February 23, 2013

HYDROGEOLOGICAL ASSESSMENT

Stewart Crossing
Solid Waste Disposal Facility

Submitted to:
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REPORT

Report Number: 1114360073-512-R-Rev0-2700

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Executive Summary

Golder Associates Ltd. ("Golder") was retained by the Government of Yukon Community Services Infrastructure Branch on September 28, 2011 to complete a groundwater monitoring well network installation and hydrogeological assessment program at up to 20 solid waste facilities located across the Territory. The Stewart Crossing Solid Waste Disposal Facility (the "Facility" or "Site") is one of the facilities included in the program. A multiphase approach was implemented at each Facility in order to carry out the hydrogeological assessment. The first phase completed for the program was a review of Site-specific requirements and considerations. The second phase was the preparation of a work plan and schedule. The third phase was the development and presentation of a Background Research and Facility Site Assessment Plan. The fourth phase consisted of the drill program tender specification and tender process management. The fifth phase consisted of the installation of a monitoring well network and collection of data on water levels, water quality, and aquifer parameters. The sixth and final phase resulted in a draft of this Hydrogeological Assessment Report, documenting the results of the investigation.

In summary, the information obtained during the Hydrogeological Assessment indicated the following:

- Site Description: The Stewart Crossing Solid Waste Disposal Facility is located in the central portion of Yukon, within the Yukon Plateau (North) Ecological Region, and in the Na Cho Nyak Dun and Selkirk First Nations' traditional territory, at latitude 63º 20' north, and longitude 138º 53' west. The Facility is located on a 6.35 hectare Reserve Parcel to the Government of Yukon (Parcel ID Number 115P07-0000-00020). It is accessed off the west side of the Klondike Highway at kilometre 535, approximately 250 km north of Whitehorse, and 4.6 kilometres south of Stewart Crossing. The Facility serves as a domestic solid waste disposal facility for approximately 35 residents from the community of Stewart Crossing and Selkirk First Nation residents. The Facility accepts residential, commercial, industrial, and demolition wastes. Hazardous waste such as batteries, waste oils, and tires are stored in waste segregation areas on-Site and removed annually or when volumes warrant. Domestic waste is burned to reduce volume prior to burial at the Site. In a territory-wide attempt to phase out burning at solid waste facilities, it is anticipated that by June 2012, domestic waste will be collected on-Site and transferred to Mayo. No evidence of spills or discharges was observed during the Site reconnaissance.
- Site Topography: The Facility is at an elevation of approximately 550 m (1,800 feet) above sea level and lies within the Crooked Creek and Stewart River watersheds. A cleared area of approximately 32,000 square meters, which slopes gently to the north, is present at the Facility. Local surficial geology is mapped as gently rolling blanket till deposits, consisting of mixed rock fragments, silt, clay, and sand.
- Stratigraphy and Hydrogeology:
  - Subsurface conditions were investigated with the installation of three monitoring wells, including SX-MW12-01, SX-MW12-02, and SX-MW12-03, which were completed on July 19, 2012, under the supervision of Golder Associates for the establishment of a monitoring well network at the Site;
  - The Site stratigraphy, based on the depth drilled, consists of 0.3 m to 2.0 m of sand overlying bedrock, drilled to a maximum depth of 31.4 metres below grade (m bg);

- Water was encountered in fractured bedrock during the drilling and installation of three monitoring wells at a depth of between 23.2 and 31.4 m bg;
- A series of hydraulic response tests were performed at the Site. The results of these tests indicate the hydraulic conductivity of the bedrock underlying the Site ranges from 1 x 10^{-4} m/s to 6 x 10^{-6} m/s. These values are considered reasonable for fractured bedrock;
- The horizontal hydraulic gradient at the Site was determined, using monitoring well water level data, to be approximately 0.05 m/m, sloping to the north;
- Average linear groundwater seepage velocity in the surficial aquifer is estimated to range between 1 x 10^{-4} m/s and 5 x 10^{-7} m/s (approximately 0.04 to 9 metres per day); and
- Based on the groundwater flow direction determined from the initial groundwater monitoring event, SX-MW12-01 and SX-MW12-02 are both located downgradient of waste disposal areas at the Site and BU-MW12-03 is located upgradient of the Site; Therefore, the requirement of a minimum two downgradient wells has been met.

- Groundwater Chemistry:
  - The results of a desktop study and several Site visits indicate that the Yukon Contaminated Sites Regulation (CSR) standards for freshwater aquatic life are applicable to the Site;
  - Groundwater samples were collected from monitoring wells SX-MW12-01, SX-MW12-02, and SX-MW12-03, and a surface water sample was collected from the Stewart River located approximately 5 km north of the Facility, during one sampling event on September 10 and 12, 2012; and
  - Results of groundwater quality analysis on samples taken from monitoring wells at the Site indicated that landfill leachate was influencing groundwater quality in SX-MW12-01 and SX-MW12-02. The level of chloride in samples taken from SX-MW12-01 and SX-MW12-02 was above the range normally associated with naturally occurring groundwater and the concentration of cadmium and cobalt exceeded CSR criteria for freshwater aquatic life in the sample collect at SX-MW12-01.

The following recommendations are made, based on the results of the 2012 hydrogeological assessment presented in this report and a moderate level of concern with potential impact of landfill leachate on groundwater quality:

- As required by the Facility's Waste Management Permit, future groundwater monitoring should be conducted twice a year (spring and late summer);
- Monitoring well location, elevation for ground surface, and the elevation of the top of the PVC standpipe (measuring point) should be surveyed for each well by a professional land surveyor prior to the next monitoring event;
- Groundwater quality at the Facility should be revaluated following two rounds of groundwater monitoring to determine if there are any potential impacts present from landfill leachate; and
- Particular attention should be given to the analytes exceeding Yukon CSR standards, and an effort should be made to identify sources of groundwater contamination.

Study Limitations

This report was prepared for the Government of Yukon, Community Services Infrastructure Development Branch.

The inferences concerning the Stewart Crossing Solid Waste Disposal Facility contained in this report are based on information obtained during the assessment conducted by Golder personnel, and are based solely on the condition of the property at the time of the Site reconnaissance, installation of monitoring wells, and groundwater monitoring events, supplemented by historical and interview information obtained by Golder, as described in this report.

This report was prepared, based in part, on information obtained from historic information sources. In evaluating the subject Site, Golder has relied in good faith on information provided. We accept no responsibility for deficiency or inaccuracy contained in this report as a result of our reliance on the aforementioned information.

The findings and conclusions documented in this report have been prepared for the specific application to this project, and have been developed in a manner consistent with that level of care normally exercised by environmental professionals currently practicing under similar conditions in the jurisdiction.

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

With respect to regulatory compliance issues, regulatory statutes are subject to interpretation. These interpretations may change over time, and should be reviewed.

If new information is discovered during future work, Golder should be requested to re-evaluate the conclusions of this report and to provide amendments, as required, prior to any reliance upon the information presented herein.

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1.0 INTRODUCTION

1.1 Background

Golder Associates Ltd. ("Golder") was retained by the Government of Yukon Community Services Infrastructure Branch on September 28, 2011 to complete a groundwater monitoring well network installation and hydrogeological assessment program at up to 20 solid waste facilities located across the Territory. The Stewart Crossing Solid Waste Disposal Facility (the "Facility" or the "Site") is one of the sites included in the program. This report presents the findings of our investigation.

These works have been performed in accordance with the approved scope of work detailed in Golder's proposal (P1-1436-0073) dated August 29, 2011, accepted by Yukon Government Community Services on October 7, 2011, and additional works detailed in our letter dated April 26, 2012 and accepted April 30, 2012.

1.2 Purpose and Objectives

A phased approach is typically implemented in order to develop a Site-specific groundwater monitoring program. The following objectives are included in the development of the program:

- Develop a conceptual hydrogeological model of the Site using existing data that identifies potential contaminant source(s), pathways, and receptors;
- Visit the Site to confirm the hydrogeological model, assess Site conditions, and identify monitoring well locations;
- Design a monitoring well network and drilling program;
- Install groundwater monitoring wells in accordance with the plan;
- Sample the groundwater and, if applicable, surface water;
- Analyze the data and identify potential impacts;
- With the new data, re-evaluate the conceptual hydrogeological model and groundwater monitoring program; and
- Provide recommendations, if needed, to further assess potential impacts to groundwater quality.

1.3 Scope and Sequence of Work

The following scope of work was proposed to develop the conceptual hydrogeological model for the Site and installation of a monitoring well network. This work was performed in accordance with the Waste Management Permit (Permit No. 80-009 effective June 17, 2010 to December 31, 2011), relevant Environment Yukon Protocols, and in accordance with the Yukon Environmental and Socioeconomic Assessment Act (YESAA) Decision Document issued for the Site (Document Number 2011-0284-025-1).

In summary, the work completed at the Facility included the following six phases:

- Phase 1 assessed the needs for special considerations at the Site;
- Phase 2 outlined a work plan and schedule;
- Phase 3 consisted of background research;
- Phase 4 consisted of the drill program tender specification and tender process management;
- Phase 5 consisted of the installation of a monitoring well network and collection of data on water levels, water quality, and aquifer parameters; and
- Phase 6 comprised the preparation of a draft of this Hydrogeological Assessment Report, documenting the results of this investigation.

1.4 Qualifications of Assessors

Project Manager

The role of Project Manager was filled by Gary Hamilton, P.Geo., of Golder's Burnaby, BC office. Mr. Hamilton is a senior contaminant Hydrogeologist and Principal with Golder Associates. He has over 25 years of experience, has completed landfill monitoring projects locally, and is very familiar with Yukon environmental regulations. Mr. Hamilton conducted the initial Site inspections, coordinated the drilling work and reviewed this assessment report.

Project Director

The role of Project Director was filled by Guy Patrick, P.Eng., of Golder's Victoria, BC office. Mr. Patrick is a senior Hydrogeologist and a Principal with Golder Associates. He is a Professional Engineer registered with the Association of Professional Engineers of the Yukon Territory. Mr. Patrick has over 30 years of experience in the field of environmental and hydrogeological assessments.

Field Hydrogeologist-Engineer

The role of Project Hydrogeologist was filled by Calvin Beebe of Golder's Nelson, BC office. Mr. Beebe has an M.Sc. degree in Hydrogeology from Saint Francis Xavier University (2012). He has completed numerous projects as a Hydrogeologist with Golder Associates including work on contaminated sites, and works with senior personnel on a regular basis.

Mr. Beebe was assisted by Ms. Andrea Badger, who joined Golder in May 2012. She obtained a B.Sc. in Civil Engineering with an Environmental Option, from the University of Alberta, Edmonton (2012) and a Diploma of Northern Studies, and Outdoor and Environmental Studies at Yukon College, Whitehorse (2007). She has been involved with monitoring well drilling, development, testing and sampling at landfills across the Yukon since beginning work at Golder. She has also been involved with surface water monitoring at a construction site in Northern British Columbia.

1.5 Authorization

Written authorization and a signed contract to proceed with the work outlined in our proposal dated August 29, 2011 was received by Ms. Laura Prentice, Program Manager, on October 7, 2011. Golder received e-mail authorization to proceed with additional work detailed in out letter dated April 26, 2012 on April 30, 2012. The Change Order for the work was attached to the e-mail message.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Location

The Stewart Crossing Solid Waste Disposal Facility is located in the central portion of Yukon, within the Na Cho Nyak Dun and Selkirk First Nations' traditional territory, at latitude 63º 20' north, and longitude 138º 53' west. The Facility is located on a 6.35 hectare Reserve Parcel to the Government of Yukon (Parcel ID. No.115P07-0000-00020). It is accessed off the west side of the Klondike Highway at kilometre 535, approximately 250 km north of Whitehorse, and 4.6 kilometres south of Stewart Crossing (Figure 1).

2.2 Site History

The Facility serves as a domestic solid waste disposal facility for approximately 35 residents from the community of Stewart Crossing and the Selkirk First Nation. The Facility accepts residential, commercial, industrial, and demolition wastes. Hazardous waste such as batteries, waste oils, and tires are stored in waste segregation areas on-Site and removed annually or when volumes warrant. Domestic waste is burned to reduce volume prior to burial at the Site. As of anticipated date of June 2012, domestic waste will be transferred to the Mayo SWDF. No evidence of spills or discharges was observed during the Site reconnaissance.

3.0 METHODOLOGY

3.1 Preliminary Hydrogeological Assessment

The preliminary hydrogeological assessment involved a desktop review and interpretation of existing information, and an inspection of the Facility. The initial inspection of the Facility was conducted on October 19, 2011, and a follow up inspection was conducted on July 19, 2012. The purpose of the preliminary hydrogeological assessment was to identify the appropriate drilling methods, equipment, and potential well locations for the installation of a monitoring well network. This portion of the work included the following three tasks:

- Compilation and review of available information;
- Assessment and interpretation of available hydrogeological data; and
- Development of a conceptual hydrogeological model.

3.1.1 Data Sources

Data used to complete the hydrogeological assessment was obtained from the following sources:

- Access Consulting Group and G. J. Bull and Associates Inc., *Solid Waste Management Plan: Stewart Crossing*, Prepared for Yukon Community Services, Community Development Branch. 2003.
- Bouwer, H. and R.C. Rice, 1976. *A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells*, Water Resources Research, vol. 12, no. 3, pp. 423-428.
- Environment Canada, Meteorological Service of Canada Last Modified 2012-05-29, Website: *http://www.climate.weatheroffice.ec.gc.ca/climate_normals/Canadian Climate Normals or Averages 1971-2000*.
- Fetter, C. W., *Applied Hydrogeology*, Third Edition, PRENTICE HALL, New Jersey. 1994.
- Government of Yukon. Environment Act Contaminated Sites Regulation. O.I.C. 2002/171, *Schedule 3 - Generic Numerical Water Standards.*
- Government of Yukon, Yukon Community Services, Community Services Infrastructure Branch, *Solid Waste Operation Plan: Stewart Crossing*, 2011.
- Government of Yukon, Yukon Environment, *Protocol for the Contaminated Sites Regulation Under the Environment Act*. 2011.
- Government of Yukon, Yukon Geological Survey, YGS MapMaker Online Website: http://maps.gov.yk.ca/imf.jsp?site=YGS
- Government of Yukon, Yukon Mining and Lands Viewer Website: http://maps.gov.yk.ca/imf.jsp?site=miningLands
- Government of Yukon, Yukon Water, Water Data Catalogue Website: http://yukonwater.ca/MonitoringYukonWater/WaterDataCatalogue/
- Government of Yukon, Department of Environment, Compiled from The Yukon Water Well Registry *Summary of Yukon Water Wells*, May 11, 2006- Website: http://www.env.gov.yk.ca/monitoringenvironment/hydrology.php
- Natural Resources Canada, Groundwater Information Network Website: http://ngwd-bdnes.cits.nrcan.gc.ca/service/api_ngwds:gin/en/wmc/aquifermap.html
- Hughes, O. L., 1983. *Surficial Geology and Geomorphology, Stewart Crossing, Yukon Territory*, Geological Survey of Canada, Unpublished.
- Site inspections of October 19, 2011 and July 19, 2012.
- Surveys and Mapping Branch, Department of Energy, Mines, and Resources. The Atlas of Canada Website: *http://atlas.nrcan.gc.ca/site/english/maps/topo/map* Map 115 P/7, scale 1:50,000.

3.1.2 Site Inspections

Prior to the Facility reconnaissance, Golder developed a Facility-specific health and safety plan (HASP) for implementation during the field work. The health and safety plan included a description of the potential hazards that could be encountered during the Facility reconnaissance and proposed mitigation. Site inspections were conducted on October 19, 2011 and July 19, 2012. The initial Site visit was conducted to review the layout of the Facility and confirm geological and topographic information obtained from the review of background data. Proposed monitoring well locations were also reviewed for access constraints. During the second Site visit, the monitoring wells were drilled and installed. Selected photographs of the Facility were taken during the reconnaissance and are presented in Appendix A.

3.1.3 Background Geological Information Sources

Geological information was obtained through a review of topographic and geological maps from the Department of Energy Mines and Resources Canada, and through the Canadian Geological Survey. Additional data on the subsurface of the surrounding area was obtained through the online Groundwater Information Network (GIN), provided by Natural Resources Canada (NRCAN), and the Yukon Water Well Registry. A search of the Yukon Water online Data Catalogue did not identify water testing results within the vicinity of the Facility.

3.1.4 Contaminated Sites Registry

A Site Registry search was conducted by Yukon Environment on December 1, 2011. The search identified no contaminated site files or spill reports for the Stewart Crossing Solid Waste Disposal Facility; however, it was noted that the Facility does not have any analytical results in the file to compare against Yukon Contaminated Site Regulation (CSR) standards to determine if any contamination exists. It was also noted that the Facility was largely unmonitored, and that there may have been opportunity for improper disposal and potentially unreported spillage of contaminants during its operation.

3.1.5 Review of Solid Waste Disposal Facility Permit and Waste Management Plan

Waste Management Permit No. 80-009 was issued on June 17, 2010 for the Facility. It states that the Facility is to be operated in compliance with any applicable requirements in federal, territorial, and municipal legislation including the Environment Act and Solid Waste Regulations.

Monitoring requirements set out in Waste Management Permit 80-009 include:

- Monitoring water levels and collecting water samples from groundwater monitoring wells at the Facility twice a year (spring and late summer);
- Sampling of downgradient surface water bodies concurrently with the groundwater sampling;
- Analyze surface water and groundwater samples for the parameters outlined in Section 3.3;

- Analyze water samples at a laboratory that is accredited as conforming to ISO/IEC 17025 by an accrediting body that conforms to ISO/IEC 17011 standards; and
- Submitting monitoring results to Environment Yukon by January 31 each year.

A summary of the Facility permits and groundwater monitoring requirements for the Site are summarized in Table 1 below.

Table 1: Summary of Waste Disposal Facility Permits and Groundwater Monitoring Requirements

Site	Site Disposal Facility Permit Number	Permit Type	Solid Waste Management Plan	Required Groundwater Monitoring
Stewart Crossing Solid Waste Disposal Facility	80-009	Landfill	Community Services Operations and Programs (2011)	Twice Per Year

3.1.6 Review of Environment Yukon Information

Golder reviewed documents pertaining to the Stewart Crossing Facility on the Yukon Environment and Socioeconomic Board (YESAB) online registry on November 25, 2012. Documents reviewed included: the most current waste facility permit issued for the Facility, the most current Solid Waste Operation Plan, and the Yukon Environmental and Socioeconomic Act Decision Document.

3.2 Field Investigations

3.2.1 Scope of Field Investigations

The scope of the field investigations included the following:

- Three (3) on-Site monitoring wells were completed by Midnight Sun Drilling under the supervision of Golder Associates on July 19, 2012;
- Monitoring wells were developed and sampled by Golder on September 10 and 12, 2012. The water level at each well was measured prior to purging and sampling, and physiochemical parameters were monitored at each well during development and sampling. Groundwater samples were sent to ALS Environmental Laboratory in Whitehorse, YT;
- Slug tests were carried out on monitoring wells SX-MW12-02 and SX-MW12-03 to assess horizontal hydraulic conductivity and linear groundwater velocity at the Site; and
- Results of field and laboratory data are summarized and interpreted in this report.

3.2.2 Groundwater Monitoring Well Network

Groundwater monitoring well installation was undertaken in general accordance with Yukon CSR Protocol (Yukon Environment, 2011).

Three groundwater monitoring wells were proposed for installation at the Site to characterize groundwater conditions underlying the waste disposal Facility. A Site plan showing the monitoring well locations and key Site features is provided in Figure 2. SX-MW12-03 was intended to characterize upgradient groundwater conditions, while SX-MW12-01 and SX-MW12-02 were intended to assess groundwater conditions downgradient of the landfill. Locations of the monitoring wells (Figure 2) were selected based on aerial photography, review of Site history, Site topography, suspected groundwater flow direction, and a Site inspection.

Specifics for each well are listed below:

- SX-MW12-01 was installed in the northeast corner of the Site, and advanced to a depth of 31.4 m below grade (bg);
- SX-MW12-02 was installed in the northwest corner of the Site, and advanced to a depth of 31.4 m bg; and
- SX-MW12-03 was installed on the south edge of the Site, and advanced to a depth of 27.4 m bg.

Wells were installed using a Driltech Marlin 5 truck-mounted air rotary drill rig.

Grab samples of drill cuttings were taken at regular intervals to log the stratigraphy encountered in each borehole. Borehole logs, documenting observed stratigraphy, along with well construction details, are provided in Appendix B. A summary of the stratigraphy and well construction details is provided in Table 2.

Each monitoring well was completed with the top of the well screen installed as close as possible to the interval where the moisture content of the formation appeared to be transitioning from unsaturated to saturated conditions.

Installation details are included on the borehole logs in Appendix B. Typical completion details are:

- Monitoring wells were completed with 50 mm, flush threaded Schedule 40 PVC casing;
- A 3 m long, PVC, factory-slotted well screen (10-slot) was installed in SX-MW12-01 and SX-MW12-02;
- SX-MW12-03 was fitted with a 6 m long, PVC, factory-slotted well screen (10-slot) ;
- PVC casing was installed above the well screen to between 0.5 and 0.95 m above grade;
- A silica sand filter pack was used to fill the annulus between the PVC well screen and the borehole wall. The sand pack was extended approximately 1 m above the top of the screened interval;
- A bentonite chip seal, approximately 1 m thick, was placed directly above the sand pack. The remainder of the annulus was filled with bentonite grout;
- Each well was covered with a PVC end-cap and a lockable steel protective casing was installed to protect the wellhead; and
- All wells were developed by removing a minimum of three well volumes using dedicated Waterra™ tubing and a Hydrolift™ pump or hand bailer. Development logs are provided in Appendix C.

Table 2: Well Construction Details

Well ID	Drilled Depth (m bg)	Aquifer Unit Monitored	Casing Diameter (mm)	Screened Interval (m bg)	Filter Pack Interval (m bg)
SX-MW12-01	31.4	Bedrock	50	28.4 – 31.4	27.7 – 31.4
SX-MW12-02	31.4	Bedrock	50	28.4 – 31.4	27.1 – 31.4
SX-MW12-03	27.4	Bedrock	50	21.3 – 27.4	19.5 – 27.4

3.2.3 Monitoring Well Surveying

Golder carried out a level survey to determine the vertical elevation to the top of the PVC wellhead (measuring point) for each well on July 19, 2012. For the purposes of the level survey, the initial elevation was surveyed relative to the top of PVC pipe at SX-MW12-02, which was estimated, using topographic data, to be 551.95 masl. Relative elevation between wells, as determined from the level survey, has a precision of ±1 cm. Table 3 presents a summary of survey data and water level measurements (recorded on August 10, 2012).

Table 3: Monitoring Well Locations and Groundwater Elevations September 10, 2012

Well ID	UTM Coordinates (Zone 8 North)	Top of PVC Casing Elevation (~masl)	Standing Water Level (mbtoc)	Groundwater Elevation (~masl)
SX-MW12-01	7024616 m N 417036 m E	552.27	16.9	535.37
SX-MW12-02	7024637 m N 416923 m E	551.95	17.5	534.45
SX-MW12-03	7024491m N 416955 m E	556.38	14.4	541.98

3.2.4 Groundwater Monitoring Event

Golder developed the monitoring wells on September 10, 2012. Due to logistical constraints, wells could not be developed immediately following installation.

All three wells were purged and sampled from September 10 to September 12, 2012. The procedure used for sampling adhered as nearly as possible CSR Protocol No. 7. Prior to purging each well, the water level was first measured with an electronic measuring tape. Between one and three well volumes were purged from each well, using 5/8 in. high density polyethylene (HDPE) Waterra™ tubing, a foot valve, and a Hydrolift™ pump. During purging, physiochemical parameters (pH, temperature, EC) were collected at regular intervals using a Hanna Instruments HI 991300 meter, and purging continued until field parameters were stable before sampling. Response in SX-MW12-01 was too slow to sample immediately following purging. The well was bailed dry on September 10, and a sample was collected 44 hours later on September 12. Groundwater development and sampling datasheets are presented in Appendix C. In addition to the three groundwater monitoring wells that were sampled, a surface water sample was collected from the Stewart River 5 km north of the Site (Figure 1).

Sample containers and appropriate preservatives were obtained from ALS's Whitehorse laboratory. Samples for dissolved metals were field filtered using 0.45-micron, in-line filters and preserved with nitric acid. Samples were kept in coolers with ice packs prior to their delivery, and were delivered within appropriate holding times. ALS is certified by the Canadian Association for Laboratory Accreditation and is accredited as conforming to ISO/IEC 17025.

3.2.5 Rising Head Hydraulic Response Tests

Hydraulic response (slug) tests were performed on September 12, 2012, to assess the hydraulic conductivity of the surficial aquifer underlying the Site. Tests were performed using a 1.5 m long, solid 38 mm diameter PVC slug and a Solinst Levelogger pressure transducer set to measure head fluctuations at one-second intervals. Manual water level measurements were also recorded throughout the tests.

A summary of the analysis of these tests is provided in Section 4.5.

3.3 Laboratory Analysis

Parameters included in the laboratory testing of groundwater samples are summarized in Table 4. The parameter list complies with the Facility's Waste Management Permit (Permit No. 80-009).

Sampling and analysis were undertaken in general accordance with Yukon CSR Protocols 2 and 5 (Government of Yukon, 2011).

Table 4: Parameters Analyzed in September 2012

Sample ID	General Parameters	Nutrients	Dissolved Metals	PAH, BTEX, DOC	VOCs
SX-MW12-01	√	√	√	√	√
SX-MW12-02	√	√	√	√	√
SX-MW12-03	√	√	√	√	√
Stewart Crossing Surface Water	√	√	√	√	√

3.4 Quality Assurance / Quality Control

Table 5 provides a detailed description of the Quality Assurance (QA) and Quality Control (QC) measures taken by Golder to ensure the accuracy and integrity of groundwater quality sample analysis.

Table 5: Review of QA/QC Procedures Taken

QA/QC Aspect	Evidence and Evaluation
Data Representativeness	
Sample Integrity	All samples were kept at the appropriate temperature and delivered to the laboratory within the appropriate holding times.
Background Samples	SX-MW12-03 is shown to be located upgradient of the Facility and is used to provide background levels of physiochemical parameters.

QA/QC Aspect	Evidence and Evaluation
Field Procedures	Monitoring wells were purged and/or developed and sampled using dedicated tubing. Equipment used in sampling more than one well was decontaminated using soap (Alconox™) and distilled water. Surface water samples were collected using one-time-use syringes.
Calibration of Field Equipment	Calibration of field equipment was undertaken daily, prior to sampling wells.
Data Precision and Accuracy	
Blind Duplicate	One blind duplicate was collected from Faro monitoring well FA-MW12-04 during the August/September 2012 groundwater monitoring event (Report # 1114360073-1100). Of the 110 analyte pairs tested, RPD values could not be calculated for 89 of the pairs, as both values in each pair were below the laboratory method detection limit (MDL). Of the remaining analyte pairs tested, 1 exceeded the RPD acceptance criteria of ±30% and only 2 exceeded 5%.
Trip Blanks	A trip blank was not collected during the September 2012 groundwater monitoring event.
Laboratory Internal QA/QC	Laboratory QA/QC is detailed in the primary laboratory report (Appendix E). Overall, the lab report showed acceptable testing frequency and acceptable results for the method blanks, laboratory duplicates, and matrix spikes.
Holding Times	Samples were delivered outside the acceptable (24 hour) hold time for physical parameters, however field parameters were taken during sample collection to compensate. Analysis for Nitrate and VOC's took place 1 - 2 days outside the recommended hold time.
Laboratory Detection Limit	Laboratory reports indicate that detection limits were below the standards applicable to this assessment.
Completeness of test program	Wells were sampled in accordance with the Site Assessment and Work Plan criteria.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection or analysis process for groundwater. The results of laboratory internal QA/QC and analysis of blind duplicates were acceptable, and therefore, the data set is considered valid and complete for use as the basis for groundwater assessment.
Charge Balance	Charge balance was calculated on each of the samples analyzed by the laboratory. Percent error in charge balance for all samples was below 3.1%.

3.5 Application of Applicable Water Quality Standards

In accordance with the Government of Yukon's solid waste facility monitoring requirements, groundwater wells and a downgradient surface water receptor were sampled and tested for the following parameters:

- Major ions (Ca, Mg, Na, K, Cl, SO_4, N, NO_2, NO_3 and P)
- Dissolved Metals
- Mercury
- Hardness
- Alkalinity
- Carbonate
- Bicarbonate
- pH
- Total dissolved solids
- Ammonia
- Dissolved organic carbon
- VOCs
- Chemical oxygen demand
- Total Kjeldahl Nitrogen
- EPH_{w10-32} & VH_{w6-10}
- BTEX
- PAHs

Groundwater and surface water analytical results were compared to the Yukon CSR water quality standards or to the Canadian Environmental Quality Guidelines for constituents where no Yukon standards were available.

The four types of water uses outlined in the CSR, the relevant water quality standards, and their applicability to this assessment are presented in Table 6.

Table 6: Applicable Water Quality Standards

Water Use	Applicable Water Quality Standard	Applicable Plume Radius (km)	Applicability to Assessment
Aquatic Life	Schedule 3 – Contaminated Sites Regulation (O.I.C. 2002/171)	1.0	Applicable
Drinking Water	Schedule 3 – Contaminated Sites Regulation (O.I.C. 2002/171)	1.5	Not Applicable
Irrigation	Schedule 3 – Contaminated Sites Regulation (O.I.C. 2002/171)	1.5	Not Applicable
Livestock	Schedule 3 – Contaminated Sites Regulation (O.I.C. 2002/171)	1.5	Not Applicable

The following discusses the applicability of each water quality standard to the Facility.

Aquatic Life

A search of the Yukon Lands viewer website, conducted by Golder November 26, 2012, showed no water bodies falling within a 1 km radius of the Site, as specified in the CSR, under which aquatic life standards are applied. A review of Google Earth images from 2012, conducted by Golder on the same day, identified several stream channels and wetlands within 1 km of the Site. Conservatively assuming that these water bodies meet the Yukon CSR criteria for surface water bodies, it was determined that aquatic life standards were **applicable** for the Facility.

Drinking Water

A search of drinking water wells on the Groundwater Information Network website and the Yukon Water Data Catalogue (accessed November 26, 2012) showed no drinking water wells located along the predicted downgradient direction between the Site and the Stewart River, nor in any other area within a 1.5 km radius of the Site. A review of the Solid Waste Operation Plan for Stewart Crossing indicated that the nearest dwelling to the Site is located approximately 2 km west of the Facility. It was therefore determined that CSR drinking water standards were **not applicable** for the Stewart Crossing Facility.

Irrigation and Livestock

A review of the Summary of Yukon Water Wells, compiled from The Yukon Water Well Registry, reviewed by Golder on November 26, 2012, showed no irrigation wells or wells for livestock on record for the Stewart Crossing area. It should be noted that this is not a complete record of all wells in the Yukon, and it is possible

that there are irrigation wells or wells for livestock in the area. A review of Google Earth Images from 2012, conducted by Golder on November 26, 2012, as well as several visits to the Facility conducted in July and September 2012 showed no agricultural land within 1.5 km of the Facility. It was therefore considered that CSR water quality standards for irrigation and livestock are **not applicable** to the Stewart Crossing Facility.

4.0 CONCEPTUAL HYDROGEOLOGICAL MODEL

4.1 Setting

The Facility is at an elevation of approximately 550 m (1,800 feet) above sea level within the Tintina Trench in the Yukon Plateau (North) Ecological Region. The Site is located in the Crooked Creek and Stewart River watersheds. A cleared area of approximately 32,000 square meters, which slopes gently to the north, is present at the Facility. In addition to the waste disposal Facility, a seepage pit it also located at the Site. Local surficial geology is mapped as gently rolling blanket till deposits, consisting of mixed fragments, silt, clay, and sand.

4.2 Climate

Climate data at the Site is likely similar to that at the Mayo Airport climate station (Climate ID 2100700), located approximately 50 kilometres northeast of the Facility at an elevation of approximately 503 m above sea level. Average monthly precipitation reported at the Mayo Airport station ranges from a low average of 9.2 mm in April to a high average of 54.4 mm in July. The average annual precipitation is approximately 312 mm, including 147 cm as snowfall. Temperature ranges from a low average of -31^{o} C in January to a high average of 22.7^{o} C in July (Environment Canada, 2012).

Annual precipitation is relatively low (approximately 300 mm per year). This suggests that the amount of infiltration of water through buried waste at the Site and into the subsurface soils is relatively low. With a significant portion of the precipitation occurring in the form of snow, and the relatively cold climate, little infiltration would be expected during the winter months. The greatest potential for infiltration of water through the waste is during the spring snow melt; however, a significant portion of the water from snow melt would typically occur as surface runoff during this period.

4.3 Geology and Hydrogeology

4.3.1 Geological Framework

The central Yukon, including the Stewart Crossing area, has undergone several episodes of glaciation. During the last glaciation (~200 kya), sediments such as glacial till, glaciofluvial, and glaciolacustrine sediments were deposited, especially in low elevation areas such as the Stewart River Valley, located downgradient of the Site, and the Tintina Trench.

The Stewart Crossing area is mapped as being underlain primarily by moraine deposits, alluvium, and glaciofluvial deposits of Quaternary origin. Ablation till, colluvial glacial debris, morainal deposits, and bedrock exposures are found at higher elevations in the mountains surrounding the Site.

Surficial geology maps published by the Yukon Geological Survey indicate natural surficial materials at the Facility are gently sloping moraine till deposits. In general, deposits consist of well compacted to non-compacted sediments comprised of mixed rock fragments, mud (silt and clay), and sand (Hughes, 1983). The thickness of the unconsolidated sediments was found to be approximately 0 - 2 m thick at the Site.

4.3.2 Principal Aquifer

As shown in Figure 4, it is inferred that groundwater at the Site occurs in a fractured bedrock water bearing zone. For the purpose of this report, this aquifer has been named the Bedrock Aquifer (Table 7).

Table 7 Aquifer Units Encountered at the Site

Aquifer Name	Location	Aquifer Type	Comments
Bedrock Aquifer	SX-MW12-01 SX-MW12-02 SX-MW12-03	Fractured Rock	▪ Hydraulic conductivity varies based on presence and orientation of the fractures

4.4 Groundwater Flow Systems

4.4.1 Regional Groundwater Flow

Regional topography slopes from south to north along the Tintina Trench. Groundwater elevation is predicted to be a subdued replica of topography in most locations, and flow to the north, discharging primarily to the Stewart River.

4.4.2 Local Groundwater Flow

Topography in the area surrounding the Facility slopes from a local topographic high, located to the southeast of the Site (elevation approximately 580 m amsl), to the north towards the Stewart River (elevation 480 m amsl).

Golder used the groundwater depth data from September 10, 2012 and well survey elevation information collected in July 2012 to calculate the groundwater elevation at each monitoring well. The water level measurements and groundwater elevations are presented in Table 3.

Local groundwater flow direction at the Site is inferred, from groundwater elevations in the newly installed monitoring well network, to be to the north (Figure 6), towards the Stewart River. The horizontal hydraulic gradient at the Site was estimated to be approximately 0.05 m/m.

4.5 Hydraulic Response Tests

Golder Associates conducted slug tests on two newly installed monitoring wells at the Facility. The slug tests were analyzed using AQTESOLV version 4.5, and the results are included in Appendix D. Table 8 provides a summary of the findings.

