Assumed**

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		Loose, brown sand and gravel			BS	1	-							
		End of Test Pit Test Pit terminated at 0.5 mbgs due to refusal on probable boulders or bedrock. Groundwater seepage not observed.												
1														
2														
3														
4														
5														

APPENDIX D

Laboratory Analytical Summary Tables

Table D.1 Results of Laboratory Analysis of Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	SSTL[2]	December, 2012															
					12-SS1	12-SS2	12-SS3	12-SS3 Lab-Dup	12-SS4	12-SS5	12-SS6	12-SS7	12-SS8	12-SS9	12-SS10	12-SS11	12-SS12	12-SS13	12-SS14	12-SS15	12-SS16	12-SS17
Aluminum	10	mg/kg	-	-	12,000	9,900	9,900	10,000	6,100	2,000	4,900	6,700	6,300	5,100	4,600	7,800	7,400	4,700	5,100	4,700	4,700	5,000
Antimony	2	mg/kg	20	-	3.0	3.9	12	9.4	nd	nd	14	4.2	2.3	2.4	5.9	17	12	4.0	2.9	4.3	nd	nd
Arsenic	2	mg/kg	17	-	5.6	8.5	13	14	**17**	nd	10	11	**24**	5.6	9.7	5.0	14	**17**	11	10	6.8	7.5
Barium	5	mg/kg	500	-	59	38	160	420	140	20	110	**1,400**	180	39	45	49	**880**	200	83	70	35	75
Beryllium	2	mg/kg	4	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bismuth	2	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	83	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Boron	5	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	5.0	nd	nd	5.7	nd	6.1	nd	nd	5.2	nd	6
Cadmium	0.3	mg/kg	10	-	nd	nd	nd	nd	nd	nd	nd	0.93	nd	nd	nd	nd	2.2	0.31	nd	nd	nd	nd
Chromium	2	mg/kg	64	-	9.3	8.3	13	13	8.2	3.1	6.7	19	8.4	4.9	5.4	7.1	23	6.1	5.6	5	5.5	6.4
Cobalt	1	mg/kg	50	-	5.9	5.2	6	5.9	2.8	nd	3.1	3.9	4.9	2.5	3.6	3.9	6.3	3.7	1.8	2.6	2	2.1
Copper	2	mg/kg	63	-	14	12	**130**	**110**	35	3.0	16	**290**	39	7.7	21	13	**79**	15	18	23	8.1	10
Iron	50	mg/kg	-	-	24,000	23,000	32,000	32,000	27,000	6,900	25,000	19,000	31,000	14,000	33,000	20,000	34,000	20,000	18,000	18,000	18,000	10,000
Lead	0.5	mg/kg	140	622	**270**	**370**	**2,000**	**1,800**	**1,200**	51	**730**	**920**	**1,600**	**190**	**820**	**340**	**4,900**	**1,100**	**1,200**	**1,100**	**430**	**500**
Lithium	20	mg/kg	-	-	22	25	24	25	7.4	nd	7.9	6.1	8.3	10	6.5	17	8.1	9.3	5.3	6.7	6.8	5.0
Manganese	2	mg/kg	-	-	750	540	590	670	360	30	560	390	610	240	200	430	770	650	230	190	160	530
Mercury	0.01	mg/kg	6.6	-	0.15	0.12	0.60	0.61	0.35	nd	0.23	0.20	0.65	0.14	0.29	0.14	1.00	0.32	0.34	0.27	0.25	0.26
Molybdenum	2	mg/kg	10	-	nd	nd	nd	nd	nd	nd	nd	2.8	3.5	nd	nd	nd	nd	nd	nd	nd	nd	nd
Nickel	2	mg/kg	50	-	7.2	8.4	10	9.7	5.7	nd	5.0	6.8	9.6	3.8	6.6	6.2	13	5.1	3.1	4.5	4.0	3.3
Rubidium	2	mg/kg	-	-	3.0	3.2	5.0	4.7	4.2	3.4	4.3	5.7	4.5	5.2	3.6	3.7	2.9	3.8	5.6	6.2	5.6	6.3
Selenium	2	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Silver	0.5	mg/kg	20	-	nd	nd	nd	nd	nd	nd	nd	0.67	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Strontium	5	mg/kg	-	-	13	9.4	12	19	17	nd	15	42	10	8.0	11	10	44	22	6.8	8.1	9.5	20
Thallium	0.1	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	nd	0.11	nd	nd	nd	nd	nd
Tin	2	mg/kg	50	-	4.1	7.1	20	25	34	nd	10	13	11	3.8	9.6	5	**76**	32	12	13	32	4.1
Uranium	0.1	mg/kg	23	-	0.46	0.39	0.39	0.4	0.48	0.22	0.42	0.5	0.48	0.45	0.49	0.37	0.55	0.34	0.4	0.46	0.4	0.39
Vanadium	2	mg/kg	130	-	12	12	15	14	14	10	12	16	12	12	9.5	13	17	12	14	9.0	13	19
Zinc	5	mg/kg	200	-	80	95	**210**	**220**	130	14	**250**	**2,000**	81	53	97	110	**1,400**	**220**	82	65	53	110

Notes:
1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (1999 and Updates). Residential land use.
2 = Site Specific Target Level (SSTL) derived for protection of residential toddler (Stantec, 2011).
RDL = Reportable Detection Limit.
nd = Not detected above standard RDL.
nd(#) = Not detected above elevated RDL shown in brackets.
"-" = no applicable guidelines.
Bold and Underlined = Value exceeds generic CCME residential guideline.
Bold/Shaded = Value exceeds SSTL.
Lab-Dup = Laboratory QA/QC duplicate sample.
Fld-Dup = QA/QC field duplicate sample.
FD-1 = Field duplicate of 12-SS1.
FD-2 = Field duplicate of 12-SS15.
CPL-13-BS112 = Field duplicate of CPL-13-BS2.
CPL-19-BS11 = Field duplicate of CPL-19-BS1.
CPL-27-BS12 = Field duplicate of CPL-27-BS1.
DUP1 = Field duplicate of BS10A.
DUP4 = Field duplicate of BS46A.

Table D.1 Results of Laboratory Analysis of Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	SSTL[2]	December, 2012														December, 2010		
					12-SS18	12-SS19	12-SS21	12-SS23	TP1-BS1	TP1-BS2	TP2-BS1	TP2-BS2	TP3-BS2	TP4-BS1	TP4-BS2	TP5-BS1	TP5-BS2	FD-1	FD-2	SS1	SS2	SS3
Aluminum	10	mg/kg	-	-	3,500	3,500	2,800	4,600	16,000	9,400	11,000	13,000	13,000	7,300	11,000	16,000	13,000	12,000	5,000	6,700	11,000	10,000
Antimony	2	mg/kg	20	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.6	nd	nd	nd	2.8	6.2	4.0	8.0	nd
Arsenic	2	mg/kg	17	-	3.1	2.4	nd	nd	3.3	2.3	4.5	2.4	2.5	6.7	3.3	5.1	5.8	5.3	**20**	**24**	**110**	3.0
Barium	5	mg/kg	500	-	25	18	13	11	65	13	160	21	22	300	14	81	200	59	72	240	**970**	31
Beryllium	2	mg/kg	4	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bismuth	2	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Boron	5	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	6.2	nd	18	nd
Cadmium	0.3	mg/kg	10	-	nd	nd	nd	nd	nd	nd	0.53	nd	nd	0.84	nd	nd	nd	nd	nd	0.3	1.4	nd
Chromium	2	mg/kg	64	-	4.2	2.6	17	2.5	9.5	6.2	7.8	7.3	8.1	7.6	7.0	9.9	8.3	9.5	6.1	12	15	5.0
Cobalt	1	mg/kg	50	-	1.8	nd	nd	nd	6.2	6.9	4.6	7.1	6.4	4.0	8.1	7.3	7.1	5.7	3.5	5.0	10	10
Copper	2	mg/kg	63	-	4.9	4.2	3.3	2.1	15	7.6	20	8.5	9.5	21	8.2	22	26	14	29	50	**150**	20
Iron	50	mg/kg	-	-	12,000	6,200	5,400	2,000	25,000	18,000	22,000	21,000	20,000	21,000	20,000	26,000	23,000	23,000	34,000	33,000	59,000	18,000
Lead	0.5	mg/kg	140	622	**190**	96	64	8.7	**200**	8	**640**	66	27	**1,500**	25	**300**	**580**	**270**	**910**	**1,600**	**2,500**	44
Lithium	20	mg/kg	-	-	6.0	2.4	nd	nd	29	30	21	29	33	14	32	29	28	22	6	12	8	29
Manganese	2	mg/kg	-	-	150	52	27	10	570	630	470	700	690	350	730	760	670	770	200	720	1,500	780
Mercury	0.01	mg/kg	6.6	-	0.13	nd	nd	nd	0.13	nd	0.17	nd	nd	0.27	nd	0.21	0.23	0.15	0.32	0.4	1.6	nd
Molybdenum	2	mg/kg	10	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.0	12	nd
Nickel	2	mg/kg	50	-	3.2	nd	nd	nd	8.3	9.8	6	9.5	9.9	5.4	9.3	9.6	9.0	7.2	8.0	9.0	21	7.0
Rubidium	2	mg/kg	-	-	4.1	5.5	4.9	5.0	3.1	nd	3.6	nd	4.1	4.4	2.1	3.3	2.8	3.1	6.3	3.0	3.0	nd
Selenium	2	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Silver	0.5	mg/kg	20	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Strontium	5	mg/kg	-	-	7.5	5.5	6.1	nd	12	7.0	10	7.7	12	18	10	11	13	11	14	24	120	nd
Thallium	0.1	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.1	0.3	nd
Tin	2	mg/kg	50	-	2.5	2.4	3.3	nd	2.2	nd	5.0	nd	nd	4.1	nd	6.5	5.5	5.2	8.6	22	15	nd
Uranium	0.1	mg/kg	23	-	0.26	0.46	0.36	0.54	0.61	0.33	0.5	0.4	0.4	0.43	0.36	0.67	0.49	0.49	0.56	0.4	0.7	0.2
Vanadium	2	mg/kg	130	-	11	7.8	8.1	3.7	13	7.9	13	8.7	11	15	9.1	13	11	12	12	15	32	12
Zinc	5	mg/kg	200	-	36	18	14	5.5	**320**	76	**250**	120	79	**700**	99	160	140	77	86	**300**	**1,200**	77

Notes:
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Bold/Shaded = Value exceeds SSTL.
Lab-Dup = Laboratory QA/QC duplicate sample.
Fld-Dup = QA/QC field duplicate sample.
FD-1 = Field duplicate of 12-SS1.
FD-2 = Field duplicate of 12-SS15.
CPL-13-BS112 = Field duplicate of CPL-13-BS2.
CPL-19-BS11 = Field duplicate of CPL-19-BS1.
CPL-27-BS12 = Field duplicate of CPL-27-BS1.
DUP1 = Field duplicate of BS10A.
DUP4 = Field duplicate of BS46A.

Table D.1 Results of Laboratory Analysis of Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	SSTL[2]	December, 2010											June, 2010						
					SS3 Lab-Dup	SS4	SS5	SS6	SS7	SS8	SS9	SS10	SS11	SS12	SS13	CPL-1 BS1	CPL-2 BS1	CPL-2 BS1 Lab-Dup	CPL-3 BS1	CPL-5 BS1	CPL-6 BS1	CPL-8 BS1
Aluminum	10	mg/kg	-	-	9,500	3,400	3,500	5,500	4,000	7,900	7,300	6,100	3,200	2,700	4,000	9,200	12,000	12,000	7,100	9,900	9,600	8,300
Antimony	2	mg/kg	20	-	nd	nd	2.0	4.0	4.0	3.0	nd	8.0	3.0	8.0	8.0	nd	nd	nd	**27**	nd	2	nd
Arsenic	2	mg/kg	17	-	2.0	6.0	9.0	**26**	9.0	11	8.0	**18**	9.0	**24**	**18**	6	4	7	4	7	5	3
Barium	5	mg/kg	500	-	32	95	360	240	340	110	140	370	200	800	380	15	21	19	56	34	32	14
Beryllium	2	mg/kg	4	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bismuth	2	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Boron	5	mg/kg	-	-	nd	6	6	nd	nd	nd	nd	nd	nd	6	nd	nd	nd	nd	nd	nd	nd	nd
Cadmium	0.3	mg/kg	10	-	nd	nd	0.8	nd	0.4	nd	0.3	0.4	0.3	3.2	0.5	nd	nd	nd	nd	0.5	nd	nd
Chromium	2	mg/kg	64	-	5.0	10	13	11	7.0	9.0	8.0	14	9.0	23	7.0	6	6	6	14	8	7	7
Cobalt	1	mg/kg	50	-	10	3.0	5.0	3.0	2.0	4.0	6.0	3.0	3.0	5.0	3.0	5	9	9	5	8	6	5
Copper	2	mg/kg	63	-	22	20	30	81	19	20	29	32	22	36	27	15	12	12	18	18	16	7
Iron	50	mg/kg	-	-	17,000	14,000	24,000	27,000	14,000	19,000	18,000	18,000	34,000	11,000	14,000	21,000	21,000	22,000	21,000	21,000	20,000	20,000
Lead	0.5	mg/kg	140	622	39	**560**	**1,800**	**2,100**	**2,000**	**1,300**	**470**	**1,400**	**860**	**3,400**	**1,500**	110	18	18	**210**	93	110	68
Lithium	20	mg/kg	-	-	27	6.0	7.0	6.0	8.0	16	15	9.0	6.0	4.0	5.0	27	36	35	nd	26	21	nd
Manganese	2	mg/kg	-	-	760	240	1,300	410	290	390	880	430	220	1,100	300	640	800	820	440	800	620	460
Mercury	0.01	mg/kg	6.6	-	nd	0.4	1.2	0.5	0.7	0.8	0.2	1.1	0.4	0.6	0.7	nd	nd	nd	nd	nd	nd	nd
Molybdenum	2	mg/kg	10	-	nd	nd	2	4	nd	nd	nd	2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Nickel	2	mg/kg	50	-	7.0	8.0	8.0	8.0	4.0	7.0	8.0	6.0	6.0	6.0	5.0	7	6	7	6	8	7	6
Rubidium	2	mg/kg	-	-	nd	nd	3.0	3.0	4.0	3.0	5.0	3.0	2.0	4.0	3.0	3	2	2	3	2	3	2
Selenium	2	mg/kg	1	-	nd	nd	nd	nd	nd	2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Silver	0.5	mg/kg	20	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Strontium	5	mg/kg	-	-	nd	21	47	16	19	11	37	27	11	57	26	6	8	6	10	10	16	10
Thallium	0.1	mg/kg	1	-	nd	nd	nd	0.1	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tin	2	mg/kg	50	-	nd	10	60	33	16	15	6.0	9.0	26	16	11	nd	nd	nd	5	nd	nd	nd
Uranium	0.1	mg/kg	23	-	0.2	0.3	0.2	0.5	0.3	0.3	0.3	0.4	0.3	0.2	0.4	0.2	0.3	0.3	0.5	0.3	0.5	0.5
Vanadium	2	mg/kg	130	-	12	8.0	9.0	17	8.0	11	10	11	9.0	7.0	12	12	13	13	12	13	13	12
Zinc	5	mg/kg	200	-	73	140	**380**	**210**	**240**	160	**250**	**230**	160	**1,200**	**270**	130	82	86	150	**500**	**220**	85

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CPL-19-BS11 = Field duplicate of CPL-19-BS1.
CPL-27-BS12 = Field duplicate of CPL-27-BS1.
DUP1 = Field duplicate of BS10A.
DUP4 = Field duplicate of BS46A.

Table D.1 Results of Laboratory Analysis of Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	SSTL[2]	June, 2010																	
					CPL-9 BS1	CPL-10 BS2	CPL-11 BS2	CPL-12 BS2	CPL-13 BS2	CPL-14 BS1	CPL-15 BS2	CPL-16 BS2	CPL-17 BS1	CPL-18 BS1	CPL-19 BS1	CPL-20 BS1	CPL-20 BS3	CPL-21 BS1	CPL-21 BS3	CPL-23 BS1	CPL-24 BS1	CPL-25 BS1
Aluminum	10	mg/kg	-	-	8,000	11,000	12,000	11,000	11,000	12,000	11,000	6,000	8,800	9,300	7,700	11,000	11,000	7,700	6,600	7,300	7,600	7,700
Antimony	2	mg/kg	20	-	3	nd	nd	nd	nd	nd	nd	nd	nd	3	nd	nd	7	3	3	13	nd	9
Arsenic	2	mg/kg	17	-	3	4	4	4	5	3	5	3	6	10	10	4	**27**	11	9	15	5	9
Barium	5	mg/kg	500	-	15	19	21	19	19	22	16	12	17	140	51	19	340	220	240	**720**	37	64
Beryllium	2	mg/kg	4	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bismuth	2	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Boron	5	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cadmium	0.3	mg/kg	10	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.6	nd	nd
Chromium	2	mg/kg	64	-	6	6	6	6	7	6	6	6	9	7	7	5	17	9	10	13	7	9
Cobalt	1	mg/kg	50	-	3	9	9	9	9	9	13	2	8	5	5	8	10	4	3	6	4	4
Copper	2	mg/kg	63	-	7	15	23	17	31	17	15	5	18	24	19	15	50	39	33	36	**65**	15
Iron	50	mg/kg	-	-	17,000	21,000	21,000	21,000	21,000	21,000	20,000	16,000	19,000	21,000	19,000	19,000	31,000	17,000	15,000	29,000	17,000	23,000
Lead	0.5	mg/kg	140	622	100	9	10	4	11	4	14	16	4	**490**	**800**	39	**1,800**	**2,600**	**2,000**	**3,900**	**290**	**590**
Lithium	20	mg/kg	-	-	nd	32	34	34	30	33	31	nd	33	24	nd	28	26	nd	nd	nd	nd	24
Manganese	2	mg/kg	-	-	320	820	840	800	800	850	730	180	760	510	450	710	1100	360	290	400	440	480
Mercury	0.01	mg/kg	6.6	-	0.10	nd	nd	nd	nd	nd	nd	0.10	nd	nd	0.30	nd	0.40	0.5	0.5	0.5	0.1	0.2
Molybdenum	2	mg/kg	10	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	3	nd	nd	nd	nd	nd
Nickel	2	mg/kg	50	-	5	8	7	8	8	8	8	3	13	8	8	7	13	7	6	11	6	9
Rubidium	2	mg/kg	-	-	2	2	2	nd	2	nd	2	2	nd	3	2	nd	2	3	3	2	3	3
Selenium	2	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Silver	0.5	mg/kg	20	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.5	0.6	nd	nd	nd
Strontium	5	mg/kg	-	-	13	nd	nd	nd	6	nd	5	9	nd	21	9	nd	22	9	10	17	6	12
Thallium	0.1	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tin	2	mg/kg	50	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	3.0	7.0	nd	16	20	13	26	4	5
Uranium	0.1	mg/kg	23	-	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.2	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.2
Vanadium	2	mg/kg	130	-	11	12	12	12	12	13	12	15	8	11	12	11	17	10	11	11	12	11
Zinc	5	mg/kg	200	-	160	96	74	74	**240**	100	90	73	79	180	120	71	**240**	**230**	**210**	**450**	110	110

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FD-1 = Field duplicate of 12-SS1.
FD-2 = Field duplicate of 12-SS15.
CPL-13-BS112 = Field duplicate of CPL-13-BS2.
CPL-19-BS11 = Field duplicate of CPL-19-BS1.
CPL-27-BS12 = Field duplicate of CPL-27-BS1.
DUP1 = Field duplicate of BS10A.
DUP4 = Field duplicate of BS46A.

Table D.1 Results of Laboratory Analysis of Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	SSTL[2]	June, 2010		Field Duplicates			August, 2008												
					CPL-26 BS1	CPL-27 BS1	CPL-13-BS112	CPL-19-BS11	CPL-27-BS12	BS7A	BS10A	BS11A	BS12A	BS21A	BS22A	BS24A	BS25A	BS27A	BS28A	BS30A	BS31A	BS33A
Aluminum	10	mg/kg	-	-	7,600	5,200	11,000	7,700	4,600	8,600	7,400	2,600	8,200	10,000	8,900	9,200	8,100	9,300	5,400	7,900	10,000	11,000
Antimony	2	mg/kg	20	-	nd	nd	nd	3	nd	nd	3	4	3	nd	nd	nd	nd	nd	3	nd	nd	3
Arsenic	2	mg/kg	17	-	3	4	4	12	3	6	5	nd	2	nd	3	nd	nd	nd	19	4	2	10
Barium	5	mg/kg	500	-	33	24	20	35	26	44	12	43	40	11	14	13	19	11	200	27	66	**1,100**
Beryllium	2	mg/kg	4	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bismuth	2	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Boron	5	mg/kg	-	-	nd	nd	nd	nd	5	6	nd	8	6	nd	nd	nd	nd	nd	6	nd	nd	nd
Cadmium	0.3	mg/kg	10	-	nd	nd	nd	nd	nd	1.1	nd	nd	nd	nd	nd	nd	nd	nd	0.3	1.9	nd	2.7
Chromium	2	mg/kg	64	-	6	6	7	7	4	11	7	4	14	6	7	7	7	6	10	8	8	26
Cobalt	1	mg/kg	50	-	4	3	9	4	2	8	5	2	7	7	6	7	6	8	5	9	7	12
Copper	2	mg/kg	63	-	8	7	29	19	6	28	16	**66**	27	11	11	12	9	29	26	18	19	**78**
Iron	50	mg/kg	-	-	16,000	17,000	21,000	21,000	10,000	21,000	13,000	5,400	20,000	16,000	17,000	16,000	15,000	17,000	21,000	19,000	20,000	29,000
Lead	0.5	mg/kg	140	622	**170**	**210**	13	**1,300**	260	**190**	**760**	140	**250**	400	150	**820**	120	580	**1,200**	**12,000**	**430**	**12,000**
Lithium	20	mg/kg	-	-	22	nd	29	nd	nd	21	15	2	16	26	26	26	25	27	11	24	27	20
Manganese	2	mg/kg	-	-	440	250	790	420	190	880	470	59	560	690	520	620	600	650	560	580	670	710
Mercury	0.01	mg/kg	6.6	-	0.1	0.1	nd	0.2	0.1	0.1	0.3	0.2	nd	nd	nd	0.1	nd	0.3	0.2	0.9	0.1	0.2
Molybdenum	2	mg/kg	10	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	2	nd	nd	nd
Nickel	2	mg/kg	50	-	6	5	9	7	3	7	6	4	11	9	9	9	9	10	9	9	10	22
Rubidium	2	mg/kg	-	-	2	3	2	4	3	3	3	2	3	nd	nd	nd	2	nd	3	nd	2	3
Selenium	2	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd (20)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Silver	0.5	mg/kg	20	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Strontium	5	mg/kg	-	-	7	6	5	6	9	24	9	20	27	nd	6	6	6	nd	22	6	5	37
Thallium	0.1	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tin	2	mg/kg	50	-	2	11	nd	8	2	nd	2	6	4	nd	nd	nd	nd	nd	15	2	nd	7
Uranium	0.1	mg/kg	23	-	0.3	0.3	0.3	0.3	0.3	0.4	0.6	0.6	0.7	0.3	0.3	0.3	0.3	0.3	0.4	0.2	0.3	0.4
Vanadium	2	mg/kg	130	-	9	10	11	14	10	11	12	6	15	7	9	8	8	8	13	8	12	18
Zinc	5	mg/kg	200	-	82	67	**220**	85	69	**440**	**270**	42	**260**	420	96	**1000**	110	200	**380**	**1300**	150	**2,400**

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DUP1 = Field duplicate of BS10A.
DUP4 = Field duplicate of BS46A.

Table D.1 Results of Laboratory Analysis of Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	SSTL[2]	August, 2008												Background Samples				
					BS34A	BS35A	BS38A	BS40A	BS41A	BS45A	BS46A	BS48A	BS49A	BS51A	BS52A	BS54A	BS55A	BS69A	BS70A	BS71A	BS72A	BS73A
Aluminum	10	mg/kg	-	-	11,000	9,700	8,500	9,200	8,600	9,100	5,800	8,200	6,500	8,700	10,000	9,600	6,100	13,000	530	1,300	700	7,000
Antimony	2	mg/kg	20	-	nd	nd	nd	nd	nd	nd	16	nd	3	3	3	nd	3	nd	nd	nd	nd	nd
Arsenic	2	mg/kg	17	-	6	3	4	2	5	3	3	6	9	6	8	4	6	2	nd	nd	nd	nd
Barium	5	mg/kg	500	-	330	350	430	72	63	10	130	21	17	25	72	58	57	9	11	11	13	10
Beryllium	2	mg/kg	4	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bismuth	2	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Boron	5	mg/kg	-	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	6	nd	8	9	6	nd
Cadmium	0.3	mg/kg	10	-	0.5	nd	0.3	nd	nd	1.4	0.3	0.9	nd	nd	nd	0.4	nd	nd	0.5	0.5	0.7	nd
Chromium	2	mg/kg	64	-	38	23	9	9	11	6	6	7	7	20	7	13	7	8	3	3	2	5
Cobalt	1	mg/kg	50	-	24	17	7	10	19	6	4	6	6	9	5	5	3	6	nd	nd	nd	3
Copper	2	mg/kg	63	-	**100**	**67**	25	26	61	**66**	10	11	17	49	15	13	12	7	5	4	6	6
Iron	50	mg/kg	-	-	30,000	23,000	18,000	19,000	20,000	17,000	13,000	15,000	26,000	23,000	18,000	17,000	16,000	20,000	710	1,000	750	13,000
Lead	0.5	mg/kg	140	622	**2,600**	**1,600**	**4,400**	**320**	**320**	**1,300**	**800**	**7,500**	240	**2,400**	280	**3,700**	310	5.8	35	20	10	11
Lithium	20	mg/kg	-	-	22	25	24	25	22	17	15	20	20	26	22	17	16	28	nd	nd	nd	15
Manganese	2	mg/kg	-	-	640	690	630	680	610	430	430	470	480	610	520	440	450	650	7	9	8	360
Mercury	0.01	mg/kg	6.6	-	0.2	nd	0.5	nd	nd	0.2	nd	0.3	0.1	0.2	nd	0.2	nd	nd	0.4	0.5	0.3	0.1
Molybdenum	2	mg/kg	10	-	3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Nickel	2	mg/kg	50	-	**54**	27	8	15	33	7	5	7	9	12	8	6	6	9	2	2	nd	6
Rubidium	2	mg/kg	-	-	3	2	2	nd	2	3	3	2	2	3	2	3	3	nd	nd	nd	nd	2
Selenium	2	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd (20)	nd (20)	nd (20)	nd
Silver	0.5	mg/kg	20	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Strontium	5	mg/kg	-	-	16	13	16	6	6	7	8	10	7	10	17	12	7	nd	40	43	46	8
Thallium	0.1	mg/kg	1	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tin	2	mg/kg	50	-	8	5	4	nd	nd	2	4	nd	nd	3	2	3	5	nd	3	nd	nd	nd
Uranium	0.1	mg/kg	23	-	0.3	0.3	0.2	0.2	0.3	0.4	0.2	0.3	0.2	0.4	0.4	0.4	0.2	0.3	nd	0.2	0.1	0.2
Vanadium	2	mg/kg	130	-	17	11	9	10	11	8	9	9	8	14	11	11	10	10	4	3	3	10
Zinc	5	mg/kg	200	-	**540**	**450**	**450**	94	110	**510**	**310**	**1400**	93	**530**	140	**1300**	96	59	27	27	27	40

Notes:
1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines fo
2 = Site Specific Target Level (SSTL) derived for protection of residential toddler (Stantec, 2011).
RDL = Reportable Detection Limit.
nd = Not detected above standard RDL.
nd(#) = Not detected above elevated RDL shown in brackets.
"-" = no applicable guidelines.
Bold and Underlined = Value exceeds generic CCME residential guideline.
Bold/Shaded = Value exceeds SSTL.
Lab-Dup = Laboratory QA/QC duplicate sample.
Fld-Dup = QA/QC field duplicate sample.
FD-1 = Field duplicate of 12-SS1.
FD-2 = Field duplicate of 12-SS15.
CPL-13-BS112 = Field duplicate of CPL-13-BS2.
CPL-19-BS11 = Field duplicate of CPL-19-BS1.
CPL-27-BS12 = Field duplicate of CPL-27-BS1.
DUP1 = Field duplicate of BS10A.
DUP4 = Field duplicate of BS46A.

Table D.1 Results of Laboratory Analysis of Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	SSTL[2]	Background Samples			Field Duplicate Samples		
					BS74A	BS75A	BS76A	DUP-1	DUP-4	DUP-4 Lab-Dup
Aluminum	10	mg/kg	-	-	690	790	1,100	4,400	8,300	8,000
Antimony	2	mg/kg	20	-	nd	nd	nd	4	15	12
Arsenic	2	mg/kg	17	-	nd	2	nd	6	5	4
Barium	5	mg/kg	500	-	15	10	11	10	140	160
Beryllium	2	mg/kg	4	-	nd	nd	nd	nd	nd	nd
Bismuth	2	mg/kg	-	-	nd	nd	nd	nd	nd	nd
Boron	5	mg/kg	-	-	10	8	8	nd	nd	nd
Cadmium	0.3	mg/kg	10	-	0.8	0.6	0.6	nd	0.4	0.4
Chromium	2	mg/kg	64	-	3	3	2	7	8	8
Cobalt	1	mg/kg	50	-	nd	nd	nd	4	5	4
Copper	2	mg/kg	63	-	6	5	5	21	13	12
Iron	50	mg/kg	-	-	790	900	850	11,000	17,000	17,000
Lead	0.5	mg/kg	140	622	38	35	17	**1,400**	**830**	**750**
Lithium	20	mg/kg	-	-	nd	nd	nd	8	20	19.0
Manganese	2	mg/kg	-	-	7	6	15	350	480	450
Mercury	0.01	mg/kg	6.6	-	0.5	0.6	0.4	0.3	0.1	0.1
Molybdenum	2	mg/kg	10	-	nd	nd	nd	nd	nd	nd
Nickel	2	mg/kg	50	-	2	2	nd	5	8	8
Rubidium	2	mg/kg	-	-	nd	nd	nd	3	3	3
Selenium	2	mg/kg	1	-	nd (20)	nd (20)	nd (20)	nd	nd	nd
Silver	0.5	mg/kg	20	-	nd	nd	nd	nd	nd	nd
Strontium	5	mg/kg	-	-	39	35	45	7	9	9
Thallium	0.1	mg/kg	1	-	nd	nd	nd	nd	nd	nd
Tin	2	mg/kg	50	-	nd	nd	nd	4.0	6.0	5.0
Uranium	0.1	mg/kg	23	-	nd	0.1	nd	0.5	0.3	0.2
Vanadium	2	mg/kg	130	-	5	5	3	11	11	11
Zinc	5	mg/kg	200	-	29	17	23	180	**410**	**380**

Notes:
1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines fo
2 = Site Specific Target Level (SSTL) derived for protection of residential toddler (Stantec, 2011).
RDL = Reportable Detection Limit.
nd = Not detected above standard RDL.
nd(#) = Not detected above elevated RDL shown in brackets.
"-" = no applicable guidelines.
Bold and Underlined = Value exceeds generic CCME residential guideline.
Bold/Shaded = Value exceeds SSTL.
Lab-Dup = Laboratory QA/QC duplicate sample.
Fld-Dup = QA/QC field duplicate sample.
FD-1 = Field duplicate of 12-SS1.
FD-2 = Field duplicate of 12-SS15.
CPL-13-BS112 = Field duplicate of CPL-13-BS2.
CPL-19-BS11 = Field duplicate of CPL-19-BS1.
CPL-27-BS12 = Field duplicate of CPL-27-BS1.
DUP1 = Field duplicate of BS10A.
DUP4 = Field duplicate of BS46A.

Table D.2 Results of Laboratory Analysis of Leachable Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	December, 2012									
				12-SS3	12-SS4	12-SS7	12-SS8	12-SS10	12-SS12	12-SS13	12-SS14	12-SS15	TP2-BS1
Leachable Aluminum	100	ug/L	-	980	670	660	910	410	390	490	470	430	1,500
Leachable Antimony	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Arsenic	20	ug/L	2,500	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Barium	50	ug/L	100,000	510	840	3,800	860	160	2,100	760	570	310	1,200
Leachable Beryllium	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Boron	500	ug/L	500,000	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Cadmium	3	ug/L	500	nd	nd	14	nd	nd	5.5	nd	nd	nd	5.6
Leachable Calcium	1000	ug/L	-	2,500	9,900	47,000	2,900	3,800	40,000	10,000	4,700	4,600	8,000
Leachable Chromium	20	ug/L	5,000	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Cobalt	10	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Copper	20	ug/L	-	29	nd	1600	34	nd	nd	nd	nd	nd	nd
Leachable Iron	500	ug/L	-	nd	600	nd	nd	540	nd	800	nd	nd	nd
Leachable Lead	5	ug/L	5,000	4,900	690	1,900	2,000	640	1,800	630	1,100	820	1,000
Leachable Lithium	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Magnesium	1000	ug/L	-	1,300	4,600	13,000	1,300	4,300	13,000	5,100	2,900	3,700	2,900
Leachable Manganese	20	ug/L	-	87	150	490	150	66	150	200	190	60	88
Leachable Molybdenum	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Nickel	20	ug/L	-	nd	nd	30	nd	nd	nd	nd	nd	nd	nd
Leachable Potassium	1000	ug/L	-	2200	2800	4800	2100	1600	3400	1500	1400	1900	2500
Leachable Selenium	20	ug/L	1,000	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Silver	5	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Strontium	50	ug/L	-	nd	130	360	nd	57	260	110	52	56	76
Leachable Thallium	1	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Tin	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Uranium	1	ug/L	10,000	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Vanadium	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Zinc	50	ug/L	-	210	510	30,000	180	170	3,300	760	390	190	2,000

Notes:

1 = Newfoundland and Labrador Department of Environment Pollution Prevention Division Guidance Document Leachable Toxic Waste, Testing and Disposal (November, 2003).

RDL = Reportable Detection Limit.

nd = Not detected above standard RDL.

nd(#) = Not detected above elevated RDL shown in brackets.

na = Not analyzed.

"-" = No applicable guidelines.

Shaded/Bolded = Value exceeds guideline.

