February 23, 2013

HYDROGEOLOGICAL ASSESSMENT

Burwash Landing
Solid Waste Disposal Facility

Submitted to:
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REPORT

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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 Burwash Landing Solid Waste Disposal Facility (the "Facility" or "Site") is one of the sites 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 Burwash Landing Solid Waste Disposal Facility is located in the southwest portion of Yukon, within the Ruby Ranges Ecological Region, and in Kluane First Nation traditional territory, at latitude 61º18' north, and longitude 138º53' west. The Site is accessed by a gravel road off the east side of the Alaska Highway at kilometre 1750, and is located approximately 172 km southeast of the community of Beaver Creek and 128 km northwest of Haines Junction. The Facility served as a domestic solid waste disposal facility for the communities of Burwash Landing, Destruction Bay, and the nearby Kluane First Nation residents until its closure in October 2011. Although the Facility was closed at the time of the June 2012 drilling program, a garbage burning vessel along with an open garbage trench were still present at the Site. No evidence of chemical or fuel storage, above or below ground storage tanks, spills, discharges, or hazardous materials storage were observed during the Site reconnaissance.
- Site Topography: The Facility is at an elevation of approximately 800 m (2,600 feet) above sea level and lies within the Kluane Lake watershed. A cleared area of approximately 13,000 square meters, that is generally flat, is present at the Facility. Local surficial geology is characteristic of hummocky kame and kettle topography, consisting of gravely kame and kettle and alluvial fan deposits. Permafrost is present in parts of the Site and is mapped as being typical of alluvial fan deposits to the north and west of Kluane Lake. The regional hydraulic gradient near the Site is expected to follow the regional topography, which slopes east towards Kluane Lake.
- Stratigraphy and Hydrogeology:
  - Topography at the Site is dominated by quaternary surficial deposits;
  - Subsurface conditions were investigated with the installation of three monitoring wells, including BU-MW12-01, BU-MW12-02, and BU-MW12-03, and one borehole (BU-BH12-03), which were completed on June 26 and 27, 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 approximately 20 m of inter-bedded and well graded sand, gravel and silt;

- An unconfined aquifer was encountered during the drilling and installation of three monitoring wells at a depth of approximately 17 m below grade;
- A series of hydraulic response tests were performed on three monitoring wells. The results of these tests indicate the hydraulic conductivity of the unconfined aquifer underlying the Site ranges from 2×10^{-4} m/s and 8×10^{-4} m/s. These values are considered reasonable for sand and gravel;
- The horizontal hydraulic gradient at the Site was determined, using monitoring well water level data, to be approximately 0.07 m/m, sloping to the east;
- Average linear groundwater seepage velocity in the surficial aquifer is estimated to range between approximately 4×10^{-5} m/s to 2×10^{-4} m/s and (approximately 3 to 14 metres per day); and
- Based on the groundwater flow direction determined from the initial groundwater monitoring event, BU-MW12-02 is located directly downgradient of the waste disposal areas and BU-MW12-03 is located cross-gradient of the waste disposal areas. BU-MW12-01 is up-gradient of the Site. Therefore, the requirement of a minimum two downgradient wells has not been met.

- Groundwater Chemistry:
  - The results of a desktop study and several Site visits indicate that the Yukon Contaminated Sites Regulation (CSR) criteria for freshwater aquatic life, drinking water, and livestock are applicable to the Site;
  - Groundwater samples were collected from monitoring wells BU-MW12-01, BU-MW12-02, and BU-MW12-03, and a surface water sample was collected from a small pond located approximately 825 m northeast of the Facility, during one sampling event on August 23, 2012; and
  - Results of groundwater sampling at the Site indicated either low or non-detect levels of all analytes, including those typically associated with landfill leachate contamination. The sample results indicated acceptable levels of relevant chemical parameters as defined by the CSR criteria for freshwater aquatic life, drinking water, and livestock. This suggests that landfill leachate influence on shallow groundwater underlying the Site is not evident.

The following recommendations are made, based on the results of the 2012 hydrogeological assessment presented in this report:

- As required by the Facility's Waste Management Permit, future groundwater monitoring should be conducted twice a year (spring and late summer);
- Groundwater quality at the Facility should be revaluated following an additional round of groundwater monitoring to determine if there are any potential impacts present from landfill leachate; and
- Since the groundwater flow direction may change seasonally, flow direction should be re-evaluated next spring to affirm whether or not the conditions for one upgradient and two downgradient monitoring wells have been met.
- If further monitoring indicates that there is only one well located down-gradient of the waste disposal area an additional well should be installed down-gradient of the site; and
- Monitoring well locations and elevations should be surveyed by a professional land surveyor.

Study Limitations

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

The inferences concerning the Burwash Landing 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 Burwash Landing 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 February 29, 2012 to December 31, 2014), relevant Environment Yukon Protocols, and in accordance with the Yukon Environmental and Socioeconomic Assessment Act (YESAA) Decision Document issued for the Site (Document Number 2011-0303-36-1).

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) and 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, 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 Burwash Landing Solid Waste Disposal Facility is in the southwest portion of Yukon, within the Ruby Ranges Ecological Region, and in the Kluane Lake Watershed. The Site is located in Kluane First Nation traditional territory at latitude 61º18' north and longitude 138º53' west. No civic address or legal description is available for the Site. It is accessed by a gravel road off the east side of the Alaska Highway at kilometre 1750, approximately 172 km southeast of the community of Beaver Creek, and 128 km northwest of Haines Junction (Figure 1).

2.2 Site History

The Burwash Landing Solid Waste Disposal Facility served exclusively as a domestic solid waste disposal facility for the communities of Burwash Landing, Destruction Bay, and the nearby Kluane First Nation residents until its closure in October 2011. The Facility received only domestic waste; no household hazardous waste, construction debris, waste oil, batteries, or white metals were accepted at this Site. No evidence of chemical or fuel storage, above or below ground storage tanks, spills, discharges, or hazardous materials storage were observed during the Site reconnaissance. Although the Facility was closed at the time of the June 2012 drilling program, a garbage burning vessel along with an open garbage trench were still present at the Site (Figure 2).

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 23, 2011, and a follow up inspection was conducted on June 26, 2012. The purpose of the preliminary hydrogeological assessment was to identify the appropriate drilling methods and 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 Burwash Landing*, 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 for Protection of Freshwater Aquatic Life*.
- Government of Yukon, Yukon Community Services, Community Services and Infrastructure Branch, *Solid Waste Operation Plan: Burwash Landing*, 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
- Rampton, V.N., 1977. *Surficial Geology and Geomorphology, Burwash Creek, Yukon Territory*, Geological Survey of Canada, Map 6-1978, scale 1:100,000.
- Site inspections of October 23, 2011 and June 26, 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 K/2, 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 23, 2011 and June 26, 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 Burwash Landing 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 February 29, 2012 for the Facility. It states that the Facility is to be closed 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 3.5;

- 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
Burwash Landing Solid Waste Disposal Facility	80-009	Landfill; undergoing decommissioning	Community Services Operations and Programs (2011)	Twice Per Year

3.1.6 Review of Environment Yukon Information

Golder reviewed documents pertaining to the Burwash Landing Facility on the Yukon Environment and Socioeconomic Board (YESAB) online registry on October 3, 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:

- Four on-Site boreholes were drilled by Midnight Sun Drilling (three of which were completed as monitoring wells) under the supervision of Golder Associates on June 26 and 27, 2012;
- Monitoring wells were developed and sampled by Golder on August 23, 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 all three newly installed monitoring wells 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 Contaminated Site Regulation Protocol (Yukon Environment, 2011).

Three (3) 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. BU-MW12-01 was intended to characterize upgradient groundwater conditions, while BU-MW12-02 and BU-MW12-03 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:

- BU-MW12-01 was installed in the southwest corner of the Site, and advanced to a depth of 20.4 m below grade (bg);
- BU-MW12-02 was installed on the east side of the Site, and advanced to a depth of 22.6 m bg;
- BU-MW12-03 was installed on the north side of the Site, and advanced to a depth of 20.4 m bg; and
- At the location of a fourth borehole (BU-BH12-03) along the north edge of the Site, permafrost was encountered at a depth of 3.7 m below grade; thus, the borehole was terminated.

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

Coordinate locations of newly installed wells were obtained by Trimble handheld GPS to an accuracy of 0.5 m or better. Elevations for top of casing (TOC) for all wells were obtained by GPS to an accuracy of ±0.6 m. In order to accurately determine groundwater elevation and flow direction, a level survey between wells was also carried out to an accuracy of ±1 cm.

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 all three monitoring wells;
- PVC casing was installed above the well screen to about 0.70 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)
BU-MW12-01	20.4	Sand (~50%) and Gravel (~50%)	50	17.4 – 20.4	16.2 – 20.4
BU-MW12-02	22.6	Sand (~50%) and Gravel (~50%)	50	19.2 – 22.3	18.3 – 22.3
BU-MW12-03	20.4	Sand (~75%) and Gravel (~25%)	50	17.1 – 20.1	16.2 – 20.1

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 June 27, 2012. Initial absolute elevation was surveyed relative to the top of PVC pipe at BU-MW12-01, which was obtained using a Trimble hand-held GPS instrument with a vertical accuracy of ±0.6 m. However, relative elevation between wells, as determined from the level survey, has an accuracy of ±1 cm. Table 3 presents a summary of survey data and water level measurements (recorded on August 23, 2012).

Table 3: Monitoring Well Locations and Groundwater Elevations August 23, 2012

Well ID	UTM Coordinates (Zone 7 North)	Top of PVC Casing Elevation (masl)	Standing Water Level (mbtoc)	Groundwater Elevation (masl)
BU-MW12-01	6798794.3 m N 613292.5 m E	806.09	17.71	788.38
BU-MW12-02	6798862.0 m N 613326.2 m E	803.55	17.96	785.59
BU-MW12-03	6798891.7 m N 613306.8 m E	804.49	17.13	787.36

3.2.4 Groundwater Monitoring Event

Golder developed monitoring wells BU-MW12-01 and BU-MW12-03 on June 27, 2012, immediately following installation. Due to logistical constraints, BU-MW12-02 could not be developed at this time, and was instead developed during the August 23, 2012 groundwater monitoring event.

All three wells were purged and sampled on August 23, 2012. The procedure used for sampling followed Contaminated Sites Regulation Protocol No. 7. Prior to purging each well, the water level was first measured with an electronic measuring tape. Approximately five well volumes were then 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. 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 a small pond located between the Site and Kluane Lake, approximately 825 m northeast of the Site.

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 June 27 and August 23, 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.

Multiple rising head tests were completed for all wells. 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 Contaminated Site Regulation (CSR) Protocols 2 and 5 (Government of Yukon, 2011).

Table 4: Parameters Analyzed in August 2012

Sample ID	General Parameters	Nutrients	Dissolved Metals	PAH, BTEX, DOC	VOCs
BU-MW12-01	√	√	√	√	√
BU-MW12-02	√	√	√	√	√
BU-MW12-03	√	√	√	√	√
Burwash Landing 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	No wells were shown to be directly upgradient of the Facility. BU-MW12-01 is located upgradient/cross-gradient of the Facility and may be used to provide background levels of physiochemical parameters.
Field Procedures	Monitoring wells were purged/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 BC-MW12-04 (this well is located at the Beaver Creek Solid Waste Disposal Facility) during the August 2012 groundwater monitoring event. Of the 110 analyte pairs tested, RPD values could not be calculated for 90 of the pairs, as both values in each pair were below the laboratory method detection limit (MDL). Of the remaining analyte pairs tested, none exceeded the RPD[1] acceptance criteria of ±30%. See: Report # 1114360073-1500
Trip Blanks	A trip blank was not collected during the August 2012 groundwater monitoring event.

[1] RPD calculations are presented in Appendix E of Golder's draft report entitled Beaver Creek Solid Waste Disposal Facility Hydrogeological Assessment" dated October 19, 2012.

QA/QC Aspect	Evidence and Evaluation
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. Sampling for VOC's took place six days outside the 14-day 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.

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_{w10-10} & 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	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	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 September 5, 2012, showed several streams, small ponds, and Kluane Lake all 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, also identified several visible streams and ponds within 1 km of the Site. The nearest body of water was determined to be a small, unnamed pond located approximately 825 m northeast of the Site. It was determined therefore, that aquatic life standards were **applicable** for the Burwash Landing Facility.

Drinking Water

A search of drinking water wells on the Groundwater Information Network website and the Yukon Water Data Catalogue (accessed September 4, 2012) showed no drinking water wells located along the predicted downgradient direction between the Site and Kluane Lake, nor in any other area within a 1.5 km radius of the Site. However, a review of the Solid Waste Operation Plan for Burwash Landing indicated that the nearest dwelling to the Site was a seasonally occupied residence located approximately 1 km northwest of the Facility. Conservatively assuming the residence has a water supply well, it was deemed that CSR drinking water standards were **applicable** for the Burwash Landing Facility.

Irrigation

A review of the Summary of Yukon Water Wells, compiled from The Yukon Water Well Registry, reviewed by Golder on September 5, 2012, showed no irrigation wells on record for the Burwash Landing 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 in the area. A review of Google Earth Images from 2012, conducted by Golder on September 5, 2012, as well as several visits to the Facility conducted in May and June 2012 showed no agricultural land within 1.5 km of the Facility. It was therefore considered that CSR water quality standards for irrigation are **not applicable** to the Burwash Landing Facility.

Livestock

A review of the Summary of Yukon Water Wells, compiled from The Yukon Water Well Registry, reviewed by Golder on September 5, 2012, showed no wells on record as being for livestock use in the Burwash Landing area. It should be noted that this is not a complete record of all wells in the Yukon. However, the Solid Waste Operation Plan for Burwash Landing indicated that there is a grazing lease located approximately 1 km northwest of the Facility, and that this lease is currently in use. It was therefore considered that CSR standards for livestock are **applicable** to the Burwash Landing Facility.

4.0 CONCEPTUAL HYDROGEOLOGICAL MODEL

4.1 Setting

The Facility is at an elevation of approximately 800 m (2,600 feet) above sea level, and lies within the Kluane Lake watershed. Local topography is characteristic of hummocky kame and kettle topography, consisting of gravely kame and kettle and alluvial fan deposits. Permafrost was found in BU-BH12-03 in the northwest corner of the Site, and is mapped as being common to kame and kettle and alluvial fan deposits in the region north and west of Kluane Lake (Rampton, 1977). The regional hydraulic gradient near the Site is expected to follow the regional topography, which slopes east towards Kluane Lake. As of the June 2012 drilling program, the landfill at Facility was closed to the public. A cleared area of approximately 13,000 square meters, that is generally flat, is present at the Site.

4.2 Climate

Climate data at the Site is likely similar to that at the Burwash Airport climate station (Climate ID 2100182), located approximately 10 kilometres northwest of the Facility at an elevation of approximately 806.2 m above sea level. Average monthly precipitation reported at the Burwash Airport station ranges from a low average of 8.5 mm in April to a high average of 66.2 mm in July. The average annual precipitation is approximately 279.7 mm, including 106.4 cm as snowfall. Temperature ranges from a low average of -22^{o} C in January to a high average of 12.8^{o} C in July (Environment Canada, 2012).

Annual precipitation is relatively low (less than 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 southern Yukon, including the Burwash area, has undergone several episodes of glaciation, the most recent being the Quaternary Macauley glaciation and the Mirror Creek glaciation. During that period, sediments such as glacial till and glaciofluvial and glaciolacustrine sediments were deposited, especially in low elevation areas such as the Shakwak Trench where the Burwash Landing Facility is located (Figure 3).

The Burwash Landing 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 to the southwest of the Site.

Surficial geology maps published by the Yukon Geological Survey (YGS) indicate natural surficial materials at the Facility are gently sloping alluvial fan deposits and hummocky kame and kettle deposits influenced by modern permafrost. In general, deposits consist of well compacted to non-compacted sediments that are primarily gravel, with some sand, and a thin veneer of silt and peat. The thickness of the unconsolidated sediments was estimated to be between 3 and 60 m thick (Rampton, 1977).

4.3.2 Principal Aquifer

As shown in Figure 4, it is inferred that groundwater at the Site occurs in a shallow, unconfined aquifer composed primarily of unconsolidated sand and gravel, with minor silt, and cobbles. For the purpose of this report, this aquifer has been named the Surficial Aquifer (Table 7).

Table 7 Aquifer Units Encountered at the Site

Aquifer Name	Location	Aquifer Type	Comments
Surficial Aquifer	BU-MW12-01 BU-MW12-02 BU-MW12-03	Unconfined; unconsolidated porous media	▪ Sand and gravel ▪ Shallow aquifer ▪ High hydraulic conductivity

4.4 Groundwater Flow Systems

4.4.1 Regional Groundwater Flow

Topography in the area surrounding the Facility slopes from the mountains, located to the southwest of the Site (elevation approximately 2000 m amsl), to the east towards Kluane Lake (elevation 895 m amsl). Regional groundwater flow is inferred to be to the east, with discharge to Kluane Lake.

4.4.2 Local Groundwater Flow

Golder used the groundwater depth data from August 23, 2012 and well survey elevation information collected in June 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 east (Figure 6), towards Lewis Creek, which flows into Kluane Lake. The horizontal hydraulic gradient at the Site was estimated to be approximately 0.07 m/m.

4.5 Hydraulic Response Tests

Golder Associates conducted slug tests on the three 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)
BU-MW12-01	Sand and Gravel	Bouwer-Rice (1976)	2×10^{-4}
BU-MW12-02	Sand and Gravel	Bouwer-Rice (1976)	8×10^{-4}
BU-MW12-03	Sand and Gravel	Bouwer-Rice (1976)	3×10^{-4}

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 2×10^{-4} m/s and 8×10^{-4} m/s. The horizontal hydraulic gradient across the Site was assessed, using the monitoring well network, to be approximately 0.07 m/m to the east. 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 0.35 (Fetter, 1994) in sand and gravel.

The resulting groundwater velocity is estimated to be between 4×10^{-5} m/s to 2×10^{-4} m/s and (approximately 3 to 14 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.

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.
- 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 Burwash Solid Waste Disposal Facility and one surface water sampling location downgradient from the Site on August 23, 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)
BU-MW12-01	490	<0.50	<0.0050	204	<0.50	8.0
BU-MW12-02	498	<0.50	<0.0050	205	<0.50	8.0
BU-MW12-03	510	<0.50	<0.0050	207	<0.50	8.2
Surface Water	486	0.62	0.0057	194	1.83	8.2

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. Values of TDS in the monitoring well samples ranged from 490 mg/L to 510 mg/L, which is well within the normal range for naturally occurring groundwater. The TDS concentration in the surface water sample was slighter lower (486 mg/L). TDS concentrations in both groundwater and surface water samples showed no evidence of influence from landfill leachate.

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 Burwash Landing Site were below detectable levels. The level of DOC detected in the surface water sample (1.83 mg/L) was well within the range of values associated with naturally occurring surface water. DOC concentrations in both groundwater and surface water samples showed no evidence of influence from landfill leachate.

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. Chloride levels from the monitoring well network were below the detection limit of 0.5 mg/L, while the chloride concentration measured in the surface water sample was slightly above the detection limit at 0.62 mg/L. These levels are considered to be very low (CSR drinking water standard is 250 mg/L) and well within the range expected in naturally occurring waters. Chloride levels in all of the samples did not show evidence of influence from landfill leachate.

Ammonia

Ammonia is a typical landfill leachate indicator. Ammonia concentrations in the groundwater samples were below the detection limit of 0.005 mg/L and the ammonia concentration in the surface water sample was slightly above the detection limit (0.0057 mg/L), indicating no evidence of influence from landfill leachate.

Metals

Metals concentrations in surface water and groundwater samples were within the range expected in naturally occurring waters. No metals concentrations exceeded any standards set by the Yukon CSR for drinking water, freshwater aquatic life, or livestock.

Organics

Detectable levels of organic constituents are often a sign of leachate contamination. Of the hydrocarbons analyzed (BTEX, PAH, EPH_{w10-10} & VH_{w6-10}, and chlorinated hydrocarbons), none were detected in any of the groundwater or surface water samples. Chlorinated hydrocarbons were analyzed outside of the recommended holding time, as summarized in Table 5.

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 Scheoller plot indicates that the chemistry in the water samples is similar, in that the plots generally overlap each other, except for chloride, which was below the detection limit in the monitoring well samples and slightly above the detection limit in the surface water 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 groundwater and surface water samples have nearly identical chemistry. Water samples can be classified as a calcium bicarbonate-sulphate water type.
- Stiff: The stiff diagram allows for differences in groundwater chemistry to be presented and viewed spatially. Here, the stiff diagram shows that all of the samples have similar chemical composition.

A charge balance was calculated on all of the samples. The results indicated a charge balance error ranging between 1.3% and 3.5%.

None of the samples indicate that landfill leachate from the Facility is influencing groundwater or surface water chemistry.

6.0 CONCLUSIONS

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

- Stratigraphy and Hydrogeology:
  - Topography at the Site is dominated by quaternary surficial deposits;
  - Subsurface conditions were investigated with the installation of three monitoring wells, including BU-MW12-01, BU-MW12-02, and BU-MW12-03, and one borehole (BU-BH12-03), which were completed on June 26 and 27, 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 approximately 20 m of interbedded and well graded sand, gravel and silt;
  - An unconfined aquifer was encountered during the drilling and installation of all three monitoring wells at a depth of approximately 17 m below grade;
  - A series of hydraulic response tests were performed on all three monitoring wells. The results of these tests indicate the hydraulic conductivity of the unconfined aquifer underlying the Site ranges from 2×10^{-5} m/s and 4×10^{-5} m/s. These values are considered reasonable for sand and gravel aquifers;
  - The horizontal hydraulic gradient at the Site was determined, using monitoring well water level data, to be approximately 0.07 m/m, sloping to the east;
  - Groundwater velocity in the surficial aquifer is estimated to range between approximately 2 and 3 metres per day; and
  - Based on the groundwater flow direction determined from the initial groundwater monitoring event, BU-MW12-02 is located downgradient of the Site. BU-MW12-01 is located up-gradient of the Site and BU-MW12-03 is located cross gradient of the Site. Therefore, the requirement of a minimum of 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) criteria for freshwater aquatic life, drinking water, and livestock are all applicable to the Site;
  - Groundwater samples were collected from monitoring wells BU-MW12-01, BU-MW12-02, and BU-MW12-03, and a surface water sample was collected from a small pond located approximately 825 m northeast of the Facility, during one sampling event on August 23, 2012; and
  - Results of groundwater sampling at the Site indicated either low or non-detect levels of all analytes, including those typically associated with landfill leachate contamination. The sample results indicated acceptable levels of all relevant chemical parameters as defined by the CSR criteria for freshwater aquatic life, drinking water, and livestock. This suggests that landfill leachate influence on shallow groundwater underlying the Site is not evident.

7.0 RECOMMENDATIONS

The following recommendations are made based on the results of the hydrogeological assessment presented in this report:

- As required by the Facility's Waste Management Permit, future groundwater monitoring should be conducted twice a year (spring and late summer);
- Groundwater quality at the Facility should be revaluated following an additional round of groundwater monitoring to determine if there are any potential impacts present from landfill leachate;
- Since the groundwater flow direction may change seasonally, flow direction should be re-evaluated next spring to affirm whether or not the conditions for one upgradient and two downgradient monitoring wells have been met;
- If further monitoring indicates that there is only one well located down-gradient of the waste disposal area an additional well should be installed down-gradient of the site; and
- Monitoring well locations and elevations should be surveyed by a professional land surveyor.

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

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Principal Hydrogeologist

Reviewed By:

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CB\GJG\GCP\syd

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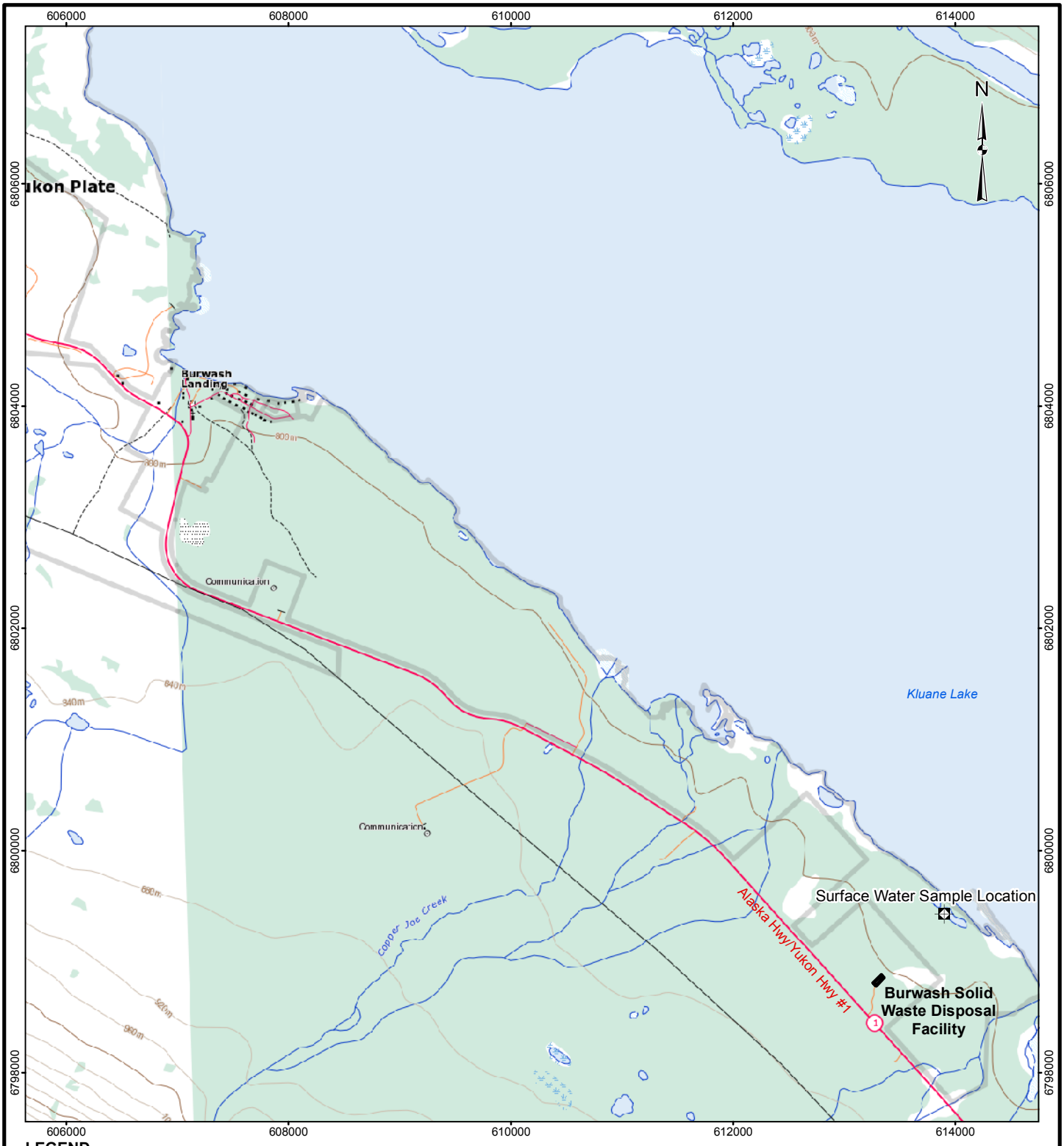

LEGEND

- FACILITY
- SURFACE WATER SAMPLE LOCATION

1 0 1

SCALE 1:50,000 KILOMETRES

PROJECT YUKON GOVERNMENT - COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
BURWASH, YUKON

TITLE

KEY PLAN

REFERENCE

BASEDATA OBTAINED FROM GEOGRATIS (NATURAL RESOURCES CANADA).
DATUM: NAD83 PROJECTION: UTM ZONE 7

Golder Associates
Greater Vancouver Office, B.C.