Table 8: Estimated Hydraulic Conductivity

Monitoring Well ID	Primary Hydrogeological Unit	Solution Used	Calculated Hydraulic Conductivity (m/s)
SX-MW12-02	Sand and Gravel	Bouwer-Rice (1976)	1×10^{-4}
SX-MW12-03	Sand and Gravel	Bouwer-Rice (1976)	6×10^{-6}

4.6 Estimated Linear Groundwater Velocity

As determined from the slug tests summarized in Table 8, the hydraulic conductivity of the shallow aquifer underlying the Site is ranges between 1×10^{-4} m/s and 6×10^{-6} m/s. The horizontal hydraulic gradient across the Site was assessed, using the monitoring well network, to be approximately 0.05 m/m to the north. A range of reasonable linear groundwater velocities is calculated using the following equation:

$$V = (Ki)/n$$

Where: V: is the groundwater velocity in meters per second (m/s);
K: is the hydraulic conductivity in m/s as determined by slug testing;
i: is the horizontal hydraulic gradient (m/m); and
n: is the porosity which is estimated to be approximately between 5% and 60% for fracture dominated metamorphic rocks (Fetter, 1994).

The resulting groundwater velocity is estimated to be between 1×10^{-4} m/s and 5×10^{-7} m/s (approximately 0.04 to 9 metres per day). Groundwater at the Site may travel faster or slower than these estimates due to inaccuracies or seasonal variations in these parameters.

4.7 Potential Contamination of Groundwater and Transport Mechanisms

Potential sources and transport mechanisms of groundwater contamination are evaluated based on the Site history, Site inspections, hydrogeological investigation, and contaminant transport principals. Potential sources include:

- Leachate from present and former domestic waste, commercial waste, metals, wood, construction debris, and any other potential waste disposed of at the Facility. Potential contaminates leaching from these sources include: heavy metals, nutrients (NO_3, NH_3), organic hydrocarbons (Fuels, PAH's, chlorinated hydrocarbons), and salts; and
- Leakage and spillage from on-Site hydrocarbon storage areas;

Transport mechanisms that may act on these sources of contamination and cause potential contamination of downgradient receptors include:

- Percolation of precipitation from the surface, through the unsaturated zone, and into the saturated zone; and
- Transport of contaminants within the saturated zone (aquifer) to other downgradient locations.

5.0 GROUNDWATER IMPACT ASSESSMENT

5.1 Review of Groundwater Chemistry

As discussed in Section 3.2.4, one round of groundwater monitoring was conducted on the three newly installed monitoring wells at the Stewart Crossing Solid Waste Disposal Facility and one surface water sampling location downgradient from the Site on September 10 and 12, 2012. Chain of custody forms for the groundwater samples collected, the complete groundwater chemistry results, and QA/QC data can be found in Appendix E. Table 9 summarizes parameters from the groundwater chemistry results, which are used to identify potential leachate contamination.

Table 9: Important Groundwater Chemistry Results

Sample Location	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Ammonia (mg/L)	Sulphate (mg/L)	DOC (mg/L)	Sodium (mg/L)
SX-MW12-01	1470	431	0.0122	63.0	3.32	21.8
SX-MW12-02	6390	2010	<0.0050	83	4.12	32.8
SX-MW12-03	227	0.97	<0.0050	12.0	2.93	6.6
Surface Water	160	<0.50	0.0110	18.6	4.26	2.4

Total Dissolved Solids

Total dissolved solids (TDS) is a measurement of the total amount of dissolved organic and inorganic material contained within a liquid. Elevated TDS can indicate the presence of groundwater contamination caused by, for example, landfill leachate. Typically, major ions that comprise TDS include: NO_3, NH_3, Na, K, Mg, Ca, SO_4, Cl, and HCO_3. Concentration of TDS in the sample taken from SX-MW12-03, the upgradient well, was 227 mg/L which is considered to be within the normal range for naturally occurring groundwater. The TDS concentration in the surface water sample was lower (160 mg/L). TDS in samples taken from the two downgradient monitoring wells, SX-MW12-01 and SX-MW12-02 (1470 mg/L and 6390 mg/L respectively), were elevated above the background levels, and were above the normal range for naturally occurring groundwater. TDS concentrations in the two downgradient wells are indicative of landfill leachate influencing the quality of groundwater underlying the Site.

Dissolved Organic Carbon

Dissolved organic carbon (DOC) concentrations can be elevated by the presence of leachate originating from decomposed organic matter. Levels associated with landfill leachate can be in the hundreds or thousands of mg/L. DOC levels from all monitoring wells at the Stewart Crossing Site ranged from 2.93 mg/L to 4.12 mg/L. The level of DOC detected in the surface water sample (4.26 mg/L) was well within the range of values associated with naturally occurring surface water. DOC concentrations in both groundwater and surface water samples did not indicate influence that landfill leachate is influencing groundwater quality underlying the Site.

Chloride

Chloride is often used as a tracer for anthropogenic influence on groundwater. Elevated chloride levels are associated with a number of sources including sewage, leachate, and road salting. In the case of landfills, elevated chloride might be expected due to degradation of waste with a high chloride concentration. The chloride concentration measured in the surface water sample was below the detection limit. Chloride concentration in the sample taken from SX-MW12-03, the upgradient well, was 0.97 mg/L which is considered to be within the normal range for naturally occurring groundwater. Chloride concentrations in samples taken from the two downgradient monitoring wells, SX-MW12-01 and SX-MW12-02, were elevated above the background levels, were above the normal range for naturally occurring groundwater, and are indicative of influence of landfill leachate on the groundwater underlying the Site.

Ammonia

Ammonia is a typical landfill leachate indicator. Ammonia concentrations in the groundwater samples were below the detection limit of 0.005 mg/L with exception of SX-MW12-01 which had a concentration of 0.0122 mg/L. The ammonia concentration in the surface water sample was slightly above the detection limit (0.0110 mg/L). None of the ammonia concentrations indicated influence from landfill leachate on groundwater underlying the Site.

Metals

Metal concentrations of cadmium and cobalt exceeded the Yukon CSR standards for freshwater aquatic life in monitoring well SX-MW12-01. All other metal concentrations were below the Yukon CSR standards.

Organics

Detectable levels of organic constituents are often a sign of leachate contamination. All samples were analyzed for the following hydrocarbons: BTEX, PAH, EPH_{w10-32} & VH_{w6-10}, and MTBE. Levels of MTBE were above the detection limit in the sample from SX-MW12-02. Since MTBE is not present in naturally occurring groundwater, this result suggests that water quality of the groundwater underlying the Site is influenced by landfill leachate.

5.2 Interpretation of Groundwater Chemistry

Factors that may affect natural groundwater quality include:

- The source and chemical composition of recharge water;
- The lithological and hydrological properties of the geologic unit;
- The various chemical processes occurring within the geologic unit; and
- The amount of time the water has remained in contact with the geologic unit (residence time).

These factors may affect the type and quantities of dissolved constituents in groundwater. The ionic composition of water can be used to classify the water into ionic types based on the dominant dissolved cation and anion, expressed in milliequivalents per litre (meq/L). These can be compared for different water samples using various types of plots.

The ionic compositions of samples from the Site were compared to identify differences in water chemistry by plotting the meq/L concentrations of the samples on three types of diagrams: a Schoeller plot (Figure 7), a Piper diagram (Figure 8), and a Stiff diagram (Figure 9).

- Schoeller: The Schoeller semi-logarithmic diagram (Figure 7) shows total concentrations of major cations and anions, and may be used to identify different water types. Here, the Schoeller plot indicates that the groundwater quality in the water samples taken from the downgradient monitoring wells (SX-MW12-01 and SX-MW12-02) differs significantly from sample taken from the upgradient well (SX-MW12-03) and the surface water sample. Key differences visible in the Schoeller Plot are an increase in total concentration of major ions, and enrichment in chloride over the upgradient sample.
- Piper: The Piper diagram (Figure 8) is used to compare the ratios of major ions and can be used to identify different water types. The Piper diagram illustrates that the background sample and the surface water sample have similar ratios of major ions, and are typed as Ca-HCO_3 and Ca-Mg-HCO_3 type water respectively. It also shows that the two downgradient groundwater samples are similar to one another, but distinct from the background and surface water samples, being enriched in chloride over bicarbonate. The two downgradient monitoring well samples are classified as Ca-Cl type water.
- Stiff: The stiff diagram allows for differences in groundwater chemistry to be presented and viewed spatially. Here, the stiff diagram shows that the surface water sample and the sample from SX-MW12-03 are different from samples taken from SX-MW12-01 and SX-MW12-02.

Elevated concentrations of chloride and TDS in samples taken from monitoring wells SX-MW12-01 and SX-MW12-02, when compared to the background sample (SX-MW12-03), indicate that landfill leachate is influencing the quality of groundwater underlying the Site.

6.0 CONCLUSIONS

The following conclusions are made based on the results of the 2012 hydrogeological assessment:

- Stratigraphy and Hydrogeology:
  - Subsurface conditions were investigated with the installation of three monitoring wells, including SX-MW12-01, SX-MW12-02, and SX-MW12-03, which were completed on July 19, 2012, under the supervision of Golder Associates for the establishment of a monitoring well network at the Site;
  - The Site stratigraphy, based on the depth drilled, consists of 0.3 m to 2.0 m of sand overlying bedrock, drilled to a maximum depth of 31.4 metres below grade (m bg);
  - Water was encountered in fractured bedrock during the drilling and installation of three monitoring wells at a depth of between 23.2 and 31.4 m bg;
  - A series of hydraulic response tests were performed at the Site. The results of these tests indicate the hydraulic conductivity of the bedrock underlying the Site ranges from 1×10^{-4} m/s to 6×10^{-6} m/s. These values are considered reasonable for fractured bedrock;
  - The horizontal hydraulic gradient at the Site was determined, using monitoring well water level data, to be approximately 0.05 m/m, sloping to the north;
  - Average linear groundwater seepage velocity in the surficial aquifer is estimated to range between 1×10^{-4} m/s and 5×10^{-7} m/s (approximately 0.04 to 9 metres per day); and
  - Based on the groundwater flow direction determined from the initial groundwater monitoring event, SX-MW12-01 and SX-MW12-02 are both located downgradient of waste disposal areas at the Site and BU-MW12-03 is located upgradient of the Site; Therefore, the requirement of a minimum two downgradient wells has been met.
- Groundwater Chemistry:
  - The results of a desktop study and several Site visits indicate that the Yukon Contaminated Sites Regulation (CSR) standards for freshwater aquatic life are applicable to the Site;
  - Groundwater samples were collected from monitoring wells SX-MW12-01, SX-MW12-02, and SX-MW12-03, and a surface water sample was collected from the Stewart River located approximately 5 km north of the Facility, during one sampling event on September 10 and 12, 2012; and
  - Results of groundwater quality analysis on samples taken from monitoring wells at the Site indicated that landfill leachate was influencing groundwater quality in SX-MW12-01 and SX-MW12-02. The level of chloride in samples taken from SX-MW12-01 and SX-MW12-02 was above the range normally associated with naturally occurring groundwater and the concentration of cadmium and cobalt exceeded CSR criteria for freshwater aquatic life in the sample collect at SX-MW12-01.

7.0 RECOMMENDATIONS

The following recommendations are made, based on the results of the 2012 hydrogeological assessment presented in this report and a moderate level of concern with potential impact of landfill leachate on groundwater quality:

- As required by the Facility's Waste Management Permit, future groundwater monitoring should be conducted twice a year (spring and late summer);
- Monitoring well location, elevation for ground surface, and the elevation of the top of the PVC standpipe (measuring point) should be surveyed for each well by a professional land surveyor prior to the next monitoring event;
- Groundwater quality at the Facility should be revaluated following two rounds of groundwater monitoring to determine if there are any potential impacts present from landfill leachate; and
- Particular attention should be given to the analytes exceeding Yukon CSR standards, and an effort should be made to identify sources of groundwater contamination.

8.0 CLOSURE

We trust that this draft report is adequate for your current needs. Should you have any questions or require any additional information, please contact the undersigned at your convenience.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Calvin Beebe, M.Sc.
Hydrogeologist

ORIGINAL SIGNED

Gary Hamilton, P.Geo.
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Reviewed By:

ORIGINAL SIGNED

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JT\GJH\GCP\syd

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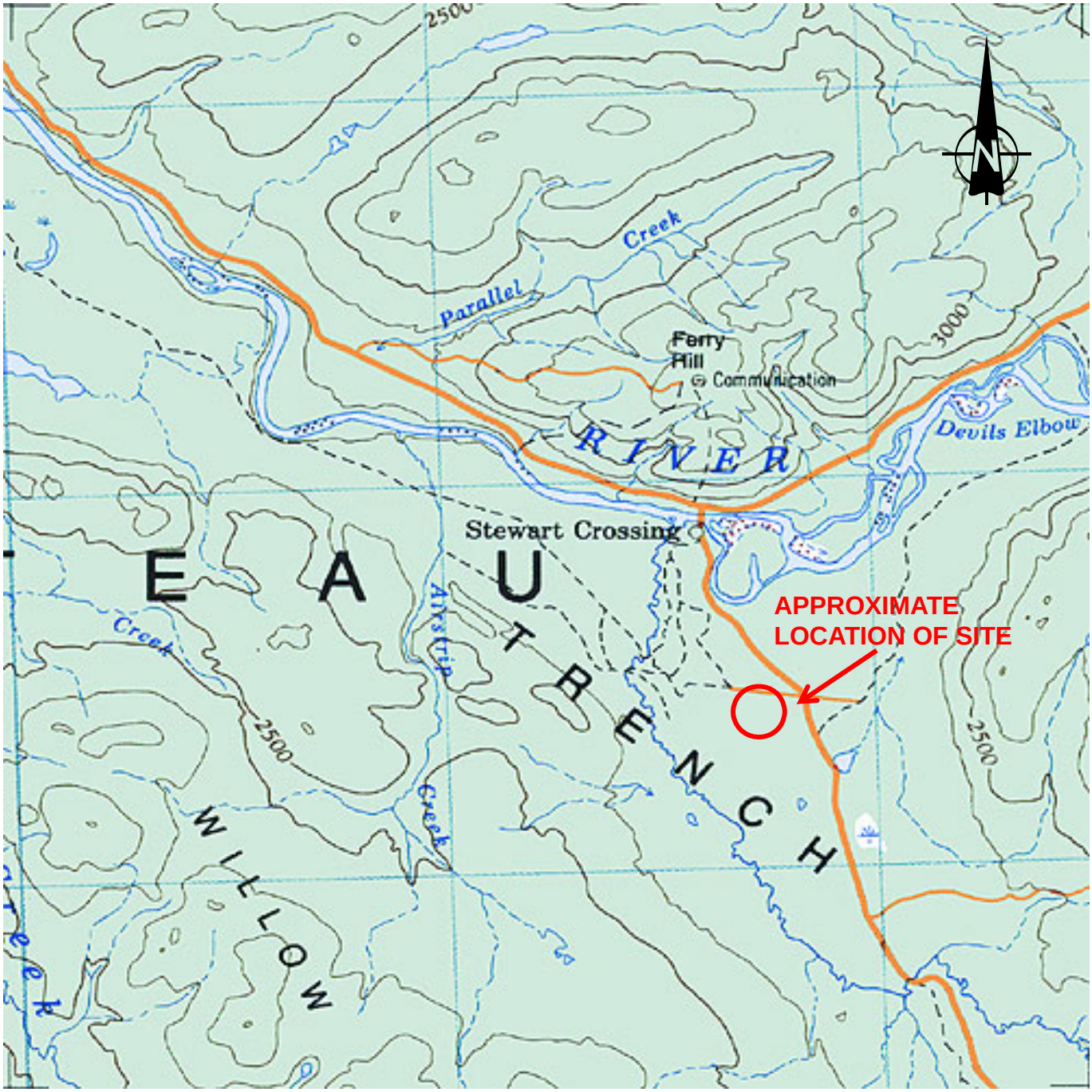
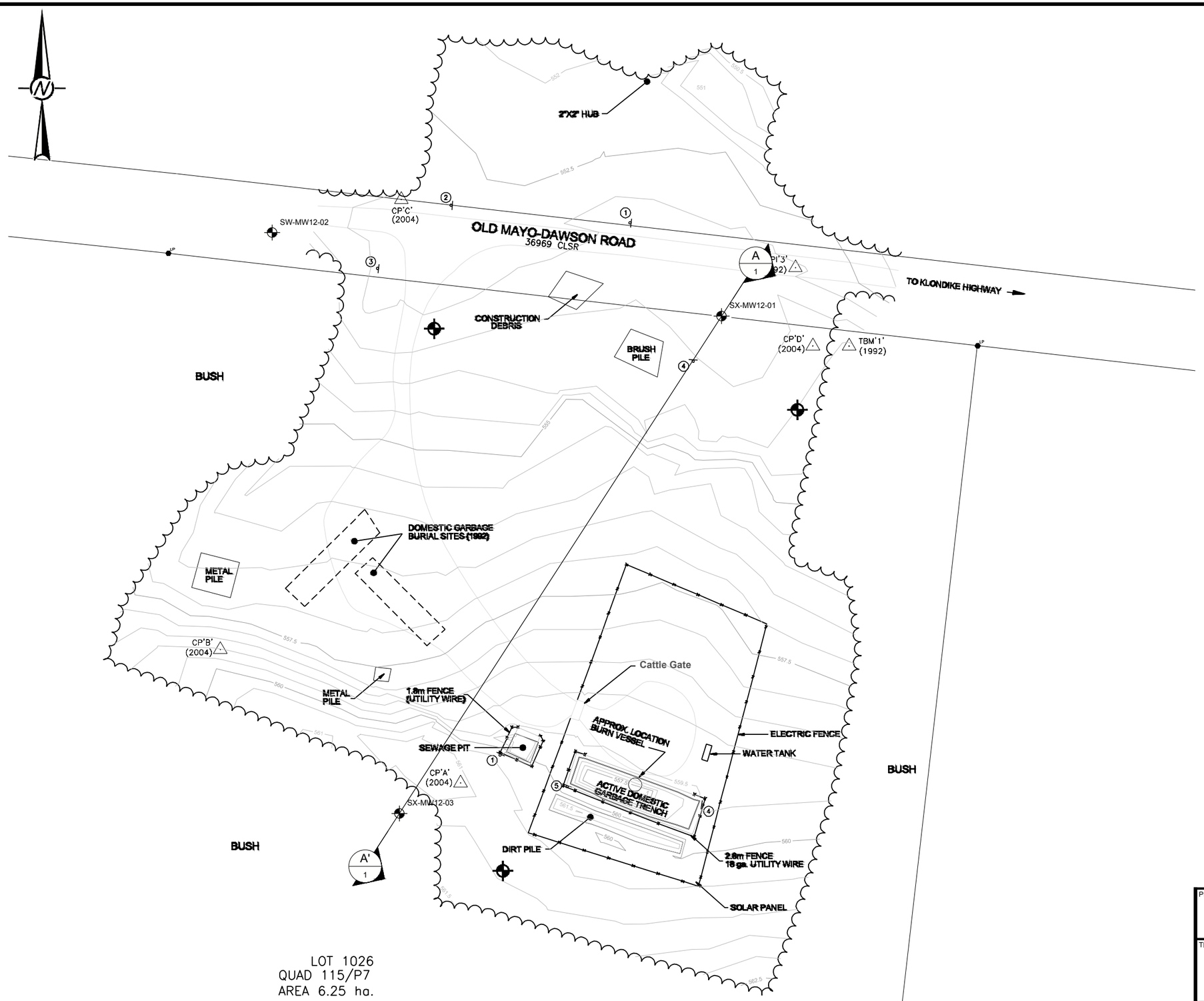


PROJECT	YUKON GOVERNMENT – COMMUNITY SERVICES SOLID WASTE DISPOSAL FACILITY STEWART CROSSING, YUKON
TITLE	KEY PLAN

Golder Associates

PROJECT No. 11-1436-0073			PHASE No. 2700	
DESIGN	SYD	23FEB13	SCALE	REV.
CADD			FIGURE 1	
CHECK				
REVIEW				

REVISION DATE: February 23, 2013 BY: Sherry Driedger FILE: O:\Final\2011\1436\11-1436-0073\11114360073-512-R-Rev0-2700\Figures\Fig01.ppt



LOT 1026
QUAD 115/P7
AREA 6.25 ha.

86830 CLSR
2002-0272 LTO

LEGEND

- MONITORING WELL LOCATION
- FENCE
- EDGE OF CLEARING
- SHOULDER OF ROAD
- SURVEY CONTROL POINT/BENCHMARK
- LEGAL POST - IRON BAR
- LEGAL POST - '77
- LEGAL POST - '69
- SIGN

NOTES

1. BASE PLAN PROVIDED BY QUEST ENGINEERING GROUP
   CAD FILE: STEWART CROSSING.DWG
   DATED: 2004.09.23

REFERENCES

1. SITE PLAN IS NOT CONSITENT WITH OBSERVED CONDITION DURING DRILLING, BUT IS INTENDED TO SHOW LOCATIONS OF NEWLY INSTALLED MONITORING WELLS IN RELATION TO BURIED STRUCTURES.

0 20 40 60m
1:1,000

PROJECT: YUKON GOVERNMENT-COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
STEWART CROSSING, YUKON

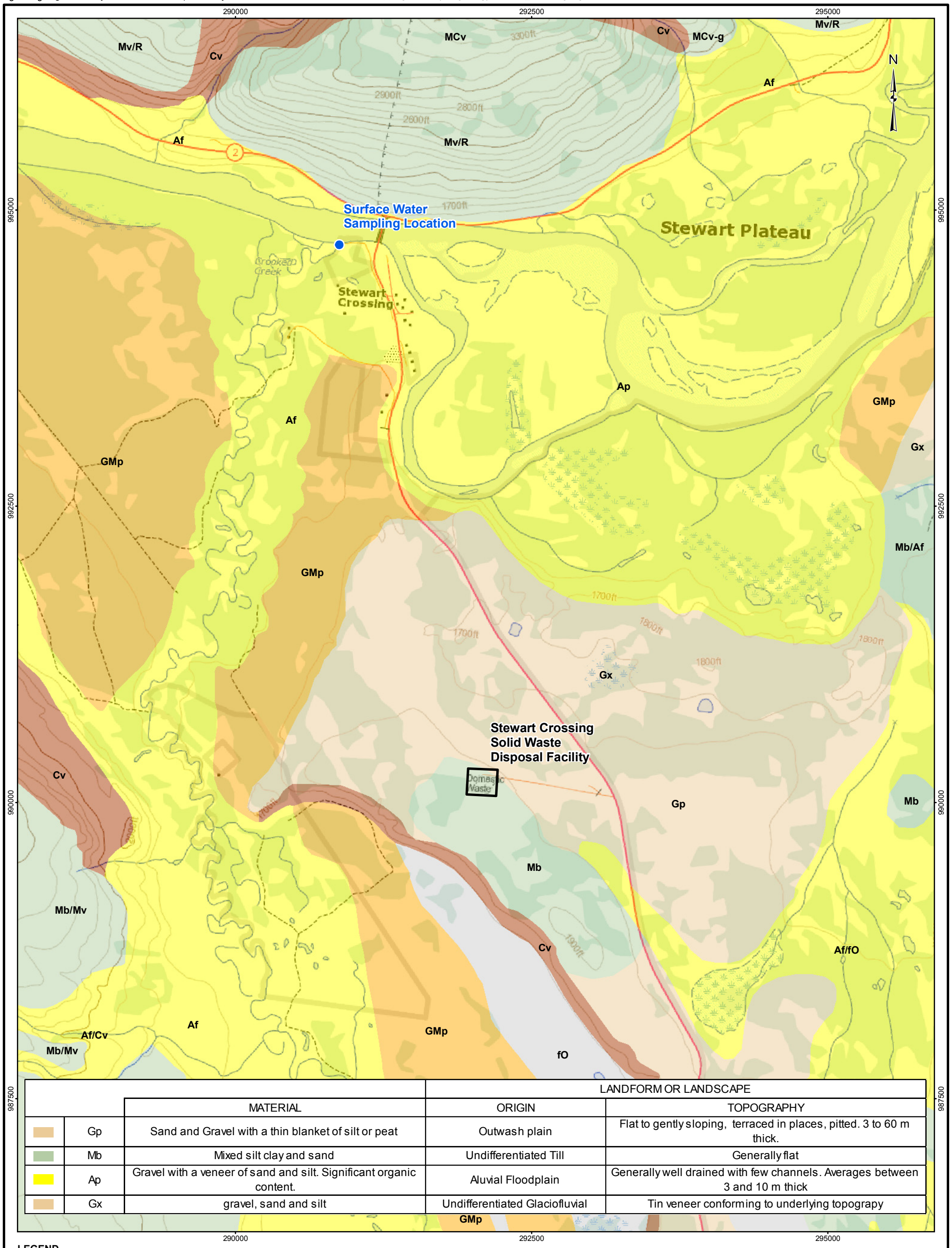
TITLE: **SITE PLAN AND CROSS-SECTION LOCATION**

Golder Associates

PROJECT No.		11-1436-0073	FILE No. 11-1436-0073-2700-2760-01
DESIGN	CB	04OCT12	SCALE AS SHOWN
CADD	MM	04OCT12	FIGURE 2
CHECK			
REVIEW			

N:\Bur-Graphics\Projects\2011\1436\11-1436-0073\Drafting\Phase 2700\2760\11-1436-0073-2700-2760-01.dwg | Layout: FIGURE 2 - SITE PLAN | Modified: mmatienzo 10/04/2012 11:58 AM | Plotted: mmatienzo 10/04/2012

\\golder.gds\gal\Burnaby\CAD-GIS\Bur-Graphics\Projects\2011\1436\11-1436-0073\GIS\Mapping\MXD\Hydrogeology\Stewart_Crossing\Figure_03_Regional_Surficial_Geology_11X17.mxd



		LANDFORM OR LANDSCAPE		
		MATERIAL	ORIGIN	TOPOGRAPHY
	Gp	Sand and Gravel with a thin blanket of silt or peat	Outwash plain	Flat to gently sloping, terraced in places, pitted. 3 to 60 m thick.
	Mb	Mixed silt clay and sand	Undifferentiated Till	Generally flat
	Ap	Gravel with a veneer of sand and silt. Significant organic content.	Aluvial Floodplain	Generally well drained with few channels. Averages between 3 and 10 m thick
	Gx	gravel, sand and silt	Undifferentiated Glaciofluvial	Tin veneer conforming to underlying topograpy

LEGEND

- FACILITY
- BUILDING
- MAJOR ROAD
- WATERCOURSE
- WATERBODY

1 0 1

SCALE 1:30,000 KILOMETRES

REFERENCE

BASEDATA OBTAINED FROM GEOGRATIS (NATURAL RESOURCES CANADA).
SURFICIAL GEOLOGY DATA OBTAINED FROM THE YUKON GOVERNMENT, ENERGY, MINES AND RESOUCES.
DATUM: NAD83 PROJECTION: ALBERS

PROJECT
YUKON GOVERNMENT - COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
STEWART CROSSING, YUKON

TITLE

REGIONAL SURFICIAL GEOLOGY

Golder Associates
Greater Vancouver Office, B.C.

PROJECT No.	11-1436-0073		PHASE No. 2700		
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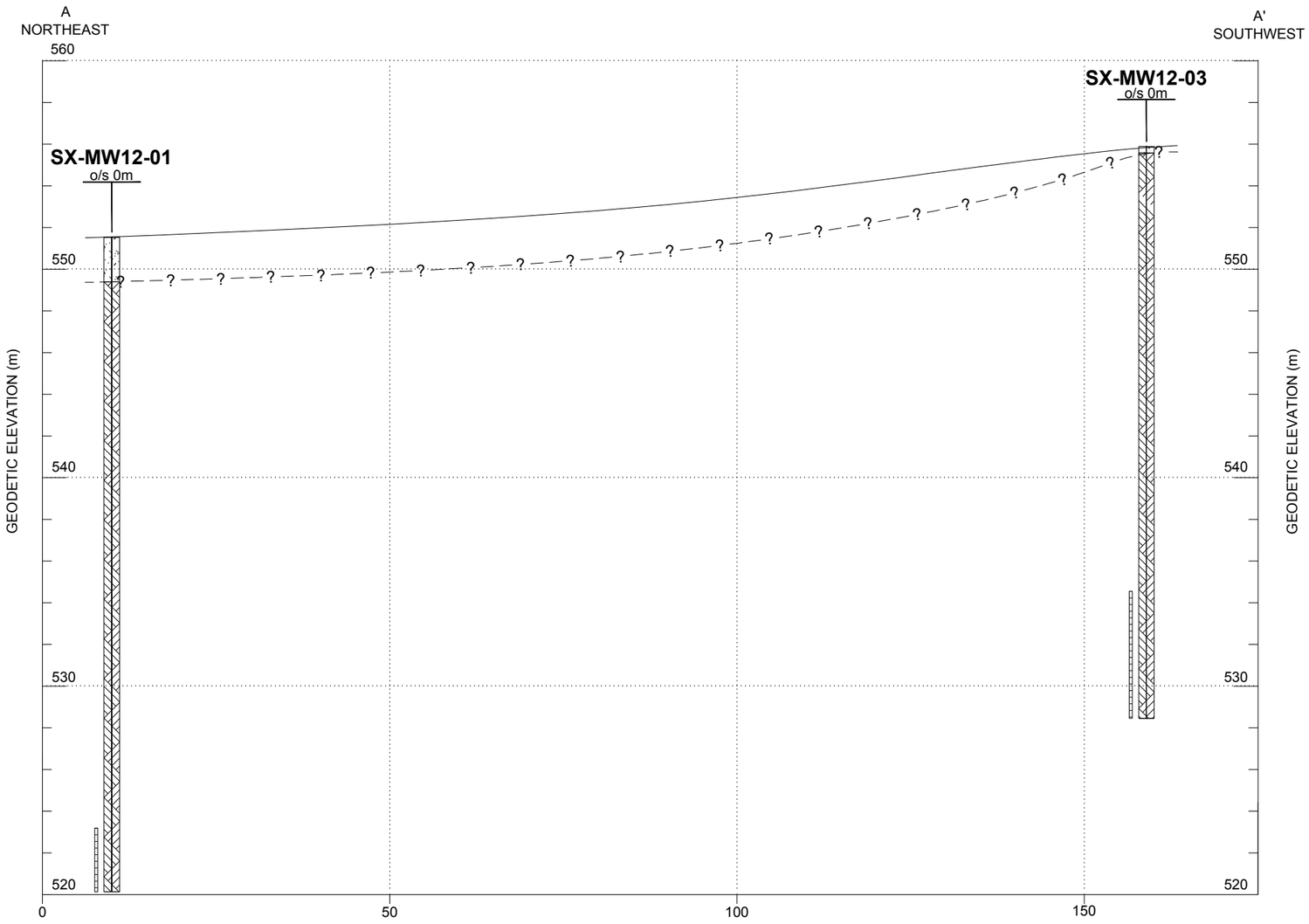
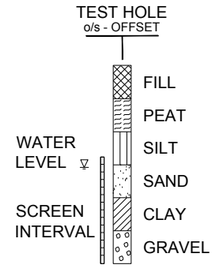
CHECK					
REVIEW					

FIGURE: 3



LEGEND

TEST HOLE LOCATION SHOWING INFERRED STRATIGRAPHIC DATA. FOR DETAILED STRATIGRAPHY REFER TO RECORD OF TEST HOLE LOGS IN APPENDIX ?).



APPROXIMATE GROUND SURFACE

INFERRED STRATIGRAPHIC BOUNDARY

INFERRED GROUNDWATER (mASL)

SPECIAL NOTE: DATA CONCERNING THE VARIOUS STRATA HAVE BEEN OBTAINED AT TEST HOLE LOCATIONS ONLY. THE SOIL STRATIGRAPHY BETWEEN TEST HOLES HAS BEEN INFERRED FROM GEOLOGICAL EVIDENCE AND MAY VARY FROM THAT SHOWN.

0 15 30 45m

1:750

VERTICAL SCALE EXAGGERATION 3X

PROJECT

GOVERNMENT OF YUKON, DEPARTMENT OF COMMUNITY SERVICES
STEWART CROSSING, Y.T.

TITLE

CONCEPTUAL HYDROGEOLOGICAL CROSS - SECTION A-A'

Golder Associates

PROJECT No.		11-1436-0073	FILE No.	1114360073-2700-2760-02
DESIGN	GJH	24OCT12	SCALE	AS SHOWN
CADD	JHL	07NOV12		
CHECK	GCP			
REVIEW				

FIGURE 4

N:\Bur-Graphics\Projects\2011\1436\11-1436-0073\Drafting\Phase 2700\2760\1114360073-2700-2760-02.dwg | Layout: FIGURE 4 | Modified: JHLee 11/07/2012 11:39 AM | Plotted: JHLee 11/07/2012

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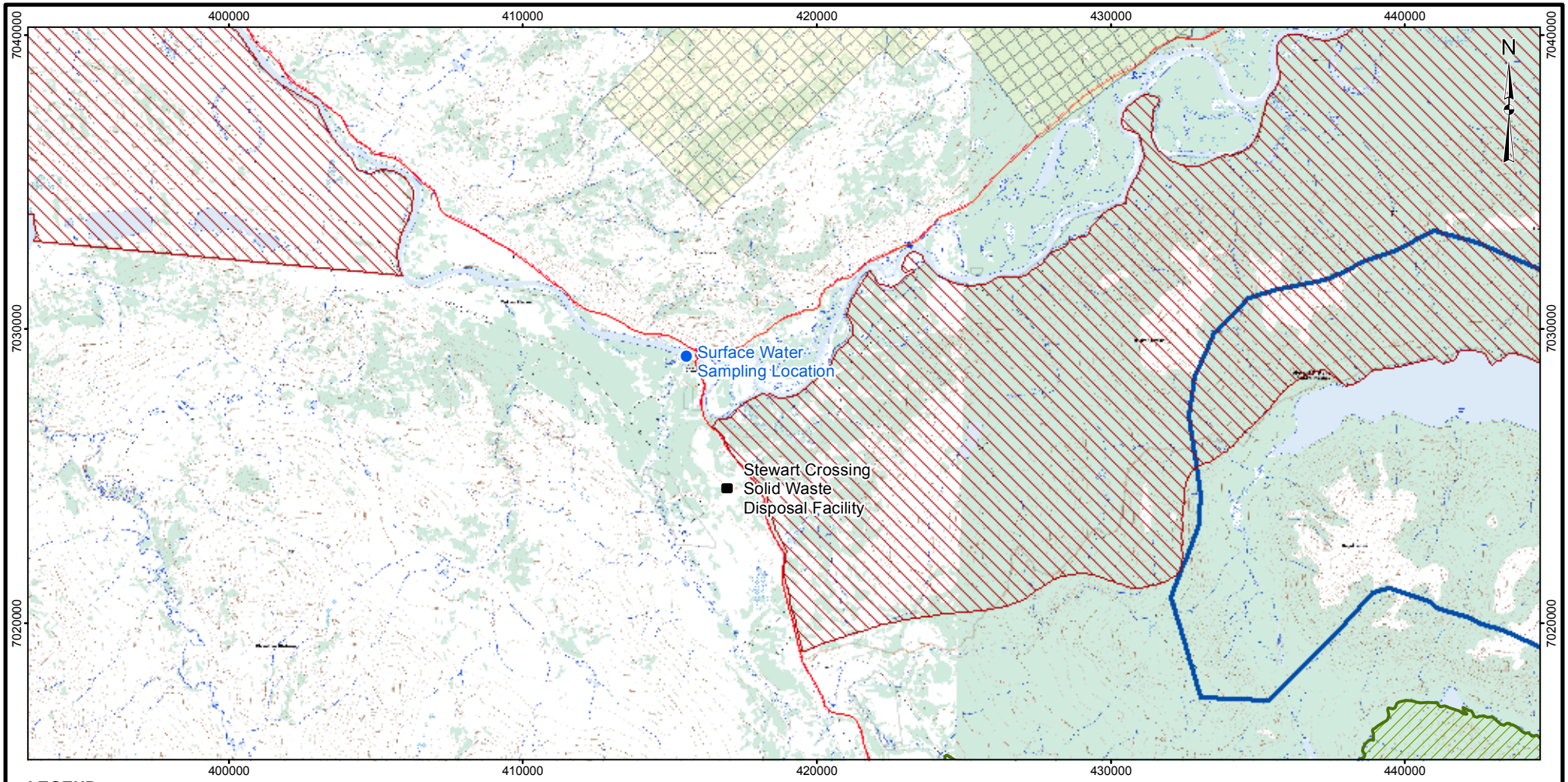

LEGEND

- MAJOR HIGHWAY
- FACILITY
- FIRST NATIONS LANDS
- PARK/PROTECTED AREA
- QUARTZ CLAIM
- WATERSHED BOUNDARY

5 0 5

SCALE 1:200,000 KILOMETRES

REFERENCE

FEATURE DATA OBTAINED FROM THE YUKON GOVERNMENT YGS MAPMAKER ONLINE. BASEDATA OBTAINED FROM GEOGRATIS (NATURAL RESOURCES CANADA).
DATUM: NAD83 PROJECTION: UTM ZONE 08

PROJECT

SOLID WASTE FACILITY HYDROGEOLOGICAL ASSESSMENT
GOVERNMENT OF YUKON, DEPARTMENT OF COMMUNITY SERVICES
STEWART CROSSING, YUKON

TITLE

REGIONAL DRAINAGE & LAND ZONING

Golder Associates
Greater Vancouver Office, B.C.