CPL-19-BS11 = field duplicate of CPL-19-BS1

Table D.2 Results of Laboratory Analysis of Leachable Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Managemen
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	December, 2012		December, 2010					June, 2010				
				TP2-BS1 Lab-Dup	TP4-BS1	SS2	SS6	SS7	SS12	SS12 Lab-Dup	CPL-1 BS1	CPL-1 BS1 Lab-Dup	CPL-5 BS1	CPL-9 BS1	CPL-19 BS1
Leachable Aluminum	100	ug/L	-	1,600	1,100	530	600	290	220	310	700	720	990	620	850
Leachable Antimony	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Arsenic	20	ug/L	2,500	nd	nd	30	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Barium	50	ug/L	100,000	1,100	700	1,900	570	670	1,300	1,400	250	250	460	340	360
Leachable Beryllium	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd (200)	nd (200)	nd (200)	nd	nd
Leachable Boron	500	ug/L	500,000	nd	nd	nd	nd	nd	nd	nd	nd (5,000)	nd (5,000)	nd (5,000)	nd	nd
Leachable Cadmium	3	ug/L	500	5.2	5.3	5	nd	nd	7	8	nd	nd	4	nd	nd
Leachable Calcium	1000	ug/L	-	7,800	25,000	25,000	6,300	12,000	17,000	19,000	6,600	7,100	18,000	11,000	4,600
Leachable Chromium	20	ug/L	5,000	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Cobalt	10	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Copper	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Iron	500	ug/L	-	nd	1,200	nd	540	nd	nd	550	nd	nd	nd	nd	nd
Leachable Lead	5	ug/L	5,000	1,300	970	1,300	1,500	1,500	2,500	4,100	210	150	87	78	1,200
Leachable Lithium	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd (200)	nd (200)	nd (200)	nd	nd
Leachable Magnesium	1000	ug/L	-	2,900	3,800	8,600	4,800	7,400	5,700	5,200	6,400	6,700	13,000	7,700	3,400
Leachable Manganese	20	ug/L	-	95	86	130	82	190	340	350	320	350	650	61	150
Leachable Molybdenum	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Nickel	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Potassium	1000	ug/L	-	2700	2100	5,400	5,700	4,500	2,800	2,100	5,600	5,900	5,200	4,400	4,400
Leachable Selenium	20	ug/L	1,000	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Silver	5	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Strontium	50	ug/L	-	72	160	350	79	130	210	230	70	73	150	130	nd
Leachable Thallium	1	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Tin	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Uranium	1	ug/L	10,000	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Vanadium	20	ug/L	-	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Leachable Zinc	50	ug/L	-	2,000	4,600	4,300	400	890	3,200	3,800	530	550	3,300	730	270

Notes:
1 = Newfoundland and Labrador Department of Environment Pollution Preventior
RDL = Reportable Detection Limit.
nd = Not detected above standard RDL.
nd(#) = Not detected above elevated RDL shown in brackets.
na = Not analyzed.
"-" = No applicable guidelines.
Shaded/Bolded = Value exceeds guideline.
CPL-19-BS11 = field duplicate of CPL-19-BS1

Table D.2 Results of Laboratory Analysis of Leachable Metals in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Managemen
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guidelines[1]	June, 2010								August, 2008			
				CPL-20 BS1	CPL-21 BS1	CPL-23 BS1	CPL-26 BS1	CPL-19-BS11	CPL-20-BS3	CPL-25-BS1	CPL-25 BS1 Lab-Dup	BS30A	BS33A	BS38A	BS48A
Leachable Aluminum	100	ug/L	-	1,400	630	650	900	840	na	na	na	440	470	390	460
Leachable Antimony	20	ug/L	-	nd	nd	57	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Arsenic	20	ug/L	2,500	nd	nd	35	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Barium	50	ug/L	100,000	350	1,400	2,000	360	570	na	na	na	85	1,100	1,100	110
Leachable Beryllium	20	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Boron	500	ug/L	500,000	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Cadmium	3	ug/L	500	nd	nd	5	nd	nd	na	na	na	3	33	5	nd
Leachable Calcium	1000	ug/L	-	3,200	10,000	11,000	6,400	6,000	na	na	na	na	na	na	na
Leachable Chromium	20	ug/L	5,000	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Cobalt	10	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	11	nd	nd
Leachable Copper	20	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	28	nd	nd
Leachable Iron	500	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Lead	5	ug/L	5,000	200	**5,200**	**17,000**	200	2,200	**5,200**	1,100	1,300	**130,000**	**81,000**	**27,000**	**42,000**
Leachable Lithium	20	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Magnesium	1000	ug/L	-	1,300	6,300	4,300	3,200	3,800	na	na	na	na	na	na	na
Leachable Manganese	20	ug/L	-	120	140	96	240	150	na	na	na	310	170	210	170
Leachable Molybdenum	20	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Nickel	20	ug/L	-	nd	nd	nd	nd	nd	na	na	na	35	46	nd	nd
Leachable Potassium	1000	ug/L	-	3,900	6,000	2,600	4,600	3,400	na	na	na	na	na	na	na
Leachable Selenium	20	ug/L	1,000	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Silver	5	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Strontium	50	ug/L	-	nd	100	98	57	55	na	na	na	56	200	130	69
Leachable Thallium	1	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Tin	20	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Uranium	1	ug/L	10,000	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Vanadium	20	ug/L	-	nd	nd	nd	nd	nd	na	na	na	nd	nd	nd	nd
Leachable Zinc	50	ug/L	-	260	1,400	2,000	280	320	na	na	na	14,000	26,000	5,200	12,000

Notes:
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RDL = Reportable Detection Limit.
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nd(#) = Not detected above elevated RDL shown in brackets.
na = Not analyzed.
"-" = No applicable guidelines.
Shaded/Bolded = Value exceeds guideline.
CPL-19-BS11 = field duplicate of CPL-19-BS1

Table D.3 Results of Laboratory Analysis of General Chemistry in Soil
Additional Delineation and Updated Remedial Action Plan/Risk Management Plan
DFO Light Station, Cape Pine, NL (DFRP# 34599)
Stantec Project No. 121412505

Parameters	RDL	Units	Guideline[1]	12-SS2	12-SS3	12-SS8	12-SS11	12-SS12	12-SS14	TP1-BS1	TPI-BS1 Lab-Dup	TP2-BS1	TP4-BS1	TP5-BS1
Ammonia-N	0.28	mg/kg	-	nd (0.34)	nd (0.34)	nd (0.35)	nd (0.39)	nd (0.67)	nd (0.45)	nd (0.31)	na	nd (0.31)	nd (0.33)	nd
Chloride (Cl)	5	mg/kg	-	45	37	93	46	150	51	69	64	80	61	39
Conductivity	1	uS/cm	2,000	88	66	110	57	130	110	76	71	83	78	47
Moisture	1	%	-	24	24	26	32	59	41	18	na	18	21	11
Nitrate + Nitrite	0.25	mg/kg	-	5.3	4.4	4.5	6.3	13	6.8	1.5	1.3	2.5	4.2	1.4
Nitrite (N)	0.05	mg/kg	-	nd	nd	nd	nd (0.1)	nd (0.1)	nd	nd	nd	nd	nd	nd
Orthophosphate (P)	0.05	mg/kg	-	0.76	0.58	0.86	1.9	9.6	0.73	0.25	0.25	0.27	3.2	0.31
Soluble (5:1) pH	N/A	pH	6 - 8	**5.4**	**5.05**	**4.94**	**5.49**	**5.94**	**4.74**	**5.97**	6.07	**5.77**	6.18	6.05
Sulphate (SO_4)	10	mg/kg	-	nd	nd	nd	nd (20)	23	nd	nd	nd	nd	25	nd

Notes:
1 = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (1999 and Updates). Residential land use.
RDL = Reportable Detection Limit.
nd = Not detected above standard RDL.
nd(#) = Not detected above elevated RDL shown in brackets.
"-" = No applicable guideline.
na = not analyzed.
Bold/shaded = Value is not in guideline range.

APPENDIX E

Maxxam Analytics Laboratory Reports

Current Investigation - 2012

Your P.O. #: 16300R-40
Your Project #: 121412505
Site Location: CAPE PINE
Your C.O.C. #: ES654612, ES654712, ES655012

Attention: Jonathan Murphy
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2012/12/07

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2I7854
Received: 2012/11/28, 10:10

Sample Matrix: Soil
Samples Received: 24

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Chloride in Soil by Auto. Colourimetry (1)	10	N/A	2012/12/06	ATL SOP 00014	Based on SM4500-Cl-
Conductance - soil (1)	10	2012/12/05	2012/12/06	ATL SOP 00006	Based on SM2510B
Total Metals Analysis by ICP (2)	10	2012/12/06	2012/12/06	CAM SOP-00408	SW-846 6010C
Metals Solids Acid Extr. ICPMS (1,3)	12	2012/12/05	2012/06/12	ATL SOP 00024/58	Based on EPA6020A
Metals Solids Acid Extr. ICPMS (1,3)	12	2012/12/05	2012/12/06	ATL SOP 00024/58	Based on EPA6020A
Moisture (1)	4	N/A	2012/11/29	ATL SOP 00001	MOE Handbook 1983
Moisture (1)	6	N/A	2012/11/30	ATL SOP 00001	MOE Handbook 1983
Nitrogen Ammonia - soil (as N) (1)	10	2012/12/05	2012/12/07	ATL SOP 00015	Based on EPA 350.1
Nitrogen - Nitrate + Nitrite (1)	10	2012/12/06	2012/12/07	ATL SOP 00016	Based on USGS enz.
Nitrogen - Nitrite by auto colourimetry (1)	10	2012/12/06	2012/12/06	ATL SOP 00017	Based on SM4500-NO2B
pH (5:1 DI Water Extract) (1)	10	2012/12/05	2012/12/06	ATL SOP 00003	Based on SM4500H+B
Phosphorus - ortho by auto Colourimetry (1)	10	2012/12/06	2012/12/07	ATL SOP 00021	Based on EPA 365.1
Sulphate in Soil by Auto Colourimetry (1)	10	2012/12/06	2012/12/07	ATL SOP 00023	Based on EPA 375.4

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

(1) This test was performed by Bedford
(2) This test was performed by Maxxam Analytics Mississauga
(3) Note: Metals naming convention has been changed from "Available" to "Acid Extractable" as part of a national harmonization initiative. Contact your project manager for additional details.

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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.maxxam.ca

Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

Encryption Key

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 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.

Total cover pages: 2

Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

RESULTS OF ANALYSES OF SOIL

Maxxam ID		PU0427	PU0428		PU0429		PU0431		PU0432		PU0434		
Sampling Date		2012/11/23	2012/11/23		2012/11/23		2012/11/23		2012/11/23		2012/11/23		
	Units	**12-SS2**	**12-SS3**	**RDL**	**12-SS8**	**RDL**	**12-SS11**	**RDL**	**12-SS12**	**RDL**	**12-SS14**	**RDL**	**QC Batch**
Inorganics													
Ammonia-N	mg/kg	ND	ND	0.34	ND	0.35	ND	0.39	ND	0.67	ND	0.45	3060357
Chloride (Cl)	mg/kg	45	37	5.0	93	5.0	46	10	150	10	51	5.0	3060289
Conductivity	uS/cm	88	66	1.0	110	1.0	57	1.0	130	1.0	110	1.0	3060193
Moisture	%	24	24	1	26	1	32	1	59	1	41	1	3053939
Nitrate + Nitrite	mg/kg	5.3	4.4	0.25	4.5	0.25	6.3	0.50	13	0.50	6.8	0.25	3060300
Nitrite (N)	mg/kg	ND	ND	0.050	ND	0.050	ND	0.10	ND	0.10	ND	0.050	3060299
Orthophosphate (P)	mg/kg	0.76	0.58	0.050	0.86	0.050	1.9	0.10	9.6	0.10	0.73	0.050	3060298
Soluble (5:1) pH	pH	5.40	5.05	N/A	4.94	N/A	5.49	N/A	5.94	N/A	4.74	N/A	3060191
Sulphate (SO4)	mg/kg	ND	ND	10	ND	10	ND	20	23	20	ND	10	3060295

Maxxam ID		PU0461	PU0461	PU0462		PU0463		PU0470		
Sampling Date		2012/11/22	2012/11/22	2012/11/22		2012/11/22		2012/11/22		
	Units	**TPI-BS1**	**TPI-BS1 Lab-Dup**	**TP2-BS1**	**RDL**	**TP4-BS1**	**RDL**	**TP5-BS1**	**RDL**	**QC Batch**
Inorganics										
Ammonia-N	mg/kg	ND		ND	0.31	ND	0.33	ND	0.28	3060357
Chloride (Cl)	mg/kg	69	64	80	5.0	61	5.0	39	5.0	3060289
Conductivity	uS/cm	76	71	83	1.0	78	1.0	47	1.0	3060193
Moisture	%	18		18	1	21	1	11	1	3052483
Nitrate + Nitrite	mg/kg	1.5	1.3	2.5	0.25	4.2	0.25	1.4	0.25	3060300
Nitrite (N)	mg/kg	ND	ND	ND	0.050	ND	0.050	ND	0.050	3060299
Orthophosphate (P)	mg/kg	0.25	0.25	0.27	0.050	3.2	0.050	0.31	0.050	3060298
Soluble (5:1) pH	pH	5.97	6.07	5.77	N/A	6.18	N/A	6.05	N/A	3060191
Sulphate (SO4)	mg/kg	ND	ND	ND	10	25	10	ND	10	3060295

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

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.maxxam.ca

Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		PU0426	PU0427	PU0428	PU0428		PU0429	PU0430	PU0431	PU0432		
Sampling Date		2012/11/23	2012/11/23	2012/11/23	2012/11/23		2012/11/23	2012/11/23	2012/11/23	2012/11/23		
	Units	**12-SS1**	**12-SS2**	**12-SS3**	**12-SS3 Lab-Dup**	**QC Batch**	**12-SS8**	**12-SS10**	**12-SS11**	**12-SS12**	**RDL**	**QC Batch**
Metals												
Acid Extractable Phosphorus (P)	ug/g		940	1400		3060169	1400		800	1300	20	3060169
Acid Extractable Aluminum (Al)	mg/kg	12000	9900	9900	10000	3058874	6300	4600	7800	7400	10	3059013
Acid Extractable Antimony (Sb)	mg/kg	3.0	3.9	12	9.4	3058874	2.3	5.9	17	12	2.0	3059013
Acid Extractable Arsenic (As)	mg/kg	5.6	8.5	13	14	3058874	24	9.7	5.0	14	2.0	3059013
Acid Extractable Barium (Ba)	mg/kg	59	38	160	420(1)	3058874	180	45	49	880	5.0	3059013
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	3058874	ND	ND	ND	ND	2.0	3059013
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	ND	3058874	ND	ND	ND	ND	2.0	3059013
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	ND	3058874	ND	5.7	ND	6.1	5.0	3059013
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	ND	3058874	ND	ND	ND	2.2	0.30	3059013
Acid Extractable Chromium (Cr)	mg/kg	9.3	8.3	13	13	3058874	8.4	5.4	7.1	23	2.0	3059013
Acid Extractable Cobalt (Co)	mg/kg	5.9	5.2	6.0	5.9	3058874	4.9	3.6	3.9	6.3	1.0	3059013
Acid Extractable Copper (Cu)	mg/kg	14	12	130	110	3058874	39	21	13	79	2.0	3059013
Acid Extractable Iron (Fe)	mg/kg	24000	23000	32000	32000	3058874	31000	33000	20000	34000	50	3059013
Acid Extractable Lead (Pb)	mg/kg	270	370	2000	1800	3058874	1600	820	340	4900	0.50	3059013
Acid Extractable Lithium (Li)	mg/kg	22	25	24	25	3058874	8.3	6.5	17	8.1	2.0	3059013
Acid Extractable Manganese (Mn)	mg/kg	750	540	590	670	3058874	610	200	430	770	2.0	3059013
Acid Extractable Mercury (Hg)	mg/kg	0.15	0.12	0.60	0.61	3058874	0.65	0.29	0.14	1.0	0.10	3059013
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	3058874	3.5	ND	ND	ND	2.0	3059013
Acid Extractable Nickel (Ni)	mg/kg	7.2	8.4	10	9.7	3058874	9.6	6.6	6.2	13	2.0	3059013
Acid Extractable Rubidium (Rb)	mg/kg	3.0	3.2	5.0	4.7	3058874	4.5	3.6	3.7	2.9	2.0	3059013
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	3058874	ND	ND	ND	ND	2.0	3059013
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	3058874	ND	ND	ND	ND	0.50	3059013
Acid Extractable Strontium (Sr)	mg/kg	13	9.4	12	19	3058874	10	11	10	44	5.0	3059013
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	ND	3058874	0.17	ND	ND	0.11	0.10	3059013
Acid Extractable Tin (Sn)	mg/kg	4.1	7.1	20	25	3058874	11	9.6	5.0	76	2.0	3059013
Acid Extractable Uranium (U)	mg/kg	0.46	0.39	0.39	0.40	3058874	0.48	0.49	0.37	0.55	0.10	3059013
Acid Extractable Vanadium (V)	mg/kg	12	12	15	14	3058874	12	9.5	13	17	2.0	3059013
Acid Extractable Zinc (Zn)	mg/kg	80	95	210	220	3058874	81	97	110	1400	5.0	3059013

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Poor RPD due to sample inhomogeneity. The sample was redigested and Ba = 490 mg/kg.

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Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		PU0433	PU0434	PU0435	PU0458	PU0459	PU0460		
Sampling Date		2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23		
	Units	**12-SS13**	**12-SS14**	**12-SS15**	**12-SS19**	**12-SS21**	**12-SS23**	**RDL**	**QC Batch**
Metals									
Acid Extractable Phosphorus (P)	ug/g		990					20	3060169
Acid Extractable Aluminum (Al)	mg/kg	4700	5100	4700	3500	2800	4600	10	3059013
Acid Extractable Antimony (Sb)	mg/kg	4.0	2.9	4.3	ND	ND	ND	2.0	3059013
Acid Extractable Arsenic (As)	mg/kg	17	11	10	2.4	ND	ND	2.0	3059013
Acid Extractable Barium (Ba)	mg/kg	200	83	70	18	13	11	5.0	3059013
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	3059013
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	3059013
Acid Extractable Boron (B)	mg/kg	ND	ND	5.2	ND	ND	ND	5.0	3059013
Acid Extractable Cadmium (Cd)	mg/kg	0.31	ND	ND	ND	ND	ND	0.30	3059013
Acid Extractable Chromium (Cr)	mg/kg	6.1	5.6	5.0	2.6	17	2.5	2.0	3059013
Acid Extractable Cobalt (Co)	mg/kg	3.7	1.8	2.6	ND	ND	ND	1.0	3059013
Acid Extractable Copper (Cu)	mg/kg	15	18	23	4.2	3.3	2.1	2.0	3059013
Acid Extractable Iron (Fe)	mg/kg	20000	18000	18000	6200	5400	2000	50	3059013
Acid Extractable Lead (Pb)	mg/kg	1100	1200	1100	96	64	8.7	0.50	3059013
Acid Extractable Lithium (Li)	mg/kg	9.3	5.3	6.7	2.4	ND	ND	2.0	3059013
Acid Extractable Manganese (Mn)	mg/kg	650	230	190	52	27	9.9	2.0	3059013
Acid Extractable Mercury (Hg)	mg/kg	0.32	0.34	0.27	ND	ND	ND	0.10	3059013
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	3059013
Acid Extractable Nickel (Ni)	mg/kg	5.1	3.1	4.5	ND	ND	ND	2.0	3059013
Acid Extractable Rubidium (Rb)	mg/kg	3.8	5.6	6.2	5.5	4.9	5.0	2.0	3059013
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	3059013
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	ND	0.50	3059013
Acid Extractable Strontium (Sr)	mg/kg	22	6.8	8.1	5.5	6.1	ND	5.0	3059013
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	ND	0.10	3059013
Acid Extractable Tin (Sn)	mg/kg	32	12	13	2.4	3.3	ND	2.0	3059013
Acid Extractable Uranium (U)	mg/kg	0.34	0.40	0.46	0.46	0.36	0.54	0.10	3059013
Acid Extractable Vanadium (V)	mg/kg	12	14	9.0	7.8	8.1	3.7	2.0	3059013
Acid Extractable Zinc (Zn)	mg/kg	220	82	65	18	14	5.5	5.0	3059013

ND = Not detected
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Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		PU0461	PU0462	PU0463		PU0464	PU0465		
Sampling Date		2012/11/22	2012/11/22	2012/11/22		2012/11/22	2012/11/22		
	Units	**TPI-BS1**	**TP2-BS1**	**TP4-BS1**	**QC Batch**	**TP1-BS2**	**TP2-BS2**	**RDL**	**QC Batch**
Metals									
Acid Extractable Phosphorus (P)	ug/g	450	600	1100	3060169			20	
Acid Extractable Aluminum (Al)	mg/kg	16000	11000	7300	3058874	9400	13000	10	3059013
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	2.6	3058874	ND	ND	2.0	3059013
Acid Extractable Arsenic (As)	mg/kg	3.3	4.5	6.7	3058874	2.3	2.4	2.0	3059013
Acid Extractable Barium (Ba)	mg/kg	65	160	300	3058874	13	21	5.0	3059013
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	3058874	ND	ND	2.0	3059013
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	3058874	ND	ND	2.0	3059013
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	3058874	ND	ND	5.0	3059013
Acid Extractable Cadmium (Cd)	mg/kg	ND	0.53	0.84	3058874	ND	ND	0.30	3059013
Acid Extractable Chromium (Cr)	mg/kg	9.5	7.8	7.6	3058874	6.2	7.3	2.0	3059013
Acid Extractable Cobalt (Co)	mg/kg	6.2	4.6	4.0	3058874	6.9	7.1	1.0	3059013
Acid Extractable Copper (Cu)	mg/kg	15	20	21	3058874	7.6	8.5	2.0	3059013
Acid Extractable Iron (Fe)	mg/kg	25000	22000	21000	3058874	18000	21000	50	3059013
Acid Extractable Lead (Pb)	mg/kg	200	640	1500	3058874	8.4	66	0.50	3059013
Acid Extractable Lithium (Li)	mg/kg	29	21	14	3058874	30	29	2.0	3059013
Acid Extractable Manganese (Mn)	mg/kg	570	470	350	3058874	630	700	2.0	3059013
Acid Extractable Mercury (Hg)	mg/kg	0.13	0.17	0.27	3058874	ND	ND	0.10	3059013
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	3058874	ND	ND	2.0	3059013
Acid Extractable Nickel (Ni)	mg/kg	8.3	6.0	5.4	3058874	9.8	9.5	2.0	3059013
Acid Extractable Rubidium (Rb)	mg/kg	3.1	3.6	4.4	3058874	ND	ND	2.0	3059013
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	3058874	ND	ND	2.0	3059013
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	3058874	ND	ND	0.50	3059013
Acid Extractable Strontium (Sr)	mg/kg	12	10	18	3058874	7.0	7.7	5.0	3059013
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	3058874	ND	ND	0.10	3059013
Acid Extractable Tin (Sn)	mg/kg	2.2	5.0	4.1	3058874	ND	ND	2.0	3059013
Acid Extractable Uranium (U)	mg/kg	0.61	0.50	0.43	3058874	0.33	0.40	0.10	3059013
Acid Extractable Vanadium (V)	mg/kg	13	13	15	3058874	7.9	8.7	2.0	3059013
Acid Extractable Zinc (Zn)	mg/kg	320	250	700	3058874	76	120	5.0	3059013

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		PU0466	PU0467	PU0469	PU0470	PU0471	PU0472		
Sampling Date		2012/11/22	2012/11/22	2012/11/22	2012/11/22	2012/11/22	2012/11/22		
	Units	**TP3-BS2**	**TP4-BS2**	**TP5-BS2**	**TP5-BS1**	**FD-1**	**FD-2**	**RDL**	**QC Batch**
Metals									
Acid Extractable Phosphorus (P)	ug/g				740			20	3060169
Acid Extractable Aluminum (Al)	mg/kg	13000	11000	13000	16000	12000	5000	10	3058874
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	ND	ND	2.8	6.2	2.0	3058874
Acid Extractable Arsenic (As)	mg/kg	2.5	3.3	5.8	5.1	5.3	20	2.0	3058874
Acid Extractable Barium (Ba)	mg/kg	22	14	200	81	59	72	5.0	3058874
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	3058874
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	3058874
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	ND	ND	6.2	5.0	3058874
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	ND	ND	ND	0.30	3058874
Acid Extractable Chromium (Cr)	mg/kg	8.1	7.0	8.3	9.9	9.5	6.1	2.0	3058874
Acid Extractable Cobalt (Co)	mg/kg	6.4	8.1	7.1	7.3	5.7	3.5	1.0	3058874
Acid Extractable Copper (Cu)	mg/kg	9.5	8.2	26	22	14	29	2.0	3058874
Acid Extractable Iron (Fe)	mg/kg	20000	20000	23000	26000	23000	34000	50	3058874
Acid Extractable Lead (Pb)	mg/kg	27	25	580	300	270	910	0.50	3058874
Acid Extractable Lithium (Li)	mg/kg	33	32	28	29	22	6.3	2.0	3058874
Acid Extractable Manganese (Mn)	mg/kg	690	730	670	760	770	200	2.0	3058874
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	0.23	0.21	0.15	0.32	0.10	3058874
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	3058874
Acid Extractable Nickel (Ni)	mg/kg	9.9	9.3	9.0	9.6	7.2	8.0	2.0	3058874
Acid Extractable Rubidium (Rb)	mg/kg	4.1	2.1	2.8	3.3	3.1	6.3	2.0	3058874
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	ND	2.0	3058874
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	ND	0.50	3058874
Acid Extractable Strontium (Sr)	mg/kg	12	10	13	11	11	14	5.0	3058874
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	ND	0.10	3058874
Acid Extractable Tin (Sn)	mg/kg	ND	ND	5.5	6.5	5.2	8.6	2.0	3058874
Acid Extractable Uranium (U)	mg/kg	0.40	0.36	0.49	0.67	0.49	0.56	0.10	3058874
Acid Extractable Vanadium (V)	mg/kg	11	9.1	11	13	12	12	2.0	3058874
Acid Extractable Zinc (Zn)	mg/kg	79	99	140	160	77	86	5.0	3058874

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

Package 1	6.9°C

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

GENERAL COMMENTS

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.maxxam.ca

Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	%Recovery	QC Limits	%Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3058874	Acid Extractable Antimony (Sb)	2012/12/06	NC	75 - 125	108	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3058874	Acid Extractable Arsenic (As)	2012/12/06	102	75 - 125	101	75 - 125	ND, RDL=2.0	mg/kg	2.4	35
3058874	Acid Extractable Barium (Ba)	2012/12/06	NC	75 - 125	104	75 - 125	ND, RDL=5.0	mg/kg	87.1(1, 2)	35
3058874	Acid Extractable Beryllium (Be)	2012/12/06	103	75 - 125	105	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3058874	Acid Extractable Bismuth (Bi)	2012/12/06	110	75 - 125	108	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3058874	Acid Extractable Boron (B)	2012/12/06	95	75 - 125	106	75 - 125	ND, RDL=5.0	mg/kg	NC	35
3058874	Acid Extractable Cadmium (Cd)	2012/12/06	101	75 - 125	105	75 - 125	ND, RDL=0.30	mg/kg	NC	35
3058874	Acid Extractable Chromium (Cr)	2012/12/06	101	75 - 125	102	75 - 125	ND, RDL=2.0	mg/kg	1.1	35
3058874	Acid Extractable Cobalt (Co)	2012/12/06	101	75 - 125	101	75 - 125	ND, RDL=1.0	mg/kg	2.1	35
3058874	Acid Extractable Copper (Cu)	2012/12/06	NC	75 - 125	102	75 - 125	ND, RDL=2.0	mg/kg	10.4	35
3058874	Acid Extractable Lead (Pb)	2012/12/06	NC	75 - 125	104	75 - 125	ND, RDL=0.50	mg/kg	6.8	35
3058874	Acid Extractable Lithium (Li)	2012/12/06	107	75 - 125	106	75 - 125	ND, RDL=2.0	mg/kg	5.7	35
3058874	Acid Extractable Manganese (Mn)	2012/12/06	NC	75 - 125	100	75 - 125	ND, RDL=2.0	mg/kg	11.7	35
3058874	Acid Extractable Mercury (Hg)	2012/12/06	101	75 - 125	104	75 - 125	ND, RDL=0.10	mg/kg	0.8	35
3058874	Acid Extractable Molybdenum (Mo)	2012/12/06	106	75 - 125	103	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3058874	Acid Extractable Nickel (Ni)	2012/12/06	101	75 - 125	99	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3058874	Acid Extractable Rubidium (Rb)	2012/12/06	93	75 - 125	98	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3058874	Acid Extractable Selenium (Se)	2012/12/06	99	75 - 125	99	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3058874	Acid Extractable Silver (Ag)	2012/12/06	102	75 - 125	102	75 - 125	ND, RDL=0.50	mg/kg	NC	35
3058874	Acid Extractable Strontium (Sr)	2012/12/06	98	75 - 125	99	75 - 125	ND, RDL=5.0	mg/kg	NC	35
3058874	Acid Extractable Thallium (Tl)	2012/12/06	103	75 - 125	108	75 - 125	ND, RDL=0.10	mg/kg	NC	35
3058874	Acid Extractable Tin (Sn)	2012/12/06	NC	75 - 125	105	75 - 125	ND, RDL=2.0	mg/kg	21.2	35
3058874	Acid Extractable Uranium (U)	2012/12/06	103	75 - 125	105	75 - 125	ND, RDL=0.10	mg/kg	NC	35
3058874	Acid Extractable Vanadium (V)	2012/12/06	99	75 - 125	100	75 - 125	ND, RDL=2.0	mg/kg	3.8	35
3058874	Acid Extractable Zinc (Zn)	2012/12/06	NC	75 - 125	98	75 - 125	ND, RDL=5.0	mg/kg	3.4	35
3058874	Acid Extractable Aluminum (Al)	2012/12/06					ND, RDL=10	mg/kg	3.0	35
3058874	Acid Extractable Iron (Fe)	2012/12/06					ND, RDL=50	mg/kg	0.3	35
3059013	Acid Extractable Antimony (Sb)	2012/12/06	NC	75 - 125	103	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Arsenic (As)	2012/12/06	97	75 - 125	102	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Barium (Ba)	2012/12/06	NC	75 - 125	103	75 - 125	ND, RDL=5.0	mg/kg	38.0(1, 3)	35
3059013	Acid Extractable Beryllium (Be)	2012/12/06	99	75 - 125	101	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Bismuth (Bi)	2012/12/06	104	75 - 125	102	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Boron (B)	2012/12/06	NC	75 - 125	100	75 - 125	ND, RDL=5.0	mg/kg	0.5	35
3059013	Acid Extractable Cadmium (Cd)	2012/12/06	97	75 - 125	98	75 - 125	ND, RDL=0.30	mg/kg	5.1	35
3059013	Acid Extractable Chromium (Cr)	2012/12/06	NC	75 - 125	101	75 - 125	ND, RDL=2.0	mg/kg	60.8(1, 4)	35
3059013	Acid Extractable Cobalt (Co)	2012/12/06	100	75 - 125	102	75 - 125	ND, RDL=1.0	mg/kg	NC	35
3059013	Acid Extractable Copper (Cu)	2012/12/06	NC	75 - 125	101	75 - 125	ND, RDL=2.0	mg/kg	4.4	35
3059013	Acid Extractable Lead (Pb)	2012/12/06	NC	75 - 125	103	75 - 125	ND, RDL=0.50	mg/kg	22.0	35
3059013	Acid Extractable Lithium (Li)	2012/12/06	103	75 - 125	106	75 - 125	ND, RDL=2.0	mg/kg	NC	35

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Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3059013	Acid Extractable Manganese (Mn)	2012/12/06	NC	75 - 125	100	75 - 125	ND, RDL=2.0	mg/kg	9.1	35
3059013	Acid Extractable Mercury (Hg)	2012/12/06	97	75 - 125	104	75 - 125	ND, RDL=0.10	mg/kg	NC	35
3059013	Acid Extractable Molybdenum (Mo)	2012/12/06	NC	75 - 125	101	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Nickel (Ni)	2012/12/06	97	75 - 125	99	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Rubidium (Rb)	2012/12/06	99	75 - 125	99	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Selenium (Se)	2012/12/06	98	75 - 125	104	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Silver (Ag)	2012/12/06	98	75 - 125	101	75 - 125	ND, RDL=0.50	mg/kg	NC	35
3059013	Acid Extractable Strontium (Sr)	2012/12/06	NC	75 - 125	100	75 - 125	ND, RDL=5.0	mg/kg	1.2	35
3059013	Acid Extractable Thallium (Tl)	2012/12/06	101	75 - 125	104	75 - 125	ND, RDL=0.10	mg/kg	NC	35
3059013	Acid Extractable Tin (Sn)	2012/12/06	NC	75 - 125	104	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Uranium (U)	2012/12/06	101	75 - 125	103	75 - 125	ND, RDL=0.10	mg/kg	6.5	35
3059013	Acid Extractable Vanadium (V)	2012/12/06	99	75 - 125	100	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3059013	Acid Extractable Zinc (Zn)	2012/12/06	NC	75 - 125	102	75 - 125	ND, RDL=5.0	mg/kg	2.4	35
3059013	Acid Extractable Aluminum (Al)	2012/12/06					ND, RDL=10	mg/kg	6.3	35
3059013	Acid Extractable Iron (Fe)	2012/12/06					ND, RDL=50	mg/kg	4.8	35
3060169	Acid Extractable Phosphorus (P)	2012/12/06	NC	75 - 125	99	80 - 120	ND, RDL=20	ug/g		
3060191	Soluble (5:1) pH	2012/12/06							1.7	N/A
3060193	Conductivity	2012/12/06							5.7	35
3060289	Chloride (Cl)	2012/12/06	103	80 - 120			ND, RDL=5.0	mg/kg	7.6	35
3060295	Sulphate (SO4)	2012/12/07	151 (1, 5)	80 - 120			ND, RDL=10	mg/kg	NC	25
3060298	Orthophosphate (P)	2012/12/07	85	80 - 120			ND, RDL=0.050	mg/kg	NC	25
3060299	Nitrite (N)	2012/12/06	81	80 - 120			ND, RDL=0.050	mg/kg	NC	35
3060300	Nitrate + Nitrite	2012/12/07	93	80 - 120			ND, RDL=0.25	mg/kg	9.4	35
3060357	Ammonia-N	2012/12/07	NC	80 - 120			ND, RDL=0.25	mg/kg	16.2	25

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
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.
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 not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(2) - Poor RPD due to sample inhomogeneity. The sample was redigested and Ba = 490 mg/kg.
(3) - Poor RPD due to sample inhomogeneity. The sample was redigested and Ba = 180 mg/kg.

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Maxxam Job #: B2I7854
Report Date: 2012/12/07

Stantec Consulting Ltd
Client Project #: 121412505
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

(4) - Poor RPD due to sample inhomogeneity. The sample was redigested and Cr = 11 mg/kg.
(5) - Poor spike recovery due to sample matrix interferences.

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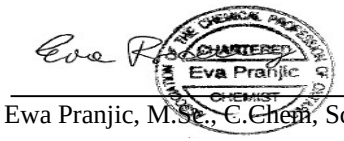
Validation Signature Page

Maxxam Job #: B2I7854

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



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

Mike Macgillivray, Scientific Specialist (Inorganics)

Kevin Macdonald, Inorganics Supervisor

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 P.O. #: 16300R-40
Your Project #: 121412505.200
Site Location: CAPE PINE
Your C.O.C. #: ES658912

Attention: Jonathan Murphy
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2012/12/18

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2J5583
Received: 2012/12/12, 10:19

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Solids Acid Extr. ICPMS (1,2)	5	2012/12/17	2012/12/18	ATL SOP 00024/58	Based on EPA6020A

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

(1) This test was performed by Bedford
(2) Note: Metals naming convention has been changed from "Available" to "Acid Extractable" as part of a national harmonization initiative. Contact your project manager for additional details.

Encryption Key

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.

Total cover pages: 1

Maxxam Job #: B2J5583
Report Date: 2012/12/18

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		PY2808	PY2809	PY2810	PY2811	PY2812		
Sampling Date		2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23		
	Units	**12-SS4**	**12-SS7**	**12-SS16**	**12-SS17**	**12-SS18**	**RDL**	**QC Batch**
Metals								
Acid Extractable Aluminum (Al)	mg/kg	6100	6700	4700	5000	3500	10	3072200
Acid Extractable Antimony (Sb)	mg/kg	ND	4.2	ND	ND	ND	2.0	3072200
Acid Extractable Arsenic (As)	mg/kg	17	11	6.8	7.5	3.1	2.0	3072200
Acid Extractable Barium (Ba)	mg/kg	140	1400	35	75	25	5.0	3072200
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	2.0	3072200
Acid Extractable Bismuth (Bi)	mg/kg	ND	83	ND	ND	ND	2.0	3072200
Acid Extractable Boron (B)	mg/kg	ND	5.0	ND	6.0	ND	5.0	3072200
Acid Extractable Cadmium (Cd)	mg/kg	ND	0.93	ND	ND	ND	0.30	3072200
Acid Extractable Chromium (Cr)	mg/kg	8.2	19	5.5	6.4	4.2	2.0	3072200
Acid Extractable Cobalt (Co)	mg/kg	2.8	3.9	2.0	2.1	1.8	1.0	3072200
Acid Extractable Copper (Cu)	mg/kg	35	290	8.1	10	4.9	2.0	3072200
Acid Extractable Iron (Fe)	mg/kg	27000	19000	18000	10000	12000	50	3072200
Acid Extractable Lead (Pb)	mg/kg	1200	920	430	500	190	0.50	3072200
Acid Extractable Lithium (Li)	mg/kg	7.4	6.1	6.8	5.0	6.0	2.0	3072200
Acid Extractable Manganese (Mn)	mg/kg	360	390	160	530	150	2.0	3072200
Acid Extractable Mercury (Hg)	mg/kg	0.35	0.20	0.25	0.26	0.13	0.10	3072200
Acid Extractable Molybdenum (Mo)	mg/kg	ND	2.8	ND	ND	ND	2.0	3072200
Acid Extractable Nickel (Ni)	mg/kg	5.7	6.8	4.0	3.3	3.2	2.0	3072200
Acid Extractable Rubidium (Rb)	mg/kg	4.2	5.7	5.6	6.3	4.1	2.0	3072200
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	2.0	3072200
Acid Extractable Silver (Ag)	mg/kg	ND	0.67	ND	ND	ND	0.50	3072200
Acid Extractable Strontium (Sr)	mg/kg	17	42	9.5	20	7.5	5.0	3072200
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	0.10	3072200
Acid Extractable Tin (Sn)	mg/kg	34	13	32	4.1	2.5	2.0	3072200
Acid Extractable Uranium (U)	mg/kg	0.48	0.50	0.40	0.39	0.26	0.10	3072200
Acid Extractable Vanadium (V)	mg/kg	14	16	13	19	11	2.0	3072200
Acid Extractable Zinc (Zn)	mg/kg	130	2000	53	110	36	5.0	3072200

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2J5583
Report Date: 2012/12/18

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

Package 1	7.3°C

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

GENERAL COMMENTS

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.maxxam.ca

Maxxam Job #: B2J5583
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Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3072200	Acid Extractable Antimony (Sb)	2012/12/18	100	75 - 125	108	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3072200	Acid Extractable Arsenic (As)	2012/12/18	NC	75 - 125	103	75 - 125	ND, RDL=2.0	mg/kg	1.5	35
3072200	Acid Extractable Barium (Ba)	2012/12/18	NC	75 - 125	100	75 - 125	ND, RDL=5.0	mg/kg	2.1	35
3072200	Acid Extractable Beryllium (Be)	2012/12/18	99	75 - 125	101	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3072200	Acid Extractable Bismuth (Bi)	2012/12/18	109	75 - 125	105	75 - 125	ND, RDL=2.0	mg/kg		
3072200	Acid Extractable Boron (B)	2012/12/18	NC	75 - 125	105	75 - 125	ND, RDL=5.0	mg/kg	4.8	35
3072200	Acid Extractable Cadmium (Cd)	2012/12/18	98	75 - 125	100	75 - 125	ND, RDL=0.30	mg/kg	NC	35
3072200	Acid Extractable Chromium (Cr)	2012/12/18	103	75 - 125	98	75 - 125	ND, RDL=2.0	mg/kg	2.0	35
3072200	Acid Extractable Cobalt (Co)	2012/12/18	99	75 - 125	98	75 - 125	ND, RDL=1.0	mg/kg	2.1	35
3072200	Acid Extractable Copper (Cu)	2012/12/18	NC	75 - 125	97	75 - 125	ND, RDL=2.0	mg/kg	4.2	35
3072200	Acid Extractable Lead (Pb)	2012/12/18	NC	75 - 125	99	75 - 125	ND, RDL=0.50	mg/kg	2.0	35
3072200	Acid Extractable Lithium (Li)	2012/12/18	NC	75 - 125	100	75 - 125	ND, RDL=2.0	mg/kg		
3072200	Acid Extractable Manganese (Mn)	2012/12/18	NC	75 - 125	102	75 - 125	ND, RDL=2.0	mg/kg	0.9	35
3072200	Acid Extractable Mercury (Hg)	2012/12/18	103	75 - 125	103	75 - 125	ND, RDL=0.10	mg/kg	NC	35
3072200	Acid Extractable Molybdenum (Mo)	2012/12/18	NC	75 - 125	104	75 - 125	ND, RDL=2.0	mg/kg	1.5	35
3072200	Acid Extractable Nickel (Ni)	2012/12/18	104	75 - 125	99	75 - 125	ND, RDL=2.0	mg/kg	3.0	35
3072200	Acid Extractable Rubidium (Rb)	2012/12/18	99	75 - 125	102	75 - 125	ND, RDL=2.0	mg/kg		
3072200	Acid Extractable Selenium (Se)	2012/12/18	103	75 - 125	104	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3072200	Acid Extractable Silver (Ag)	2012/12/18	105	75 - 125	102	75 - 125	ND, RDL=0.50	mg/kg	NC	35
3072200	Acid Extractable Strontium (Sr)	2012/12/18	NC	75 - 125	103	75 - 125	ND, RDL=5.0	mg/kg	9.0	35
3072200	Acid Extractable Thallium (Tl)	2012/12/18	103	75 - 125	105	75 - 125	ND, RDL=0.10	mg/kg	NC	35
3072200	Acid Extractable Tin (Sn)	2012/12/18	121	75 - 125	108	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3072200	Acid Extractable Uranium (U)	2012/12/18	103	75 - 125	102	75 - 125	ND, RDL=0.10	mg/kg	16.8	35
3072200	Acid Extractable Vanadium (V)	2012/12/18	NC	75 - 125	100	75 - 125	ND, RDL=2.0	mg/kg	1.6	35
3072200	Acid Extractable Zinc (Zn)	2012/12/18	NC	75 - 125	101	75 - 125	ND, RDL=5.0	mg/kg	8.6	35
3072200	Acid Extractable Aluminum (Al)	2012/12/18					ND, RDL=10	mg/kg	0.8	35
3072200	Acid Extractable Iron (Fe)	2012/12/18					ND, RDL=50	mg/kg	2.1	35