PROJECT No.	11-1436-0073		PHASE No. 1700	
DESIGN	CB	06 Sep. 2012	SCALE AS SHOWN	REV. 0
GIS	DSC	06 Sep. 2012	FIGURE: 1	
CHECK				
REVIEW				

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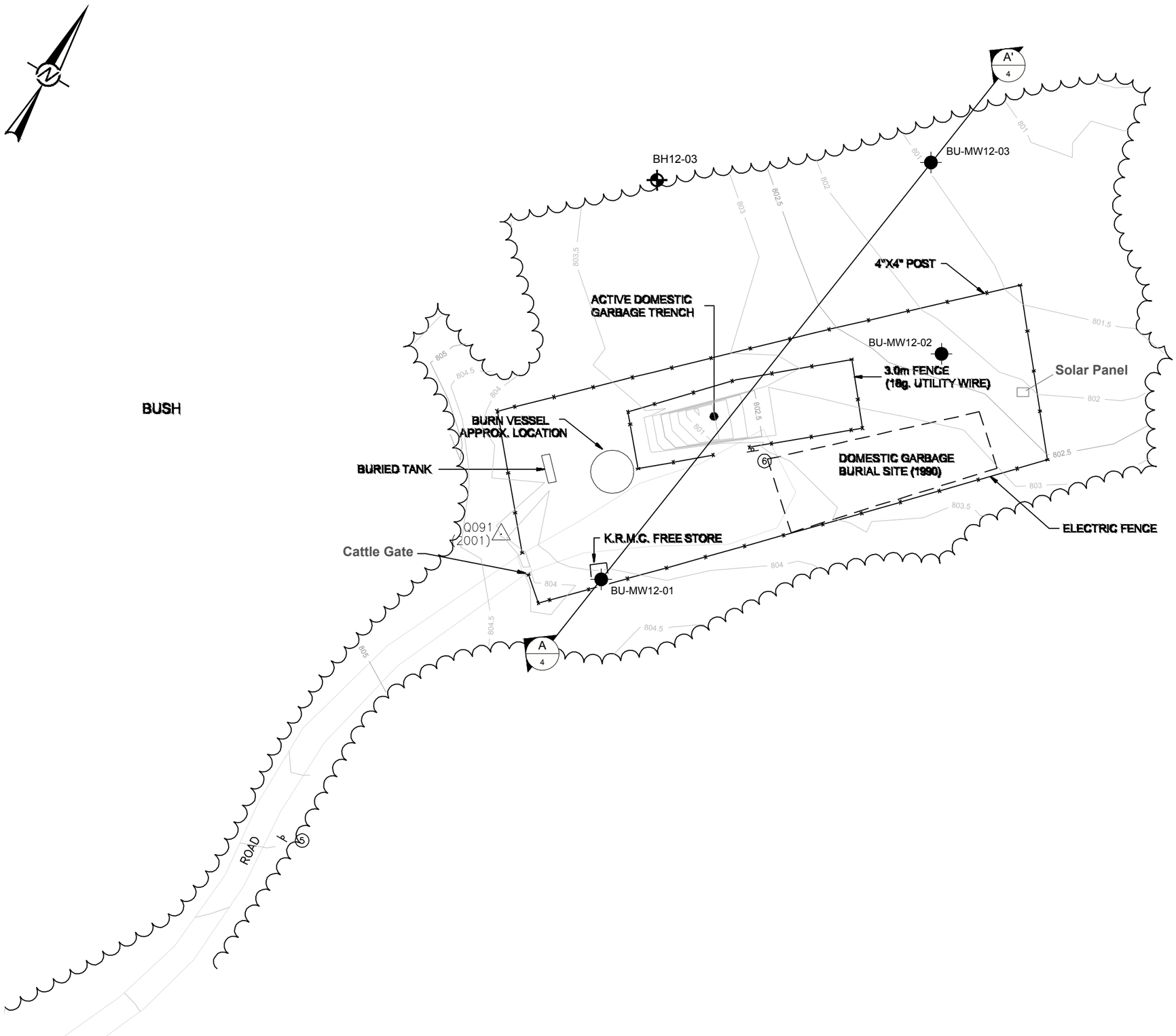

LEGEND

- BOREHOLE LOCATION
- MONITORING WELL LOCATION
- FENCE
- EDGE OF CLEARING

REFERENCES

1. BASE PLAN PROVIDED BY QUEST ENGINEERING GROUP
   CAD FILE: DBAY2004.DWG
   DATED:2002.01.15

NOTES

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

0 15 30 45m

1:750

PROJECT YUKON GOVERNMENT-COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
BURWASH LANDING, YUKON

TITLE

SITE PLAN AND CROSS-SECTION LOCATION

PROJECT No.		11-1436-0073	FILE No.	1700-1760
DESIGN	CB	30AUG12	SCALE	AS SHOWN
CADD	TS	12SEP12		
CHECK	GCP			
REVIEW				

Golder Associates

FIGURE 2

FILENAME|LAYOUT|MODIFIED|PLOTTED|OFFICE

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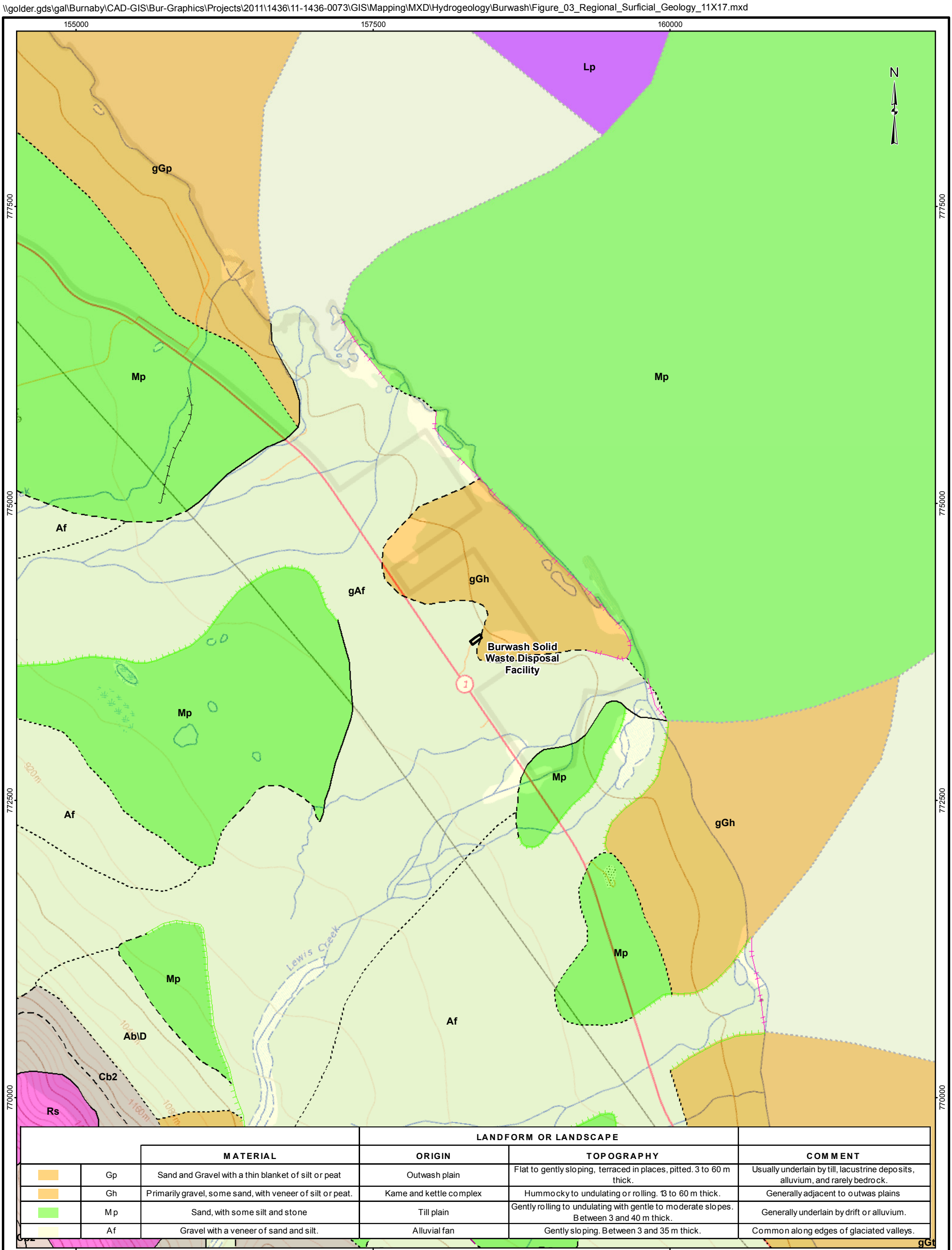


		LANDFORM OR LANDSCAPE			
		MATERIAL	ORIGIN	TOPOGRAPHY	COMMENT
	Gp	Sand and Gravel with a thin blanket of silt or peat	Outwash plain	Flat to gently sloping, terraced in places, pitted. 3 to 60 m thick.	Usually underlain by till, lacustrine deposits, alluvium, and rarely bedrock.
	Gh	Primarily gravel, some sand, with veneer of silt or peat.	Kame and kettle complex	Hummocky to undulating or rolling. 13 to 60 m thick.	Generally adjacent to outwas plains
	Mp	Sand, with some silt and stone	Till plain	Gently rolling to undulating with gentle to moderate slopes. Between 3 and 40 m thick.	Generally underlain by drift or alluvium.
	Af	Gravel with a veneer of sand and silt.	Alluvial fan	Gently sloping. Between 3 and 35 m thick.	Common along edges of glaciated valleys.

LEGEND

- FACILITY
- BUILDING
- MAJOR ROAD
- WATERCOURSE

1 0 1

SCALE 1:30,000 KILOMETRES

REFERENCE

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

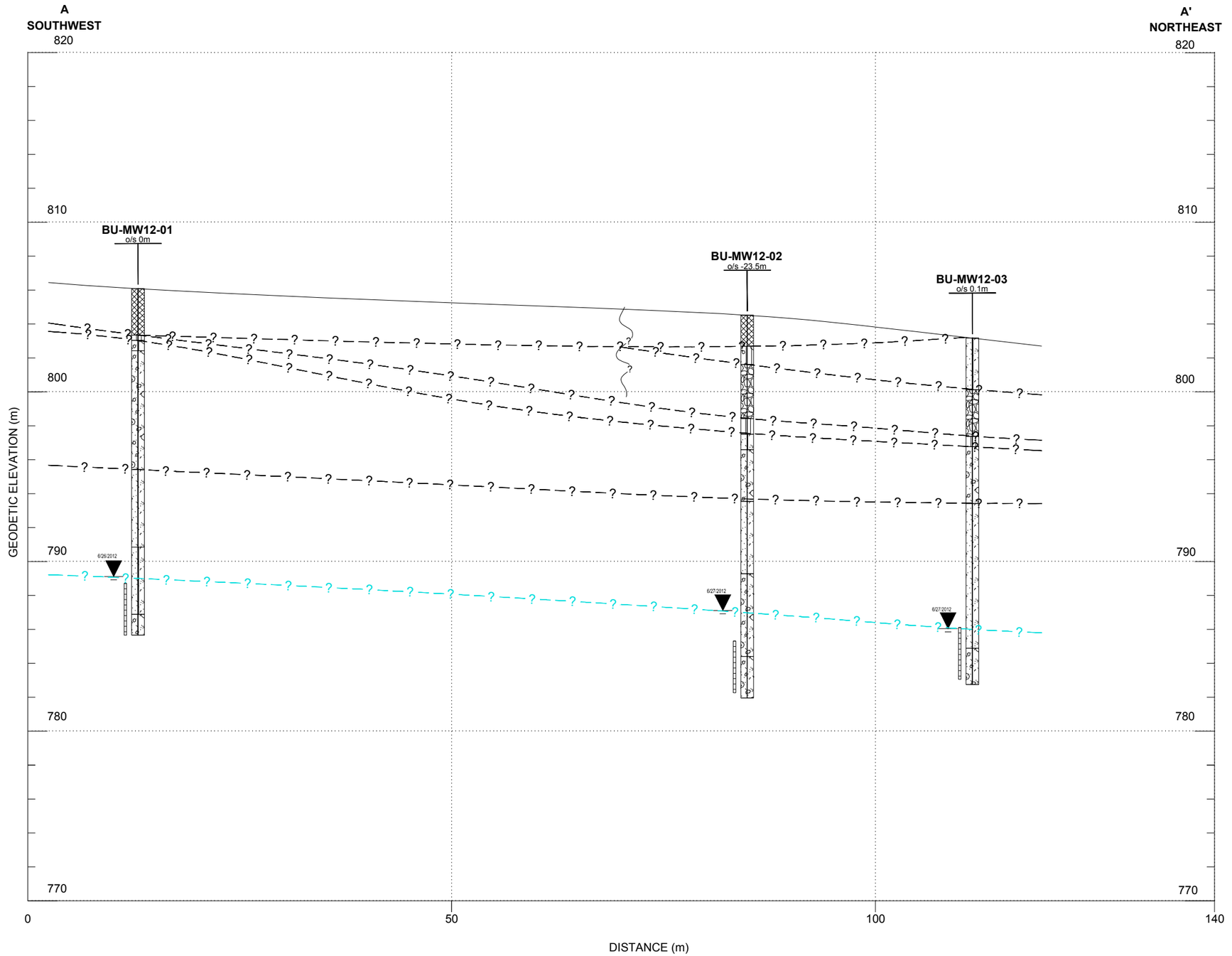
PROJECT
YUKON GOVERNMENT - COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
BURWASH, YUKON

TITLE
REGIONAL SURFICIAL GEOLOGY

Golder Associates
Greater Vancouver Office, B.C.

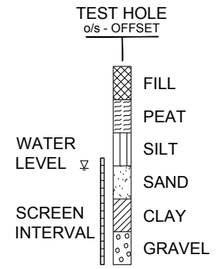
PROJECT No.	11-1436-0073		PHASE No. 1700		
DESIGN	CB	24 Aug. 2012	SCALE AS SHOWN	REV.	0
GIS	DSC	06 Sep. 2012			
CHECK					
REVIEW					

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 10 20 30m

1:500

VERTICAL SCALE EXAGGERATION 2X

PROJECT

GOVERNMENT OF YUKON, DEPARTMENT OF COMMUNITY SERVICES
BURWASH LANDING, Y.T.

TITLE

CONCEPTUAL HYDROGEOLOGICAL CROSS - SECTION A-A'

Golder Associates

PROJECT No.		11-1436-0073	FILE No. 11-1436-0073-1700-1760-02	
DESIGN	GJH	24OCT12	SCALE	AS SHOWN
CADD	JHL	02NOV12		
CHECK	GCP			
REVIEW				

FIGURE 4

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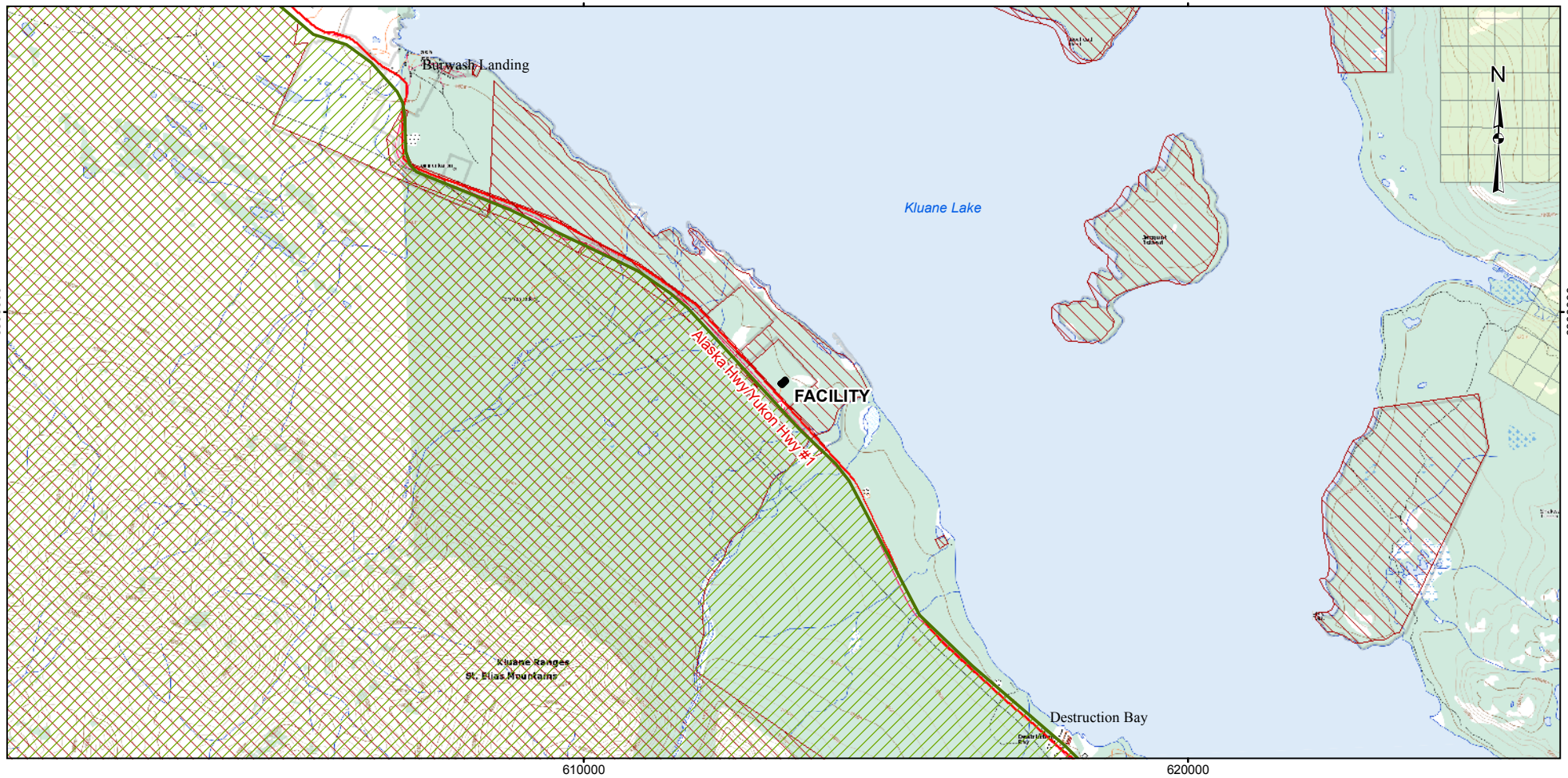

LEGEND

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

2 0 2

SCALE 1:100,000 KILOMETRES

PROJECT

YUKON GOVERNMENT - COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
BURWASH, YUKON

TITLE

REGIONAL DRAINAGE & LAND ZONING

REFERENCE

FEATURE DATA OBTAINED FROM THE YUKON GOVERNMENT YGS MAPMAKER ONLINE. BASEDATA OBTAINED FROM GEOGRATIS (NATURAL RESOURCES CANADA).
DATUM: NAD83 PROJECTION: UTM ZONE 07

Golder Associates
Greater Vancouver Office, B.C.

PROJECT No.		11-1436-0073	PHASE No. 1700	
DESIGN	CB	06 Sep. 2012	SCALE AS SHOWN	REV. 0
GIS	DSC	07 Sep. 2012		
CHECK				
REVIEW				

FIGURE: 5

LEGEND

- MONITORING WELL
- GROUNDWATER ELEVATION (MEASURED ON AUGUST 23, 2012)
- INFERRED POTENTIOMETRIC CONTOURS
- INFERRED GROUNDWATER FLOW DIRECTION

30 0 30

SCALE 1:1,500 METRES

REFERENCE

IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009.
DATUM: NAD83 PROJECTION: UTM ZONE 7

PROJECT
YUKON GOVERNMENT - COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
BURWASH, YUKON

TITLE
MONITORING WELL LOCATION MAP GROUNDWATER ELEVATION

Golder Associates
Greater Vancouver Office, B.C.

PROJECT No.	11-1436-0073		PHASE No. 1700	
DESIGN	CB	04 Sep. 2012	SCALE AS SHOWN	REV. 0
GIS	DSC	06 Sep. 2012		
CHECK				
REVIEW				

FIGURE: 6

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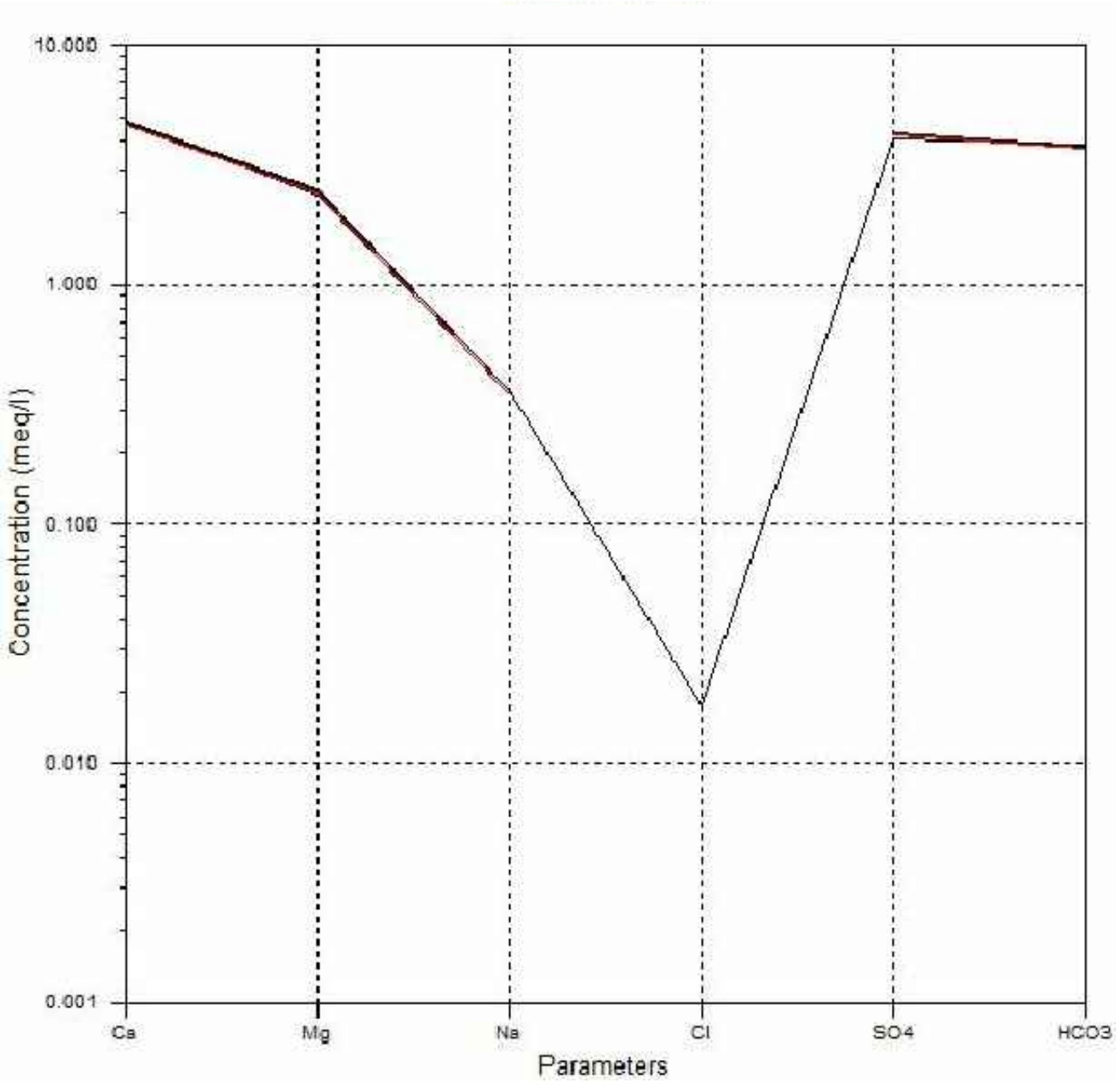