PROJECT No.	11-1436-0073		PHASE No. 2700	
DESIGN	CB	6 Nov. 2012	SCALE AS SHOWN	REV. 0
GIS	CD	13 Nov. 2012		
CHECK				
REVIEW				

FIGURE: 5

LEGEND

- MONITORING WELL
- GROUND WATER ELEVATION (MASL) - MEASURED ON XXXX, 2012
- GROUNDWATER FLOW DIRECTION
- i HYDRAULIC GRADIENT

40 0 40

SCALE (APPROX.) METRES

REFERENCE

IMAGE OBTAINED FROM GOOGLE EARTH, USED UNDER LICENSE.
IMAGERY DATE: AUGUST 17, 2007. GOOGLE EARTH IMAGE IS NOT TO SCALE.

DATUM: NAD83 PROJECTION: UTM ZONE 8

PROJECT
YUKON GOVERNMENT - COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
STEWART CROSSING, YUKON

TITLE
MONITORING WELL LOCATION MAP AND GROUNDWATER ELEVATION

Golder Associates
Greater Vancouver Office, B.C.

PROJECT No.	11-1436-0073		PHASE No. 2700	
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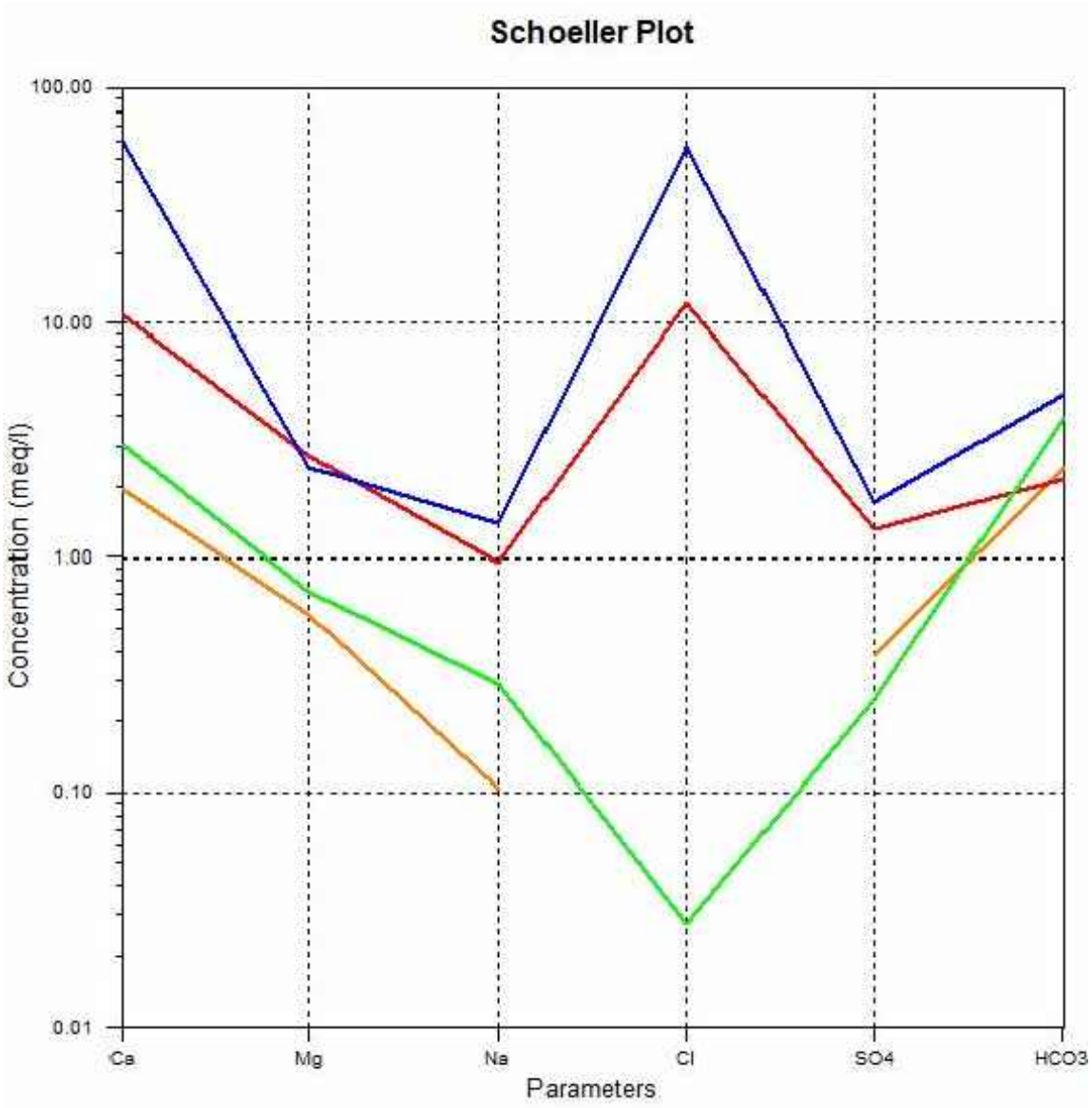
CHECK				
REVIEW				

FIGURE: 6

\\golder.gds\gal\Burnaby\CAD-GIS\Bur-Graphics\Projects\2011\1436\11-1436-0073\GIS\Mapping\MXD\Hydrogeology\Stewart_Crossing\Figure_06_Borehole_location.mxd



LEGEND

Sample Data

Summer 2012

- SX-MW12-01
- SX-MW12-02
- SX-MW12-03
- SX-Surface Water

PROJECT

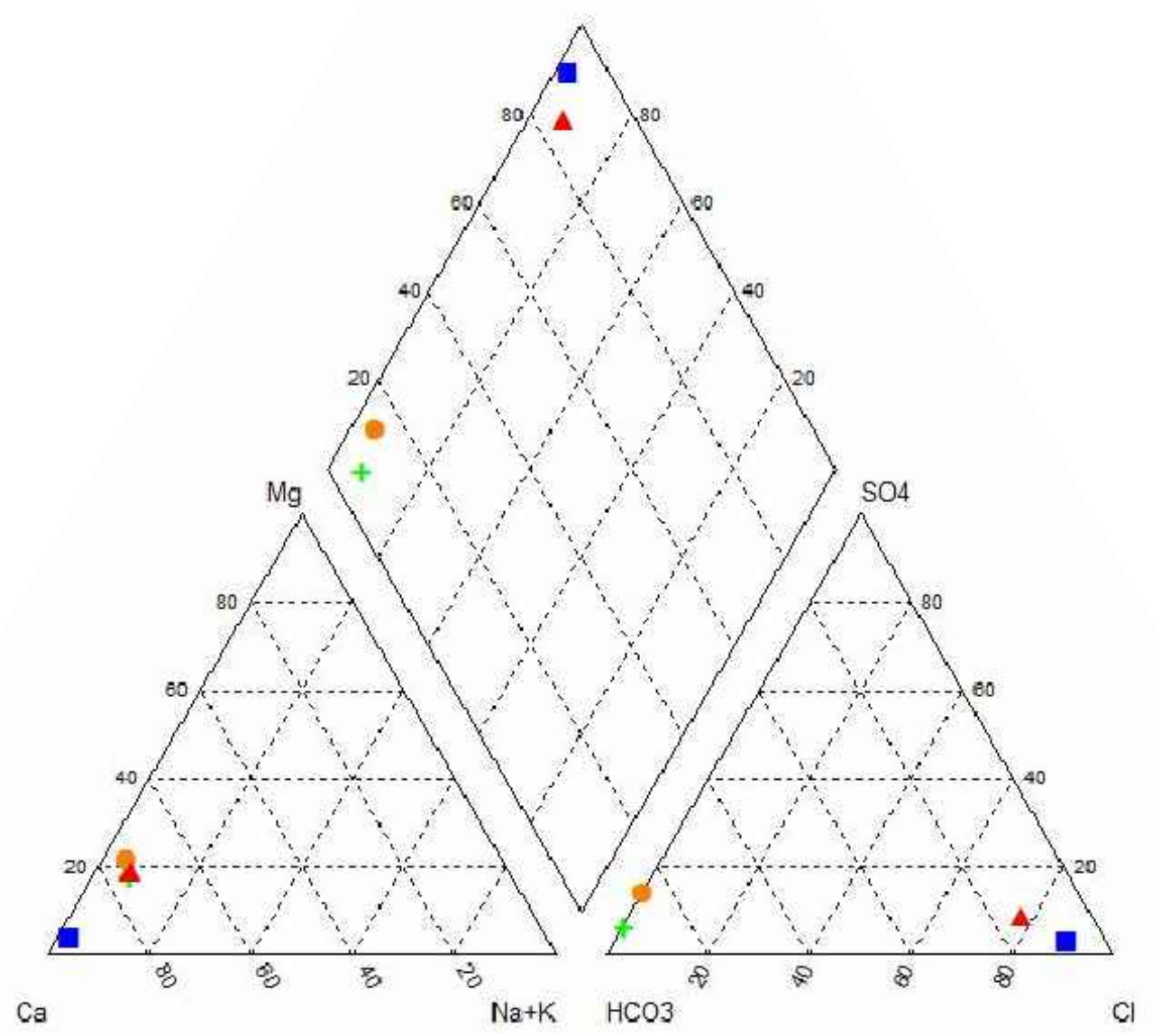
SOLID WASTE FACILITY HYDROGEOLOGICAL ASSESSMENT
GOVERNMENT OF YUKON, DEPARTMENT OF COMMUNITY SERVICES
STEWART CROSSING, YUKON

TITLE

SCHOELLER PLOT

Golder Associates

PROJECT No.	11-1436-0073		FILE No. 1114360073-2700-2760-FIG_07
DESIGN			SCALE NOT TO SCALE
CADD	JD	16NOV12	FIGURE 7
CHECK			
REVIEW			



LEGEND

Chemistry Data

Summer 2012

- SX-MW12-01
- SX-MW12-02
- SX-MW12-03
- SX-Surface Water

PROJECT

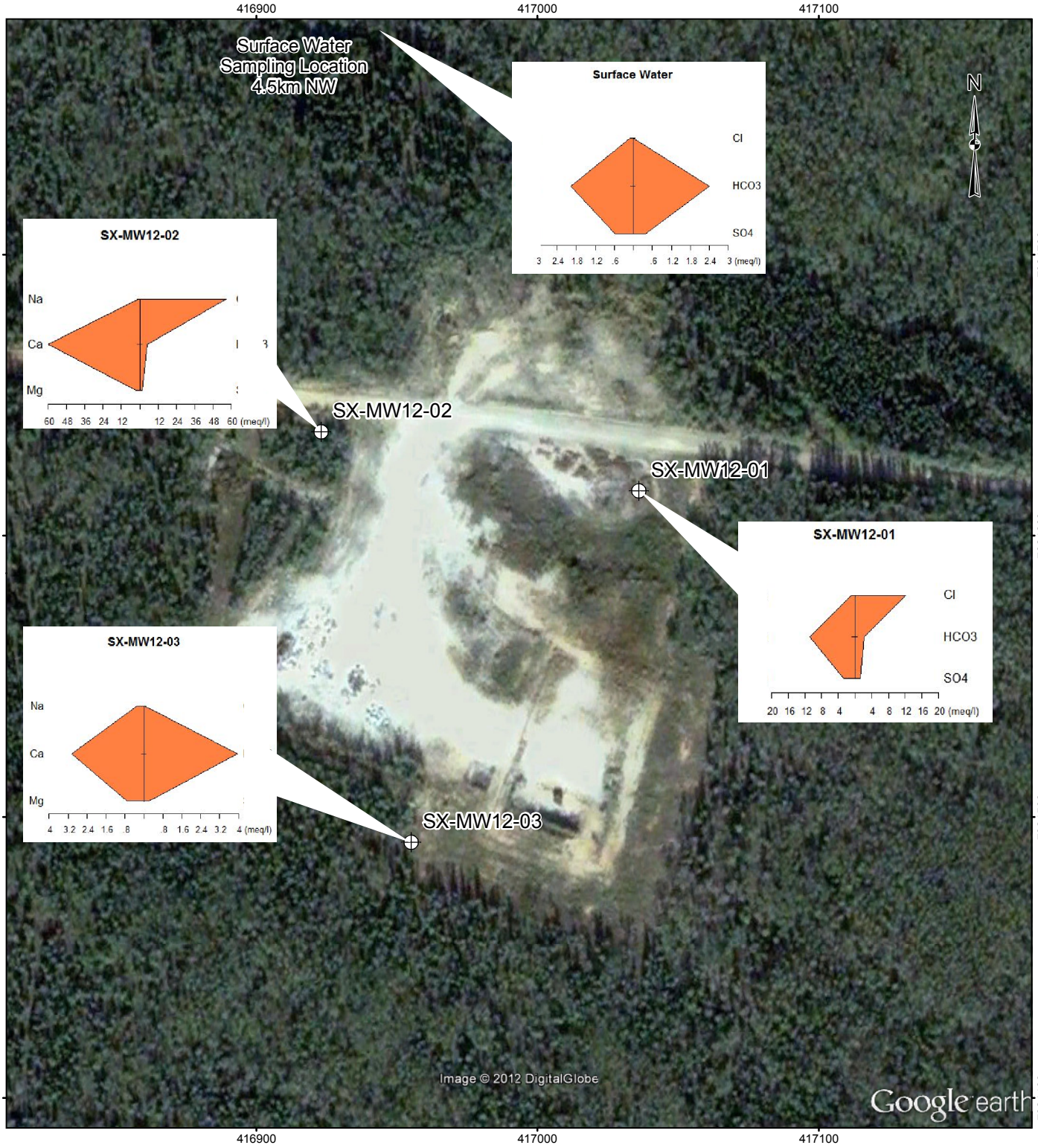
SOLID WASTE FACILITY HYDROGEOLOGICAL ASSESSMENT
GOVERNMENT OF YUKON, DEPARTMENT OF COMMUNITY SERVICES
STEWART CROSSING, YUKON

TITLE

PIPER PLOT

Golder Associates

PROJECT No.	11-1436-0073		FILE No. 1114360073-2700-2760-FIG_08
DESIGN			SCALE NOT TO SCALE
CADD	JD	16NOV12	FIGURE 8
CHECK			
REVIEW			



LEGEND

⊕ MONITORING WELL

40 0 40

SCALE (APPROX.) METRES

REFERENCE

IMAGE OBTAINED FROM GOOGLE EARTH, USED UNDER LICENSE.
IMAGERY DATE: AUGUST 17, 2007. GOOGLE EARTH IMAGE IS NOT TO SCALE.

DATUM: NAD83 PROJECTION: UTM ZONE 8

PROJECT
YUKON GOVERNMENT - COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
STEWART CROSSING, YUKON

TITLE

STIFF DIAGRAMS

Golder Associates
Greater Vancouver Office, B.C.

PROJECT No.	11-1436-0073		PHASE No. 2700	
DESIGN	CB	06 Nov. 2012	SCALE AS SHOWN	REV. 0
GIS	CD	13 Nov. 2012		
CHECK				
REVIEW				

FIGURE: 9

\\golder.gds\gal\Burnaby\CAD-GIS\Bur-Graphics\Projects\2011\1436\11-1436-0073\GIS\Mapping\MXD\Hydrogeology\Stewart_Crossing\Figure_09_Stiff_Diagrams.mxd

APPENDIX A

Site Photographs

Photograph 1: The active burn vessel in the southern portion of the Site.

Photograph 2: Looking northwest across the Site at the burn vessel, access road, and sewage pit.

Photograph 3: A view along the eastern fence-line off the Facility showing the burn vessel and emergency water tank.

o:\final\2011\1436\11-1436-0073\1114360073-512-r-rev0-2700\appendices\app a\site photos.docx

APPENDIX B

Well Construction Logs

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024616 E: 417036

RECORD OF MONITORING WELL: SX-MW12-01

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
		Ground Surface		551.53										Stickup = 0.74m
0	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	(SP) fine SAND, light brown, moist.		0.00										Bentonite Seal
1														
2				549.40										
		BEDROCK, light grey, dry.		2.13										
3														
4														
5														
6														
7														
8														
9														
10		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

File:N:\BUR-GRAPHICS\PROJECTS\2011\1436\11-1436-0073\DRAFTING\GINT\11-1436-0073 (2700 SX).GPJ Output Form:BC_BOREHOLE (ENVIRO) Template:BC REGION TEMPLATE BETA 1.GDT Library:BC REGION LIBRARY.GLB gpoczynski 12/31/12

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024616 E: 417036

RECORD OF MONITORING WELL: SX-MW12-01

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
10	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	BEDROCK, light grey, dry. *(continued)*												
11														
12														
13														
14														
15														Bentonite Seal
16														
17														
18														
19														
20		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024616 E: 417036

RECORD OF MONITORING WELL: SX-MW12-01

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
20	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	BEDROCK, light grey, dry. *(continued)*												Bentonite Seal
21														
22														
23														
24														
25														
26														
27														
28														10/20 Silica Sand
29														51mm Slotted PVC Pipe
30		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024616 E: 417036

RECORD OF MONITORING WELL: SX-MW12-01

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
30														
31	Air Rotary	BEDROCK, light grey, dry. *(continued)*		520.14										51mm Slotted PVC Pipe
		End of Monitoring Well.		31.39										
32														
33														
34														
35														
36														
37														
38														
39														
40														

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024637 E: 416923

RECORD OF MONITORING WELL: SX-MW12-02

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
		Ground Surface		551.00										Stickup = 0.95m
0	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	(SP) fine SAND, light brown, moist.		0.00										
				550.09										
1		BEDROCK, light grey, dry.		0.91										
2														
3														
4														
5														Bentonite Seal
6														
7														
8														
9														
10		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024637 E: 416923

RECORD OF MONITORING WELL: SX-MW12-02

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
10	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	BEDROCK, light grey, dry. *(continued)*												
11														
12														
13														
14														
15														Bentonite Seal
16														
17														
18														
19														
20		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024637 E: 416923

RECORD OF MONITORING WELL: SX-MW12-02

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
20	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	BEDROCK, light grey, dry. *(continued)*												
21														
22														
23														Bentonite Seal
24														
25														
26														
27				523.57										
		(SW) SAND, brown, wet.		27.43										10/20 Silica Sand
28														
29														51mm Slotted PVC Pipe
30		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024637 E: 416923

RECORD OF MONITORING WELL: SX-MW12-02

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20) / PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
30													
31	Air Rotary	(SW) SAND, brown, wet. *(continued)*		519.61									51mm Slotted PVC Pipe
		End of Monitoring Well.		31.39									
32													
33													
34													
35													
36													
37													
38													
39													
40													

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024491 E: 416955

RECORD OF MONITORING WELL: SX-MW12-03

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
0	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	Ground Surface		555.88										Stickup = 0.5m??????
		(SP) fine SAND, light brown, moist.		0.00 555.58										
		BEDROCK, light grey, dry.		0.30										
1														
2														
3														
4														
5														Bentonite Seal
6														
7														
8														
9														
10		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024491 E: 416955

RECORD OF MONITORING WELL: SX-MW12-03

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
10	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	BEDROCK, light grey, dry. *(continued)*												Bentonite Seal
11														
12														
13														
14														
15														
16														
17														
18														
19														
20		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

PROJECT No.: 11-1436-0073 (2700)

LOCATION: Stewart Crossing
N: 7024491 E: 416955

RECORD OF MONITORING WELL: SX-MW12-03

DRILLING DATE: July 19, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

SHEET 3 OF 3
DATUM:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	CORE No.	CORE RECOVERY %	PID ppm (5 10 15 20)	PID ppm (50 100 150 200)	WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
20	M5 Drilltech Truck Mounted Auger Drill Rig Air Rotary	BEDROCK, light grey, dry. *(continued)*												10/20 Silica Sand
21														
22														
23		- wet at 23.16m depth.												
24														51mm Slotted PVC Pipe
25														
26														
27				528.45										
		End of Monitoring Well.		27.43										
28														
29														
30														

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: DRAFT

APPENDIX C

Well Development and Sampling Sheets

GROUNDWATER DEVELOPMENT AND PURGING/SAMPLING DATA SHEET

☐ Development
☒ Purging/Sampling

08V 0417036 7624616

Well No.: SX-MW12-01
Location: STEWART CROSSING
Weather: OVERCAST
Temperature: 1°C
Project No.: 11.1436.0073/12700
Date: 10 SEP.12
Time: 13:40
Completed by: A BADGER

MONITORING WELL INFORMATION

Time of Measurement: 13:45
Depth to product: ____ Product thickness: ____
Depth to water Below Top of Casing: A 16.90 metres
Depth to Bottom of Well Below Top of Casing: B 32.42 metres
Diameter Standpipe: C ____ mm

Tidally influenced: ☐ Yes ☒ No
One well volume:
(B-A)*2.0 = 15.52 · 2 = 31.04 litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ____ litres - for a 38 mm (1.5 inch) diameter well
Sample intake depth: ____ metres

EQUIPMENT LIST

YSI 556 MPS

pH and Temp. Meter: Model ____ Serial No. ____
Conductivity Meter: Model ____ Serial No. ____
Dissolved Oxygen Meter: Model ____ Serial No. ____
Pump: ☐ None ☒ Waterra ☐ Peristaltic ☐ Submersible
Pump Details: ____

Calibration Buffers: ☒ 4 ☒ 7 ☐ 10
Calibration Solution: 1413
☐ D.O. Chemet Ampoule
☐ Bailer Type: ____

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 4 ≈ 124.12 litres
Avg. Flow Rate: ____ L/min.
Start: 13.55
Finish: 12-SEP-12 10:31

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %		Water Level (m)	Remarks
13:57	1	2.42	6.22	7091					
14:03	15	2.44	6.47	6079					
14:12	30	2.50	6.60	6318				31.27	
14:52								31.83	
12-SEP-12		RETURN TO COLLECT SAMPLE.							
10:18	0.5	3.70	6.37	4422				17.29	
10:31	10	2.57	6.59	3709					SAMPLE COLLECTED

Comments:
Odour: ☐ Yes ☐ No If yes ____
Sheen: ☐ Yes ☐ No If yes Hydrocarbon-like ☐ OR Metallic-like ☐
Turbidity: Clear I I I I I I I I I (I) I I I I I I I I I I I I I I I I I I I I I Very Silty

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ____ Consumables: ☐ Waterra Tubing ____ ☐ HDPE/Teflon Tubing ____ ☐ Groundwater Filter ____
Field Dup. ____ ☐ Silicon Tubing ____ ☐ D.O. Ampoules ____ ☐ ____

GROUNDWATER DEVELOPMENT AND PURGING/SAMPLING DATA SHEET

☒ Development
☒ Purging/Sampling

Well No.: SX-MW12-02
Location: STEWART CROSSING
Weather: OVERCAST **Temperature:** 1°C
Project No.: 1.1436.0073/12700
Date: 10 SEP. 12 **Time:** 15:40
Completed by: A BADGER

MONITORING WELL INFORMATION

Time of Measurement: 15:40
Depth to product: ______ Product thickness: ______
Depth to water Below Top of Casing: A 17.50 metres
Depth to Bottom of Well Below Top of Casing: B 32.54 metres
Diameter Standpipe: C ______ mm
Tidally Influenced: ☐ Yes ☒ No
One well volume:
(B-A)*2.0 = 15.04·2 50.08 litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
Sample intake depth: ______ metres

EQUIPMENT LIST

YSI 556 MPS

pH and Temp. Meter: Model ______ Serial No. ______
Conductivity Meter: Model ______ Serial No. ______
Dissolved Oxygen Meter: Model ______ Serial No. ______
Pump: ☐ None ☒ Waterra ☐ Peristaltic ☐ Submersible
Pump Details: ______
Calibration Buffers: ☒ 4 ☒ 7 ☐ 10
Calibration Solution: 1413
☐ D.O. Chemet Ampoule
☐ Bailer Type: ______

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 50.08·3 = 90.24 litres
Avg. Flow Rate: ______ L/min. Start: 15:45 Finish: 16:25

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %		Water Level (m)	Remarks
15:45	1 L	2.83	6.30	20990					
15:51	15 L	3.01	6.97	20962					
15:57	30 L	2.86	7.07	20952				17.52	
16:04	45	2.73	7.11	20906					
16:10	60	2.78	7.12	20911				17.56	
16:17	75	2.66	7.12	20914					
16:25	90	2.81	7.12	20916					SAMPLE + DUPLICATE COLLECTED SX-MW12-04
									* 5 CM CUT OFF STICKUP. NEW HEIGHT 0.93 M

Comments:
Odour: ☐ Yes ☐ No If yes ______
Sheen: ☐ Yes ☐ No If yes Hydrocarbon-like ☐ OR Metallic-like ☐
Turbidity: Clear (circled) I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

(Container Size: 40 mL – 4 L)

SCN No. ______
Field Dup. ______
Consumables: ☐ Waterra Tubing ______ ☐ HDPE/Teflon Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

GROUNDWATER DEVELOPMENT AND PURGING/SAMPLING DATA SHEET

☑ Development
☐ Purging/Sampling

Well No.: SX-MW12-03
Location: STEWART CROSSING
Weather: OVERCAST   Temperature: 2°C
Project No.: 11-1436-0073/2700
Date: 10 SEP 12   Time: 17:00
Completed by: A BADGER

MONITORING WELL INFORMATION

Time of Measurement: 17:00
Depth to product: ______ Product thickness: ______
Depth to water Below Top of Casing: A 14.40 metres
Depth to Bottom of Well Below Top of Casing: B 28.04 metres
Diameter Standpipe: C ______ mm
Tidally Influenced: ☐ Yes ☒ No
One well volume: ______
(B-A)*2.0 = 13.66 2 = 27.32 litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
Sample intake depth: ______ metres

EQUIPMENT LIST

YSI 556 MPS

pH and Temp. Meter: Model ______ Serial No. ______
Conductivity Meter: Model ______ Serial No. ______
Dissolved Oxygen Meter: Model ______ Serial No. ______
Pump: ☐ None ☑ Waterra ☐ Peristaltic ☐ Submersible
Pump Details: ______
Calibration Buffers: ☒ 4 ☒ 7 ☐ 10
Calibration Solution: 1413
☐ D.O. Chemet Ampoule
☐ Bailer Type: ______

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 27.32 = 82 litres
Avg. Flow Rate: ______ L/min. Start: 17:08 Finish: 17:40

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %		Water Level (m)	Remarks
17:10	1	2.29	6.81	1956					
~~17:15~~	~~15~~							~~15.10~~	
17:20	30	2.33	6.96	1219				15.10	
17:25	45	2.20	7.00	1234					
17:30	60	2.28	7.07	1236				15.20	
17:35	75	2.20	7.09	1248					
17:40	90	2.22	7.11	1254				15.51	SAMPLE COLLECTED

Comments:

Odour: ☐ Yes ☐ No If yes ______
Sheen: ☐ Yes ☐ No If yes Hydrocarbon-like ☐ OR Metallic-like ☐
Turbidity: Clear I I I I (I) I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

(Container Size spans 40 mL – 4 L)

SCN No. ______ Consumables: ☐ Waterra Tubing ______ ☐ HDPE/Teflon Tubing ______ ☐ Groundwater Filter ______
Field Dup. ______ ☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ ______

Surface Water Sampling Data Sheet

☑ Field Characterization
☑ Sampling

Sample Number:	SX SURFACE	**Project No.**	11-1436-0073/2700
Location:	08 V 0415559 7029062	**Completed By:**	A BADGER
Weather:	OVERCAST	**Date:**	~~A BADGE~~ 12 SEP-12
Temperature:	3°C	**Time:**	13:20
		Reviewed By:	

EQUIPMENT LIST YSI 556 MPS

pH and Temp. Meter: Model ______ Serial No. ______ Calibration Buffers: ☑ 4 ☑ 7 ☐ 10

Conductivity Meter: Model ______ Serial No. ______ Calibration Solution: 1413

Dissolved Oxygen Meter: Model ______ Serial No. ______ ☐ D.O. Chemet Ampoule

Pump: ☑ None ☐ Waterra ☐ Peristaltic ☐ Submersible Bailer: ☐ None ☐ Stainless Steel ☐ Teflon ☐ PVC

Sample Depth: SURFACE

SURFACE WATER SAMPLING

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %	Remarks
13:20	Ø	5.18	6.65	608			

Comments:

Odour: ☐ Yes ☐ No If yes ______

Sheen: ☐ Yes ☐ No If yes ______

Turbidity: Clear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Very Silty

Other: ______

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L			
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. Consumables: ☐ D.O. Ampoules ______ ☐ Alkalinity Test ______ ☐ Other ______

APPENDIX D

Slug Test Data

Single-well Response Test Data Sheet

☑ Rising Head
☑ Falling Head

Well No.: SX-MW12-02
Location: 08 V 0416923 7024637
Project No.: 11-1436-0073/2700
Completed By: A BADGER
Date: 12-SEP-12
Time: 11:05

MONITORING WELL INFORMATION

Depth to water below top of casing:	17.50	meters	
Depth to bottom of well below top of casing:	32.48	meters	
Distance from top of pipe to ground surface:	0.94	meters	
Well casing diameter:	0.05 ~~0.025~~	meters	(1 inch = 0.025 meters)
Borehold diameter:		meters	
Screen length:		meters	(1 foot = 0.3048 meters)
Screened unit:			(eg: sand, silt, clay)

EQUIPMENT LIST

☑ Slug
Mass: _____ kilograms
Length: 1.5 meters
Diameter: 0.0375 meters

☐ Bailer
Water column height: _____ meters
Inside diameter: _____ meters
and/or Volume of water removed: _____ litres

Pressure transducer serial #: 0011048419
Sampling Interval: 1 seconds or minutes (circle one)

SINGLE-WELL RESPONSE TEST

Start time: 11:10 Finish time: 11:45

Time	Elapsed Time	Water Level (m)	Comments
11:10			TX IN 20 CM OFF BOTTOM
11:15		17.48	SLUG IN
11:20		17.50	SLUG OUT
11:25			SLUG IN
11:30			SLUG OUT
11:35			SLUG IN
11:40			SLUG OUT
11:45			TX OUT

Single-well Response Test Data Sheet

☐ Rising Head
☒ Falling Head

Well No.: SX-MW12-07
Location: 08V 0416955 7024491
Project No.: 11-1436-0073/2700
Completed By: A BADGER
Date: 12-SEP-12
Time: 12:00

MONITORING WELL INFORMATION

Depth to water below top of casing:	14.54	meters	
Depth to bottom of well below top of casing:	28.03	meters	
Distance from top of pipe to ground surface:	0.52	meters	
Well casing diameter:		meters	(1 inch = 0.025 meters)
Borehold diameter:		meters	
Screen length:		meters	(1 foot = 0.3048 meters)
Screened unit:			(eg: sand, silt, clay)

EQUIPMENT LIST

☒ Slug
Mass: _____ kilograms
Length: 1.5 meters
Diameter: 0.0375 meters

☐ Bailer
Water column height: _____ meters
Inside diameter: _____ meters
and/or Volume of water removed: _____ litres

Pressure transducer serial #: 0011048419
Sampling Interval: 1 seconds or minutes (circle one)

SINGLE-WELL RESPONSE TEST

Start time: 12:00 Finish time: 13:00

Time	Elapsed Time	Water Level (m)	Comments
12:00			Tx IN 20 cm OFF BOTTOM
12:05		14.10	SLUG IN
12:10		14.36	
12:25		14.36	
12:45		14.36	
13:00		14.36	SLUG OUT, Tx OUT

APPENDIX E

Analytical Reports and Chain of Custody Forms

Table E-1
Results of Water Analyses - Metals
[YTG Landfill Monitoring, Stewart Crossing, Yukon]

SCN			L1209363-9	L1209363-5	L1209363-6	L1209363-7	L1209363-8
Location	Aquatic Life CSR-AW (freshwater)		SX SURFACE	SX-MW12-01	SX-MW12-02	SX-MW12-03	SX-MW12-04
QA/QC					FDA		FD
Date		Notes	12-SEP-12	12-SEP-12	10-SEP-12	10-SEP-12	10-SEP-12
Parameters							
pH (field)			6.65	6.59	7.12	7.11	7.12
Temperature °C			5.18	2.57	2.81	2.22	2.81
Conductivity (uS/cm)			608	3709	20910	1254	20910
Dissolved Oxygen (mg/L)			-	-	-	-	-
Laboratory Parameters							
pH (laboratory)			7.90	7.78	7.70	8.05	7.78
Hardness (as CaCO3)			127	681	3120	189	3040
total dissolved solids			160	1470	6260	227	6390
Aggregate Organics							
COD			<20	52	81	<20	88
dissolved organic carbon			4.26	3.32	4.12	2.93	3.85
Bacteriological							
Coliform Bacteria - Fecal			-	-	-	-	-
Dissolved Metals							
aluminum			<0.010	<0.050	<0.10	<0.010	<0.10
antimony	0.2		<0.00050	<0.0025	<0.0050	<0.00050	<0.0050
arsenic	0.05		0.00086	0.00060	<0.0010	0.00029	<0.0010
barium	10		0.094	<0.10	<0.20	0.021	<0.20
beryllium	0.053		<0.0050	<0.0050	<0.010	<0.0050	<0.010
bismuth			<0.20	<0.20	<0.40	<0.20	<0.40
boron			<0.10	<0.50	<1.0	<0.10	<1.0
cadmium	0.0001 - 0.0006	H	<0.00020	**0.0016**	*<0.0020*	<0.00020	*<0.0020*
calcium			39.6	218	1200	61.2	1170
chromium	0.010^{VI}, 0.090^{III}	V	<0.0020	<0.010	*<0.020*	<0.0020	*<0.020*
cobalt	0.009		*<0.010*	**0.025**	*<0.020*	*<0.010*	*<0.020*
copper	0.020 - 0.090	H	<0.0010	<0.0050	<0.010	<0.0010	<0.010
iron			0.194	<0.030	<0.060	<0.030	<0.060
lead	0.040 - 0.160	H	<0.00050	<0.0025	<0.0050	<0.00050	<0.0050
lithium			<0.010	0.021	0.032	0.012	0.032
magnesium			6.95	32.9	29.5	8.68	29.5
manganese			0.129	1.28	<0.020	0.113	<0.020
mercury	0.001		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
molybdenum	10		<0.030	<0.030	<0.060	<0.030	<0.060
nickel	0.250 - 1.5	H	<0.050	0.106	<0.10	<0.050	<0.10
phosphorus			<0.30	<0.30	<0.60	<0.30	<0.60
potassium			1.09	2.76	1.2	0.49	1.3
selenium	0.01		<0.0010	<0.0050	<0.010	<0.0010	<0.010
silicon			4.08	4.83	4.80	4.93	4.84
silver	0.0005 - 0.015	H	<0.010	<0.010	*<0.020*	<0.010	*<0.020*
sodium			2.4	21.8	32.3	6.6	32.8
strontium			0.206	0.837	2.10	0.215	2.17
thallium	0.003		*<0.20*	*<0.20*	*<0.40*	*<0.20*	*<0.40*
tin			<0.030	<0.030	<0.060	<0.030	<0.060
titanium	1		<0.010	0.018	<0.020	<0.010	<0.020
uranium	3		0.00086	0.0267	0.204	0.0180	0.196
vanadium			<0.030	<0.030	<0.060	<0.030	<0.060
zinc	0.075 - 2.4	H	<0.050	<0.25	<0.50	<0.050	<0.50
Other Inorganics							
bicarbonate (CaCO3)			120	107	247	198	246
carbonate (CaCO3)			<2.0	<2.0	<2.0	<2.0	<2.0
hydroxide (CaCO3)			<2.0	<2.0	<2.0	<2.0	<2.0
total alkalinity (CaCO3)			120	107	247	198	246
ammonia	1.31 - 18.5	pH	0.0110	0.0122	<0.0050	<0.0050	<0.0050
bromide (free)							
chloride			<0.50	431	2010	0.97	1970
fluoride	2 - 3	H	0.193	<0.20	<0.40	0.377	<0.40
nitrate (as N)	400		<0.10	<0.050	3.47	0.167	2.38
nitrite (as N)	0.2 - 2	Cl	<0.020	<0.010	<0.050	<0.0010	<0.0010
total Kjeldahl nitrogen			0.169	0.179	0.156	0.079	0.137
sulphate	1000		18.6	63.0	83	12.0	82