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
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.
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 not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

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Validation Signature Page

Maxxam Job #: B2J5583

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

Mike Macgillivray, Scientific Specialist (Inorganics)

==========

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Your P.O. #: 16300R-40
Your Project #: 121412505.200
Site Location: CAPE PINE
Your C.O.C. #: ES659112

Attention: Jonathan Murphy
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2012/12/20

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2J5634
Received: 2012/12/12, 10:19

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Leach. Tot. MS - N-per (1)	9	2012/12/19	2012/12/19	ATL SOP 00059	Based on EPA6020A
TCLP Inorganic extraction - pH (1)	9	N/A	2012/12/19	ATL SOP-00035	Based on EPA1311
TCLP Inorganic extraction - Weight (1)	9	N/A	2012/12/19	ATL SOP-00035	Based on EPA1311

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

(1) This test was performed by Bedford

Encryption Key

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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Total cover pages: 1

Maxxam Job #: B2J5634
Report Date: 2012/12/20

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

RESULTS OF ANALYSES OF SOIL

Maxxam ID		PY3041	PY3042	PY3043	PY3044	PY3045	PY3046	PY3047	PY3048	PY3048	PY3049		
Sampling Date		2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23		
	Units	**12-SS3**	**12-SS8**	**12-SS10**	**12-SS12**	**12-SS13**	**12-SS14**	**12-SS15**	**TP2-BS1**	**TP2-BS1 Lab-Dup**	**TP4-BS1**	**RDL**	**QC Batch**
Inorganics													
Sample Weight (as received)	g	50	50	50	40	40	50	30	50	50	50	N/A	3073313
Initial pH	N/A	5.7	5.6	5.5	6.0	5.7	5.4	5.5	6.2	NA	6.6		3073315
Final pH	N/A	5.1	5.1	4.9	5.0	5.1	5.1	5.1	5.0	5.0	5.1		3073315

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

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Maxxam Job #: B2J5634
Report Date: 2012/12/20

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

ELEMENTS BY ICP/MS (SOIL)

Maxxam ID		PY3041	PY3042	PY3043	PY3044	PY3045	PY3046	PY3047	PY3048	PY3048	PY3049		
Sampling Date		2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23	2012/11/23		
	Units	**12-SS3**	**12-SS8**	**12-SS10**	**12-SS12**	**12-SS13**	**12-SS14**	**12-SS15**	**TP2-BS1**	**TP2-BS1 Lab-Dup**	**TP4-BS1**	**RDL**	**QC Batch**
Metals													
Leachable Aluminum (Al)	ug/L	980	910	410	390	490	470	430	1500	1600	1100	100	3074846
Leachable Antimony (Sb)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Arsenic (As)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Barium (Ba)	ug/L	510	860	160	2100	760	570	310	1200	1100	700	50	3074846
Leachable Beryllium (Be)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Boron (B)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500	3074846
Leachable Cadmium (Cd)	ug/L	ND	ND	ND	5.5	ND	ND	ND	5.6	5.2	5.3	3.0	3074846
Leachable Calcium (Ca)	ug/L	2500	2900	3800	40000	10000	4700	4600	8000	7800	25000	1000	3074846
Leachable Chromium (Cr)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Cobalt (Co)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	3074846
Leachable Copper (Cu)	ug/L	29	34	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Iron (Fe)	ug/L	ND	ND	540	ND	800	ND	ND	ND	ND	1200	500	3074846
Leachable Lead (Pb)	ug/L	4900	2000	640	1800	630	1100	820	1000	1300	970	5.0	3074846
Leachable Lithium (Li)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Magnesium (Mg)	ug/L	1300	1300	4300	13000	5100	2900	3700	2900	2900	3800	1000	3074846
Leachable Manganese (Mn)	ug/L	87	150	66	150	200	190	60	88	95	86	20	3074846
Leachable Molybdenum (Mo)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Nickel (Ni)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Potassium (K)	ug/L	2200	2100	1600	3400	1500	1400	1900	2500	2700	2100	1000	3074846
Leachable Selenium (Se)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	3074846
Leachable Silver (Ag)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0	3074846
Leachable Strontium (Sr)	ug/L	ND	ND	57	260	110	52	56	76	72	160	50	3074846
Leachable Thallium (Tl)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	3074846
Leachable Tin (Sn)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Uranium (U)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	3074846
Leachable Vanadium (V)	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	3074846
Leachable Zinc (Zn)	ug/L	210	180	170	3300	760	390	190	2000	2000	4600	50	3074846

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B2J5634
Report Date: 2012/12/20

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

Package 1	7.3°C

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

GENERAL COMMENTS

Sample PY3044-01: Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample PY3045-01: Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Sample PY3047-01: Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

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Maxxam Job #: B2J5634
Report Date: 2012/12/20

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

QUALITY ASSURANCE REPORT

			Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3073313	Sample Weight (as received)	2012/12/19			NA, RDL=N/A	g	0	N/A
3074846	Leachable Aluminum (Al)	2012/12/19	111	80 - 120	ND, RDL=100	ug/L	2.4	35
3074846	Leachable Antimony (Sb)	2012/12/19	113	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Arsenic (As)	2012/12/19	110	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Barium (Ba)	2012/12/19	107	80 - 120	ND, RDL=50	ug/L	8.5	35
3074846	Leachable Beryllium (Be)	2012/12/19	105	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Boron (B)	2012/12/19	104	80 - 120	ND, RDL=500	ug/L	NC	35
3074846	Leachable Cadmium (Cd)	2012/12/19	107	80 - 120	ND, RDL=3.0	ug/L	NC	35
3074846	Leachable Calcium (Ca)	2012/12/19	103	80 - 120	ND, RDL=1000	ug/L	2.1	35
3074846	Leachable Chromium (Cr)	2012/12/19	111	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Cobalt (Co)	2012/12/19	112	80 - 120	ND, RDL=10	ug/L	NC	35
3074846	Leachable Copper (Cu)	2012/12/19	110	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Iron (Fe)	2012/12/19	115	80 - 120	ND, RDL=500	ug/L	NC	35
3074846	Leachable Lead (Pb)	2012/12/19	107	80 - 120	ND, RDL=5.0	ug/L	19.6	35
3074846	Leachable Lithium (Li)	2012/12/19	109	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Magnesium (Mg)	2012/12/19	115	80 - 120	ND, RDL=1000	ug/L	NC	35
3074846	Leachable Manganese (Mn)	2012/12/19	107	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Molybdenum (Mo)	2012/12/19	115	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Nickel (Ni)	2012/12/19	113	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Potassium (K)	2012/12/19	109	80 - 120	ND, RDL=1000	ug/L	NC	35
3074846	Leachable Selenium (Se)	2012/12/19	112	80 - 120	ND, RDL=10	ug/L	NC	35
3074846	Leachable Silver (Ag)	2012/12/19	112	80 - 120	ND, RDL=5.0	ug/L	NC	35
3074846	Leachable Strontium (Sr)	2012/12/19	106	80 - 120	ND, RDL=50	ug/L	NC	35
3074846	Leachable Thallium (Tl)	2012/12/19	112	80 - 120	ND, RDL=1.0	ug/L	NC	35
3074846	Leachable Tin (Sn)	2012/12/19	113	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Uranium (U)	2012/12/19	116	80 - 120	ND, RDL=1.0	ug/L	NC	35
3074846	Leachable Vanadium (V)	2012/12/19	113	80 - 120	ND, RDL=20	ug/L	NC	35
3074846	Leachable Zinc (Zn)	2012/12/19	113	80 - 120	ND, RDL=50	ug/L	0.04	35

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
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.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

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Validation Signature Page

Maxxam Job #: B2J5634

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

Mike Macgillivray, Scientific Specialist (Inorganics)

==========

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Your P.O. #: 16300R-40
Your Project #: 121412505.200
Site Location: CAPE PINE
Your C.O.C. #: ES663212

Attention: Jonathan Murphy
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2013/01/03

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2K0782
Received: 2012/12/20, 10:21

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Leach. Tot. MS - N-per (1)	2	2012/12/22	2012/12/23	ATL SOP 00059	Based on EPA6020A
Metals Solids Acid Extr. ICPMS (1,2)	3	2012/12/21	2012/12/22	ATL SOP 00024/58	Based on EPA6020A
TCLP Inorganic extraction - pH (1)	2	N/A	2012/12/22	ATL SOP-00035	Based on EPA1311
TCLP Inorganic extraction - Weight (1)	2	N/A	2012/12/22	ATL SOP-00035	Based on EPA1311

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

(1) This test was performed by Bedford
(2) Note: Metals naming convention has been changed from "Available" to "Acid Extractable" as part of a national harmonization initiative. Contact your project manager for additional details.

Encryption Key

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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Total cover pages: 1

Maxxam Job #: B2K0782
Report Date: 2013/01/03

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

RESULTS OF ANALYSES OF SOIL

Maxxam ID		QB0778	QB0781		
Sampling Date		2012/11/23	2012/11/23		
	Units	**12-SS4**	**12-SS7**	**RDL**	**QC Batch**
Inorganics					
Sample Weight (as received)	g	50	50	N/A	3078219
Initial pH	N/A	5.4	6.8		3078224
Final pH	N/A	5.0	5.1		3078224

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

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Maxxam Job #: B2K0782
Report Date: 2013/01/03

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

ELEMENTS BY ICP/MS (SOIL)

Maxxam ID		QB0778	QB0781		
Sampling Date		2012/11/23	2012/11/23		
	Units	**12-SS4**	**12-SS7**	**RDL**	**QC Batch**
Metals					
Leachable Aluminum (Al)	ug/L	670	660	100	3079169
Leachable Antimony (Sb)	ug/L	ND	ND	20	3079169
Leachable Arsenic (As)	ug/L	ND	ND	20	3079169
Leachable Barium (Ba)	ug/L	840	3800	50	3079169
Leachable Beryllium (Be)	ug/L	ND	ND	20	3079169
Leachable Boron (B)	ug/L	ND	ND	500	3079169
Leachable Cadmium (Cd)	ug/L	ND	14	3.0	3079169
Leachable Calcium (Ca)	ug/L	9900	47000	1000	3079169
Leachable Chromium (Cr)	ug/L	ND	ND	20	3079169
Leachable Cobalt (Co)	ug/L	ND	ND	10	3079169
Leachable Copper (Cu)	ug/L	ND	1600	20	3079169
Leachable Iron (Fe)	ug/L	600	ND	500	3079169
Leachable Lead (Pb)	ug/L	690	1900	5.0	3079169
Leachable Lithium (Li)	ug/L	ND	ND	20	3079169
Leachable Magnesium (Mg)	ug/L	4600	13000	1000	3079169
Leachable Manganese (Mn)	ug/L	150	490	20	3079169
Leachable Molybdenum (Mo)	ug/L	ND	ND	20	3079169
Leachable Nickel (Ni)	ug/L	ND	30	20	3079169
Leachable Potassium (K)	ug/L	2800	4800	1000	3079169
Leachable Selenium (Se)	ug/L	ND	ND	10	3079169
Leachable Silver (Ag)	ug/L	ND	ND	5.0	3079169
Leachable Strontium (Sr)	ug/L	130	360	50	3079169
Leachable Thallium (Tl)	ug/L	ND	ND	1.0	3079169
Leachable Tin (Sn)	ug/L	ND	ND	20	3079169
Leachable Uranium (U)	ug/L	ND	ND	1.0	3079169
Leachable Vanadium (V)	ug/L	ND	ND	20	3079169
Leachable Zinc (Zn)	ug/L	510	30000	50	3079169

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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.maxxam.ca

Maxxam Job #: B2K0782
Report Date: 2013/01/03

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		QB0779	QB0780	QB0782		
Sampling Date		2012/11/23	2012/11/23	2012/11/23		
	Units	**12-SS5**	**12-SS6**	**12-SS9**	**RDL**	**QC Batch**
Metals						
Acid Extractable Aluminum (Al)	mg/kg	2000	4900	5100	10	3077699
Acid Extractable Antimony (Sb)	mg/kg	ND	14	2.4	2.0	3077699
Acid Extractable Arsenic (As)	mg/kg	ND	10	5.6	2.0	3077699
Acid Extractable Barium (Ba)	mg/kg	20	110	39	5.0	3077699
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	2.0	3077699
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	2.0	3077699
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	5.0	3077699
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	0.30	3077699
Acid Extractable Chromium (Cr)	mg/kg	3.1	6.7	4.9	2.0	3077699
Acid Extractable Cobalt (Co)	mg/kg	ND	3.1	2.5	1.0	3077699
Acid Extractable Copper (Cu)	mg/kg	3.0	16	7.7	2.0	3077699
Acid Extractable Iron (Fe)	mg/kg	6900	25000	14000	50	3077699
Acid Extractable Lead (Pb)	mg/kg	51	730	190	0.50	3077699
Acid Extractable Lithium (Li)	mg/kg	ND	7.9	9.5	2.0	3077699
Acid Extractable Manganese (Mn)	mg/kg	30	560	240	2.0	3077699
Acid Extractable Mercury (Hg)	mg/kg	ND	0.23	0.14	0.10	3077699
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	2.0	3077699
Acid Extractable Nickel (Ni)	mg/kg	ND	5.0	3.8	2.0	3077699
Acid Extractable Rubidium (Rb)	mg/kg	3.4	4.3	5.2	2.0	3077699
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	2.0	3077699
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	0.50	3077699
Acid Extractable Strontium (Sr)	mg/kg	ND	15	8.0	5.0	3077699
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	0.10	3077699
Acid Extractable Tin (Sn)	mg/kg	ND	10	3.8	2.0	3077699
Acid Extractable Uranium (U)	mg/kg	0.22	0.42	0.45	0.10	3077699
Acid Extractable Vanadium (V)	mg/kg	10	12	12	2.0	3077699
Acid Extractable Zinc (Zn)	mg/kg	14	250	53	5.0	3077699

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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.maxxam.ca

Maxxam Job #: B2K0782
Report Date: 2013/01/03

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

Package 1	4.3°C

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

GENERAL COMMENTS

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.maxxam.ca

Maxxam Job #: B2K0782
Report Date: 2013/01/03

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3077699	Acid Extractable Antimony (Sb)	2012/12/22	91	75 - 125	97	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Arsenic (As)	2012/12/22	98	75 - 125	99	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Barium (Ba)	2012/12/22	NC	75 - 125	98	75 - 125	ND, RDL=5.0	mg/kg	14.2	35
3077699	Acid Extractable Beryllium (Be)	2012/12/22	99	75 - 125	95	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Bismuth (Bi)	2012/12/22	104	75 - 125	101	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Boron (B)	2012/12/22	88	75 - 125	95	75 - 125	ND, RDL=5.0	mg/kg	NC	35
3077699	Acid Extractable Cadmium (Cd)	2012/12/22	95	75 - 125	95	75 - 125	ND, RDL=0.30	mg/kg	NC	35
3077699	Acid Extractable Chromium (Cr)	2012/12/22	93	75 - 125	97	75 - 125	ND, RDL=2.0	mg/kg	4.1	35
3077699	Acid Extractable Cobalt (Co)	2012/12/22	95	75 - 125	97	75 - 125	ND, RDL=1.0	mg/kg	6.1	35
3077699	Acid Extractable Copper (Cu)	2012/12/22	102	75 - 125	95	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Lead (Pb)	2012/12/22	96	75 - 125	98	75 - 125	ND, RDL=0.50	mg/kg	1.3	35
3077699	Acid Extractable Lithium (Li)	2012/12/22	102	75 - 125	97	75 - 125	ND, RDL=2.0	mg/kg	6.8	35
3077699	Acid Extractable Manganese (Mn)	2012/12/22	NC	75 - 125	97	75 - 125	ND, RDL=2.0	mg/kg	19.0	35
3077699	Acid Extractable Mercury (Hg)	2012/12/22	93	75 - 125	102	75 - 125	ND, RDL=0.10	mg/kg	NC	35
3077699	Acid Extractable Molybdenum (Mo)	2012/12/22	97	75 - 125	97	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Nickel (Ni)	2012/12/22	93	75 - 125	95	75 - 125	ND, RDL=2.0	mg/kg	4.6	35
3077699	Acid Extractable Rubidium (Rb)	2012/12/22	91	75 - 125	95	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Selenium (Se)	2012/12/22	96	75 - 125	98	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Silver (Ag)	2012/12/22	93	75 - 125	94	75 - 125	ND, RDL=0.50	mg/kg	NC	35
3077699	Acid Extractable Strontium (Sr)	2012/12/22	99	75 - 125	100	75 - 125	ND, RDL=5.0	mg/kg	NC	35
3077699	Acid Extractable Thallium (Tl)	2012/12/22	102	75 - 125	100	75 - 125	ND, RDL=0.10	mg/kg	NC	35
3077699	Acid Extractable Tin (Sn)	2012/12/22	100	75 - 125	100	75 - 125	ND, RDL=2.0	mg/kg	NC	35
3077699	Acid Extractable Uranium (U)	2012/12/22	104	75 - 125	99	75 - 125	ND, RDL=0.10	mg/kg	9.5	35
3077699	Acid Extractable Vanadium (V)	2012/12/22	92	75 - 125	98	75 - 125	ND, RDL=2.0	mg/kg	3.3	35
3077699	Acid Extractable Zinc (Zn)	2012/12/22	NC	75 - 125	100	75 - 125	ND, RDL=5.0	mg/kg	3.2	35
3077699	Acid Extractable Aluminum (Al)	2012/12/22					ND, RDL=10	mg/kg	4.0	35
3077699	Acid Extractable Iron (Fe)	2012/12/22					ND, RDL=50	mg/kg	2.2	35
3078219	Sample Weight (as received)	2012/12/22					NA, RDL=N/A	g		
3079169	Leachable Aluminum (Al)	2012/12/31			107	80 - 120	ND, RDL=100	ug/L		
3079169	Leachable Antimony (Sb)	2012/12/31			110	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Arsenic (As)	2012/12/31			104	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Barium (Ba)	2012/12/31			108	80 - 120	230, RDL=50(1)	ug/L		
3079169	Leachable Beryllium (Be)	2012/12/31			104	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Boron (B)	2012/12/31			103	80 - 120	ND, RDL=500	ug/L		
3079169	Leachable Cadmium (Cd)	2012/12/31			106	80 - 120	ND, RDL=3.0	ug/L		
3079169	Leachable Calcium (Ca)	2012/12/31			112	80 - 120	1200, RDL=1000	ug/L		
3079169	Leachable Chromium (Cr)	2012/12/31			107	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Cobalt (Co)	2012/12/31			109	80 - 120	ND, RDL=10	ug/L		
3079169	Leachable Copper (Cu)	2012/12/31			107	80 - 120	ND, RDL=20	ug/L		

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Maxxam Job #: B2K0782
Report Date: 2013/01/03

Stantec Consulting Ltd
Client Project #: 121412505.200
Site Location: CAPE PINE
Your P.O. #: 16300R-40
Sampler Initials: JM

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3079169	Leachable Iron (Fe)	2012/12/31			107	80 - 120	ND, RDL=500	ug/L		
3079169	Leachable Lead (Pb)	2012/12/31			108	80 - 120	ND, RDL=5.0	ug/L		
3079169	Leachable Lithium (Li)	2012/12/31			109	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Magnesium (Mg)	2012/12/31			106	80 - 120	ND, RDL=1000	ug/L		
3079169	Leachable Manganese (Mn)	2012/12/31			106	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Molybdenum (Mo)	2012/12/31			111	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Nickel (Ni)	2012/12/31			106	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Potassium (K)	2012/12/31			105	80 - 120	ND, RDL=1000	ug/L		
3079169	Leachable Selenium (Se)	2012/12/31			103	80 - 120	ND, RDL=10	ug/L		
3079169	Leachable Silver (Ag)	2012/12/31			119	80 - 120	ND, RDL=5.0	ug/L		
3079169	Leachable Strontium (Sr)	2012/12/31			106	80 - 120	ND, RDL=50	ug/L		
3079169	Leachable Thallium (Tl)	2012/12/31			107	80 - 120	ND, RDL=1.0	ug/L		
3079169	Leachable Tin (Sn)	2012/12/31			110	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Uranium (U)	2012/12/31			110	80 - 120	ND, RDL=1.0	ug/L		
3079169	Leachable Vanadium (V)	2012/12/31			106	80 - 120	ND, RDL=20	ug/L		
3079169	Leachable Zinc (Zn)	2012/12/31			106	80 - 120	ND, RDL=50	ug/L		

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
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.
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 not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Low level lab contamination. Minimal impact on data quality.

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Validation Signature Page

Maxxam Job #: B2K0782

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

Kevin Macdonald, Inorganics Supervisor

==========

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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HHRA Re-Evaluation - 2011

Your P.O. #: 16300R-40
Your Project #: 121411355
Site: CAPE PINE
Your C.O.C. #: ES202210, ES202310

Attention: Jonathan Murphy
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2010/12/22

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0I2237
Received: 2010/12/16, 9:31

Sample Matrix: Soil
Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Solid Avail. Unified MS - Nper	13	2010/12/20	2010/12/20	ATL SOP 00024 R5	Based on EPA6020A

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key

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

==========

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.

Total cover pages: 1

This document is in electronic format, hard copy is available on request.

Maxxam Job #: B0I2237
Report Date: 2010/12/22

Stantec Consulting Ltd
Client Project #: 121411355
Project name: CAPE PINE
Your P.O. #: 16300R-40

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		IE7202		IE7204		IE7205	IE7205	IE7206	IE7207	IE7208	IE7209	IE7210		
Sampling Date		2010/12/14		2010/12/14		2010/12/14	2010/12/14	2010/12/14	2010/12/14	2010/12/14	2010/12/14	2010/12/14		
	Units	**SS1**	**RDL**	**SS2**	**RDL**	**SS3**	**SS3 Lab-Dup**	**SS4**	**SS5**	**SS6**	**SS7**	**SS8**	**RDL**	**QC Batch**
Metals														
Available Aluminum (Al)	mg/kg	6700	10	11000	10	10000	9500	3400	3500	5500	4000	7900	10	2364139
Available Antimony (Sb)	mg/kg	4	2	8	2	ND	ND	ND	2	4	4	3	2	2364139
Available Arsenic (As)	mg/kg	24	2	110	2	3	2	6	9	26	9	11	2	2364139
Available Barium (Ba)	mg/kg	240	5	970	5	31	32	95	360	240	340	110	5	2364139
Available Beryllium (Be)	mg/kg	ND	2	ND	2	ND	ND	ND	ND	ND	ND	ND	2	2364139
Available Bismuth (Bi)	mg/kg	ND	2	ND	2	ND	ND	ND	ND	ND	ND	ND	2	2364139
Available Boron (B)	mg/kg	ND	5	18	5	ND	ND	6	6	ND	ND	ND	5	2364139
Available Cadmium (Cd)	mg/kg	0.3	0.3	1.4	0.3	ND	ND	ND	0.8	ND	0.4	ND	0.3	2364139
Available Chromium (Cr)	mg/kg	12	2	15	2	5	5	10	13	11	7	9	2	2364139
Available Cobalt (Co)	mg/kg	5	1	10	1	10	10	3	5	3	2	4	1	2364139
Available Copper (Cu)	mg/kg	50	2	150	2	20	22	20	30	81	19	20	2	2364139
Available Iron (Fe)	mg/kg	33000	50	59000	500	18000	17000	14000	24000	27000	14000	19000	50	2364139
Available Lead (Pb)	mg/kg	1600	0.5	2500	5	44	39	560	1800	2100	2000	1300	0.5	2364139
Available Lithium (Li)	mg/kg	12	2	8	2	29	27	6	7	6	8	16	2	2364139
Available Manganese (Mn)	mg/kg	720	2	1500	2	780	760	240	1300	410	290	390	2	2364139
Available Mercury (Hg)	mg/kg	0.4	0.1	1.6	0.1	ND	ND	0.4	1.2	0.5	0.7	0.8	0.1	2364139
Available Molybdenum (Mo)	mg/kg	3	2	12	2	ND	ND	ND	2	4	ND	ND	2	2364139
Available Nickel (Ni)	mg/kg	9	2	21	2	7	7	8	8	8	4	7	2	2364139
Available Rubidium (Rb)	mg/kg	3	2	3	2	ND	ND	ND	3	3	4	3	2	2364139
Available Selenium (Se)	mg/kg	ND	2	ND	2	ND	ND	ND	ND	ND	ND	2	2	2364139
Available Silver (Ag)	mg/kg	ND	0.5	ND	0.5	ND	ND	ND	ND	ND	ND	ND	0.5	2364139
Available Strontium (Sr)	mg/kg	24	5	120	5	ND	ND	21	47	16	19	11	5	2364139
Available Thallium (Tl)	mg/kg	0.1	0.1	0.3	0.1	ND	ND	ND	ND	0.1	ND	ND	0.1	2364139
Available Tin (Sn)	mg/kg	22	2	15	2	ND	ND	10	60	33	16	15	2	2364139
Available Uranium (U)	mg/kg	0.4	0.1	0.7	0.1	0.2	0.2	0.3	0.2	0.5	0.3	0.3	0.1	2364139
Available Vanadium (V)	mg/kg	15	2	32	2	12	12	8	9	17	8	11	2	2364139
Available Zinc (Zn)	mg/kg	300	5	1200	5	77	73	140	380	210	240	160	5	2364139

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0I2237
Report Date: 2010/12/22

Stantec Consulting Ltd
Client Project #: 121411355
Project name: CAPE PINE
Your P.O. #: 16300R-40

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		IE7211	IE7212	IE7213		IE7214		IE7215		
Sampling Date		2010/12/14	2010/12/14	2010/12/14		2010/12/14		2010/12/14		
	Units	**SS9**	**SS10**	**SS11**	**RDL**	**SS12**	**RDL**	**SS13**	**RDL**	**QC Batch**
Metals										
Available Aluminum (Al)	mg/kg	7300	6100	3200	10	2700	10	4000	10	2364139
Available Antimony (Sb)	mg/kg	ND	8	3	2	8	2	8	2	2364139
Available Arsenic (As)	mg/kg	8	18	9	2	24	2	18	2	2364139
Available Barium (Ba)	mg/kg	140	370	200	5	800	5	380	5	2364139
Available Beryllium (Be)	mg/kg	ND	ND	ND	2	ND	2	ND	2	2364139
Available Bismuth (Bi)	mg/kg	ND	ND	ND	2	ND	2	ND	2	2364139
Available Boron (B)	mg/kg	ND	ND	ND	5	6	5	ND	5	2364139
Available Cadmium (Cd)	mg/kg	0.3	0.4	0.3	0.3	3.2	0.3	0.5	0.3	2364139
Available Chromium (Cr)	mg/kg	8	14	9	2	23	2	7	2	2364139
Available Cobalt (Co)	mg/kg	6	3	3	1	5	1	3	1	2364139
Available Copper (Cu)	mg/kg	29	32	22	2	36	2	27	2	2364139
Available Iron (Fe)	mg/kg	18000	18000	34000	50	11000	50	14000	50	2364139
Available Lead (Pb)	mg/kg	470	1400	860	0.5	3400	5	1500	0.5	2364139
Available Lithium (Li)	mg/kg	15	9	6	2	4	2	5	2	2364139
Available Manganese (Mn)	mg/kg	880	430	220	2	1100	2	300	2	2364139
Available Mercury (Hg)	mg/kg	0.2	1.1	0.4	0.1	0.6	0.1	0.7	0.1	2364139
Available Molybdenum (Mo)	mg/kg	ND	2	ND	2	ND	2	ND	2	2364139
Available Nickel (Ni)	mg/kg	8	6	6	2	6	2	5	2	2364139
Available Rubidium (Rb)	mg/kg	5	3	2	2	4	2	3	2	2364139
Available Selenium (Se)	mg/kg	ND	ND	ND	2	ND	2	ND	2	2364139
Available Silver (Ag)	mg/kg	ND	ND	ND	0.5	ND	0.5	ND	0.5	2364139
Available Strontium (Sr)	mg/kg	37	27	11	5	57	5	26	5	2364139
Available Thallium (Tl)	mg/kg	ND	ND	ND	0.1	ND	0.1	ND	0.1	2364139
Available Tin (Sn)	mg/kg	6	9	26	2	16	2	11	2	2364139
Available Uranium (U)	mg/kg	0.3	0.4	0.3	0.1	0.2	0.1	0.4	0.1	2364139
Available Vanadium (V)	mg/kg	10	11	9	2	7	2	12	2	2364139
Available Zinc (Zn)	mg/kg	250	230	160	5	1200	5	270	5	2364139

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0I2237
Report Date: 2010/12/22

Stantec Consulting Ltd
Client Project #: 121411355
Project name: CAPE PINE
Your P.O. #: 16300R-40

Package 1	10.0°C

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

GENERAL COMMENTS

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel:902-420-0203 Toll-free:800-565-7227 Fax:902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B0I2237
Report Date: 2010/12/22

Stantec Consulting Ltd
Client Project #: 121411355
Project name: CAPE PINE
Your P.O. #: 16300R-40

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2364139	Available Aluminum (Al)	2010/12/20	NC	75 - 125	92	75 - 125	ND, RDL=10	mg/kg	5.8	35	75	75 - 125
2364139	Available Antimony (Sb)	2010/12/20	74(1, 2)	75 - 125	88	75 - 125	ND, RDL=2	mg/kg	NC	35		
2364139	Available Arsenic (As)	2010/12/20	95	75 - 125	91	75 - 125	ND, RDL=2	mg/kg	NC	35	104	75 - 125
2364139	Available Barium (Ba)	2010/12/20	NC	75 - 125	95	75 - 125	ND, RDL=5	mg/kg	4.3	35	105	75 - 125
2364139	Available Beryllium (Be)	2010/12/20	96	75 - 125	96	75 - 125	ND, RDL=2	mg/kg	NC	35		
2364139	Available Bismuth (Bi)	2010/12/20	90	75 - 125	88	75 - 125	ND, RDL=2	mg/kg	NC	35		
2364139	Available Boron (B)	2010/12/20	85	75 - 125	88	75 - 125	ND, RDL=5	mg/kg	NC	35		
2364139	Available Cadmium (Cd)	2010/12/20	101	75 - 125	96	75 - 125	ND, RDL=0.3	mg/kg	NC	35		
2364139	Available Chromium (Cr)	2010/12/20	86	75 - 125	85	75 - 125	ND, RDL=2	mg/kg	NC	35	77	75 - 125
2364139	Available Cobalt (Co)	2010/12/20	95	75 - 125	94	75 - 125	ND, RDL=1	mg/kg	2.3	35	90	75 - 125
2364139	Available Copper (Cu)	2010/12/20	NC	75 - 125	91	75 - 125	ND, RDL=2	mg/kg	11.7	35	98	75 - 125
2364139	Available Iron (Fe)	2010/12/20	NC	75 - 125	96	75 - 125	ND, RDL=50	mg/kg	5.0	35	90	75 - 125
2364139	Available Lead (Pb)	2010/12/20	NC	75 - 125	94	75 - 125	ND, RDL=0.5	mg/kg	12.4	35	105	75 - 125
2364139	Available Lithium (Li)	2010/12/20	NC	75 - 125	91	75 - 125	ND, RDL=2	mg/kg	5.8	35		
2364139	Available Manganese (Mn)	2010/12/20	NC	75 - 125	93	75 - 125	ND, RDL=2	mg/kg	3.0	35	100	75 - 125
2364139	Available Mercury (Hg)	2010/12/20	106	75 - 125	105	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2364139	Available Molybdenum (Mo)	2010/12/20	93	75 - 125	94	75 - 125	ND, RDL=2	mg/kg	NC	35		
2364139	Available Nickel (Ni)	2010/12/20	87	75 - 125	93	75 - 125	ND, RDL=2	mg/kg	NC	35	93	75 - 125
2364139	Available Rubidium (Rb)	2010/12/20	92	75 - 125	97	75 - 125	ND, RDL=2	mg/kg	NC	35		
2364139	Available Selenium (Se)	2010/12/20	91	75 - 125	98	75 - 125	ND, RDL=2	mg/kg	NC	35		
2364139	Available Silver (Ag)	2010/12/20	99	75 - 125	98	75 - 125	ND, RDL=0.5	mg/kg	NC	35		
2364139	Available Strontium (Sr)	2010/12/20	84	75 - 125	97	75 - 125	ND, RDL=5	mg/kg	NC	35	88	75 - 125
2364139	Available Thallium (Tl)	2010/12/20	90	75 - 125	91	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2364139	Available Tin (Sn)	2010/12/20	99	75 - 125	94	75 - 125	ND, RDL=2	mg/kg	NC	35		
2364139	Available Uranium (U)	2010/12/20	90	75 - 125	89	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2364139	Available Vanadium (V)	2010/12/20	NC	75 - 125	91	75 - 125	ND, RDL=2	mg/kg	1.1	35	91	75 - 125
2364139	Available Zinc (Zn)	2010/12/20	91	75 - 125	92	75 - 125	ND, RDL=5	mg/kg	6.1	35	102	75 - 125

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
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 not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(2) - Low recovery due to sample matrix.

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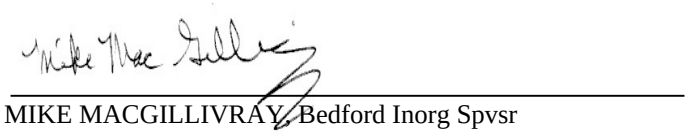
Validation Signature Page

Maxxam Job #: B0I2237

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



MIKE MACGILLIVRAY, Bedford Inorg Spvsr

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Your P.O. #: 16300R-40
Your Project #: 121411355
Site: CAPE PINE
Your C.O.C. #: B 075328

Attention: Jonathan Murphy
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2011/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0I5227
Received: 2010/12/23, 10:07

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Leach. Tot. MS - N-per	4	2010/12/31	2011/01/04	ATL SOP 00059 R1	Based on EPA6020A
TCLP Inorganic extraction - pH	4	N/A	2010/12/30	ATL SOP-00035 R4	Based on EPA1311
TCLP Inorganic extraction - Weight	4	N/A	2010/12/30	ATL SOP-00035 R4	Based on EPA1311

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key

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

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Total cover pages: 1

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Maxxam Job #: B0I5227
Report Date: 2011/01/06

Stantec Consulting Ltd
Client Project #: 121411355
Project name: CAPE PINE
Your P.O. #: 16300R-40

RESULTS OF ANALYSES OF SOIL

Maxxam ID		IG1909	IG1916	IG1917	IG1918	IG1918		
Sampling Date		2010/12/14	2010/12/14	2010/12/14	2010/12/14	2010/12/14		
	Units	**SS2 (P# IE7204)**	**SS6 (P# IE7208)**	**SS7 (P# IE7209)**	**SS12 (P# IE7214)**	**SS12 (P# IE7214) Lab-Dup**	**RDL**	**QC Batch**
Inorganics								
Sample Weight (as received)	g	50	50	50	50	50	N/A	2370196
Initial pH	N/A	7.0	6.0	5.8	5.9	NA		2370198
Final pH	N/A	5.0	4.9	4.8	4.8	4.9		2370198

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

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Maxxam Job #: B0I5227
Report Date: 2011/01/06

Stantec Consulting Ltd
Client Project #: 121411355
Project name: CAPE PINE
Your P.O. #: 16300R-40

ELEMENTS BY ICP/MS (SOIL)

Maxxam ID		IG1909	IG1916	IG1917	IG1918	IG1918		
Sampling Date		2010/12/14	2010/12/14	2010/12/14	2010/12/14	2010/12/14		
	Units	**SS2 (P# IE7204)**	**SS6 (P# IE7208)**	**SS7 (P# IE7209)**	**SS12 (P# IE7214)**	**SS12 (P# IE7214) Lab-Dup**	**RDL**	**QC Batch**
Metals								
Leachable Aluminum (Al)	ug/L	530	600	290	220	310	100	2372093
Leachable Antimony (Sb)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Arsenic (As)	ug/L	30	ND	ND	ND	ND	20	2372093
Leachable Barium (Ba)	ug/L	1900	570	670	1300	1400	50	2372093
Leachable Beryllium (Be)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Boron (B)	ug/L	ND	ND	ND	ND	ND	500	2372093
Leachable Cadmium (Cd)	ug/L	5	ND	ND	7	8	3	2372093
Leachable Calcium (Ca)	ug/L	25000	6300	12000	17000	19000	1000	2372093
Leachable Chromium (Cr)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Cobalt (Co)	ug/L	ND	ND	ND	ND	ND	10	2372093
Leachable Copper (Cu)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Iron (Fe)	ug/L	ND	540	ND	ND	550	500	2372093
Leachable Lead (Pb)	ug/L	1300	1500	1500	2500	4100(1)	5	2372093
Leachable Lithium (Li)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Magnesium (Mg)	ug/L	8600	4800	7400	5700	5200	1000	2372093
Leachable Manganese (Mn)	ug/L	130	82	190	340	350	20	2372093
Leachable Molybdenum (Mo)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Nickel (Ni)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Potassium (K)	ug/L	5400	5700	4500	2800	2100	1000	2372093
Leachable Selenium (Se)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Silver (Ag)	ug/L	ND	ND	ND	ND	ND	5	2372093
Leachable Strontium (Sr)	ug/L	350	79	130	210	230	50	2372093
Leachable Thallium (Tl)	ug/L	ND	ND	ND	ND	ND	1	2372093
Leachable Tin (Sn)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Uranium (U)	ug/L	ND	ND	ND	ND	ND	1	2372093
Leachable Vanadium (V)	ug/L	ND	ND	ND	ND	ND	20	2372093
Leachable Zinc (Zn)	ug/L	4300	400	890	3200	3800	50	2372093

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Poor RPD due to sample inhomogeneity.