LEGEND

- BU-MW12-01
- Burwash Surface Water Sample
- BU-MW12-03
- BU-MW12-02

NOTES

1. LINES OVERLAP AND ARE NOT VISIBLE DUE TO SIMILARITY IN CHEMISTRY OF SAMPLES.

PROJECT YUKON GOVERNMENT-COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
BURWASH LANDING, YUKON

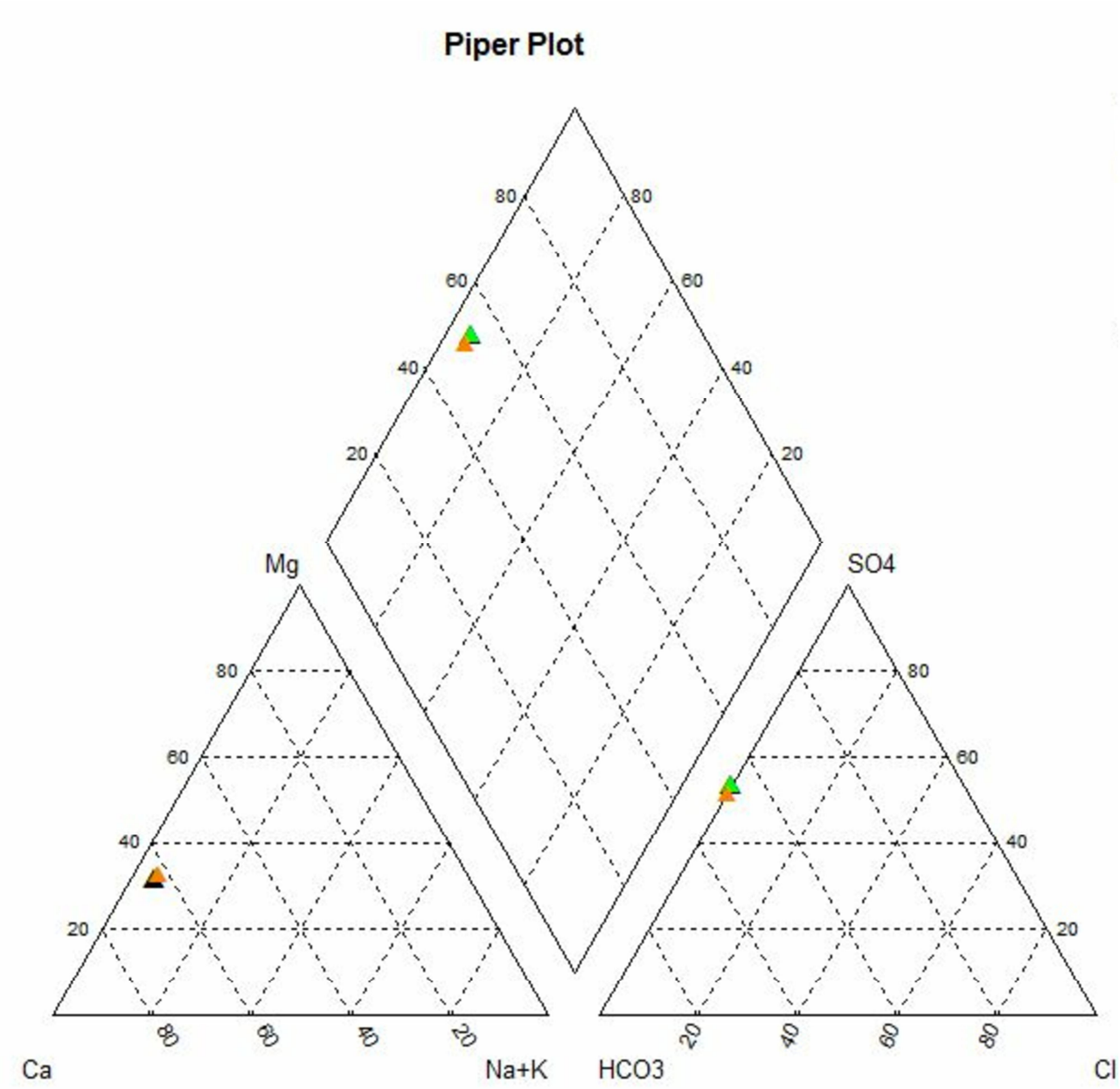
TITLE

SCHOELLER PLOT

Golder Associates

PROJECT No.		11-1436-0073	FILE No. 11-1436-0073-1700-1760-01
DESIGN	CB	24SEP12	SCALE NOT TO SCALE
CADD	MM	19SEP12	
CHECK			
REVIEW			

FIGURE 7



LEGEND

Monitoring Event
August 2012

- BU-MW12-01
- BU-MW12-02
- Burwash Surface Water Sample
- BU-MW12-03

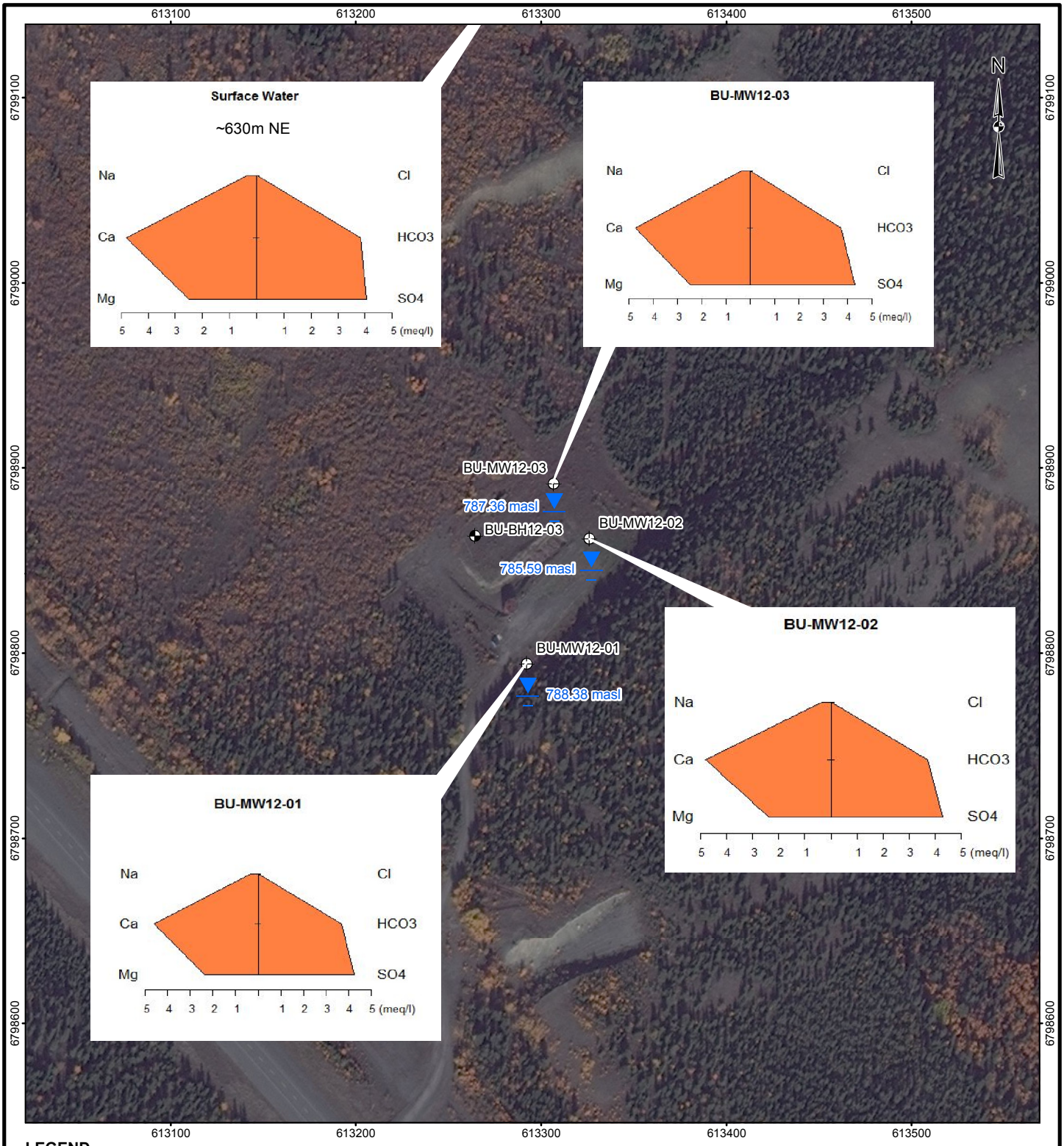
PROJECT YUKON GOVERNMENT-COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
BURWASH LANDING, YUKON

TITLE

PIPER PLOT

Golder Associates

PROJECT No.		11-1436-0073	FILE No. 11-1436-0073-1700-1760-01
DESIGN	CB	18SEP12	SCALE NOT TO SCALE
CADD	TS	19SEP12	
CHECK	####		**FIGURE 8**
REVIEW	####	####	



LEGEND

- BOREHOLE
- MONITORING WELL
- GROUNDWATER ELEVATION (MEASURED ON AUGUST 22, 2012)

60 0 60

SCALE 1:3,000 METRES

REFERENCE

IMAGERY OBTAINED FROM BING MAPS FOR ARCGIS PUBLISHED BY MICROSOFT CORPORATION, REDMOND, WA, MAY 2009.
DATUM: NAD83 PROJECTION: UTM ZONE 7

PROJECT
YUKON GOVERNMENT - COMMUNITY SERVICES
SOLID WASTE DISPOSAL FACILITY
BURWASH, YUKON

TITLE

STIFF DIAGRAM

Golder Associates
Greater Vancouver Office, B.C.

PROJECT No.	11-1436-0073		PHASE No.	1700	
DESIGN	CB	18 Sep. 2012	SCALE AS SHOWN	REV.	0
GIS	DSC	19 Sep. 2012			
CHECK					
REVIEW					

FIGURE: 9

\\golder.gds\gal\Burnaby\CAD-GIS\Bur-Graphics\Projects\2011\1436\11-1436-0073\GIS\Mapping\MXD\Hydrogeology\Burwash\Figure_09_Stiff_Diagram.mxd

APPENDIX A

Site Photographs

Photograph 1: Taken during the preliminary Site visit on October 23, 2011. A view from the entrance to the Facility looking north at the KRMC Free Store and burn vessel.

Photograph 2: Taken during the preliminary Site visit on October 23, 2011. A view from the west corner of the Facility looking east at the burn vessel and garbage trench.

Photograph 3: Taken during the monitoring well installation program in June 2012. A view of the access road to the Facility, monitoring well BU-MW12-01, and mountains of the Kluane Ranges in the background.

Photograph 4: Taken during the monitoring well installation program in June 2012. A close-up of the open garbage trench.

APPENDIX B

Well Construction Logs

PROJECT No.: 11-1436-0073 (1700)

RECORD OF BOREHOLE: BU-BH12-03

SHEET 1 OF 1
DATUM: Local

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798863.53 E: ~613264.5
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 27, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

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												
0	M5 Drilltech Truck Mounted Auger Drill Rig Air Rotary	(SM) SILTY SAND, some gravel, brown, moist.		0.00										
1		(GM) SILTY GRAVEL, some sand, brown, moist. - at 1.83m depth: wet.		1.22										
2		(GW) GRAVEL, some sand, some silt, grey-brown, wet.		1.83										
3		(CH) CLAY, trace silt, brown, wet. - at 3.66m depth: some ice (permafrost).		3.05										
		End of Borehole.		3.66										
4														
5														
6														
7														
8														
9														
10														

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: CB
CHECKED: GH

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-01

DATUM: Local

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798794.34 E: ~613292.5
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 26, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

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											Stickup = 0.71m
0	M5 Drillech Truck Mounted Auger Drill Rig, Air Rotary	Landfill (plastic bags, wood, metal), with CLAYEY SAND. (FILL)		0.00									
1													
2													
3		(ML) SILT, some clay, dark brown, moist.		2.74									
		(SM-GM) SILTY SAND and GRAVEL, dark brown, moist.		3.05									
4		(GW-SW) GRAVEL and SAND, trace silt, brown, moist.		3.66									
5													Bentonite Seal
6													
7													
8													
9													
10		*CONTINUED NEXT PAGE*											

DEPTH SCALE
1 : 50

LOGGED: CB
CHECKED: GH

Golder Associates

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-01

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798794.34 E: ~613292.5
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 26, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM: Local

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	(GW-SW) GRAVEL and SAND, trace silt, brown, moist. *(continued)*												
		(SP) fine SAND, trace coarse sand, trace gravel, moist.		10.67										
11														
12														
13														Bentonite Seal
14														
15														
		(SM) SILTY SAND, fine sand, brown, moist.		15.24										
16														10/20 Silica Sand
														06/26/2012 ▽
17														
18														
														51mm Slotted PVC Pipe
19														
		(SW-GW) SAND and GRAVEL, dark brown, wet. - Sampled Sa 1.		19.20										
20		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: CB
CHECKED: GH

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-01

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798794.34 E: ~613292.5
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 26, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM: Local

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	Air Rotary	(SW-GW) SAND and GRAVEL, dark brown, wet. - Sampled Sa 1. *(continued)*											51mm Slotted PVC Pipe
		End of Monitoring Well.		20.42									
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

DEPTH SCALE
1 : 50

LOGGED: CB
CHECKED: GH

Golder Associates

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-02

DATUM: Local

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798862 E: ~613326.2
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 27, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

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												
0	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	(SM) SILTY SAND, some gravel, brown, moist. (FILL)		0.00										
1														
2		(ML) gravelly SILT, trace sand, brown, moist.		1.83										
3		(GW) GRAVEL, some sand, trace silt, brown, moist.		2.90										
4														
5														Bentonite Seal
6		(ML) SILT, some clay, grey-brown, moist.		6.10										
7		(SM) SILTY SAND, some gravel, grey-brown, moist.		7.01										
8		(SW-GW) SAND and GRAVEL, trace silt.		7.92										
9														
10		- from 9.75m - 10.97m depth: dry.												
		CONTINUED NEXT PAGE												

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: CB/AB
CHECKED: GH

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-02

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798862 E: ~613326.2
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 27, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM: Local

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	(SW-GW) SAND and GRAVEL, trace silt. *(continued)*												
11		(SP) fine SAND, trace gravel, grey-brown, dry. - from 11.28m - 11.58m depth: silty.		10.97										
12		- from 12.19m - 15.24m depth: some gravel.												
13														
14														Bentonite Seal
15														
16		(GW-SW) GRAVEL and SAND, grey-brown, dry.		15.24										
17		- at 16.76m depth: wet.												06/27/2012 ▽
18														
19														10/20 Silica Sand 51mm Slotted PVC Pipe
20		*CONTINUED NEXT PAGE*												

DEPTH SCALE
1 : 50

LOGGED: CB/AB
CHECKED: GH

Golder Associates

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-02

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798862 E: ~613326.2
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 27, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM: Local

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	(GW-SW) GRAVEL and SAND, grey-brown, wet.		20.12										51mm Slotted PVC Pipe
21														
22		End of Monitoring Well.		22.56										
23														
24														
25														
26														
27														
28														
29														
30														

DEPTH SCALE
1 : 50

LOGGED: CB/AB
CHECKED: GH

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-03

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798891.72 E: ~613306.8
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 27, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM: Local

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												
0	M5 Drillech Truck Mounted Auger Drill Rig Air Rotary	(SM) SILTY SAND, dark grey, moist.		0.00										
1		- some gravel from 1.52m - 3.05m depth.												
2														
3		(GW) GRAVEL, some sand, trace silt, dark grey-brown, moist.		3.05										
4														
5														Bentonite Seal
6		(ML) SILT, dark grey, moist.		5.79										
		(SW-GW) SAND and GRAVEL, trace silt, dark grey-brown, moist.		6.40										
7														
8														
9														
10		(SP) fine SAND, trace gravel, brown, moist.		9.75										

CONTINUED NEXT PAGE

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: GH

Golder Associates

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-03

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798891.72 E: ~613306.8
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 27, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM: Local

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	(SP) fine SAND, trace gravel, brown, moist. *(continued)*												
11														
12														
13														Bentonite Seal
14														
15														
16														
16		- at 16.46m depth: wet.												10/20 Silica Sand 06/27/2012 ▽
17														
18														
18		(GW-SW) GRAVEL and SAND, dark grey-brown, wet.		18.29										51mm Slotted PVC Pipe
19														
20														

CONTINUED NEXT PAGE

DEPTH SCALE
1 : 50

LOGGED: AB
CHECKED: GH

Golder Associates

PROJECT No.: 11-1436-0073 (1700)

RECORD OF MONITORING WELL: BU-MW12-03

CLIENT: Yukon Government Community Services
PROJECT: Yukon Landfill Assessment
LOCATION: Burwash Landing Solid Waste Disposal Facility
N: ~6798891.72 E: ~613306.8
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 27, 2012
DRILLING CONTRACTOR: Midnight Sun Drilling

DATUM: Local

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	Air Rotary	(GW-SW) GRAVEL and SAND, dark grey-brown, wet. *(continued)*												
		End of Monitoring Well.		20.42										
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: AB
CHECKED: GH

APPENDIX C

Well Development and Sampling Sheets

GROUNDWATER DEVELOPMENT AND PURGING/SAMPLING DATA SHEET

☑ Development
☐ Purging/Sampling

Well No.: BU-MW12-01 **Project No.:** 11-1436-0073 (1700)
Location: Bo[illegible]wash Landing **Date:** 27-Jun-12 **Time:** 10:45
Weather: ______ **Temperature:** ______ **Completed by:** Calvin Beebe

MONITORING WELL INFORMATION

Time of Measurement: ~10:50
Tidally Influenced: ☐ Yes ☒ No
Depth to product: X Product thickness: X
One well volume: ______
Depth to water Below Top of Casing: A 18.25 metres (B-A)*2.0 = 6 litres - for a 51 mm (2.0 inch) diameter well
Depth to Bottom of Well Below Top of Casing: B 21.18 metres (B-A)*1.1 = X litres - for a 38 mm (1.5 inch) diameter well
Diameter Standpipe: C 51 mm Sample intake depth: ~20 metres

EQUIPMENT LIST

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

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = 18 litres
Avg. Flow Rate: 1.05 L/min. Start: ______ Finish: ______

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %		Water Level (m)	Remarks
10:53	2	5.86	7.75	693					
10:55	5	5.32	7.58	696					
11:01	8	5.72	7.51	692					
11:03	10	4.50	7.53	697					
11:07	18	4.93	7.53	693					

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 I I I Very Silty

Analysis	Type		Container Size 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	

SON 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.: BU-MW12-03
Location: Burwash Landing
Weather: ____ Temperature: ____
Project No.: 11-1436-0073 (1700)
Date: 27-Jun-12 Time: 15:34
Completed by: Calvin Beebe

MONITORING WELL INFORMATION

Time of Measurement: ~15:40
Depth to product: x Product thickness: x
Depth to water Below Top of Casing: A 17.29 metres
Depth to Bottom of Well Below Top of Casing: B 21.11 metres
Diameter Standpipe: C 51 mm
Tidally influenced: ☐ Yes ☒ No
One well volume:
(B-A)*2.0 = 6 litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = x litres - for a 38 mm (1.5 inch) diameter well
Sample intake depth: ~20 metres

EQUIPMENT LIST

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

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = 18 litres
Avg. Flow Rate: 2.5 L/min. Start: 15:45 Finish: 16:03

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	5	8.14	7.49	768					
15:48	8	5.49	7.51	744					
15:51	15	5.55	7.60	730					
15:55	25	5.03	7.45	734					
15:58	30	5.03	7.41	725					
16:03	45	4.82	7.49	726					

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 I I Very Silty

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. ____ Field Dup. ____
Consumables: ☐ Waterra Tubing ____ ☐ Silicon Tubing ____ ☐ HDPE/Teflon Tubing ____ ☐ D.O. Ampoules ____ ☐ Groundwater Filter ____ ☐ ____

GROUNDWATER DEVELOPMENT AND PURGING/SAMPLING DATA SHEET

☐ Development
☑ Purging/Sampling

Well No.: BU-MW12-01 **Project No.:** 11-1436-0073 / 1700

Location: BURWASH **Date:** 23-AUG-12 **Time:** 15:25

Weather: CLEAR **Temperature:** 15°C **Completed by:** A BADGER

MONITORING WELL INFORMATION

Time of Measurement: 15:20 Tidally influenced: ☐ Yes ☒ No

Depth to product: ________ Product thickness: ________ One well volume: ________

Depth to water Below Top of Casing: A 17.71 metres (B-A)*2.0 = 3.462 7 litres - for a 51 mm (2.0 inch) diameter well

Depth to Bottom of Well Below Top of Casing: B 21.17 metres (B-A)*1.1 = ________ litres - for a 38 mm (1.5 inch) diameter well

Diameter Standpipe: C ________ mm Sample intake depth: ________ metres

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA HI991300 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 Type: ________

Pump Details: ________

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 7.4 = 30 litres

Avg. Flow Rate: ________ L/min. Start: 15:25 Finish: 1544

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %		Water Level (m)	Remarks
15:26	0.5	11.2	7.63	590					
15:28	7	7.6	7.61	602				17.72	
15:32	15	5.8	7.61	616				17.72	
15:36	22	5.4	7.62	634				17.72	
15:40	30	5.3	7.62	609				17.72	
15:44	37	5.0	7.62	597				17.72	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 I Very Silty

Analysis	Type		Container Size 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.: BU-MW12-02 Project No.: 11-1436-0073/1700
Location: BURWASH Date: 23-AUG-12 Time: 17:00
Weather: CLEAR Temperature: 12°C Completed by: A BADGER

MONITORING WELL INFORMATION

Time of Measurement: 16:55
Tidally influenced: ☐ Yes ☒ No
Depth to product: ______ Product thickness: ______
One well volume: ______
Depth to water Below Top of Casing: A 17.96 metres (B-A)*2.0 = 5.2/.2 10.5 litres - for a 51 mm (2.0 inch) diameter well
Depth to Bottom of Well Below Top of Casing: B 22.16 metres (B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
Diameter Standpipe: C ______ mm Sample intake depth: ______ metres

EQUIPMENT LIST

pH and Temp. Meter: Model HANNA HI 991300 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 Type: ______
Pump Details: ______

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 10.6 = 60 litres
Avg. Flow Rate: ______ L/min. Start: 17:00 Finish: 17:23

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %		Water Level (m)	Remarks
17:02	1	10.2	7.43	585					
17:03	8	7.6	7.53	572					
17:06	15	5.9	7.59	608				17.96	
17:09	22	5.0	7.57	596					
17:11	30	4.8	7.57	615				17.96	
17:15	37	4.6	7.58	596					
17:17	45	4.5	7.57	605				17.96	
17:20	52	4.6	7.59	595					
17:23	60	4.5	7.58	605				17.96	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 I Very Silty

Analysis	Type		40 mL	100 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
			Container Size									
	☐ 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.: BU-MW12-03
Project No.: 11-1436-0073/1700
Location: BURWASH
Date: 23-AUG-12
Time: 16:05
Weather: CLEAR
Temperature: 15°C
Completed by: A BADGER

MONITORING WELL INFORMATION

Time of Measurement: 16:05
Tidally influenced: ☐ Yes ☒ No
Depth to product: ______ Product thickness: ______
One well volume: ______
Depth to water Below Top of Casing: A 17.13 metres
(B-A)*2.0 = 3.99.2 → 8 litres - for a 51 mm (2.0 inch) diameter well
Depth to Bottom of Well Below Top of Casing: B 21.12 metres
(B-A)*1.1 = ______ litres - for a 38 mm (1.5 inch) diameter well
Diameter Standpipe: C ______ mm
Sample intake depth: ______ metres

EQUIPMENT LIST

HANNA HI 991300

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 Type: ______
Pump Details: ______

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 8.4 = 37 litres
Avg. Flow Rate: ______ L/min.
Start: 16:10
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
16:10	0.5	10.6	7.56	552					
16:11	8	7.7	7.62	578				8	
16:14	15	5.8	7.63	596				17.12	
16:17	22	5.1	7.67	585					
16:19	30	4.9	7.66	617					
16:21	37	4.6	7.67	612					
16:25	45	4.7	7.68	610				17.12	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 I I Very Silty

Analysis	Type		Container Size 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. ______
Field Dup. ______
Consumables: ☐ Waterra Tubing ☐ HDPE/Teflon Tubing ______ ☐ Groundwater Filter ______
☐ Silicon Tubing ☐ D.O. Ampoules ______ ☐ ______

Surface Water Sampling Data Sheet

☑ Field Characterization
☑ Sampling

Sample Number: BU SURFACE
Location: 07V 0613900 6799431
Weather: CLEAR
Temperature: 12°C

Project No. 11-1436-0073/1700
Completed By: A BADGER
Date: 23-AUG-12
Time: 18:30
Reviewed By:

EQUIPMENT LIST

HANNA HI 991300

pH and Temp. Meter: Model ______ Serial No. ______
Conductivity Meter: Model ______ Serial No. ______
Dissolved Oxygen Meter: Model ______ Serial No. ______

Calibration Buffers: ☒ 4 ☒ 7 ☐ 10
Calibration Solution: 1413
☐ 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
18:50		16.3	8.24	570			

Comments:

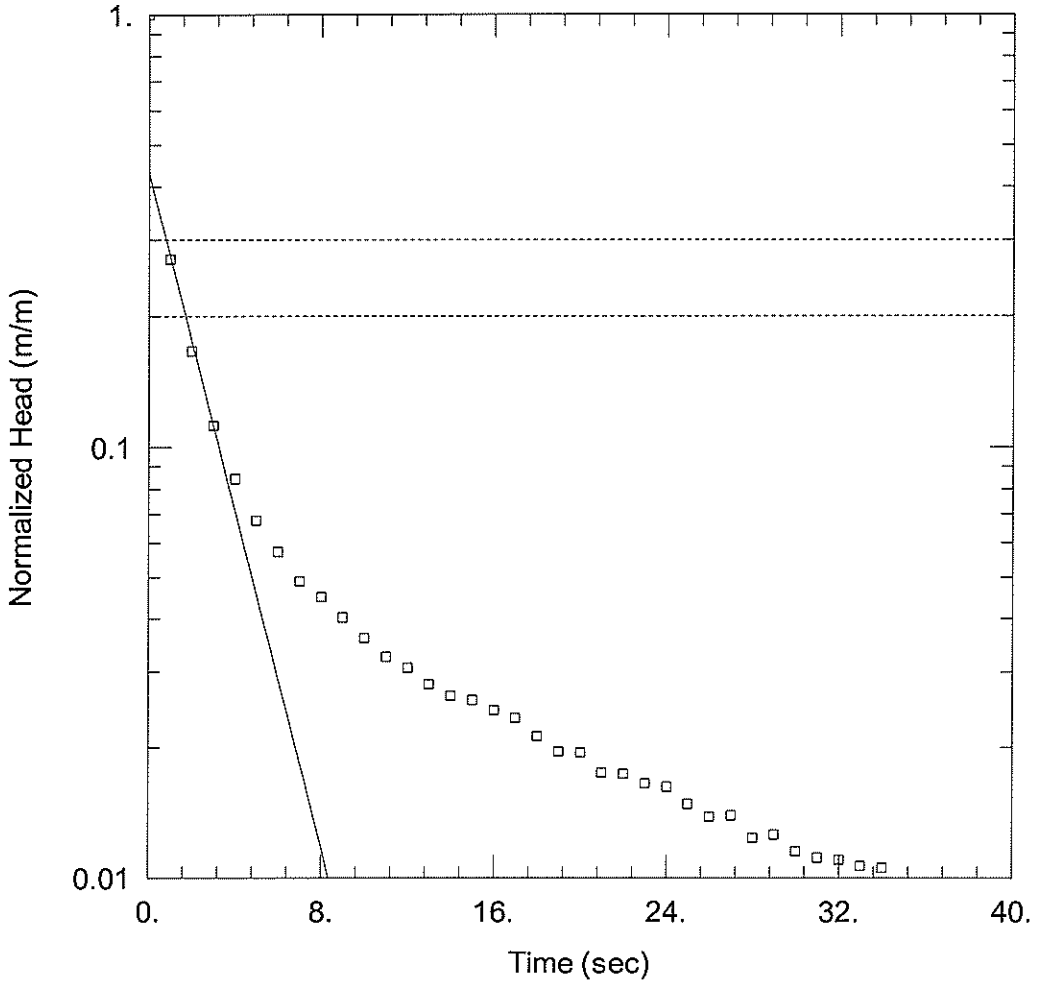
Odour: ☐ Yes ☐ No If yes ______
Sheen: ☐ Yes ☐ No If yes ______
Turbidity: Clear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Very Silty
Other: ______

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



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-01 Test 1.aqt
Date: 10/22/12 Time: 11:52:17

PROJECT INFORMATION

Test Well: BU-MW12-01
Test Date: 27-JUNE-12

AQUIFER DATA

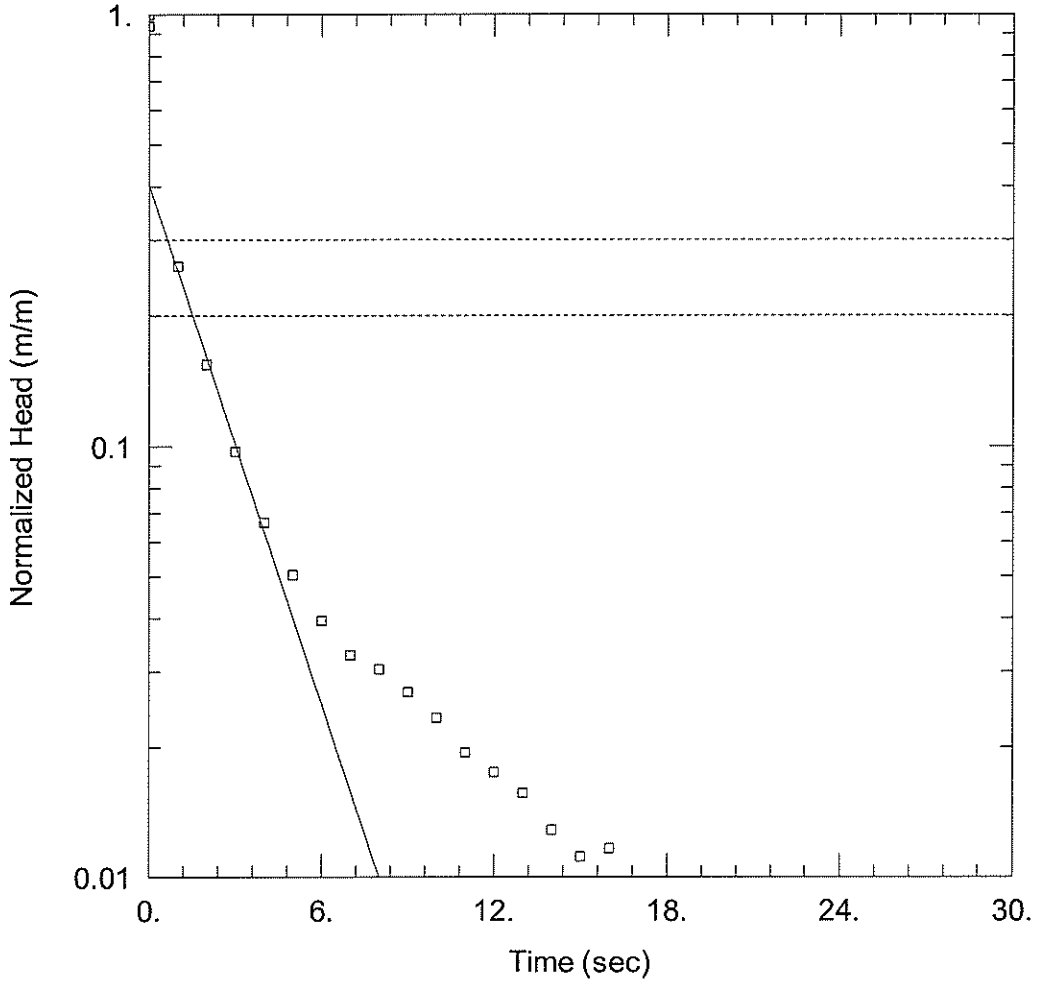
Saturated Thickness: 1.22 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BU-MW12-01)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 3.05 m
Casing Radius: 0.025 m
Static Water Column Height: 2.93 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0002728 m/sec
y0 = 0.3497 m



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-01 Test 2.aqt
Date: 10/22/12 Time: 12:39:20

PROJECT INFORMATION

Test Well: BU-MW12-01
Test Date: 27-JUNE-12

AQUIFER DATA

Saturated Thickness: 1.22 m Anisotropy Ratio (Kz/Kr): 1.

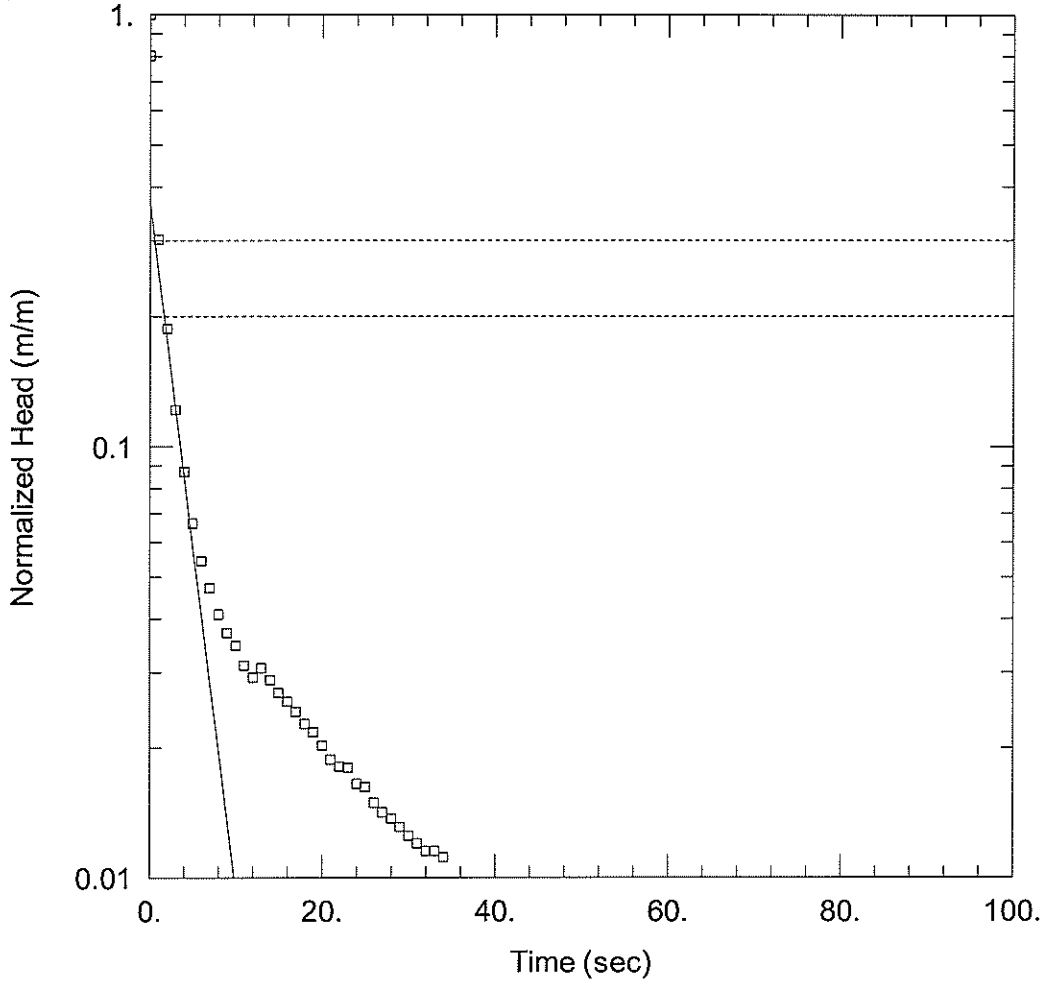
WELL DATA (BU-MW12-01)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 3.05 m
Casing Radius: 0.025 m
Static Water Column Height: 2.93 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002802 m/sec
y0 = 0.3295 m



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-01 Test 3.aqt
Date: 10/22/12 Time: 12:39:54

PROJECT INFORMATION

Test Well: BU-MW12-01
Test Date: 27-JUNE-12

AQUIFER DATA

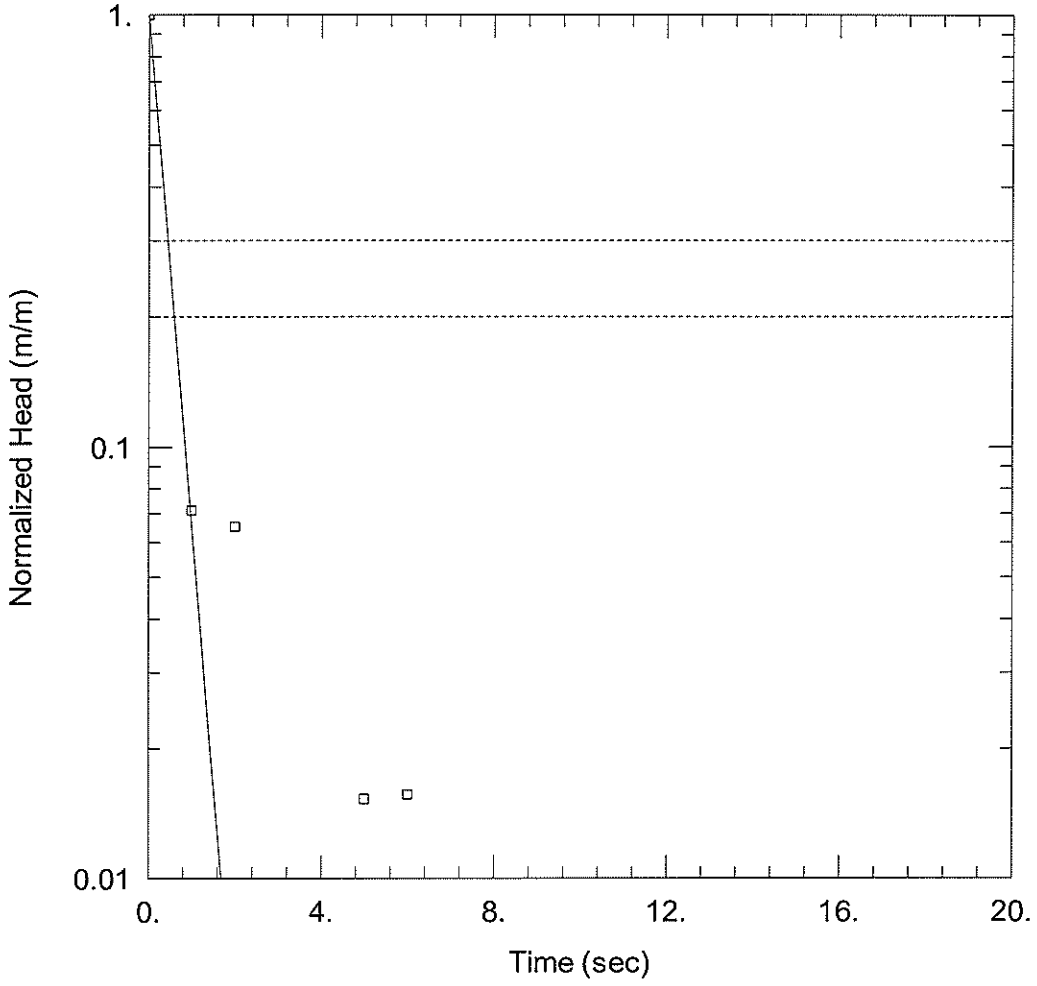
Saturated Thickness: 1.22 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BU-MW12-01)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 3.05 m
Casing Radius: 0.025 m
Static Water Column Height: 2.93 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.000222 m/sec
y0 = 0.2988 m



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-02 Test 1.aqt
Date: 10/22/12 Time: 12:40:38

PROJECT INFORMATION

Test Well: BU-MW12-02
Test Date: 23-AUGUST-12

AQUIFER DATA

Saturated Thickness: 5.18 m Anisotropy Ratio (Kz/Kr): 1.

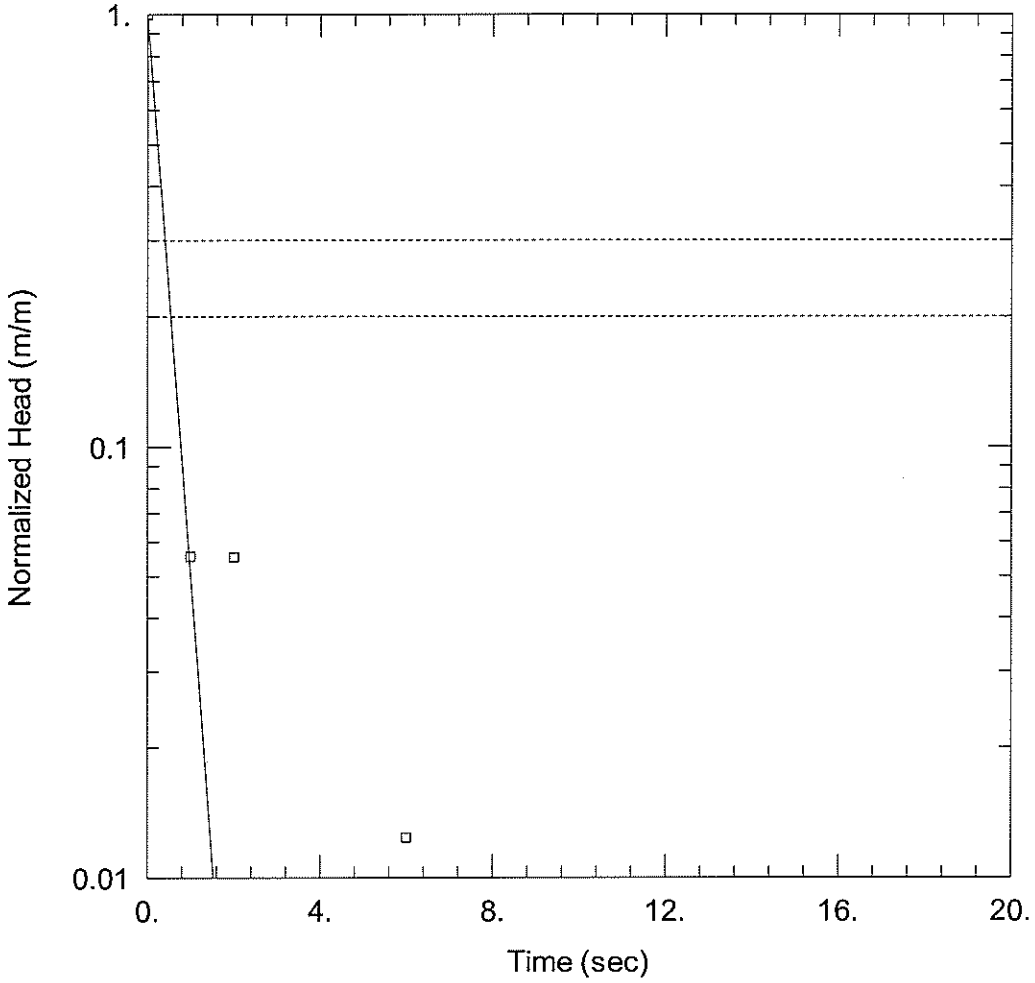
WELL DATA (BU-MW12-02)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 5.18 m
Casing Radius: 0.025 m
Static Water Column Height: 5.18 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0008398 m/sec y0 = 0.8258 m



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-02 Test 2.aqt
Date: 10/22/12 Time: 12:40:55

PROJECT INFORMATION

Test Well: BU-MW12-02
Test Date: 23-AUGUST-12

AQUIFER DATA

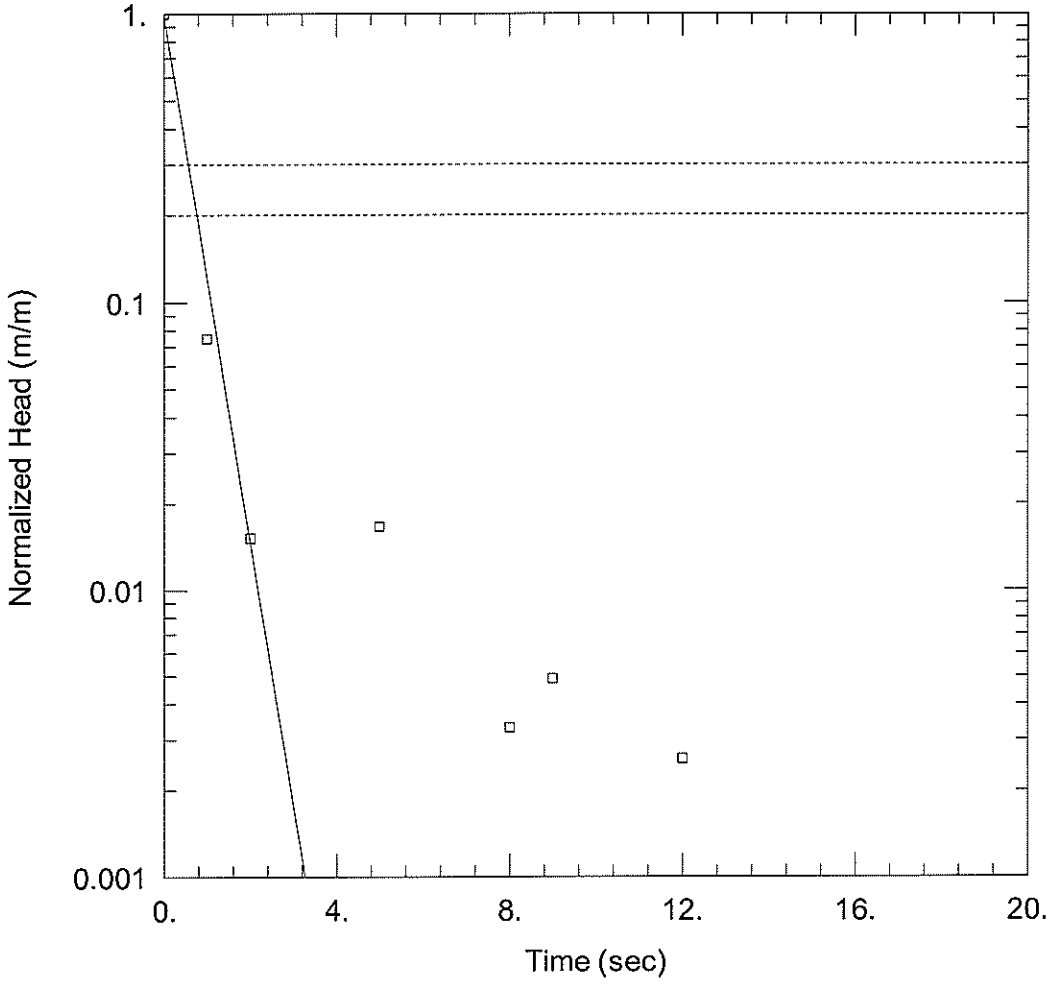
Saturated Thickness: 5.18 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BU-MW12-02)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 5.18 m
Casing Radius: 0.025 m
Static Water Column Height: 5.18 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0009157 m/sec
y0 = 0.8258 m



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-02 Test 3.aqt
Date: 10/22/12 Time: 12:42:08

PROJECT INFORMATION

Test Well: BU-MW12-02
Test Date: 23-AUGUST-12

AQUIFER DATA

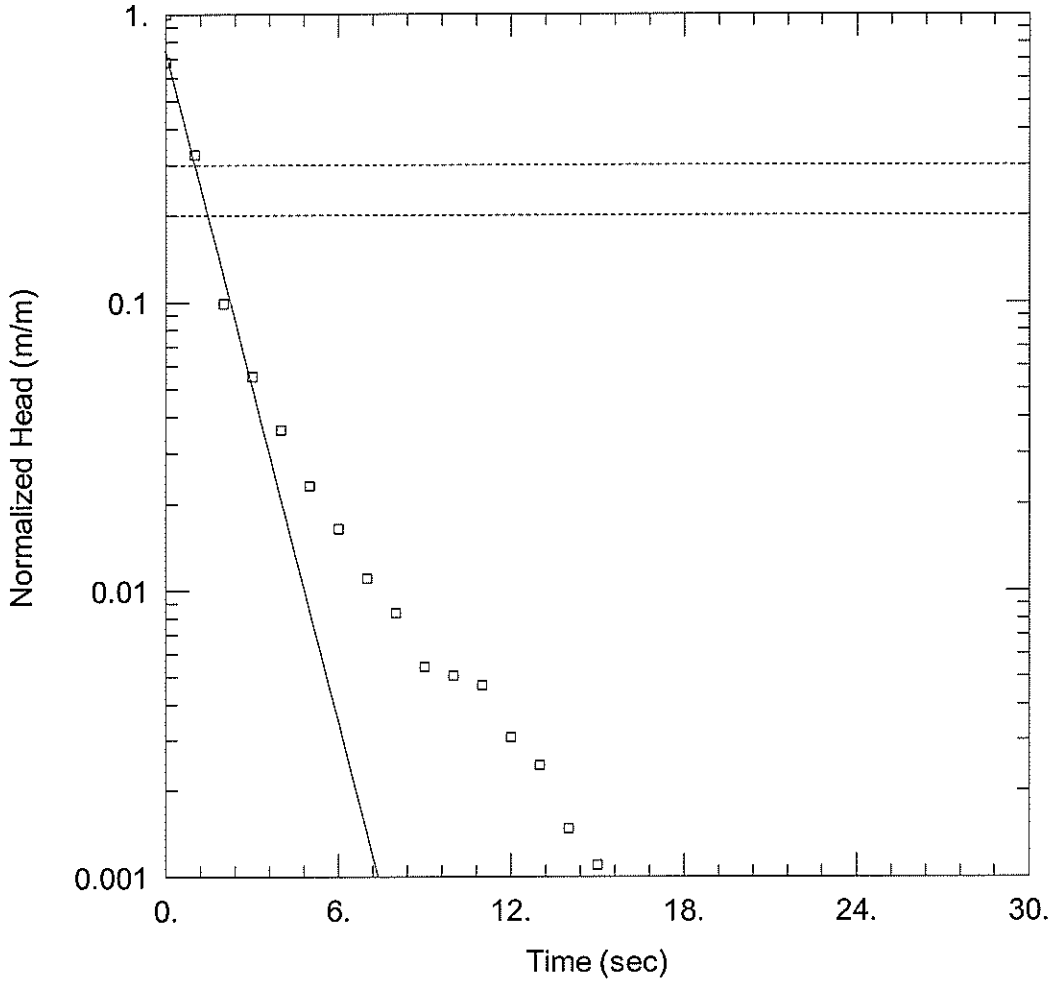
Saturated Thickness: 5.18 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BU-MW12-02)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 5.18 m
Casing Radius: 0.025 m
Static Water Column Height: 5.18 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0006482 m/sec
y0 = 0.8258 m



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-03 Test 1.aqt
Date: 10/22/12 Time: 12:48:59

PROJECT INFORMATION

Test Well: BU-MW12-03
Test Date: 27-June-12

AQUIFER DATA

Saturated Thickness: 3.82 m Anisotropy Ratio (Kz/Kr): 1.