Notes:
All concentrations in milligrams per litre (mg/L), unless otherwise noted.
Standards from the Yukon Contaminated Sites Regulation (CSR), from the Environment Act (O.I.C. 2002/171) its associated Schedules.
Land Use abbreviations: AW (Aquatic Life) and DW (Drinking Water).
H = standard is Hardness dependent
CL = standard is chloride dependent
pH = standard is pH dependent
V= Standard is valence dependent VI refers to chromium VI and III refers to chromium III
T = standard varies with temperature
MCS = Most Conservative Standard
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
SCN = sample control number
Italics indicates standard is below detection limit.
Bold= Exceeds CSR Drinking water (DW) standard.
Yellow highlight and box= Exceeds CSR freshwater aquatic life (AW) standards; AW standards assume minimum 1:10 dilution is available.
COC = Chain of Custody

Table E-2
Results of Water Analyses - Hydrocarbons
[YTG Landfill Monitoring, Stewart Crossing, Yukon]

SCN			L1209363-9	L1209363-5	L1209363-6	L1209363-7	L1209363-8
Location	Aquatic Life CSR-AW (freshwater)		SX SURFACE	SX-MW12-01	SX-MW12-02	SX-MW12-03	SX-MW12-04
QA/QC					DUP		DUP
Date		Notes	12-SEP-12	12-SEP-12	10-SEP-12	10-SEP-12	10-SEP-12
Monoaromatic Hydrocarbons							
benzene	4		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
ethylbenzene	2		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
styrene	0.72		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
toluene	0.390		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
ortho-xylene			<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
meta- & para-xylene			<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
total xylene			<0.00075	<0.00075	<0.00075	<0.00075	<0.00075
VHw_{6-10}	15		<0.10	<0.10	<0.10	<0.10	<0.10
VPHw	1.5		<0.10	<0.10	<0.10	<0.10	<0.10
Polycyclic Aromatic Hydrocarbons							
acenaphthene			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
acenaphthylene			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
acridine	0.0005		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
anthracene	0.001		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
benzo(a)anthracene	0.001		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
benzo(a)pyrene	0.0001		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
benzo(b)fluoranthene			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
benzo(g,h,i)perylene			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
benzo(k)fluoranthene			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
chrysene			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
dibenzo(a,h)anthracene			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
fluoranthene	0.002		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
fluorene	0.12		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
indeno(1,2,3-c,d)pyrene			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
naphthalene	0.01		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
phenanthrene	0.003		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
pyrene	0.0002		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
quinoline	0.034		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Other Hydrocarbons							
$EPHw_{10-19}$	5		<0.25	<0.25	<0.25	<0.25	<0.25
$EPHw_{19-32}$			<0.25	<0.25	<0.25	<0.25	<0.25
LEPHw	0.5		<0.25	<0.25	<0.25	<0.25	<0.25
HEPHw			<0.25	<0.25	<0.25	<0.25	<0.25
Miscellaneous Organics							
methyl tertiary butyl ether (MTBE)			<0.00050	<0.00050	0.00148	<0.00050	0.00148

Notes:
All concentrations in milligrams per litre (mg/L), unless otherwise noted.
Standards from the Yukon Contaminated Sites Regulation (CSR), from the Environment Act (O.I.C. 2002/171) its associated Schedules.
Land Use abbreviations: DW (Drinking Water) and AW (Aquatic Life).
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
SCN = sample control number
COC = Chain of Custody
$EPHw_{10-19}$ = extractable petroleum hydrocarbons, carbon range 10-19
LEPHw = light extractable petroleum hydrocarbons
Where water use for the protection of aquatic life applies, the standards for $EPHw_{10-19}$ is equivalent to LEPHw, when no LEPHw analysis is undertaken.
VPHw = volatile petroleum hydrocarbons
VHw_{6-10} = volatile hydrocarbons, carbon range 6-10
Where water use for the protection of aquatic life applies, the standards for VHw6-10 equivalent to VPHw, when no VPHw analysis is undertaken.
PAH = polycyclic aromatic hydrocarbon
Italics indicates standard is below detection limit.
Yellow highlight and box= Exceeds CSR freshwater aquatic life (AW) standards; AW standards assume minimum 1:10 dilution is available.

Table E-3
Results of Quality Control Analyses - Metals
[YTG Landfill Monitoring, Stewart Crossing, Yukon]

	SCN	L1209363-6	L1209363-8				
	Location	SX-MW12-02	SX-MW12-04	Method Detection Limit	Mean	Relative Percent Difference	Difference Factor (DF)
	QA/QC	FDA	FD				
	Date	10-SEP-12	10-SEP-12				
Laboratory Parameters							
pH (laboratory)		7.70	7.78	0.10	7.74	1.03%	NA
Hardness (as CaCO3)		3120	3040	0.50	3080	2.60%	NA
total dissolved solids		6260	6390	10	6325	2.06%	NA
Aggregate Organics							
COD		81	88	20	84.5	NA	0.00
dissolved organic carbon		4.12	3.85	1.0	3.985	NA	80.00
Dissolved Metals							
aluminum		<0.10	<0.10	0.010	NC	NC	NA
antimony		<0.0050	<0.0050	0.00050	NC	NC	NA
arsenic		<0.0010	<0.0010	0.00010	NC	NC	NA
barium		<0.20	<0.20	0.020	NC	NC	NA
beryllium		<0.010	<0.010	0.0050	NC	NC	NA
bismuth		<0.40	<0.40	0.20	NC	NC	NA
boron		<1.0	<1.0	0.10	NC	NC	NA
cadmium		*<0.0020*	*<0.0020*	0.00020	NC	NC	NA
calcium		1200	1170	0.10	1185	2.53%	NA
chromium		*<0.020*	*<0.020*	0.0020	NC	NC	NA
cobalt		*<0.020*	*<0.020*	0.010	NC	NC	NA
copper		<0.010	<0.010	0.0010	NC	NC	NA
iron		<0.060	<0.060	0.030	NC	NC	NA
lead		<0.0050	<0.0050	0.00050	NC	NC	NA
lithium		0.032	0.032	0.010	0.032	NA	0.00
magnesium		29.5	29.5	0.10	29.5	0.00%	NA
manganese		<0.020	<0.020	0.0020	NC	NC	NA
mercury		<0.00020	<0.00020	0.00020	NC	NC	NA
molybdenum		<0.060	<0.060	0.030	NC	NC	NA
nickel		<0.10	<0.10	0.050	NC	NC	NA
phosphorus		<0.60	<0.60	0.30	NC	NC	NA
potassium		1.2	1.3	0.10	1.25	8.00%	NA
selenium		<0.010	<0.010	0.0010	NC	NC	NA
silicon		4.80	4.84	0.050	4.82	0.83%	NA
silver		*<0.020*	*<0.020*	0.010	NC	NC	NA
sodium		32.3	32.8	2.0	32.55	1.54%	NA
strontium		2.10	2.17	0.0050	2.135	3.28%	NA
thallium		*<0.40*	*<0.40*	0.20	NC	NC	NA
tin		<0.060	<0.060	0.030	NC	NC	NA
titanium		<0.020	<0.020	0.010	NC	NC	NA
uranium		0.204	0.196	0.00010	0.2	4.00%	NA
vanadium		<0.060	<0.060	0.030	NC	NC	NA
zinc		<0.50	<0.50	0.050	NC	NC	NA
Other Inorganics							
bicarbonate (CaCO3)		247	246	2.0	246.5	0.41%	NA
carbonate (CaCO3)		<2.0	<2.0	2.0	NC	NA	NA
hydroxide (CaCO3)		<2.0	<2.0	2.0	NC	NA	NA
total alkalinity (CaCO3)		247	246	2.0	246.5	0.41%	NA
ammonia		<0.0050	<0.0050	0.0050	NC	NA	NA
chloride		2010	1970	5.0	1990	2.01%	NA
fluoride		<0.40	<0.40	0.20	NC	NA	NA
nitrate (as N)		3.47	2.38	0.050	2.925	37.26%	NA
nitrite (as N)		<0.050	<0.0010	0.010	NC	NA	NA
total Kjeldahl nitrogen		0.156	0.137	0.25	0.1465	NA	0.08
sulphate		83	82	5.0	82.5	1.21%	NA

Notes:
All concentrations in milligrams per litre (mg/L), unless otherwise noted.
Method Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Mean indicates the mean or average value calculated of a field duplicate pair (the FDA and the FD).
Relative Percent Difference is calculated when the mean value is greater than five times the method detection limit; Golder's internal QA/QC target is less than 35%.
Difference Factor is calculated when the mean value is less than five times the method detection limit; Golder's internal QA/QC target is less than 2.
NC = Not Calculated
NA = not applicable
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
SCN = sample control number
COC = Chain of Custody
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-4
Results of Quality Control Analyses - Hydrocarbons
[YTG Landfill Monitoring, Stewart Crossing, Yukon]

	SCN	L1209363-6	L1209363-8	Method Detection Limit	Mean	Relative Percent Difference	Difference Factor (DF)
	Location	SX-MW12-02	SX-MW12-04				
	QA/QC	DUP	DUP				
	Date	10-SEP-12	10-SEP-12				
Monoaromatic Hydrocarbons							
benzene		<0.00050	<0.00050	0.00050	NC	NC	NA
ethylbenzene		<0.00050	<0.00050	0.00050	NC	NC	NA
styrene		<0.00050	<0.00050	0.00050	NC	NC	NA
toluene		<0.00050	<0.00050	0.00050	NC	NC	NA
ortho-xylene		<0.00050	<0.00050	0.00050	NC	NC	NA
meta- & para-xylene		<0.00050	<0.00050	0.00050	NC	NC	NA
total xylene		<0.00075	<0.00075	0.00075	NC	NC	NA
VHw_{6-10}		<0.10	<0.10	0.10	NC	NC	NA
VPHw		<0.10	<0.10	0.10	NC	NC	NA
Polycyclic Aromatic Hydrocarbons							
acenaphthene		<0.000050	<0.000050	0.000050	NC	NC	NA
acenaphthylene		<0.000050	<0.000050	0.000050	NC	NC	NA
acridine		<0.000050	<0.000050	0.000050	NC	NC	NA
anthracene		<0.000050	<0.000050	0.000050	NC	NC	NA
benzo(a)anthracene		<0.000050	<0.000050	0.000050	NC	NC	NA
benzo(a)pyrene		<0.000010	<0.000010	0.000010	NC	NC	NA
benzo(b)fluoranthene		<0.000050	<0.000050	0.000050	NC	NC	NA
benzo(g,h,i)perylene		<0.000050	<0.000050	0.000050	NC	NC	NA
benzo(k)fluoranthene		<0.000050	<0.000050	0.000050	NC	NC	NA
chrysene		<0.000050	<0.000050	0.000050	NC	NC	NA
dibenzo(a,h)anthracene		<0.000050	<0.000050	0.000050	NC	NC	NA
fluoranthene		<0.000050	<0.000050	0.000050	NC	NC	NA
fluorene		<0.000050	<0.000050	0.000050	NC	NC	NA
indeno(1,2,3-c,d)pyrene		<0.000050	<0.000050	0.000050	NC	NC	NA
naphthalene		<0.000050	<0.000050	0.000050	NC	NC	NA
phenanthrene		<0.000050	<0.000050	0.000050	NC	NC	NA
pyrene		<0.000050	<0.000050	0.000050	NC	NC	NA
quinoline		<0.000050	<0.000050	0.00005	NC	NC	NA
Other Hydrocarbons							
$EPHw_{10-19}$		<0.25	<0.25	0.25	NC	NC	NA
$EPHw_{19-32}$		<0.25	<0.25	0.25	NC	NC	NA
LEPHw		<0.25	<0.25	0.25	NC	NC	NA
HEPHw		<0.25	<0.25	0.25	NC	NC	NA
Miscellaneous Organics							
methyl tertiary butyl ether (MTBE)		0.00148	0.00148	0.00050	0.00148	0.00%	NA

Notes:
All concentrations in milligrams per litre (mg/L), unless otherwise noted.
Method Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Mean indicates the mean or average value calculated of a field duplicate pair (the FDA and the FD).
Relative Percent Difference is calculated when the mean value is greater than five times the method detection limit; Golder's internal QA/QC target is less than 35%.
Difference Factor is calculated when the mean value is less than five times the method detection limit; Golder's internal QA/QC target is less than 2.
NC = Not Calculated
NA = not applicable
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
SCN = sample control number
COC = Chain of Custody
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

GOLDER ASSOCIATES LTD.
ATTN: Andrea Badger
201B, 170 Titanium Way
Whitehorse YT Y1A 0G1

Date Received: 14-SEP-12
Report Date: 27-SEP-12 10:35 (MT)
Version: FINAL

Client Phone: 867-633-6076

Certificate of Analysis

Lab Work Order #: L1209363

Project P.O. #: NOT SUBMITTED
Job Reference: 11-1436-0073/1200,2200,2400,2700
C of C Numbers:
Legal Site Desc:

Amber Springer
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1209363-1	L1209363-2	L1209363-3	L1209363-4	L1209363-5
Description	groundwater	groundwater	groundwater	surface water	groundwater
Sampled Date	09-SEP-12	10-SEP-12	10-SEP-12	13-SEP-12	12-SEP-12
Sampled Time	15:40	10:20	11:30	13:30	10:40
Client ID	PC-MW12-01	PC-MW12-02	PC-MW12-03	PC SURFACE	SX-MW12-01
Grouping / **Analyte**					
WATER					
Physical Tests					
Hardness (as CaCO3) (mg/L)	5720	2500	3010	2350	681
pH (pH)	7.83	7.93	7.87	8.13	7.78
Total Dissolved Solids (mg/L)	8890	3970	4690	3870	1470
Anions and Nutrients					
Alkalinity, Bicarbonate (as CaCO3) (mg/L)	447	288	270	344	107
Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<1.0	<2.0
Alkalinity, Total (as CaCO3) (mg/L)	447	288	270	344	107
Ammonia, Total (as N) (mg/L)	1.84	1.54	1.80	0.342	0.0122
Chloride (Cl) (mg/L)	109	90	105	76	431
Fluoride (F) (mg/L)	<0.40 DLM	<0.40 DLM	<0.40 DLM	0.48	<0.20 DLM
Nitrate (as N) (mg/L)	<0.25 DLA	<0.10 DLA	<0.10 DLA	<0.10 DLA	<0.050 DLA
Nitrite (as N) (mg/L)	<0.050 DLA	<0.020 DLA	<0.020 DLA	<0.020 DLA	<0.010 DLA
Total Kjeldahl Nitrogen (mg/L)	4.04	2.54	3.07	3.95	0.179
Sulfate (SO4) (mg/L)	5840	2520	2900	2140	63.0
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)	33.8	17.2	18.1	68.6	3.32
Dissolved Metals					
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	LAB	FIELD
Aluminum (Al)-Dissolved (mg/L)	<0.10 DLA	<0.050 DLA	<0.050 DLA	<0.050 DLA	<0.050 DLA
Antimony (Sb)-Dissolved (mg/L)	<0.0050 DLA	<0.0025 DLA	<0.0025 DLA	<0.0025 DLA	<0.0025 DLA
Arsenic (As)-Dissolved (mg/L)	0.0083	0.00855	0.00699	0.00134	0.00060
Barium (Ba)-Dissolved (mg/L)	<0.20 DLA	<0.10 DLA	<0.10 DLA	<0.10 DLA	<0.10 DLA
Beryllium (Be)-Dissolved (mg/L)	<0.010 DLA	<0.0050	<0.0050	<0.0050	<0.0050
Bismuth (Bi)-Dissolved (mg/L)	<0.40 DLA	<0.20 DLA	<0.20 DLA	<0.20 DLA	<0.20 DLA
Boron (B)-Dissolved (mg/L)	<1.0 DLA	<0.50 DLA	<0.50 DLA	<0.50 DLA	<0.50 DLA
Cadmium (Cd)-Dissolved (mg/L)	<0.0020 DLA	<0.0010 DLA	<0.0010 DLA	<0.0010 DLA	0.0016
Calcium (Ca)-Dissolved (mg/L)	372	213	263	278	218
Chromium (Cr)-Dissolved (mg/L)	<0.020 DLA	<0.010 DLA	<0.010 DLA	<0.010 DLA	<0.010 DLA
Cobalt (Co)-Dissolved (mg/L)	<0.020 DLA	<0.010 DLA	<0.010 DLA	<0.010 DLA	0.025
Copper (Cu)-Dissolved (mg/L)	<0.010 DLA	<0.0050 DLA	<0.0050 DLA	<0.0050 DLA	<0.0050 DLA
Iron (Fe)-Dissolved (mg/L)	0.463	0.475	0.297	0.079	<0.030
Lead (Pb)-Dissolved (mg/L)	<0.0050 DLA	<0.0025 DLA	<0.0025 DLA	<0.0025 DLA	<0.0025 DLA
Lithium (Li)-Dissolved (mg/L)	0.025	0.021	0.035	0.031	0.021
Magnesium (Mg)-Dissolved (mg/L)	1160	477	571	403	32.9
Manganese (Mn)-Dissolved (mg/L)	0.691	0.377	0.400	0.042	1.28
Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Molybdenum (Mo)-Dissolved (mg/L)	<0.060 DLA	<0.030	<0.030	<0.030	<0.030
Nickel (Ni)-Dissolved (mg/L)	<0.10 DLA	<0.050	<0.050	<0.050	0.106

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1209363-6	L1209363-7	L1209363-8	L1209363-9	L1209363-10
Description	groundwater	groundwater	groundwater	surface water	groundwater
Sampled Date	10-SEP-12	10-SEP-12	10-SEP-12	12-SEP-12	11-SEP-12
Sampled Time	16:30	17:45	16:30	13:20	10:45
Client ID	SX-MW12-02	SX-MW12-03	SX-MW12-04	SX SURFACE	MA-MW12-01
Grouping / **Analyte**					
WATER					
Physical Tests					
Hardness (as CaCO3) (mg/L)	3120	189	3040	127	229
pH (pH)	7.70	8.05	7.78	7.90	8.07
Total Dissolved Solids (mg/L)	6260	227	6390	160	364
Anions and Nutrients					
Alkalinity, Bicarbonate (as CaCO3) (mg/L)	247	198	246	120	195
Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as CaCO3) (mg/L)	247	198	246	120	195
Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	0.0110	0.0306
Chloride (Cl) (mg/L)	2010	0.97	1970	<0.50	<0.50
Fluoride (F) (mg/L)	<0.40 DLM	0.377	<0.40 DLM	0.193	0.077
Nitrate (as N) (mg/L)	3.47	0.167	2.38	<0.10 DLA	0.0126
Nitrite (as N) (mg/L)	<0.050 DLA	<0.0010	<0.0010	<0.020 DLA	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.156 TKNI	0.079	0.137 TKNI	0.169	0.77
Sulfate (SO4) (mg/L)	83	12.0	82	18.6	104
Organic / Inorganic Carbon					
Dissolved Organic Carbon (mg/L)	4.12	2.93	3.85	4.26	1.24
Dissolved Metals					
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	LAB	FIELD
Aluminum (Al)-Dissolved (mg/L)	<0.10 DLA	<0.010	<0.10 DLA	<0.010	<0.010
Antimony (Sb)-Dissolved (mg/L)	<0.0050 DLA	<0.00050	<0.0050 DLA	<0.00050	<0.00050
Arsenic (As)-Dissolved (mg/L)	<0.0010 DLA	0.00029	<0.0010 DLA	0.00086	0.00377
Barium (Ba)-Dissolved (mg/L)	<0.20 DLA	0.021	<0.20 DLA	0.094	0.050
Beryllium (Be)-Dissolved (mg/L)	<0.010 DLA	<0.0050	<0.010 DLA	<0.0050	<0.0050
Bismuth (Bi)-Dissolved (mg/L)	<0.40 DLA	<0.20	<0.40 DLA	<0.20	<0.20
Boron (B)-Dissolved (mg/L)	<1.0 DLA	<0.10	<1.0 DLA	<0.10	<0.10
Cadmium (Cd)-Dissolved (mg/L)	<0.0020 DLA	<0.00020	<0.0020 DLA	<0.00020	<0.00020
Calcium (Ca)-Dissolved (mg/L)	1200	61.2	1170	39.6	67.3
Chromium (Cr)-Dissolved (mg/L)	<0.020 DLA	<0.0020	<0.020 DLA	<0.0020	<0.0020
Cobalt (Co)-Dissolved (mg/L)	<0.020 DLA	<0.010	<0.020 DLA	<0.010	<0.010
Copper (Cu)-Dissolved (mg/L)	<0.010 DLA	<0.0010	<0.010 DLA	<0.0010	<0.0010
Iron (Fe)-Dissolved (mg/L)	<0.060 DLA	<0.030	<0.060 DLA	0.194	0.597
Lead (Pb)-Dissolved (mg/L)	<0.0050 DLA	<0.00050	<0.0050 DLA	<0.00050	<0.00050
Lithium (Li)-Dissolved (mg/L)	0.032	0.012	0.032	<0.010	<0.010
Magnesium (Mg)-Dissolved (mg/L)	29.5	8.68	29.5	6.95	14.8
Manganese (Mn)-Dissolved (mg/L)	<0.020 DLA	0.113	<0.020 DLA	0.129	0.482
Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Molybdenum (Mo)-Dissolved (mg/L)	<0.060 DLA	<0.030	<0.060 DLA	<0.030	<0.030
Nickel (Ni)-Dissolved (mg/L)	<0.10 DLA	<0.050	<0.10 DLA	<0.050	<0.050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1209363-11 groundwater 11-SEP-12 12:30 MA-MW12-02	L1209363-12 groundwater 11-SEP-12 14:15 MA-MW12-03	L1209363-13 groundwater 11-SEP-12 15:15 MA-MW12-04	L1209363-14 surface water 12-SEP-12 17:30 MA SURFACE	L1209363-15 groundwater 13-SEP-12 09:25 KE-MW12-01
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	419	191	252	108	719
	pH (pH)	7.94	8.02	8.04	8.16	7.69
	Total Dissolved Solids (mg/L)	4270	263	325	145	968
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	287	154	180	84.2	373
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	287	154	180	84.2	373
	Ammonia, Total (as N) (mg/L)	0.420	0.322	0.0090	<0.0050	0.0877
	Chloride (Cl) (mg/L)	5.1	<0.50	<0.50	<0.50	<5.0 DLM
	Fluoride (F) (mg/L)	0.23	0.074	0.057	0.061	<0.20 DLM
	Nitrate (as N) (mg/L)	0.161	0.0135	0.0137	0.0553	<0.050 DLA
	Nitrite (as N) (mg/L)	0.020	<0.0010	<0.0010	<0.0010	<0.010 DLA
	Total Kjeldahl Nitrogen (mg/L)	8.19	7.36	0.27	0.122	0.572
	Sulfate (SO4) (mg/L)	633	54.7	83.7	29.9	408
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	4.09	0.92	0.74	2.77	5.57
Dissolved Metals	Dissolved Metals Filtration Location	LAB	LAB	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.194	0.016	<0.010	0.026	0.058
	Antimony (Sb)-Dissolved (mg/L)	0.00588	0.00847	<0.00050	<0.00050	0.0019
	Arsenic (As)-Dissolved (mg/L)	0.00236	0.00245	0.00306	0.00225	0.00058
	Barium (Ba)-Dissolved (mg/L)	0.041	0.093	0.061	0.056	<0.040 DLA
	Beryllium (Be)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Bismuth (Bi)-Dissolved (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.20 DLA
	Cadmium (Cd)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	0.00142
	Calcium (Ca)-Dissolved (mg/L)	124	59.2	75.1	32.4	209
	Chromium (Cr)-Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0040 DLA
	Cobalt (Co)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	0.076
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020 DLA
	Iron (Fe)-Dissolved (mg/L)	0.221	<0.030	0.089	<0.030	0.183
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010 DLA
	Lithium (Li)-Dissolved (mg/L)	0.023	<0.010	<0.010	<0.010	0.016
	Magnesium (Mg)-Dissolved (mg/L)	26.5	10.4	15.8	6.68	47.9
	Manganese (Mn)-Dissolved (mg/L)	0.859	0.271	0.319	0.0102	2.86
	Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Molybdenum (Mo)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Nickel (Ni)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	0.141