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Maxxam Job #: B0I5227
Report Date: 2011/01/06

Stantec Consulting Ltd
Client Project #: 121411355
Project name: CAPE PINE
Your P.O. #: 16300R-40

GENERAL COMMENTS

Sample IG1909-01: Results for potassium were reported from the ICP-OES.

Sample IG1916-01: Results for potassium were reported from the ICP-OES.

Sample IG1917-01: Results for potassium were reported from the ICP-OES.

Sample IG1918-01: Results for potassium were reported from the ICP-OES.

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Maxxam Job #: B0I5227
Report Date: 2011/01/06

Stantec Consulting Ltd
Client Project #: 121411355
Project name: CAPE PINE
Your P.O. #: 16300R-40

QUALITY ASSURANCE REPORT

			Method Blank		RPD	
QC Batch	Parameter	Date	Value	Units	Value (%)	QC Limits
2370196	Sample Weight (as received)	2010/12/30	50, RDL=N/A	g	0	N/A
2372093	Leachable Aluminum (Al)	2011/01/04	ND, RDL=100	ug/L	NC	25
2372093	Leachable Antimony (Sb)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Arsenic (As)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Barium (Ba)	2011/01/04	ND, RDL=50	ug/L	6.4	25
2372093	Leachable Beryllium (Be)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Boron (B)	2011/01/04	ND, RDL=500	ug/L	NC	25
2372093	Leachable Cadmium (Cd)	2011/01/04	ND, RDL=3	ug/L	NC	25
2372093	Leachable Calcium (Ca)	2011/01/04	ND, RDL=1000	ug/L	11.9	25
2372093	Leachable Chromium (Cr)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Cobalt (Co)	2011/01/04	ND, RDL=10	ug/L	NC	25
2372093	Leachable Copper (Cu)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Iron (Fe)	2011/01/04	ND, RDL=500	ug/L	NC	25
2372093	Leachable Lead (Pb)	2011/01/04	ND, RDL=5	ug/L	47.6(1, 2)	25
2372093	Leachable Lithium (Li)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Magnesium (Mg)	2011/01/04	ND, RDL=1000	ug/L	8.2	25
2372093	Leachable Manganese (Mn)	2011/01/04	ND, RDL=20	ug/L	2.5	25
2372093	Leachable Molybdenum (Mo)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Nickel (Ni)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Potassium (K)	2011/01/04	ND, RDL=1000	ug/L	NC	25
2372093	Leachable Selenium (Se)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Silver (Ag)	2011/01/04	ND, RDL=5	ug/L	NC	25
2372093	Leachable Strontium (Sr)	2011/01/04	ND, RDL=50	ug/L	NC	25
2372093	Leachable Thallium (Tl)	2011/01/04	ND, RDL=1	ug/L	NC	25
2372093	Leachable Tin (Sn)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Uranium (U)	2011/01/04	ND, RDL=1	ug/L	NC	25
2372093	Leachable Vanadium (V)	2011/01/04	ND, RDL=20	ug/L	NC	25
2372093	Leachable Zinc (Zn)	2011/01/04	ND, RDL=50	ug/L	18.1	25

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(2) - Poor RPD due to sample inhomogeneity.

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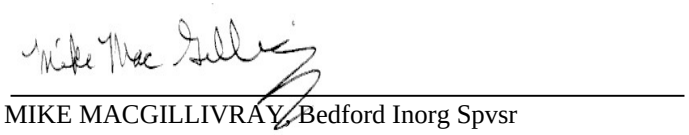
Validation Signature Page

Maxxam Job #: B0I5227

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



MIKE MACGILLIVRAY, Bedford Inorg Spvsr

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www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC #: B 075328 Page 1 of 1

This column for lab use only:
Client Code: 10951
Maxxam Job #: B01S227

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp

Integrity: YES (NO) Integrity / Checklist by: JT
Labelled by: Location / Bin #: WIF:20

INVOICE INFORMATION:
Company Name: Stantec
Contact Name: Accounts Payable
Address: St. John's, NL
Postal Code:
Email:
Ph: Fax:

REPORT INFORMATION (if differs from invoice):
Company Name: Stantec
Contact Name: Jon Murphy
Address:
Postal Code:
Email:
Ph: Fax:

PO #: 163008R-40
Project # / Phase #: 121411355
Project Name / Site Location: Cape Pine
Quote: A96124
Site #:
Task Order #:
Sampled by:

TURNAROUND TIME
Standard ☐
10 day ☐
If RUSH Specify Date:
Pre-scheduled rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCl:Cl4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron required for CCME Agricultural	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Soil (Potable), NS Fuel Oil Soil Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	TCLP leachate + metals
IG 1909	1 SS2 (P# IE7204)	SOIL	DEC14/10																		✓
IG 1916	2 SS6 (P# IE 7208)																				✓
IG 1917	3 SS7 (P# IE7209)																				✓
IG 1918	4 SS12 (P# IE7214)																				✓
	5																				
	6																				
	7																				
	8																				
	9																				
	10																				

2010 DEC 23 AM 10:07

WIF 128

RELINQUISHED BY: (Signature/Print) by email Date: Dec 23/10 Time:
RECEIVED BY: (Signature/Print) Date: Time:
Erin Fraser/Erin Fraser

White: Maxxam Yellow: Mail Pink: Client

Additional Delineation – June 2010

Your Project #: 121411106
Site: R.A.P. CAPE PINE
Your C.O.C. #: B 70336

Attention: Jim Slade
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2010/06/11

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B072194
Received: 2010/06/07, 10:24

Sample Matrix: Soil
Samples Received: 29

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
TEH in Soil (PIRI)	9	2010/06/09	2010/06/10	ATL SOP 00111 R3	Based on Atl. PIRI
Metals Solid Avail. Unified MS - Nper	29	2010/06/09	2010/06/10	ATL SOP 00024 R5	Based on EPA6020A
Moisture	9	N/A	2010/06/09	ATL SOP 00001 R3	MOE Handbook 1983
VPH in Soil (PIRI)	9	2010/06/08	2010/06/09	ATL SOP 00119 R6	Based on Atl. PIRI
ModTPH (T1) Calc. for Soil	9	2010/06/07	2010/06/11		Based on Atl. PIRI

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MICHELLE HILL, Project Manager
Email: Michelle.Hill@maxxamanalytics.com
Phone# (902) 420-0203

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Total cover pages: 1

This document is in electronic format, hard copy is available on request.

Maxxam Job #: B072194
Report Date: 2010/06/11

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GC2124	GC2127	GC2129	GC2131	GC2132	GC2133	GC2134	GC2145	GC2160		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/02		
	Units	**CPL-1 BS1**	**CPL-5 BS1**	**CPL-8 BS1**	**CPL-10 BS2**	**CPL-11 BS2**	**CPL-12 BS2**	**CPL-13 BS2**	**CPL-23 BS1**	**CPL-13-BS112**	**RDL**	**QC Batch**
Inorganics												
Moisture	%	9	7	25	5	7	5	7	36	7	1	2172941

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B072194
Report Date: 2010/06/11

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GC2124	GC2125	GC2125	GC2126	GC2127	GC2128	GC2129	GC2130	GC2131	GC2132		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-1 BS1**	**CPL-2 BS1**	**CPL-2 BS1 Lab-Dup**	**CPL-3 BS1**	**CPL-5 BS1**	**CPL-6 BS1**	**CPL-8 BS1**	**CPL-9 BS1**	**CPL-10 BS2**	**CPL-11 BS2**	**RDL**	**QC Batch**
Metals													
Available Aluminum (Al)	mg/kg	9200	12000	12000	7100	9900	9600	8300	8000	11000	12000	10	2173741
Available Antimony (Sb)	mg/kg	ND	ND	ND	27	ND	2	ND	3	ND	ND	2	2173741
Available Arsenic (As)	mg/kg	6	4	7	4	7	5	3	3	4	4	2	2173741
Available Barium (Ba)	mg/kg	15	21	19	56	34	32	14	15	19	21	5	2173741
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Boron (B)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	2173741
Available Cadmium (Cd)	mg/kg	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND	0.3	2173741
Available Chromium (Cr)	mg/kg	6	6	6	14	8	7	7	6	6	6	2	2173741
Available Cobalt (Co)	mg/kg	5	9	9	5	8	6	5	3	9	9	1	2173741
Available Copper (Cu)	mg/kg	15	12	12	18	18	16	7	7	15	23	2	2173741
Available Iron (Fe)	mg/kg	21000	21000	22000	21000	21000	20000	20000	17000	21000	21000	50	2173741
Available Lead (Pb)	mg/kg	110	18	18	210	93	110	68	100	8.7	9.8	0.5	2173741
Available Lithium (Li)	mg/kg	27	36	35	ND(1)	26	21	ND(1)	ND(1)	32	34	20	2173741
Available Manganese (Mn)	mg/kg	640	800	820	440	800	620	460	320	820	840	2	2173741
Available Mercury (Hg)	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND	0.1	2173741
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Nickel (Ni)	mg/kg	7	6	7	6	8	7	6	5	8	7	2	2173741
Available Rubidium (Rb)	mg/kg	3	2	2	3	2	3	2	2	2	2	2	2173741
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	2173741
Available Strontium (Sr)	mg/kg	6	8	6	10	10	16	10	13	ND	ND	5	2173741
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	2173741
Available Tin (Sn)	mg/kg	ND	ND	ND	5	ND	ND	ND	ND	ND	ND	2	2173741
Available Uranium (U)	mg/kg	0.2	0.3	0.3	0.5	0.3	0.5	0.5	0.7	0.3	0.3	0.1	2173741
Available Vanadium (V)	mg/kg	12	13	13	12	13	13	12	11	12	12	2	2173741
Available Zinc (Zn)	mg/kg	130	82	86	150	500	220	85	160	96	74	5	2173741

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.

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Maxxam Job #: B072194
Report Date: 2010/06/11

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GC2133	GC2134	GC2135	GC2136	GC2137	GC2138	GC2139	GC2140	GC2141		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-12 BS2**	**CPL-13 BS2**	**CPL-14 BS1**	**CPL-15 BS2**	**CPL-16 BS2**	**CPL-17 BS1**	**CPL-18 BS1**	**CPL-19 BS1**	**CPL-20 BS1**	**RDL**	**QC Batch**
Metals												
Available Aluminum (Al)	mg/kg	11000	11000	12000	11000	6000	8800	9300	7700	11000	10	2173741
Available Antimony (Sb)	mg/kg	ND	ND	ND	ND	ND	ND	3	ND	ND	2	2173741
Available Arsenic (As)	mg/kg	4	5	3	5	3	6	10	10	4	2	2173741
Available Barium (Ba)	mg/kg	19	19	22	16	12	17	140	51	19	5	2173741
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Boron (B)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	2173741
Available Cadmium (Cd)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	2173741
Available Chromium (Cr)	mg/kg	6	7	6	6	6	9	7	7	5	2	2173741
Available Cobalt (Co)	mg/kg	9	9	9	13	2	8	5	5	8	1	2173741
Available Copper (Cu)	mg/kg	17	31	17	15	5	18	24	19	15	2	2173741
Available Iron (Fe)	mg/kg	21000	21000	21000	20000	16000	19000	21000	19000	19000	50	2173741
Available Lead (Pb)	mg/kg	4.4	11	3.9	14	16	3.8	490	800	39	0.5	2173741
Available Lithium (Li)	mg/kg	34	30	33	31	ND(1)	33	24	ND(1)	28	20	2173741
Available Manganese (Mn)	mg/kg	800	800	850	730	180	760	510	450	710	2	2173741
Available Mercury (Hg)	mg/kg	ND	ND	ND	ND	0.1	ND	ND	0.3	ND	0.1	2173741
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Nickel (Ni)	mg/kg	8	8	8	8	3	13	8	8	7	2	2173741
Available Rubidium (Rb)	mg/kg	ND	2	ND	2	2	ND	3	2	ND	2	2173741
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	2173741
Available Strontium (Sr)	mg/kg	ND	6	ND	5	9	ND	21	9	ND	5	2173741
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	2173741
Available Tin (Sn)	mg/kg	ND	ND	ND	ND	ND	ND	3	7	ND	2	2173741
Available Uranium (U)	mg/kg	0.3	0.3	0.3	0.3	0.5	0.2	0.4	0.3	0.3	0.1	2173741
Available Vanadium (V)	mg/kg	12	12	13	12	15	8	11	12	11	2	2173741
Available Zinc (Zn)	mg/kg	74	240	100	90	73	79	180	120	71	5	2173741

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.

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Maxxam Job #: B072194
Report Date: 2010/06/11

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GC2142	GC2143		GC2144	GC2145	GC2146		
Sampling Date		2010/06/03	2010/06/03		2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-20 BS3**	**CPL-21 BS1**	**QC Batch**	**CPL-21 BS3**	**CPL-23 BS1**	**CPL-24 BS1**	**RDL**	**QC Batch**
Metals									
Available Aluminum (Al)	mg/kg	11000	7700	2173741	6600	7300	7600	10	2173831
Available Antimony (Sb)	mg/kg	7	3	2173741	3	13	ND	2	2173831
Available Arsenic (As)	mg/kg	27	11	2173741	9	15	5	2	2173831
Available Barium (Ba)	mg/kg	340	220	2173741	240	720	37	5	2173831
Available Beryllium (Be)	mg/kg	ND	ND	2173741	ND	ND	ND	2	2173831
Available Bismuth (Bi)	mg/kg	ND	ND	2173741	ND	ND	ND	2	2173831
Available Boron (B)	mg/kg	ND	ND	2173741	ND	ND	ND	5	2173831
Available Cadmium (Cd)	mg/kg	ND	ND	2173741	ND	0.6	ND	0.3	2173831
Available Chromium (Cr)	mg/kg	17	9	2173741	10	13	7	2	2173831
Available Cobalt (Co)	mg/kg	10	4	2173741	3	6	4	1	2173831
Available Copper (Cu)	mg/kg	50	39	2173741	33	36	65	2	2173831
Available Iron (Fe)	mg/kg	31000	17000	2173741	15000	29000	17000	50	2173831
Available Lead (Pb)	mg/kg	1800	2600	2173741	2000	3900	290	0.5	2173831
Available Lithium (Li)	mg/kg	26	ND(1)	2173741	ND(1)	ND(1)	ND(1)	20	2173831
Available Manganese (Mn)	mg/kg	1100	360	2173741	290	400	440	2	2173831
Available Mercury (Hg)	mg/kg	0.4	0.5	2173741	0.5	0.5	0.1	0.1	2173831
Available Molybdenum (Mo)	mg/kg	3	ND	2173741	ND	ND	ND	2	2173831
Available Nickel (Ni)	mg/kg	13	7	2173741	6	11	6	2	2173831
Available Rubidium (Rb)	mg/kg	2	3	2173741	3	2	3	2	2173831
Available Selenium (Se)	mg/kg	ND	ND	2173741	ND	ND	ND	2	2173831
Available Silver (Ag)	mg/kg	ND	0.5	2173741	0.6	ND	ND	0.5	2173831
Available Strontium (Sr)	mg/kg	22	9	2173741	10	17	6	5	2173831
Available Thallium (Tl)	mg/kg	ND	ND	2173741	ND	ND	ND	0.1	2173831
Available Tin (Sn)	mg/kg	16	20	2173741	13	26	4	2	2173831
Available Uranium (U)	mg/kg	0.4	0.3	2173741	0.3	0.3	0.3	0.1	2173831
Available Vanadium (V)	mg/kg	17	10	2173741	11	11	12	2	2173831
Available Zinc (Zn)	mg/kg	240	230	2173741	210	450	110	5	2173831

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.

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Maxxam Job #: B072194
Report Date: 2010/06/11

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GC2147	GC2148	GC2149	GC2160	GC2161	GC2162		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/02	2010/06/02	2010/06/02		
	Units	**CPL-25 BS1**	**CPL-26 BS1**	**CPL-27 BS1**	**CPL-13-BS112**	**CPL-19-BS11**	**CPL-27-BS12**	**RDL**	**QC Batch**
Metals									
Available Aluminum (Al)	mg/kg	7700	7600	5200	11000	7700	4600	10	2173831
Available Antimony (Sb)	mg/kg	9	ND	ND	ND	3	ND	2	2173831
Available Arsenic (As)	mg/kg	9	3	4	4	12	3	2	2173831
Available Barium (Ba)	mg/kg	64	33	24	20	35	26	5	2173831
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	ND	2	2173831
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	ND	2	2173831
Available Boron (B)	mg/kg	ND	ND	ND	ND	ND	5	5	2173831
Available Cadmium (Cd)	mg/kg	ND	ND	ND	ND	ND	ND	0.3	2173831
Available Chromium (Cr)	mg/kg	9	6	6	7	7	4	2	2173831
Available Cobalt (Co)	mg/kg	4	4	3	9	4	2	1	2173831
Available Copper (Cu)	mg/kg	15	8	7	29	19	6	2	2173831
Available Iron (Fe)	mg/kg	23000	16000	17000	21000	21000	10000	50	2173831
Available Lead (Pb)	mg/kg	590	170	210	13	1300	260	0.5	2173831
Available Lithium (Li)	mg/kg	24	22	ND(1)	29	ND(1)	ND(1)	20	2173831
Available Manganese (Mn)	mg/kg	480	440	250	790	420	190	2	2173831
Available Mercury (Hg)	mg/kg	0.2	0.1	0.1	ND	0.2	0.1	0.1	2173831
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	ND	2	2173831
Available Nickel (Ni)	mg/kg	9	6	5	9	7	3	2	2173831
Available Rubidium (Rb)	mg/kg	3	2	3	2	4	3	2	2173831
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	ND	2	2173831
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	ND	0.5	2173831
Available Strontium (Sr)	mg/kg	12	7	6	5	6	9	5	2173831
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	ND	0.1	2173831
Available Tin (Sn)	mg/kg	5	2	11	ND	8	2	2	2173831
Available Uranium (U)	mg/kg	0.2	0.3	0.3	0.3	0.3	0.3	0.1	2173831
Available Vanadium (V)	mg/kg	11	9	10	11	14	10	2	2173831
Available Zinc (Zn)	mg/kg	110	82	67	220	85	69	5	2173831

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.

Maxxam Job #: B072194
Report Date: 2010/06/11

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		GC2124	GC2127	GC2129	GC2131		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-1 BS1**	**CPL-5 BS1**	**CPL-8 BS1**	**CPL-10 BS2**	**RDL**	**QC Batch**
Petroleum Hydrocarbons							
Benzene	mg/kg	ND	ND	ND	ND	0.03	2173771
Toluene	mg/kg	ND	ND	ND	ND	0.03	2173771
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.03	2173771
Xylene (Total)	mg/kg	ND	ND	ND	ND	0.05	2173771
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	3	2173771
>C10-C21 Hydrocarbons	mg/kg	ND	ND	ND	ND	15	2173694
>C21-<C32 Hydrocarbons	mg/kg	31	34	41	ND	15	2173694
Modified TPH (Tier1)	mg/kg	31	34	41	ND	20	2171465
Surrogate Recovery (%)							
Isobutylbenzene - Extractable	%	102	99	99	98		2173694
Isobutylbenzene - Volatile	%	99	100	111	97		2173771
n-Dotriacontane - Extractable	%	97(1)	102(2)	104(3)	102(4)		2173694

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Possible lube oil fraction. Silica gel clean-up performed prior to analysis as per client request.
(2) - Lube oil fraction. Silica gel clean-up performed prior to analysis as per client request.
(3) - Possible lube oil fraction. Unidentified compound(s) in lube oil range. Silica gel clean-up performed prior to analysis as per client request.
(4) - Silica gel clean-up performed prior to analysis as per client request.

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Maxxam Job #: B072194
Report Date: 2010/06/11

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		GC2132	GC2133	GC2133	GC2134	GC2145	GC2160		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/02		
	Units	**CPL-11 BS2**	**CPL-12 BS2**	**CPL-12 BS2 Lab-Dup**	**CPL-13 BS2**	**CPL-23 BS1**	**CPL-13-BS112**	**RDL**	**QC Batch**
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	ND	ND	ND	ND	ND	0.03	2173771
Toluene	mg/kg	ND	ND	ND	ND	ND	ND	0.03	2173771
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	ND	0.03	2173771
Xylene (Total)	mg/kg	ND	ND	ND	ND	ND	ND	0.05	2173771
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	ND	ND	3	2173771
>C10-C21 Hydrocarbons	mg/kg	ND	ND		ND	120	ND	15	2173694
>C21-<C32 Hydrocarbons	mg/kg	ND	ND		ND	270	ND	15	2173694
Modified TPH (Tier1)	mg/kg	ND	ND		ND	390	ND	20	2171465
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	98	103		104	109	99		2173694
Isobutylbenzene - Volatile	%	103	102	103	99	121	100		2173771
n-Dotriacontane - Extractable	%	102(1)	108(1)		110(1)	92(2)	107(1)		2173694

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Silica gel clean-up performed prior to analysis as per client request.
(2) - Possible lube oil fraction; interference from possible PAHs. Silica gel clean-up performed prior to analysis as per client request.

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Report Date: 2010/06/11

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2173694	Isobutylbenzene - Extractable	2010/06/10	103	30 - 130	96	30 - 130	92	%				
2173694	n-Dotriacontane - Extractable	2010/06/10	96	30 - 130	91	30 - 130	92	%				
2173694	>C10-C21 Hydrocarbons	2010/06/10	89	30 - 130	83	30 - 130	ND, RDL=15	mg/kg	NC	50		
2173694	>C21-<C32 Hydrocarbons	2010/06/10	93	30 - 130	89	30 - 130	ND, RDL=15	mg/kg	NC	50		
2173741	Available Aluminum (Al)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=10	mg/kg	3.2	35	92	75 - 125
2173741	Available Antimony (Sb)	2010/06/10	80	75 - 125	95	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Arsenic (As)	2010/06/10	106	75 - 125	109	75 - 125	ND, RDL=2	mg/kg	NC	35	120	75 - 125
2173741	Available Barium (Ba)	2010/06/10	NC	75 - 125	108	75 - 125	ND, RDL=5	mg/kg	NC	35	114	75 - 125
2173741	Available Beryllium (Be)	2010/06/10	102	75 - 125	106	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Bismuth (Bi)	2010/06/10	100	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Boron (B)	2010/06/10	103	75 - 125	104	75 - 125	ND, RDL=5	mg/kg	NC	35		
2173741	Available Cadmium (Cd)	2010/06/10	104	75 - 125	105	75 - 125	ND, RDL=0.3	mg/kg	NC	35		
2173741	Available Chromium (Cr)	2010/06/10	96	75 - 125	103	75 - 125	ND, RDL=2	mg/kg	NC	35	92	75 - 125
2173741	Available Cobalt (Co)	2010/06/10	99	75 - 125	104	75 - 125	ND, RDL=1	mg/kg	6.0	35	97	75 - 125
2173741	Available Copper (Cu)	2010/06/10	NC	75 - 125	105	75 - 125	ND, RDL=2	mg/kg	4.7	35	98	75 - 125
2173741	Available Iron (Fe)	2010/06/10	NC	75 - 125	103	75 - 125	ND, RDL=50	mg/kg	4.9	35	108	75 - 125
2173741	Available Lead (Pb)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=0.5	mg/kg	1.1	35	105	75 - 125
2173741	Available Lithium (Li)	2010/06/10	NC	75 - 125	106	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Manganese (Mn)	2010/06/10	NC	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	2.8	35	113	75 - 125
2173741	Available Mercury (Hg)	2010/06/10	104	75 - 125	105	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173741	Available Molybdenum (Mo)	2010/06/10	103	75 - 125	103	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Nickel (Ni)	2010/06/10	96	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	NC	35	100	75 - 125
2173741	Available Rubidium (Rb)	2010/06/10	93	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Selenium (Se)	2010/06/10	96	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Silver (Ag)	2010/06/10	101	75 - 125	103	75 - 125	ND, RDL=0.5	mg/kg	NC	35		
2173741	Available Strontium (Sr)	2010/06/10	86	75 - 125	107	75 - 125	ND, RDL=5	mg/kg	NC	35	114	75 - 125
2173741	Available Thallium (Tl)	2010/06/10	103	75 - 125	103	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173741	Available Tin (Sn)	2010/06/10	99	75 - 125	100	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Uranium (U)	2010/06/10	106	75 - 125	106	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173741	Available Vanadium (V)	2010/06/10	NC	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	1.5	35	112	75 - 125
2173741	Available Zinc (Zn)	2010/06/10	96	75 - 125	101	75 - 125	ND, RDL=5	mg/kg	4.5	35	100	75 - 125
2173771	Isobutylbenzene - Volatile	2010/06/09	96	60 - 140	94	60 - 140	99	%				
2173771	Benzene	2010/06/09	83	60 - 140	83	60 - 140	ND, RDL=0.03	mg/kg	NC	50		
2173771	Toluene	2010/06/09	125	60 - 140	84	60 - 140	ND, RDL=0.03	mg/kg	NC	50		
2173771	Ethylbenzene	2010/06/09	107	60 - 140	84	60 - 140	ND, RDL=0.03	mg/kg	NC	50		
2173771	Xylene (Total)	2010/06/09	115	60 - 140	87	60 - 140	ND, RDL=0.05	mg/kg	NC	50		
2173771	C6 - C10 (less BTEX)	2010/06/09					ND, RDL=3	mg/kg	NC	50		
2173831	Available Aluminum (Al)	2010/06/10	NC	75 - 125	96	75 - 125	ND, RDL=10	mg/kg	5.3	35	91	75 - 125
2173831	Available Antimony (Sb)	2010/06/10	82	75 - 125	99	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Arsenic (As)	2010/06/10	NC	75 - 125	107	75 - 125	ND, RDL=2	mg/kg	6.6	35	119	75 - 125

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Maxxam Job #: B072194
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Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2173831	Available Barium (Ba)	2010/06/10	NC	75 - 125	109	75 - 125	ND, RDL=5	mg/kg	7.3	35	114	75 - 125
2173831	Available Beryllium (Be)	2010/06/10	109	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Bismuth (Bi)	2010/06/10	105	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Boron (B)	2010/06/10	94	75 - 125	104	75 - 125	ND, RDL=5	mg/kg	NC	35		
2173831	Available Cadmium (Cd)	2010/06/10	109	75 - 125	104	75 - 125	ND, RDL=0.3	mg/kg	NC	35		
2173831	Available Chromium (Cr)	2010/06/10	NC	75 - 125	101	75 - 125	ND, RDL=2	mg/kg	6.8	35	92	75 - 125
2173831	Available Cobalt (Co)	2010/06/10	107	75 - 125	101	75 - 125	ND, RDL=1	mg/kg	5.8	35	102	75 - 125
2173831	Available Copper (Cu)	2010/06/10	NC	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	5.1	35	95	75 - 125
2173831	Available Iron (Fe)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=50	mg/kg	6.1	35	108	75 - 125
2173831	Available Lead (Pb)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=0.5	mg/kg	4.4	35	104	75 - 125
2173831	Available Lithium (Li)	2010/06/10	NC	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC(1)	35		
2173831	Available Manganese (Mn)	2010/06/10	NC	75 - 125	99	75 - 125	ND, RDL=2	mg/kg	4.4	35	112	75 - 125
2173831	Available Mercury (Hg)	2010/06/10	105	75 - 125	100	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173831	Available Molybdenum (Mo)	2010/06/10	107	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Nickel (Ni)	2010/06/10	NC	75 - 125	101	75 - 125	ND, RDL=2	mg/kg	4.3	35	103	75 - 125
2173831	Available Rubidium (Rb)	2010/06/10	99	75 - 125	98	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Selenium (Se)	2010/06/10	107	75 - 125	101	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Silver (Ag)	2010/06/10	106	75 - 125	104	75 - 125	ND, RDL=0.5	mg/kg	NC	35		
2173831	Available Strontium (Sr)	2010/06/10	NC	75 - 125	102	75 - 125	ND, RDL=5	mg/kg	NC	35	111	75 - 125
2173831	Available Thallium (Tl)	2010/06/10	107	75 - 125	103	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173831	Available Tin (Sn)	2010/06/10	99	75 - 125	103	75 - 125	ND, RDL=2	mg/kg	NC(2)	35		
2173831	Available Uranium (U)	2010/06/10	111	75 - 125	106	75 - 125	ND, RDL=0.1	mg/kg	13.2	35		
2173831	Available Vanadium (V)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=2	mg/kg	7.0	35	112	75 - 125
2173831	Available Zinc (Zn)	2010/06/10	104	75 - 125	99	75 - 125	ND, RDL=5	mg/kg	5.4	35	101	75 - 125

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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 not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.
(2) - Poor RPD due to sample inhomogeneity.

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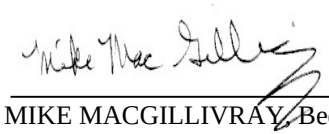
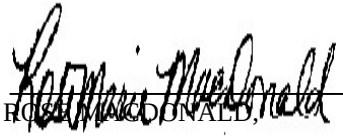
Validation Signature Page

Maxxam Job #: B072194

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



MIKE MACGILLIVRAY, Bedford Inorg Spvsr



ROSS MACDONALD, [illegible]

ALAN STEWART, Scientific Specialist (Organics)

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Your Project #: 121411106
Site: R.A.P. CAPE PINE
Your C.O.C. #: B 70336

Attention: Jim Slade
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2010/06/15

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B072194
Received: 2010/06/07, 10:24

Sample Matrix: Leachate
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Leach. Tot. Coll. Cell MS - N-per	7	2010/06/10	2010/06/11	ATL SOP 00058 R2	Based on EPA6020A
Metals Leach. Tot. Coll. Cell MS - N-per	2	2010/06/10	2010/06/14	ATL SOP 00058 R2	Based on EPA6020A

Sample Matrix: Soil
Samples Received: 30

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
TEH in Soil (PIRI)	9	2010/06/09	2010/06/10	ATL SOP 00111 R3	Based on Atl. PIRI
Metals Solid Avail. Unified MS - Nper	29	2010/06/09	2010/06/10	ATL SOP 00024 R5	Based on EPA6020A
Metals Solid Avail. Unified MS - Nper	1	2010/06/10	2010/06/11	ATL SOP 00024 R5	Based on EPA6020A
Moisture	9	N/A	2010/06/09	ATL SOP 00001 R3	MOE Handbook 1983
VPH in Soil (PIRI)	9	2010/06/08	2010/06/09	ATL SOP 00119 R6	Based on Atl. PIRI
TCLP Inorganic extraction - pH	9	N/A	2010/06/10	ATL SOP-00035 R4	Based on EPA1311
TCLP Inorganic extraction - Weight	9	N/A	2010/06/10	ATL SOP-00035 R4	Based on EPA1311
ModTPH (T1) Calc. for Soil	9	2010/06/07	2010/06/11		Based on Atl. PIRI

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MICHELLE HILL, Project Manager
Email: Michelle.Hill@maxxamanalytics.com
Phone# (902) 420-0203

==========

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Total cover pages: 1

This document is in electronic format, hard copy is available on request.

Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ICP/MS (LEACHATE)

Maxxam ID		GC2124	GC2124	GC2127			GC2130		
Sampling Date		2010/06/03	2010/06/03	2010/06/03			2010/06/03		
	Units	**CPL-1 BS1**	**CPL-1 BS1 Lab-Dup**	**CPL-5 BS1**	**RDL**	**QC Batch**	**CPL-9 BS1**	**RDL**	**QC Batch**
Metals									
Leachable Aluminum (Al)	ug/L	700	720	990	100	2176276	620	100	2176349
Leachable Antimony (Sb)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Arsenic (As)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Barium (Ba)	ug/L	250	250	460	50	2176276	340	50	2176349
Leachable Beryllium (Be)	ug/L	ND(1)	ND(1)	ND(1)	200	2176276	ND	20	2176349
Leachable Boron (B)	ug/L	ND(1)	ND(1)	ND(1)	5000	2176276	ND	500	2176349
Leachable Cadmium (Cd)	ug/L	ND	ND	4	3	2176276	ND	3	2176349
Leachable Calcium (Ca)	ug/L	6600	7100	18000	1000	2176276	11000	1000	2176349
Leachable Chromium (Cr)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Cobalt (Co)	ug/L	ND	ND	ND	10	2176276	ND	10	2176349
Leachable Copper (Cu)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Iron (Fe)	ug/L	ND	ND	ND	500	2176276	ND	500	2176349
Leachable Lead (Pb)	ug/L	210	150(2)	87	5	2176276	78	5	2176349
Leachable Lithium (Li)	ug/L	ND(1)	ND(1)	ND(1)	200	2176276	ND	20	2176349
Leachable Magnesium (Mg)	ug/L	6400	6700	13000	1000	2176276	7700	1000	2176349
Leachable Manganese (Mn)	ug/L	320	350	650	20	2176276	61	20	2176349
Leachable Molybdenum (Mo)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Nickel (Ni)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Potassium (K)	ug/L	5600	5900	5200	1000	2176276	4400	1000	2176349
Leachable Selenium (Se)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Silver (Ag)	ug/L	ND	ND	ND	5	2176276	ND	5	2176349
Leachable Strontium (Sr)	ug/L	70	73	150	50	2176276	130	50	2176349
Leachable Thallium (Tl)	ug/L	ND	ND	ND	1	2176276	ND	1	2176349
Leachable Tin (Sn)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Uranium (U)	ug/L	ND	ND	ND	1	2176276	ND	1	2176349
Leachable Vanadium (V)	ug/L	ND	ND	ND	20	2176276	ND	20	2176349
Leachable Zinc (Zn)	ug/L	530	550	3300	50	2176276	730	50	2176349

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Elevated reporting limit due to sample matrix.
(2) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ICP/MS (LEACHATE)

Maxxam ID		GC2140	GC2141	GC2143	GC2145	GC2148	GC2161		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/02		
	Units	**CPL-19 BS1**	**CPL-20 BS1**	**CPL-21 BS1**	**CPL-23 BS1**	**CPL-26 BS1**	**CPL-19-BS11**	**RDL**	**QC Batch**
Metals									
Leachable Aluminum (Al)	ug/L	850	1400	630	650	900	840	100	2176349
Leachable Antimony (Sb)	ug/L	ND	ND	ND	57	ND	ND	20	2176349
Leachable Arsenic (As)	ug/L	ND	ND	ND	35	ND	ND	20	2176349
Leachable Barium (Ba)	ug/L	360	350	1400	2000	360	570	50	2176349
Leachable Beryllium (Be)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Boron (B)	ug/L	ND	ND	ND	ND	ND	ND	500	2176349
Leachable Cadmium (Cd)	ug/L	ND	ND	ND	5	ND	ND	3	2176349
Leachable Calcium (Ca)	ug/L	4600	3200	10000	11000	6400	6000	1000	2176349
Leachable Chromium (Cr)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Cobalt (Co)	ug/L	ND	ND	ND	ND	ND	ND	10	2176349
Leachable Copper (Cu)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Iron (Fe)	ug/L	ND	ND	ND	ND	ND	ND	500	2176349
Leachable Lead (Pb)	ug/L	1200	200	5200	17000	200	2200	5	2176349
Leachable Lithium (Li)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Magnesium (Mg)	ug/L	3400	1300	6300	4300	3200	3800	1000	2176349
Leachable Manganese (Mn)	ug/L	150	120	140	96	240	150	20	2176349
Leachable Molybdenum (Mo)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Nickel (Ni)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Potassium (K)	ug/L	4400	3900	6000	2600	4600	3400	1000	2176349
Leachable Selenium (Se)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Silver (Ag)	ug/L	ND	ND	ND	ND	ND	ND	5	2176349
Leachable Strontium (Sr)	ug/L	ND	ND	100	98	57	55	50	2176349
Leachable Thallium (Tl)	ug/L	ND	ND	ND	ND	ND	ND	1	2176349
Leachable Tin (Sn)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Uranium (U)	ug/L	ND	ND	ND	ND	ND	ND	1	2176349
Leachable Vanadium (V)	ug/L	ND	ND	ND	ND	ND	ND	20	2176349
Leachable Zinc (Zn)	ug/L	270	260	1400	2000	280	320	50	2176349

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GC2124	GC2124	GC2127	GC2129	GC2130	GC2131	GC2132	GC2133	GC2134	GC2140		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-1 BS1**	**CPL-1 BS1 Lab-Dup**	**CPL-5 BS1**	**CPL-8 BS1**	**CPL-9 BS1**	**CPL-10 BS2**	**CPL-11 BS2**	**CPL-12 BS2**	**CPL-13 BS2**	**CPL-19 BS1**	**RDL**	**QC Batch**
Inorganics													
Moisture	%	9		7	25		5	7	5	7		1	2172941
Sample Weight (as received)	g	50	50	50		50					50	N/A	2175025
Initial pH	N/A	6.6	NA	7.4		6.1					5.6		2175029
Final pH	N/A	4.9	4.9	4.9		4.9					4.9		2175029

Maxxam ID		GC2141	GC2143	GC2145	GC2148	GC2160	GC2161		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/02	2010/06/02		
	Units	**CPL-20 BS1**	**CPL-21 BS1**	**CPL-23 BS1**	**CPL-26 BS1**	**CPL-13-BS112**	**CPL-19-BS11**	**RDL**	**QC Batch**
Inorganics									
Moisture	%			36		7		1	2172941
Sample Weight (as received)	g	50	50	50	50		50	N/A	2175025
Initial pH	N/A	5.6	5.8	6.0	6.0		5.8		2175029
Final pH	N/A	4.9	4.9	4.9	4.8		4.8		2175029