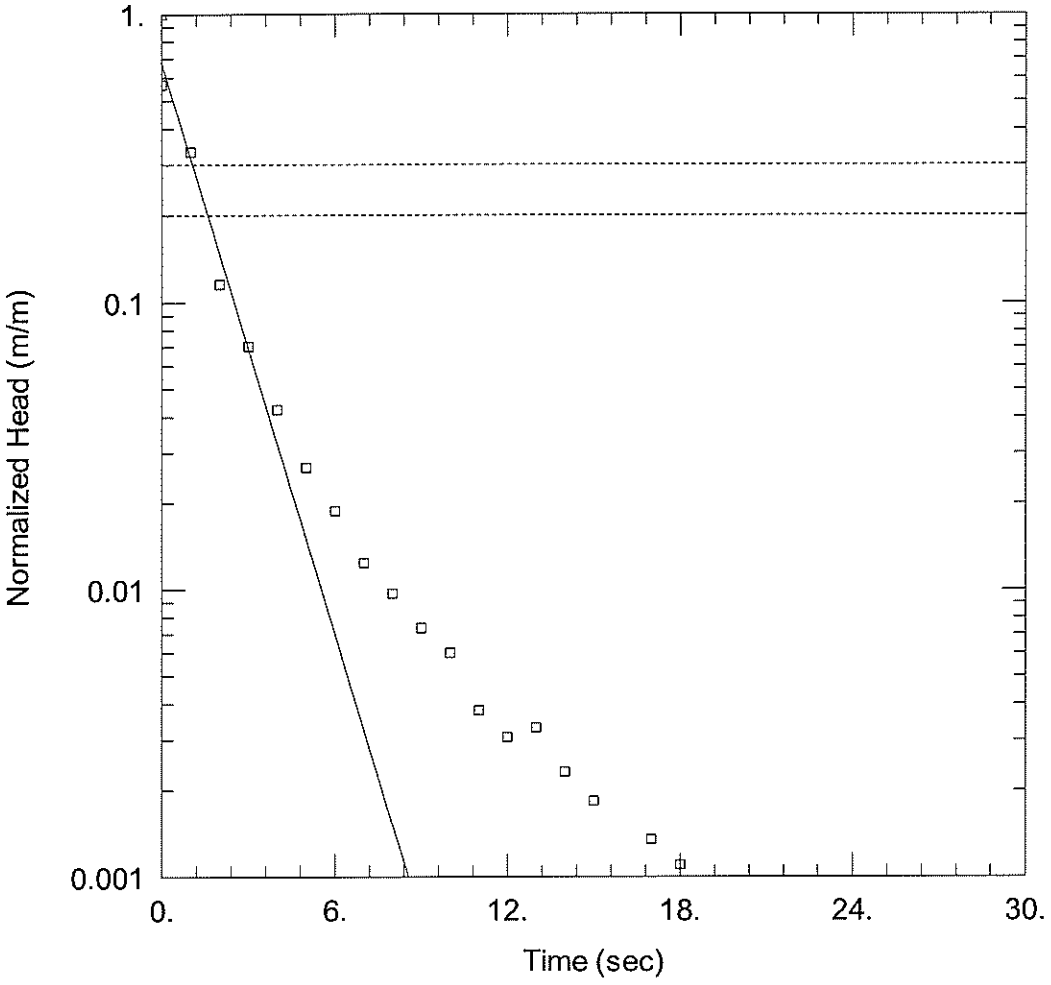
WELL DATA (BU-MW12-03)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 3.82 m
Casing Radius: 0.025 m
Static Water Column Height: 3.82 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0002562 m/sec y0 = 0.6064 m



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-03 Test 2.aqt
Date: 10/22/12 Time: 12:44:26

PROJECT INFORMATION

Test Well: BU-MW12-02
Test Date: 27-June-12

AQUIFER DATA

Saturated Thickness: 3.82 m Anisotropy Ratio (Kz/Kr): 1.

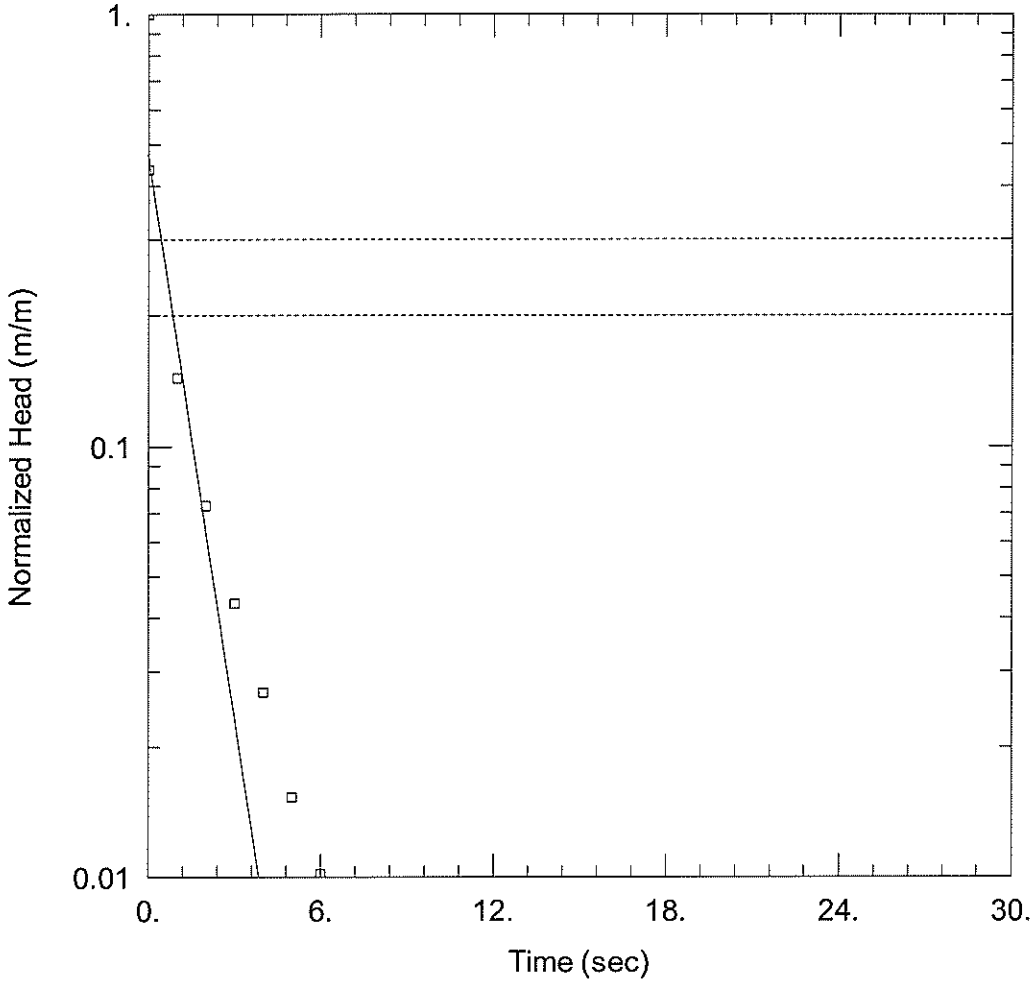
WELL DATA (BU-MW12-03)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 3.82 m
Casing Radius: 0.025 m
Static Water Column Height: 3.82 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0002181 m/sec y0 = 0.5517 m



WELL TEST ANALYSIS

Data Set: \...\BU-MW12-03 Test 3.aqt
Date: 10/22/12 Time: 12:44:45

PROJECT INFORMATION

Test Well: BU-MW12-03
Test Date: 27-June-12

AQUIFER DATA

Saturated Thickness: 3.82 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BU-MW12-03)

Initial Displacement: 0.817 m
Total Well Penetration Depth: 3.82 m
Casing Radius: 0.025 m
Static Water Column Height: 3.82 m
Screen Length: 3.05 m
Well Radius: 0.092 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0002869 m/sec y0 = 0.385 m

Single-well Response Test Data Sheet

☑ Rising Head
☑ Falling Head

Well No.: BH-MW12-02
Location: BURWASH
Project No.: 11-1436-0073/1700
Completed By: A BADGER
Date: 23-AUG-12
Time: 17:30

MONITORING WELL INFORMATION

Depth to water below top of casing:	17.96 meters	
Depth to bottom of well below top of casing:	23.16 meters	
Distance from top of pipe to ground surface:	0.55 meters	
Well casing diameter:	0.05 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 #: 0051050342
Sampling Interval: 1 seconds or minutes (circle one)

SINGLE-WELL RESPONSE TEST

Start time: 17:33 Finish time: 18:14

Time	Elapsed Time	Water Level (m)	Comments
17:33			Tx in 20 cm off BOTTOM
17:37		17.96	SLUG IN
17:42		17.96	SLUG OUT
17:47			SLUG IN
17:52			SLUG OUT
17:57			SLUG IN
18:02			SLUG OUT
18:07			SLUG IN
18:12			SLUG OUT
18:14			Tx OUT

Single-well Response Test Data Sheet

☑ Rising Head
☐ Falling Head

Well No.: BU-mw12-03
Location: Burwash Landing
Project No.: 11-1436-0073 (1705)
Completed By: Calvin Beebe
Date: 27-Jun-12
Time: 15:40

MONITORING WELL INFORMATION

Depth to water below top of casing:	17.29	meters	
Depth to bottom of well below top of casing:	21.11	meters	
Distance from top of pipe to ground surface:		meters	
Well casing diameter:	0.051	meters	(1 inch = 0.025 meters)
Borehole diameter:	0.184	meters	
Screen length:	3.05	meters	(1 foot = 0.3048 meters)
Screened unit:		(eg: sand, silt, clay)	

EQUIPMENT LIST

☒ Slug
Mass: ~~X~~ kilograms
Length: 1.5 meters
Diameter: 0.0381 meters

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

☐ ~~Water~~
~~Volume of water added:~~ litres

Pressure transducer serial #: Solinst Levellogger
Sampling Interval: 1 second seconds or minutes (circle one)

SINGLE-WELL RESPONSE TEST

Start time: 15:55 Finish time: 16:34

Time	Elapsed Time	Water Level (m)	Comments
15:55	0		Transducer in
15:57	2 min	17.29	Static
15:59	4 min		Slug in
16:04	9 min		Slug out
16:09	14 min		Slug in
16:14	19 min		Slug out
16:19	24 min		Slug in
16:24	29 min		Slug out
16:29	34 min		Transducer out
16:34	39 min	17.285	static

Single-well Response Test Data Sheet

☑ Rising Head
☐ Falling Head

Well No.: BU-MW12-01
Location: Burwash Landing
Project No.: 11-1436-0073 (1750)
Completed By: Calvin Beebe
Date: 27-Jun-12
Time: 10:45

MONITORING WELL INFORMATION

Depth to water below top of casing:	18.25	meters	
Depth to bottom of well below top of casing:	21.18	meters	
Distance from top of pipe to ground surface:		meters	
Well casing diameter:	0.051	meters	(1 inch = 0.025 meters)
Borehole diameter:	0.184	meters	
Screen length:	3.05	meters	(1 foot = 0.3048 meters)
Screened unit:		(eg: sand, silt, clay)	

EQUIPMENT LIST

☑ Slug
Mass: X kilograms
Length: 1.5 meters
Diameter: 0.0381 meters

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

☐ Water
Volume of water added: litres

Pressure transducer serial #: Solinst Level loggers
Sampling Interval: 1 second seconds or minutes (circle one)

SINGLE-WELL RESPONSE TEST

Start time: 11:56 Finish time: 13:20

Time	Elapsed Time	Water Level (m)	Comments
11:56	0		Transducer in
12:08	12 min	18.23	Static
12:15	19 min		Slug in
12:20	24 min		Slug out
12:25	29 min	18.23	Static
12:28	32 min		Slug in
12:35	39 min		Slug out
12:40	44 min		Slug in
12:47	51 min		Slug out
12:54	58 min		Slug in
13:01	1:05		Slug out
13:07	1:11		Slug in
13:14	1:18		Slug out
13:20	1:24		Transducer out

GROUNDWATER DEVELOPMENT AND PURGING/SAMPLING DATA SHEET

☑ Development
☐ Purging/Sampling

Well No.: BU-MW12-01 Project No.: 11-1436-0073 (1700)
Location: Borwash Landing Date: 27-Jun-12 Time: 10:45
Weather: Temperature: Completed by: Calvin Beebe

MONITORING WELL INFORMATION

Time of Measurement: ~10:50 Tidally Influenced: ☐ Yes ☒ No
Depth to product: X Product thickness: X One well volume:
Depth to water Below Top of Casing: A 18.25 metres (B-A)*2.0 = 6 litres - for a 51 mm (2.0 inch) diameter well
Depth to Bottom of Well Below Top of Casing: B 21.18 metres (B-A)*1.1 = X litres - for a 38 mm (1.5 inch) diameter well
Diameter Standpipe: C 51 mm Sample intake depth: ~20 metres

EQUIPMENT LIST

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

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = 18 litres
Avg. Flow Rate: 1.05 L/min. Start: Finish:

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	Cond. (uS/cm)	Redox (mV)	Diss. O_2 (mg/L) or %		Water Level (m)	Remarks
10:53	2	5.86	7.75	693					
10:55	5	5.32	7.58	696					
11:01	8	5.72	7.51	692					
11:03	10	4.50	7.53	697					
11:07	18	4.93	7.53	693					

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 I I I Very Silty

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	

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

APPENDIX E

Analytical Reports and Chain of Custody Forms

Table E-1
Results of Water Analyses - Metals
YTG Landfill Monitoring, Burwash, Yukon

SCN Location QA/QC Date	*Livestock CSR- LW*	Drinking Water CSR - DW	Aquatic Life CSR-AW (freshwater)	Notes	L1199825-14 BU-MW12-01 23-AUG-12	L1199825-15 BU-MW12-02 23-AUG-12	L1199825-16 BU-MW12-03 23-AUG-12	L1199825-17 BU-SURFACE 23-AUG-12
Parameters								
pH (field)					7.62	7.58	7.68	8.24
Temperature °C					5.00	4.5	4.70	16.3
Conductivity (uS/cm)					597	605	610	570
Dissolved Oxygen (mg/L)					-	-	-	-
Laboratory Parameters								
pH (laboratory)					8.05	7.97	8.06	8.34
Hardness (as CaCO3)					351	360	361	365
total dissolved solids					490	498	510	486
Aggregate Organics								
COD					<20	<20	<20	<20
dissolved organic carbon					<0.50	<0.50	<0.50	1.83
Dissolved Metals								
aluminum	5	**0.2**			<0.010	<0.010	<0.010	0.020
antimony		**0.006**	0.2		<0.00050	<0.00050	<0.00050	<0.00050
arsenic	0.025	**0.025**	0.05		0.00014	0.00014	0.00018	0.00056
barium		**1**	10		0.060	0.060	0.058	0.039
beryllium	0.1		0.053		<0.0050	<0.0050	<0.0050	<0.0050
bismuth					<0.20	<0.20	<0.20	<0.20
boron	5	**5**			<0.10	<0.10	<0.10	0.11
cadmium	0.08	**0.005**	0.0001 - 0.0006	H	<0.00020	<0.00020	<0.00020	<0.00020
calcium	1000				92.6	96.5	94.9	96.2
chromium	0.05	**0.05**	0.010^{VI}, 0.090^{III}	V	0.0032	0.0030	0.0034	<0.0020
cobalt	1		0.009		*<0.010*	*<0.010*	*<0.010*	*<0.010*
copper	0.3	**1**	0.020 - 0.090	H	<0.0010	<0.0010	<0.0010	0.0013
iron		**0.3**			<0.030	<0.030	<0.030	0.032
lead	0.1	**0.01**	0.040 - 0.160	H	<0.00050	<0.00050	<0.00050	<0.00050
lithium	5				<0.010	<0.010	<0.010	<0.010
magnesium		**100**			29.1	28.8	30.0	30.2
manganese		**0.05**			<0.0020	0.0054	0.0168	0.0106
mercury	0.002	**0.001**	0.001		<0.00020	<0.00020	<0.00020	<0.00020
molybdenum	0.05	**0.250**	10		<0.030	<0.030	<0.030	<0.030
nickel	1		0.250 - 1.5	H	<0.050	<0.050	<0.050	<0.050
phosphorus					<0.30	<0.30	<0.30	<0.30
potassium					1.37	1.38	1.42	1.86
selenium	0.05	**0.01**	0.01		0.0083	0.0083	0.0084	0.0063
silicon					4.36	4.21	4.18	4.93
silver			0.0005 - 0.015	H	<0.010	<0.010	<0.010	<0.010
sodium		**200**			8.0	8.0	8.2	8.2
strontium					0.327	0.324	0.330	0.337
thallium			0.003		*<0.20*	*<0.20*	*<0.20*	*<0.20*
tin					<0.030	<0.030	<0.030	<0.030
titanium			1		0.012	0.012	0.012	0.013
uranium	0.2	**0.1**	3		0.00053	0.00057	0.00061	0.00053
vanadium	0.1				<0.030	<0.030	<0.030	<0.030
zinc	2	**5**	0.075 - 2.4	H	<0.050	<0.050	<0.050	<0.050
Other Inorganics								
bicarbonate (CaCO3)					184	186	188	192
carbonate (CaCO3)					<2.0	<2.0	<2.0	2.7
hydroxide (CaCO3)					<2.0	<2.0	<2.0	<1.0
total alkalinity (CaCO3)					184	186	188	195
ammonia			1.31 - 18.5	pH	<0.0050	<0.0050	<0.0050	0.0057
chloride		**250**			<0.50	<0.50	<0.50	0.62
fluoride	1	**1.5**	2 - 3	H	0.054	0.061	0.058	0.068
nitrate (as N)	100	**10**	400		0.436	0.446	0.457	0.135
nitrite (as N)	10	**3.2**	0.2 - 2	Cl	<0.0010	<0.0010	0.0039	<0.0010
total Kjeldahl nitrogen					<0.050	<0.050	0.085	0.146
sulphate	1000	**500**	1000		204	205	207	194

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: LW (Livestock), DW (Drinking Water) and AW (Aquatic Life).
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
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
SCN = sample control number
Italics indicates standard is below detection limit.
COC = Chain of Custody

Table E-2
Results of Water Analyses - Hydrocarbons
YTG Landfill Monitoring, Burwash, Yukon

SCN Location QA/QC Date	*Livestock CSR- LW*	**Drinking Water CSR - DW**	Aquatic Life CSR-AW (freshwater)	Notes	L1199825-14 BU-MW12-01 23-AUG-12	L1199825-15 BU-MW12-02 23-AUG-12	L1199825-16 BU-MW12-03 23-AUG-12	L1199825-17 BU-SURFACE 23-AUG-12
Monoaromatic Hydrocarbons								
benzene		**0.005**	4		<0.00050	<0.00050	<0.00050	<0.00050
ethylbenzene		**0.0024**	2		<0.00050	<0.00050	<0.00050	<0.00050
styrene			0.72		<0.00050	<0.00050	<0.00050	<0.00050
toluene		**0.024**	0.390		<0.00050	<0.00050	<0.00050	<0.00050
ortho-xylene					<0.00050	<0.00050	<0.00050	<0.00050
meta- & para-xylene					<0.00050	<0.00050	<0.00050	<0.00050
total xylene		**0.3**			<0.00075	<0.00075	<0.00075	<0.00075
VHw_{6-10}	*15*	**15**	15		<0.10	<0.10	<0.10	<0.10
VPHw			1.5		<0.10	<0.10	<0.10	<0.10
Polycyclic Aromatic Hydrocarbons								
acenaphthene					<0.000050	<0.000050	<0.000050	<0.00020
acenaphthylene					<0.000050	<0.000050	<0.000050	<0.00020
acridine			0.0005		<0.000050	<0.000050	<0.000050	<0.00020
anthracene			0.001		<0.000050	<0.000050	<0.000050	<0.00020
benzo(a)anthracene			0.001		<0.000050	<0.000050	<0.000050	<0.00020
benzo(a)pyrene		**0.00001**	0.0001		<0.000010	<0.000010	<0.000010	<0.000040
benzo(b)fluoranthene					<0.000050	<0.000050	<0.000050	<0.00020
benzo(g,h,i)perylene					<0.000050	<0.000050	<0.000050	<0.00020
benzo(k)fluoranthene					<0.000050	<0.000050	<0.000050	<0.00020
chrysene					<0.000050	<0.000050	<0.000050	<0.00020
dibenzo(a,h)anthracene					<0.000050	<0.000050	<0.000050	<0.00020
fluoranthene			0.002		<0.000050	<0.000050	<0.000050	<0.00020
fluorene			0.12		<0.000050	<0.000050	<0.000050	<0.00020
indeno(1,2,3-c,d)pyrene					<0.000050	<0.000050	<0.000050	<0.00020
naphthalene			0.01		<0.000050	<0.000050	<0.000050	<0.00020
phenanthrene			0.003		<0.000050	<0.000050	<0.000050	<0.00020
pyrene			0.0002		<0.000050	<0.000050	<0.000050	<0.00020
quinoline			0.034		<0.000050	<0.000050	<0.000050	<0.00020
Other Hydrocarbons								
$EPHw_{10-19}$	5	**5**	5		<0.25	<0.25	<0.25	<1.0
$EPHw_{19-32}$					<0.25	<0.25	<0.25	<1.0
LEPHw			0.5		<0.25	<0.25	<0.25	*<1.0*
HEPHw					<0.25	<0.25	<0.25	<1.0
Miscellaneous Organics								
methyl tertiary butyl ether (MTBE)					<0.00050	<0.00050	<0.00050	<0.00050
Chlorinated Hydrocarbons								
bromodichloromethane (BDCM)					<0.0010	<0.0010	<0.0010	<0.0010
tribromomethane (bromoform)	0.1				<0.0010	<0.0010	<0.0010	<0.0010
tetrachloromethane (carbon tetrachloride)	0.005	**0.005**	0.13		<0.00050	<0.00050	<0.00050	<0.00050
monochlorobenzene (chlorobenzene)		**0.03**	0.013		<0.0010	<0.0010	<0.0010	<0.0010
dibromochloromethane (DBCM)	0.1				<0.0010	<0.0010	<0.0010	<0.0010
chloroethane (ethyl chloride)					<0.0010	<0.0010	<0.0010	<0.0010
trichloromethane (chloroform)	0.1	**0.1**	0.02		<0.0010	<0.0010	<0.0010	<0.0010
chloromethane (methyl chloride)					<0.0050	<0.0050	<0.0050	<0.0050
1,2-dichlorobenzene		**0.003**			<0.00070	<0.00070	<0.00070	<0.00070
1,3-dichlorobenzene			1.5		<0.0010	<0.0010	<0.0010	<0.0010
1,4-dichlorobenzene		**0.001**	0.26		<0.0010	<0.0010	<0.0010	<0.0010
1,1-dichloroethane					<0.0010	<0.0010	<0.0010	<0.0010
1,2-dichloroethane	0.005	**0.005**	1		<0.0010	<0.0010	<0.0010	<0.0010
1,1-dichloroethylene (1,1-dichloroethene)		**0.014**			<0.0010	<0.0010	<0.0010	<0.0010
1,2-dichloroethylene (cis) (1,2-dichloroethene (cis))					<0.0010	<0.0010	<0.0010	<0.0010
1,2-dichloroethylene (trans) (1,2-dichloroethene (trans))					<0.0010	<0.0010	<0.0010	<0.0010
1,3-dichloropropene					<0.0014	<0.0014	<0.0014	<0.0014
dichloromethane (methylene chloride)	0.05	**0.05**	0.98		<0.0050	<0.0050	<0.0050	<0.0050
1,2-dichloropropane (propylene dichloride)					<0.0010	<0.0010	<0.0010	<0.0010
cis-1,3-Dichloropropylene					<0.0010	<0.0010	<0.0010	<0.0010
trans-1,3-Dichloropropylene					<0.0010	<0.0010	<0.0010	<0.0010
1,1,1,2-tetrachloroethane					<0.0010	<0.0010	<0.0010	<0.0010
1,1,2,2-tetrachloroethane					<0.0010	<0.0010	<0.0010	<0.0010
tetrachloroethylene (1,1,2,2-tetrachloroethene)		**0.03**	1.1		<0.0010	<0.0010	<0.0010	<0.0010
1,1,1-trichloroethane					<0.0010	<0.0010	<0.0010	<0.0010
1,1,2-trichloroethane					<0.0010	<0.0010	<0.0010	<0.0010
trichloroethylene (1,1,2-trichloroethene)	0.05	**0.05**	0.2		<0.0010	<0.0010	<0.0010	<0.0010
trichlorofluromethane (freon 11)					<0.0010	<0.0010	<0.0010	<0.0010
vinyl chloride (chloroethene)		**0.002**			<0.0010	<0.0010	<0.0010	<0.0010

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: LW (Livestock), DW (Drinking Water) and AW (Aquatic Life).
Italics indicates standard is below detection limit.
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

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

Date Received: 24-AUG-12
Report Date: 13-SEP-12 15:40 (MT)
Version: FINAL REV. 2

Client Phone: 867-633-6076

Certificate of Analysis

Lab Work Order #: L1199825

Project P.O. #: NOT SUBMITTED
Job Reference: 11-1436-0073/1600
C of C Numbers: 1, 2
Legal Site Desc:

Comments: This report contains missing VOC data.