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1209363-16	L1209363-17			
	Description	groundwater	surface water			
	Sampled Date	13-SEP-12	11-SEP-12			
	Sampled Time	09:55	19:15			
	Client ID	KE-MW12-03	KE SURFACE			
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	1790	95.5			
	pH (pH)	7.55	7.86			
	Total Dissolved Solids (mg/L)	2710	133			
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	408	41.1			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0			
	Alkalinity, Total (as CaCO3) (mg/L)	408	41.1			
	Ammonia, Total (as N) (mg/L)	0.0442	0.0085			
	Chloride (Cl) (mg/L)	24	0.76			
	Fluoride (F) (mg/L)	<0.40 DLM	0.058			
	Nitrate (as N) (mg/L)	<0.10 DLA	0.127			
	Nitrite (as N) (mg/L)	0.062	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	0.520	0.186			
	Sulfate (SO4) (mg/L)	1540	52.9			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	5.04	1.33			
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	<0.050 DLA	0.042			
	Antimony (Sb)-Dissolved (mg/L)	<0.0025 DLA	<0.00050			
	Arsenic (As)-Dissolved (mg/L)	0.00081	0.00090			
	Barium (Ba)-Dissolved (mg/L)	<0.10 DLA	0.052			
	Beryllium (Be)-Dissolved (mg/L)	<0.0050	<0.0050			
	Bismuth (Bi)-Dissolved (mg/L)	<0.20	<0.20			
	Boron (B)-Dissolved (mg/L)	<0.50 DLA	<0.10			
	Cadmium (Cd)-Dissolved (mg/L)	0.0020	<0.00020			
	Calcium (Ca)-Dissolved (mg/L)	571	30.1			
	Chromium (Cr)-Dissolved (mg/L)	<0.010 DLA	<0.0020			
	Cobalt (Co)-Dissolved (mg/L)	0.092	<0.010			
	Copper (Cu)-Dissolved (mg/L)	<0.0050 DLA	<0.0010			
	Iron (Fe)-Dissolved (mg/L)	0.475	0.036			
	Lead (Pb)-Dissolved (mg/L)	<0.0025 DLA	<0.00050			
	Lithium (Li)-Dissolved (mg/L)	0.071	<0.010			
	Magnesium (Mg)-Dissolved (mg/L)	88.8	4.95			
	Manganese (Mn)-Dissolved (mg/L)	4.20	0.0047			
	Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.030	<0.030			
	Nickel (Ni)-Dissolved (mg/L)	0.277	<0.050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1209363-1 groundwater 09-SEP-12 15:40 PC-MW12-01	L1209363-2 groundwater 10-SEP-12 10:20 PC-MW12-02	L1209363-3 groundwater 10-SEP-12 11:30 PC-MW12-03	L1209363-4 surface water 13-SEP-12 13:30 PC SURFACE	L1209363-5 groundwater 12-SEP-12 10:40 SX-MW12-01
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.60 DLA	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	27.5	28.2	32.7	15.3	2.76
	Selenium (Se)-Dissolved (mg/L)	<0.010 DLA	<0.0050 DLA	<0.0050 DLA	<0.0050 DLA	<0.0050 DLA
	Silicon (Si)-Dissolved (mg/L)	6.37	6.51	7.69	8.51	4.83
	Silver (Ag)-Dissolved (mg/L)	<0.020 DLA	<0.010	<0.010	<0.010	<0.010
	Sodium (Na)-Dissolved (mg/L)	231	113	125	103	21.8
	Strontium (Sr)-Dissolved (mg/L)	4.06	2.20	2.84	1.49	0.837
	Thallium (Tl)-Dissolved (mg/L)	<0.40 DLA	<0.20	<0.20	<0.20	<0.20
	Tin (Sn)-Dissolved (mg/L)	<0.060 DLA	<0.030	<0.030	<0.030	<0.030
	Titanium (Ti)-Dissolved (mg/L)	<0.020 DLA	0.018	0.020	0.020	0.018
	Uranium (U)-Dissolved (mg/L)	0.0639	0.00731	0.00886	0.203	0.0267
	Vanadium (V)-Dissolved (mg/L)	<0.060 DLA	<0.030	<0.030	<0.030	<0.030
	Zinc (Zn)-Dissolved (mg/L)	<0.50 DLA	<0.25 DLA	<0.25 DLA	<0.25 DLA	<0.25 DLA
Aggregate Organics	COD (mg/L)	123	56	81	218	52
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Bromodichloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Bromoform (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Carbon Tetrachloride (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Chlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Dibromochloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Chloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Chloroform (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Chloromethane (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	1,2-Dichlorobenzene (mg/L)	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070
	1,3-Dichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,4-Dichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1-Dichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,2-Dichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	cis-1,2-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	trans-1,2-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,3-Dichloropropene (cis & trans) (mg/L)	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014
	Dichloromethane (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	1,2-Dichloropropane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	cis-1,3-Dichloropropylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	trans-1,3-Dichloropropylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1209363-6 groundwater 10-SEP-12 16:30 SX-MW12-02	L1209363-7 groundwater 10-SEP-12 17:45 SX-MW12-03	L1209363-8 groundwater 10-SEP-12 16:30 SX-MW12-04	L1209363-9 surface water 12-SEP-12 13:20 SX SURFACE	L1209363-10 groundwater 11-SEP-12 10:45 MA-MW12-01
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.60 DLA	<0.30	<0.60 DLA	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.2	0.49	1.3	1.09	1.77
	Selenium (Se)-Dissolved (mg/L)	<0.010 DLA	<0.0010	<0.010 DLA	<0.0010	<0.0010
	Silicon (Si)-Dissolved (mg/L)	4.80	4.93	4.84	4.08	2.40
	Silver (Ag)-Dissolved (mg/L)	<0.020 DLA	<0.010	<0.020 DLA	<0.010	<0.010
	Sodium (Na)-Dissolved (mg/L)	32.3	6.6	32.8	2.4	<2.0
	Strontium (Sr)-Dissolved (mg/L)	2.10	0.215	2.17	0.206	0.396
	Thallium (Tl)-Dissolved (mg/L)	<0.40 DLA	<0.20	<0.40 DLA	<0.20	<0.20
	Tin (Sn)-Dissolved (mg/L)	<0.060 DLA	<0.030	<0.060 DLA	<0.030	<0.030
	Titanium (Ti)-Dissolved (mg/L)	<0.020 DLA	<0.010	<0.020 DLA	<0.010	0.012
	Uranium (U)-Dissolved (mg/L)	0.204	0.0180	0.196	0.00086	0.00271
	Vanadium (V)-Dissolved (mg/L)	<0.060 DLA	<0.030	<0.060 DLA	<0.030	<0.030
	Zinc (Zn)-Dissolved (mg/L)	<0.50 DLA	<0.050	<0.50 DLA	<0.050	<0.050
Aggregate Organics	COD (mg/L)	81	<20	88	<20	53
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Bromodichloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Bromoform (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Carbon Tetrachloride (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Chlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Dibromochloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Chloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Chloroform (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Chloromethane (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	1,2-Dichlorobenzene (mg/L)	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070
	1,3-Dichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,4-Dichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1-Dichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,2-Dichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	cis-1,2-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	trans-1,2-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,3-Dichloropropene (cis & trans) (mg/L)	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014
	Dichloromethane (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	1,2-Dichloropropane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	cis-1,3-Dichloropropylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	trans-1,3-Dichloropropylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1209363-11	L1209363-12	L1209363-13	L1209363-14	L1209363-15
Description	groundwater	groundwater	groundwater	surface water	groundwater
Sampled Date	11-SEP-12	11-SEP-12	11-SEP-12	12-SEP-12	13-SEP-12
Sampled Time	12:30	14:15	15:15	17:30	09:25
Client ID	MA-MW12-02	MA-MW12-03	MA-MW12-04	MA SURFACE	KE-MW12-01
Grouping / **Analyte**					
WATER					
Dissolved Metals Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved (mg/L)	4.10	2.50	1.76	0.50	1.52
Selenium (Se)-Dissolved (mg/L)	0.0012	<0.0010	<0.0010	<0.0010	<0.0020 DLA
Silicon (Si)-Dissolved (mg/L)	4.69	2.61	2.91	2.08	5.77
Silver (Ag)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Sodium (Na)-Dissolved (mg/L)	166	<2.0	<2.0	<2.0	5.4
Strontium (Sr)-Dissolved (mg/L)	1.02	0.276	0.325	0.163	0.510
Thallium (Tl)-Dissolved (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
Tin (Sn)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
Titanium (Ti)-Dissolved (mg/L)	0.022	<0.010	0.010	<0.010	0.029
Uranium (U)-Dissolved (mg/L)	0.0542	0.0190	0.00454	0.00071	0.00232
Vanadium (V)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
Zinc (Zn)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.10 DLA
Aggregate Organics COD (mg/L)	77	146	20	<20	47
Volatile Organic Compounds Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bromodichloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bromoform (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Carbon Tetrachloride (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dibromochloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chloroform (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chloromethane (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1,2-Dichlorobenzene (mg/L)	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070
1,3-Dichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,4-Dichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1-Dichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2-Dichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
cis-1,2-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
trans-1,2-Dichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,3-Dichloropropene (cis & trans) (mg/L)	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014
Dichloromethane (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1,2-Dichloropropane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
cis-1,3-Dichloropropylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
trans-1,3-Dichloropropylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1209363-16	L1209363-17			
	Description	groundwater	surface water			
	Sampled Date	13-SEP-12	11-SEP-12			
	Sampled Time	09:55	19:15			
	Client ID	KE-MW12-03	KE SURFACE			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30			
	Potassium (K)-Dissolved (mg/L)	17.2	0.18			
	Selenium (Se)-Dissolved (mg/L)	0.0336	<0.0010			
	Silicon (Si)-Dissolved (mg/L)	9.32	2.92			
	Silver (Ag)-Dissolved (mg/L)	<0.010	<0.010			
	Sodium (Na)-Dissolved (mg/L)	26.9	<2.0			
	Strontium (Sr)-Dissolved (mg/L)	1.69	0.0880			
	Thallium (Tl)-Dissolved (mg/L)	<0.20	<0.20			
	Tin (Sn)-Dissolved (mg/L)	<0.030	<0.030			
	Titanium (Ti)-Dissolved (mg/L)	0.056	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.0412	0.00022			
	Vanadium (V)-Dissolved (mg/L)	<0.030	<0.030			
	Zinc (Zn)-Dissolved (mg/L)	<0.25 DLA	<0.050			
Aggregate Organics	COD (mg/L)	42	<20			
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050			
	Bromodichloromethane (mg/L)	<0.0010	<0.0010			
	Bromoform (mg/L)	<0.0010	<0.0010			
	Carbon Tetrachloride (mg/L)	<0.00050	<0.00050			
	Chlorobenzene (mg/L)	<0.0010	<0.0010			
	Dibromochloromethane (mg/L)	<0.0010	<0.0010			
	Chloroethane (mg/L)	<0.0010	<0.0010			
	Chloroform (mg/L)	<0.0010	<0.0010			
	Chloromethane (mg/L)	<0.0050	<0.0050			
	1,2-Dichlorobenzene (mg/L)	<0.00070	<0.00070			
	1,3-Dichlorobenzene (mg/L)	<0.0010	<0.0010			
	1,4-Dichlorobenzene (mg/L)	<0.0010	<0.0010			
	1,1-Dichloroethane (mg/L)	<0.0010	<0.0010			
	1,2-Dichloroethane (mg/L)	<0.0010	<0.0010			
	1,1-Dichloroethylene (mg/L)	<0.0010	<0.0010			
	cis-1,2-Dichloroethylene (mg/L)	<0.0010	<0.0010			
	trans-1,2-Dichloroethylene (mg/L)	<0.0010	<0.0010			
	1,3-Dichloropropene (cis & trans) (mg/L)	<0.0014	<0.0014			
	Dichloromethane (mg/L)	<0.0050	<0.0050			
	1,2-Dichloropropane (mg/L)	<0.0010	<0.0010			
	cis-1,3-Dichloropropylene (mg/L)	<0.0010	<0.0010			
	trans-1,3-Dichloropropylene (mg/L)	<0.0010	<0.0010			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1209363-1 groundwater 09-SEP-12 15:40 PC-MW12-01	L1209363-2 groundwater 10-SEP-12 10:20 PC-MW12-02	L1209363-3 groundwater 10-SEP-12 11:30 PC-MW12-03	L1209363-4 surface water 13-SEP-12 13:30 PC SURFACE	L1209363-5 groundwater 12-SEP-12 10:40 SX-MW12-01
Sample ID						
Description						
Sampled Date						
Sampled Time						
Client ID						
WATER						
Volatile Organic Compounds	Ethylbenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Methyl t-butyl ether (MTBE) (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Styrene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	1,1,1,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Tetrachloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	1,1,1-Trichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1,2-Trichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Trichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Trichlorofluoromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Vinyl Chloride (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	ortho-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	meta- & para-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075
	Surrogate: 4-Bromofluorobenzene (SS) (%)	77.8	79.3	80.7	79.6	79.1
	Surrogate: 1,4-Difluorobenzene (SS) (%)	83.2	83.0	82.5	83.1	82.9
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<0.25	<0.25	0.47	<0.25
	EPH19-32 (mg/L)	<0.25	<0.25	<0.25	0.54	<0.25
	LEPH (mg/L)	<0.25	<0.25	<0.25	0.47	<0.25
	HEPH (mg/L)	<0.25	<0.25	<0.25	0.54	<0.25
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	VPH (C6-C10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	69.0 SURR-ND	80.1	76.0	81.9	85.7
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000070 DLM	<0.000050
	Acenaphthylene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Acridine (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benz(a)anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(a)pyrene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(b)fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(g,h,i)perylene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(k)fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Chrysene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Dibenz(a,h)anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1209363-6 groundwater 10-SEP-12 16:30 SX-MW12-02	L1209363-7 groundwater 10-SEP-12 17:45 SX-MW12-03	L1209363-8 groundwater 10-SEP-12 16:30 SX-MW12-04	L1209363-9 surface water 12-SEP-12 13:20 SX SURFACE	L1209363-10 groundwater 11-SEP-12 10:45 MA-MW12-01
Sample ID						
Description						
Sampled Date						
Sampled Time						
Client ID						
WATER						
Volatile Organic Compounds	Ethylbenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Methyl t-butyl ether (MTBE) (mg/L)	0.00148	<0.00050	0.00148	<0.00050	<0.00050
	Styrene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	1,1,1,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Tetrachloroethylene (mg/L)	0.0011	<0.0010	0.0010	<0.0010	<0.0010
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	1,1,1-Trichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1,2-Trichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Trichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Trichlorofluoromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Vinyl Chloride (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	ortho-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	meta- & para-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075
	Surrogate: 4-Bromofluorobenzene (SS) (%)	77.1	77.8	78.2	76.2	78.6
	Surrogate: 1,4-Difluorobenzene (SS) (%)	82.9	83.0	83.3	83.1	83.5
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	EPH19-32 (mg/L)	<0.25	<0.25	<0.25	<0.25	0.51
	LEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	HEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	0.51
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	VPH (C6-C10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	78.8	77.7	77.7	70.5	76.5
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Acenaphthylene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Acridine (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benz(a)anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(a)pyrene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(b)fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(g,h,i)perylene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(k)fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Chrysene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Dibenz(a,h)anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1209363-11 groundwater 11-SEP-12 12:30 MA-MW12-02	L1209363-12 groundwater 11-SEP-12 14:15 MA-MW12-03	L1209363-13 groundwater 11-SEP-12 15:15 MA-MW12-04	L1209363-14 surface water 12-SEP-12 17:30 MA SURFACE	L1209363-15 groundwater 13-SEP-12 09:25 KE-MW12-01
WATER						
Volatile Organic Compounds	Ethylbenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Methyl t-butyl ether (MTBE) (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Styrene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	1,1,1,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Tetrachloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	1,1,1-Trichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	1,1,2-Trichloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Trichloroethylene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Trichlorofluoromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Vinyl Chloride (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	ortho-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	meta- & para-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075
	Surrogate: 4-Bromofluorobenzene (SS) (%)	78.2	79.6	79.7	78.1	78.8
	Surrogate: 1,4-Difluorobenzene (SS) (%)	83.0	83.2	83.1	83.1	83.6
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	EPH19-32 (mg/L)	<0.25	0.78	0.50	<0.25	0.54
	LEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	HEPH (mg/L)	<0.25	0.78	0.50	<0.25	0.54
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	VPH (C6-C10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	71.3	83.0	75.8	78.8	75.4
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Acenaphthylene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Acridine (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benz(a)anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(a)pyrene (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Benzo(b)fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(g,h,i)perylene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Benzo(k)fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Chrysene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Dibenz(a,h)anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1209363-16	L1209363-17			
	Description	groundwater	surface water			
	Sampled Date	13-SEP-12	11-SEP-12			
	Sampled Time	09:55	19:15			
	Client ID	KE-MW12-03	KE SURFACE			
Grouping	**Analyte**					
WATER						
Volatile Organic Compounds	Ethylbenzene (mg/L)	<0.00050	<0.00050			
	Methyl t-butyl ether (MTBE) (mg/L)	<0.00050	<0.00050			
	Styrene (mg/L)	<0.00050	<0.00050			
	1,1,1,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010			
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010			
	Tetrachloroethylene (mg/L)	<0.0010	<0.0010			
	Toluene (mg/L)	0.00159	<0.00050			
	1,1,1-Trichloroethane (mg/L)	<0.0010	<0.0010			
	1,1,2-Trichloroethane (mg/L)	<0.0010	<0.0010			
	Trichloroethylene (mg/L)	<0.0010	<0.0010			
	Trichlorofluoromethane (mg/L)	<0.0010	<0.0010			
	Vinyl Chloride (mg/L)	<0.0010	<0.0010			
	ortho-Xylene (mg/L)	<0.00050	<0.00050			
	meta- & para-Xylene (mg/L)	0.00063	<0.00050			
	Xylenes (mg/L)	<0.00075	<0.00075			
	Surrogate: 4-Bromofluorobenzene (SS) (%)	78.3	79.8			
	Surrogate: 1,4-Difluorobenzene (SS) (%)	81.9	82.8			
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<0.25			
	EPH19-32 (mg/L)	<0.25	<0.25			
	LEPH (mg/L)	<0.25	<0.25			
	HEPH (mg/L)	<0.25	<0.25			
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10	<0.10			
	VPH (C6-C10) (mg/L)	<0.10	<0.10			
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	73.8	81.8			
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000050	<0.000050			
	Acenaphthylene (mg/L)	<0.000050	<0.000050			
	Acridine (mg/L)	<0.000050	<0.000050			
	Anthracene (mg/L)	<0.000050	<0.000050			
	Benz(a)anthracene (mg/L)	<0.000050	<0.000050			
	Benzo(a)pyrene (mg/L)	<0.000010	<0.000010			
	Benzo(b)fluoranthene (mg/L)	<0.000050	<0.000050			
	Benzo(g,h,i)perylene (mg/L)	<0.000050	<0.000050			
	Benzo(k)fluoranthene (mg/L)	<0.000050	<0.000050			
	Chrysene (mg/L)	<0.000050	<0.000050			
	Dibenz(a,h)anthracene (mg/L)	<0.000050	<0.000050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1209363-1	L1209363-2	L1209363-3	L1209363-4	L1209363-5
	Description	groundwater	groundwater	groundwater	surface water	groundwater
	Sampled Date	09-SEP-12	10-SEP-12	10-SEP-12	13-SEP-12	12-SEP-12
	Sampled Time	15:40	10:20	11:30	13:30	10:40
	Client ID	PC-MW12-01	PC-MW12-02	PC-MW12-03	PC SURFACE	SX-MW12-01
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	Fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Fluorene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Naphthalene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Phenanthrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Pyrene (mg/L)	0.000098	<0.000050	<0.000050	<0.000050	<0.000050
	Quinoline (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Surrogate: Acenaphthene d10 (%)	86.1	91.8	93.5	102.1	94.4
	Surrogate: Acridine d9 (%)	89.4	96.4	97.1	103.3	101.1
	Surrogate: Chrysene d12 (%)	80.2	87.6	86.6	83.0	85.4
	Surrogate: Naphthalene d8 (%)	90.2	93.6	91.6	98.4	94.4
	Surrogate: Phenanthrene d10 (%)	88.9	93.4	95.9	95.0	96.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1209363-6	L1209363-7	L1209363-8	L1209363-9	L1209363-10
	Description	groundwater	groundwater	groundwater	surface water	groundwater
	Sampled Date	10-SEP-12	10-SEP-12	10-SEP-12	12-SEP-12	11-SEP-12
	Sampled Time	16:30	17:45	16:30	13:20	10:45
	Client ID	SX-MW12-02	SX-MW12-03	SX-MW12-04	SX SURFACE	MA-MW12-01
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	Fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Fluorene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Naphthalene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Phenanthrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Pyrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Quinoline (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Surrogate: Acenaphthene d10 (%)	99.8	90.1	90.2	95.7	94.4
	Surrogate: Acridine d9 (%)	106.9	95.4	94.6	100.1	93.6
	Surrogate: Chrysene d12 (%)	93.7	85.2	85.5	89.5	86.4
	Surrogate: Naphthalene d8 (%)	100.7	90.3	89.7	95.2	93.9
	Surrogate: Phenanthrene d10 (%)	103.0	92.2	91.2	97.9	95.4

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1209363-11	L1209363-12	L1209363-13	L1209363-14	L1209363-15
	Description	groundwater	groundwater	groundwater	surface water	groundwater
	Sampled Date	11-SEP-12	11-SEP-12	11-SEP-12	12-SEP-12	13-SEP-12
	Sampled Time	12:30	14:15	15:15	17:30	09:25
	Client ID	MA-MW12-02	MA-MW12-03	MA-MW12-04	MA SURFACE	KE-MW12-01
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	Fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Fluorene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Naphthalene (mg/L)	<0.000050	0.000051	<0.000050	<0.000050	0.000059
	Phenanthrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Pyrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Quinoline (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Surrogate: Acenaphthene d10 (%)	89.7	89.6	98.3	92.0	104.8
	Surrogate: Acridine d9 (%)	96.3	90.7	99.3	97.7	101.0
	Surrogate: Chrysene d12 (%)	86.7	75.9	89.1	78.7	87.4
	Surrogate: Naphthalene d8 (%)	89.8	88.9	97.8	92.5	88.0
	Surrogate: Phenanthrene d10 (%)	92.3	91.3	99.6	93.7	96.5

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1209363-16	L1209363-17			
	Description	groundwater	surface water			
	Sampled Date	13-SEP-12	11-SEP-12			
	Sampled Time	09:55	19:15			
	Client ID	KE-MW12-03	KE SURFACE			
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	Fluoranthene (mg/L)	<0.000050	<0.000050			
	Fluorene (mg/L)	<0.000050	<0.000050			
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000050	<0.000050			
	Naphthalene (mg/L)	0.000065	<0.000050			
	Phenanthrene (mg/L)	<0.000050	<0.000050			
	Pyrene (mg/L)	<0.000050	<0.000050			
	Quinoline (mg/L)	<0.000050	<0.000050			
	Surrogate: Acenaphthene d10 (%)	106.9	89.3			
	Surrogate: Acridine d9 (%)	91.2	87.3			
	Surrogate: Chrysene d12 (%)	78.1	75.5			
	Surrogate: Naphthalene d8 (%)	88.8	89.6			
	Surrogate: Phenanthrene d10 (%)	88.4	88.3			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Nitrite (as N)	DLA	L1209363-1, -10, -11, -12, -13, -14, -15, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nitrate (as N)	DLA	L1209363-1, -10, -11, -12, -13, -14, -15, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Aluminum (Al)-Dissolved	DLA	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Duplicate	Boron (B)-Dissolved	DLA	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Duplicate	Cadmium (Cd)-Dissolved	DLA	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Duplicate	Chromium (Cr)-Dissolved	DLA	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Duplicate	Copper (Cu)-Dissolved	DLA	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Duplicate	Lead (Pb)-Dissolved	DLA	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Duplicate	Selenium (Se)-Dissolved	DLA	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Duplicate	Zinc (Zn)-Dissolved	DLA	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Duplicate	Fluoride (F)	DLM	L1209363-1, -10, -11, -12, -13, -14, -15, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Method Blank	Manganese (Mn)-Dissolved	MB-LOR	L1209363-11, -12, -4, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Matrix Spike	Potassium (K)-Dissolved	MS-B	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1209363-1, -10, -13, -14, -15, -16, -2, -3, -5, -6, -7, -8

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
DLM	Detection Limit Adjusted For Sample Matrix Effects
MB-LOR	Method Blank exceeds ALS DQO. LORs adjusted for samples with positive hits below 5 times blank level. Please contact ALS if re-analysis is required.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SURR-ND	Surrogate recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.
TKNI	TKN result is likely biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ALK-SCR-VA	Water	Alkalinity by colour or titration	EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.
OR
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-WR	Water	Nitrite Nitrogen by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.

Reference Information

ANIONS-NO3-IC-WR	Water	Nitrate Nitrogen by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

COD-COL-VA	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

EPH-SF-FID-VA	Water	EPH in Water by GCFID	BCMOE EPH GCFID

This analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Extractable Petroleum Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999). The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene and analysed by capillary column gas chromatography with flame ionization detection (GC/FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-DIS-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS	EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

LEPH/HEPH-CALC-VA	Water	LEPHs and HEPHs	BC MOE LABORATORY MANUAL (2005)

Light and Heavy Extractable Petroleum Hydrocarbons in water. These results are determined according to the British Columbia Ministry of Environment, Lands, and Parks Analytical Method for Contaminated Sites "Calculation of Light and Heavy Extractable Petroleum Hydrocarbons in Solids or Water". According to this method, LEPH and HEPH are calculated by subtracting selected Polycyclic Aromatic Hydrocarbon results from Extractable Petroleum Hydrocarbon results. To calculate LEPH, the individual results for Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene are subtracted from EPH(C10-19). To calculate HEPH, the individual results for Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene are subtracted from EPH(C19-32). Analysis of Extractable Petroleum Hydrocarbons adheres to all prescribed elements of the BCMELP method "Extractable Petroleum Hydrocarbons in Water by GC/FID" (Version 2.1, July 20, 1999).

MET-DIS-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-DIS-LOW-MS-VA	Water	Dissolved Metals in Water by ICPMS(Low)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures involves preliminary sample treatment by filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PAH-SF-MS-VA	Water	PAH in Water by GCMS	EPA 3510, 8270

The entire water sample is extracted with dichloromethane, prior to analysis by gas chromatography with mass spectrometric detection (GC/MS). Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PAH-SURR-MS-VA	Water	PAH Surrogates for Waters	EPA 3510, 8270

Analysed as per the corresponding PAH test method. Known quantities of surrogate compounds are added prior to analysis to each sample to demonstrate analytical accuracy.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

Reference Information

It is recommended that this analysis be conducted in the field.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

VH-HSFID-VA	Water	VH in Water by Headspace GCFID	B.C. MIN. OF ENV. LAB. MAN. (2009)

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transfered into a gas chromatograph. Compounds eluting between n-hexane and n-decane are measured and summed together using flame-ionization detection.

VH-SURR-FID-VA	Water	VH Surrogates for Waters	B.C. MIN. OF ENV. LAB. MAN. (2009)
VOC-HSMS-VA	Water	VOCs in water by Headspace GCMS	EPA8260B, 5021

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.

VOC7-HSMS-VA	Water	BTEX/MTBE/Styrene by Headspace GCMS	EPA8260B, 5021

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transfered into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.

VOC7/VOC-SURR-MS-VA	Water	VOC7 and/or VOC Surrogates for Waters	EPA8260B, 5021
VPH-CALC-VA	Water	VPH is VH minus select aromatics	BC MOE LABORATORY MANUAL (2005)

These results are determined according to the British Columbia Ministry of Environment Analytical Method for Contaminated Sites "Calculation of Volatile Petroleum Hydrocarbons in Solids or Water". The concentrations of specific Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene, Xylenes and, in solids, Styrene) are subtracted from the collective concentration of Volatile Hydrocarbons (VH) that elute between n-hexane (nC6) and n-decane (nC10).

XYLENES-CALC-VA	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: GOLDER ASSOCIATES LTD.
201B, 170 Titanium Way
Whitehorse YT Y1A 0G1
Contact: Andrea Badger

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-PCT-VA	**Water**							
Batch R2440917								
WG1551094-10 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			105.2		%		85-115	21-SEP-12
WG1551094-11 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			102.5		%		85-115	21-SEP-12
WG1551094-12 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			105.5		%		85-115	21-SEP-12
WG1551094-13 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			105.2		%		85-115	21-SEP-12
WG1551094-14 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			103.6		%		85-115	21-SEP-12
WG1551094-15 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			103.8		%		85-115	21-SEP-12
WG1551094-16 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			106.1		%		85-115	21-SEP-12
WG1551094-9 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			107.8		%		85-115	21-SEP-12
WG1551094-34 DUP		**L1209363-12**						
Alkalinity, Total (as CaCO3)		154	155		mg/L	0.2	20	21-SEP-12
Alkalinity, Bicarbonate (as CaCO3)		154	155		mg/L	0.2	20	21-SEP-12
Alkalinity, Carbonate (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	25	21-SEP-12
Alkalinity, Hydroxide (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	21-SEP-12
WG1551094-2 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	21-SEP-12
WG1551094-4 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	21-SEP-12
WG1551094-5 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	21-SEP-12
WG1551094-6 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-PCT-VA	**Water**							
Batch R2440917								
WG1551094-6 MB								
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	21-SEP-12
WG1551094-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	21-SEP-12
Batch R2443112								
WG1553049-10 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			104.1		%		85-115	25-SEP-12
WG1553049-11 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			104.3		%		85-115	25-SEP-12
WG1553049-12 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			104.1		%		85-115	25-SEP-12
WG1553049-13 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			102.9		%		85-115	25-SEP-12
WG1553049-14 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			102.5		%		85-115	25-SEP-12
WG1553049-15 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			105.2		%		85-115	25-SEP-12
WG1553049-16 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			102.1		%		85-115	25-SEP-12
WG1553049-9 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			104.5		%		85-115	25-SEP-12
WG1553049-8 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	25-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	25-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	25-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	25-SEP-12
ALK-SCR-VA	**Water**							
Batch R2440701								
WG1550572-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			97.4		%		85-115	20-SEP-12
WG1550572-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			106.3		%		85-115	20-SEP-12
WG1550572-10 DUP		**L1209363-10**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-SCR-VA	**Water**							
Batch R2440701								
WG1550572-10 DUP		**L1209363-10**						
Alkalinity, Total (as CaCO3)		195	194		mg/L	0.4	20	20-SEP-12
WG1550572-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	20-SEP-12
WG1550572-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	20-SEP-12
WG1550572-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	20-SEP-12
ANIONS-CL-IC-VA	**Water**							
Batch R2439735								
WG1549122-3 DUP		**L1209363-12**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	19-SEP-12
WG1549122-15 LCS								
Chloride (Cl)			97.9		%		85-115	19-SEP-12
WG1549122-2 LCS								
Chloride (Cl)			97.8		%		85-115	19-SEP-12
WG1549122-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-10 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-13 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-4 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-7 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-11 MS		**L1209564-7**						
Chloride (Cl)			101.1		%		75-125	19-SEP-12
WG1549122-14 MS		**L1209704-1**						
Chloride (Cl)			100.7		%		75-125	19-SEP-12
WG1549122-5 MS		**L1209363-7**						
Chloride (Cl)			100.5		%		75-125	19-SEP-12
WG1549122-8 MS		**L1209433-3**						
Chloride (Cl)			100.5		%		75-125	19-SEP-12
ANIONS-F-IC-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-F-IC-VA	**Water**							
Batch R2439735								
WG1549122-3 DUP		**L1209363-12**						
Fluoride (F)		0.074	0.074		mg/L	0.0	20	19-SEP-12
WG1549122-15 LCS								
Fluoride (F)			101.9		%		85-115	19-SEP-12
WG1549122-2 LCS								
Fluoride (F)			101.6		%		85-115	19-SEP-12
WG1549122-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-SEP-12
WG1549122-10 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-SEP-12
WG1549122-13 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-SEP-12
WG1549122-4 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-SEP-12
WG1549122-7 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-SEP-12
WG1549122-11 MS		**L1209564-7**						
Fluoride (F)			100.4		%		75-125	19-SEP-12
WG1549122-14 MS		**L1209704-1**						
Fluoride (F)			104.6		%		75-125	19-SEP-12
WG1549122-5 MS		**L1209363-7**						
Fluoride (F)			100.5		%		75-125	19-SEP-12
WG1549122-8 MS		**L1209433-3**						
Fluoride (F)			104.0		%		75-125	19-SEP-12
ANIONS-NO2-IC-WR	**Water**							
Batch R2439214								
WG1549682-3 DUP		**L1209363-1**						
Nitrite (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	14-SEP-12
WG1549682-2 LCS								
Nitrite (as N)			104.8		%		85-115	14-SEP-12
WG1549682-6 LCS								
Nitrite (as N)			104.0		%		85-115	14-SEP-12
WG1549682-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	14-SEP-12
WG1549682-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	14-SEP-12
WG1549682-4 MS		**L1209363-7**						
Nitrite (as N)			97.1		%		75-125	14-SEP-12
WG1549682-8 MS		**L1209430-2**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-NO2-IC-WR	**Water**							
Batch R2439214								
WG1549682-8 MS		**L1209430-2**						
Nitrite (as N)			102.8		%		75-125	14-SEP-12
ANIONS-NO3-IC-WR	**Water**							
Batch R2439214								
WG1549682-3 DUP		**L1209363-1**						
Nitrate (as N)		<0.25	<0.25	RPD-NA	mg/L	N/A	20	14-SEP-12
WG1549682-2 LCS								
Nitrate (as N)			104.2		%		85-115	14-SEP-12
WG1549682-6 LCS								
Nitrate (as N)			104.5		%		85-115	14-SEP-12
WG1549682-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	14-SEP-12
WG1549682-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	14-SEP-12
WG1549682-4 MS		**L1209363-7**						
Nitrate (as N)			99.6		%		75-125	14-SEP-12
WG1549682-8 MS		**L1209430-2**						
Nitrate (as N)			100.7		%		75-125	14-SEP-12
ANIONS-SO4-IC-VA	**Water**							
Batch R2439735								
WG1549122-3 DUP		**L1209363-12**						
Sulfate (SO4)		54.7	54.7		mg/L	0.0	20	19-SEP-12
WG1549122-15 LCS								
Sulfate (SO4)			101.1		%		85-115	19-SEP-12
WG1549122-2 LCS								
Sulfate (SO4)			100.9		%		85-115	19-SEP-12
WG1549122-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-10 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-13 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-4 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-7 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	19-SEP-12
WG1549122-11 MS		**L1209564-7**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-SO4-IC-VA	**Water**							
Batch R2439735								
WG1549122-11 MS		**L1209564-7**						
Sulfate (SO4)			102.9		%		75-125	19-SEP-12
WG1549122-14 MS		**L1209704-1**						
Sulfate (SO4)			102.5		%		75-125	19-SEP-12
WG1549122-5 MS		**L1209363-7**						
Sulfate (SO4)			101.2		%		75-125	19-SEP-12
WG1549122-8 MS		**L1209433-3**						
Sulfate (SO4)			97.9		%		75-125	19-SEP-12
CARBONS-DOC-VA	**Water**							
Batch R2439116								
WG1549198-2 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			100.2		%		80-120	18-SEP-12
WG1549198-4 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			98.0		%		80-120	18-SEP-12
WG1549198-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-SEP-12
WG1549198-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	18-SEP-12
WG1549198-7 MS		**L1209483-3**						
Dissolved Organic Carbon			90.6		%		70-130	18-SEP-12
Batch R2439195								
WG1548363-10 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			97.7		%		80-120	17-SEP-12
WG1548363-2 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			99.5		%		80-120	17-SEP-12
WG1548363-4 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			94.2		%		80-120	17-SEP-12
WG1548363-6 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			95.6		%		80-120	17-SEP-12
WG1548363-8 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			95.8		%		80-120	17-SEP-12
WG1548363-13 DUP		**L1209363-16**						
Dissolved Organic Carbon		5.04	4.95		mg/L	1.8	20	17-SEP-12
WG1548363-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	17-SEP-12
WG1548363-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	17-SEP-12
WG1548363-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R2439195								
WG1548363-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	17-SEP-12
WG1548363-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	17-SEP-12
WG1548363-9 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	17-SEP-12
WG1548363-14 MS		**L1209478-2**						
Dissolved Organic Carbon			96.4		%		70-130	17-SEP-12
Batch R2439946								
WG1550152-2 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			98.1		%		80-120	19-SEP-12
WG1550152-4 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			94.2		%		80-120	19-SEP-12
WG1550152-6 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			90.1		%		80-120	19-SEP-12
WG1550152-8 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			90.4		%		80-120	19-SEP-12
WG1550152-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	19-SEP-12
WG1550152-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	19-SEP-12
WG1550152-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	19-SEP-12
WG1550152-7 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	19-SEP-12
WG1550152-10 MS		**L1210319-11**						
Dissolved Organic Carbon			100.4		%		70-130	19-SEP-12
COD-COL-VA	**Water**							
Batch R2437967								
WG1548328-10 LCS								
COD			104.4		%		85-115	18-SEP-12
WG1548328-2 LCS								
COD			104.5		%		85-115	18-SEP-12
WG1548328-6 LCS								
COD			102.1		%		85-115	18-SEP-12
WG1548328-1 MB								
COD			<20		mg/L		20	18-SEP-12
WG1548328-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COD-COL-VA	**Water**							
Batch R2437967								
WG1548328-5 MB								
COD			<20		mg/L		20	18-SEP-12
WG1548328-9 MB								
COD			<20		mg/L		20	18-SEP-12
WG1548328-4 MS		**L1209045-1**						
COD			103.7		%		75-125	18-SEP-12
WG1548328-8 MS		**L1209491-2**						
COD			96.7		%		75-125	18-SEP-12
EPH-SF-FID-VA	**Water**							
Batch R2439979								
WG1549364-1 MB								
EPH10-19			<0.25		mg/L		0.25	20-SEP-12
EPH19-32			<0.25		mg/L		0.25	20-SEP-12
Batch R2440082								
WG1549364-3 MB								
EPH10-19			<0.25		mg/L		0.25	21-SEP-12
EPH19-32			<0.25		mg/L		0.25	21-SEP-12
Batch R2442176								
WG1550411-1 MB								
EPH10-19			<0.25		mg/L		0.25	24-SEP-12
EPH19-32			<0.25		mg/L		0.25	24-SEP-12
WG1550411-3 MB								
EPH10-19			<0.25		mg/L		0.25	24-SEP-12
EPH19-32			<0.25		mg/L		0.25	24-SEP-12
HG-DIS-CVAFS-VA	**Water**							
Batch R2438056								
WG1548035-3 LCS								
Mercury (Hg)-Dissolved			91.4		%		80-120	18-SEP-12
WG1548035-1 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Batch R2439159								
WG1548683-10 LCS								
Mercury (Hg)-Dissolved			95.4		%		80-120	19-SEP-12
WG1548683-11 LCS								
Mercury (Hg)-Dissolved			99.3		%		80-120	19-SEP-12
WG1548683-1 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	19-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-DIS-CVAFS-VA	**Water**							
Batch R2439159								
WG1548683-7 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	19-SEP-12
Batch R2440928								
WG1548035-18 DUP		**L1209363-2**						
Mercury (Hg)-Dissolved		<0.00020	<0.000050	RPD-NA	mg/L	N/A	20	21-SEP-12
WG1548035-19 MS		**L1209363-3**						
Mercury (Hg)-Dissolved			87.1		%		70-130	21-SEP-12
Batch R2442023								
WG1552509-8 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Batch R2443000								
WG1552509-14 LCS								
Mercury (Hg)-Dissolved			89.5		%		80-120	25-SEP-12
WG1552509-15 LCS								
Mercury (Hg)-Dissolved			90.8		%		80-120	25-SEP-12
WG1552509-7 LCS								
Mercury (Hg)-Dissolved			89.9		%		80-120	25-SEP-12
WG1552509-1 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	25-SEP-12
WG1552509-9 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	25-SEP-12
MET-DIS-ICP-VA	**Water**							
Batch R2437951								
WG1548035-2 CRM		**VA-HIGH-WATRM**						
Beryllium (Be)-Dissolved			95.2		%		80-120	17-SEP-12
Bismuth (Bi)-Dissolved			99.6		%		80-120	17-SEP-12
Cobalt (Co)-Dissolved			95.0		%		80-120	17-SEP-12
Iron (Fe)-Dissolved			97.4		%		80-120	17-SEP-12
Lithium (Li)-Dissolved			100.2		%		80-120	17-SEP-12
Molybdenum (Mo)-Dissolved			96.4		%		80-120	17-SEP-12
Nickel (Ni)-Dissolved			96.3		%		80-120	17-SEP-12
Phosphorus (P)-Dissolved			101.7		%		80-120	17-SEP-12
Silicon (Si)-Dissolved			103.7		%		80-120	17-SEP-12
Silver (Ag)-Dissolved			93.8		%		80-120	17-SEP-12
Sodium (Na)-Dissolved			99.7		%		80-120	17-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2437951								
WG1548035-2 CRM		**VA-HIGH-WATRM**						
Strontium (Sr)-Dissolved			99.3		%		80-120	17-SEP-12
Thallium (Tl)-Dissolved			96.9		%		80-120	17-SEP-12
Tin (Sn)-Dissolved			98.9		%		80-120	17-SEP-12
Titanium (Ti)-Dissolved			96.9		%		80-120	17-SEP-12
Vanadium (V)-Dissolved			96.2		%		80-120	17-SEP-12
WG1548035-1 MB								
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	17-SEP-12
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	17-SEP-12
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	17-SEP-12
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	17-SEP-12
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	17-SEP-12
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	17-SEP-12
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	17-SEP-12
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	17-SEP-12
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	17-SEP-12
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	17-SEP-12
Sodium (Na)-Dissolved			<2.0		mg/L		2	17-SEP-12
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	17-SEP-12
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	17-SEP-12
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	17-SEP-12
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	17-SEP-12
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	17-SEP-12
Batch R2438999								
WG1548683-4 CRM		**VA-HIGH-WATRM**						
Beryllium (Be)-Dissolved			94.1		%		80-120	18-SEP-12
Bismuth (Bi)-Dissolved			99.0		%		80-120	18-SEP-12
Cobalt (Co)-Dissolved			96.0		%		80-120	18-SEP-12
Iron (Fe)-Dissolved			98.2		%		80-120	18-SEP-12
Lithium (Li)-Dissolved			100.0		%		80-120	18-SEP-12
Molybdenum (Mo)-Dissolved			97.0		%		80-120	18-SEP-12
Nickel (Ni)-Dissolved			96.4		%		80-120	18-SEP-12
Phosphorus (P)-Dissolved			99.1		%		80-120	18-SEP-12
Silicon (Si)-Dissolved			102.3		%		80-120	18-SEP-12
Silver (Ag)-Dissolved			95.2		%		80-120	18-SEP-12
Sodium (Na)-Dissolved			99.1		%		80-120	18-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2438999								
WG1548683-4 CRM		**VA-HIGH-WATRM**						
Strontium (Sr)-Dissolved			100.1		%		80-120	18-SEP-12
Thallium (Tl)-Dissolved			97.6		%		80-120	18-SEP-12
Tin (Sn)-Dissolved			97.6		%		80-120	18-SEP-12
Titanium (Ti)-Dissolved			100.9		%		80-120	18-SEP-12
Vanadium (V)-Dissolved			96.4		%		80-120	18-SEP-12
WG1548683-8 CRM		**VA-HIGH-WATRM**						
Beryllium (Be)-Dissolved			92.8		%		80-120	18-SEP-12
Bismuth (Bi)-Dissolved			99.0		%		80-120	18-SEP-12
Cobalt (Co)-Dissolved			96.4		%		80-120	18-SEP-12
Iron (Fe)-Dissolved			97.0		%		80-120	18-SEP-12
Lithium (Li)-Dissolved			98.3		%		80-120	18-SEP-12
Molybdenum (Mo)-Dissolved			97.1		%		80-120	18-SEP-12
Nickel (Ni)-Dissolved			96.8		%		80-120	18-SEP-12
Phosphorus (P)-Dissolved			99.0		%		80-120	18-SEP-12
Silicon (Si)-Dissolved			101.3		%		80-120	18-SEP-12
Silver (Ag)-Dissolved			94.9		%		80-120	18-SEP-12
Sodium (Na)-Dissolved			98.3		%		80-120	18-SEP-12
Strontium (Sr)-Dissolved			98.4		%		80-120	18-SEP-12
Thallium (Tl)-Dissolved			98.5		%		80-120	18-SEP-12
Tin (Sn)-Dissolved			98.2		%		80-120	18-SEP-12
Titanium (Ti)-Dissolved			100.1		%		80-120	18-SEP-12
Vanadium (V)-Dissolved			95.0		%		80-120	18-SEP-12
WG1548683-1 MB								
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	18-SEP-12
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	18-SEP-12
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	18-SEP-12
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	18-SEP-12
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	18-SEP-12
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	18-SEP-12
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	18-SEP-12
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Sodium (Na)-Dissolved			<2.0		mg/L		2	18-SEP-12
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	18-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2438999								
WG1548683-1 MB								
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	18-SEP-12
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	18-SEP-12
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	18-SEP-12
WG1548683-7 MB								
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	18-SEP-12
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	18-SEP-12
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	18-SEP-12
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	18-SEP-12
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	18-SEP-12
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	18-SEP-12
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	18-SEP-12
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Sodium (Na)-Dissolved			<2.0		mg/L		2	18-SEP-12
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	18-SEP-12
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	18-SEP-12
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	18-SEP-12
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	18-SEP-12
Batch R2439886								
WG1548035-17 MS		**L1208829-3**						
Iron (Fe)-Dissolved			93.9		%		70-130	20-SEP-12
Sodium (Na)-Dissolved			100.1		%		70-130	20-SEP-12
Titanium (Ti)-Dissolved			106.0		%		70-130	20-SEP-12
Batch R2440104								
WG1548035-11 MS		**L1209483-3**						
Iron (Fe)-Dissolved			96.0		%		70-130	19-SEP-12
Sodium (Na)-Dissolved			102.0		%		70-130	19-SEP-12
Titanium (Ti)-Dissolved			105.4		%		70-130	19-SEP-12
Batch R2441032								
WG1548683-6 MS		**L1209093-4**						
Iron (Fe)-Dissolved			90.8		%		70-130	20-SEP-12
Sodium (Na)-Dissolved			103.3		%		70-130	20-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2441032								
WG1548683-6 MS		**L1209093-4**						
Titanium (Ti)-Dissolved			103.7		%		70-130	20-SEP-12
Batch R2442122								
WG1552509-10 CRM		**VA-HIGH-WATRM**						
Beryllium (Be)-Dissolved			98.6		%		80-120	24-SEP-12
Bismuth (Bi)-Dissolved			102.1		%		80-120	24-SEP-12
Cobalt (Co)-Dissolved			97.5		%		80-120	24-SEP-12
Iron (Fe)-Dissolved			100.2		%		80-120	24-SEP-12
Lithium (Li)-Dissolved			100.9		%		80-120	24-SEP-12
Molybdenum (Mo)-Dissolved			100.1		%		80-120	24-SEP-12
Nickel (Ni)-Dissolved			98.1		%		80-120	24-SEP-12
Phosphorus (P)-Dissolved			102.2		%		80-120	24-SEP-12
Silicon (Si)-Dissolved			102.1		%		80-120	24-SEP-12
Silver (Ag)-Dissolved			101.9		%		80-120	24-SEP-12
Sodium (Na)-Dissolved			102.2		%		80-120	24-SEP-12
Strontium (Sr)-Dissolved			101.8		%		80-120	24-SEP-12
Thallium (Tl)-Dissolved			100.1		%		80-120	24-SEP-12
Tin (Sn)-Dissolved			98.6		%		80-120	24-SEP-12
Titanium (Ti)-Dissolved			105.0		%		80-120	24-SEP-12
Vanadium (V)-Dissolved			101.3		%		80-120	24-SEP-12
WG1552509-8 MB								
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	24-SEP-12
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	24-SEP-12
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Sodium (Na)-Dissolved			<2.0		mg/L		2	24-SEP-12
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	24-SEP-12
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	24-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2442122								
WG1552509-8 MB								
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Batch R2442237								
WG1548035-27 MS		**L1209469-4**						
Iron (Fe)-Dissolved			95.2		%		70-130	21-SEP-12
Sodium (Na)-Dissolved			104.9		%		70-130	21-SEP-12
Titanium (Ti)-Dissolved			105.2		%		70-130	21-SEP-12
Batch R2442242								
WG1548035-18 DUP		**L1209363-2**						
Beryllium (Be)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	21-SEP-12
Bismuth (Bi)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	20	21-SEP-12
Cobalt (Co)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	21-SEP-12
Iron (Fe)-Dissolved		0.475	0.481		mg/L	1.4	20	21-SEP-12
Lithium (Li)-Dissolved		0.021	0.021		mg/L	0.4	20	21-SEP-12
Molybdenum (Mo)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	21-SEP-12
Nickel (Ni)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	21-SEP-12
Phosphorus (P)-Dissolved		<0.30	<0.30	RPD-NA	mg/L	N/A	20	21-SEP-12
Silicon (Si)-Dissolved		6.51	6.58		mg/L	1.1	20	21-SEP-12
Silver (Ag)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	21-SEP-12
Sodium (Na)-Dissolved		113	113		mg/L	0.1	20	21-SEP-12
Strontium (Sr)-Dissolved		2.20	2.22		mg/L	0.7	20	21-SEP-12
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	20	21-SEP-12
Tin (Sn)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	21-SEP-12
Titanium (Ti)-Dissolved		0.018	0.019		mg/L	2.7	20	21-SEP-12
Vanadium (V)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	21-SEP-12
WG1548035-19 MS		**L1209363-3**						
Iron (Fe)-Dissolved			104.2		%		70-130	21-SEP-12
Sodium (Na)-Dissolved			N/A	MS-B	%		-	21-SEP-12
Titanium (Ti)-Dissolved			113.9		%		70-130	21-SEP-12
Batch R2442243								
WG1548035-25 MS		**L1209711-3**						
Iron (Fe)-Dissolved			94.5		%		70-130	22-SEP-12
Sodium (Na)-Dissolved			97.7		%		70-130	22-SEP-12
Titanium (Ti)-Dissolved			99.3		%		70-130	22-SEP-12