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

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GC2124	GC2125	GC2125	GC2126	GC2127	GC2128	GC2129	GC2130	GC2131	GC2132		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-1 BS1**	**CPL-2 BS1**	**CPL-2 BS1 Lab-Dup**	**CPL-3 BS1**	**CPL-5 BS1**	**CPL-6 BS1**	**CPL-8 BS1**	**CPL-9 BS1**	**CPL-10 BS2**	**CPL-11 BS2**	**RDL**	**QC Batch**
Metals													
Available Aluminum (Al)	mg/kg	9200	12000	12000	7100	9900	9600	8300	8000	11000	12000	10	2173741
Available Antimony (Sb)	mg/kg	ND	ND	ND	27	ND	2	ND	3	ND	ND	2	2173741
Available Arsenic (As)	mg/kg	6	4	7	4	7	5	3	3	4	4	2	2173741
Available Barium (Ba)	mg/kg	15	21	19	56	34	32	14	15	19	21	5	2173741
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Boron (B)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	2173741
Available Cadmium (Cd)	mg/kg	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND	0.3	2173741
Available Chromium (Cr)	mg/kg	6	6	6	14	8	7	7	6	6	6	2	2173741
Available Cobalt (Co)	mg/kg	5	9	9	5	8	6	5	3	9	9	1	2173741
Available Copper (Cu)	mg/kg	15	12	12	18	18	16	7	7	15	23	2	2173741
Available Iron (Fe)	mg/kg	21000	21000	22000	21000	21000	20000	20000	17000	21000	21000	50	2173741
Available Lead (Pb)	mg/kg	110	18	18	210	93	110	68	100	8.7	9.8	0.5	2173741
Available Lithium (Li)	mg/kg	27	36	35	ND(1)	26	21	ND(1)	ND(1)	32	34	20	2173741
Available Manganese (Mn)	mg/kg	640	800	820	440	800	620	460	320	820	840	2	2173741
Available Mercury (Hg)	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND	0.1	2173741
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Nickel (Ni)	mg/kg	7	6	7	6	8	7	6	5	8	7	2	2173741
Available Rubidium (Rb)	mg/kg	3	2	2	3	2	3	2	2	2	2	2	2173741
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	2173741
Available Strontium (Sr)	mg/kg	6	8	6	10	10	16	10	13	ND	ND	5	2173741
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	2173741
Available Tin (Sn)	mg/kg	ND	ND	ND	5	ND	ND	ND	ND	ND	ND	2	2173741
Available Uranium (U)	mg/kg	0.2	0.3	0.3	0.5	0.3	0.5	0.5	0.7	0.3	0.3	0.1	2173741
Available Vanadium (V)	mg/kg	12	13	13	12	13	13	12	11	12	12	2	2173741
Available Zinc (Zn)	mg/kg	130	82	86	150	500	220	85	160	96	74	5	2173741

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GC2133	GC2134	GC2135	GC2136	GC2137	GC2138	GC2139	GC2140	GC2141	GC2142		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-12 BS2**	**CPL-13 BS2**	**CPL-14 BS1**	**CPL-15 BS2**	**CPL-16 BS2**	**CPL-17 BS1**	**CPL-18 BS1**	**CPL-19 BS1**	**CPL-20 BS1**	**CPL-20 BS3**	**RDL**	**QC Batch**
Metals													
Available Aluminum (Al)	mg/kg	11000	11000	12000	11000	6000	8800	9300	7700	11000	11000	10	2173741
Available Antimony (Sb)	mg/kg	ND	ND	ND	ND	ND	ND	3	ND	ND	7	2	2173741
Available Arsenic (As)	mg/kg	4	5	3	5	3	6	10	10	4	27	2	2173741
Available Barium (Ba)	mg/kg	19	19	22	16	12	17	140	51	19	340	5	2173741
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Boron (B)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	2173741
Available Cadmium (Cd)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	2173741
Available Chromium (Cr)	mg/kg	6	7	6	6	6	9	7	7	5	17	2	2173741
Available Cobalt (Co)	mg/kg	9	9	9	13	2	8	5	5	8	10	1	2173741
Available Copper (Cu)	mg/kg	17	31	17	15	5	18	24	19	15	50	2	2173741
Available Iron (Fe)	mg/kg	21000	21000	21000	20000	16000	19000	21000	19000	19000	31000	50	2173741
Available Lead (Pb)	mg/kg	4.4	11	3.9	14	16	3.8	490	800	39	1800	0.5	2173741
Available Lithium (Li)	mg/kg	34	30	33	31	ND(1)	33	24	ND(1)	28	26	20	2173741
Available Manganese (Mn)	mg/kg	800	800	850	730	180	760	510	450	710	1100	2	2173741
Available Mercury (Hg)	mg/kg	ND	ND	ND	ND	0.1	ND	ND	0.3	ND	0.4	0.1	2173741
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	2	2173741
Available Nickel (Ni)	mg/kg	8	8	8	8	3	13	8	8	7	13	2	2173741
Available Rubidium (Rb)	mg/kg	ND	2	ND	2	2	ND	3	2	ND	2	2	2173741
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	2173741
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	2173741
Available Strontium (Sr)	mg/kg	ND	6	ND	5	9	ND	21	9	ND	22	5	2173741
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	2173741
Available Tin (Sn)	mg/kg	ND	ND	ND	ND	ND	ND	3	7	ND	16	2	2173741
Available Uranium (U)	mg/kg	0.3	0.3	0.3	0.3	0.5	0.2	0.4	0.3	0.3	0.4	0.1	2173741
Available Vanadium (V)	mg/kg	12	12	13	12	15	8	11	12	11	17	2	2173741
Available Zinc (Zn)	mg/kg	74	240	100	90	73	79	180	120	71	240	5	2173741

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GC2143		GC2144	GC2145	GC2146	GC2147	GC2148		
Sampling Date		2010/06/03		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-21 BS1**	**QC Batch**	**CPL-21 BS3**	**CPL-23 BS1**	**CPL-24 BS1**	**CPL-25 BS1**	**CPL-26 BS1**	**RDL**	**QC Batch**
Metals										
Available Aluminum (Al)	mg/kg	7700	2173741	6600	7300	7600	7700	7600	10	2173831
Available Antimony (Sb)	mg/kg	3	2173741	3	13	ND	9	ND	2	2173831
Available Arsenic (As)	mg/kg	11	2173741	9	15	5	9	3	2	2173831
Available Barium (Ba)	mg/kg	220	2173741	240	720	37	64	33	5	2173831
Available Beryllium (Be)	mg/kg	ND	2173741	ND	ND	ND	ND	ND	2	2173831
Available Bismuth (Bi)	mg/kg	ND	2173741	ND	ND	ND	ND	ND	2	2173831
Available Boron (B)	mg/kg	ND	2173741	ND	ND	ND	ND	ND	5	2173831
Available Cadmium (Cd)	mg/kg	ND	2173741	ND	0.6	ND	ND	ND	0.3	2173831
Available Chromium (Cr)	mg/kg	9	2173741	10	13	7	9	6	2	2173831
Available Cobalt (Co)	mg/kg	4	2173741	3	6	4	4	4	1	2173831
Available Copper (Cu)	mg/kg	39	2173741	33	36	65	15	8	2	2173831
Available Iron (Fe)	mg/kg	17000	2173741	15000	29000	17000	23000	16000	50	2173831
Available Lead (Pb)	mg/kg	2600	2173741	2000	3900	290	590	170	0.5	2173831
Available Lithium (Li)	mg/kg	ND(1)	2173741	ND(1)	ND(1)	ND(1)	24	22	20	2173831
Available Manganese (Mn)	mg/kg	360	2173741	290	400	440	480	440	2	2173831
Available Mercury (Hg)	mg/kg	0.5	2173741	0.5	0.5	0.1	0.2	0.1	0.1	2173831
Available Molybdenum (Mo)	mg/kg	ND	2173741	ND	ND	ND	ND	ND	2	2173831
Available Nickel (Ni)	mg/kg	7	2173741	6	11	6	9	6	2	2173831
Available Rubidium (Rb)	mg/kg	3	2173741	3	2	3	3	2	2	2173831
Available Selenium (Se)	mg/kg	ND	2173741	ND	ND	ND	ND	ND	2	2173831
Available Silver (Ag)	mg/kg	0.5	2173741	0.6	ND	ND	ND	ND	0.5	2173831
Available Strontium (Sr)	mg/kg	9	2173741	10	17	6	12	7	5	2173831
Available Thallium (Tl)	mg/kg	ND	2173741	ND	ND	ND	ND	ND	0.1	2173831
Available Tin (Sn)	mg/kg	20	2173741	13	26	4	5	2	2	2173831
Available Uranium (U)	mg/kg	0.3	2173741	0.3	0.3	0.3	0.2	0.3	0.1	2173831
Available Vanadium (V)	mg/kg	10	2173741	11	11	12	11	9	2	2173831
Available Zinc (Zn)	mg/kg	230	2173741	210	450	110	110	82	5	2173831

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QC Batch = Quality Control Batch
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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GC2149	GC2160	GC2161	GC2162		GD0619		
Sampling Date		2010/06/03	2010/06/02	2010/06/02	2010/06/02		2010/06/03		
	Units	**CPL-27 BS1**	**CPL-13-BS112**	**CPL-19-BS11**	**CPL-27-BS12**	**QC Batch**	**CPL-22-BS1**	**RDL**	**QC Batch**
Metals									
Available Aluminum (Al)	mg/kg	5200	11000	7700	4600	2173831	7900	10	2174997
Available Antimony (Sb)	mg/kg	ND	ND	3	ND	2173831	9	2	2174997
Available Arsenic (As)	mg/kg	4	4	12	3	2173831	41	2	2174997
Available Barium (Ba)	mg/kg	24	20	35	26	2173831	1500	5	2174997
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	2173831	ND	2	2174997
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	2173831	ND	2	2174997
Available Boron (B)	mg/kg	ND	ND	ND	5	2173831	ND	5	2174997
Available Cadmium (Cd)	mg/kg	ND	ND	ND	ND	2173831	2.0	0.3	2174997
Available Chromium (Cr)	mg/kg	6	7	7	4	2173831	21	2	2174997
Available Cobalt (Co)	mg/kg	3	9	4	2	2173831	6	1	2174997
Available Copper (Cu)	mg/kg	7	29	19	6	2173831	320	2	2174997
Available Iron (Fe)	mg/kg	17000	21000	21000	10000	2173831	36000	50	2174997
Available Lead (Pb)	mg/kg	210	13	1300	260	2173831	7200	0.5	2174997
Available Lithium (Li)	mg/kg	ND(1)	29	ND(1)	ND(1)	2173831	ND(1)	20	2174997
Available Manganese (Mn)	mg/kg	250	790	420	190	2173831	1100	2	2174997
Available Mercury (Hg)	mg/kg	0.1	ND	0.2	0.1	2173831	3.2	0.1	2174997
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	2173831	2	2	2174997
Available Nickel (Ni)	mg/kg	5	9	7	3	2173831	11	2	2174997
Available Rubidium (Rb)	mg/kg	3	2	4	3	2173831	3	2	2174997
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	2173831	ND	2	2174997
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	2173831	0.8	0.5	2174997
Available Strontium (Sr)	mg/kg	6	5	6	9	2173831	57	5	2174997
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	2173831	0.2	0.1	2174997
Available Tin (Sn)	mg/kg	11	ND	8	2	2173831	47	2	2174997
Available Uranium (U)	mg/kg	0.3	0.3	0.3	0.3	2173831	0.3	0.1	2174997
Available Vanadium (V)	mg/kg	10	11	14	10	2173831	14	2	2174997
Available Zinc (Zn)	mg/kg	67	220	85	69	2173831	1400	5	2174997

ND = Not detected
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QC Batch = Quality Control Batch
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		GC2124	GC2127	GC2129	GC2131		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03		
	Units	**CPL-1 BS1**	**CPL-5 BS1**	**CPL-8 BS1**	**CPL-10 BS2**	**RDL**	**QC Batch**
Petroleum Hydrocarbons							
Benzene	mg/kg	ND	ND	ND	ND	0.03	2173771
Toluene	mg/kg	ND	ND	ND	ND	0.03	2173771
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.03	2173771
Xylene (Total)	mg/kg	ND	ND	ND	ND	0.05	2173771
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	3	2173771
>C10-C21 Hydrocarbons	mg/kg	ND	ND	ND	ND	15	2173694
>C21-<C32 Hydrocarbons	mg/kg	31	34	41	ND	15	2173694
Modified TPH (Tier1)	mg/kg	31	34	41	ND	20	2171465
Surrogate Recovery (%)							
Isobutylbenzene - Extractable	%	102	99	99	98		2173694
Isobutylbenzene - Volatile	%	99	100	111	97		2173771
n-Dotriacontane - Extractable	%	97(1)	102(2)	104(3)	102(4)		2173694

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Possible lube oil fraction. Silica gel clean-up performed prior to analysis as per client request.
(2) - Lube oil fraction. Silica gel clean-up performed prior to analysis as per client request.
(3) - Possible lube oil fraction. Unidentified compound(s) in lube oil range. Silica gel clean-up performed prior to analysis as per client request.
(4) - Silica gel clean-up performed prior to analysis as per client request.

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		GC2132	GC2133	GC2133	GC2134	GC2145	GC2160		
Sampling Date		2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/03	2010/06/02		
	Units	**CPL-11 BS2**	**CPL-12 BS2**	**CPL-12 BS2 Lab-Dup**	**CPL-13 BS2**	**CPL-23 BS1**	**CPL-13-BS112**	**RDL**	**QC Batch**
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	ND	ND	ND	ND	ND	0.03	2173771
Toluene	mg/kg	ND	ND	ND	ND	ND	ND	0.03	2173771
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	ND	0.03	2173771
Xylene (Total)	mg/kg	ND	ND	ND	ND	ND	ND	0.05	2173771
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	ND	ND	3	2173771
>C10-C21 Hydrocarbons	mg/kg	ND	ND		ND	120	ND	15	2173694
>C21-<C32 Hydrocarbons	mg/kg	ND	ND		ND	270	ND	15	2173694
Modified TPH (Tier1)	mg/kg	ND	ND		ND	390	ND	20	2171465
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	98	103		104	109	99		2173694
Isobutylbenzene - Volatile	%	103	102	103	99	121	100		2173771
n-Dotriacontane - Extractable	%	102(1)	108(1)		110(1)	92(2)	107(1)		2173694

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Silica gel clean-up performed prior to analysis as per client request.
(2) - Possible lube oil fraction; interference from possible PAHs. Silica gel clean-up performed prior to analysis as per client request.

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2173694	Isobutylbenzene - Extractable	2010/06/10	103	30 - 130	96	30 - 130	92	%				
2173694	n-Dotriacontane - Extractable	2010/06/10	96	30 - 130	91	30 - 130	92	%				
2173694	>C10-C21 Hydrocarbons	2010/06/10	89	30 - 130	83	30 - 130	ND, RDL=15	mg/kg	NC	50		
2173694	>C21-<C32 Hydrocarbons	2010/06/10	93	30 - 130	89	30 - 130	ND, RDL=15	mg/kg	NC	50		
2173741	Available Aluminum (Al)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=10	mg/kg	3.2	35	92	75 - 125
2173741	Available Antimony (Sb)	2010/06/10	80	75 - 125	95	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Arsenic (As)	2010/06/10	106	75 - 125	109	75 - 125	ND, RDL=2	mg/kg	NC	35	120	75 - 125
2173741	Available Barium (Ba)	2010/06/10	NC	75 - 125	108	75 - 125	ND, RDL=5	mg/kg	NC	35	114	75 - 125
2173741	Available Beryllium (Be)	2010/06/10	102	75 - 125	106	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Bismuth (Bi)	2010/06/10	100	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Boron (B)	2010/06/10	103	75 - 125	104	75 - 125	ND, RDL=5	mg/kg	NC	35		
2173741	Available Cadmium (Cd)	2010/06/10	104	75 - 125	105	75 - 125	ND, RDL=0.3	mg/kg	NC	35		
2173741	Available Chromium (Cr)	2010/06/10	96	75 - 125	103	75 - 125	ND, RDL=2	mg/kg	NC	35	92	75 - 125
2173741	Available Cobalt (Co)	2010/06/10	99	75 - 125	104	75 - 125	ND, RDL=1	mg/kg	6.0	35	97	75 - 125
2173741	Available Copper (Cu)	2010/06/10	NC	75 - 125	105	75 - 125	ND, RDL=2	mg/kg	4.7	35	98	75 - 125
2173741	Available Iron (Fe)	2010/06/10	NC	75 - 125	103	75 - 125	ND, RDL=50	mg/kg	4.9	35	108	75 - 125
2173741	Available Lead (Pb)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=0.5	mg/kg	1.1	35	105	75 - 125
2173741	Available Lithium (Li)	2010/06/10	NC	75 - 125	106	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Manganese (Mn)	2010/06/10	NC	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	2.8	35	113	75 - 125
2173741	Available Mercury (Hg)	2010/06/10	104	75 - 125	105	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173741	Available Molybdenum (Mo)	2010/06/10	103	75 - 125	103	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Nickel (Ni)	2010/06/10	96	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	NC	35	100	75 - 125
2173741	Available Rubidium (Rb)	2010/06/10	93	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Selenium (Se)	2010/06/10	96	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Silver (Ag)	2010/06/10	101	75 - 125	103	75 - 125	ND, RDL=0.5	mg/kg	NC	35		
2173741	Available Strontium (Sr)	2010/06/10	86	75 - 125	107	75 - 125	ND, RDL=5	mg/kg	NC	35	114	75 - 125
2173741	Available Thallium (Tl)	2010/06/10	103	75 - 125	103	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173741	Available Tin (Sn)	2010/06/10	99	75 - 125	100	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173741	Available Uranium (U)	2010/06/10	106	75 - 125	106	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173741	Available Vanadium (V)	2010/06/10	NC	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	1.5	35	112	75 - 125
2173741	Available Zinc (Zn)	2010/06/10	96	75 - 125	101	75 - 125	ND, RDL=5	mg/kg	4.5	35	100	75 - 125
2173771	Isobutylbenzene - Volatile	2010/06/09	96	60 - 140	94	60 - 140	99	%				
2173771	Benzene	2010/06/09	83	60 - 140	83	60 - 140	ND, RDL=0.03	mg/kg	NC	50		
2173771	Toluene	2010/06/09	125	60 - 140	84	60 - 140	ND, RDL=0.03	mg/kg	NC	50		
2173771	Ethylbenzene	2010/06/09	107	60 - 140	84	60 - 140	ND, RDL=0.03	mg/kg	NC	50		
2173771	Xylene (Total)	2010/06/09	115	60 - 140	87	60 - 140	ND, RDL=0.05	mg/kg	NC	50		
2173771	C6 - C10 (less BTEX)	2010/06/09					ND, RDL=3	mg/kg	NC	50		
2173831	Available Aluminum (Al)	2010/06/10	NC	75 - 125	96	75 - 125	ND, RDL=10	mg/kg	5.3	35	91	75 - 125
2173831	Available Antimony (Sb)	2010/06/10	82	75 - 125	99	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Arsenic (As)	2010/06/10	NC	75 - 125	107	75 - 125	ND, RDL=2	mg/kg	6.6	35	119	75 - 125

Maxxam Job #: B072194
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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2173831	Available Barium (Ba)	2010/06/10	NC	75 - 125	109	75 - 125	ND, RDL=5	mg/kg	7.3	35	114	75 - 125
2173831	Available Beryllium (Be)	2010/06/10	109	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Bismuth (Bi)	2010/06/10	105	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Boron (B)	2010/06/10	94	75 - 125	104	75 - 125	ND, RDL=5	mg/kg	NC	35		
2173831	Available Cadmium (Cd)	2010/06/10	109	75 - 125	104	75 - 125	ND, RDL=0.3	mg/kg	NC	35		
2173831	Available Chromium (Cr)	2010/06/10	NC	75 - 125	101	75 - 125	ND, RDL=2	mg/kg	6.8	35	92	75 - 125
2173831	Available Cobalt (Co)	2010/06/10	107	75 - 125	101	75 - 125	ND, RDL=1	mg/kg	5.8	35	102	75 - 125
2173831	Available Copper (Cu)	2010/06/10	NC	75 - 125	102	75 - 125	ND, RDL=2	mg/kg	5.1	35	95	75 - 125
2173831	Available Iron (Fe)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=50	mg/kg	6.1	35	108	75 - 125
2173831	Available Lead (Pb)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=0.5	mg/kg	4.4	35	104	75 - 125
2173831	Available Lithium (Li)	2010/06/10	NC	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC(1)	35		
2173831	Available Manganese (Mn)	2010/06/10	NC	75 - 125	99	75 - 125	ND, RDL=2	mg/kg	4.4	35	112	75 - 125
2173831	Available Mercury (Hg)	2010/06/10	105	75 - 125	100	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173831	Available Molybdenum (Mo)	2010/06/10	107	75 - 125	104	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Nickel (Ni)	2010/06/10	NC	75 - 125	101	75 - 125	ND, RDL=2	mg/kg	4.3	35	103	75 - 125
2173831	Available Rubidium (Rb)	2010/06/10	99	75 - 125	98	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Selenium (Se)	2010/06/10	107	75 - 125	101	75 - 125	ND, RDL=2	mg/kg	NC	35		
2173831	Available Silver (Ag)	2010/06/10	106	75 - 125	104	75 - 125	ND, RDL=0.5	mg/kg	NC	35		
2173831	Available Strontium (Sr)	2010/06/10	NC	75 - 125	102	75 - 125	ND, RDL=5	mg/kg	NC	35	111	75 - 125
2173831	Available Thallium (Tl)	2010/06/10	107	75 - 125	103	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2173831	Available Tin (Sn)	2010/06/10	99	75 - 125	103	75 - 125	ND, RDL=2	mg/kg	NC(2)	35		
2173831	Available Uranium (U)	2010/06/10	111	75 - 125	106	75 - 125	ND, RDL=0.1	mg/kg	13.2	35		
2173831	Available Vanadium (V)	2010/06/10	NC	75 - 125	100	75 - 125	ND, RDL=2	mg/kg	7.0	35	112	75 - 125
2173831	Available Zinc (Zn)	2010/06/10	104	75 - 125	99	75 - 125	ND, RDL=5	mg/kg	5.4	35	101	75 - 125
2174997	Available Aluminum (Al)	2010/06/11	NC	75 - 125	95	75 - 125	ND, RDL=10	mg/kg	0.4	35	85	75 - 125
2174997	Available Antimony (Sb)	2010/06/11	79	75 - 125	90	75 - 125	ND, RDL=2	mg/kg	NC	35		
2174997	Available Arsenic (As)	2010/06/11	100	75 - 125	105	75 - 125	ND, RDL=2	mg/kg	NC	35	117	75 - 125
2174997	Available Barium (Ba)	2010/06/11	NC	75 - 125	103	75 - 125	ND, RDL=5	mg/kg	NC	35	108	75 - 125
2174997	Available Beryllium (Be)	2010/06/11	102	75 - 125	98	75 - 125	ND, RDL=2	mg/kg	NC	35		
2174997	Available Bismuth (Bi)	2010/06/11	98	75 - 125	98	75 - 125	ND, RDL=2	mg/kg				
2174997	Available Boron (B)	2010/06/11	91	75 - 125	89	75 - 125	ND, RDL=5	mg/kg	NC	35		
2174997	Available Cadmium (Cd)	2010/06/11	102	75 - 125	102	75 - 125	ND, RDL=0.3	mg/kg	NC	35		
2174997	Available Chromium (Cr)	2010/06/11	NC	75 - 125	100	75 - 125	ND, RDL=2	mg/kg	6.3	35	87	75 - 125
2174997	Available Cobalt (Co)	2010/06/11	101	75 - 125	99	75 - 125	ND, RDL=1	mg/kg	15.9	35	99	75 - 125
2174997	Available Copper (Cu)	2010/06/11	NC	75 - 125	101	75 - 125	ND, RDL=2	mg/kg	24.9	35	95	75 - 125
2174997	Available Iron (Fe)	2010/06/11	NC	75 - 125	102	75 - 125	ND, RDL=50	mg/kg	3.2	35	104	75 - 125
2174997	Available Lead (Pb)	2010/06/11	94	75 - 125	96	75 - 125	ND, RDL=0.5	mg/kg	4.7	35	103	75 - 125
2174997	Available Lithium (Li)	2010/06/11	94	75 - 125	100	75 - 125	ND, RDL=2	mg/kg				
2174997	Available Manganese (Mn)	2010/06/11	NC	75 - 125	97	75 - 125	ND, RDL=2	mg/kg	17.4	35	108	75 - 125
2174997	Available Mercury (Hg)	2010/06/11	103	75 - 125	101	75 - 125	ND, RDL=0.1	mg/kg				

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2174997	Available Molybdenum (Mo)	2010/06/11	102	75 - 125	98	75 - 125	ND, RDL=2	mg/kg	NC	35		
2174997	Available Nickel (Ni)	2010/06/11	NC	75 - 125	98	75 - 125	ND, RDL=2	mg/kg	6.3	35	102	75 - 125
2174997	Available Rubidium (Rb)	2010/06/11	96	75 - 125	95	75 - 125	ND, RDL=2	mg/kg				
2174997	Available Selenium (Se)	2010/06/11	100	75 - 125	96	75 - 125	ND, RDL=2	mg/kg	NC	35		
2174997	Available Silver (Ag)	2010/06/11	100	75 - 125	101	75 - 125	ND, RDL=0.5	mg/kg	NC	35		
2174997	Available Strontium (Sr)	2010/06/11	NC	75 - 125	99	75 - 125	ND, RDL=5	mg/kg	NC	35	107	75 - 125
2174997	Available Thallium (Tl)	2010/06/11	100	75 - 125	100	75 - 125	ND, RDL=0.1	mg/kg	NC	35		
2174997	Available Tin (Sn)	2010/06/11	95	75 - 125	92	75 - 125	ND, RDL=2	mg/kg	NC	35		
2174997	Available Uranium (U)	2010/06/11	106	75 - 125	103	75 - 125	ND, RDL=0.1	mg/kg	38.1(3)	35		
2174997	Available Vanadium (V)	2010/06/11	NC	75 - 125	98	75 - 125	ND, RDL=2	mg/kg	3.0	35	106	75 - 125
2174997	Available Zinc (Zn)	2010/06/11	101	75 - 125	103	75 - 125	ND, RDL=5	mg/kg	4.7	35	100	75 - 125
2175025	Sample Weight (as received)	2010/06/10					50, RDL=N/A	g	0	N/A		
2176276	Leachable Aluminum (Al)	2010/06/14					ND, RDL=100	ug/L	2.2	25		
2176276	Leachable Antimony (Sb)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Arsenic (As)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Barium (Ba)	2010/06/14					ND, RDL=50	ug/L	NC	25		
2176276	Leachable Beryllium (Be)	2010/06/14					ND, RDL=20	ug/L	NC(4)	25		
2176276	Leachable Boron (B)	2010/06/14					ND, RDL=500	ug/L	NC(4)	25		
2176276	Leachable Cadmium (Cd)	2010/06/14					ND, RDL=3	ug/L	NC	25		
2176276	Leachable Calcium (Ca)	2010/06/14					ND, RDL=1000	ug/L	6.3	25		
2176276	Leachable Chromium (Cr)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Cobalt (Co)	2010/06/14					ND, RDL=10	ug/L	NC	25		
2176276	Leachable Copper (Cu)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Iron (Fe)	2010/06/14					ND, RDL=500	ug/L	NC	25		
2176276	Leachable Lead (Pb)	2010/06/14					ND, RDL=5	ug/L	28.4(3)	25		
2176276	Leachable Lithium (Li)	2010/06/14					ND, RDL=20	ug/L	NC(4)	25		
2176276	Leachable Magnesium (Mg)	2010/06/14					ND, RDL=1000	ug/L	4.6	25		
2176276	Leachable Manganese (Mn)	2010/06/14					ND, RDL=20	ug/L	8.5	25		
2176276	Leachable Molybdenum (Mo)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Nickel (Ni)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Potassium (K)	2010/06/14					ND, RDL=1000	ug/L	4.7	25		
2176276	Leachable Selenium (Se)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Silver (Ag)	2010/06/14					ND, RDL=5	ug/L	NC	25		
2176276	Leachable Strontium (Sr)	2010/06/14					ND, RDL=50	ug/L	NC	25		
2176276	Leachable Thallium (Tl)	2010/06/14					ND, RDL=1	ug/L	NC	25		
2176276	Leachable Tin (Sn)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Uranium (U)	2010/06/14					ND, RDL=1	ug/L	NC	25		
2176276	Leachable Vanadium (V)	2010/06/14					ND, RDL=20	ug/L	NC	25		
2176276	Leachable Zinc (Zn)	2010/06/14					ND, RDL=50	ug/L	3.7	25		
2176349	Leachable Aluminum (Al)	2010/06/11					ND, RDL=100	ug/L				

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2176349	Leachable Antimony (Sb)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Arsenic (As)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Barium (Ba)	2010/06/11					ND, RDL=50	ug/L				
2176349	Leachable Beryllium (Be)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Boron (B)	2010/06/11					ND, RDL=500	ug/L				
2176349	Leachable Cadmium (Cd)	2010/06/11					ND, RDL=3	ug/L				
2176349	Leachable Calcium (Ca)	2010/06/11					ND, RDL=1000	ug/L				
2176349	Leachable Chromium (Cr)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Cobalt (Co)	2010/06/11					ND, RDL=10	ug/L				
2176349	Leachable Copper (Cu)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Iron (Fe)	2010/06/11					ND, RDL=500	ug/L				
2176349	Leachable Lead (Pb)	2010/06/11					ND, RDL=5	ug/L				
2176349	Leachable Lithium (Li)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Magnesium (Mg)	2010/06/11					ND, RDL=1000	ug/L				
2176349	Leachable Manganese (Mn)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Molybdenum (Mo)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Nickel (Ni)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Potassium (K)	2010/06/11					ND, RDL=1000	ug/L				
2176349	Leachable Selenium (Se)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Silver (Ag)	2010/06/11					ND, RDL=5	ug/L				
2176349	Leachable Strontium (Sr)	2010/06/11					ND, RDL=50	ug/L				
2176349	Leachable Thallium (Tl)	2010/06/11					ND, RDL=1	ug/L				
2176349	Leachable Tin (Sn)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Uranium (U)	2010/06/11					ND, RDL=1	ug/L				

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Maxxam Job #: B072194
Report Date: 2010/06/15

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2176349	Leachable Vanadium (V)	2010/06/11					ND, RDL=20	ug/L				
2176349	Leachable Zinc (Zn)	2010/06/11					ND, RDL=50	ug/L				

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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 not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Elevated reporting limit due to lab contamination. Minimal impact on data quality.
(2) - Poor RPD due to sample inhomogeneity.
(3) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(4) - Elevated reporting limit due to sample matrix.

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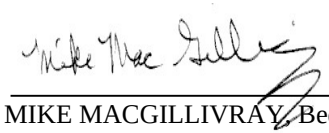
Validation Signature Page

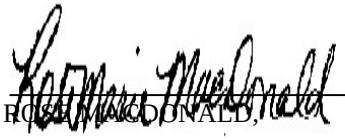
Maxxam Job #: B072194

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



MIKE MACGILLIVRAY, Bedford Inorg Spvsr

KEVIN MACDONALD, Inorganics Supervisor



ROSA MACDONALD, [illegible]

ALAN STEWART, Scientific Specialist (Organics)

==========

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Your Project #: 121411106
Site: R.A.P. CAPE PINE
Your C.O.C. #: B 58717

Attention: Jim Slade
Stantec Consulting Ltd
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2010/06/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B077414
Received: 2010/06/16, 11:08

Sample Matrix: Leachate
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Leach. Tot. Coll. Cell MS - N-per	2	2010/06/18	2010/06/21	ATL SOP 00058 R2	Based on EPA6020A

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
TCLP Inorganic extraction - pH	2	N/A	2010/06/18	ATL SOP-00035 R4	Based on EPA1311
TCLP Inorganic extraction - Weight	2	N/A	2010/06/18	ATL SOP-00035 R4	Based on EPA1311

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MICHELLE HILL, Project Manager
Email: Michelle.Hill@maxxamanalytics.com
Phone# (902) 420-0203

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Total cover pages: 1

This document is in electronic format, hard copy is available on request.

Maxxam Job #: B077414
Report Date: 2010/06/21

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

ELEMENTS BY ICP/MS (LEACHATE)

Maxxam ID		GE7934	GE7934	GE7935		
Sampling Date		2010/06/16	2010/06/16	2010/06/16		
	Units	**CPL-25-BS1 (P#GC2147)**	**CPL-25-BS1 (P#GC2147) Lab-Dup**	**CPL-20-BS3 (P#GC2142)**	**RDL**	**QC Batch**
Metals						
Leachable Lead (Pb)	ug/L	1100	1300	5200	5	2183679

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GE7934	GE7934	GE7935		
Sampling Date		2010/06/16	2010/06/16	2010/06/16		
	Units	**CPL-25-BS1 (P#GC2147)**	**CPL-25-BS1 (P#GC2147) Lab-Dup**	**CPL-20-BS3 (P#GC2142)**	**RDL**	**QC Batch**
Inorganics						
Sample Weight (as received)	g	50	50	50	N/A	2182856
Initial pH	N/A	6.1	NA	6.0		2182860
Final pH	N/A	4.9	4.9	4.9		2182860

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

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Maxxam Job #: B077414
Report Date: 2010/06/21

Stantec Consulting Ltd
Client Project #: 121411106
Project name: R.A.P. CAPE PINE

QUALITY ASSURANCE REPORT

			Method Blank		RPD	
QC Batch	Parameter	Date	Value	Units	Value (%)	QC Limits
2182856	Sample Weight (as received)	2010/06/18	50, RDL=N/A	g	0	N/A
2183679	Leachable Lead (Pb)	2010/06/21	ND, RDL=5	ug/L	15.7	25

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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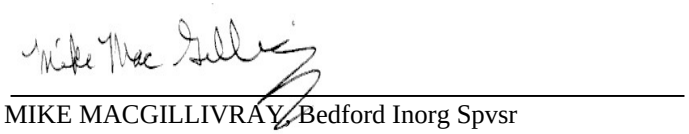
Validation Signature Page

Maxxam Job #: B077414

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

KEVIN MACDONALD, Inorganics Supervisor



MIKE MACGILLIVRAY, Bedford Inorg Spvsr

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Maxxam Analytics Inc

200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227
www.maxxamanalytics.com E-mail: clientservicesbedford@maxxamanalytics.com

CHAIN OF CUSTODY RECORD

B 58717

INVOICE INFORMATION:
Company Name: Stantec
Contact Name: Accounts Payable
Address:
Postal Code
Email:
Ph: Fax:

REPORT INFORMATION (if differs from invoice):
Company Name: Stantec
Contact Name: Jonathan Murphy
Address: cc Jim Slade
St. John's, NL
Email:
Ph: Fax:

Project #: 121411106
PO # & Phase #:
Proj Name/Location: R.A.P. Cape Pine
Site #:
Task #:
Quotation #: A96124
Sampled By:

MAXXAM JOB NUMBER: B077414 (Lab Use only)
Client Code: 1095
ENTERED BY, Init: BC
Labeled by, Init: WIF
Location/ Bin #: 544 (H)

Specify Guideline Requirements:

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Seawater Potable/NonPotable/Tissue/Soil/Sludge/Metal

DUE DATE: ☑ STANDARD ☐ 10 day

RUSH Due Date:

Extra cost for rush. Rush analysis should be scheduled prior to sample submission.

Client will be contacted if Rush date cannot be met.

Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	Metals Water: RCAp-30 Circle Total or Diss Metals	Metals Water: RCAp-MS Circle Total or Diss Metals	Metals Water: Total Digest (Default Method)	Metals Water: Dissolved	Metals Soil: Mercury is not included in soil or water metals scan	Metals Soil: Available Metals Digest Default Method (HNO3/H2O2)	Metals Soil: Hot Water soluble Boron (required for CCME Agriculture)	Metals Soil: Tin (required for CCME soils)	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Total Digest - for ocean sediments (HNO3/HF/HCLO4)	Organics: TPH MUST (BTEX, C6-C50)	Organics: Soil (Potable), TPH MUST, NS Fuel Oil Spill Policy Low Level BTEX & C6-C50	Organics: NB Potable Water BTEX, VPH, Low Level TEH	Organics: TPH Fractionation	Organics: PAH's	Organics: PCB's	Organics: VOC's EPA 624,8260	Other Analysis or Comments/Hazards
CPL-25-BS1 (P#GC2147)																							TCLP leachate+metals
CPL-20-BS3 (P#GC2142)																							TCLP leachate+metals

2018 JUN 16 AM 11:08

RELINQUISHED BY:
Signature: by email
Print:
Date: June 16/18
Time:

Received by & Temp check by:
Signature: MLomeo
Print: MLomeo
Temp 1: N/A
Temp 2:
Temp 3:

Hold Time Checked	☐	Rush availability note added to COC ☐
Matrix added	☐	
Bottle types added	☐	
BOD moved to Freezer	☐	INTEGRITY
Time Stamped	☐	Yes / No
Storage Bin assigned	☐	
If no date sampled, check bottle	☐	
COC client signed	☐	Init: MC

NBENVPROCOC Bedford 02/08

ATL FCO 00149 / Revision 6

Phase III ESA – 2009

Your P.O. #: NSD016300
Your Project #: 1042036.04/ Z9100
Site: CAPE PINE
Your C.O.C. #: 10769

Attention: Jim Slade
Jacques Whitford Limited
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2008/08/12

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A884993
Received: 2008/08/01, 9:43

Sample Matrix: Soil
Samples Received: 49

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Mercury (CVAA)	3	N/A	2008/08/05	ATL SOP 00026 R3	Based on EPA245.5
Metals Solid Avail. Unified MS - Nper	17	N/A	2008/08/06	ATL SOP 00024 R3	Based on EPA6020A
Metals Solid Avail. Unified MS - Nper	29	N/A	2008/08/07	ATL SOP 00024 R3	Based on EPA6020A
Moisture	9	N/A	2008/08/05	ATL SOP 00001 R2	MOE Handbook 1983
PAH Compounds by GCMS (SIM) (1)	8	2008/08/07	2008/08/08	ATL SOP 00102 R2	Based on EPA8270C
PCBs in soil by GC/ECD	1	2008/08/05	2008/08/06	ATL SOP 00106 R2	Based on EPA8082
pH (5:1 DI Water Extract)	2	N/A	2008/08/11	ATL SOP 00005 R4	Based on EPA150.1
dry aqueous leach	2	N/A	2008/08/11	ATL SOP 00033	Based onCart.93 16.2
Total Organic Carbon in Soil	2	N/A	2008/08/08	ATL SOP 00044 R2	LECO 203-601-224

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

(1) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

SHARLENE BAIRD, Project Manager
Email: sharlene.baird.reports@maxxamanalytics.com
Phone# (902) 420-0203 Ext:262

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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. SCC and CAEAL have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

RESULTS OF ANALYSES OF SOIL

Maxxam ID		AC6528	AC6535	AC6542	AC6556		
Sampling Date		2008/07/25	2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769	10769		
Registration #							
	Units	**BS7A**	**BS8A**	**BS13A**	**BS39A**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	27	59	38	16	1	1577707

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		AC6557	AC6567	AC6573	AC6575		
Sampling Date		2008/07/25	2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769	10769		
Registration #							
	Units	**BS40A**	**BS57A**	**BS66A**	**BS69A**	**RDL**	**QC Batch**
Charge/Prep Analysis							
Dry Mass to Volume Ratio	N/A				1:5	N/A	1583048
Inorganics							
Moisture	%	10	39	44		1	1577707
Soluble (5:1) pH	pH				5.42	N/A	1582906

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		AC6576	AC6576	AC6577	AC6578		
Sampling Date		2008/07/25	2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769	10769		
Registration #							
	Units	**BS70A**	**BS70A Lab-Dup**	**BS71A**	**BS72A**	**RDL**	**QC Batch**
Charge/Prep Analysis							
Dry Mass to Volume Ratio	N/A				1:5	N/A	1583048
Inorganics							
Moisture	%			77		1	1577707
Organic Carbon (TOC)	g/kg	380	380			5	1579988
Soluble (5:1) pH	pH				4.03	N/A	1582906

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

RESULTS OF ANALYSES OF SOIL

Maxxam ID		AC6581	AC6582		
Sampling Date		2008/07/25	2008/07/25		
COC Number		10769	10769		
Registration #					
	Units	**BS75A**	**BS76A**	**RDL**	**QC Batch**
Inorganics					
Moisture	%	78		1	1577707
Organic Carbon (TOC)	g/kg		400	5	1579988

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

MERCURY BY COLD VAPOUR AA (SOIL)

Maxxam ID		AC6552	AC6553	AC6554		
Sampling Date		2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769		
Registration #						
	Units	**BS33A**	**BS34A**	**BS35A**	**RDL**	**QC Batch**
Metals						
Mercury (Hg)	mg/kg	0.13	0.13	0.03	0.01	1578064

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6528	AC6537		AC6540		
Sampling Date		2008/07/25	2008/07/25		2008/07/25		
COC Number		10769	10769		10769		
Registration #							
	Units	**BS7A**	**BS10A**	**RDL**	**BS11A**	**RDL**	**QC Batch**
Metals							
Available Aluminum (Al)	mg/kg	8600	7400	10	2600	10	1579842
Available Antimony (Sb)	mg/kg	ND	3	2	4	2	1579842
Available Arsenic (As)	mg/kg	6	5	2	ND	2	1579842
Available Barium (Ba)	mg/kg	44	12	5	43	5	1579842
Available Beryllium (Be)	mg/kg	ND	ND	2	ND	2	1579842
Available Bismuth (Bi)	mg/kg	ND	ND	2	ND	2	1579842
Available Boron (B)	mg/kg	6	ND	5	8	5	1579842
Available Cadmium (Cd)	mg/kg	1.1	ND	0.3	ND	0.3	1579842
Available Chromium (Cr)	mg/kg	11	7	2	4	2	1579842
Available Cobalt (Co)	mg/kg	8	5	1	2	1	1579842
Available Copper (Cu)	mg/kg	28	16	2	66	2	1579842
Available Iron (Fe)	mg/kg	21000	13000	50	5400	50	1579842
Available Lead (Pb)	mg/kg	190	760	0.5	140	0.5	1579842
Available Lithium (Li)	mg/kg	21	15	2	2	2	1579842
Available Manganese (Mn)	mg/kg	880	470	2	59	2	1579842
Available Mercury (Hg)	mg/kg	0.1	0.3	0.1	0.2	0.1	1579842
Available Molybdenum (Mo)	mg/kg	ND	ND	2	ND	2	1579842
Available Nickel (Ni)	mg/kg	7	6	2	4	2	1579842
Available Rubidium (Rb)	mg/kg	3	3	2	2	2	1579842
Available Selenium (Se)	mg/kg	ND	ND	2	ND (1)	20	1579842
Available Silver (Ag)	mg/kg	ND	ND	0.5	ND	0.5	1579842
Available Strontium (Sr)	mg/kg	24	9	5	20	5	1579842
Available Thallium (Tl)	mg/kg	ND	ND	0.1	ND	0.1	1579842
Available Tin (Sn)	mg/kg	ND	2	2	6	2	1579842
Available Uranium (U)	mg/kg	0.4	0.6	0.1	0.6	0.1	1579842
Available Vanadium (V)	mg/kg	11	12	2	6	2	1579842
Available Zinc (Zn)	mg/kg	440	270	5	42	5	1579842

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated reporting limit due to sample matrix.

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6541	AC6544	AC6545	AC6546		
Sampling Date		2008/07/25	2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769	10769		
Registration #							
	Units	**BS12A**	**BS21A**	**BS22A**	**BS24A**	**RDL**	**QC Batch**
Metals							
Available Aluminum (Al)	mg/kg	8200	10000	8900	9200	10	1579842
Available Antimony (Sb)	mg/kg	3	ND	ND	ND	2	1579842
Available Arsenic (As)	mg/kg	2	ND	3	ND	2	1579842
Available Barium (Ba)	mg/kg	40	11	14	13	5	1579842
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	2	1579842
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	2	1579842
Available Boron (B)	mg/kg	6	ND	ND	ND	5	1579842
Available Cadmium (Cd)	mg/kg	ND	ND	ND	ND	0.3	1579842
Available Chromium (Cr)	mg/kg	14	6	7	7	2	1579842
Available Cobalt (Co)	mg/kg	7	7	6	7	1	1579842
Available Copper (Cu)	mg/kg	27	11	11	12	2	1579842
Available Iron (Fe)	mg/kg	20000	16000	17000	16000	50	1579842
Available Lead (Pb)	mg/kg	250	400	150	820	0.5	1579842
Available Lithium (Li)	mg/kg	16	26	26	26	2	1579842
Available Manganese (Mn)	mg/kg	560	690	520	620	2	1579842
Available Mercury (Hg)	mg/kg	ND	ND	ND	0.1	0.1	1579842
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	2	1579842
Available Nickel (Ni)	mg/kg	11	9	9	9	2	1579842
Available Rubidium (Rb)	mg/kg	3	ND	ND	ND	2	1579842
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	2	1579842
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	0.5	1579842
Available Strontium (Sr)	mg/kg	27	ND	6	6	5	1579842
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	0.1	1579842
Available Tin (Sn)	mg/kg	4	ND	ND	ND	2	1579842
Available Uranium (U)	mg/kg	0.7	0.3	0.3	0.3	0.1	1579842
Available Vanadium (V)	mg/kg	15	7	9	8	2	1579842
Available Zinc (Zn)	mg/kg	260	420	96	1000	5	1579842

ND = Not detected
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QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6547	AC6548	AC6548	AC6549		
Sampling Date		2008/07/25	2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769	10769		
Registration #							
	Units	**BS25A**	**BS27A**	**BS27A Lab-Dup**	**BS28A**	**RDL**	**QC Batch**
Metals							
Available Aluminum (Al)	mg/kg	8100	9300	9100	5400	10	1579842
Available Antimony (Sb)	mg/kg	ND	ND	ND	3	2	1579842
Available Arsenic (As)	mg/kg	ND	ND	3	19	2	1579842
Available Barium (Ba)	mg/kg	19	11	10	200	5	1579842
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	2	1579842
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	2	1579842
Available Boron (B)	mg/kg	ND	ND	ND	6	5	1579842
Available Cadmium (Cd)	mg/kg	ND	ND	ND	0.3	0.3	1579842
Available Chromium (Cr)	mg/kg	7	6	6	10	2	1579842
Available Cobalt (Co)	mg/kg	6	8	8	5	1	1579842
Available Copper (Cu)	mg/kg	9	29	28	26	2	1579842
Available Iron (Fe)	mg/kg	15000	17000	17000	21000	50	1579842
Available Lead (Pb)	mg/kg	120	460	580	1200	0.5	1579842
Available Lithium (Li)	mg/kg	25	27	26	11	2	1579842
Available Manganese (Mn)	mg/kg	600	650	640	560	2	1579842
Available Mercury (Hg)	mg/kg	ND	0.3	0.2	0.2	0.1	1579842
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	2	2	1579842
Available Nickel (Ni)	mg/kg	9	10	9	9	2	1579842
Available Rubidium (Rb)	mg/kg	2	ND	ND	3	2	1579842
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	2	1579842
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	0.5	1579842
Available Strontium (Sr)	mg/kg	6	ND	ND	22	5	1579842
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	0.1	1579842
Available Tin (Sn)	mg/kg	ND	ND	ND	15	2	1579842
Available Uranium (U)	mg/kg	0.3	0.3	0.3	0.4	0.1	1579842
Available Vanadium (V)	mg/kg	8	8	8	13	2	1579842
Available Zinc (Zn)	mg/kg	110	200	200	380	5	1579842

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6550		AC6551		
Sampling Date		2008/07/25		2008/07/25		
COC Number		10769		10769		
Registration #						
	Units	**BS30A**	**RDL**	**BS31A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	7900	10	10000	10	1579842
Available Antimony (Sb)	mg/kg	ND	2	ND	2	1579842
Available Arsenic (As)	mg/kg	4	2	2	2	1579842
Available Barium (Ba)	mg/kg	27	5	66	5	1579842
Available Beryllium (Be)	mg/kg	ND	2	ND	2	1579842
Available Bismuth (Bi)	mg/kg	ND	2	ND	2	1579842
Available Boron (B)	mg/kg	ND	5	ND	5	1579842
Available Cadmium (Cd)	mg/kg	1.9	0.3	ND	0.3	1579842
Available Chromium (Cr)	mg/kg	8	2	8	2	1579842
Available Cobalt (Co)	mg/kg	9	1	7	1	1579842
Available Copper (Cu)	mg/kg	18	2	19	2	1579842
Available Iron (Fe)	mg/kg	19000	50	20000	50	1579842
Available Lead (Pb)	mg/kg	12000	5	430	0.5	1579842
Available Lithium (Li)	mg/kg	24	2	27	2	1579842
Available Manganese (Mn)	mg/kg	580	2	670	2	1579842
Available Mercury (Hg)	mg/kg	0.9	0.1	0.1	0.1	1579842
Available Molybdenum (Mo)	mg/kg	ND	2	ND	2	1579842
Available Nickel (Ni)	mg/kg	9	2	10	2	1579842
Available Rubidium (Rb)	mg/kg	ND	2	2	2	1579842
Available Selenium (Se)	mg/kg	ND	2	ND	2	1579842
Available Silver (Ag)	mg/kg	ND	0.5	ND	0.5	1579842
Available Strontium (Sr)	mg/kg	6	5	5	5	1579842
Available Thallium (Tl)	mg/kg	ND	0.1	ND	0.1	1579842
Available Tin (Sn)	mg/kg	2	2	ND	2	1579842
Available Uranium (U)	mg/kg	0.2	0.1	0.3	0.1	1579842
Available Vanadium (V)	mg/kg	8	2	12	2	1579842
Available Zinc (Zn)	mg/kg	1300	5	150	5	1579842

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6552	AC6553		AC6554		
Sampling Date		2008/07/25	2008/07/25		2008/07/25		
COC Number		10769	10769		10769		
Registration #							
	Units	**BS33A**	**BS34A**	**RDL**	**BS35A**	**RDL**	**QC Batch**
Metals							
Available Aluminum (Al)	mg/kg	11000	11000	10	9700	10	1579842
Available Antimony (Sb)	mg/kg	3	ND	2	ND	2	1579842
Available Arsenic (As)	mg/kg	10	6	2	3	2	1579842
Available Barium (Ba)	mg/kg	1100	330	5	350	5	1579842
Available Beryllium (Be)	mg/kg	ND	ND	2	ND	2	1579842
Available Bismuth (Bi)	mg/kg	ND	ND	2	ND	2	1579842
Available Boron (B)	mg/kg	ND	ND	5	ND	5	1579842
Available Cadmium (Cd)	mg/kg	2.7	0.5	0.3	ND	0.3	1579842
Available Chromium (Cr)	mg/kg	26	38	2	23	2	1579842
Available Cobalt (Co)	mg/kg	12	24	1	17	1	1579842
Available Copper (Cu)	mg/kg	78	100	2	67	2	1579842
Available Iron (Fe)	mg/kg	29000	30000	50	23000	50	1579842
Available Lead (Pb)	mg/kg	12000	2600	5	1600	0.5	1579842
Available Lithium (Li)	mg/kg	20	22	2	25	2	1579842
Available Manganese (Mn)	mg/kg	710	640	2	690	2	1579842
Available Mercury (Hg)	mg/kg	0.2	0.2	0.1	ND	0.1	1579842
Available Molybdenum (Mo)	mg/kg	ND	3	2	ND	2	1579842
Available Nickel (Ni)	mg/kg	22	54	2	27	2	1579842
Available Rubidium (Rb)	mg/kg	3	3	2	2	2	1579842
Available Selenium (Se)	mg/kg	ND	ND	2	ND	2	1579842
Available Silver (Ag)	mg/kg	ND	ND	0.5	ND	0.5	1579842
Available Strontium (Sr)	mg/kg	37	16	5	13	5	1579842
Available Thallium (Tl)	mg/kg	ND	ND	0.1	ND	0.1	1579842
Available Tin (Sn)	mg/kg	7	8	2	5	2	1579842
Available Uranium (U)	mg/kg	0.4	0.3	0.1	0.3	0.1	1579842
Available Vanadium (V)	mg/kg	18	17	2	11	2	1579842
Available Zinc (Zn)	mg/kg	2400	540	5	450	5	1579842

ND = Not detected
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QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6555		AC6557		
Sampling Date		2008/07/25		2008/07/25		
COC Number		10769		10769		
Registration #						
	Units	**BS38A**	**RDL**	**BS40A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	8500	10	9200	10	1579842
Available Antimony (Sb)	mg/kg	ND	2	ND	2	1579842
Available Arsenic (As)	mg/kg	4	2	2	2	1579842
Available Barium (Ba)	mg/kg	430	5	72	5	1579842
Available Beryllium (Be)	mg/kg	ND	2	ND	2	1579842
Available Bismuth (Bi)	mg/kg	ND	2	ND	2	1579842
Available Boron (B)	mg/kg	ND	5	ND	5	1579842
Available Cadmium (Cd)	mg/kg	0.3	0.3	ND	0.3	1579842
Available Chromium (Cr)	mg/kg	9	2	9	2	1579842
Available Cobalt (Co)	mg/kg	7	1	10	1	1579842
Available Copper (Cu)	mg/kg	25	2	26	2	1579842
Available Iron (Fe)	mg/kg	18000	50	19000	50	1579842
Available Lead (Pb)	mg/kg	4400	5	320	0.5	1579842
Available Lithium (Li)	mg/kg	24	2	25	2	1579842
Available Manganese (Mn)	mg/kg	630	2	680	2	1579842
Available Mercury (Hg)	mg/kg	0.5	0.1	ND	0.1	1579842
Available Molybdenum (Mo)	mg/kg	ND	2	ND	2	1579842
Available Nickel (Ni)	mg/kg	8	2	15	2	1579842
Available Rubidium (Rb)	mg/kg	2	2	ND	2	1579842
Available Selenium (Se)	mg/kg	ND	2	ND	2	1579842
Available Silver (Ag)	mg/kg	ND	0.5	ND	0.5	1579842
Available Strontium (Sr)	mg/kg	16	5	6	5	1579842
Available Thallium (Tl)	mg/kg	ND	0.1	ND	0.1	1579842
Available Tin (Sn)	mg/kg	4	2	ND	2	1579842
Available Uranium (U)	mg/kg	0.2	0.1	0.2	0.1	1579842
Available Vanadium (V)	mg/kg	9	2	10	2	1579842
Available Zinc (Zn)	mg/kg	450	5	94	5	1579842

ND = Not detected
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QC Batch = Quality Control Batch

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Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6558	AC6559	AC6560		
Sampling Date		2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769		
Registration #						
	Units	**BS41A**	**BS45A**	**BS46A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	8600	9100	5800	10	1581217
Available Antimony (Sb)	mg/kg	ND	ND	16	2	1581217
Available Arsenic (As)	mg/kg	5	3	3	2	1581217
Available Barium (Ba)	mg/kg	63	10	130	5	1581217
Available Beryllium (Be)	mg/kg	ND	ND	ND	2	1581217
Available Bismuth (Bi)	mg/kg	ND	ND	ND	2	1581217
Available Boron (B)	mg/kg	ND	ND	ND	5	1581217
Available Cadmium (Cd)	mg/kg	ND	1.4	0.3	0.3	1581217
Available Chromium (Cr)	mg/kg	11	6	6	2	1581217
Available Cobalt (Co)	mg/kg	19	6	4	1	1581217
Available Copper (Cu)	mg/kg	61	66	10	2	1581217
Available Iron (Fe)	mg/kg	20000	17000	13000	50	1581217
Available Lead (Pb)	mg/kg	320	1300	800	0.5	1581217
Available Lithium (Li)	mg/kg	22	17	15	2	1581217
Available Manganese (Mn)	mg/kg	610	430	430	2	1581217
Available Mercury (Hg)	mg/kg	ND	0.2	ND	0.1	1581217
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	2	1581217
Available Nickel (Ni)	mg/kg	33	7	5	2	1581217
Available Rubidium (Rb)	mg/kg	2	3	3	2	1581217
Available Selenium (Se)	mg/kg	ND	ND	ND	2	1581217
Available Silver (Ag)	mg/kg	ND	ND	ND	0.5	1581217
Available Strontium (Sr)	mg/kg	6	7	8	5	1581217
Available Thallium (Tl)	mg/kg	ND	ND	ND	0.1	1581217
Available Tin (Sn)	mg/kg	ND	2	4	2	1581217
Available Uranium (U)	mg/kg	0.3	0.4	0.2	0.1	1581217
Available Vanadium (V)	mg/kg	11	8	9	2	1581217
Available Zinc (Zn)	mg/kg	110	510	310	5	1581217

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6561		AC6562		
Sampling Date		2008/07/25		2008/07/25		
COC Number		10769		10769		
Registration #						
	Units	**BS48A**	**RDL**	**BS49A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	8200	10	6500	10	1581217
Available Antimony (Sb)	mg/kg	ND	2	3	2	1581217
Available Arsenic (As)	mg/kg	6	2	9	2	1581217
Available Barium (Ba)	mg/kg	21	5	17	5	1581217
Available Beryllium (Be)	mg/kg	ND	2	ND	2	1581217
Available Bismuth (Bi)	mg/kg	ND	2	ND	2	1581217
Available Boron (B)	mg/kg	ND	5	ND	5	1581217
Available Cadmium (Cd)	mg/kg	0.9	0.3	ND	0.3	1581217
Available Chromium (Cr)	mg/kg	7	2	7	2	1581217
Available Cobalt (Co)	mg/kg	6	1	6	1	1581217
Available Copper (Cu)	mg/kg	11	2	17	2	1581217
Available Iron (Fe)	mg/kg	15000	50	26000	50	1581217
Available Lead (Pb)	mg/kg	7500	5	240	0.5	1581217
Available Lithium (Li)	mg/kg	20	2	20	2	1581217
Available Manganese (Mn)	mg/kg	470	2	480	2	1581217
Available Mercury (Hg)	mg/kg	0.3	0.1	0.1	0.1	1581217
Available Molybdenum (Mo)	mg/kg	ND	2	ND	2	1581217
Available Nickel (Ni)	mg/kg	7	2	9	2	1581217
Available Rubidium (Rb)	mg/kg	2	2	2	2	1581217
Available Selenium (Se)	mg/kg	ND	2	ND	2	1581217
Available Silver (Ag)	mg/kg	ND	0.5	ND	0.5	1581217
Available Strontium (Sr)	mg/kg	10	5	7	5	1581217
Available Thallium (Tl)	mg/kg	ND	0.1	ND	0.1	1581217
Available Tin (Sn)	mg/kg	ND	2	ND	2	1581217
Available Uranium (U)	mg/kg	0.3	0.1	0.2	0.1	1581217
Available Vanadium (V)	mg/kg	9	2	8	2	1581217
Available Zinc (Zn)	mg/kg	1400	5	93	5	1581217

ND = Not detected
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QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6563		AC6564		
Sampling Date		2008/07/25		2008/07/25		
COC Number		10769		10769		
Registration #						
	Units	**BS51A**	**RDL**	**BS52A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	8700	10	10000	10	1581217
Available Antimony (Sb)	mg/kg	3	2	3	2	1581217
Available Arsenic (As)	mg/kg	6	2	8	2	1581217
Available Barium (Ba)	mg/kg	25	5	72	5	1581217
Available Beryllium (Be)	mg/kg	ND	2	ND	2	1581217
Available Bismuth (Bi)	mg/kg	ND	2	ND	2	1581217
Available Boron (B)	mg/kg	ND	5	ND	5	1581217
Available Cadmium (Cd)	mg/kg	ND	0.3	ND	0.3	1581217
Available Chromium (Cr)	mg/kg	20	2	7	2	1581217
Available Cobalt (Co)	mg/kg	9	1	5	1	1581217
Available Copper (Cu)	mg/kg	49	2	15	2	1581217
Available Iron (Fe)	mg/kg	23000	50	18000	50	1581217
Available Lead (Pb)	mg/kg	2400	5	280	0.5	1581217
Available Lithium (Li)	mg/kg	26	2	22	2	1581217
Available Manganese (Mn)	mg/kg	610	2	520	2	1581217
Available Mercury (Hg)	mg/kg	0.2	0.1	ND	0.1	1581217
Available Molybdenum (Mo)	mg/kg	ND	2	ND	2	1581217
Available Nickel (Ni)	mg/kg	12	2	8	2	1581217
Available Rubidium (Rb)	mg/kg	3	2	2	2	1581217
Available Selenium (Se)	mg/kg	ND	2	ND	2	1581217
Available Silver (Ag)	mg/kg	ND	0.5	ND	0.5	1581217
Available Strontium (Sr)	mg/kg	10	5	17	5	1581217
Available Thallium (Tl)	mg/kg	ND	0.1	ND	0.1	1581217
Available Tin (Sn)	mg/kg	3	2	2	2	1581217
Available Uranium (U)	mg/kg	0.4	0.1	0.4	0.1	1581217
Available Vanadium (V)	mg/kg	14	2	11	2	1581217
Available Zinc (Zn)	mg/kg	530	5	140	5	1581217

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6565		AC6566		
Sampling Date		2008/07/25		2008/07/25		
COC Number		10769		10769		
Registration #						
	Units	**BS54A**	**RDL**	**BS55A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	9600	10	6100	10	1581217
Available Antimony (Sb)	mg/kg	ND	2	3	2	1581217
Available Arsenic (As)	mg/kg	4	2	6	2	1581217
Available Barium (Ba)	mg/kg	58	5	57	5	1581217
Available Beryllium (Be)	mg/kg	ND	2	ND	2	1581217
Available Bismuth (Bi)	mg/kg	ND	2	ND	2	1581217
Available Boron (B)	mg/kg	ND	5	6	5	1581217
Available Cadmium (Cd)	mg/kg	0.4	0.3	ND	0.3	1581217
Available Chromium (Cr)	mg/kg	13	2	7	2	1581217
Available Cobalt (Co)	mg/kg	5	1	3	1	1581217
Available Copper (Cu)	mg/kg	13	2	12	2	1581217
Available Iron (Fe)	mg/kg	17000	50	16000	50	1581217
Available Lead (Pb)	mg/kg	3700	5	310	0.5	1581217
Available Lithium (Li)	mg/kg	17	2	16	2	1581217
Available Manganese (Mn)	mg/kg	440	2	450	2	1581217
Available Mercury (Hg)	mg/kg	0.2	0.1	ND	0.1	1581217
Available Molybdenum (Mo)	mg/kg	ND	2	ND	2	1581217
Available Nickel (Ni)	mg/kg	6	2	6	2	1581217
Available Rubidium (Rb)	mg/kg	3	2	3	2	1581217
Available Selenium (Se)	mg/kg	ND	2	ND	2	1581217
Available Silver (Ag)	mg/kg	ND	0.5	ND	0.5	1581217
Available Strontium (Sr)	mg/kg	12	5	7	5	1581217
Available Thallium (Tl)	mg/kg	ND	0.1	ND	0.1	1581217
Available Tin (Sn)	mg/kg	3	2	5	2	1581217
Available Uranium (U)	mg/kg	0.4	0.1	0.2	0.1	1581217
Available Vanadium (V)	mg/kg	11	2	10	2	1581217
Available Zinc (Zn)	mg/kg	1300	5	96	5	1581217

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6567		AC6568		
Sampling Date		2008/07/25		2008/07/25		
COC Number		10769		10769		
Registration #						
	Units	**BS57A**	**RDL**	**BS58A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	5500	10	2300	10	1581217
Available Antimony (Sb)	mg/kg	34	2	3	2	1581217
Available Arsenic (As)	mg/kg	5	2	ND	2	1581217
Available Barium (Ba)	mg/kg	240	5	46	5	1581217
Available Beryllium (Be)	mg/kg	ND	2	ND	2	1581217
Available Bismuth (Bi)	mg/kg	ND	2	ND	2	1581217
Available Boron (B)	mg/kg	ND	5	ND	5	1581217
Available Cadmium (Cd)	mg/kg	0.6	0.3	ND	0.3	1581217
Available Chromium (Cr)	mg/kg	8	2	3	2	1581217
Available Cobalt (Co)	mg/kg	5	1	2	1	1581217
Available Copper (Cu)	mg/kg	16	2	6	2	1581217
Available Iron (Fe)	mg/kg	17000	50	5600	50	1581217
Available Lead (Pb)	mg/kg	2600	5	220	0.5	1581217
Available Lithium (Li)	mg/kg	14	2	3	2	1581217
Available Manganese (Mn)	mg/kg	660	2	120	2	1581217
Available Mercury (Hg)	mg/kg	0.3	0.1	0.1	0.1	1581217
Available Molybdenum (Mo)	mg/kg	ND	2	ND	2	1581217
Available Nickel (Ni)	mg/kg	7	2	3	2	1581217
Available Rubidium (Rb)	mg/kg	3	2	3	2	1581217
Available Selenium (Se)	mg/kg	ND	2	ND	2	1581217
Available Silver (Ag)	mg/kg	ND	0.5	ND	0.5	1581217
Available Strontium (Sr)	mg/kg	19	5	10	5	1581217
Available Thallium (Tl)	mg/kg	ND	0.1	ND	0.1	1581217
Available Tin (Sn)	mg/kg	3	2	ND	2	1581217
Available Uranium (U)	mg/kg	0.2	0.1	0.2	0.1	1581217
Available Vanadium (V)	mg/kg	10	2	7	2	1581217
Available Zinc (Zn)	mg/kg	1200	5	110	5	1581217

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6569		AC6570		
Sampling Date		2008/07/25		2008/07/25		
COC Number		10769		10769		
Registration #						
	Units	**BS60A**	**RDL**	**BS61A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	6600	10	2900	10	1581218
Available Antimony (Sb)	mg/kg	21	2	9	2	1581218
Available Arsenic (As)	mg/kg	3	2	ND	2	1581218
Available Barium (Ba)	mg/kg	200	5	110	5	1581218
Available Beryllium (Be)	mg/kg	ND	2	ND	2	1581218
Available Bismuth (Bi)	mg/kg	ND	2	ND	2	1581218
Available Boron (B)	mg/kg	ND	5	ND	5	1581218
Available Cadmium (Cd)	mg/kg	0.6	0.3	ND	0.3	1581218
Available Chromium (Cr)	mg/kg	7	2	4	2	1581218
Available Cobalt (Co)	mg/kg	2	1	2	1	1581218
Available Copper (Cu)	mg/kg	76	2	7	2	1581218
Available Iron (Fe)	mg/kg	17000	50	7300	50	1581218
Available Lead (Pb)	mg/kg	1000	0.5	480	0.5	1581218
Available Lithium (Li)	mg/kg	8	2	4	2	1581218
Available Manganese (Mn)	mg/kg	280	2	210	2	1581218
Available Mercury (Hg)	mg/kg	0.2	0.1	0.1	0.1	1581218
Available Molybdenum (Mo)	mg/kg	ND	2	ND	2	1581218
Available Nickel (Ni)	mg/kg	5	2	3	2	1581218
Available Rubidium (Rb)	mg/kg	2	2	3	2	1581218
Available Selenium (Se)	mg/kg	ND (1)	20	ND	2	1581218
Available Silver (Ag)	mg/kg	ND	0.5	ND	0.5	1581218
Available Strontium (Sr)	mg/kg	11	5	16	5	1581218
Available Thallium (Tl)	mg/kg	ND	0.1	ND	0.1	1581218
Available Tin (Sn)	mg/kg	3	2	ND	2	1581218
Available Uranium (U)	mg/kg	0.4	0.1	0.3	0.1	1581218
Available Vanadium (V)	mg/kg	10	2	11	2	1581218
Available Zinc (Zn)	mg/kg	490	5	170	5	1581218

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated reporting limit due to sample matrix.

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Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6571		AC6572	AC6573		
Sampling Date		2008/07/25		2008/07/25	2008/07/25		
COC Number		10769		10769	10769		
Registration #							
	Units	**BS63A**	**RDL**	**BS64A**	**BS66A**	**RDL**	**QC Batch**
Metals							
Available Aluminum (Al)	mg/kg	5600	10	5000	5500	10	1581218
Available Antimony (Sb)	mg/kg	26	2	10	26	2	1581218
Available Arsenic (As)	mg/kg	4	2	ND	3	2	1581218
Available Barium (Ba)	mg/kg	220	5	180	530	5	1581218
Available Beryllium (Be)	mg/kg	ND	2	ND	ND	2	1581218
Available Bismuth (Bi)	mg/kg	ND	2	ND	ND	2	1581218
Available Boron (B)	mg/kg	ND	5	ND	5	5	1581218
Available Cadmium (Cd)	mg/kg	0.5	0.3	0.6	0.9	0.3	1581218
Available Chromium (Cr)	mg/kg	7	2	6	10	2	1581218
Available Cobalt (Co)	mg/kg	3	1	3	4	1	1581218
Available Copper (Cu)	mg/kg	31	2	10	18	2	1581218
Available Iron (Fe)	mg/kg	15000	50	9800	13000	50	1581218
Available Lead (Pb)	mg/kg	450	0.5	840	2100	0.5	1581218
Available Lithium (Li)	mg/kg	10	2	8	12	2	1581218
Available Manganese (Mn)	mg/kg	260	2	250	430	2	1581218
Available Mercury (Hg)	mg/kg	ND	0.1	0.2	0.5	0.1	1581218
Available Molybdenum (Mo)	mg/kg	ND	2	ND	ND	2	1581218
Available Nickel (Ni)	mg/kg	5	2	6	6	2	1581218
Available Rubidium (Rb)	mg/kg	ND	2	2	2	2	1581218
Available Selenium (Se)	mg/kg	ND (1)	20	ND	ND	2	1581218
Available Silver (Ag)	mg/kg	ND	0.5	ND	ND	0.5	1581218
Available Strontium (Sr)	mg/kg	13	5	13	22	5	1581218
Available Thallium (Tl)	mg/kg	ND	0.1	ND	ND	0.1	1581218
Available Tin (Sn)	mg/kg	ND	2	ND	3	2	1581218
Available Uranium (U)	mg/kg	0.5	0.1	0.4	0.3	0.1	1581218
Available Vanadium (V)	mg/kg	12	2	6	11	2	1581218
Available Zinc (Zn)	mg/kg	220	5	260	660	5	1581218

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated reporting limit due to sample matrix.

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Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6574	AC6575		AC6576		
Sampling Date		2008/07/25	2008/07/25		2008/07/25		
COC Number		10769	10769		10769		
Registration #							
	Units	**BS67A**	**BS69A**	**RDL**	**BS70A**	**RDL**	**QC Batch**
Metals							
Available Aluminum (Al)	mg/kg	3600	13000	10	530	10	1581218
Available Antimony (Sb)	mg/kg	31	ND	2	ND	2	1581218
Available Arsenic (As)	mg/kg	3	2	2	ND	2	1581218
Available Barium (Ba)	mg/kg	720	9	5	11	5	1581218
Available Beryllium (Be)	mg/kg	ND	ND	2	ND	2	1581218
Available Bismuth (Bi)	mg/kg	ND	ND	2	ND	2	1581218
Available Boron (B)	mg/kg	ND	ND	5	8	5	1581218
Available Cadmium (Cd)	mg/kg	0.4	ND	0.3	0.5	0.3	1581218
Available Chromium (Cr)	mg/kg	6	8	2	3	2	1581218
Available Cobalt (Co)	mg/kg	2	6	1	ND	1	1581218
Available Copper (Cu)	mg/kg	9	7	2	5	2	1581218
Available Iron (Fe)	mg/kg	9500	20000	50	710	50	1581218
Available Lead (Pb)	mg/kg	980	5.8	0.5	35	0.5	1581218
Available Lithium (Li)	mg/kg	5	28	2	ND	2	1581218
Available Manganese (Mn)	mg/kg	290	650	2	7	2	1581218
Available Mercury (Hg)	mg/kg	0.1	ND	0.1	0.4	0.1	1581218
Available Molybdenum (Mo)	mg/kg	ND	ND	2	ND	2	1581218
Available Nickel (Ni)	mg/kg	3	9	2	2	2	1581218
Available Rubidium (Rb)	mg/kg	3	ND	2	ND	2	1581218
Available Selenium (Se)	mg/kg	ND	ND	2	ND (1)	20	1581218
Available Silver (Ag)	mg/kg	ND	ND	0.5	ND	0.5	1581218
Available Strontium (Sr)	mg/kg	29	ND	5	40	5	1581218
Available Thallium (Tl)	mg/kg	ND	ND	0.1	ND	0.1	1581218
Available Tin (Sn)	mg/kg	4	ND	2	3	2	1581218
Available Uranium (U)	mg/kg	0.3	0.3	0.1	ND	0.1	1581218
Available Vanadium (V)	mg/kg	13	10	2	4	2	1581218
Available Zinc (Zn)	mg/kg	230	59	5	27	5	1581218

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated reporting limit due to sample matrix.

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Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6577	AC6578		AC6579		
Sampling Date		2008/07/25	2008/07/25		2008/07/25		
COC Number		10769	10769		10769		
Registration #							
	Units	**BS71A**	**BS72A**	**RDL**	**BS73A**	**RDL**	**QC Batch**
Metals							
Available Aluminum (Al)	mg/kg	1300	700	10	7000	10	1581218
Available Antimony (Sb)	mg/kg	ND	ND	2	ND	2	1581218
Available Arsenic (As)	mg/kg	ND	ND	2	ND	2	1581218
Available Barium (Ba)	mg/kg	11	13	5	10	5	1581218
Available Beryllium (Be)	mg/kg	ND	ND	2	ND	2	1581218
Available Bismuth (Bi)	mg/kg	ND	ND	2	ND	2	1581218
Available Boron (B)	mg/kg	9	6	5	ND	5	1581218
Available Cadmium (Cd)	mg/kg	0.5	0.7	0.3	ND	0.3	1581218
Available Chromium (Cr)	mg/kg	3	2	2	5	2	1581218
Available Cobalt (Co)	mg/kg	ND	ND	1	3	1	1581218
Available Copper (Cu)	mg/kg	4	6	2	6	2	1581218
Available Iron (Fe)	mg/kg	1000	750	50	13000	50	1581218
Available Lead (Pb)	mg/kg	20	10	0.5	11	0.5	1581218
Available Lithium (Li)	mg/kg	ND	ND	2	15	2	1581218
Available Manganese (Mn)	mg/kg	9	8	2	360	2	1581218
Available Mercury (Hg)	mg/kg	0.5	0.3	0.1	0.1	0.1	1581218
Available Molybdenum (Mo)	mg/kg	ND	ND	2	ND	2	1581218
Available Nickel (Ni)	mg/kg	2	ND	2	6	2	1581218
Available Rubidium (Rb)	mg/kg	ND	ND	2	2	2	1581218
Available Selenium (Se)	mg/kg	ND (1)	ND (1)	20	ND	2	1581218
Available Silver (Ag)	mg/kg	ND	ND	0.5	ND	0.5	1581218
Available Strontium (Sr)	mg/kg	43	46	5	8	5	1581218
Available Thallium (Tl)	mg/kg	ND	ND	0.1	ND	0.1	1581218
Available Tin (Sn)	mg/kg	ND	ND	2	ND	2	1581218
Available Uranium (U)	mg/kg	0.2	0.1	0.1	0.2	0.1	1581218
Available Vanadium (V)	mg/kg	3	3	2	10	2	1581218
Available Zinc (Zn)	mg/kg	27	27	5	40	5	1581218

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated reporting limit due to sample matrix.