Amber Springer
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1199825-1	L1199825-2	L1199825-3	L1199825-4	L1199825-5
	Description	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
	Sampled Date	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12
	Sampled Time	11:35	13:00	14:10	09:30	09:30
	Client ID	BC-MW12-01	BC-MW12-02	BC-MW12-03	BC-MW12-04	BC-MW12-05
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	160	161	157	162	163
	pH (pH)	8.01	8.08	8.01	7.91	7.96
	Total Dissolved Solids (mg/L)	220	220	209	219	224
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	132	134	130	139	139
	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)	132	134	130	139	139
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0106	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	0.62	0.63	0.59	0.61	0.62
	Fluoride (F) (mg/L)	0.038	0.035	0.038	0.038	0.036
	Nitrate (as N) (mg/L)	0.275	0.283	0.305	0.337	0.337
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.051	<0.050	0.099	0.054	0.051
	Sulfate (SO4) (mg/L)	39.5	39.9	38.9	39.3	39.5
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.69	0.54	0.52	0.74	0.71
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	0.012
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	0.00083	0.00078	0.00089	0.00086	0.00085
	Barium (Ba)-Dissolved (mg/L)	0.025	0.021	0.023	0.024	0.024
	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	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Dissolved (mg/L)	52.2	52.7	49.4	53.3	53.4
	Chromium (Cr)-Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Cobalt (Co)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Magnesium (Mg)-Dissolved (mg/L)	7.13	7.14	8.30	7.10	7.19
	Manganese (Mn)-Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	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	<0.050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1199825-6	L1199825-7	L1199825-8	L1199825-9	L1199825-10
Description	Surface Water	Ground Water	Ground Water	Surface Water	Ground Water
Sampled Date	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12	23-AUG-12
Sampled Time	15:20	17:00	18:15	19:30	14:10
Client ID	BC SURFACE	HC-MW12-01	HC-MW12-02	HC SURFACE	DB-MW12-01
Grouping / **Analyte**					
WATER					
Physical Tests Hardness (as CaCO3) (mg/L)	157	68.5	60.8	220	306
pH (pH)	8.04	7.17	7.65	7.66	8.09
Total Dissolved Solids (mg/L)	192	106	112	328	449
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	148	67.9	59.5	216	161
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)	148	67.9	59.5	216	161
Ammonia, Total (as N) (mg/L)	0.0063	0.0074	0.0337	0.0747	0.0054
Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	1.78	<0.50
Fluoride (F) (mg/L)	0.039	0.062	0.048	0.071	0.058
Nitrate (as N) (mg/L)	0.0512	0.106	0.243	<0.0050	0.398
Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.156	0.537	0.91	0.650	0.052
Sulfate (SO4) (mg/L)	21.5	2.48	2.72	55.8	186
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	2.28	13.6	11.8	7.00	1.92
Dissolved Metals Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.043	0.091	0.081	<0.010	<0.010
Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Dissolved (mg/L)	0.00071	0.00043	0.00043	0.00033	0.00021
Barium (Ba)-Dissolved (mg/L)	0.027	<0.020	0.023	0.081	0.034
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	<0.10
Cadmium (Cd)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Calcium (Ca)-Dissolved (mg/L)	49.7	21.4	18.9	61.3	77.6
Chromium (Cr)-Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	0.0032
Cobalt (Co)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Copper (Cu)-Dissolved (mg/L)	0.0015	0.0114	0.0096	0.0012	<0.0010
Iron (Fe)-Dissolved (mg/L)	0.074	0.062	0.152	0.084	<0.030
Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium (Li)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Magnesium (Mg)-Dissolved (mg/L)	8.01	3.65	3.30	16.3	27.3
Manganese (Mn)-Dissolved (mg/L)	0.0342	0.0065	0.0614	0.0326	<0.0020
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	<0.050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1199825-11 Ground Water 23-AUG-12 11:30 DB-MW12-02	L1199825-12 Ground Water 23-AUG-12 12:30 DB-MW12-03	L1199825-13 Surface Water 24-AUG-12 09:30 DB SURFACE	L1199825-14 Ground Water 23-AUG-12 15:45 BU-MW12-01	L1199825-15 Ground Water 23-AUG-12 17:20 BU-MW12-02
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	318	320	130	351	360
	pH (pH)	8.03	8.08	8.17	8.05	7.97
	Total Dissolved Solids (mg/L)	465	457	180	490	498
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	154	155	87.8	184	186
	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)	154	155	87.8	184	186
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0054	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.058	0.057	0.070	0.054	0.061
	Nitrate (as N) (mg/L)	0.316	0.358	0.0058	0.436	0.446
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	0.069	<0.050	<0.050
	Sulfate (SO4) (mg/L)	195	195	56.8	204	205
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	<0.50	0.50	1.38	<0.50	<0.50
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Dissolved (mg/L)	0.00016	0.00020	0.00040	0.00014	0.00014
	Barium (Ba)-Dissolved (mg/L)	0.026	0.028	0.025	0.060	0.060
	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	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Dissolved (mg/L)	80.9	82.5	36.5	92.6	96.5
	Chromium (Cr)-Dissolved (mg/L)	0.0031	0.0031	<0.0020	0.0032	0.0030
	Cobalt (Co)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Copper (Cu)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Lithium (Li)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Magnesium (Mg)-Dissolved (mg/L)	28.1	27.7	9.53	29.1	28.8
	Manganese (Mn)-Dissolved (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	0.0054
	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	<0.050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1199825-16	L1199825-17	L1199825-18	L1199825-19	L1199825-20
Description	Ground Water	Surface Water	Ground Water	Ground Water	Ground Water
Sampled Date	23-AUG-12	23-AUG-12	24-AUG-12	24-AUG-12	24-AUG-12
Sampled Time	16:40	18:30	14:00	13:00	11:50
Client ID	BU-MW12-03	BU-SURFACE	SC-MW12-01	SC-MW12-02	SC-MW12-03
Grouping / **Analyte**					
WATER					
Physical Tests Hardness (as CaCO3) (mg/L)	361	365	351	223	258
pH (pH)	8.06	8.34	7.91	8.15	8.07
Total Dissolved Solids (mg/L)	510	486	526	345	328
Anions and Nutrients Alkalinity, Bicarbonate (as CaCO3) (mg/L)	188	192	245	175	219
Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	2.7	<2.0	<2.0	<2.0
Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<1.0	<2.0	<2.0	<2.0
Alkalinity, Total (as CaCO3) (mg/L)	188	195	245	175	219
Ammonia, Total (as N) (mg/L)	<0.0050	0.0057	0.0201	0.147	0.168
Chloride (Cl) (mg/L)	<0.50	0.62	15.3	<0.50	<0.50
Fluoride (F) (mg/L)	0.058	0.068	0.116	0.137	0.109
Nitrate (as N) (mg/L)	0.457	0.135	0.125	<0.0050	<0.0050
Nitrite (as N) (mg/L)	0.0039	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen (mg/L)	0.085	0.146	0.170	0.415	0.198
Sulfate (SO4) (mg/L)	207	194	129	83.7	71.1
Organic / Inorganic Carbon Dissolved Organic Carbon (mg/L)	<0.50	1.83	1.78	1.43	<0.50
Dissolved Metals Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	<0.010	0.020	<0.010	0.010	<0.010
Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Dissolved (mg/L)	0.00018	0.00056	0.00080	0.00600	0.00570
Barium (Ba)-Dissolved (mg/L)	0.058	0.039	0.042	0.026	0.028
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	0.11	<0.10	<0.10	<0.10
Cadmium (Cd)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Calcium (Ca)-Dissolved (mg/L)	94.9	96.2	65.3	35.8	43.6
Chromium (Cr)-Dissolved (mg/L)	0.0034	<0.0020	<0.0020	<0.0020	<0.0020
Cobalt (Co)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Copper (Cu)-Dissolved (mg/L)	<0.0010	0.0013	<0.0010	<0.0010	<0.0010
Iron (Fe)-Dissolved (mg/L)	<0.030	0.032	<0.030	<0.030	<0.030
Lead (Pb)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium (Li)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Magnesium (Mg)-Dissolved (mg/L)	30.0	30.2	45.6	32.5	36.2
Manganese (Mn)-Dissolved (mg/L)	0.0168	0.0106	0.0984	0.354	0.0796
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	<0.050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1199825-21				
	Description	Surface Water				
	Sampled Date	24-AUG-12				
	Sampled Time	14:40				
	Client ID	SC SURFACE				
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	884				
	pH (pH)	8.09				
	Total Dissolved Solids (mg/L)	1150				
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	336				
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0				
	Alkalinity, Total (as CaCO3) (mg/L)	336				
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Chloride (Cl) (mg/L)	<5.0 DLA				
	Fluoride (F) (mg/L)	<0.20 DLA				
	Nitrate (as N) (mg/L)	<0.050 DLA				
	Nitrite (as N) (mg/L)	<0.010 DLA				
	Total Kjeldahl Nitrogen (mg/L)	0.166				
	Sulfate (SO4) (mg/L)	557				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	5.95				
Dissolved Metals	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	<0.020 DLA				
	Antimony (Sb)-Dissolved (mg/L)	<0.0010 DLA				
	Arsenic (As)-Dissolved (mg/L)	0.00074				
	Barium (Ba)-Dissolved (mg/L)	0.074				
	Beryllium (Be)-Dissolved (mg/L)	<0.0050				
	Bismuth (Bi)-Dissolved (mg/L)	<0.20				
	Boron (B)-Dissolved (mg/L)	<0.20 DLA				
	Cadmium (Cd)-Dissolved (mg/L)	<0.00040 DLA				
	Calcium (Ca)-Dissolved (mg/L)	225				
	Chromium (Cr)-Dissolved (mg/L)	<0.0040 DLA				
	Cobalt (Co)-Dissolved (mg/L)	<0.010				
	Copper (Cu)-Dissolved (mg/L)	<0.0020 DLA				
	Iron (Fe)-Dissolved (mg/L)	0.076				
	Lead (Pb)-Dissolved (mg/L)	<0.0010 DLA				
	Lithium (Li)-Dissolved (mg/L)	<0.010				
	Magnesium (Mg)-Dissolved (mg/L)	78.5				
	Manganese (Mn)-Dissolved (mg/L)	0.248				
	Mercury (Hg)-Dissolved (mg/L)	<0.00020				
	Molybdenum (Mo)-Dissolved (mg/L)	<0.030				
	Nickel (Ni)-Dissolved (mg/L)	<0.050				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1199825-1	L1199825-2	L1199825-3	L1199825-4	L1199825-5
	Description	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
	Sampled Date	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12
	Sampled Time	11:35	13:00	14:10	09:30	09:30
	Client ID	BC-MW12-01	BC-MW12-02	BC-MW12-03	BC-MW12-04	BC-MW12-05
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)	1.28	1.27	1.47	1.33	1.36
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silicon (Si)-Dissolved (mg/L)	6.33	6.34	6.29	6.42	6.45
	Silver (Ag)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Sodium (Na)-Dissolved (mg/L)	3.6	3.6	3.7	3.6	3.6
	Strontium (Sr)-Dissolved (mg/L)	0.167	0.170	0.171	0.167	0.168
	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)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00034	0.00032	0.00036	0.00033	0.00033
	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	<0.050
Aggregate Organics	COD (mg/L)	<20	<20	<20	<20	<20
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	L1199825-6 Surface Water 22-AUG-12 15:20 BC SURFACE	L1199825-7 Ground Water 22-AUG-12 17:00 HC-MW12-01	L1199825-8 Ground Water 22-AUG-12 18:15 HC-MW12-02	L1199825-9 Surface Water 22-AUG-12 19:30 HC SURFACE	L1199825-10 Ground Water 23-AUG-12 14:10 DB-MW12-01
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.51	0.99	1.10	1.42	1.43
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0071
	Silicon (Si)-Dissolved (mg/L)	5.81	4.66	4.50	4.87	4.65
	Silver (Ag)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Sodium (Na)-Dissolved (mg/L)	3.9	<2.0	<2.0	4.3	8.0
	Strontium (Sr)-Dissolved (mg/L)	0.158	0.0440	0.0430	0.210	0.301
	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)	<0.010	<0.010	<0.010	<0.010	0.011
	Uranium (U)-Dissolved (mg/L)	0.00033	<0.00010	<0.00010	0.00082	0.00053
	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	<0.050
Aggregate Organics	COD (mg/L)	<20	54	79	42	<20
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	L1199825-11 Ground Water 23-AUG-12 11:30 DB-MW12-02	L1199825-12 Ground Water 23-AUG-12 12:30 DB-MW12-03	L1199825-13 Surface Water 24-AUG-12 09:30 DB SURFACE	L1199825-14 Ground Water 23-AUG-12 15:45 BU-MW12-01	L1199825-15 Ground Water 23-AUG-12 17:20 BU-MW12-02
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.40	1.40	2.24	1.37	1.38
	Selenium (Se)-Dissolved (mg/L)	0.0073	0.0075	<0.0010	0.0083	0.0083
	Silicon (Si)-Dissolved (mg/L)	4.56	4.59	1.77	4.36	4.21
	Silver (Ag)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Sodium (Na)-Dissolved (mg/L)	8.0	8.2	2.6	8.0	8.0
	Strontium (Sr)-Dissolved (mg/L)	0.295	0.298	0.207	0.327	0.324
	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)	0.011	0.011	<0.010	0.012	0.012
	Uranium (U)-Dissolved (mg/L)	0.00054	0.00053	0.00080	0.00053	0.00057
	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	<0.050
Aggregate Organics	COD (mg/L)	<20	<20	<20	<20	<20
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	L1199825-16	L1199825-17	L1199825-18	L1199825-19	L1199825-20
Description	Ground Water	Surface Water	Ground Water	Ground Water	Ground Water
Sampled Date	23-AUG-12	23-AUG-12	24-AUG-12	24-AUG-12	24-AUG-12
Sampled Time	16:40	18:30	14:00	13:00	11:50
Client ID	BU-MW12-03	BU-SURFACE	SC-MW12-01	SC-MW12-02	SC-MW12-03
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)	1.42	1.86	4.42	3.59	3.32
Selenium (Se)-Dissolved (mg/L)	0.0084	0.0063	0.0014	<0.0010	<0.0010
Silicon (Si)-Dissolved (mg/L)	4.18	4.93	7.01	8.05	9.85
Silver (Ag)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Sodium (Na)-Dissolved (mg/L)	8.2	8.2	8.7	10.9	7.6
Strontium (Sr)-Dissolved (mg/L)	0.330	0.337	0.450	0.278	0.347
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)	0.012	0.013	0.010	<0.010	<0.010
Uranium (U)-Dissolved (mg/L)	0.00061	0.00053	0.00149	0.00104	0.00077
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	<0.050
Aggregate Organics COD (mg/L)	<20	<20	32	45	<20
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	L1199825-21				
	Description	Surface Water				
	Sampled Date	24-AUG-12				
	Sampled Time	14:40				
	Client ID	SC SURFACE				
Grouping	**Analyte**					
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.30				
	Potassium (K)-Dissolved (mg/L)	7.52				
	Selenium (Se)-Dissolved (mg/L)	<0.0020 DLA				
	Silicon (Si)-Dissolved (mg/L)	5.34				
	Silver (Ag)-Dissolved (mg/L)	<0.010				
	Sodium (Na)-Dissolved (mg/L)	5.0				
	Strontium (Sr)-Dissolved (mg/L)	0.952				
	Thallium (Tl)-Dissolved (mg/L)	<0.20				
	Tin (Sn)-Dissolved (mg/L)	<0.030				
	Titanium (Ti)-Dissolved (mg/L)	0.018				
	Uranium (U)-Dissolved (mg/L)	0.00236				
	Vanadium (V)-Dissolved (mg/L)	<0.030				
	Zinc (Zn)-Dissolved (mg/L)	<0.10 DLA				
Aggregate Organics	COD (mg/L)	<20				
Volatile Organic Compounds	Benzene (mg/L)	<0.00050				
	Bromodichloromethane (mg/L)	<0.0010				
	Bromoform (mg/L)	<0.0010				
	Carbon Tetrachloride (mg/L)	<0.00050				
	Chlorobenzene (mg/L)	<0.0010				
	Dibromochloromethane (mg/L)	<0.0010				
	Chloroethane (mg/L)	<0.0010				
	Chloroform (mg/L)	<0.0010				
	Chloromethane (mg/L)	<0.0050				
	1,2-Dichlorobenzene (mg/L)	<0.00070				
	1,3-Dichlorobenzene (mg/L)	<0.0010				
	1,4-Dichlorobenzene (mg/L)	<0.0010				
	1,1-Dichloroethane (mg/L)	<0.0010				
	1,2-Dichloroethane (mg/L)	<0.0010				
	1,1-Dichloroethylene (mg/L)	<0.0010				
	cis-1,2-Dichloroethylene (mg/L)	<0.0010				
	trans-1,2-Dichloroethylene (mg/L)	<0.0010				
	1,3-Dichloropropene (cis & trans) (mg/L)	<0.0014				
	Dichloromethane (mg/L)	<0.0050				
	1,2-Dichloropropane (mg/L)	<0.0010				
	cis-1,3-Dichloropropylene (mg/L)	<0.0010				
	trans-1,3-Dichloropropylene (mg/L)	<0.0010				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1199825-1	L1199825-2	L1199825-3	L1199825-4	L1199825-5
Description	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sampled Date	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12
Sampled Time	11:35	13:00	14:10	09:30	09:30
Client ID	BC-MW12-01	BC-MW12-02	BC-MW12-03	BC-MW12-04	BC-MW12-05
Grouping / **Analyte**					
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) (%)	87.3	84.8	86.0	85.6	86.2
Surrogate: 1,4-Difluorobenzene (SS) (%)	85.3	85.0	84.9	85.2	84.9
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	<0.25
LEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
HEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
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) (%)	113.3	104.9	105.6	103.4	105.6
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
Fluoranthene (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	L1199825-6	L1199825-7	L1199825-8	L1199825-9	L1199825-10
	Description	Surface Water	Ground Water	Ground Water	Surface Water	Ground Water
	Sampled Date	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12	23-AUG-12
	Sampled Time	15:20	17:00	18:15	19:30	14:10
	Client ID	BC SURFACE	HC-MW12-01	HC-MW12-02	HC SURFACE	DB-MW12-01
Grouping	**Analyte**					
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) (%)	86.4	85.4	83.5	86.5	86.6
	Surrogate: 1,4-Difluorobenzene (SS) (%)	85.1	84.9	85.5	84.9	85.4
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	<0.25
	LEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	HEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	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) (%)	101.2	108.7	99.4	104.9	101.4
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
	Fluoranthene (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	L1199825-11	L1199825-12	L1199825-13	L1199825-14	L1199825-15
	Description	Ground Water	Ground Water	Surface Water	Ground Water	Ground Water
	Sampled Date	23-AUG-12	23-AUG-12	24-AUG-12	23-AUG-12	23-AUG-12
	Sampled Time	11:30	12:30	09:30	15:45	17:20
	Client ID	DB-MW12-02	DB-MW12-03	DB SURFACE	BU-MW12-01	BU-MW12-02
Grouping	**Analyte**					
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) (%)	84.8	86.0	85.7	85.3	84.2
	Surrogate: 1,4-Difluorobenzene (SS) (%)	85.0	84.9	85.0	84.9	84.8
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	<0.25
	LEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	HEPH (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	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) (%)	99.6	101.2	100.8	100.8	93.8
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
	Fluoranthene (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	L1199825-16	L1199825-17	L1199825-18	L1199825-19	L1199825-20
	Description	Ground Water	Surface Water	Ground Water	Ground Water	Ground Water
	Sampled Date	23-AUG-12	23-AUG-12	24-AUG-12	24-AUG-12	24-AUG-12
	Sampled Time	16:40	18:30	14:00	13:00	11:50
	Client ID	BU-MW12-03	BU-SURFACE	SC-MW12-01	SC-MW12-02	SC-MW12-03
Grouping	**Analyte**					
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) (%)	83.3	83.6	83.7	84.5	83.5
	Surrogate: 1,4-Difluorobenzene (SS) (%)	84.6	84.9	85.1	84.6	84.9
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<1.0	<0.25	<0.25	<0.25
	EPH19-32 (mg/L)	<0.25	<1.0	<0.25	<0.25	<0.25
	LEPH (mg/L)	<0.25	<1.0	<0.25	<0.25	<0.25
	HEPH (mg/L)	<0.25	<1.0	<0.25	<0.25	<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) (%)	93.8	99.4	89.9	95.1	89.6
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Acenaphthylene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Acridine (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Anthracene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Benz(a)anthracene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Benzo(a)pyrene (mg/L)	<0.000010	<0.000040	<0.000010	<0.000010	<0.000010
	Benzo(b)fluoranthene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Benzo(g,h,i)perylene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Benzo(k)fluoranthene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Chrysene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Dibenz(a,h)anthracene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Fluoranthene (mg/L)	<0.000050	<0.00020	<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	L1199825-21				
	Description	Surface Water				
	Sampled Date	24-AUG-12				
	Sampled Time	14:40				
	Client ID	SC SURFACE				
Grouping	**Analyte**					
WATER						
Volatile Organic Compounds	Ethylbenzene (mg/L)	<0.00050				
	Methyl t-butyl ether (MTBE) (mg/L)	<0.00050				
	Styrene (mg/L)	<0.00050				
	1,1,1,2-Tetrachloroethane (mg/L)	<0.0010				
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0010				
	Tetrachloroethylene (mg/L)	<0.0010				
	Toluene (mg/L)	<0.00050				
	1,1,1-Trichloroethane (mg/L)	<0.0010				
	1,1,2-Trichloroethane (mg/L)	<0.0010				
	Trichloroethylene (mg/L)	<0.0010				
	Trichlorofluoromethane (mg/L)	<0.0010				
	Vinyl Chloride (mg/L)	<0.0010				
	ortho-Xylene (mg/L)	<0.00050				
	meta- & para-Xylene (mg/L)	<0.00050				
	Xylenes (mg/L)	<0.00075				
	Surrogate: 4-Bromofluorobenzene (SS) (%)	85.0				
	Surrogate: 1,4-Difluorobenzene (SS) (%)	84.9				
Hydrocarbons	EPH10-19 (mg/L)	<0.25				
	EPH19-32 (mg/L)	<0.25				
	LEPH (mg/L)	<0.25				
	HEPH (mg/L)	<0.25				
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10				
	VPH (C6-C10) (mg/L)	<0.10				
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	99.0				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000050				
	Acenaphthylene (mg/L)	<0.000050				
	Acridine (mg/L)	<0.000050				
	Anthracene (mg/L)	<0.000050				
	Benz(a)anthracene (mg/L)	<0.000050				
	Benzo(a)pyrene (mg/L)	<0.000010				
	Benzo(b)fluoranthene (mg/L)	<0.000050				
	Benzo(g,h,i)perylene (mg/L)	<0.000050				
	Benzo(k)fluoranthene (mg/L)	<0.000050				
	Chrysene (mg/L)	<0.000050				
	Dibenz(a,h)anthracene (mg/L)	<0.000050				
	Fluoranthene (mg/L)	<0.000050				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1199825-1	L1199825-2	L1199825-3	L1199825-4	L1199825-5
	Description	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
	Sampled Date	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12
	Sampled Time	11:35	13:00	14:10	09:30	09:30
	Client ID	BC-MW12-01	BC-MW12-02	BC-MW12-03	BC-MW12-04	BC-MW12-05
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	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 (%)	91.3	90.0	92.0	92.8	95.5
	Surrogate: Acridine d9 (%)	91.9	95.4	94.1	94.4	90.4
	Surrogate: Chrysene d12 (%)	88.1	87.4	86.0	87.6	86.4
	Surrogate: Naphthalene d8 (%)	89.7	87.9	88.6	90.4	94.6
	Surrogate: Phenanthrene d10 (%)	92.2	93.4	94.0	93.6	94.2

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1199825-6	L1199825-7	L1199825-8	L1199825-9	L1199825-10
	Description	Surface Water	Ground Water	Ground Water	Surface Water	Ground Water
	Sampled Date	22-AUG-12	22-AUG-12	22-AUG-12	22-AUG-12	23-AUG-12
	Sampled Time	15:20	17:00	18:15	19:30	14:10
	Client ID	BC SURFACE	HC-MW12-01	HC-MW12-02	HC SURFACE	DB-MW12-01
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	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 (%)	86.7	92.2	96.8	100.1	96.0
	Surrogate: Acridine d9 (%)	85.5	94.0	91.4	102.8	97.9
	Surrogate: Chrysene d12 (%)	82.0	85.3	89.2	92.8	91.1
	Surrogate: Naphthalene d8 (%)	86.2	89.4	93.4	103.3	92.9
	Surrogate: Phenanthrene d10 (%)	89.5	94.1	93.8	100.5	97.6

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1199825-11	L1199825-12	L1199825-13	L1199825-14	L1199825-15
	Description	Ground Water	Ground Water	Surface Water	Ground Water	Ground Water
	Sampled Date	23-AUG-12	23-AUG-12	24-AUG-12	23-AUG-12	23-AUG-12
	Sampled Time	11:30	12:30	09:30	15:45	17:20
	Client ID	DB-MW12-02	DB-MW12-03	DB SURFACE	BU-MW12-01	BU-MW12-02
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	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 (%)	92.6	95.7	91.4	95.9	92.0
	Surrogate: Acridine d9 (%)	93.1	98.3	101.1	98.2	91.1
	Surrogate: Chrysene d12 (%)	90.4	90.6	87.2	89.6	87.2
	Surrogate: Naphthalene d8 (%)	89.7	92.2	89.3	93.6	89.2
	Surrogate: Phenanthrene d10 (%)	94.7	99.1	95.0	98.0	94.8

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1199825-16 Ground Water 23-AUG-12 16:40 BU-MW12-03	L1199825-17 Surface Water 23-AUG-12 18:30 BU-SURFACE	L1199825-18 Ground Water 24-AUG-12 14:00 SC-MW12-01	L1199825-19 Ground Water 24-AUG-12 13:00 SC-MW12-02	L1199825-20 Ground Water 24-AUG-12 11:50 SC-MW12-03
Sample ID		L1199825-16	L1199825-17	L1199825-18	L1199825-19	L1199825-20
Description		Ground Water	Surface Water	Ground Water	Ground Water	Ground Water
Sampled Date		23-AUG-12	23-AUG-12	24-AUG-12	24-AUG-12	24-AUG-12
Sampled Time		16:40	18:30	14:00	13:00	11:50
Client ID		BU-MW12-03	BU-SURFACE	SC-MW12-01	SC-MW12-02	SC-MW12-03
WATER						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Naphthalene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Phenanthrene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Pyrene (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Quinoline (mg/L)	<0.000050	<0.00020	<0.000050	<0.000050	<0.000050
	Surrogate: Acenaphthene d10 (%)	92.3	31.6 SOL:PP	98.4	93.7	100.4
	Surrogate: Acridine d9 (%)	96.2	31.7 SOL:PP	94.5	96.5	102.4
	Surrogate: Chrysene d12 (%)	86.2	28.1 SOL:PP	90.5	82.0	91.7
	Surrogate: Naphthalene d8 (%)	88.6	15.5 SOL:PP	95.2	97.8	103.3
	Surrogate: Phenanthrene d10 (%)	95.1	32.2 SOL:PP	103.6	96.3	105.2

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1199825-21				
	Description	Surface Water				
	Sampled Date	24-AUG-12				
	Sampled Time	14:40				
	Client ID	SC SURFACE				
Grouping	**Analyte**					
WATER						
Polycyclic Aromatic Hydrocarbons	Fluorene (mg/L)	<0.000050				
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000050				
	Naphthalene (mg/L)	<0.000050				
	Phenanthrene (mg/L)	<0.000050				
	Pyrene (mg/L)	<0.000050				
	Quinoline (mg/L)	<0.000050				
	Surrogate: Acenaphthene d10 (%)	99.5				
	Surrogate: Acridine d9 (%)	102.8				
	Surrogate: Chrysene d12 (%)	92.4				
	Surrogate: Naphthalene d8 (%)	97.4				
	Surrogate: Phenanthrene d10 (%)	101.8				

* 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	Aluminum (Al)-Dissolved	DLA	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Duplicate	Selenium (Se)-Dissolved	DLA	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zinc (Zn)-Dissolved	DLA	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chloride (Cl)	DLA	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L1199825-4
Matrix Spike	Sulfate (SO4)	MS-B	L1199825-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SOL:PP	Surrogate recovery outside acceptable limits due to prep process

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-WR	Water	Chloride 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.