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2442493								
WG1548035-29 MS		**L1210039-13**						
Iron (Fe)-Dissolved			93.3		%		70-130	22-SEP-12
Sodium (Na)-Dissolved			101.6		%		70-130	22-SEP-12
Titanium (Ti)-Dissolved			107.9		%		70-130	22-SEP-12
WG1548035-31 MS		**L1210039-31**						
Iron (Fe)-Dissolved			93.9		%		70-130	22-SEP-12
Sodium (Na)-Dissolved			98.5		%		70-130	22-SEP-12
Titanium (Ti)-Dissolved			104.9		%		70-130	22-SEP-12
Batch R2442899								
WG1552509-11 CRM		**VA-HIGH-WATRM**						
Beryllium (Be)-Dissolved			95.7		%		80-120	24-SEP-12
Bismuth (Bi)-Dissolved			99.1		%		80-120	24-SEP-12
Cobalt (Co)-Dissolved			95.6		%		80-120	24-SEP-12
Iron (Fe)-Dissolved			98.1		%		80-120	24-SEP-12
Lithium (Li)-Dissolved			101.3		%		80-120	24-SEP-12
Molybdenum (Mo)-Dissolved			97.6		%		80-120	24-SEP-12
Nickel (Ni)-Dissolved			97.2		%		80-120	24-SEP-12
Phosphorus (P)-Dissolved			100.4		%		80-120	24-SEP-12
Silicon (Si)-Dissolved			100.8		%		80-120	24-SEP-12
Silver (Ag)-Dissolved			102.4		%		80-120	24-SEP-12
Sodium (Na)-Dissolved			97.1		%		80-120	24-SEP-12
Strontium (Sr)-Dissolved			100.0		%		80-120	24-SEP-12
Thallium (Tl)-Dissolved			96.9		%		80-120	24-SEP-12
Tin (Sn)-Dissolved			99.0		%		80-120	24-SEP-12
Titanium (Ti)-Dissolved			102.1		%		80-120	24-SEP-12
Vanadium (V)-Dissolved			100.9		%		80-120	24-SEP-12
WG1552509-5 CRM		**VA-HIGH-WATRM**						
Beryllium (Be)-Dissolved			96.5		%		80-120	24-SEP-12
Bismuth (Bi)-Dissolved			99.1		%		80-120	24-SEP-12
Cobalt (Co)-Dissolved			95.4		%		80-120	24-SEP-12
Iron (Fe)-Dissolved			98.7		%		80-120	24-SEP-12
Lithium (Li)-Dissolved			106.5		%		80-120	24-SEP-12
Molybdenum (Mo)-Dissolved			99.3		%		80-120	24-SEP-12
Nickel (Ni)-Dissolved			97.5		%		80-120	24-SEP-12
Phosphorus (P)-Dissolved			100.9		%		80-120	24-SEP-12
Silicon (Si)-Dissolved			102.7		%		80-120	24-SEP-12

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2442899								
WG1552509-5 CRM		**VA-HIGH-WATRM**						
Silver (Ag)-Dissolved			104.3		%		80-120	24-SEP-12
Sodium (Na)-Dissolved			98.4		%		80-120	24-SEP-12
Strontium (Sr)-Dissolved			101.8		%		80-120	24-SEP-12
Thallium (Tl)-Dissolved			97.9		%		80-120	24-SEP-12
Tin (Sn)-Dissolved			97.7		%		80-120	24-SEP-12
Titanium (Ti)-Dissolved			103.0		%		80-120	24-SEP-12
Vanadium (V)-Dissolved			101.6		%		80-120	24-SEP-12
WG1552509-1 MB								
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	24-SEP-12
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	24-SEP-12
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Sodium (Na)-Dissolved			<2.0		mg/L		2	24-SEP-12
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	24-SEP-12
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
WG1552509-9 MB								
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	24-SEP-12
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	24-SEP-12
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	24-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2442899								
WG1552509-9 MB								
Sodium (Na)-Dissolved			<2.0		mg/L		2	24-SEP-12
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	24-SEP-12
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	24-SEP-12
Batch R2443052								
WG1548035-9 MS		**L1209492-46**						
Iron (Fe)-Dissolved			100.2		%		70-130	25-SEP-12
Sodium (Na)-Dissolved			101.8		%		70-130	25-SEP-12
Titanium (Ti)-Dissolved			109.3		%		70-130	25-SEP-12
Batch R2443115								
WG1548035-5 MS		**L1209555-18**						
Iron (Fe)-Dissolved			99.9		%		70-130	25-SEP-12
Sodium (Na)-Dissolved			114.6		%		70-130	25-SEP-12
Titanium (Ti)-Dissolved			112.7		%		70-130	25-SEP-12
WG1548035-7 MS		**L1209555-29**						
Iron (Fe)-Dissolved			101.7		%		70-130	25-SEP-12
Sodium (Na)-Dissolved			109.8		%		70-130	25-SEP-12
Titanium (Ti)-Dissolved			112.0		%		70-130	25-SEP-12
Batch R2443141								
WG1548035-15 MS		**L1209537-4**						
Iron (Fe)-Dissolved			96.5		%		70-130	23-SEP-12
Sodium (Na)-Dissolved			101.9		%		70-130	23-SEP-12
Titanium (Ti)-Dissolved			106.4		%		70-130	23-SEP-12
Batch R2443782								
WG1548035-13 MS		**L1209540-7**						
Iron (Fe)-Dissolved			87.8		%		70-130	25-SEP-12
Sodium (Na)-Dissolved			97.3		%		70-130	25-SEP-12
Titanium (Ti)-Dissolved			94.9		%		70-130	25-SEP-12
Batch R2444051								
WG1548035-33 MS		**L1209581-2**						
Iron (Fe)-Dissolved			100.4		%		70-130	24-SEP-12
Sodium (Na)-Dissolved			108.6		%		70-130	24-SEP-12
Titanium (Ti)-Dissolved			111.1		%		70-130	24-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch R2438088								
WG1548035-1 MB								
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	18-SEP-12
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-SEP-12
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-SEP-12
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Calcium (Ca)-Dissolved			<0.020		mg/L		0.02	18-SEP-12
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	18-SEP-12
Copper (Cu)-Dissolved			<0.00050		mg/L		0.0005	18-SEP-12
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	18-SEP-12
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-SEP-12
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	18-SEP-12
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-SEP-12
Zinc (Zn)-Dissolved			<0.0030		mg/L		0.003	18-SEP-12
Batch R2438189								
WG1548683-4 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			112.9		%		80-120	18-SEP-12
Antimony (Sb)-Dissolved			107.1		%		80-120	18-SEP-12
Arsenic (As)-Dissolved			112.9		%		80-120	18-SEP-12
Barium (Ba)-Dissolved			114.2		%		80-120	18-SEP-12
Cadmium (Cd)-Dissolved			113.0		%		80-120	18-SEP-12
Calcium (Ca)-Dissolved			108.0		%		80-120	18-SEP-12
Chromium (Cr)-Dissolved			111.6		%		80-120	18-SEP-12
Copper (Cu)-Dissolved			108.3		%		80-120	18-SEP-12
Lead (Pb)-Dissolved			107.6		%		80-120	18-SEP-12
Magnesium (Mg)-Dissolved			111.6		%		80-120	18-SEP-12
Manganese (Mn)-Dissolved			110.1		%		80-120	18-SEP-12
Potassium (K)-Dissolved			110.9		%		80-120	18-SEP-12
Selenium (Se)-Dissolved			101.4		%		80-120	18-SEP-12
Uranium (U)-Dissolved			104.0		%		80-120	18-SEP-12
Zinc (Zn)-Dissolved			102.4		%		80-120	18-SEP-12
WG1548683-7 MB								
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	18-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch R2438189								
WG1548683-7 MB								
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-SEP-12
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-SEP-12
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	18-SEP-12
Copper (Cu)-Dissolved			<0.00050		mg/L		0.0005	18-SEP-12
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-SEP-12
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	18-SEP-12
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-SEP-12
Zinc (Zn)-Dissolved			<0.0030		mg/L		0.003	18-SEP-12
Batch R2438609								
WG1548683-1 MB								
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	18-SEP-12
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-SEP-12
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-SEP-12
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-SEP-12
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Calcium (Ca)-Dissolved			<0.020		mg/L		0.02	18-SEP-12
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	18-SEP-12
Copper (Cu)-Dissolved			<0.00050		mg/L		0.0005	18-SEP-12
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	18-SEP-12
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	18-SEP-12
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-SEP-12
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	18-SEP-12
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-SEP-12
Zinc (Zn)-Dissolved			<0.0030		mg/L		0.003	18-SEP-12
Batch R2439752								
WG1548035-2 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			103.1		%		80-120	19-SEP-12
Antimony (Sb)-Dissolved			100.6		%		80-120	19-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch	**R2439752**							
WG1548035-2	**CRM**	**VA-HIGH-WATRM**						
Arsenic (As)-Dissolved			103.3		%		80-120	19-SEP-12
Barium (Ba)-Dissolved			105.0		%		80-120	19-SEP-12
Boron (B)-Dissolved			108.1		%		80-120	19-SEP-12
Cadmium (Cd)-Dissolved			103.0		%		80-120	19-SEP-12
Calcium (Ca)-Dissolved			97.7		%		80-120	19-SEP-12
Chromium (Cr)-Dissolved			102.6		%		80-120	19-SEP-12
Copper (Cu)-Dissolved			97.1		%		80-120	19-SEP-12
Lead (Pb)-Dissolved			101.3		%		80-120	19-SEP-12
Magnesium (Mg)-Dissolved			99.2		%		80-120	19-SEP-12
Manganese (Mn)-Dissolved			101.8		%		80-120	19-SEP-12
Potassium (K)-Dissolved			99.6		%		80-120	19-SEP-12
Selenium (Se)-Dissolved			100.4		%		80-120	19-SEP-12
Uranium (U)-Dissolved			101.5		%		80-120	19-SEP-12
Zinc (Zn)-Dissolved			94.6		%		80-120	19-SEP-12
WG1548683-8	**CRM**	**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			99.8		%		80-120	19-SEP-12
Antimony (Sb)-Dissolved			104.3		%		80-120	19-SEP-12
Arsenic (As)-Dissolved			100.7		%		80-120	19-SEP-12
Barium (Ba)-Dissolved			103.6		%		80-120	19-SEP-12
Boron (B)-Dissolved			110.7		%		80-120	19-SEP-12
Cadmium (Cd)-Dissolved			102.1		%		80-120	19-SEP-12
Calcium (Ca)-Dissolved			100.5		%		80-120	19-SEP-12
Chromium (Cr)-Dissolved			100.7		%		80-120	19-SEP-12
Copper (Cu)-Dissolved			96.1		%		80-120	19-SEP-12
Lead (Pb)-Dissolved			105.2		%		80-120	19-SEP-12
Magnesium (Mg)-Dissolved			98.2		%		80-120	19-SEP-12
Manganese (Mn)-Dissolved			101.9		%		80-120	19-SEP-12
Potassium (K)-Dissolved			97.7		%		80-120	19-SEP-12
Selenium (Se)-Dissolved			100.6		%		80-120	19-SEP-12
Uranium (U)-Dissolved			109.6		%		80-120	19-SEP-12
Zinc (Zn)-Dissolved			93.4		%		80-120	19-SEP-12
Batch	**R2440035**							
WG1548683-7	**MB**							
Calcium (Ca)-Dissolved			<0.020		mg/L		0.02	20-SEP-12
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	20-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch R2440035								
WG1548683-7 MB								
Manganese (Mn)-Dissolved			0.000077	MB-LOR	mg/L		0.00005	20-SEP-12
Batch R2441054								
WG1548035-18 DUP		**L1209363-2**						
Aluminum (Al)-Dissolved		<0.050	<0.015	RPD-NA	mg/L	N/A	20	20-SEP-12
Antimony (Sb)-Dissolved		<0.0025	0.00061		mg/L	1.2	20	20-SEP-12
Arsenic (As)-Dissolved		0.00855	0.00861		mg/L	0.7	20	20-SEP-12
Barium (Ba)-Dissolved		<0.10	0.0123		mg/L	0.3	20	20-SEP-12
Boron (B)-Dissolved		<0.50	<0.050	RPD-NA	mg/L	N/A	20	20-SEP-12
Cadmium (Cd)-Dissolved		<0.0010	<0.00025	RPD-NA	mg/L	N/A	20	20-SEP-12
Calcium (Ca)-Dissolved		213	213		mg/L	0.0	20	20-SEP-12
Chromium (Cr)-Dissolved		<0.010	<0.0025	RPD-NA	mg/L	N/A	20	20-SEP-12
Copper (Cu)-Dissolved		<0.0050	<0.0025	RPD-NA	mg/L	N/A	20	20-SEP-12
Lead (Pb)-Dissolved		<0.0025	<0.00025	RPD-NA	mg/L	N/A	20	20-SEP-12
Magnesium (Mg)-Dissolved		477	482		mg/L	1.2	20	20-SEP-12
Manganese (Mn)-Dissolved		0.377	0.385		mg/L	2.1	20	20-SEP-12
Potassium (K)-Dissolved		28.2	28.9		mg/L	2.3	20	20-SEP-12
Selenium (Se)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	20-SEP-12
Uranium (U)-Dissolved		0.00731	0.00741		mg/L	1.4	20	20-SEP-12
Zinc (Zn)-Dissolved		<0.25	<0.015	RPD-NA	mg/L	N/A	20	20-SEP-12
WG1548035-19 MS		**L1209363-3**						
Aluminum (Al)-Dissolved			91.6		%		70-130	20-SEP-12
Arsenic (As)-Dissolved			112.8		%		70-130	20-SEP-12
Cadmium (Cd)-Dissolved			93.0		%		70-130	20-SEP-12
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	20-SEP-12
Chromium (Cr)-Dissolved			94.6		%		70-130	20-SEP-12
Copper (Cu)-Dissolved			87.6		%		70-130	20-SEP-12
Lead (Pb)-Dissolved			101.2		%		70-130	20-SEP-12
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	20-SEP-12
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	20-SEP-12
Potassium (K)-Dissolved			N/A	MS-B	%		-	20-SEP-12
Uranium (U)-Dissolved			N/A	MS-B	%		-	20-SEP-12
Zinc (Zn)-Dissolved			80.7		%		70-130	20-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch	**R2442159**							
WG1552509-8	**MB**							
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	24-SEP-12
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	24-SEP-12
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	24-SEP-12
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Boron (B)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Calcium (Ca)-Dissolved			<0.020		mg/L		0.02	24-SEP-12
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	24-SEP-12
Copper (Cu)-Dissolved			<0.00050		mg/L		0.0005	24-SEP-12
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	24-SEP-12
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	24-SEP-12
Zinc (Zn)-Dissolved			<0.0030		mg/L		0.003	24-SEP-12
WG1548035-19	**MS**	**L1209363-3**						
Antimony (Sb)-Dissolved			126.6		%		70-130	24-SEP-12
Boron (B)-Dissolved			127.0		%		70-130	24-SEP-12
Batch	**R2442738**							
WG1552509-1	**MB**							
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	24-SEP-12
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	24-SEP-12
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	24-SEP-12
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Boron (B)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Calcium (Ca)-Dissolved			<0.020		mg/L		0.02	24-SEP-12
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	24-SEP-12
Copper (Cu)-Dissolved			<0.00050		mg/L		0.0005	24-SEP-12
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	24-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch R2442738								
WG1552509-1 MB								
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	24-SEP-12
Zinc (Zn)-Dissolved			<0.0030		mg/L		0.003	24-SEP-12
WG1552509-9 MB								
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	24-SEP-12
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	24-SEP-12
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	24-SEP-12
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Boron (B)-Dissolved			<0.010		mg/L		0.01	24-SEP-12
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Calcium (Ca)-Dissolved			<0.020		mg/L		0.02	24-SEP-12
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	24-SEP-12
Copper (Cu)-Dissolved			<0.00050		mg/L		0.0005	24-SEP-12
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	24-SEP-12
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	24-SEP-12
Potassium (K)-Dissolved			<0.050		mg/L		0.05	24-SEP-12
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	24-SEP-12
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	24-SEP-12
Zinc (Zn)-Dissolved			<0.0030		mg/L		0.003	24-SEP-12
Batch R2443662								
WG1552509-10 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			104.6		%		80-120	25-SEP-12
Antimony (Sb)-Dissolved			106.7		%		80-120	25-SEP-12
Arsenic (As)-Dissolved			102.2		%		80-120	25-SEP-12
Barium (Ba)-Dissolved			102.5		%		80-120	25-SEP-12
Boron (B)-Dissolved			91.1		%		80-120	25-SEP-12
Cadmium (Cd)-Dissolved			103.9		%		80-120	25-SEP-12
Calcium (Ca)-Dissolved			99.3		%		80-120	25-SEP-12
Chromium (Cr)-Dissolved			100.1		%		80-120	25-SEP-12
Copper (Cu)-Dissolved			98.5		%		80-120	25-SEP-12
Lead (Pb)-Dissolved			102.2		%		80-120	25-SEP-12
Magnesium (Mg)-Dissolved			101.5		%		80-120	25-SEP-12
Manganese (Mn)-Dissolved			102.0		%		80-120	25-SEP-12
Potassium (K)-Dissolved			102.0		%		80-120	25-SEP-12
Selenium (Se)-Dissolved			102.5		%		80-120	25-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch R2443662								
WG1552509-10 CRM		**VA-HIGH-WATRM**						
Uranium (U)-Dissolved			103.1		%		80-120	25-SEP-12
Zinc (Zn)-Dissolved			97.0		%		80-120	25-SEP-12
WG1552509-11 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			104.9		%		80-120	25-SEP-12
Antimony (Sb)-Dissolved			106.5		%		80-120	25-SEP-12
Arsenic (As)-Dissolved			101.2		%		80-120	25-SEP-12
Barium (Ba)-Dissolved			101.0		%		80-120	25-SEP-12
Boron (B)-Dissolved			91.4		%		80-120	25-SEP-12
Cadmium (Cd)-Dissolved			102.0		%		80-120	25-SEP-12
Calcium (Ca)-Dissolved			99.7		%		80-120	25-SEP-12
Chromium (Cr)-Dissolved			102.1		%		80-120	25-SEP-12
Copper (Cu)-Dissolved			98.5		%		80-120	25-SEP-12
Lead (Pb)-Dissolved			97.8		%		80-120	25-SEP-12
Magnesium (Mg)-Dissolved			105.0		%		80-120	25-SEP-12
Manganese (Mn)-Dissolved			102.5		%		80-120	25-SEP-12
Potassium (K)-Dissolved			101.3		%		80-120	25-SEP-12
Selenium (Se)-Dissolved			99.6		%		80-120	25-SEP-12
Uranium (U)-Dissolved			99.7		%		80-120	25-SEP-12
Zinc (Zn)-Dissolved			97.3		%		80-120	25-SEP-12
WG1552509-5 CRM		**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			106.5		%		80-120	25-SEP-12
Antimony (Sb)-Dissolved			105.9		%		80-120	25-SEP-12
Arsenic (As)-Dissolved			102.8		%		80-120	25-SEP-12
Barium (Ba)-Dissolved			102.5		%		80-120	25-SEP-12
Boron (B)-Dissolved			93.2		%		80-120	25-SEP-12
Cadmium (Cd)-Dissolved			103.4		%		80-120	25-SEP-12
Calcium (Ca)-Dissolved			101.6		%		80-120	25-SEP-12
Chromium (Cr)-Dissolved			101.2		%		80-120	25-SEP-12
Copper (Cu)-Dissolved			99.2		%		80-120	25-SEP-12
Lead (Pb)-Dissolved			103.4		%		80-120	25-SEP-12
Magnesium (Mg)-Dissolved			103.1		%		80-120	25-SEP-12
Manganese (Mn)-Dissolved			101.9		%		80-120	25-SEP-12
Potassium (K)-Dissolved			103.2		%		80-120	25-SEP-12
Selenium (Se)-Dissolved			101.3		%		80-120	25-SEP-12
Uranium (U)-Dissolved			103.8		%		80-120	25-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch R2443662								
WG1552509-5 CRM		**VA-HIGH-WATRM**						
Zinc (Zn)-Dissolved			98.7		%		80-120	25-SEP-12
NH3-F-VA	**Water**							
Batch R2441464								
WG1551682-10 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			94.4		%		85-115	23-SEP-12
WG1551682-2 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			101.4		%		85-115	23-SEP-12
WG1551682-4 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			98.9		%		85-115	23-SEP-12
WG1551682-6 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			93.4		%		85-115	23-SEP-12
WG1551682-8 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			93.7		%		85-115	23-SEP-12
WG1551682-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	23-SEP-12
WG1551682-3 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	23-SEP-12
WG1551682-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	23-SEP-12
WG1551682-7 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	23-SEP-12
WG1551682-9 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	23-SEP-12
WG1551682-12 MS		**L1209742-2**						
Ammonia, Total (as N)			95.1		%		75-125	23-SEP-12
Batch R2442196								
WG1552459-10 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			86.6		%		85-115	24-SEP-12
WG1552459-2 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			101.0		%		85-115	24-SEP-12
WG1552459-4 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			93.1		%		85-115	24-SEP-12
WG1552459-6 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			95.5		%		85-115	24-SEP-12
WG1552459-8 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			95.6		%		85-115	24-SEP-12
WG1552459-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R2442196								
WG1552459-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	24-SEP-12
WG1552459-3 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	24-SEP-12
WG1552459-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	24-SEP-12
WG1552459-7 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	24-SEP-12
WG1552459-9 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	24-SEP-12
WG1552459-12 MS		**L1209462-7**						
Ammonia, Total (as N)			95.5		%		75-125	24-SEP-12
PAH-SF-MS-VA	**Water**							
Batch R2438644								
WG1549364-2 LCS								
Acenaphthene			105.0		%		60-130	20-SEP-12
Acenaphthylene			104.9		%		60-130	20-SEP-12
Acridine			101.3		%		60-130	20-SEP-12
Anthracene			107.2		%		60-130	20-SEP-12
Benz(a)anthracene			101.2		%		60-130	20-SEP-12
Benzo(a)pyrene			100.3		%		60-130	20-SEP-12
Benzo(b)fluoranthene			94.7		%		60-130	20-SEP-12
Benzo(g,h,i)perylene			90.0		%		60-130	20-SEP-12
Benzo(k)fluoranthene			93.4		%		60-130	20-SEP-12
Chrysene			102.6		%		60-130	20-SEP-12
Dibenz(a,h)anthracene			98.9		%		60-130	20-SEP-12
Fluoranthene			105.4		%		60-130	20-SEP-12
Fluorene			102.7		%		60-130	20-SEP-12
Indeno(1,2,3-c,d)pyrene			104.2		%		60-130	20-SEP-12
Naphthalene			102.0		%		50-130	20-SEP-12
Phenanthrene			110.2		%		60-130	20-SEP-12
Pyrene			104.7		%		60-130	20-SEP-12
Quinoline			99.4		%		60-130	20-SEP-12
WG1549364-1 MB								
Acenaphthene			<0.000050		mg/L		0.00005	20-SEP-12
Acenaphthylene			<0.000050		mg/L		0.00005	20-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-SF-MS-VA	**Water**							
Batch R2438644								
WG1549364-1 MB								
Acridine			<0.000050		mg/L		0.00005	20-SEP-12
Anthracene			<0.000050		mg/L		0.00005	20-SEP-12
Benz(a)anthracene			<0.000050		mg/L		0.00005	20-SEP-12
Benzo(a)pyrene			<0.000010		mg/L		0.00001	20-SEP-12
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	20-SEP-12
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	20-SEP-12
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	20-SEP-12
Chrysene			<0.000050		mg/L		0.00005	20-SEP-12
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	20-SEP-12
Fluoranthene			<0.000050		mg/L		0.00005	20-SEP-12
Fluorene			<0.000050		mg/L		0.00005	20-SEP-12
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	20-SEP-12
Naphthalene			<0.000050		mg/L		0.00005	20-SEP-12
Phenanthrene			<0.000050		mg/L		0.00005	20-SEP-12
Pyrene			<0.000050		mg/L		0.00005	20-SEP-12
Quinoline			<0.000050		mg/L		0.00005	20-SEP-12
WG1549364-3 MB								
Acenaphthene			<0.000050		mg/L		0.00005	20-SEP-12
Acenaphthylene			<0.000050		mg/L		0.00005	20-SEP-12
Acridine			<0.000050		mg/L		0.00005	20-SEP-12
Anthracene			<0.000050		mg/L		0.00005	20-SEP-12
Benz(a)anthracene			<0.000050		mg/L		0.00005	20-SEP-12
Benzo(a)pyrene			<0.000010		mg/L		0.00001	20-SEP-12
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	20-SEP-12
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	20-SEP-12
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	20-SEP-12
Chrysene			<0.000050		mg/L		0.00005	20-SEP-12
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	20-SEP-12
Fluoranthene			<0.000050		mg/L		0.00005	20-SEP-12
Fluorene			<0.000050		mg/L		0.00005	20-SEP-12
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	20-SEP-12
Naphthalene			<0.000050		mg/L		0.00005	20-SEP-12
Phenanthrene			<0.000050		mg/L		0.00005	20-SEP-12
Pyrene			<0.000050		mg/L		0.00005	20-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-SF-MS-VA	**Water**							
Batch R2438644								
WG1549364-3 MB								
Quinoline			<0.000050		mg/L		0.00005	20-SEP-12
Batch R2439714								
WG1550411-2 LCS								
Acenaphthene			91.8		%		60-130	21-SEP-12
Acenaphthylene			88.5		%		60-130	21-SEP-12
Acridine			90.0		%		60-130	21-SEP-12
Anthracene			95.8		%		60-130	21-SEP-12
Benz(a)anthracene			86.4		%		60-130	21-SEP-12
Benzo(a)pyrene			76.7		%		60-130	21-SEP-12
Benzo(b)fluoranthene			89.5		%		60-130	21-SEP-12
Benzo(g,h,i)perylene			91.9		%		60-130	21-SEP-12
Benzo(k)fluoranthene			99.4		%		60-130	21-SEP-12
Chrysene			92.6		%		60-130	21-SEP-12
Dibenz(a,h)anthracene			94.7		%		60-130	21-SEP-12
Fluoranthene			93.1		%		60-130	21-SEP-12
Fluorene			90.6		%		60-130	21-SEP-12
Indeno(1,2,3-c,d)pyrene			88.3		%		60-130	21-SEP-12
Naphthalene			86.2		%		50-130	21-SEP-12
Phenanthrene			89.2		%		60-130	21-SEP-12
Pyrene			93.5		%		60-130	21-SEP-12
Quinoline			83.5		%		60-130	21-SEP-12
WG1550411-1 MB								
Acenaphthene			<0.000050		mg/L		0.00005	21-SEP-12
Acenaphthylene			<0.000050		mg/L		0.00005	21-SEP-12
Acridine			<0.000050		mg/L		0.00005	21-SEP-12
Anthracene			<0.000050		mg/L		0.00005	21-SEP-12
Benz(a)anthracene			<0.000050		mg/L		0.00005	21-SEP-12
Benzo(a)pyrene			<0.000010		mg/L		0.00001	21-SEP-12
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	21-SEP-12
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	21-SEP-12
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	21-SEP-12
Chrysene			<0.000050		mg/L		0.00005	21-SEP-12
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	21-SEP-12
Fluoranthene			<0.000050		mg/L		0.00005	21-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-SF-MS-VA	**Water**							
Batch R2439714								
WG1550411-1 MB								
Fluorene			<0.000050		mg/L		0.00005	21-SEP-12
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	21-SEP-12
Naphthalene			<0.000050		mg/L		0.00005	21-SEP-12
Phenanthrene			<0.000050		mg/L		0.00005	21-SEP-12
Pyrene			<0.000050		mg/L		0.00005	21-SEP-12
Quinoline			<0.000050		mg/L		0.00005	21-SEP-12
Batch R2440768								
WG1550411-3 MB								
Acenaphthene			<0.000050		mg/L		0.00005	21-SEP-12
Acenaphthylene			<0.000050		mg/L		0.00005	21-SEP-12
Acridine			<0.000050		mg/L		0.00005	21-SEP-12
Anthracene			<0.000050		mg/L		0.00005	21-SEP-12
Benz(a)anthracene			<0.000050		mg/L		0.00005	21-SEP-12
Benzo(a)pyrene			<0.000010		mg/L		0.00001	21-SEP-12
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	21-SEP-12
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	21-SEP-12
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	21-SEP-12
Chrysene			<0.000050		mg/L		0.00005	21-SEP-12
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	21-SEP-12
Fluoranthene			<0.000050		mg/L		0.00005	21-SEP-12
Fluorene			<0.000050		mg/L		0.00005	21-SEP-12
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	21-SEP-12
Naphthalene			<0.000050		mg/L		0.00005	21-SEP-12
Phenanthrene			<0.000050		mg/L		0.00005	21-SEP-12
Pyrene			<0.000050		mg/L		0.00005	21-SEP-12
Quinoline			<0.000050		mg/L		0.00005	21-SEP-12
PH-PCT-VA	**Water**							
Batch R2443112								
WG1553049-24 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	25-SEP-12
WG1553049-25 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	25-SEP-12
WG1553049-26 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	25-SEP-12
WG1553049-27 CRM		**VA-PH7-BUF**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-PCT-VA	**Water**							
Batch R2443112								
WG1553049-27 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	25-SEP-12
WG1553049-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	25-SEP-12
WG1553049-29 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	25-SEP-12
WG1553049-30 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	25-SEP-12
TDS-VA	**Water**							
Batch R2439701								
WG1548151-3 DUP		**L1209363-1**						
Total Dissolved Solids		8890	8750		mg/L	1.6	20	18-SEP-12
WG1548151-11 LCS								
Total Dissolved Solids			99.2		%		85-115	18-SEP-12
WG1548151-2 LCS								
Total Dissolved Solids			100.4		%		85-115	18-SEP-12
WG1548151-5 LCS								
Total Dissolved Solids			97.8		%		85-115	18-SEP-12
WG1548151-8 LCS								
Total Dissolved Solids			97.6		%		85-115	18-SEP-12
WG1548151-1 MB								
Total Dissolved Solids			<10		mg/L		10	18-SEP-12
WG1548151-10 MB								
Total Dissolved Solids			<10		mg/L		10	18-SEP-12
WG1548151-4 MB								
Total Dissolved Solids			<10		mg/L		10	18-SEP-12
WG1548151-7 MB								
Total Dissolved Solids			<10		mg/L		10	18-SEP-12
TKN-F-VA	**Water**							
Batch R2441463								
WG1549655-6 DUP		**L1209363-15**						
Total Kjeldahl Nitrogen		0.572	0.556		mg/L	2.8	20	23-SEP-12
WG1549655-2 LCS								
Total Kjeldahl Nitrogen			104.2		%		75-125	23-SEP-12
WG1549655-5 LCS								
Total Kjeldahl Nitrogen			112.2		%		75-125	23-SEP-12
WG1549655-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	23-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-F-VA	**Water**							
Batch R2441463								
WG1549655-4 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	23-SEP-12
Batch R2442141								
WG1550523-2 LCS								
Total Kjeldahl Nitrogen			93.5		%		75-125	24-SEP-12
WG1550523-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-SEP-12
Batch R2443047								
WG1550523-5 LCS								
Total Kjeldahl Nitrogen			98.2		%		75-125	24-SEP-12
WG1550523-4 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	24-SEP-12
VH-HSFID-VA	**Water**							
Batch R2441333								
WG1550775-3 DUP		**L1209363-17**						
Volatile Hydrocarbons (VH6-10)		<0.10	<0.10	RPD-NA	mg/L	N/A	50	22-SEP-12
WG1550775-2 LCS								
Volatile Hydrocarbons (VH6-10)			85.2		%		70-130	22-SEP-12
WG1550775-1 MB								
Volatile Hydrocarbons (VH6-10)			<0.10		mg/L		0.1	22-SEP-12
VOC-HSMS-VA	**Water**							
Batch R2443281								
WG1554616-2 LCS								
Bromodichloromethane			93.9		%		70-130	26-SEP-12
Bromoform			93.6		%		70-130	26-SEP-12
Carbon Tetrachloride			103.1		%		70-130	26-SEP-12
Chlorobenzene			98.5		%		70-130	26-SEP-12
Dibromochloromethane			93.9		%		70-130	26-SEP-12
Chloroethane			95.8		%		60-140	26-SEP-12
Chloroform			94.2		%		70-130	26-SEP-12
Chloromethane			96.7		%		60-140	26-SEP-12
1,2-Dichlorobenzene			99.6		%		70-130	26-SEP-12
1,3-Dichlorobenzene			103.1		%		70-130	26-SEP-12
1,4-Dichlorobenzene			100.8		%		70-130	26-SEP-12
1,1-Dichloroethane			90.6		%		70-130	26-SEP-12
1,2-Dichloroethane			85.3		%		70-130	26-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HSMS-VA	**Water**							
Batch	**R2443281**							
WG1554616-2	**LCS**							
1,1-Dichloroethylene			80.5		%		70-130	26-SEP-12
cis-1,2-Dichloroethylene			95.2		%		70-130	26-SEP-12
trans-1,2-Dichloroethylene			88.8		%		70-130	26-SEP-12
Dichloromethane			86.3		%		60-140	26-SEP-12
1,2-Dichloropropane			90.6		%		70-130	26-SEP-12
cis-1,3-Dichloropropylene			88.1		%		70-130	26-SEP-12
trans-1,3-Dichloropropylene			88.0		%		70-130	26-SEP-12
1,1,1,2-Tetrachloroethane			100.7		%		70-130	26-SEP-12
1,1,2,2-Tetrachloroethane			84.9		%		70-130	26-SEP-12
Tetrachloroethylene			106.3		%		70-130	26-SEP-12
1,1,1-Trichloroethane			100.2		%		70-130	26-SEP-12
1,1,2-Trichloroethane			89.1		%		70-130	26-SEP-12
Trichloroethylene			101.7		%		70-130	26-SEP-12
Trichlorofluoromethane			111.4		%		60-140	26-SEP-12
Vinyl Chloride			99.8		%		60-140	26-SEP-12
WG1554616-1	**MB**							
Bromodichloromethane			<0.0010		mg/L		0.001	26-SEP-12
Bromoform			<0.0010		mg/L		0.001	26-SEP-12
Carbon Tetrachloride			<0.00050		mg/L		0.0005	26-SEP-12
Chlorobenzene			<0.0010		mg/L		0.001	26-SEP-12
Dibromochloromethane			<0.0010		mg/L		0.001	26-SEP-12
Chloroethane			<0.0010		mg/L		0.001	26-SEP-12
Chloroform			<0.0010		mg/L		0.001	26-SEP-12
Chloromethane			<0.0050		mg/L		0.005	26-SEP-12
1,2-Dichlorobenzene			<0.00070		mg/L		0.0007	26-SEP-12
1,3-Dichlorobenzene			<0.0010		mg/L		0.001	26-SEP-12
1,4-Dichlorobenzene			<0.0010		mg/L		0.001	26-SEP-12
1,1-Dichloroethane			<0.0010		mg/L		0.001	26-SEP-12
1,2-Dichloroethane			<0.0010		mg/L		0.001	26-SEP-12
1,1-Dichloroethylene			<0.0010		mg/L		0.001	26-SEP-12
cis-1,2-Dichloroethylene			<0.0010		mg/L		0.001	26-SEP-12
trans-1,2-Dichloroethylene			<0.0010		mg/L		0.001	26-SEP-12
Dichloromethane			<0.0050		mg/L		0.005	26-SEP-12
1,2-Dichloropropane			<0.0010		mg/L		0.001	26-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HSMS-VA	**Water**							
Batch **R2443281**								
WG1554616-1 **MB**								
cis-1,3-Dichloropropylene			<0.0010		mg/L		0.001	26-SEP-12
trans-1,3-Dichloropropylene			<0.0010		mg/L		0.001	26-SEP-12
1,1,1,2-Tetrachloroethane			<0.0010		mg/L		0.001	26-SEP-12
1,1,2,2-Tetrachloroethane			<0.0010		mg/L		0.001	26-SEP-12
Tetrachloroethylene			<0.0010		mg/L		0.001	26-SEP-12
1,1,1-Trichloroethane			<0.0010		mg/L		0.001	26-SEP-12
1,1,2-Trichloroethane			<0.0010		mg/L		0.001	26-SEP-12
Trichloroethylene			<0.0010		mg/L		0.001	26-SEP-12
Trichlorofluoromethane			<0.0010		mg/L		0.001	26-SEP-12
Vinyl Chloride			<0.0010		mg/L		0.001	26-SEP-12
VOC7-HSMS-VA	**Water**							
Batch **R2441066**								
WG1550775-3 **DUP**		**L1209363-17**						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	23-SEP-12
Ethylbenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	23-SEP-12
Methyl t-butyl ether (MTBE)		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	23-SEP-12
Styrene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	23-SEP-12
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	23-SEP-12
meta- & para-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	23-SEP-12
ortho-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	23-SEP-12
WG1550775-2 **LCS**								
Benzene			101.5		%		70-130	22-SEP-12
Ethylbenzene			106.6		%		70-130	22-SEP-12
Methyl t-butyl ether (MTBE)			103.4		%		70-130	22-SEP-12
Styrene			98.7		%		70-130	22-SEP-12
Toluene			101.6		%		70-130	22-SEP-12
meta- & para-Xylene			103.3		%		70-130	22-SEP-12
ortho-Xylene			104.7		%		70-130	22-SEP-12
WG1550775-1 **MB**								
Benzene			<0.00050		mg/L		0.0005	22-SEP-12
Ethylbenzene			<0.00050		mg/L		0.0005	22-SEP-12
Methyl t-butyl ether (MTBE)			<0.00050		mg/L		0.0005	22-SEP-12
Styrene			<0.00050		mg/L		0.0005	22-SEP-12
Toluene			<0.00050		mg/L		0.0005	22-SEP-12
meta- & para-Xylene			<0.00050		mg/L		0.0005	22-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC7-HSMS-VA	**Water**							
Batch R2441066								
WG1550775-1 MB								
ortho-Xylene			<0.00050		mg/L		0.0005	22-SEP-12