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6580	AC6581	AC6582		
Sampling Date		2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769		
Registration #						
	Units	**BS74A**	**BS75A**	**BS76A**	**RDL**	**QC Batch**
Metals						
Available Aluminum (Al)	mg/kg	690	790	1100	10	1581218
Available Antimony (Sb)	mg/kg	ND	ND	ND	2	1581218
Available Arsenic (As)	mg/kg	ND	2	ND	2	1581218
Available Barium (Ba)	mg/kg	15	10	11	5	1581218
Available Beryllium (Be)	mg/kg	ND	ND	ND	2	1581218
Available Bismuth (Bi)	mg/kg	ND	ND	ND	2	1581218
Available Boron (B)	mg/kg	10	8	8	5	1581218
Available Cadmium (Cd)	mg/kg	0.8	0.6	0.6	0.3	1581218
Available Chromium (Cr)	mg/kg	3	3	2	2	1581218
Available Cobalt (Co)	mg/kg	ND	ND	ND	1	1581218
Available Copper (Cu)	mg/kg	6	5	5	2	1581218
Available Iron (Fe)	mg/kg	790	900	850	50	1581218
Available Lead (Pb)	mg/kg	38	35	17	0.5	1581218
Available Lithium (Li)	mg/kg	ND	ND	ND	2	1581218
Available Manganese (Mn)	mg/kg	7	6	15	2	1581218
Available Mercury (Hg)	mg/kg	0.5	0.6	0.4	0.1	1581218
Available Molybdenum (Mo)	mg/kg	ND	ND	ND	2	1581218
Available Nickel (Ni)	mg/kg	2	2	ND	2	1581218
Available Rubidium (Rb)	mg/kg	ND	ND	ND	2	1581218
Available Selenium (Se)	mg/kg	ND (1)	ND (1)	ND (1)	20	1581218
Available Silver (Ag)	mg/kg	ND	ND	ND	0.5	1581218
Available Strontium (Sr)	mg/kg	39	35	45	5	1581218
Available Thallium (Tl)	mg/kg	ND	ND	ND	0.1	1581218
Available Tin (Sn)	mg/kg	ND	ND	ND	2	1581218
Available Uranium (U)	mg/kg	ND	0.1	ND	0.1	1581218
Available Vanadium (V)	mg/kg	5	5	3	2	1581218
Available Zinc (Zn)	mg/kg	29	17	23	5	1581218

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated reporting limit due to sample matrix.

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6583	AC6584	AC6585	AC6586		
Sampling Date		2008/07/25	2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769	10769		
Registration #							
	Units	**DUP-1**	**DUP-2**	**DUP-3**	**DUP-4**	**RDL**	**QC Batch**
Metals							
Available Aluminum (Al)	mg/kg	4400	8500	5200	8300	10	1581218
Available Antimony (Sb)	mg/kg	4	ND	2	15	2	1581218
Available Arsenic (As)	mg/kg	6	3	20	5	2	1581218
Available Barium (Ba)	mg/kg	10	15	140	140	5	1581218
Available Beryllium (Be)	mg/kg	ND	ND	ND	ND	2	1581218
Available Bismuth (Bi)	mg/kg	ND	ND	ND	ND	2	1581218
Available Boron (B)	mg/kg	ND	ND	ND	ND	5	1581218
Available Cadmium (Cd)	mg/kg	ND	ND	ND	0.4	0.3	1581218
Available Chromium (Cr)	mg/kg	7	7	8	8	2	1581218
Available Cobalt (Co)	mg/kg	4	6	4	5	1	1581218
Available Copper (Cu)	mg/kg	21	12	20	13	2	1581218
Available Iron (Fe)	mg/kg	11000	16000	22000	17000	50	1581218
Available Lead (Pb)	mg/kg	1400	180	900	830	0.5	1581218
Available Lithium (Li)	mg/kg	8	23	13	20	2	1581218
Available Manganese (Mn)	mg/kg	350	500	500	480	2	1581218
Available Mercury (Hg)	mg/kg	0.3	ND	0.2	0.1	0.1	1581218
Available Molybdenum (Mo)	mg/kg	ND	ND	2	ND	2	1581218
Available Nickel (Ni)	mg/kg	5	9	8	8	2	1581218
Available Rubidium (Rb)	mg/kg	3	ND	3	3	2	1581218
Available Selenium (Se)	mg/kg	ND	ND	ND	ND	2	1581218
Available Silver (Ag)	mg/kg	ND	ND	ND	ND	0.5	1581218
Available Strontium (Sr)	mg/kg	7	7	13	9	5	1581218
Available Thallium (Tl)	mg/kg	ND	ND	ND	ND	0.1	1581218
Available Tin (Sn)	mg/kg	4	ND	11	6	2	1581218
Available Uranium (U)	mg/kg	0.5	0.3	0.3	0.3	0.1	1581218
Available Vanadium (V)	mg/kg	11	9	11	11	2	1581218
Available Zinc (Zn)	mg/kg	180	90	300	410	5	1581218

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		AC6586		
Sampling Date		2008/07/25		
COC Number		10769		
Registration #				
	Units	**DUP-4 Lab-Dup**	**RDL**	**QC Batch**
Metals				
Available Aluminum (Al)	mg/kg	8000	10	1581218
Available Antimony (Sb)	mg/kg	12	2	1581218
Available Arsenic (As)	mg/kg	4	2	1581218
Available Barium (Ba)	mg/kg	160	5	1581218
Available Beryllium (Be)	mg/kg	ND	2	1581218
Available Bismuth (Bi)	mg/kg	ND	2	1581218
Available Boron (B)	mg/kg	ND	5	1581218
Available Cadmium (Cd)	mg/kg	0.4	0.3	1581218
Available Chromium (Cr)	mg/kg	8	2	1581218
Available Cobalt (Co)	mg/kg	4	1	1581218
Available Copper (Cu)	mg/kg	12	2	1581218
Available Iron (Fe)	mg/kg	17000	50	1581218
Available Lead (Pb)	mg/kg	750	0.5	1581218
Available Lithium (Li)	mg/kg	19	2	1581218
Available Manganese (Mn)	mg/kg	450	2	1581218
Available Mercury (Hg)	mg/kg	0.1	0.1	1581218
Available Molybdenum (Mo)	mg/kg	ND	2	1581218
Available Nickel (Ni)	mg/kg	8	2	1581218
Available Rubidium (Rb)	mg/kg	3	2	1581218
Available Selenium (Se)	mg/kg	ND	2	1581218
Available Silver (Ag)	mg/kg	ND	0.5	1581218
Available Strontium (Sr)	mg/kg	9	5	1581218
Available Thallium (Tl)	mg/kg	ND	0.1	1581218
Available Tin (Sn)	mg/kg	5	2	1581218
Available Uranium (U)	mg/kg	0.2	0.1	1581218
Available Vanadium (V)	mg/kg	11	2	1581218
Available Zinc (Zn)	mg/kg	380	5	1581218

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
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Project name: CAPE PINE
Your P.O. #: NSD016300

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		AC6535	AC6542	AC6556	AC6557		
Sampling Date		2008/07/25	2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769	10769		
Registration #							
	Units	**BS8A**	**BS13A**	**BS39A**	**BS40A**	**RDL**	**QC Batch**
Polyaromatic Hydrocarbons							
1-Methylnaphthalene	mg/kg	ND	ND	0.12	ND	0.05	1580485
2-Methylnaphthalene	mg/kg	ND	ND	0.14	ND	0.05	1580485
Acenaphthene	mg/kg	ND	ND	0.12	ND	0.05	1580485
Acenaphthylene	mg/kg	ND	ND	0.14	ND	0.05	1580485
Anthracene	mg/kg	ND	ND	0.43	ND	0.05	1580485
Benzo(a)anthracene	mg/kg	ND	ND	0.78	ND	0.05	1580485
Benzo(a)pyrene	mg/kg	ND	ND	0.71	ND	0.05	1580485
Benzo(b)fluoranthene	mg/kg	ND	ND	0.57	ND	0.05	1580485
Benzo(g,h,i)perylene	mg/kg	ND	ND	0.42	ND	0.05	1580485
Benzo(k)fluoranthene	mg/kg	ND	ND	0.54	ND	0.05	1580485
Chrysene	mg/kg	ND	ND	0.75	ND	0.05	1580485
Dibenz(a,h)anthracene	mg/kg	ND	ND	0.09	ND	0.05	1580485
Fluoranthene	mg/kg	ND	ND	2.0	ND	0.05	1580485
Fluorene	mg/kg	ND	ND	0.28	ND	0.05	1580485
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	0.46	ND	0.05	1580485
Naphthalene	mg/kg	ND	ND	0.15	ND	0.05	1580485
Perylene	mg/kg	ND	ND	0.21	ND	0.05	1580485
Phenanthrene	mg/kg	ND	ND	2.2	ND	0.05	1580485
Pyrene	mg/kg	ND	ND	1.7	ND	0.05	1580485
Surrogate Recovery (%)							
D10-Anthracene	%	89	90	95	87		1580485
D14-Terphenyl (FS)	%	91	91	94	84		1580485
D8-Acenaphthylene	%	97	100	105	72		1580485

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		AC6567	AC6573	AC6577	AC6581		
Sampling Date		2008/07/25	2008/07/25	2008/07/25	2008/07/25		
COC Number		10769	10769	10769	10769		
Registration #							
	Units	**BS57A**	**BS66A**	**BS71A**	**BS75A**	**RDL**	**QC Batch**
Polyaromatic Hydrocarbons							
1-Methylnaphthalene	mg/kg	ND	ND	ND	ND	0.05	1580485
2-Methylnaphthalene	mg/kg	ND	ND	ND	ND	0.05	1580485
Acenaphthene	mg/kg	ND	ND	ND	ND	0.05	1580485
Acenaphthylene	mg/kg	ND	ND	ND	ND	0.05	1580485
Anthracene	mg/kg	ND	ND	ND	ND	0.05	1580485
Benzo(a)anthracene	mg/kg	0.21	0.28	ND	ND	0.05	1580485
Benzo(a)pyrene	mg/kg	0.26	0.38	ND	ND	0.05	1580485
Benzo(b)fluoranthene	mg/kg	0.24	0.35	ND	ND	0.05	1580485
Benzo(g,h,i)perylene	mg/kg	0.17	0.27	ND	ND	0.05	1580485
Benzo(k)fluoranthene	mg/kg	0.26	0.34	ND	ND	0.05	1580485
Chrysene	mg/kg	0.33	0.43	ND	ND	0.05	1580485
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	0.05	1580485
Fluoranthene	mg/kg	0.76	0.92	ND	ND	0.05	1580485
Fluorene	mg/kg	ND	ND	ND	ND	0.05	1580485
Indeno(1,2,3-cd)pyrene	mg/kg	0.22	0.29	ND	ND	0.05	1580485
Naphthalene	mg/kg	ND	ND	ND	ND	0.05	1580485
Perylene	mg/kg	ND	ND	ND	ND	0.05	1580485
Phenanthrene	mg/kg	0.42	0.48	ND	ND	0.05	1580485
Pyrene	mg/kg	0.64	0.76	ND	ND	0.05	1580485
Surrogate Recovery (%)							
D10-Anthracene	%	91	88	86	86		1580485
D14-Terphenyl (FS)	%	96	81	91	88		1580485
D8-Acenaphthylene	%	78	73	94	74		1580485

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		AC6581		
Sampling Date		2008/07/25		
COC Number		10769		
Registration #				
	Units	**BS75A Lab-Dup**	**RDL**	**QC Batch**
Polyaromatic Hydrocarbons				
1-Methylnaphthalene	mg/kg	ND	0.05	1580485
2-Methylnaphthalene	mg/kg	ND	0.05	1580485
Acenaphthene	mg/kg	ND	0.05	1580485
Acenaphthylene	mg/kg	ND	0.05	1580485
Anthracene	mg/kg	ND	0.05	1580485
Benzo(a)anthracene	mg/kg	ND	0.05	1580485
Benzo(a)pyrene	mg/kg	ND	0.05	1580485
Benzo(b)fluoranthene	mg/kg	ND	0.05	1580485
Benzo(g,h,i)perylene	mg/kg	ND	0.05	1580485
Benzo(k)fluoranthene	mg/kg	ND	0.05	1580485
Chrysene	mg/kg	ND	0.05	1580485
Dibenz(a,h)anthracene	mg/kg	ND	0.05	1580485
Fluoranthene	mg/kg	ND	0.05	1580485
Fluorene	mg/kg	ND	0.05	1580485
Indeno(1,2,3-cd)pyrene	mg/kg	ND	0.05	1580485
Naphthalene	mg/kg	ND	0.05	1580485
Perylene	mg/kg	ND	0.05	1580485
Phenanthrene	mg/kg	ND	0.05	1580485
Pyrene	mg/kg	ND	0.05	1580485
Surrogate Recovery (%)				
D10-Anthracene	%	84		1580485
D14-Terphenyl (FS)	%	89		1580485
D8-Acenaphthylene	%	73		1580485

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		AC6528		
Sampling Date		2008/07/25		
COC Number		10769		
Registration #				
	Units	**BS7A**	**RDL**	**QC Batch**
PCBs				
Total PCB	ug/g	ND	0.05	1577955
Surrogate Recovery (%)				
Decachlorobiphenyl	%	83		1577955

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A884993
Report Date: 2008/08/12

Jacques Whitford Limited
Client Project #: 1042036.04/ Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

GENERAL COMMENTS

Results relate only to the items tested.

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Jacques Whitford Limited
Attention: Jim Slade
Client Project #: 1042036.04/ Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report

Maxxam Job Number: DA884993

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1577955	CMI	MATRIX SPIKE	Decachlorobiphenyl	2008/08/06		84	%	30 - 130
			Total PCB	2008/08/06		124	%	70 - 130
		Spiked Blank	Decachlorobiphenyl	2008/08/05		97	%	30 - 130
			Total PCB	2008/08/05		116	%	70 - 130
		Method Blank	Decachlorobiphenyl	2008/08/05		97	%	30 - 130
			Total PCB	2008/08/05	ND, RDL=0.05		ug/g	
		RPD	Decachlorobiphenyl	2008/08/06	4.3		%	N/A
			Total PCB	2008/08/06	NC		%	50
1578064	AMC	MATRIX SPIKE	Mercury (Hg)	2008/08/05		76	%	75 - 125
		QC STANDARD	Mercury (Hg)	2008/08/05		75	%	75 - 125
		Spiked Blank	Mercury (Hg)	2008/08/05		98	%	N/A
		Method Blank	Mercury (Hg)	2008/08/05	ND, RDL=0.01		mg/kg	
		RPD	Mercury (Hg)	2008/08/05	3.8		%	35
1579842	DLB	MATRIX SPIKE						
		[AC6548-01]	Available Aluminum (Al)	2008/08/06		NC	%	75 - 125
			Available Antimony (Sb)	2008/08/06		92	%	75 - 125
			Available Arsenic (As)	2008/08/06		101	%	75 - 125
			Available Barium (Ba)	2008/08/06		NC	%	75 - 125
			Available Beryllium (Be)	2008/08/06		95	%	75 - 125
			Available Bismuth (Bi)	2008/08/06		99	%	75 - 125
			Available Boron (B)	2008/08/06		95	%	75 - 125
			Available Cadmium (Cd)	2008/08/06		99	%	75 - 125
			Available Chromium (Cr)	2008/08/06		95	%	75 - 125
			Available Cobalt (Co)	2008/08/06		94	%	75 - 125
			Available Copper (Cu)	2008/08/06		NC	%	75 - 125
			Available Iron (Fe)	2008/08/06		NC	%	75 - 125
			Available Lead (Pb)	2008/08/06		NC	%	75 - 125
			Available Lithium (Li)	2008/08/06		NC	%	75 - 125
			Available Manganese (Mn)	2008/08/06		NC	%	75 - 125
			Available Mercury (Hg)	2008/08/06		93	%	75 - 125
			Available Molybdenum (Mo)	2008/08/06		99	%	75 - 125
			Available Nickel (Ni)	2008/08/06		92	%	75 - 125
			Available Rubidium (Rb)	2008/08/06		95	%	75 - 125
			Available Selenium (Se)	2008/08/06		91	%	75 - 125
			Available Silver (Ag)	2008/08/06		101	%	75 - 125
			Available Strontium (Sr)	2008/08/06		93	%	75 - 125
			Available Thallium (Tl)	2008/08/06		96	%	75 - 125
			Available Tin (Sn)	2008/08/06		105	%	75 - 125
			Available Uranium (U)	2008/08/06		102	%	75 - 125
			Available Vanadium (V)	2008/08/06		100	%	75 - 125
			Available Zinc (Zn)	2008/08/06		90	%	75 - 125
		QC STANDARD	Available Aluminum (Al)	2008/08/06		84	%	75 - 125
			Available Arsenic (As)	2008/08/06		102	%	75 - 125
			Available Barium (Ba)	2008/08/06		111	%	75 - 125
			Available Chromium (Cr)	2008/08/06		85	%	75 - 125
			Available Cobalt (Co)	2008/08/06		95	%	75 - 125
			Available Copper (Cu)	2008/08/06		88	%	75 - 125
			Available Iron (Fe)	2008/08/06		93	%	75 - 125
			Available Lead (Pb)	2008/08/06		99	%	75 - 125
			Available Manganese (Mn)	2008/08/06		104	%	75 - 125
			Available Nickel (Ni)	2008/08/06		93	%	75 - 125
			Available Strontium (Sr)	2008/08/06		89	%	75 - 125
			Available Vanadium (V)	2008/08/06		106	%	75 - 125
			Available Zinc (Zn)	2008/08/06		97	%	75 - 125
		Method Blank	Available Aluminum (Al)	2008/08/06	ND, RDL=10		mg/kg	

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Jacques Whitford Limited
Attention: Jim Slade
Client Project #: 1042036.04/ Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report (Continued)

Maxxam Job Number: DA884993

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1579842	DLB	Method Blank	Available Antimony (Sb)	2008/08/06	ND, RDL=2		mg/kg	
			Available Arsenic (As)	2008/08/06	ND, RDL=2		mg/kg	
			Available Barium (Ba)	2008/08/06	ND, RDL=5		mg/kg	
			Available Beryllium (Be)	2008/08/06	ND, RDL=2		mg/kg	
			Available Bismuth (Bi)	2008/08/06	ND, RDL=2		mg/kg	
			Available Boron (B)	2008/08/06	ND, RDL=5		mg/kg	
			Available Cadmium (Cd)	2008/08/06	ND, RDL=0.3		mg/kg	
			Available Chromium (Cr)	2008/08/06	ND, RDL=2		mg/kg	
			Available Cobalt (Co)	2008/08/06	ND, RDL=1		mg/kg	
			Available Copper (Cu)	2008/08/06	ND, RDL=2		mg/kg	
			Available Iron (Fe)	2008/08/06	ND, RDL=50		mg/kg	
			Available Lead (Pb)	2008/08/06	ND, RDL=0.5		mg/kg	
			Available Lithium (Li)	2008/08/06	ND, RDL=2		mg/kg	
			Available Manganese (Mn)	2008/08/06	ND, RDL=2		mg/kg	
			Available Mercury (Hg)	2008/08/06	ND, RDL=0.1		mg/kg	
			Available Molybdenum (Mo)	2008/08/06	ND, RDL=2		mg/kg	
			Available Nickel (Ni)	2008/08/06	ND, RDL=2		mg/kg	
			Available Rubidium (Rb)	2008/08/06	ND, RDL=2		mg/kg	
			Available Selenium (Se)	2008/08/06	ND, RDL=2		mg/kg	
			Available Silver (Ag)	2008/08/06	ND, RDL=0.5		mg/kg	
			Available Strontium (Sr)	2008/08/06	ND, RDL=5		mg/kg	
			Available Thallium (Tl)	2008/08/06	ND, RDL=0.1		mg/kg	
			Available Tin (Sn)	2008/08/06	ND, RDL=2		mg/kg	
			Available Uranium (U)	2008/08/06	ND, RDL=0.1		mg/kg	
			Available Vanadium (V)	2008/08/06	ND, RDL=2		mg/kg	
			Available Zinc (Zn)	2008/08/06	ND, RDL=5		mg/kg	
		RPD [AC6548-01]	Available Aluminum (Al)	2008/08/06	2.9		%	35
			Available Antimony (Sb)	2008/08/06	NC		%	35
			Available Arsenic (As)	2008/08/06	NC		%	35
			Available Barium (Ba)	2008/08/06	NC		%	35
			Available Beryllium (Be)	2008/08/06	NC		%	35
			Available Bismuth (Bi)	2008/08/06	NC		%	N/A
			Available Boron (B)	2008/08/06	NC		%	35
			Available Cadmium (Cd)	2008/08/06	NC		%	35
			Available Chromium (Cr)	2008/08/06	NC		%	35
			Available Cobalt (Co)	2008/08/06	7.8		%	35
			Available Copper (Cu)	2008/08/06	3.8		%	35
			Available Iron (Fe)	2008/08/06	3.0		%	35
			Available Lead (Pb)	2008/08/06	24.1		%	35
			Available Lithium (Li)	2008/08/06	4.8		%	N/A
			Available Manganese (Mn)	2008/08/06	2.6		%	35
			Available Mercury (Hg)	2008/08/06	NC		%	N/A
			Available Molybdenum (Mo)	2008/08/06	NC		%	35
			Available Nickel (Ni)	2008/08/06	NC		%	35
			Available Rubidium (Rb)	2008/08/06	NC		%	N/A
			Available Selenium (Se)	2008/08/06	NC		%	35
			Available Silver (Ag)	2008/08/06	NC		%	35
			Available Strontium (Sr)	2008/08/06	NC		%	35
			Available Thallium (Tl)	2008/08/06	NC		%	35
			Available Tin (Sn)	2008/08/06	NC		%	N/A
			Available Uranium (U)	2008/08/06	NC		%	35
			Available Vanadium (V)	2008/08/06	NC		%	35
			Available Zinc (Zn)	2008/08/06	3.8		%	35
1579988	CAC	QC STANDARD	Organic Carbon (TOC)	2008/08/08		91	%	75 - 125
		Method Blank	Organic Carbon (TOC)	2008/08/08	ND, RDL=0.2		g/kg	

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Jacques Whitford Limited
Attention: Jim Slade
Client Project #: 1042036.04/ Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report (Continued)

Maxxam Job Number: DA884993

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1579988	CAC	RPD [AC6576-01]	Organic Carbon (TOC)	2008/08/08	1.8		%	35
1580485	RST	MATRIX SPIKE						
		[AC6581-01]	D10-Anthracene	2008/08/12		88	%	30 - 130
			D14-Terphenyl (FS)	2008/08/12		93 (1)	%	30 - 130
			D8-Acenaphthylene	2008/08/12		96	%	30 - 130
			1-Methylnaphthalene	2008/08/12		80	%	30 - 130
			2-Methylnaphthalene	2008/08/12		80	%	30 - 130
			Acenaphthene	2008/08/12		80	%	30 - 130
			Acenaphthylene	2008/08/12		77	%	30 - 130
			Anthracene	2008/08/12		77	%	30 - 130
			Benzo(a)anthracene	2008/08/12		72	%	30 - 130
			Benzo(a)pyrene	2008/08/12		54	%	30 - 130
			Benzo(b)fluoranthene	2008/08/12		54	%	30 - 130
			Benzo(g,h,i)perylene	2008/08/12		49	%	30 - 130
			Benzo(k)fluoranthene	2008/08/12		54	%	30 - 130
			Chrysene	2008/08/12		64	%	30 - 130
			Dibenz(a,h)anthracene	2008/08/12		56	%	30 - 130
			Fluoranthene	2008/08/12		61	%	30 - 130
			Fluorene	2008/08/12		78	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2008/08/12		47	%	30 - 130
			Naphthalene	2008/08/12		79	%	30 - 130
			Perylene	2008/08/12		50	%	30 - 130
			Phenanthrene	2008/08/12		79	%	30 - 130
			Pyrene	2008/08/12		59	%	30 - 130
		Spiked Blank	D10-Anthracene	2008/08/08		90	%	30 - 130
			D14-Terphenyl (FS)	2008/08/08		83	%	30 - 130
			D8-Acenaphthylene	2008/08/08		79	%	30 - 130
			1-Methylnaphthalene	2008/08/08		74	%	30 - 130
			2-Methylnaphthalene	2008/08/08		78	%	30 - 130
			Acenaphthene	2008/08/08		77	%	30 - 130
			Acenaphthylene	2008/08/08		75	%	30 - 130
			Anthracene	2008/08/08		79	%	30 - 130
			Benzo(a)anthracene	2008/08/08		73	%	30 - 130
			Benzo(a)pyrene	2008/08/08		78	%	30 - 130
			Benzo(b)fluoranthene	2008/08/08		78	%	30 - 130
			Benzo(g,h,i)perylene	2008/08/08		76	%	30 - 130
			Benzo(k)fluoranthene	2008/08/08		79	%	30 - 130
			Chrysene	2008/08/08		78	%	30 - 130
			Dibenz(a,h)anthracene	2008/08/08		71	%	30 - 130
			Fluoranthene	2008/08/08		77	%	30 - 130
			Fluorene	2008/08/08		76	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2008/08/08		64	%	30 - 130
			Naphthalene	2008/08/08		76	%	30 - 130
			Perylene	2008/08/08		81	%	30 - 130
			Phenanthrene	2008/08/08		76	%	30 - 130
			Pyrene	2008/08/08		75	%	30 - 130
		Method Blank	D10-Anthracene	2008/08/08		97	%	30 - 130
			D14-Terphenyl (FS)	2008/08/08		93	%	30 - 130
			D8-Acenaphthylene	2008/08/08		90	%	30 - 130
			1-Methylnaphthalene	2008/08/08	ND, RDL=0.05		mg/kg	
			2-Methylnaphthalene	2008/08/08	ND, RDL=0.05		mg/kg	
			Acenaphthene	2008/08/08	ND, RDL=0.05		mg/kg	
			Acenaphthylene	2008/08/08	ND, RDL=0.05		mg/kg	
			Anthracene	2008/08/08	ND, RDL=0.05		mg/kg	
			Benzo(a)anthracene	2008/08/08	ND, RDL=0.05		mg/kg	

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Client Project #: 1042036.04/ Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report (Continued)

Maxxam Job Number: DA884993

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1580485	RST	Method Blank	Benzo(a)pyrene	2008/08/08	ND, RDL=0.05		mg/kg	
			Benzo(b)fluoranthene	2008/08/08	ND, RDL=0.05		mg/kg	
			Benzo(g,h,i)perylene	2008/08/08	ND, RDL=0.05		mg/kg	
			Benzo(k)fluoranthene	2008/08/08	ND, RDL=0.05		mg/kg	
			Chrysene	2008/08/08	ND, RDL=0.05		mg/kg	
			Dibenz(a,h)anthracene	2008/08/08	ND, RDL=0.05		mg/kg	
			Fluoranthene	2008/08/08	ND, RDL=0.05		mg/kg	
			Fluorene	2008/08/08	ND, RDL=0.05		mg/kg	
			Indeno(1,2,3-cd)pyrene	2008/08/08	ND, RDL=0.05		mg/kg	
			Naphthalene	2008/08/08	ND, RDL=0.05		mg/kg	
			Perylene	2008/08/08	ND, RDL=0.05		mg/kg	
			Phenanthrene	2008/08/08	ND, RDL=0.05		mg/kg	
			Pyrene	2008/08/08	ND, RDL=0.05		mg/kg	
		RPD [AC6581-01]	1-Methylnaphthalene	2008/08/08	NC		%	50
			2-Methylnaphthalene	2008/08/08	NC		%	50
			Acenaphthene	2008/08/08	NC		%	50
			Acenaphthylene	2008/08/08	NC		%	50
			Anthracene	2008/08/08	NC		%	50
			Benzo(a)anthracene	2008/08/08	NC		%	50
			Benzo(a)pyrene	2008/08/08	NC		%	50
			Benzo(b)fluoranthene	2008/08/08	NC		%	50
			Benzo(g,h,i)perylene	2008/08/08	NC		%	50
			Benzo(k)fluoranthene	2008/08/08	NC		%	50
			Chrysene	2008/08/08	NC		%	50
			Dibenz(a,h)anthracene	2008/08/08	NC		%	50
			Fluoranthene	2008/08/08	NC		%	50
			Fluorene	2008/08/08	NC		%	50
			Indeno(1,2,3-cd)pyrene	2008/08/08	NC		%	50
			Naphthalene	2008/08/08	NC		%	50
			Perylene	2008/08/08	NC		%	50
			Phenanthrene	2008/08/08	NC		%	50
			Pyrene	2008/08/08	NC		%	50
1581217	DLB	MATRIX SPIKE	Available Aluminum (Al)	2008/08/07		NC	%	75 - 125
			Available Antimony (Sb)	2008/08/07		69 (2)	%	75 - 125
			Available Arsenic (As)	2008/08/07		NC	%	75 - 125
			Available Barium (Ba)	2008/08/07		NC	%	75 - 125
			Available Beryllium (Be)	2008/08/07		96	%	75 - 125
			Available Bismuth (Bi)	2008/08/07		103	%	75 - 125
			Available Boron (B)	2008/08/07		88	%	75 - 125
			Available Cadmium (Cd)	2008/08/07		96	%	75 - 125
			Available Chromium (Cr)	2008/08/07		NC	%	75 - 125
			Available Cobalt (Co)	2008/08/07		NC	%	75 - 125
			Available Copper (Cu)	2008/08/07		NC	%	75 - 125
			Available Iron (Fe)	2008/08/07		NC	%	75 - 125
			Available Lead (Pb)	2008/08/07		NC	%	75 - 125
			Available Lithium (Li)	2008/08/07		NC	%	75 - 125
			Available Manganese (Mn)	2008/08/07		NC	%	75 - 125
			Available Mercury (Hg)	2008/08/07		90	%	75 - 125
			Available Molybdenum (Mo)	2008/08/07		93	%	75 - 125
			Available Nickel (Ni)	2008/08/07		NC	%	75 - 125
			Available Rubidium (Rb)	2008/08/07		92	%	75 - 125
			Available Selenium (Se)	2008/08/07		69 (2)	%	75 - 125
			Available Silver (Ag)	2008/08/07		99	%	75 - 125
			Available Strontium (Sr)	2008/08/07		86	%	75 - 125
			Available Thallium (Tl)	2008/08/07		105	%	75 - 125

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Client Project #: 1042036.04/ Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report (Continued)

Maxxam Job Number: DA884993

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1581217	DLB	MATRIX SPIKE	Available Tin (Sn)	2008/08/07		103	%	75 - 125
			Available Uranium (U)	2008/08/07		106	%	75 - 125
			Available Vanadium (V)	2008/08/07		NC	%	75 - 125
			Available Zinc (Zn)	2008/08/07		93	%	75 - 125
		QC STANDARD	Available Aluminum (Al)	2008/08/07		88	%	75 - 125
			Available Arsenic (As)	2008/08/07		113	%	75 - 125
			Available Barium (Ba)	2008/08/07		116	%	75 - 125
			Available Chromium (Cr)	2008/08/07		92	%	75 - 125
			Available Cobalt (Co)	2008/08/07		99	%	75 - 125
			Available Copper (Cu)	2008/08/07		91	%	75 - 125
			Available Iron (Fe)	2008/08/07		95	%	75 - 125
			Available Lead (Pb)	2008/08/07		110	%	75 - 125
			Available Manganese (Mn)	2008/08/07		108	%	75 - 125
			Available Nickel (Ni)	2008/08/07		100	%	75 - 125
			Available Strontium (Sr)	2008/08/07		95	%	75 - 125
			Available Vanadium (V)	2008/08/07		109	%	75 - 125
			Available Zinc (Zn)	2008/08/07		97	%	75 - 125
		Spiked Blank	Available Aluminum (Al)	2008/08/07		101	%	75 - 125
			Available Antimony (Sb)	2008/08/07		103	%	75 - 125
			Available Arsenic (As)	2008/08/07		96	%	75 - 125
			Available Barium (Ba)	2008/08/07		104	%	75 - 125
			Available Beryllium (Be)	2008/08/07		102	%	75 - 125
			Available Bismuth (Bi)	2008/08/07		105	%	75 - 125
			Available Boron (B)	2008/08/07		100	%	75 - 125
			Available Cadmium (Cd)	2008/08/07		101	%	75 - 125
			Available Chromium (Cr)	2008/08/07		107	%	75 - 125
			Available Cobalt (Co)	2008/08/07		102	%	75 - 125
			Available Copper (Cu)	2008/08/07		102	%	75 - 125
			Available Iron (Fe)	2008/08/07		102	%	75 - 125
			Available Lead (Pb)	2008/08/07		102	%	75 - 125
			Available Lithium (Li)	2008/08/07		99	%	75 - 125
			Available Manganese (Mn)	2008/08/07		105	%	75 - 125
			Available Mercury (Hg)	2008/08/07		96	%	75 - 125
			Available Molybdenum (Mo)	2008/08/07		100	%	75 - 125
			Available Nickel (Ni)	2008/08/07		104	%	75 - 125
			Available Rubidium (Rb)	2008/08/07		103	%	75 - 125
			Available Selenium (Se)	2008/08/07		90	%	75 - 125
			Available Silver (Ag)	2008/08/07		107	%	75 - 125
			Available Strontium (Sr)	2008/08/07		103	%	75 - 125
			Available Thallium (Tl)	2008/08/07		106	%	75 - 125
			Available Tin (Sn)	2008/08/07		107	%	75 - 125
			Available Uranium (U)	2008/08/07		105	%	75 - 125
			Available Vanadium (V)	2008/08/07		108	%	75 - 125
			Available Zinc (Zn)	2008/08/07		92	%	75 - 125
		Method Blank	Available Aluminum (Al)	2008/08/07	ND, RDL=10		mg/kg	
			Available Antimony (Sb)	2008/08/07	ND, RDL=2		mg/kg	
			Available Arsenic (As)	2008/08/07	ND, RDL=2		mg/kg	
			Available Barium (Ba)	2008/08/07	ND, RDL=5		mg/kg	
			Available Beryllium (Be)	2008/08/07	ND, RDL=2		mg/kg	
			Available Bismuth (Bi)	2008/08/07	ND, RDL=2		mg/kg	
			Available Boron (B)	2008/08/07	ND, RDL=5		mg/kg	
			Available Cadmium (Cd)	2008/08/07	ND, RDL=0.3		mg/kg	
			Available Chromium (Cr)	2008/08/07	ND, RDL=2		mg/kg	
			Available Cobalt (Co)	2008/08/07	ND, RDL=1		mg/kg	
			Available Copper (Cu)	2008/08/07	ND, RDL=2		mg/kg	

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Attention: Jim Slade
Client Project #: 1042036.04/ Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report (Continued)

Maxxam Job Number: DA884993

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1581217	DLB	Method Blank	Available Iron (Fe)	2008/08/07	ND, RDL=50		mg/kg	
			Available Lead (Pb)	2008/08/07	ND, RDL=0.5		mg/kg	
			Available Lithium (Li)	2008/08/07	ND, RDL=2		mg/kg	
			Available Manganese (Mn)	2008/08/07	ND, RDL=2		mg/kg	
			Available Mercury (Hg)	2008/08/07	ND, RDL=0.1		mg/kg	
			Available Molybdenum (Mo)	2008/08/07	ND, RDL=2		mg/kg	
			Available Nickel (Ni)	2008/08/07	ND, RDL=2		mg/kg	
			Available Rubidium (Rb)	2008/08/07	ND, RDL=2		mg/kg	
			Available Selenium (Se)	2008/08/07	ND, RDL=2		mg/kg	
			Available Silver (Ag)	2008/08/07	ND, RDL=0.5		mg/kg	
			Available Strontium (Sr)	2008/08/07	ND, RDL=5		mg/kg	
			Available Thallium (Tl)	2008/08/07	ND, RDL=0.1		mg/kg	
			Available Tin (Sn)	2008/08/07	ND, RDL=2		mg/kg	
			Available Uranium (U)	2008/08/07	ND, RDL=0.1		mg/kg	
			Available Vanadium (V)	2008/08/07	ND, RDL=2		mg/kg	
			Available Zinc (Zn)	2008/08/07	ND, RDL=5		mg/kg	
		RPD	Available Lead (Pb)	2008/08/07	41.7 (3)		%	35
1581218	DLB	MATRIX SPIKE [AC6586-01]						
			Available Aluminum (Al)	2008/08/07		NC	%	75 - 125
			Available Antimony (Sb)	2008/08/07		NC	%	75 - 125
			Available Arsenic (As)	2008/08/07		93	%	75 - 125
			Available Barium (Ba)	2008/08/07		NC	%	75 - 125
			Available Beryllium (Be)	2008/08/07		95	%	75 - 125
			Available Bismuth (Bi)	2008/08/07		99	%	75 - 125
			Available Boron (B)	2008/08/07		89	%	75 - 125
			Available Cadmium (Cd)	2008/08/07		97	%	75 - 125
			Available Chromium (Cr)	2008/08/07		94	%	75 - 125
			Available Cobalt (Co)	2008/08/07		97	%	75 - 125
			Available Copper (Cu)	2008/08/07		NC	%	75 - 125
			Available Iron (Fe)	2008/08/07		NC	%	75 - 125
			Available Lead (Pb)	2008/08/07		NC	%	75 - 125
			Available Lithium (Li)	2008/08/07		NC	%	75 - 125
			Available Manganese (Mn)	2008/08/07		NC	%	75 - 125
			Available Mercury (Hg)	2008/08/07		85	%	75 - 125
			Available Molybdenum (Mo)	2008/08/07		98	%	75 - 125
			Available Nickel (Ni)	2008/08/07		92	%	75 - 125
			Available Rubidium (Rb)	2008/08/07		94	%	75 - 125
			Available Selenium (Se)	2008/08/07		91	%	75 - 125
			Available Silver (Ag)	2008/08/07		101	%	75 - 125
			Available Strontium (Sr)	2008/08/07		90	%	75 - 125
			Available Thallium (Tl)	2008/08/07		96	%	75 - 125
			Available Tin (Sn)	2008/08/07		133 (4)	%	75 - 125
			Available Uranium (U)	2008/08/07		100	%	75 - 125
			Available Vanadium (V)	2008/08/07		NC	%	75 - 125
			Available Zinc (Zn)	2008/08/07		NC	%	75 - 125
		QC STANDARD	Available Aluminum (Al)	2008/08/07		85	%	75 - 125
			Available Arsenic (As)	2008/08/07		110	%	75 - 125
			Available Barium (Ba)	2008/08/07		112	%	75 - 125
			Available Chromium (Cr)	2008/08/07		85	%	75 - 125
			Available Cobalt (Co)	2008/08/07		96	%	75 - 125
			Available Copper (Cu)	2008/08/07		90	%	75 - 125
			Available Iron (Fe)	2008/08/07		91	%	75 - 125
			Available Lead (Pb)	2008/08/07		106	%	75 - 125
			Available Manganese (Mn)	2008/08/07		105	%	75 - 125
			Available Nickel (Ni)	2008/08/07		94	%	75 - 125