ANIONS-F-IC-WR	Water	Fluoride by Ion Chromatography	EPA 300.1

Reference Information

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.

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.

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-WR	Water	Sulphate 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.

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

Reference Information

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-MAN-WR	Water	pH by Meter	APHA 4500-H (B)

"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."

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:

1 2

Reference Information

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 R2431168								
WG1540768-10 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			105.0		%		85-115	06-SEP-12
WG1540768-11 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			105.0		%		85-115	06-SEP-12
WG1540768-12 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			104.7		%		85-115	06-SEP-12
WG1540768-13 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			104.9		%		85-115	06-SEP-12
WG1540768-14 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			102.3		%		85-115	06-SEP-12
WG1540768-15 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			105.5		%		85-115	06-SEP-12
WG1540768-16 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			105.7		%		85-115	06-SEP-12
WG1540768-9 CRM		**VA-ALK-PCT-CONTROL**						
Alkalinity, Total (as CaCO3)			104.8		%		85-115	06-SEP-12
WG1540768-31 DUP		**L1199825-17**						
Alkalinity, Total (as CaCO3)		195	198		mg/L	1.5	20	06-SEP-12
Alkalinity, Bicarbonate (as CaCO3)		192	195		mg/L	1.2	20	06-SEP-12
Alkalinity, Carbonate (as CaCO3)		2.7	3.2		mg/L	18	25	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	06-SEP-12
WG1540768-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	06-SEP-12
WG1540768-2 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	06-SEP-12
WG1540768-3 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	06-SEP-12
WG1540768-4 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-PCT-VA	**Water**							
Batch R2431168								
WG1540768-4 MB								
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	06-SEP-12
WG1540768-5 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	06-SEP-12
WG1540768-6 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	06-SEP-12
WG1540768-7 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	06-SEP-12
WG1540768-8 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Bicarbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Carbonate (as CaCO3)			<1.0		mg/L		1	06-SEP-12
Alkalinity, Hydroxide (as CaCO3)			<1.0		mg/L		1	06-SEP-12
ALK-SCR-VA	**Water**							
Batch R2426042								
WG1535785-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			98.6		%		85-115	28-AUG-12
WG1535785-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			104.7		%		85-115	28-AUG-12
WG1535785-11 DUP		**L1199825-19**						
Alkalinity, Total (as CaCO3)		175	178		mg/L	2.0	20	28-AUG-12
WG1535785-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	28-AUG-12
WG1535785-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	28-AUG-12
WG1535785-7 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-SCR-VA	**Water**							
Batch R2426042								
WG1535785-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	28-AUG-12
ANIONS-CL-IC-WR	**Water**							
Batch R2430124								
WG1534216-7 DUP		**L1199825-2**						
Chloride (Cl)		0.63	0.61		mg/L	1.8	20	24-AUG-12
WG1534216-2 LCS								
Chloride (Cl)			102.3		%		85-115	24-AUG-12
WG1534216-6 LCS								
Chloride (Cl)			102.1		%		85-115	24-AUG-12
WG1534216-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	24-AUG-12
WG1534216-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	24-AUG-12
WG1534216-4 MS		**L1199540-2**						
Chloride (Cl)			102.9		%		75-125	24-AUG-12
WG1534216-8 MS		**L1199825-2**						
Chloride (Cl)			95.7		%		75-125	24-AUG-12
ANIONS-F-IC-WR	**Water**							
Batch R2430124								
WG1534216-7 DUP		**L1199825-2**						
Fluoride (F)		0.035	0.035		mg/L	0.0	20	24-AUG-12
WG1534216-2 LCS								
Fluoride (F)			95.9		%		85-115	24-AUG-12
WG1534216-6 LCS								
Fluoride (F)			92.9		%		85-115	24-AUG-12
WG1534216-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	24-AUG-12
WG1534216-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	24-AUG-12
WG1534216-8 MS		**L1199825-2**						
Fluoride (F)			87.3		%		75-125	24-AUG-12
ANIONS-NO2-IC-WR	**Water**							
Batch R2430124								
WG1534216-7 DUP		**L1199825-2**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	24-AUG-12
WG1534216-2 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-NO2-IC-WR	**Water**							
Batch R2430124								
WG1534216-2 LCS								
Nitrite (as N)			96.3		%		85-115	24-AUG-12
WG1534216-6 LCS								
Nitrite (as N)			102.5		%		85-115	24-AUG-12
WG1534216-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	24-AUG-12
WG1534216-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	24-AUG-12
WG1534216-8 MS		**L1199825-2**						
Nitrite (as N)			99.6		%		75-125	24-AUG-12
ANIONS-NO3-IC-WR	**Water**							
Batch R2430124								
WG1534216-7 DUP		**L1199825-2**						
Nitrate (as N)		0.283	0.282		mg/L	0.4	20	24-AUG-12
WG1534216-2 LCS								
Nitrate (as N)			103.5		%		85-115	24-AUG-12
WG1534216-6 LCS								
Nitrate (as N)			103.6		%		85-115	24-AUG-12
WG1534216-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	24-AUG-12
WG1534216-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	24-AUG-12
WG1534216-4 MS		**L1199540-2**						
Nitrate (as N)			102.5		%		75-125	24-AUG-12
WG1534216-8 MS		**L1199825-2**						
Nitrate (as N)			97.2		%		75-125	24-AUG-12
ANIONS-SO4-IC-WR	**Water**							
Batch R2430124								
WG1534216-7 DUP		**L1199825-2**						
Sulfate (SO4)		39.9	39.9		mg/L	0.1	20	24-AUG-12
WG1534216-2 LCS								
Sulfate (SO4)			103.4		%		85-115	24-AUG-12
WG1534216-6 LCS								
Sulfate (SO4)			106.3		%		85-115	24-AUG-12
WG1534216-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	24-AUG-12
WG1534216-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	24-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-SO4-IC-WR	**Water**							
Batch R2430124								
WG1534216-4 MS		**L1199540-2**						
Sulfate (SO4)			N/A	MS-B	%		-	24-AUG-12
WG1534216-8 MS		**L1199825-2**						
Sulfate (SO4)			92.7		%		75-125	24-AUG-12
CARBONS-DOC-VA	**Water**							
Batch R2427184								
WG1537210-15 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			99.2		%		80-120	29-AUG-12
WG1537210-2 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			99.4		%		80-120	29-AUG-12
WG1537210-4 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			99.9		%		80-120	29-AUG-12
WG1537210-6 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			100.6		%		80-120	29-AUG-12
WG1537210-9 DUP		**L1199825-14**						
Dissolved Organic Carbon		<0.50	<0.50	RPD-NA	mg/L	N/A	20	29-AUG-12
WG1537210-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	29-AUG-12
WG1537210-14 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	29-AUG-12
WG1537210-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	29-AUG-12
WG1537210-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	29-AUG-12
WG1537210-10 MS		**L1199896-3**						
Dissolved Organic Carbon			N/A	MS-B	%		-	29-AUG-12
WG1537210-12 MS		**L1199911-5**						
Dissolved Organic Carbon			N/A	MS-B	%		-	29-AUG-12
Batch R2429154								
WG1539205-2 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			95.6		%		80-120	31-AUG-12
WG1539205-4 CRM		**VA-DOC-C-CAFFEINE**						
Dissolved Organic Carbon			98.0		%		80-120	31-AUG-12
WG1539205-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	31-AUG-12
WG1539205-3 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	31-AUG-12
WG1539205-6 MS		**L1201634-5**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CARBONS-DOC-VA	**Water**							
Batch R2429154								
WG1539205-6 MS		**L1201634-5**						
Dissolved Organic Carbon			N/A	MS-B	%		-	31-AUG-12
COD-COL-VA	**Water**							
Batch R2426372								
WG1536259-10 LCS								
COD			103.8		%		85-115	29-AUG-12
WG1536259-2 LCS								
COD			106.0		%		85-115	29-AUG-12
WG1536259-6 LCS								
COD			105.8		%		85-115	29-AUG-12
WG1536259-1 MB								
COD			<20		mg/L		20	29-AUG-12
WG1536259-5 MB								
COD			<20		mg/L		20	29-AUG-12
WG1536259-9 MB								
COD			<20		mg/L		20	29-AUG-12
WG1536259-12 MS		**L1200185-1**						
COD			94.0		%		75-125	29-AUG-12
WG1536259-4 MS		**L1199717-9**						
COD			104.3		%		75-125	29-AUG-12
WG1536259-8 MS		**L1200103-9**						
COD			104.6		%		75-125	29-AUG-12
EPH-SF-FID-VA	**Water**							
Batch R2426236								
WG1535548-1 MB								
EPH10-19			<0.25		mg/L		0.25	29-AUG-12
EPH19-32			<0.25		mg/L		0.25	29-AUG-12
Batch R2426306								
WG1535548-3 MB								
EPH10-19			<0.25		mg/L		0.25	30-AUG-12
EPH19-32			<0.25		mg/L		0.25	30-AUG-12
HG-DIS-CVAFS-VA	**Water**							
Batch R2427021								
WG1535973-8 DUP		**L1199825-12**						
Mercury (Hg)-Dissolved		<0.00020	<0.000050	RPD-NA	mg/L	N/A	20	30-AUG-12
WG1537425-2 LCS								
Mercury (Hg)-Dissolved			97.4		%		80-120	30-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-DIS-CVAFS-VA	**Water**							
Batch R2427021								
WG1537425-1 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	30-AUG-12
WG1535973-4 MS		**L1199751-1**						
Mercury (Hg)-Dissolved			83.0		%		70-130	30-AUG-12
WG1535973-5 MS		**L1200298-2**						
Mercury (Hg)-Dissolved			81.9		%		70-130	30-AUG-12
Batch R2427960								
WG1538442-2 LCS								
Mercury (Hg)-Dissolved			94.0		%		80-120	31-AUG-12
WG1538442-1 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	31-AUG-12
Batch R2429147								
WG1535973-6 MS		**L1198788-2**						
Mercury (Hg)-Dissolved			122.8		%		70-130	04-SEP-12
MET-DIS-ICP-VA	**Water**							
Batch R2426332								
WG1535973-2 CRM		**VA-HIGH-WATRM**						
Beryllium (Be)-Dissolved			98.1		%		80-120	29-AUG-12
Bismuth (Bi)-Dissolved			100.0		%		80-120	29-AUG-12
Cobalt (Co)-Dissolved			96.1		%		80-120	29-AUG-12
Iron (Fe)-Dissolved			101.8		%		80-120	29-AUG-12
Lithium (Li)-Dissolved			101.7		%		80-120	29-AUG-12
Molybdenum (Mo)-Dissolved			99.6		%		80-120	29-AUG-12
Nickel (Ni)-Dissolved			98.9		%		80-120	29-AUG-12
Phosphorus (P)-Dissolved			100.5		%		80-120	29-AUG-12
Silicon (Si)-Dissolved			101.5		%		80-120	29-AUG-12
Silver (Ag)-Dissolved			100.6		%		80-120	29-AUG-12
Sodium (Na)-Dissolved			99.8		%		80-120	29-AUG-12
Strontium (Sr)-Dissolved			100.7		%		80-120	29-AUG-12
Thallium (Tl)-Dissolved			98.0		%		80-120	29-AUG-12
Tin (Sn)-Dissolved			100.5		%		80-120	29-AUG-12
Titanium (Ti)-Dissolved			104.2		%		80-120	29-AUG-12
Vanadium (V)-Dissolved			101.8		%		80-120	29-AUG-12
WG1535973-1 MB								
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	29-AUG-12
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	29-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2426332								
WG1535973-1 MB								
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	29-AUG-12
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	29-AUG-12
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	29-AUG-12
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	29-AUG-12
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	29-AUG-12
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	29-AUG-12
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	29-AUG-12
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	29-AUG-12
Sodium (Na)-Dissolved			<2.0		mg/L		2	29-AUG-12
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	29-AUG-12
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	29-AUG-12
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	29-AUG-12
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	29-AUG-12
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	29-AUG-12
Batch R2427019								
WG1535973-4 MS		**L1199751-1**						
Iron (Fe)-Dissolved			105.9		%		70-130	29-AUG-12
Sodium (Na)-Dissolved			114.3		%		70-130	29-AUG-12
Titanium (Ti)-Dissolved			115.7		%		70-130	29-AUG-12
Batch R2427206								
WG1535973-5 MS		**L1200298-2**						
Iron (Fe)-Dissolved			101.7		%		70-130	30-AUG-12
Sodium (Na)-Dissolved			108.5		%		70-130	30-AUG-12
Titanium (Ti)-Dissolved			119.6		%		70-130	30-AUG-12
Batch R2427313								
WG1535973-11 DUP		**L1199825-1**						
Beryllium (Be)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-AUG-12
Bismuth (Bi)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	20	29-AUG-12
Cobalt (Co)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-AUG-12
Iron (Fe)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-AUG-12
Lithium (Li)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-AUG-12
Molybdenum (Mo)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-AUG-12
Nickel (Ni)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	29-AUG-12
Phosphorus (P)-Dissolved		<0.30	<0.30	RPD-NA	mg/L	N/A	20	29-AUG-12
Silicon (Si)-Dissolved		6.33	6.30		mg/L	0.5	20	29-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2427313								
WG1535973-11 DUP		**L1199825-1**						
Silver (Ag)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-AUG-12
Sodium (Na)-Dissolved		3.6	3.5		mg/L	1.0	20	29-AUG-12
Strontium (Sr)-Dissolved		0.167	0.166		mg/L	0.7	20	29-AUG-12
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	20	29-AUG-12
Tin (Sn)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-AUG-12
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-AUG-12
Vanadium (V)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-AUG-12
WG1535973-8 DUP		**L1199825-12**						
Beryllium (Be)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	29-AUG-12
Bismuth (Bi)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	20	29-AUG-12
Cobalt (Co)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-AUG-12
Iron (Fe)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-AUG-12
Lithium (Li)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-AUG-12
Molybdenum (Mo)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-AUG-12
Nickel (Ni)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	29-AUG-12
Phosphorus (P)-Dissolved		<0.30	<0.30	RPD-NA	mg/L	N/A	20	29-AUG-12
Silicon (Si)-Dissolved		4.59	4.59		mg/L	0.1	20	29-AUG-12
Silver (Ag)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	29-AUG-12
Sodium (Na)-Dissolved		8.2	8.2		mg/L	0.2	20	29-AUG-12
Strontium (Sr)-Dissolved		0.298	0.300		mg/L	0.7	20	29-AUG-12
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	20	29-AUG-12
Tin (Sn)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-AUG-12
Titanium (Ti)-Dissolved		0.011	0.011		mg/L	2.0	20	29-AUG-12
Vanadium (V)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	20	29-AUG-12
WG1535973-3 MS		**L1199825-13**						
Iron (Fe)-Dissolved			96.2		%		70-130	29-AUG-12
Sodium (Na)-Dissolved			103.8		%		70-130	29-AUG-12
Titanium (Ti)-Dissolved			107.0		%		70-130	29-AUG-12
MET-DIS-LOW-MS-VA	**Water**							
Batch R2427074								
WG1535973-4 MS		**L1199751-1**						
Aluminum (Al)-Dissolved			95.9		%		70-130	29-AUG-12
Antimony (Sb)-Dissolved			97.0		%		70-130	29-AUG-12
Arsenic (As)-Dissolved			107.2		%		70-130	29-AUG-12
Barium (Ba)-Dissolved			N/A	MS-B	%		-	29-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch	**R2427074**							
WG1535973-4	**MS**	**L1199751-1**						
Boron (B)-Dissolved			94.2		%		70-130	29-AUG-12
Cadmium (Cd)-Dissolved			102.8		%		70-130	29-AUG-12
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	29-AUG-12
Chromium (Cr)-Dissolved			99.1		%		70-130	29-AUG-12
Copper (Cu)-Dissolved			99.98		%		70-130	29-AUG-12
Lead (Pb)-Dissolved			96.9		%		70-130	29-AUG-12
Magnesium (Mg)-Dissolved			87.2		%		70-130	29-AUG-12
Manganese (Mn)-Dissolved			110.5		%		70-130	29-AUG-12
Potassium (K)-Dissolved			99.5		%		70-130	29-AUG-12
Selenium (Se)-Dissolved			106.4		%		70-130	29-AUG-12
Uranium (U)-Dissolved			97.2		%		70-130	29-AUG-12
Zinc (Zn)-Dissolved			100.1		%		70-130	29-AUG-12
Batch	**R2427075**							
WG1535973-1	**MB**							
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	29-AUG-12
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	29-AUG-12
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	29-AUG-12
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	29-AUG-12
Boron (B)-Dissolved			<0.010		mg/L		0.01	29-AUG-12
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	29-AUG-12
Calcium (Ca)-Dissolved			<0.020		mg/L		0.02	29-AUG-12
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	29-AUG-12
Copper (Cu)-Dissolved			<0.00050		mg/L		0.0005	29-AUG-12
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	29-AUG-12
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	29-AUG-12
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	29-AUG-12
Potassium (K)-Dissolved			<0.050		mg/L		0.05	29-AUG-12
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	29-AUG-12
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	29-AUG-12
Zinc (Zn)-Dissolved			<0.0030		mg/L		0.003	29-AUG-12
Batch	**R2427170**							
WG1535973-2	**CRM**	**VA-HIGH-WATRM**						
Aluminum (Al)-Dissolved			100.1		%		80-120	29-AUG-12
Antimony (Sb)-Dissolved			100.6		%		80-120	29-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch R2427170								
WG1535973-2 CRM		**VA-HIGH-WATRM**						
Arsenic (As)-Dissolved			103.3		%		80-120	29-AUG-12
Barium (Ba)-Dissolved			99.1		%		80-120	29-AUG-12
Boron (B)-Dissolved			96.8		%		80-120	29-AUG-12
Cadmium (Cd)-Dissolved			102.5		%		80-120	29-AUG-12
Calcium (Ca)-Dissolved			98.8		%		80-120	29-AUG-12
Chromium (Cr)-Dissolved			103.9		%		80-120	29-AUG-12
Copper (Cu)-Dissolved			97.7		%		80-120	29-AUG-12
Lead (Pb)-Dissolved			101.4		%		80-120	29-AUG-12
Magnesium (Mg)-Dissolved			103.4		%		80-120	29-AUG-12
Manganese (Mn)-Dissolved			101.1		%		80-120	29-AUG-12
Potassium (K)-Dissolved			102.3		%		80-120	29-AUG-12
Selenium (Se)-Dissolved			100.2		%		80-120	29-AUG-12
Uranium (U)-Dissolved			101.2		%		80-120	29-AUG-12
Zinc (Zn)-Dissolved			99.9		%		80-120	29-AUG-12
Batch R2427183								
WG1535973-11 DUP		**L1199825-1**						
Aluminum (Al)-Dissolved		<0.010	<0.0030	RPD-NA	mg/L	N/A	20	29-AUG-12
Antimony (Sb)-Dissolved		<0.00050	<0.00010	RPD-NA	mg/L	N/A	20	29-AUG-12
Arsenic (As)-Dissolved		0.00083	0.00080		mg/L	4.0	20	29-AUG-12
Barium (Ba)-Dissolved		0.025	0.0251		mg/L	1.0	20	29-AUG-12
Boron (B)-Dissolved		<0.10	0.020		mg/L	1.3	20	29-AUG-12
Cadmium (Cd)-Dissolved		<0.00020	<0.000050	RPD-NA	mg/L	N/A	20	29-AUG-12
Calcium (Ca)-Dissolved		52.2	51.4		mg/L	1.5	20	29-AUG-12
Chromium (Cr)-Dissolved		<0.0020	0.00054		mg/L	7.8	20	29-AUG-12
Copper (Cu)-Dissolved		<0.0010	<0.00050	RPD-NA	mg/L	N/A	20	29-AUG-12
Lead (Pb)-Dissolved		<0.00050	<0.000050	RPD-NA	mg/L	N/A	20	29-AUG-12
Magnesium (Mg)-Dissolved		7.13	7.11		mg/L	0.3	20	29-AUG-12
Manganese (Mn)-Dissolved		<0.0020	0.000225		mg/L	6.0	20	29-AUG-12
Potassium (K)-Dissolved		1.28	1.27		mg/L	0.4	20	29-AUG-12
Selenium (Se)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	29-AUG-12
Uranium (U)-Dissolved		0.00034	0.000327		mg/L	3.8	20	29-AUG-12
Zinc (Zn)-Dissolved		<0.050	<0.0030	RPD-NA	mg/L	N/A	20	29-AUG-12
WG1535973-8 DUP		**L1199825-12**						
Aluminum (Al)-Dissolved		<0.010	<0.0030	RPD-NA	mg/L	N/A	20	29-AUG-12
Antimony (Sb)-Dissolved		<0.00050	<0.00010	RPD-NA	mg/L	N/A	20	29-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-VA	**Water**							
Batch R2427183								
WG1535973-8 DUP		**L1199825-12**						
Arsenic (As)-Dissolved		0.00020	0.00018		mg/L	13	20	29-AUG-12
Barium (Ba)-Dissolved		0.028	0.0276		mg/L	1.0	20	29-AUG-12
Boron (B)-Dissolved		<0.10	0.091		mg/L	0.8	20	29-AUG-12
Cadmium (Cd)-Dissolved		<0.00020	<0.000050	RPD-NA	mg/L	N/A	20	29-AUG-12
Calcium (Ca)-Dissolved		82.5	82.4		mg/L	0.1	20	29-AUG-12
Chromium (Cr)-Dissolved		0.0031	0.00304		mg/L	3.5	20	29-AUG-12
Copper (Cu)-Dissolved		<0.0010	<0.00050	RPD-NA	mg/L	N/A	20	29-AUG-12
Lead (Pb)-Dissolved		<0.00050	<0.000050	RPD-NA	mg/L	N/A	20	29-AUG-12
Magnesium (Mg)-Dissolved		27.7	28.4		mg/L	2.3	20	29-AUG-12
Manganese (Mn)-Dissolved		<0.0020	0.00109		mg/L	1.0	20	29-AUG-12
Potassium (K)-Dissolved		1.40	1.39		mg/L	0.4	20	29-AUG-12
Selenium (Se)-Dissolved		0.0075	0.0075		mg/L	0.4	20	29-AUG-12
Uranium (U)-Dissolved		0.00053	0.000519		mg/L	2.3	20	29-AUG-12
Zinc (Zn)-Dissolved		<0.050	<0.0030	RPD-NA	mg/L	N/A	20	29-AUG-12
WG1535973-3 MS		**L1199825-13**						
Aluminum (Al)-Dissolved			119.8		%		70-130	29-AUG-12
Antimony (Sb)-Dissolved			105.6		%		70-130	29-AUG-12
Arsenic (As)-Dissolved			124.0		%		70-130	29-AUG-12
Barium (Ba)-Dissolved			N/A	MS-B	%		-	29-AUG-12
Boron (B)-Dissolved			94.7		%		70-130	29-AUG-12
Cadmium (Cd)-Dissolved			122.1		%		70-130	29-AUG-12
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	29-AUG-12
Chromium (Cr)-Dissolved			118.0		%		70-130	29-AUG-12
Copper (Cu)-Dissolved			119.7		%		70-130	29-AUG-12
Lead (Pb)-Dissolved			102.7		%		70-130	29-AUG-12
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	29-AUG-12
Manganese (Mn)-Dissolved			117.0		%		70-130	29-AUG-12
Selenium (Se)-Dissolved			97.2		%		70-130	29-AUG-12
Uranium (U)-Dissolved			84.3		%		70-130	29-AUG-12
Zinc (Zn)-Dissolved			117.3		%		70-130	29-AUG-12
NH3-F-VA	**Water**							
Batch R2427382								
WG1537645-10 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			99.6		%		85-115	30-AUG-12
WG1537645-2 CRM		**VA-NH3-F**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R2427382								
WG1537645-2 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			102.9		%		85-115	30-AUG-12
WG1537645-4 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			95.4		%		85-115	30-AUG-12
WG1537645-6 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			99.5		%		85-115	30-AUG-12
WG1537645-8 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			100.2		%		85-115	30-AUG-12
WG1537645-11 DUP		**L1199825-21**						
Ammonia, Total (as N)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	30-AUG-12
WG1537645-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	30-AUG-12
WG1537645-3 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	30-AUG-12
WG1537645-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	30-AUG-12
WG1537645-7 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	30-AUG-12
WG1537645-9 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	30-AUG-12
WG1537645-12 MS		**L1199825-21**						
Ammonia, Total (as N)			95.6		%		75-125	30-AUG-12
WG1537645-14 MS		**L1200094-1**						
Ammonia, Total (as N)			99.5		%		75-125	30-AUG-12
PAH-SF-MS-VA	**Water**							
Batch R2427369								
WG1535548-2 LCS								
Acenaphthene			91.5		%		60-130	30-AUG-12
Acenaphthylene			91.6		%		60-130	30-AUG-12
Acridine			88.2		%		60-130	30-AUG-12
Anthracene			93.3		%		60-130	30-AUG-12
Benz(a)anthracene			88.5		%		60-130	30-AUG-12
Benzo(a)pyrene			82.1		%		60-130	30-AUG-12
Benzo(b)fluoranthene			79.7		%		60-130	30-AUG-12
Benzo(g,h,i)perylene			96.6		%		60-130	30-AUG-12
Benzo(k)fluoranthene			102.4		%		60-130	30-AUG-12
Chrysene			101.6		%		60-130	30-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-SF-MS-VA	**Water**							
Batch R2427369								
WG1535548-2 LCS								
Dibenz(a,h)anthracene			93.0		%		60-130	30-AUG-12
Fluoranthene			94.7		%		60-130	30-AUG-12
Fluorene			90.1		%		60-130	30-AUG-12
Indeno(1,2,3-c,d)pyrene			87.9		%		60-130	30-AUG-12
Naphthalene			86.8		%		50-130	30-AUG-12
Phenanthrene			94.4		%		60-130	30-AUG-12
Pyrene			93.6		%		60-130	30-AUG-12
Quinoline			91.2		%		60-130	30-AUG-12
WG1535548-1 MB								
Acenaphthene			<0.000050		mg/L		0.00005	30-AUG-12
Acenaphthylene			<0.000050		mg/L		0.00005	30-AUG-12
Acridine			<0.000050		mg/L		0.00005	30-AUG-12
Anthracene			<0.000050		mg/L		0.00005	30-AUG-12
Benz(a)anthracene			<0.000050		mg/L		0.00005	30-AUG-12
Benzo(a)pyrene			<0.000010		mg/L		0.00001	30-AUG-12
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	30-AUG-12
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	30-AUG-12
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	30-AUG-12
Chrysene			<0.000050		mg/L		0.00005	30-AUG-12
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	30-AUG-12
Fluoranthene			<0.000050		mg/L		0.00005	30-AUG-12
Fluorene			<0.000050		mg/L		0.00005	30-AUG-12
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	30-AUG-12
Naphthalene			<0.000050		mg/L		0.00005	30-AUG-12
Phenanthrene			<0.000050		mg/L		0.00005	30-AUG-12
Pyrene			<0.000050		mg/L		0.00005	30-AUG-12
Quinoline			<0.000050		mg/L		0.00005	30-AUG-12
WG1535548-3 MB								
Acenaphthene			<0.000050		mg/L		0.00005	30-AUG-12
Acenaphthylene			<0.000050		mg/L		0.00005	30-AUG-12
Acridine			<0.000050		mg/L		0.00005	30-AUG-12
Anthracene			<0.000050		mg/L		0.00005	30-AUG-12
Benz(a)anthracene			<0.000050		mg/L		0.00005	30-AUG-12
Benzo(a)pyrene			<0.000010		mg/L		0.00001	30-AUG-12
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	30-AUG-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-SF-MS-VA	**Water**							
Batch R2427369								
WG1535548-3 MB								
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	30-AUG-12
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	30-AUG-12
Chrysene			<0.000050		mg/L		0.00005	30-AUG-12
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	30-AUG-12
Fluoranthene			<0.000050		mg/L		0.00005	30-AUG-12
Fluorene			<0.000050		mg/L		0.00005	30-AUG-12
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	30-AUG-12
Naphthalene			<0.000050		mg/L		0.00005	30-AUG-12
Phenanthrene			<0.000050		mg/L		0.00005	30-AUG-12
Pyrene			<0.000050		mg/L		0.00005	30-AUG-12
Quinoline			<0.000050		mg/L		0.00005	30-AUG-12
PH-MAN-WR	**Water**							
Batch R2430231								
WG1534970-4 DUP		**L1199825-1**						
pH		8.01	8.02		pH	0.1	25	27-AUG-12
WG1534970-1 LCS								
pH			99.9		%		70-130	27-AUG-12
WG1534970-3 LCS								
pH			99.9		%		70-130	27-AUG-12
TDS-VA	**Water**							
Batch R2427807								
WG1536565-6 DUP		**L1199825-15**						
Total Dissolved Solids		498	510		mg/L	2.5	20	29-AUG-12
WG1536565-2 LCS								
Total Dissolved Solids			104.4		%		85-115	29-AUG-12
WG1536565-5 LCS								
Total Dissolved Solids			101.3		%		85-115	29-AUG-12
WG1536565-1 MB								
Total Dissolved Solids			<10		mg/L		10	29-AUG-12
WG1536565-4 MB								
Total Dissolved Solids			<10		mg/L		10	29-AUG-12
TKN-F-VA	**Water**							
Batch R2427212								
WG1536242-3 DUP		**L1199825-10**						
Total Kjeldahl Nitrogen		0.052	0.074	J	mg/L	0.022	0.1	30-AUG-12
WG1536242-2 LCS								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-F-VA	**Water**							
Batch R2427212								
WG1536242-2 LCS								
Total Kjeldahl Nitrogen			98.7		%		75-125	30-AUG-12
WG1536242-5 LCS								
Total Kjeldahl Nitrogen			93.2		%		75-125	30-AUG-12
WG1536242-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	30-AUG-12
WG1536242-4 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	30-AUG-12
VH-HSFID-VA	**Water**							
Batch R2426189								
WG1537421-3 DUP		**L1199825-21**						
Volatile Hydrocarbons (VH6-10)		<0.10	<0.10	RPD-NA	mg/L	N/A	50	31-AUG-12
WG1537421-2 LCS								
Volatile Hydrocarbons (VH6-10)			105.7		%		70-130	31-AUG-12
WG1537421-1 MB								
Volatile Hydrocarbons (VH6-10)			<0.10		mg/L		0.1	31-AUG-12
VOC-HSMS-VA	**Water**							
Batch R2428608								
WG1544270-3 DUP		**L1199825-21**						
Bromodichloromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Bromoform		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Carbon Tetrachloride		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	12-SEP-12
Chlorobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Dibromochloromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Chloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	12-SEP-12
Chloroform		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Chloromethane		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	12-SEP-12
1,2-Dichlorobenzene		<0.00070	<0.00070	RPD-NA	mg/L	N/A	30	12-SEP-12
1,3-Dichlorobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
1,4-Dichlorobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
1,1-Dichloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
1,2-Dichloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
1,1-Dichloroethylene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
cis-1,2-Dichloroethylene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
trans-1,2-Dichloroethylene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Dichloromethane		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	12-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HSMS-VA	**Water**							
Batch R2428608								
WG1544270-3 DUP		**L1199825-21**						
1,2-Dichloropropane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
cis-1,3-Dichloropropylene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
trans-1,3-Dichloropropylene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
1,1,1,2-Tetrachloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
1,1,2,2-Tetrachloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Tetrachloroethylene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
1,1,1-Trichloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
1,1,2-Trichloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Trichloroethylene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	12-SEP-12
Trichlorofluoromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	12-SEP-12
Vinyl Chloride		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	12-SEP-12
WG1544270-2 LCS								
Bromodichloromethane			87.1		%		70-130	12-SEP-12
Bromoform			100.4		%		70-130	12-SEP-12
Carbon Tetrachloride			100.8		%		70-130	12-SEP-12
Chlorobenzene			96.4		%		70-130	12-SEP-12
Dibromochloromethane			100.0		%		70-130	12-SEP-12
Chloroethane			84.5		%		60-140	12-SEP-12
Chloroform			89.2		%		70-130	12-SEP-12
Chloromethane			74.1		%		60-140	12-SEP-12
1,2-Dichlorobenzene			96.9		%		70-130	12-SEP-12
1,3-Dichlorobenzene			98.3		%		70-130	12-SEP-12
1,4-Dichlorobenzene			96.6		%		70-130	12-SEP-12
1,1-Dichloroethane			82.0		%		70-130	12-SEP-12
1,2-Dichloroethane			78.2		%		70-130	12-SEP-12
1,1-Dichloroethylene			71.2		%		70-130	12-SEP-12
cis-1,2-Dichloroethylene			94.3		%		70-130	12-SEP-12
trans-1,2-Dichloroethylene			80.1		%		70-130	12-SEP-12
Dichloromethane			83.3		%		60-140	12-SEP-12
1,2-Dichloropropane			84.5		%		70-130	12-SEP-12
cis-1,3-Dichloropropylene			87.3		%		70-130	12-SEP-12
trans-1,3-Dichloropropylene			80.5		%		70-130	12-SEP-12
1,1,1,2-Tetrachloroethane			104.2		%		70-130	12-SEP-12
1,1,2,2-Tetrachloroethane			81.6		%		70-130	12-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HSMS-VA	**Water**							
Batch R2428608								
WG1544270-2 LCS								
Tetrachloroethylene			105.0		%		70-130	12-SEP-12
1,1,1-Trichloroethane			94.1		%		70-130	12-SEP-12
1,1,2-Trichloroethane			89.1		%		70-130	12-SEP-12
Trichloroethylene			105.6		%		70-130	12-SEP-12
Trichlorofluoromethane			100.7		%		60-140	12-SEP-12
Vinyl Chloride			83.1		%		60-140	12-SEP-12
WG1544270-1 MB								
Bromodichloromethane			<0.0010		mg/L		0.001	12-SEP-12
Bromoform			<0.0010		mg/L		0.001	12-SEP-12
Carbon Tetrachloride			<0.00050		mg/L		0.0005	12-SEP-12
Chlorobenzene			<0.0010		mg/L		0.001	12-SEP-12
Dibromochloromethane			<0.0010		mg/L		0.001	12-SEP-12
Chloroethane			<0.0010		mg/L		0.001	12-SEP-12
Chloroform			<0.0010		mg/L		0.001	12-SEP-12
Chloromethane			<0.0050		mg/L		0.005	12-SEP-12
1,2-Dichlorobenzene			<0.00070		mg/L		0.0007	12-SEP-12
1,3-Dichlorobenzene			<0.0010		mg/L		0.001	12-SEP-12
1,4-Dichlorobenzene			<0.0010		mg/L		0.001	12-SEP-12
1,1-Dichloroethane			<0.0010		mg/L		0.001	12-SEP-12
1,2-Dichloroethane			<0.0010		mg/L		0.001	12-SEP-12
1,1-Dichloroethylene			<0.0010		mg/L		0.001	12-SEP-12
cis-1,2-Dichloroethylene			<0.0010		mg/L		0.001	12-SEP-12
trans-1,2-Dichloroethylene			<0.0010		mg/L		0.001	12-SEP-12
Dichloromethane			<0.0050		mg/L		0.005	12-SEP-12
1,2-Dichloropropane			<0.0010		mg/L		0.001	12-SEP-12
cis-1,3-Dichloropropylene			<0.0010		mg/L		0.001	12-SEP-12
trans-1,3-Dichloropropylene			<0.0010		mg/L		0.001	12-SEP-12
1,1,1,2-Tetrachloroethane			<0.0010		mg/L		0.001	12-SEP-12
1,1,2,2-Tetrachloroethane			<0.0010		mg/L		0.001	12-SEP-12
Tetrachloroethylene			<0.0010		mg/L		0.001	12-SEP-12
1,1,1-Trichloroethane			<0.0010		mg/L		0.001	12-SEP-12
1,1,2-Trichloroethane			<0.0010		mg/L		0.001	12-SEP-12
Trichloroethylene			<0.0010		mg/L		0.001	12-SEP-12
Trichlorofluoromethane			<0.0010		mg/L		0.001	12-SEP-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HSMS-VA	**Water**							
Batch R2428608								
WG1544270-1 MB								
Vinyl Chloride			<0.0010		mg/L		0.001	12-SEP-12
VOC7-HSMS-VA	**Water**							
Batch R2425830								
WG1537421-3 DUP		**L1199825-21**						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	30-AUG-12
Ethylbenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	30-AUG-12
Methyl t-butyl ether (MTBE)		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	30-AUG-12
Styrene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	30-AUG-12
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	30-AUG-12
meta- & para-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	30-AUG-12
ortho-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	30-AUG-12
WG1537421-2 LCS								
Benzene			103.5		%		70-130	30-AUG-12
Ethylbenzene			102.1		%		70-130	30-AUG-12
Methyl t-butyl ether (MTBE)			102.8		%		70-130	30-AUG-12
Styrene			103.3		%		70-130	30-AUG-12
Toluene			101.8		%		70-130	30-AUG-12
meta- & para-Xylene			101.1		%		70-130	30-AUG-12
ortho-Xylene			103.3		%		70-130	30-AUG-12
WG1537421-1 MB								
Benzene			<0.00050		mg/L		0.0005	30-AUG-12
Ethylbenzene			<0.00050		mg/L		0.0005	30-AUG-12
Methyl t-butyl ether (MTBE)			<0.00050		mg/L		0.0005	30-AUG-12
Styrene			<0.00050		mg/L		0.0005	30-AUG-12
Toluene			<0.00050		mg/L		0.0005	30-AUG-12
meta- & para-Xylene			<0.00050		mg/L		0.0005	30-AUG-12
ortho-Xylene			<0.00050		mg/L		0.0005	30-AUG-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.
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							
pH by Meter							
	1	22-AUG-12 11:35	27-AUG-12 15:48	24	124	hours	EHTR
	2	22-AUG-12 13:00	27-AUG-12 15:48	24	123	hours	EHTR
	3	22-AUG-12 14:10	27-AUG-12 15:48	24	122	hours	EHTR
	4	22-AUG-12 09:30	27-AUG-12 15:48	24	126	hours	EHTR
	5	22-AUG-12 09:30	27-AUG-12 15:48	24	126	hours	EHTR
	6	22-AUG-12 15:20	27-AUG-12 15:48	24	120	hours	EHTR
	7	22-AUG-12 17:00	27-AUG-12 15:48	24	119	hours	EHTR
	8	22-AUG-12 18:15	27-AUG-12 15:48	24	118	hours	EHTR
	9	22-AUG-12 19:30	27-AUG-12 15:48	24	116	hours	EHTR
	10	23-AUG-12 14:10	27-AUG-12 15:48	24	98	hours	EHTR
	11	23-AUG-12 11:30	27-AUG-12 15:48	24	100	hours	EHTR
	12	23-AUG-12 12:30	27-AUG-12 15:48	24	99	hours	EHTR
	13	24-AUG-12 09:30	27-AUG-12 15:48	24	78	hours	EHTL
	14	23-AUG-12 15:45	27-AUG-12 15:48	24	96	hours	EHTR
	15	23-AUG-12 17:20	27-AUG-12 15:48	24	95	hours	EHTR
	16	23-AUG-12 16:40	27-AUG-12 15:48	24	95	hours	EHTR
	17	23-AUG-12 18:30	27-AUG-12 15:48	24	93	hours	EHTR
	18	24-AUG-12 14:00	27-AUG-12 15:48	24	74	hours	EHTL
	19	24-AUG-12 13:00	27-AUG-12 15:48	24	75	hours	EHTL
	20	24-AUG-12 11:50	27-AUG-12 15:48	24	76	hours	EHTL
	21	24-AUG-12 14:40	27-AUG-12 15:48	24	73	hours	EHTL
Volatile Organic Compounds							
VOCs in water by Headspace GCMS							
	1	22-AUG-12 11:35	11-SEP-12 16:49	14	20	days	EHT
	2	22-AUG-12 13:00	11-SEP-12 16:49	14	20	days	EHT
	3	22-AUG-12 14:10	11-SEP-12 16:49	14	20	days	EHT
	4	22-AUG-12 09:30	11-SEP-12 16:49	14	20	days	EHT
	5	22-AUG-12 09:30	11-SEP-12 16:49	14	20	days	EHT
	6	22-AUG-12 15:20	11-SEP-12 16:49	14	20	days	EHT
	7	22-AUG-12 17:00	11-SEP-12 16:49	14	20	days	EHT
	8	22-AUG-12 18:15	11-SEP-12 16:49	14	20	days	EHT
	9	22-AUG-12 19:30	11-SEP-12 16:49	14	20	days	EHT
	10	23-AUG-12 14:10	11-SEP-12 16:49	14	19	days	EHT
	11	23-AUG-12 11:30	11-SEP-12 16:49	14	19	days	EHT
	12	23-AUG-12 12:30	11-SEP-12 16:49	14	19	days	EHT
	13	24-AUG-12 09:30	11-SEP-12 16:49	14	18	days	EHT
	14	23-AUG-12 15:45	11-SEP-12 16:49	14	19	days	EHT
	15	23-AUG-12 17:20	11-SEP-12 16:49	14	19	days	EHT
	16	23-AUG-12 16:40	11-SEP-12 16:49	14	19	days	EHT
	17	23-AUG-12 18:30	11-SEP-12 16:49	14	19	days	EHT
	18	24-AUG-12 14:00	11-SEP-12 16:49	14	18	days	EHT
	19	24-AUG-12 13:00	11-SEP-12 16:49	14	18	days	EHT
	20	24-AUG-12 11:50	11-SEP-12 16:49	14	18	days	EHT
	21	24-AUG-12 14:40	11-SEP-12 16:49	14	18	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 L1199825 were received on 24-AUG-12 19:50.