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MB-LOR	Method Blank exceeds ALS DQO. LORs adjusted for samples with positive hits below 5 times blank level. Please contact ALS if re-analysis is required.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Total Dissolved Solids by Gravimetric							
	1	09-SEP-12 15:40	18-SEP-12 00:00	7	8	days	EHT
	2	10-SEP-12 10:20	18-SEP-12 00:00	7	8	days	EHT
	3	10-SEP-12 11:30	18-SEP-12 00:00	7	8	days	EHT
pH by Meter (Automated)							
	1	09-SEP-12 15:40	25-SEP-12 11:16	0.25	380	hours	EHTR-FM
	2	10-SEP-12 10:20	25-SEP-12 11:16	0.25	361	hours	EHTR-FM
	3	10-SEP-12 11:30	25-SEP-12 11:16	0.25	360	hours	EHTR-FM
	4	13-SEP-12 13:30	25-SEP-12 11:16	0.25	286	hours	EHTR-FM
	5	12-SEP-12 10:40	25-SEP-12 11:16	0.25	313	hours	EHTR-FM
	6	10-SEP-12 16:30	25-SEP-12 11:16	0.25	355	hours	EHTR-FM
	7	10-SEP-12 17:45	25-SEP-12 11:16	0.25	354	hours	EHTR-FM
	8	10-SEP-12 16:30	25-SEP-12 11:16	0.25	355	hours	EHTR-FM
	9	12-SEP-12 13:20	25-SEP-12 11:16	0.25	310	hours	EHTR-FM
	10	11-SEP-12 10:45	25-SEP-12 11:16	0.25	336	hours	EHTR-FM
	11	11-SEP-12 12:30	25-SEP-12 11:16	0.25	335	hours	EHTR-FM
	12	11-SEP-12 14:15	25-SEP-12 11:16	0.25	333	hours	EHTR-FM
	13	11-SEP-12 15:15	25-SEP-12 11:16	0.25	332	hours	EHTR-FM
	14	12-SEP-12 17:30	25-SEP-12 11:16	0.25	306	hours	EHTR-FM
	15	13-SEP-12 09:25	25-SEP-12 11:16	0.25	290	hours	EHTR-FM
	16	13-SEP-12 09:55	25-SEP-12 11:16	0.25	289	hours	EHTR-FM
	17	11-SEP-12 19:15	25-SEP-12 11:16	0.25	328	hours	EHTR-FM
Anions and Nutrients							
Nitrate Nitrogen by Ion Chromatography							
	1	09-SEP-12 15:40	14-SEP-12 17:19	3	5	days	EHTR
	2	10-SEP-12 10:20	14-SEP-12 17:19	3	4	days	EHTR
	3	10-SEP-12 11:30	14-SEP-12 17:19	3	4	days	EHTR
	6	10-SEP-12 16:30	14-SEP-12 17:19	3	4	days	EHTR
	7	10-SEP-12 17:45	14-SEP-12 17:19	3	4	days	EHTR
	8	10-SEP-12 16:30	14-SEP-12 17:19	3	4	days	EHTR
Nitrite Nitrogen by Ion Chromatography							
	1	09-SEP-12 15:40	14-SEP-12 17:19	3	5	days	EHTR
	2	10-SEP-12 10:20	14-SEP-12 17:19	3	4	days	EHTR
	3	10-SEP-12 11:30	14-SEP-12 17:19	3	4	days	EHTR
	6	10-SEP-12 16:30	14-SEP-12 17:19	3	4	days	EHTR
	7	10-SEP-12 17:45	14-SEP-12 17:19	3	4	days	EHTR
	8	10-SEP-12 16:30	14-SEP-12 17:19	3	4	days	EHTR
Volatile Organic Compounds							
VOCs in water by Headspace GCMS							
	1	09-SEP-12 15:40	26-SEP-12 19:41	14	17	days	EHT
	2	10-SEP-12 10:20	26-SEP-12 19:41	14	16	days	EHT
	3	10-SEP-12 11:30	26-SEP-12 19:41	14	16	days	EHT
	6	10-SEP-12 16:30	26-SEP-12 19:41	14	16	days	EHT
	7	10-SEP-12 17:45	26-SEP-12 19:41	14	16	days	EHT
	8	10-SEP-12 16:30	26-SEP-12 19:41	14	16	days	EHT
	10	11-SEP-12 10:45	26-SEP-12 19:41	14	15	days	EHT
	11	11-SEP-12 12:30	26-SEP-12 19:41	14	15	days	EHT
	12	11-SEP-12 14:15	26-SEP-12 19:41	14	15	days	EHT
	13	11-SEP-12 15:15	26-SEP-12 19:41	14	15	days	EHT
	17	11-SEP-12 19:15	26-SEP-12 19:41	14	15	days	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1209363 were received on 14-SEP-12 10:55.

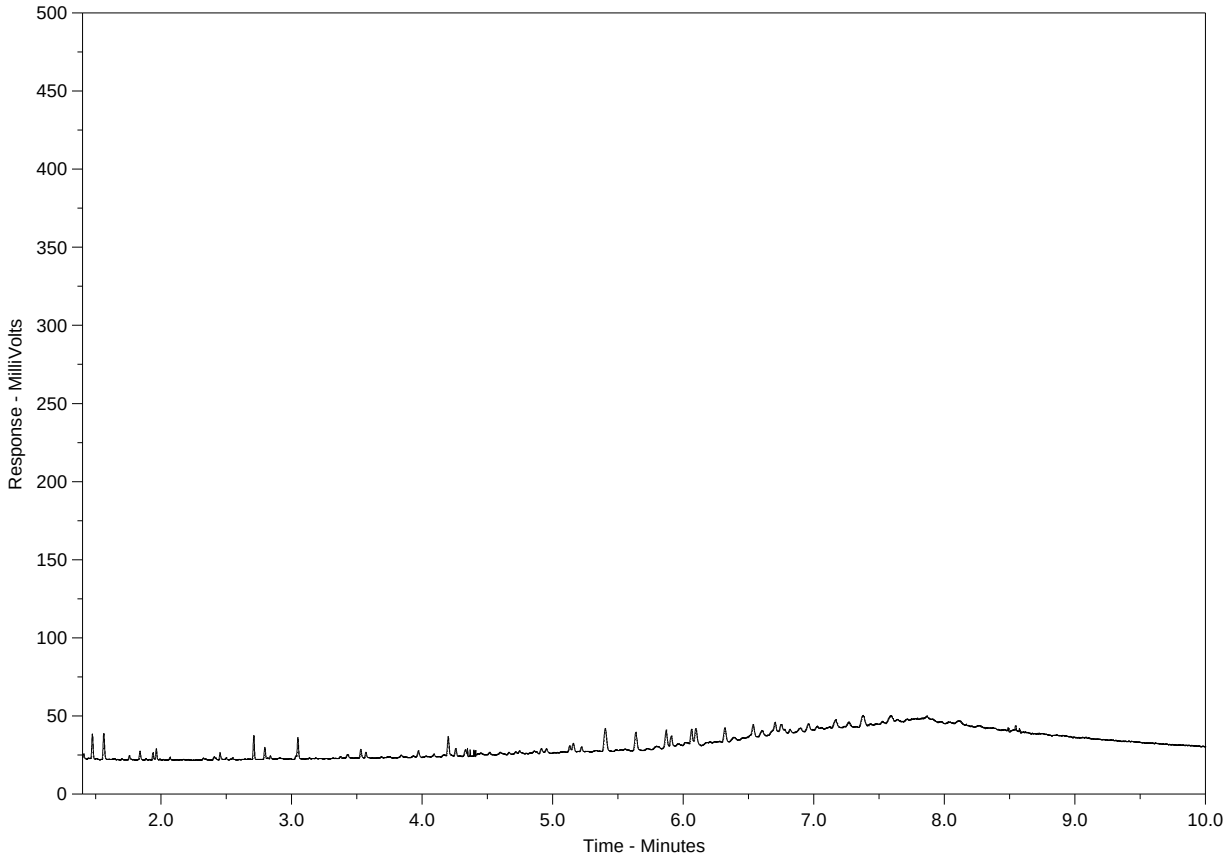
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-1
Client Sample ID: PC-MW12-01



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

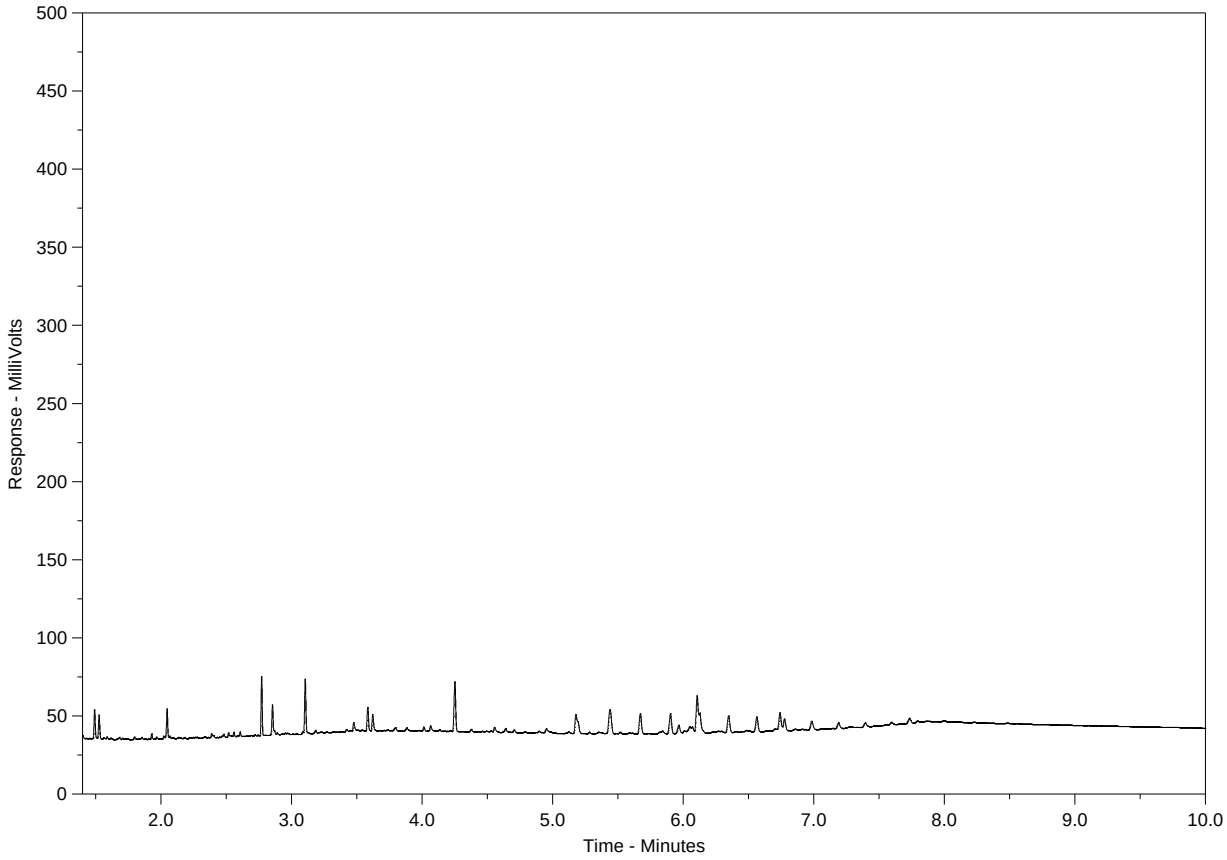
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-2
Client Sample ID: PC-MW12-02



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

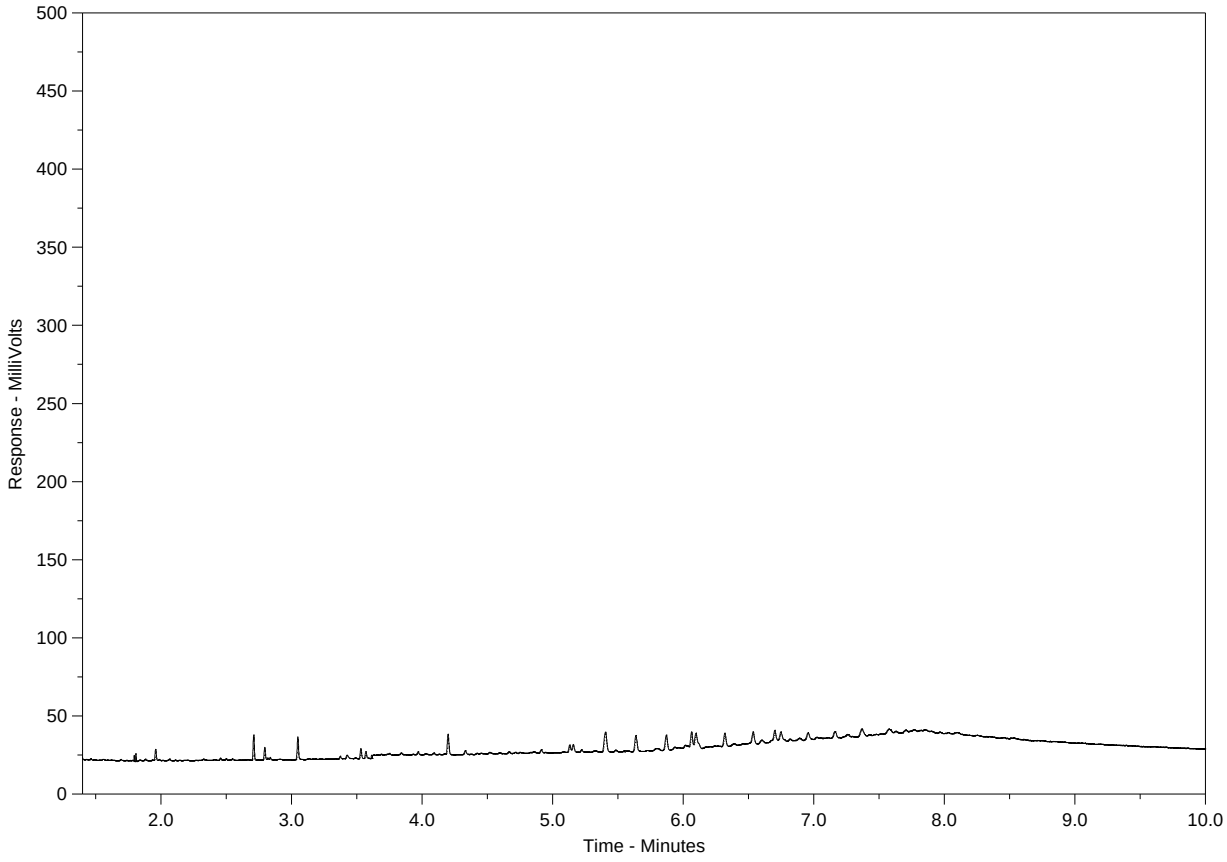
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-3
Client Sample ID: PC-MW12-03



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

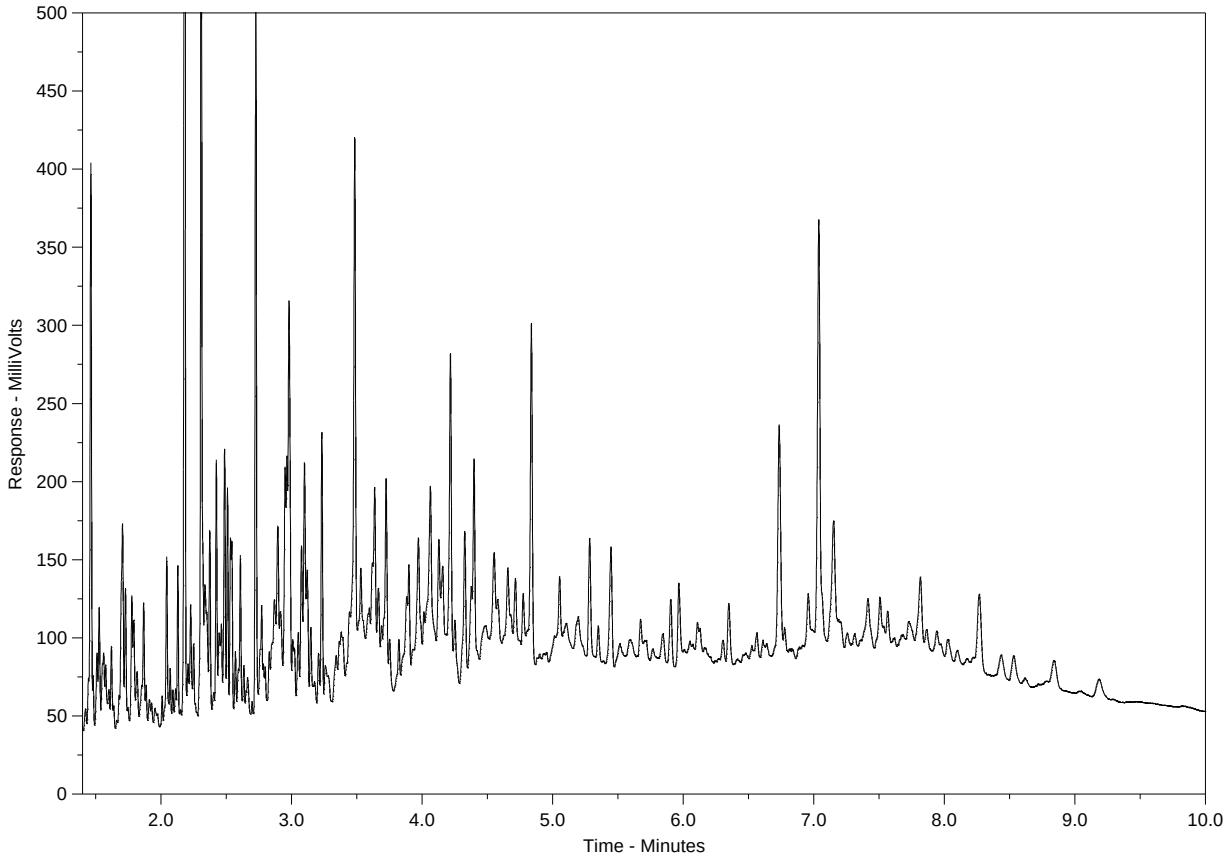
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-4
Client Sample ID: PC SURFACE



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

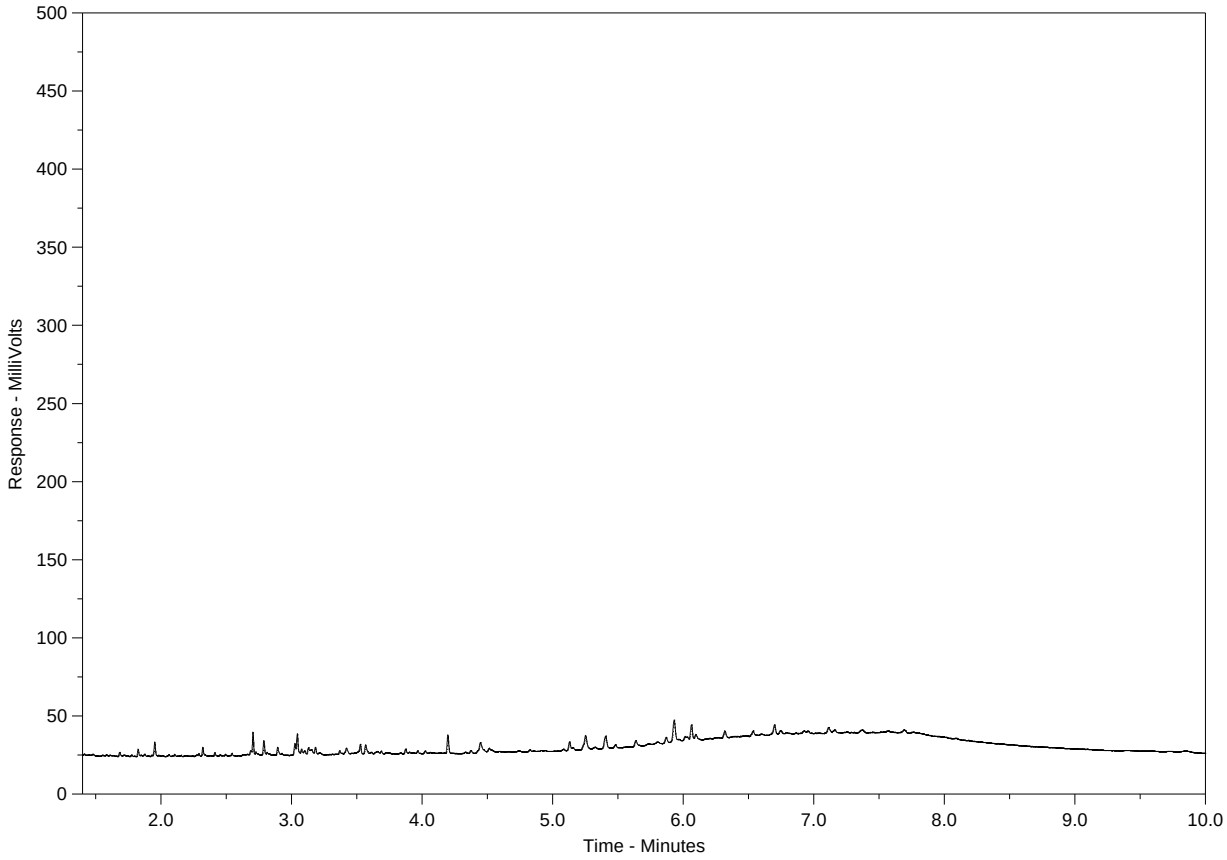
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-5
Client Sample ID: SX-MW12-01



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

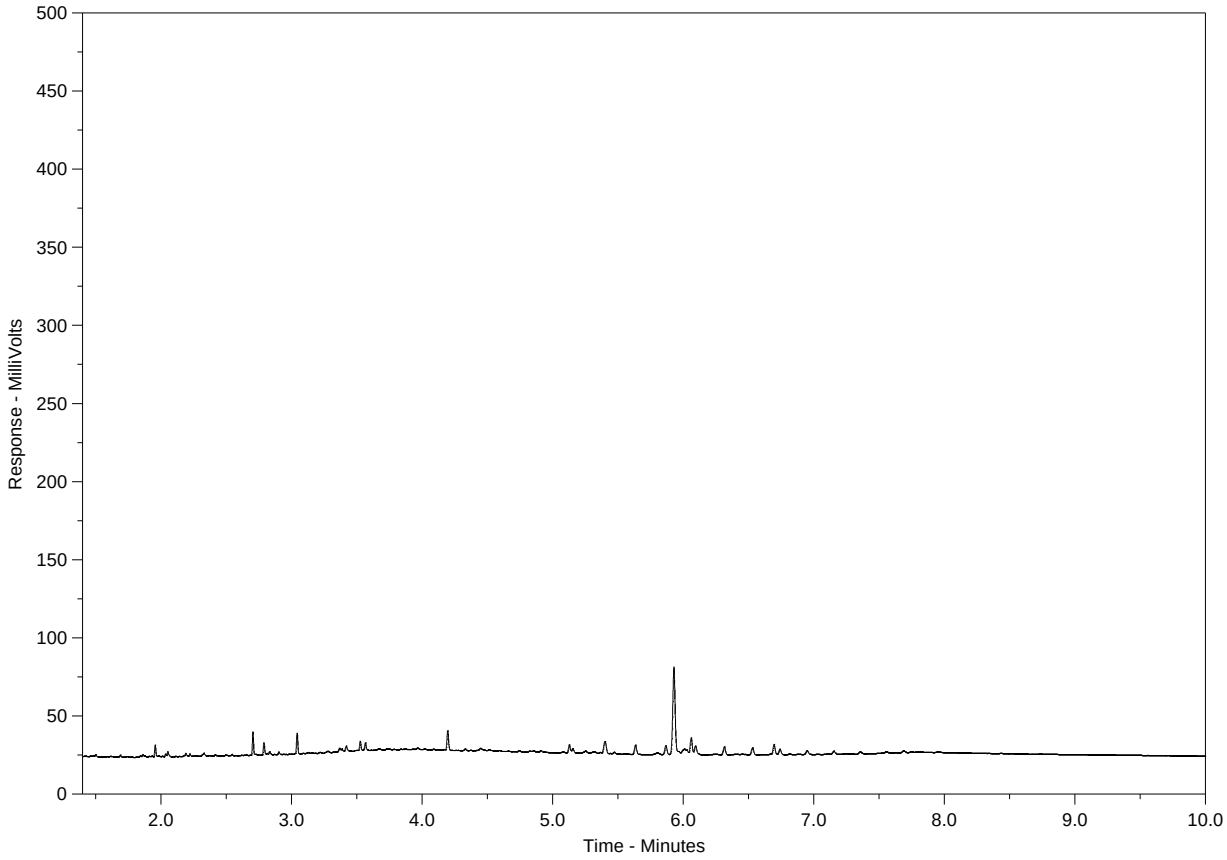
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-6
Client Sample ID: SX-MW12-02



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

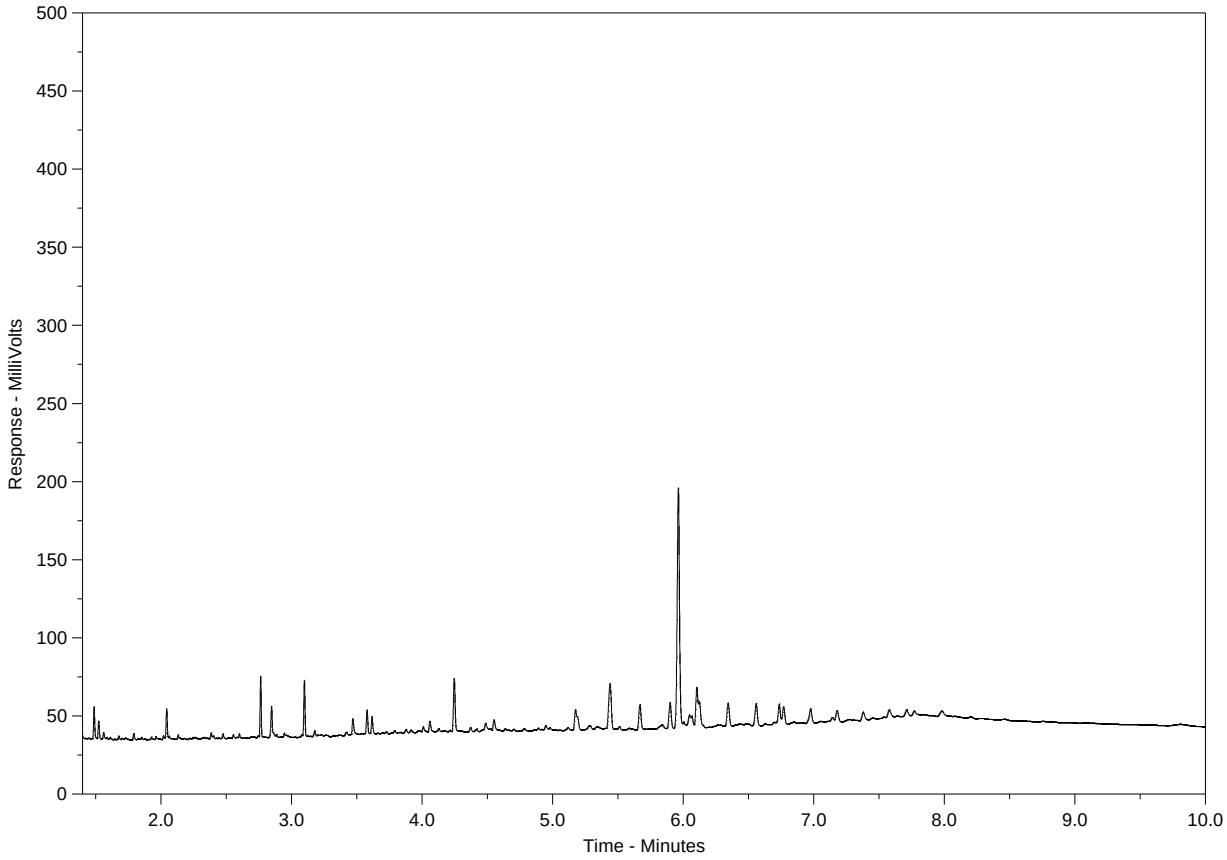
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-7
Client Sample ID: SX-MW12-03