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Attention: Jim Slade
Client Project #: 1042036.04/ Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report (Continued)

Maxxam Job Number: DA884993

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1581218	DLB	QC STANDARD	Available Strontium (Sr)	2008/08/07		90	%	75 - 125
			Available Vanadium (V)	2008/08/07		104	%	75 - 125
			Available Zinc (Zn)	2008/08/07		94	%	75 - 125
		Spiked Blank	Available Aluminum (Al)	2008/08/07		105	%	75 - 125
			Available Antimony (Sb)	2008/08/07		106	%	75 - 125
			Available Arsenic (As)	2008/08/07		98	%	75 - 125
			Available Barium (Ba)	2008/08/07		107	%	75 - 125
			Available Beryllium (Be)	2008/08/07		103	%	75 - 125
			Available Bismuth (Bi)	2008/08/07		104	%	75 - 125
			Available Boron (B)	2008/08/07		102	%	75 - 125
			Available Cadmium (Cd)	2008/08/07		105	%	75 - 125
			Available Chromium (Cr)	2008/08/07		108	%	75 - 125
			Available Cobalt (Co)	2008/08/07		104	%	75 - 125
			Available Copper (Cu)	2008/08/07		102	%	75 - 125
			Available Iron (Fe)	2008/08/07		107	%	75 - 125
			Available Lead (Pb)	2008/08/07		102	%	75 - 125
			Available Lithium (Li)	2008/08/07		101	%	75 - 125
			Available Manganese (Mn)	2008/08/07		107	%	75 - 125
			Available Mercury (Hg)	2008/08/07		95	%	75 - 125
			Available Molybdenum (Mo)	2008/08/07		103	%	75 - 125
			Available Nickel (Ni)	2008/08/07		106	%	75 - 125
			Available Rubidium (Rb)	2008/08/07		105	%	75 - 125
			Available Selenium (Se)	2008/08/07		94	%	75 - 125
			Available Silver (Ag)	2008/08/07		112	%	75 - 125
			Available Strontium (Sr)	2008/08/07		105	%	75 - 125
			Available Thallium (Tl)	2008/08/07		102	%	75 - 125
			Available Tin (Sn)	2008/08/07		106	%	75 - 125
			Available Uranium (U)	2008/08/07		107	%	75 - 125
			Available Vanadium (V)	2008/08/07		115	%	75 - 125
			Available Zinc (Zn)	2008/08/07		94	%	75 - 125
		Method Blank	Available Aluminum (Al)	2008/08/07	ND, RDL=10		mg/kg	
			Available Antimony (Sb)	2008/08/07	ND, RDL=2		mg/kg	
			Available Arsenic (As)	2008/08/07	ND, RDL=2		mg/kg	
			Available Barium (Ba)	2008/08/07	ND, RDL=5		mg/kg	
			Available Beryllium (Be)	2008/08/07	ND, RDL=2		mg/kg	
			Available Bismuth (Bi)	2008/08/07	ND, RDL=2		mg/kg	
			Available Boron (B)	2008/08/07	ND, RDL=5		mg/kg	
			Available Cadmium (Cd)	2008/08/07	ND, RDL=0.3		mg/kg	
			Available Chromium (Cr)	2008/08/07	ND, RDL=2		mg/kg	
			Available Cobalt (Co)	2008/08/07	ND, RDL=1		mg/kg	
			Available Copper (Cu)	2008/08/07	ND, RDL=2		mg/kg	
			Available Iron (Fe)	2008/08/07	ND, RDL=50		mg/kg	
			Available Lead (Pb)	2008/08/07	ND, RDL=0.5		mg/kg	
			Available Lithium (Li)	2008/08/07	ND, RDL=2		mg/kg	
			Available Manganese (Mn)	2008/08/07	ND, RDL=2		mg/kg	
			Available Mercury (Hg)	2008/08/07	ND, RDL=0.1		mg/kg	
			Available Molybdenum (Mo)	2008/08/07	ND, RDL=2		mg/kg	
			Available Nickel (Ni)	2008/08/07	ND, RDL=2		mg/kg	
			Available Rubidium (Rb)	2008/08/07	ND, RDL=2		mg/kg	
			Available Selenium (Se)	2008/08/07	ND, RDL=2		mg/kg	
			Available Silver (Ag)	2008/08/07	ND, RDL=0.5		mg/kg	
			Available Strontium (Sr)	2008/08/07	ND, RDL=5		mg/kg	
			Available Thallium (Tl)	2008/08/07	ND, RDL=0.1		mg/kg	
			Available Tin (Sn)	2008/08/07	ND, RDL=2		mg/kg	
			Available Uranium (U)	2008/08/07	ND, RDL=0.1		mg/kg	

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Jacques Whitford Limited
Attention: Jim Slade
Client Project #: 1042036.04/ Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report (Continued)

Maxxam Job Number: DA884993

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1581218	DLB	Method Blank	Available Vanadium (V)	2008/08/07	ND, RDL=2		mg/kg	
			Available Zinc (Zn)	2008/08/07	ND, RDL=5		mg/kg	
		RPD [AC6586-01]	Available Aluminum (Al)	2008/08/07	4.0		%	35
			Available Antimony (Sb)	2008/08/07	18.2		%	35
			Available Arsenic (As)	2008/08/07	NC		%	35
			Available Barium (Ba)	2008/08/07	13.7		%	35
			Available Beryllium (Be)	2008/08/07	NC		%	35
			Available Bismuth (Bi)	2008/08/07	NC		%	N/A
			Available Boron (B)	2008/08/07	NC		%	35
			Available Cadmium (Cd)	2008/08/07	NC		%	35
			Available Chromium (Cr)	2008/08/07	NC		%	35
			Available Cobalt (Co)	2008/08/07	NC		%	35
			Available Copper (Cu)	2008/08/07	3.6		%	35
			Available Iron (Fe)	2008/08/07	2.5		%	35
			Available Lead (Pb)	2008/08/07	10.1		%	35
			Available Lithium (Li)	2008/08/07	3.8		%	N/A
			Available Manganese (Mn)	2008/08/07	5.5		%	35
			Available Mercury (Hg)	2008/08/07	NC		%	N/A
			Available Molybdenum (Mo)	2008/08/07	NC		%	35
			Available Nickel (Ni)	2008/08/07	NC		%	35
			Available Rubidium (Rb)	2008/08/07	NC		%	N/A
			Available Selenium (Se)	2008/08/07	NC		%	35
			Available Silver (Ag)	2008/08/07	NC		%	35
			Available Strontium (Sr)	2008/08/07	NC		%	35
			Available Thallium (Tl)	2008/08/07	NC		%	35
			Available Tin (Sn)	2008/08/07	NC		%	N/A
			Available Uranium (U)	2008/08/07	NC		%	35
			Available Vanadium (V)	2008/08/07	6.4		%	35
			Available Zinc (Zn)	2008/08/07	7.4		%	35
1582906	JRC	Method Blank	Soluble (5:1) pH	2008/08/11	5.85, RDL=0		pH	
		RPD	Soluble (5:1) pH	2008/08/11	1.5		%	N/A
1583048	YZH	Method Blank	Dry Mass to Volume Ratio	2008/08/11	1:5, RDL=0		N/A	
		RPD	Dry Mass to Volume Ratio	2008/08/11	0		%	N/A

ND = Not detected
N/A = Not Applicable
NC = Non-calculable
RPD = Relative Percent Difference
QC Standard = Quality Control Standard
SPIKE = Fortified sample
(1) Matrix Spike: results are outside acceptance limit. Analysis was repeated with similar results.
(2) Low recovery due to sample matrix.
(3) Poor RPD due to sample inhomogeneity.
(4) Elevated recovery due to sample inhomogeneity.

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Your P.O. #: NSD016300
Your Project #: 1042036.04/Z9100
Site: CAPE PINE
Your C.O.C. #: B 59357

Attention: Susan Barfoot
Jacques Whitford Limited
St. John's - Standing Offer
607 Torbay Rd
St. John's, NL
A1A 4Y6

Report Date: 2008/08/28

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A890474
Received: 2008/08/15, 8:36

Sample Matrix: Leachate
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Leachate Total MS - N-per	5	N/A	2008/08/20	ATL SOP 00024 R3	Based on EPA6020A

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
TEH in Soil (AA PIRI)	1	N/A	2008/08/28	ATL SOP 00116 R2	Based on Atl. PIRI
Moisture	1	N/A	2008/08/15	ATL SOP 00001 R2	MOE Handbook 1983
VPH in Soil (PIRI2)	1	N/A	2008/08/16	ATL SOP 00120 R3	Based on Atl. PIRI
TCLP Inorganic extraction - pH	5	N/A	2008/08/19	4100_1_1	Based on EPA1311
TCLP Inorganic extraction - Weight	5	N/A	2008/08/19	4100_1_1	Based on EPA1311
ModTPH (T2) Calc. for Soil	1	N/A	2008/08/28	n/a	Based on Atl. PIRI

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

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

SHARLENE BAIRD, Project Manager
Email: sharlene.baird.reports@maxxamanalytics.com
Phone# (902) 420-0203 Ext:262

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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. SCC and CAEAL have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A890474
Report Date: 2008/08/28

Jacques Whitford Limited
Client Project #: 1042036.04/Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ICP/MS (LEACHATE)

Maxxam ID		AF1609	AF1610		
Sampling Date		2008/08/14	2008/08/14		
COC Number		B 59357	B 59357		
Registration #					
	Units	**BS30A (P#AC6550)**	**BS33A (P#AC6552)**	**RDL**	**QC Batch**
Metals					
Leachable Aluminum (Al)	ug/L	440	470	100	1591528
Leachable Antimony (Sb)	ug/L	ND	ND	20	1591528
Leachable Arsenic (As)	ug/L	ND	ND	20	1591528
Leachable Barium (Ba)	ug/L	85	1100	50	1591528
Leachable Beryllium (Be)	ug/L	ND	ND	20	1591528
Leachable Boron (B)	ug/L	ND	ND	500	1591528
Leachable Cadmium (Cd)	ug/L	3	33	3	1591528
Leachable Chromium (Cr)	ug/L	ND	ND	20	1591528
Leachable Cobalt (Co)	ug/L	ND	11	10	1591528
Leachable Copper (Cu)	ug/L	ND	28	20	1591528
Leachable Iron (Fe)	ug/L	ND	ND	500	1591528
Leachable Lead (Pb)	ug/L	130000	81000	50	1591528
Leachable Lithium (Li)	ug/L	ND	ND	20	1591528
Leachable Manganese (Mn)	ug/L	310	170	20	1591528
Leachable Molybdenum (Mo)	ug/L	ND	ND	20	1591528
Leachable Nickel (Ni)	ug/L	35	46	20	1591528
Leachable Selenium (Se)	ug/L	ND	ND	20	1591528
Leachable Silver (Ag)	ug/L	ND	ND	5	1591528
Leachable Strontium (Sr)	ug/L	56	200	50	1591528
Leachable Thallium (Tl)	ug/L	ND	ND	1	1591528
Leachable Tin (Sn)	ug/L	ND	ND	20	1591528
Leachable Uranium (U)	ug/L	ND	ND	1	1591528
Leachable Vanadium (V)	ug/L	ND	ND	20	1591528
Leachable Zinc (Zn)	ug/L	14000	26000	50	1591528

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A890474
Report Date: 2008/08/28

Jacques Whitford Limited
Client Project #: 1042036.04/Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ICP/MS (LEACHATE)

Maxxam ID		AF1611	AF1612		
Sampling Date		2008/08/14	2008/08/14		
COC Number		B 59357	B 59357		
Registration #					
	Units	**BS38A (P#AC6555)**	**BS48A (P#AC6561)**	**RDL**	**QC Batch**
Metals					
Leachable Aluminum (Al)	ug/L	390	460	100	1591656
Leachable Antimony (Sb)	ug/L	ND	ND	20	1591656
Leachable Arsenic (As)	ug/L	ND	ND	20	1591656
Leachable Barium (Ba)	ug/L	1100	110	50	1591656
Leachable Beryllium (Be)	ug/L	ND	ND	20	1591656
Leachable Boron (B)	ug/L	ND	ND	500	1591656
Leachable Cadmium (Cd)	ug/L	5	ND	3	1591656
Leachable Chromium (Cr)	ug/L	ND	ND	20	1591656
Leachable Cobalt (Co)	ug/L	ND	ND	10	1591656
Leachable Copper (Cu)	ug/L	ND	ND	20	1591656
Leachable Iron (Fe)	ug/L	ND	ND	500	1591656
Leachable Lead (Pb)	ug/L	27000	42000	50	1591656
Leachable Lithium (Li)	ug/L	ND	ND	20	1591656
Leachable Manganese (Mn)	ug/L	210	170	20	1591656
Leachable Molybdenum (Mo)	ug/L	ND	ND	20	1591656
Leachable Nickel (Ni)	ug/L	ND	ND	20	1591656
Leachable Selenium (Se)	ug/L	ND	ND	20	1591656
Leachable Silver (Ag)	ug/L	ND	ND	5	1591656
Leachable Strontium (Sr)	ug/L	130	69	50	1591656
Leachable Thallium (Tl)	ug/L	ND	ND	1	1591656
Leachable Tin (Sn)	ug/L	ND	ND	20	1591656
Leachable Uranium (U)	ug/L	ND	ND	1	1591656
Leachable Vanadium (V)	ug/L	ND	ND	20	1591656
Leachable Zinc (Zn)	ug/L	5200	12000	50	1591656

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A890474
Report Date: 2008/08/28

Jacques Whitford Limited
Client Project #: 1042036.04/Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ELEMENTS BY ICP/MS (LEACHATE)

Maxxam ID		AF1613	AF1613		
Sampling Date		2008/08/14	2008/08/14		
COC Number		B 59357	B 59357		
Registration #					
	Units	**BS57A (P#AC6567)**	**BS57A (P#AC6567) Lab-Dup**	**RDL**	**QC Batch**
Metals					
Leachable Aluminum (Al)	ug/L	870	780	100	1591656
Leachable Antimony (Sb)	ug/L	21	ND	20	1591656
Leachable Arsenic (As)	ug/L	ND	ND	20	1591656
Leachable Barium (Ba)	ug/L	750	690	50	1591656
Leachable Beryllium (Be)	ug/L	ND	ND	20	1591656
Leachable Boron (B)	ug/L	ND	ND	500	1591656
Leachable Cadmium (Cd)	ug/L	6	6	3	1591656
Leachable Chromium (Cr)	ug/L	ND	ND	20	1591656
Leachable Cobalt (Co)	ug/L	ND	ND	10	1591656
Leachable Copper (Cu)	ug/L	ND	ND	20	1591656
Leachable Iron (Fe)	ug/L	810	830	500	1591656
Leachable Lead (Pb)	ug/L	4600	3300 (1)	5	1591656
Leachable Lithium (Li)	ug/L	ND	ND	20	1591656
Leachable Manganese (Mn)	ug/L	290	250	20	1591656
Leachable Molybdenum (Mo)	ug/L	ND	ND	20	1591656
Leachable Nickel (Ni)	ug/L	ND	ND	20	1591656
Leachable Selenium (Se)	ug/L	ND	ND	20	1591656
Leachable Silver (Ag)	ug/L	ND	ND	5	1591656
Leachable Strontium (Sr)	ug/L	190	190	50	1591656
Leachable Thallium (Tl)	ug/L	ND	ND	1	1591656
Leachable Tin (Sn)	ug/L	ND	ND	20	1591656
Leachable Uranium (U)	ug/L	ND	ND	1	1591656
Leachable Vanadium (V)	ug/L	ND	ND	20	1591656
Leachable Zinc (Zn)	ug/L	15000	14000	50	1591656

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Poor RPD due to sample inhomogeneity.

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Maxxam Job #: A890474
Report Date: 2008/08/28

Jacques Whitford Limited
Client Project #: 1042036.04/Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

RESULTS OF ANALYSES OF SOIL

Maxxam ID		AF1607	AF1609	AF1610		
Sampling Date		2008/08/14	2008/08/14	2008/08/14		
COC Number		B 59357	B 59357	B 59357		
Registration #						
	Units	**BS13A (P#AB7777)**	**BS30A (P#AC6550)**	**BS33A (P#AC6552)**	**RDL**	**QC Batch**
Inorganics						
Moisture	%	31			1	1587915
Sample Weight (as received)	g		50	50	N/A	1590520
Initial pH	N/A		6.6	7.2		1590517
Final pH	N/A		5.0	5.0		1590517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		AF1611	AF1612	AF1613		
Sampling Date		2008/08/14	2008/08/14	2008/08/14		
COC Number		B 59357	B 59357	B 59357		
Registration #						
	Units	**BS38A (P#AC6555)**	**BS48A (P#AC6561)**	**BS57A (P#AC6567)**	**RDL**	**QC Batch**
Inorganics						
Sample Weight (as received)	g	47	50	50	N/A	1590520
Initial pH	N/A	6.8	6.5	5.7		1590517
Final pH	N/A	4.9	4.9	4.9		1590517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A890474
Report Date: 2008/08/28

Jacques Whitford Limited
Client Project #: 1042036.04/Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

RESULTS OF ANALYSES OF SOIL

Maxxam ID		AF1613		
Sampling Date		2008/08/14		
COC Number		B 59357		
Registration #				
	Units	**BS57A (P#AC6567) Lab-Dup**	**RDL**	**QC Batch**
Inorganics				
Sample Weight (as received)	g	50	N/A	1590520
Initial pH	N/A	5.7		1590517
Final pH	N/A	4.9		1590517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A890474
Report Date: 2008/08/28

Jacques Whitford Limited
Client Project #: 1042036.04/Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		AF1607		
Sampling Date		2008/08/14		
COC Number		B 59357		
Registration #				
	Units	**BS13A (P#AB7777)**	**RDL**	**QC Batch**
Petroleum Hydrocarbons				
Benzene	mg/kg	ND	0.03	1587351
Toluene	mg/kg	ND	0.03	1587351
Ethylbenzene	mg/kg	ND	0.03	1587351
Xylene (Total)	mg/kg	ND	0.05	1587351
Aliphatic >C6-C8	mg/kg	ND (1)	0.7	1587351
Aliphatic >C8-C10	mg/kg	ND	0.4	1587351
>C8-C10 Aromatics (-EX)	mg/kg	ND	0.1	1587351
Aliphatic >C10-C12	mg/kg	ND	30	1597204
Aliphatic >C12-C16	mg/kg	180	56	1597204
Aliphatic >C16-C21	mg/kg	830	56	1597204
Aliphatic >C21-<C32	mg/kg	390	56	1597204
Aromatic >C10-C12	mg/kg	33	15	1597204
Aromatic >C12-C16	mg/kg	86	56	1597204
Aromatic >C16-C21	mg/kg	580	56	1597204
Aromatic >C21-<C32	mg/kg	550	56	1597204
Modified TPH (Tier 2)	mg/kg	2700	60	1588585
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	73		1597204
n-Dotriacontane - Extractable	%	101 (2)		1597204
Isobutylbenzene - Volatile	%	77		1587351

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Elevated VPH RDL(s) due to detected levels in the method blank.
(2) Weathered fuel oil fraction. Lube oil fraction.

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Maxxam Job #: A890474
Report Date: 2008/08/28

Jacques Whitford Limited
Client Project #: 1042036.04/Z9100
Project name: CAPE PINE
Your P.O. #: NSD016300

GENERAL COMMENTS

Sample AF1611-01: Method Deviation Comment: Reduced sample weight used for leachate procedure due to insufficient sample. All extraction ratios maintained. Minimal impact on sample data quality.

Results relate only to the items tested.

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Jacques Whitford Limited
Attention: Susan Barfoot
Client Project #: 1042036.04/Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report

Maxxam Job Number: DA890474

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1587351	HSR	Spiked Blank	Isobutylbenzene - Volatile	2008/08/15		102	%	60 - 140
			Benzene	2008/08/15		80	%	60 - 140
			Toluene	2008/08/15		84	%	60 - 140
			Ethylbenzene	2008/08/15		84	%	60 - 140
			Xylene (Total)	2008/08/15		83	%	60 - 140
		Method Blank	Isobutylbenzene - Volatile	2008/08/15		101	%	60 - 140
			Benzene	2008/08/15	ND, RDL=0.03		mg/kg	
			Toluene	2008/08/15	ND, RDL=0.03		mg/kg	
			Ethylbenzene	2008/08/15	ND, RDL=0.03		mg/kg	
			Xylene (Total)	2008/08/15	ND, RDL=0.05		mg/kg	
			Aliphatic >C6-C8	2008/08/15	0.7, RDL=0.1		mg/kg	
			Aliphatic >C8-C10	2008/08/15	ND, RDL=0.4		mg/kg	
			>C8-C10 Aromatics (-EX)	2008/08/15	ND, RDL=0.1		mg/kg	
1590520	AMC	RPD [AF1613-01]	Sample Weight (as received)	2008/08/19	0		%	N/A
1591528	DLB	Method Blank	Leachable Aluminum (Al)	2008/08/20	ND, RDL=100		ug/L	
			Leachable Antimony (Sb)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Arsenic (As)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Barium (Ba)	2008/08/20	ND, RDL=50		ug/L	
			Leachable Beryllium (Be)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Boron (B)	2008/08/20	ND, RDL=500		ug/L	
			Leachable Cadmium (Cd)	2008/08/20	ND, RDL=3		ug/L	
			Leachable Chromium (Cr)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Cobalt (Co)	2008/08/20	ND, RDL=10		ug/L	
			Leachable Copper (Cu)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Iron (Fe)	2008/08/20	ND, RDL=500		ug/L	
			Leachable Lead (Pb)	2008/08/20	ND, RDL=5		ug/L	
			Leachable Lithium (Li)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Manganese (Mn)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Molybdenum (Mo)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Nickel (Ni)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Selenium (Se)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Silver (Ag)	2008/08/20	ND, RDL=5		ug/L	
			Leachable Strontium (Sr)	2008/08/20	ND, RDL=50		ug/L	
			Leachable Thallium (Tl)	2008/08/20	ND, RDL=1		ug/L	
			Leachable Tin (Sn)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Uranium (U)	2008/08/20	ND, RDL=1		ug/L	
			Leachable Vanadium (V)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Zinc (Zn)	2008/08/20	ND, RDL=50		ug/L	
1591656	DLB	Method Blank	Leachable Aluminum (Al)	2008/08/20	ND, RDL=100		ug/L	
			Leachable Antimony (Sb)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Arsenic (As)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Barium (Ba)	2008/08/20	ND, RDL=50		ug/L	
			Leachable Beryllium (Be)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Boron (B)	2008/08/20	ND, RDL=500		ug/L	
			Leachable Cadmium (Cd)	2008/08/20	ND, RDL=3		ug/L	
			Leachable Chromium (Cr)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Cobalt (Co)	2008/08/20	ND, RDL=10		ug/L	
			Leachable Copper (Cu)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Iron (Fe)	2008/08/20	ND, RDL=500		ug/L	
			Leachable Lead (Pb)	2008/08/20	ND, RDL=5		ug/L	
			Leachable Lithium (Li)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Manganese (Mn)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Molybdenum (Mo)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Nickel (Ni)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Selenium (Se)	2008/08/20	ND, RDL=20		ug/L	

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Jacques Whitford Limited
Attention: Susan Barfoot
Client Project #: 1042036.04/Z9100
P.O. #: NSD016300
Project name: CAPE PINE

Quality Assurance Report (Continued)

Maxxam Job Number: DA890474

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1591656	DLB	Method Blank	Leachable Silver (Ag)	2008/08/20	ND, RDL=5		ug/L	
			Leachable Strontium (Sr)	2008/08/20	ND, RDL=50		ug/L	
			Leachable Thallium (Tl)	2008/08/20	ND, RDL=1		ug/L	
			Leachable Tin (Sn)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Uranium (U)	2008/08/20	ND, RDL=1		ug/L	
			Leachable Vanadium (V)	2008/08/20	ND, RDL=20		ug/L	
			Leachable Zinc (Zn)	2008/08/20	ND, RDL=50		ug/L	
		RPD [AF1613-00]	Leachable Aluminum (Al)	2008/08/20	10.5		%	25
			Leachable Antimony (Sb)	2008/08/20	NC		%	25
			Leachable Arsenic (As)	2008/08/20	NC		%	25
			Leachable Barium (Ba)	2008/08/20	7.7		%	25
			Leachable Beryllium (Be)	2008/08/20	NC		%	25
			Leachable Boron (B)	2008/08/20	NC		%	25
			Leachable Cadmium (Cd)	2008/08/20	NC		%	25
			Leachable Chromium (Cr)	2008/08/20	NC		%	25
			Leachable Cobalt (Co)	2008/08/20	NC		%	25
			Leachable Copper (Cu)	2008/08/20	NC		%	25
			Leachable Iron (Fe)	2008/08/20	NC		%	25
			Leachable Lead (Pb)	2008/08/20	32.5 (1)		%	25
			Leachable Lithium (Li)	2008/08/20	NC		%	25
			Leachable Manganese (Mn)	2008/08/20	14.2		%	25
			Leachable Molybdenum (Mo)	2008/08/20	NC		%	25
			Leachable Nickel (Ni)	2008/08/20	NC		%	25
			Leachable Selenium (Se)	2008/08/20	NC		%	25
			Leachable Silver (Ag)	2008/08/20	NC		%	25
			Leachable Strontium (Sr)	2008/08/20	NC		%	25
			Leachable Thallium (Tl)	2008/08/20	NC		%	25
			Leachable Tin (Sn)	2008/08/20	NC		%	25
			Leachable Uranium (U)	2008/08/20	NC		%	25
			Leachable Vanadium (V)	2008/08/20	NC		%	25
			Leachable Zinc (Zn)	2008/08/20	9.5		%	25
1597204	AON	Method Blank	Isobutylbenzene - Extractable	2008/08/27		80	%	30 - 130
			n-Dotriacontane - Extractable	2008/08/27		112	%	30 - 130
			Aliphatic >C10-C12	2008/08/27	ND, RDL=8.0		mg/kg	
			Aliphatic >C12-C16	2008/08/27	ND, RDL=15		mg/kg	
			Aliphatic >C16-C21	2008/08/27	ND, RDL=15		mg/kg	
			Aliphatic >C21-<C32	2008/08/27	ND, RDL=15		mg/kg	
			Aromatic >C10-C12	2008/08/27	8.1, RDL=4.0 (2)		mg/kg	
			Aromatic >C12-C16	2008/08/27	ND, RDL=15		mg/kg	
			Aromatic >C16-C21	2008/08/27	18, RDL=15		mg/kg	
			Aromatic >C21-<C32	2008/08/27	51, RDL=15		mg/kg	

ND = Not detected
N/A = Not Applicable
NC = Non-calculable
RPD = Relative Percent Difference
SPIKE = Fortified sample
(1) Poor RPD due to sample inhomogeneity.
(2) Elevated TEH RDL(s) due to detected levels in the method blank.

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APPENDIX F

ProUCL Output

General UCL Statistics for Full Data Sets

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Number of Valid Observations	95	Number of Distinct Observations	73

Raw Statistics		**Log-transformed Statistics**	
Minimum	3.8	Minimum of Log Data	1.335
Maximum	12000	Maximum of Log Data	9.393
Mean	1152	Mean of log Data	5.823
Median	430	SD of log Data	1.877
SD	2022		
Coefficient of Variation	1.755		
Skewness	3.819		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	0.285	Lilliefors Test Statistic	0.0847
Lilliefors Critical Value	0.0909	Lilliefors Critical Value	0.0909
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1497	95% H-UCL	3691
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	4274
95% Adjusted-CLT UCL (Chen-1995)	1580	97.5% Chebyshev (MVUE) UCL	5313
95% Modified-t UCL (Johnson-1978)	1510	99% Chebyshev (MVUE) UCL	7352

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.506	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	2275		
MLE of Mean	1152		
MLE of Standard Deviation	1619		
nu star	96.2		
Approximate Chi Square Value (.05)	74.58	Nonparametric Statistics	
Adjusted Level of Significance	0.0475	95% CLT UCL	1493
Adjusted Chi Square Value	74.28	95% Jackknife UCL	1497
		95% Standard Bootstrap UCL	1497
Anderson-Darling Test Statistic	0.559	95% Bootstrap-t UCL	1698
Anderson-Darling 5% Critical Value	0.817	95% Hall's Bootstrap UCL	1682
Kolmogorov-Smirnov Test Statistic	0.0586	95% Percentile Bootstrap UCL	1495
Kolmogorov-Smirnov 5% Critical Value	0.097	95% BCA Bootstrap UCL	1604
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2056
		97.5% Chebyshev(Mean, Sd) UCL	2448
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3216
95% Approximate Gamma UCL	1486		
95% Adjusted Gamma UCL	1492		

Potential UCL to Use	**Use 95% Approximate Gamma UCL**	**1486**

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). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Pb

General Statistics

Number of Valid Observations	72	Number of Distinct Observations	59
Number of Missing Values	1		

Raw Statistics		Log-transformed Statistics	
Minimum	4	Minimum of Log Data	1.386
Maximum	2600	Maximum of Log Data	7.863
Mean	472	Mean of log Data	5.245
Geometric Mean	189.7	SD of log Data	1.683
Median	275		
SD	548.4		
Std. Error of Mean	64.62		
Coefficient of Variation	1.162		
Skewness	1.771		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.197	Lilliefors Test Statistic	0.125
Lilliefors Critical Value	0.104	Lilliefors Critical Value	0.104
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	579.7	95% H-UCL	1428
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1670
95% Adjusted-CLT UCL (Chen-1995)	592.7	97.5% Chebyshev (MVUE) UCL	2069
95% Modified-t UCL (Johnson-1978)	581.9	99% Chebyshev (MVUE) UCL	2852

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.649	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	727.3		
MLE of Mean	472		
MLE of Standard Deviation	585.9		
nu star	93.44		
Approximate Chi Square Value (.05)	72.15	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0467	95% CLT UCL	578.3
Adjusted Chi Square Value	71.76	95% Jackknife UCL	579.7
		95% Standard Bootstrap UCL	574.6
Anderson-Darling Test Statistic	0.259	95% Bootstrap-t UCL	596.9
Anderson-Darling 5% Critical Value	0.801	95% Hall's Bootstrap UCL	593
Kolmogorov-Smimov Test Statistic	0.0582	95% Percentile Bootstrap UCL	579.5
Kolmogorov-Smirnov 5% Critical Value	0.11	95% BCA Bootstrap UCL	588.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	753.6
		97.5% Chebyshev(Mean, Sd) UCL	875.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1115
95% Approximate Gamma UCL (Use when n >= 40)	611.2		
95% Adjusted Gamma UCL (Use when n < 40)	614.5		

Potential UCL to Use — Use 95% Approximate Gamma UCL 611.2

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). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Pb

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics		Log-transformed Statistics	
Minimum	51	Minimum of Log Data	3.932
Maximum	920	Maximum of Log Data	6.824
Mean	373.4	Mean of log Data	5.662
Geometric Mean	287.8	SD of log Data	0.828
Median	280		
SD	274.9		
Std. Error of Mean	91.65		
Coefficient of Variation	0.736		
Skewness	1.271		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.848	Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	543.9	95% H-UCL	940.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	866.9
95% Adjusted-CLT UCL (Chen-1995)	565.7	97.5% Chebyshev (MVUE) UCL	1074
95% Modified-t UCL (Johnson-1978)	550.3	99% Chebyshev (MVUE) UCL	1482

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.454	Data appear Normal at 5% Significance Level	
Theta Star	256.8		
MLE of Mean	373.4		
MLE of Standard Deviation	309.7		
nu star	26.18		
Approximate Chi Square Value (.05)	15.52	Nonparametric Statistics	
Adjusted Level of Significance	0.0231	95% CLT UCL	524.2
Adjusted Chi Square Value	13.81	95% Jackknife UCL	543.9
		95% Standard Bootstrap UCL	515.2
Anderson-Darling Test Statistic	0.4	95% Bootstrap-t UCL	776.5
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	1776
Kolmogorov-Smirnov Test Statistic	0.19	95% Percentile Bootstrap UCL	524.6
Kolmogorov-Smirnov 5% Critical Value	0.282	95% BCA Bootstrap UCL	547.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	772.9
		97.5% Chebyshev(Mean, Sd) UCL	945.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1285
95% Approximate Gamma UCL (Use when n >= 40)	630		
95% Adjusted Gamma UCL (Use when n < 40)	707.7		

Potential UCL to Use

Use 95% Student's-t UCL 543.9

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). For additional insight, the user may want to consult a statistician.

APPENDIX G

Remedial Options Evaluation Spreadsheet

Qualitative Remedial Options Evaluation
Site: DFO Light Station, Cape Pine, NL (DFRP# 34599)
PWGSC
Date: March 31, 2013

Remedial Objective: Remediate areas of soil containing the highest concentrations of lead, thereby lowering the site EPC to 612 mg/kg, which is below the SSTL of 622 mg/kg. Therefore, unacceptable risks to a residential visitor (toddler) at the site from dermal contact/ingestion of surface soil will no longer be expected.

Remedial Approach	Application	Advantages	Disadvantages	Time Frame	Costs	Other Considerations/Comments	Ranking
Excavation and Off-Site Disposal	Excavate lead impacted soil, transport and dispose off-site. Non-leachable soil will be disposed of at a municipal landfill, upon approval from landfill operator and Service NL. Leachable soil will be disposed of at an approved soil treatment facility (*i.e.*, UESI in Sunnyside, NL). The remedial excavation would then be backfilled with clean, imported fill and topped with topsoil and sod.	This option would remove areas containing the highest concentrations of lead impacted soil from the site, eliminating all potential risks identified with respect to lead impacted soil for current and future land uses. This is a relatively straight forward process that involves the use of typical and readily available heavy equipment such as excavators, backhoes and tandem dump trucks.	There are currently no operational landfills located near the site. The closest operational landfill is located in St. John's, NL. Permission may be granted from Service NL to dispose of soil in a recently closed landfill in Trepassey, NL. If soil has to be trucked to St. John's, this could have significant implications on costs and timelines.	3 + weeks	Moderate	Non-leachable soil might have to be disposed of at a landfill in St. John's, nearly 200 km away from the site. Service NL might give permission to dispose soil at a closer decommissioned landfill in Trepassey (soil to be used as cover material). Leachable soil will have to be disposed of at a soil treatment facility, located in Sunnyside, NL. Backfill will have to be obtained from an off-site source. Confirmatory soil samples will have to be collected from boundaries of remedial excavation. Site is located at the end of an 8 km gravel road that could be damaged by dump truck traffic.	1
Soil Washing	Mobilize a mobile soil washing unit, available from CleanEarth Technologies in Enbridge, NS to the site. The mobile unit would essentially "wash" the soil, reducing the lead content and making it suitable (*i.e.*, lead concentration less than SSTL) to reuse as backfill.	Very little soil removal/disposal will be required (*i.e.*, approximately 10%) as all soil treatment is done on site. Very little backfill required.	Procurement of the mobile unit is based on a first come, first served basis and it may not be available when desired. Mobilization costs could be high. This method is somewhat complex and would require a pilot test to be completed prior to the application of the technology to determine the effectiveness of the treatment process and the need for modifications to the soil washing unit. Additionally, weather is a limiting factor as temperatures must be over 10 ˚C.	2 weeks on-site for setup and treatment and estimated 2 days for washing	High	Mobile soil washing equipment is available on a first come, first served basis, meaning that the equipment may not be available when required. Level of efficacy is dependant mainly on grain size of soil particles. Prior to initiating site remediation, necessary provincial permitting (certificate of approval from NLDEC) would be required. The timeline for such approval is unknown and could vary from weeks to as many as four months.	4
Limited Soil Excavation and Capping	Excavate and remove areas of impacted soil containing the highest concentrations of lead from the site that cannot be capped due to close proximity to on-site structures and cap select impacted areas of non-leachable lead impacted soil (*i.e.*, areas of the site containing high concentrations of lead) with a layer such as clay, asphalt or soil.	Eliminates exposure pathway (*i.e.*, dermal contact) with contaminated soil. Limited leachable material excavated and removed, therefore reducing costs. Less damage to existing environment and fewer trucks would be used.	Leachable and non-leachable lead impacts in soil are still present on site. Will require further monitoring to ensure the capping material remains in adequate condition.	3 weeks	Low	Approval regarding minimum capping depth would be required from Service NL prior to beginning site work. The presence of capping material will change the appearance of the site and will be difficult to blend in with the surroundings. Regular monitoring of the capping would be required, and maintenance requirements may arise in the future. Leaving impacts on the site could potentially hinder any future development or divestiture of the site.	2
Limited Soil Excavation and Fencing	Excavate and remove lead impacted soil in exceedance on the SSTL of the west residential property, excavate and remove areas of impacted soil containing the highest concentrations of lead from the east residential property, and fence the areas of the DFO site in exceedance of the SSTL.	Eliminates exposure pathway (*i.e.*, dermal contact) with contaminated soil. Limited leachable soil excavation and removal, therefore reducing costs. Not as time consuming. Less damage to existing environment and fewer trucks would be used. Fencing is relatively inexpensive and easy to install. Easy to inspect.	Hazards are still present in soil on the DFO site. Unreliable over the long term. Susceptible to intrusion/trespassing as the level of protection depends on the public adhering to the signage. Public notices are often ineffective and unreliable and have a tendency to attract attention.	2 + weeks	Moderate	Fencing portions of the site will change the appearance, and may not be esthetically pleasing as it would not blend with the surroundings. Due to the exposure to high winds at the site, regular monitoring and maintenance of the fencing would be required to ensure it stays in adequate condition (*i.e.*, upright and provides the intended physical barrier). In addition, it is recommended to secure fence posts into the ground by a minimum of 1.0 m, therefore depending on the depth to bedrock (which undulates across the site) this might not be attainable. Leaving impacts on the site could potentially hinder any future development or divestiture of the site.	3