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

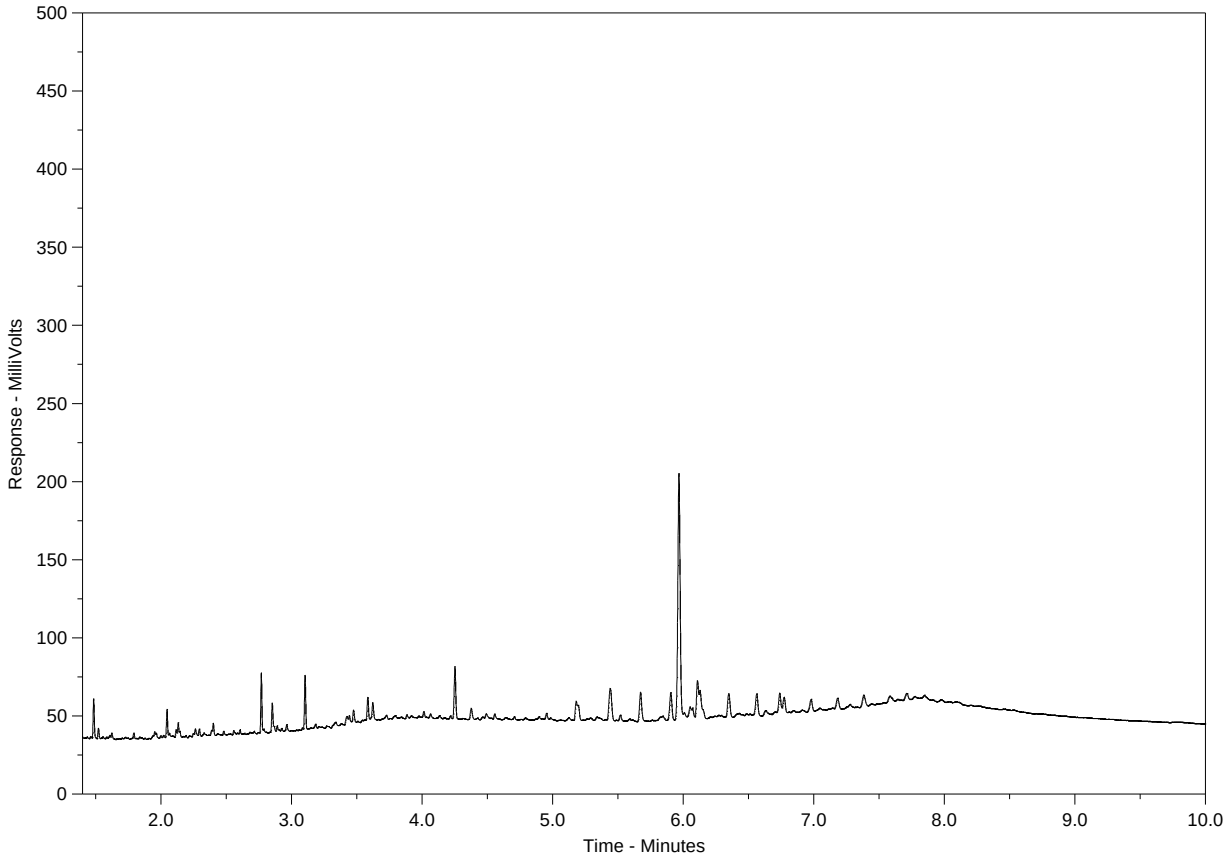
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-8
Client Sample ID: SX-MW12-04



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

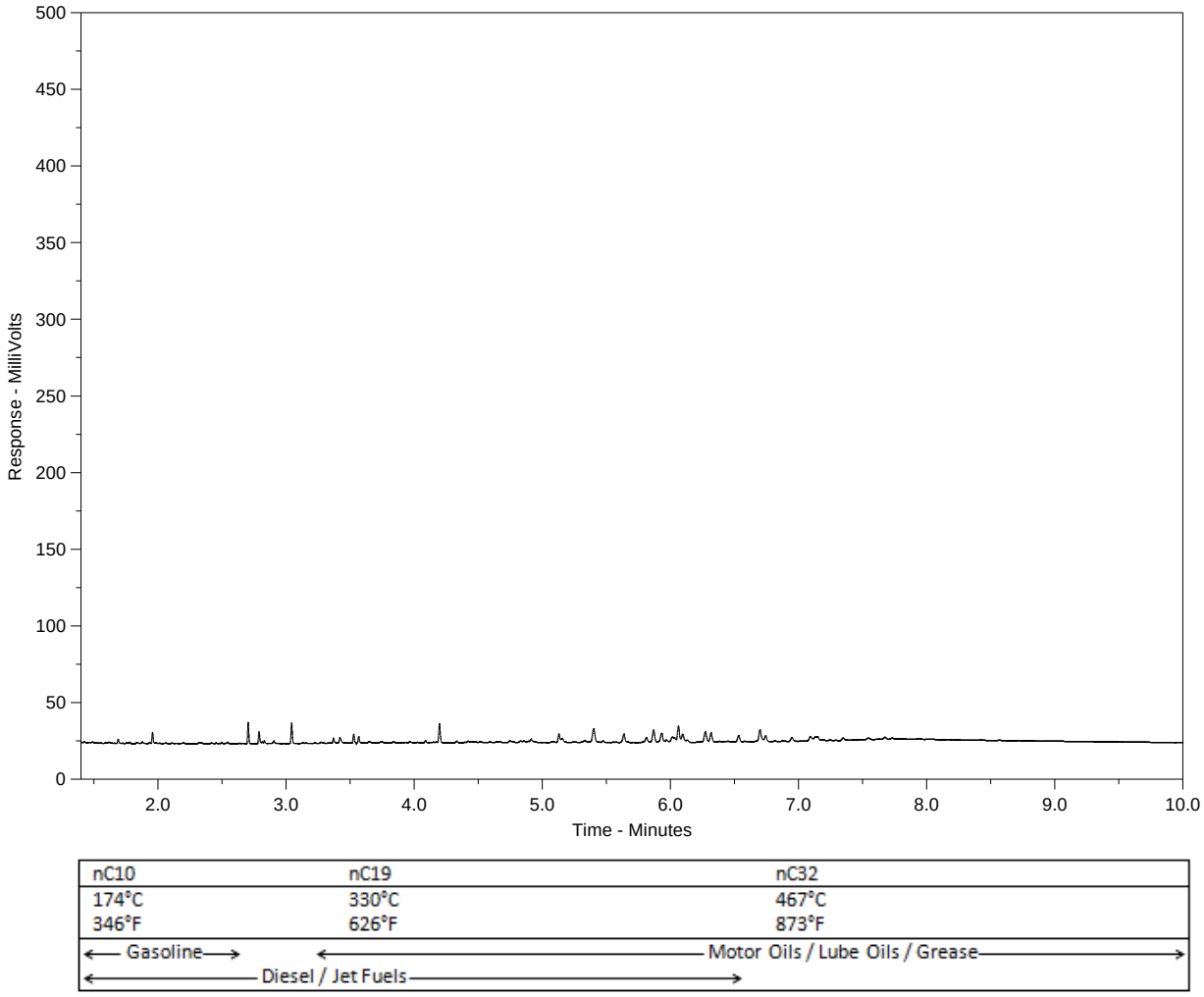
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-9
Client Sample ID: SX SURFACE



The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

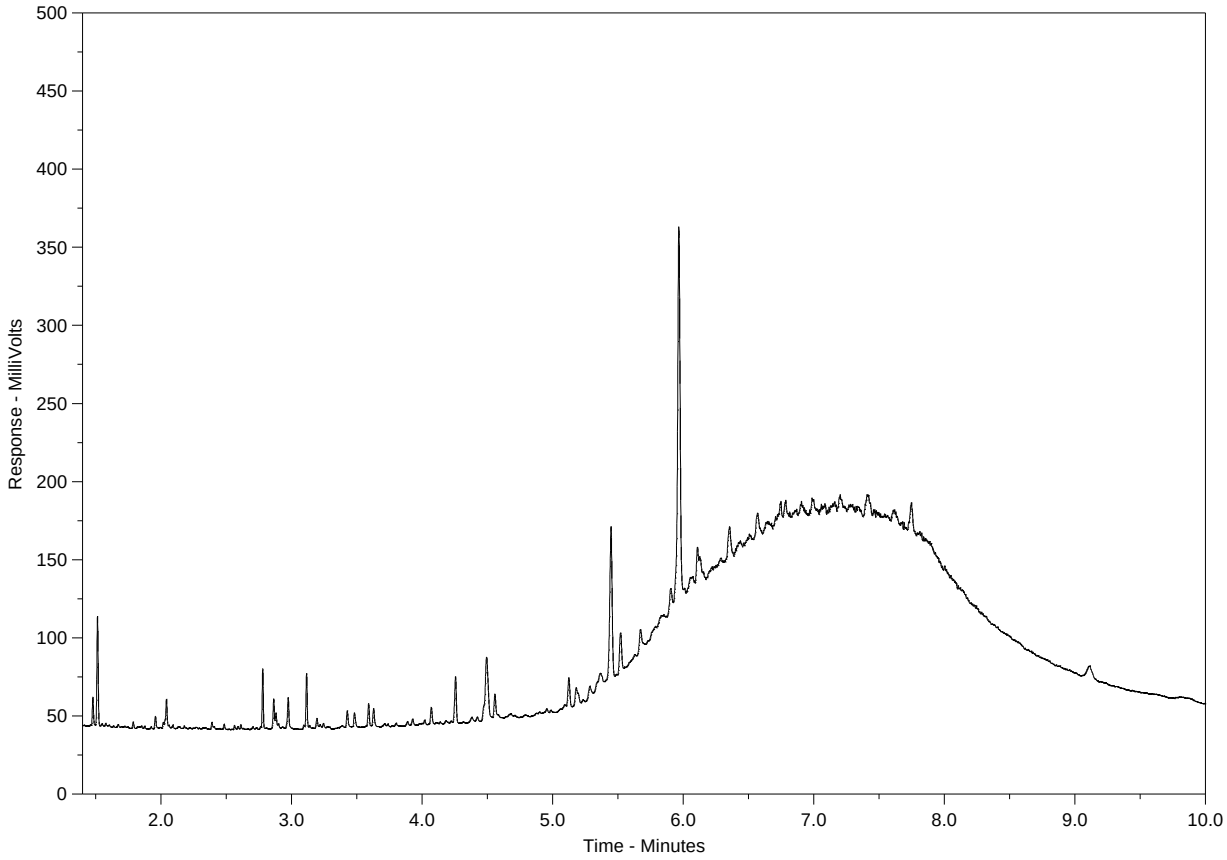
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-10
Client Sample ID: MA-MW12-01



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

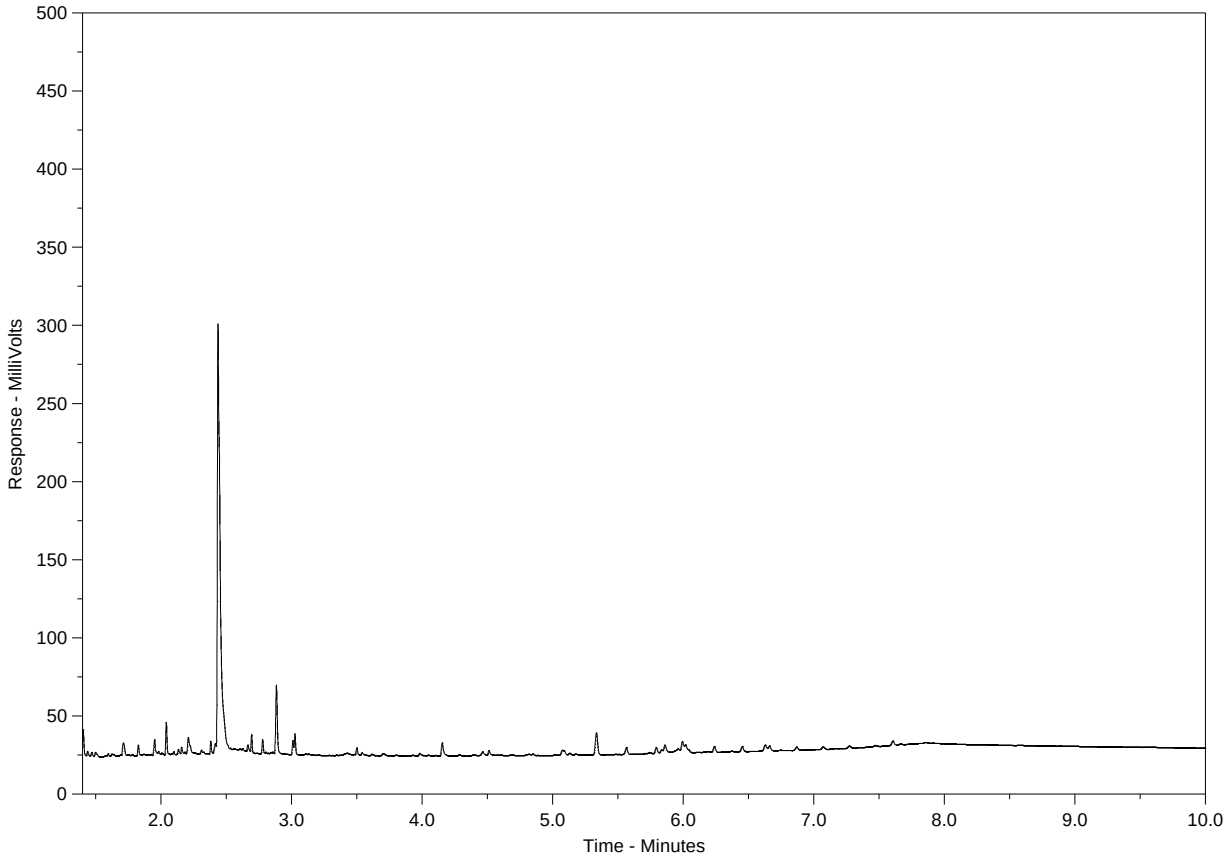
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-11
Client Sample ID: MA-MW12-02



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

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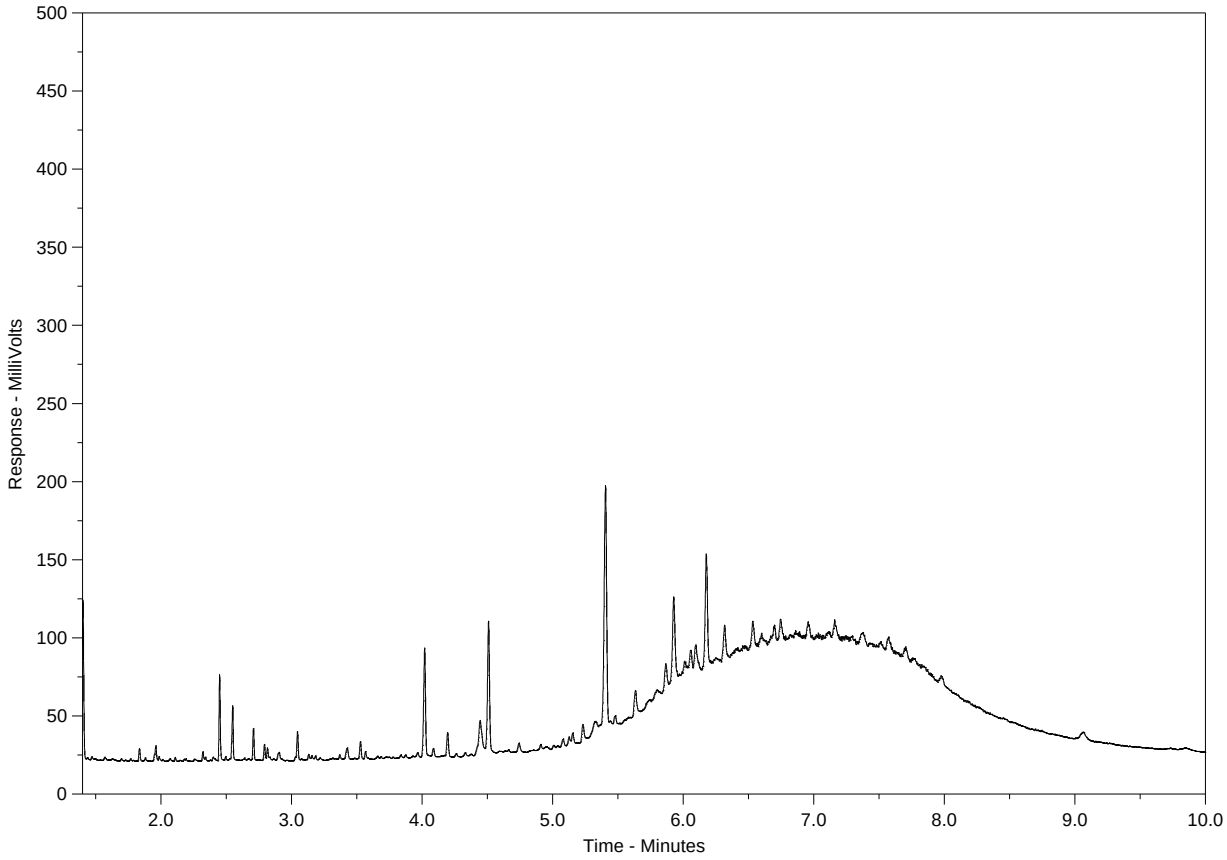
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-12
Client Sample ID: MA-MW12-03



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

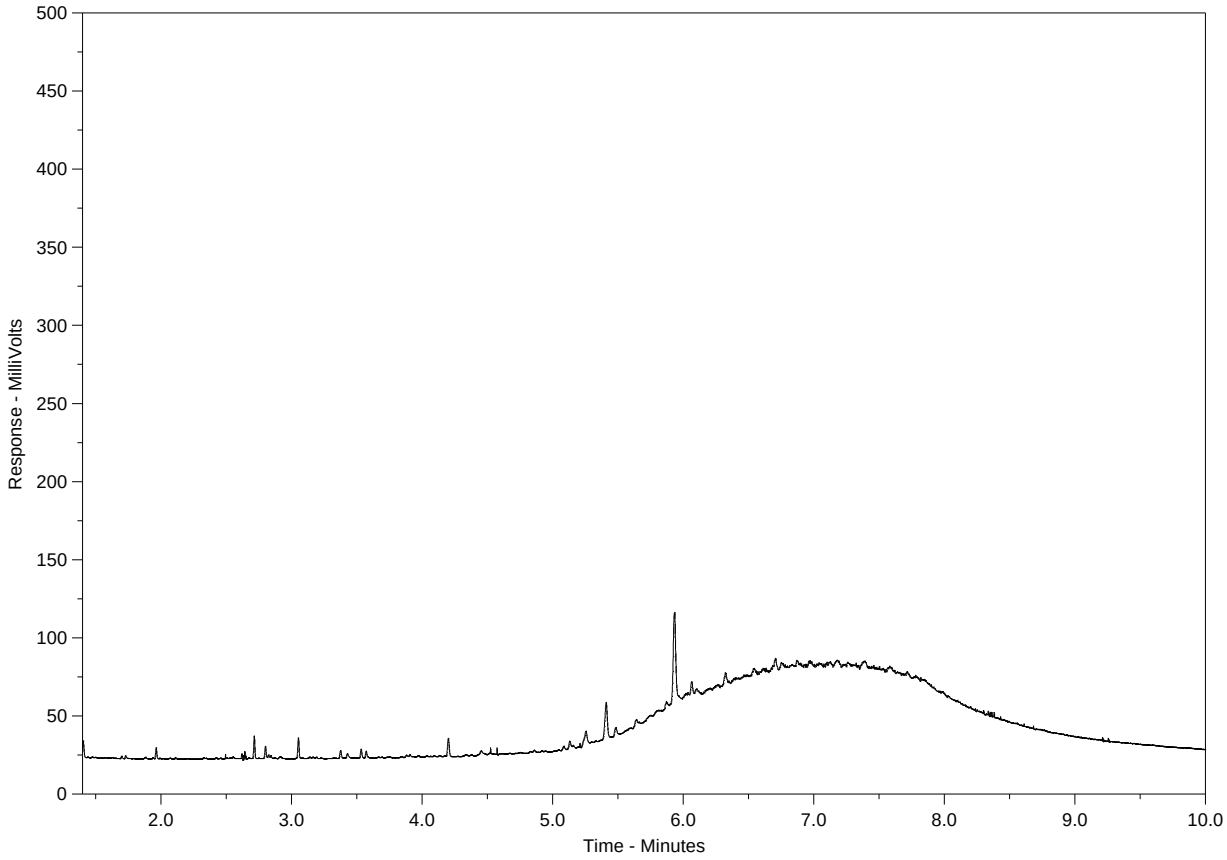
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-13
Client Sample ID: MA-MW12-04



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

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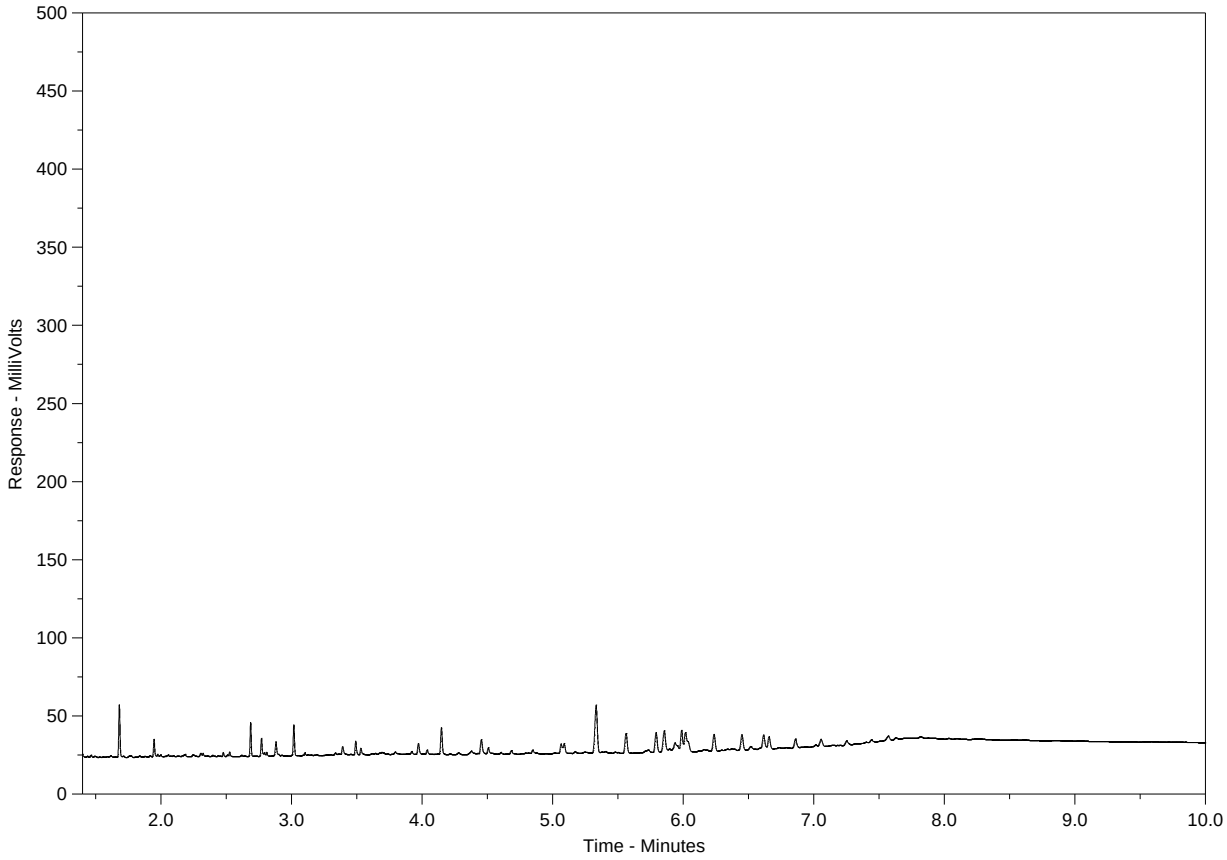
Hydrocarbon Distribution Report

ALS Sample ID: L1209363-14
Client Sample ID: MA SURFACE



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

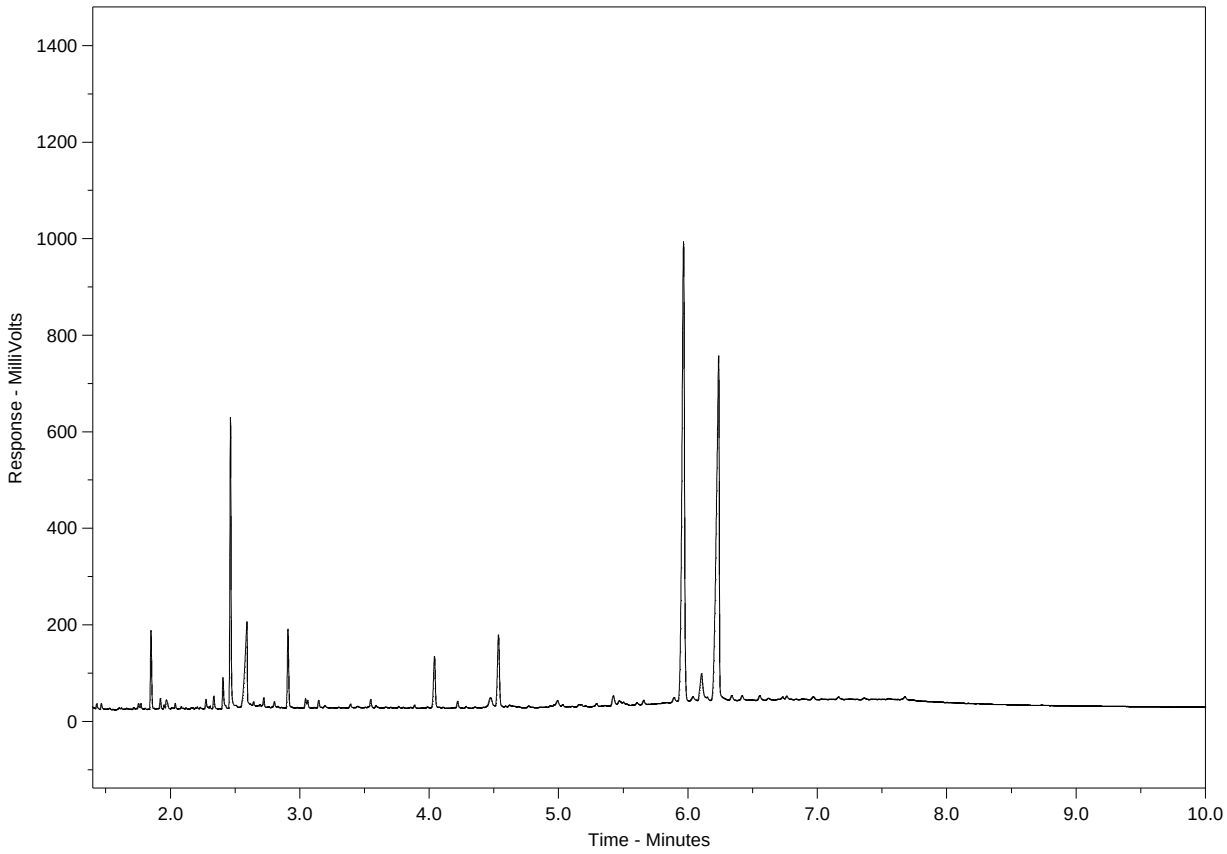
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1209363-15
Client Sample ID: KE-MW12-01



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

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Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

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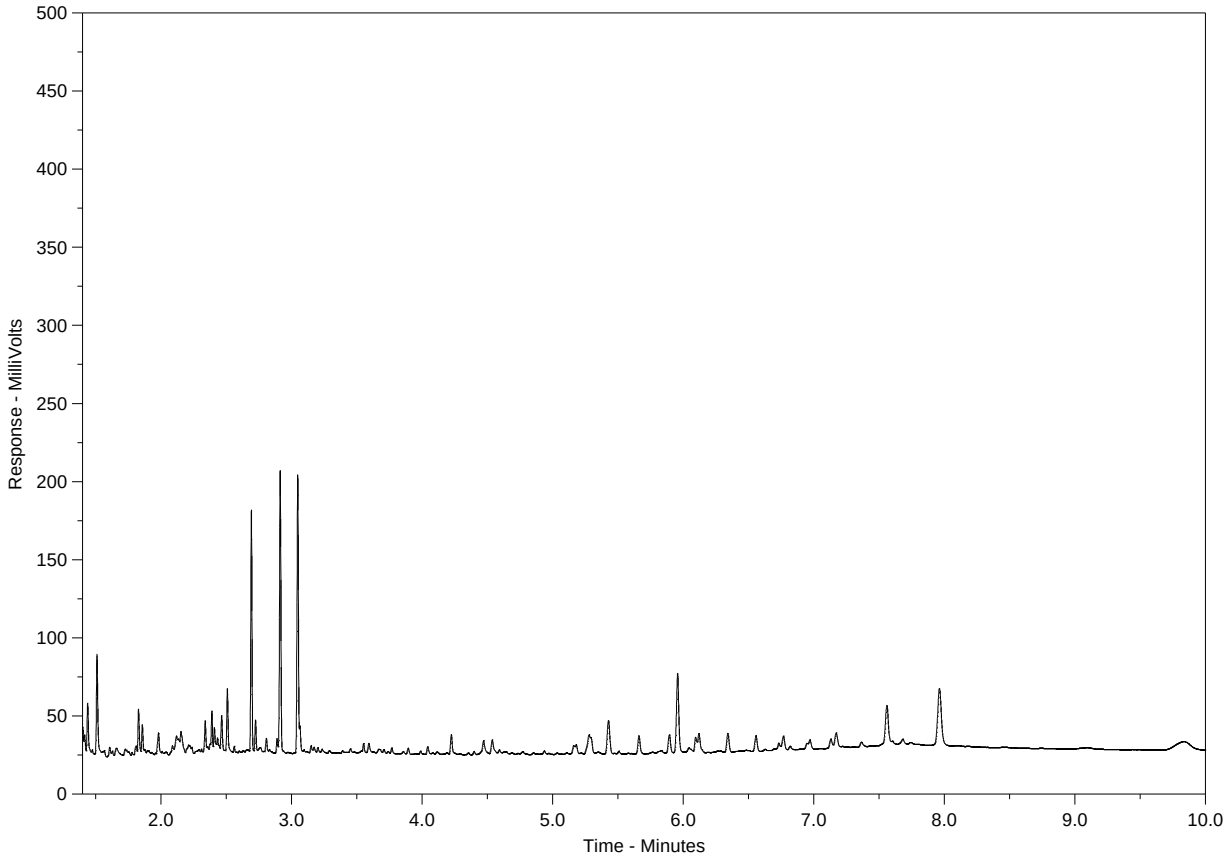
Hydrocarbon Distribution Report

ALS Sample ID: L1209363-16
Client Sample ID: KE-MW12-03



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

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The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

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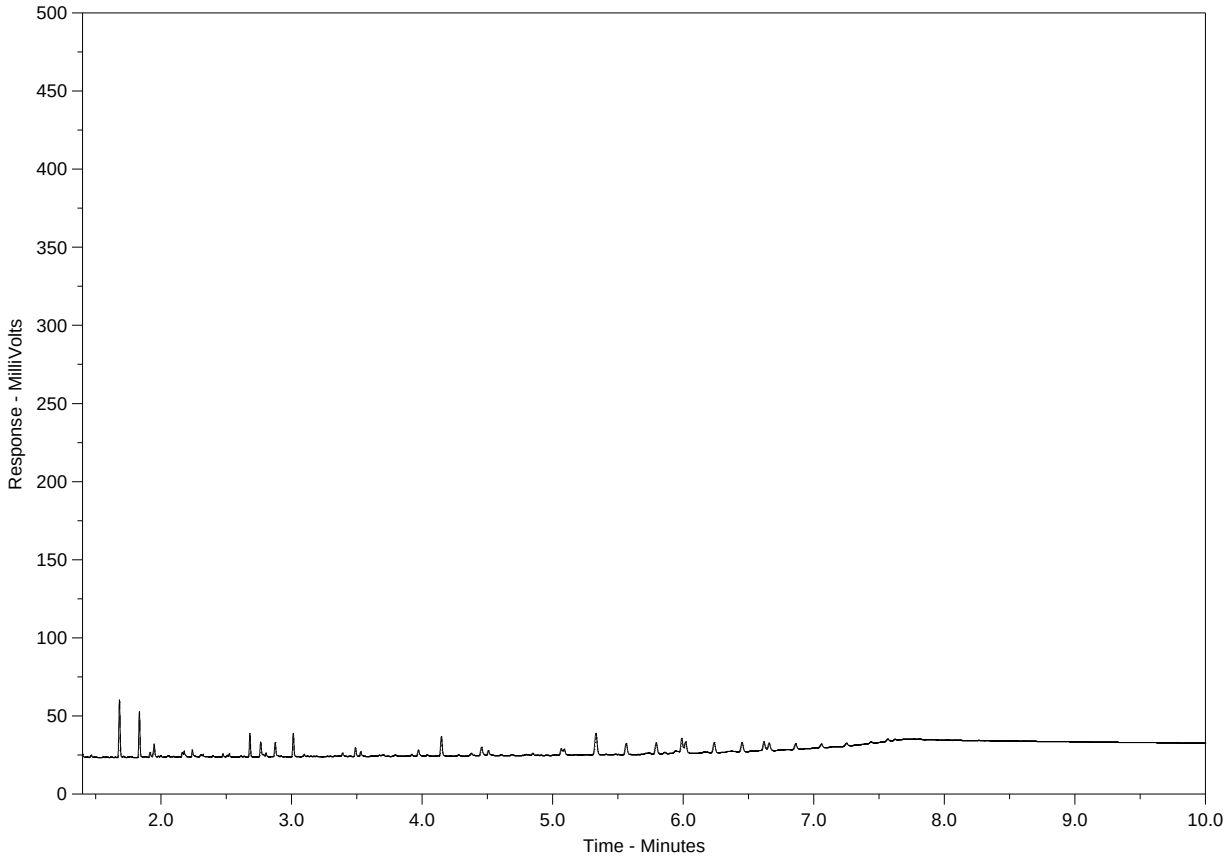
Hydrocarbon Distribution Report

ALS Sample ID: L1209363-17
Client Sample ID: KE SURFACE



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

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The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Golder Associates	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Andrea Badger	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	203 170 Titanium Way	Email 1: andrea_badger@golder.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Whitehorse, YT Y1A 0G1	Email 2: gary_hamilton@golder.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-633-6076 Fax:	Email 3: calvin_beebe@golder.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #: 11-1436-0073/1200, 2200, 2400, 2700	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)	L1209363	**ALS Contact:**	**Sampler:** A Badger

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	As per 11-1436-0072/xxxx	Number of Containers
	PC-MW12-01	09-Sep-12	15:40	Groundwater	X	8
	PC-MW12-02	10-Sep-12	10:20	Groundwater	X	8
	PC-MW12-03	10-Sep-12	11:30	Groundwater	X	8
	PC Surface	13-Sep-12	13:30	Surface Water	X	8
	SX-MW12-01	12-Sep-12	10:40	Groundwater	X	8
	SX-MW12-02	10-Sep-12	16:30	Groundwater	X	8
	SX-MW12-03	10-Sep-12	17:45	Groundwater	X	8
	SX-MW12-04	10-Sep-12	16:30	Groundwater	X	8
	SX Surface	12-Sep-12	13:20	Surface Water	X	8
	MA-MW12-01	11-Sep-12	10:45	Groundwater	X	8
	MA-MW12-02	11-Sep-12	12:30	Groundwater	X	8
	MA-MW12-03	11-Sep-12	14:15	Groundwater	X	8

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

PC Surface, SX Surface, MA-MW12-02 and MA-MW12-03 samples for dissolved metals are not filtered or preserved
None of the samples for DOC are filtered or preserved

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Andrea Badger	14-Sep-12	10:30		14-Sep-12	10:50	3.2 °C				

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Golder Associates	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Andrea Badger	☑ PDF ☑ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	203 170 Titanium Way	Email 1: andrea_badger@golder.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Whitehorse, YT Y1A 0G1	Email 2: gary_hamilton@golder.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867-633-6076 Fax:	Email 3: calvin_beebe@golder.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #: 11-1436-0073/1200, 2200, 2400, 2700	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		**ALS Contact:**	**Sampler:** A Badger

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	As per 11-1436-0072/xxxx	Number of Containers
	MA-MW12-04	11-Sep-12	15:15	Groundwater	X	8
	MA Surface	12-Sep-12	18:30	Surface Water	X	8
	KE-MW12-01	13-Sep-12	9:25	Groundwater	X	8
	KE-MW12-03	13-Sep-12	9:55	Groundwater	X	8
	KE Surface	11-Sep-12	19:15	Surface Water	X	8

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

PC Surface, SX Surface, MA-MW12-02 and MA-MW12-03 samples for dissolved metals are not filtered or preserved
None of the samples for DOC are filtered or preserved

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Andrea Badger	14-Sep-12	10:30				°C				

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

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Golder Associates