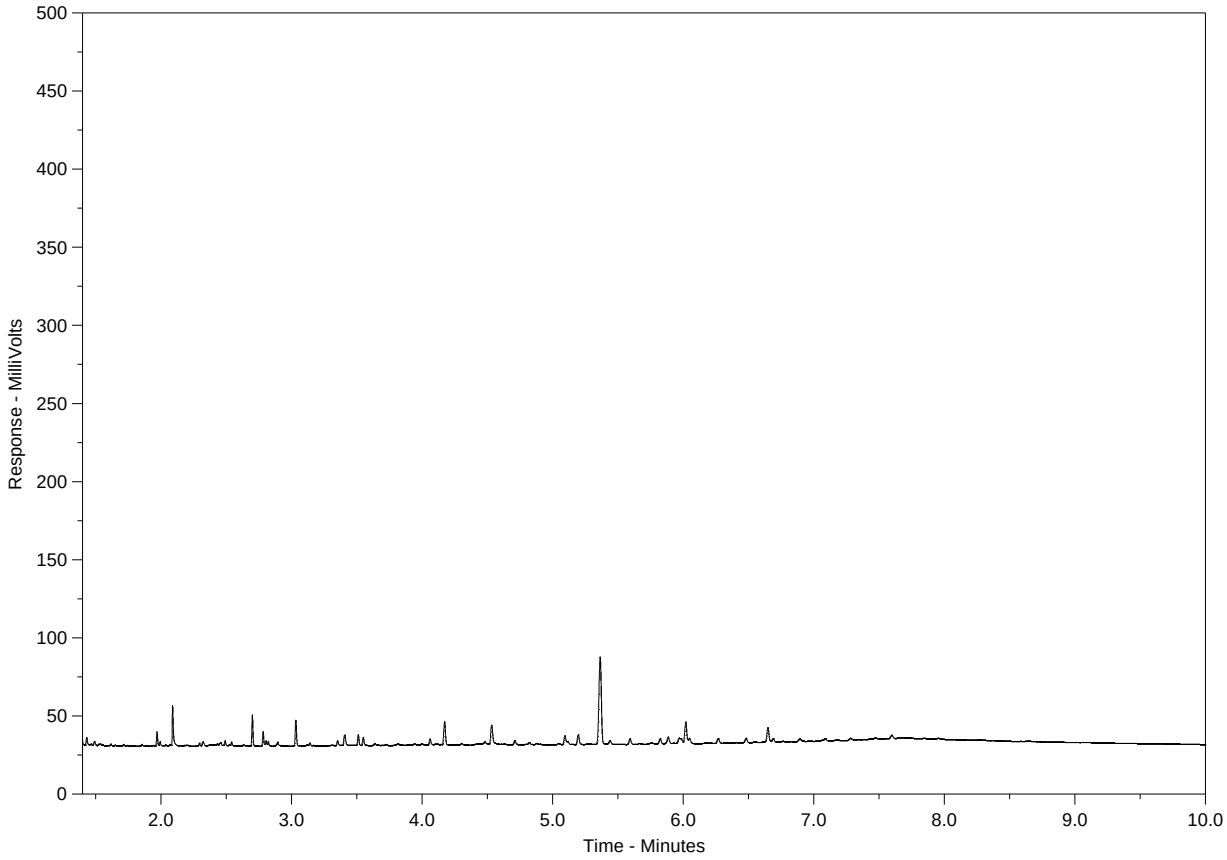
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where 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: L1199825-1
Client Sample ID: BC-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.

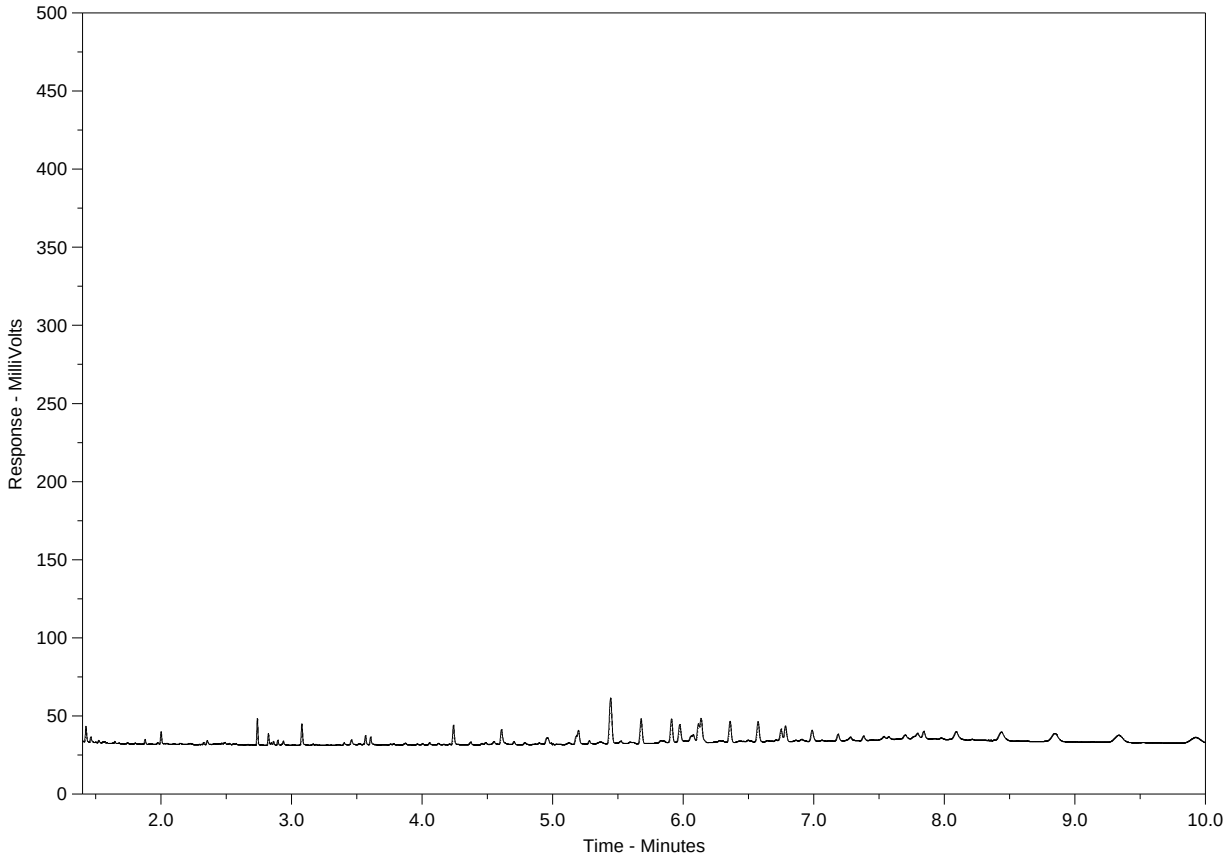
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-2
Client Sample ID: BC-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.

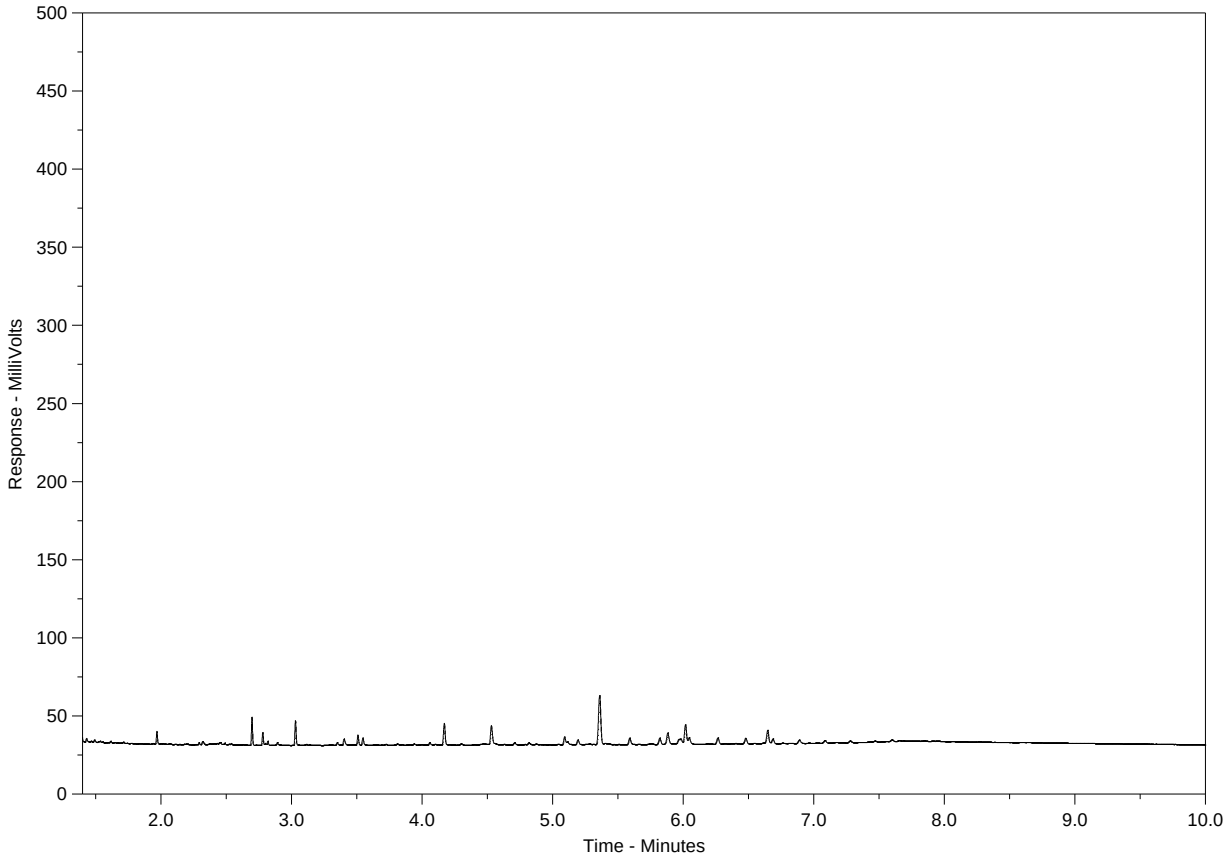
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-3
Client Sample ID: BC-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.

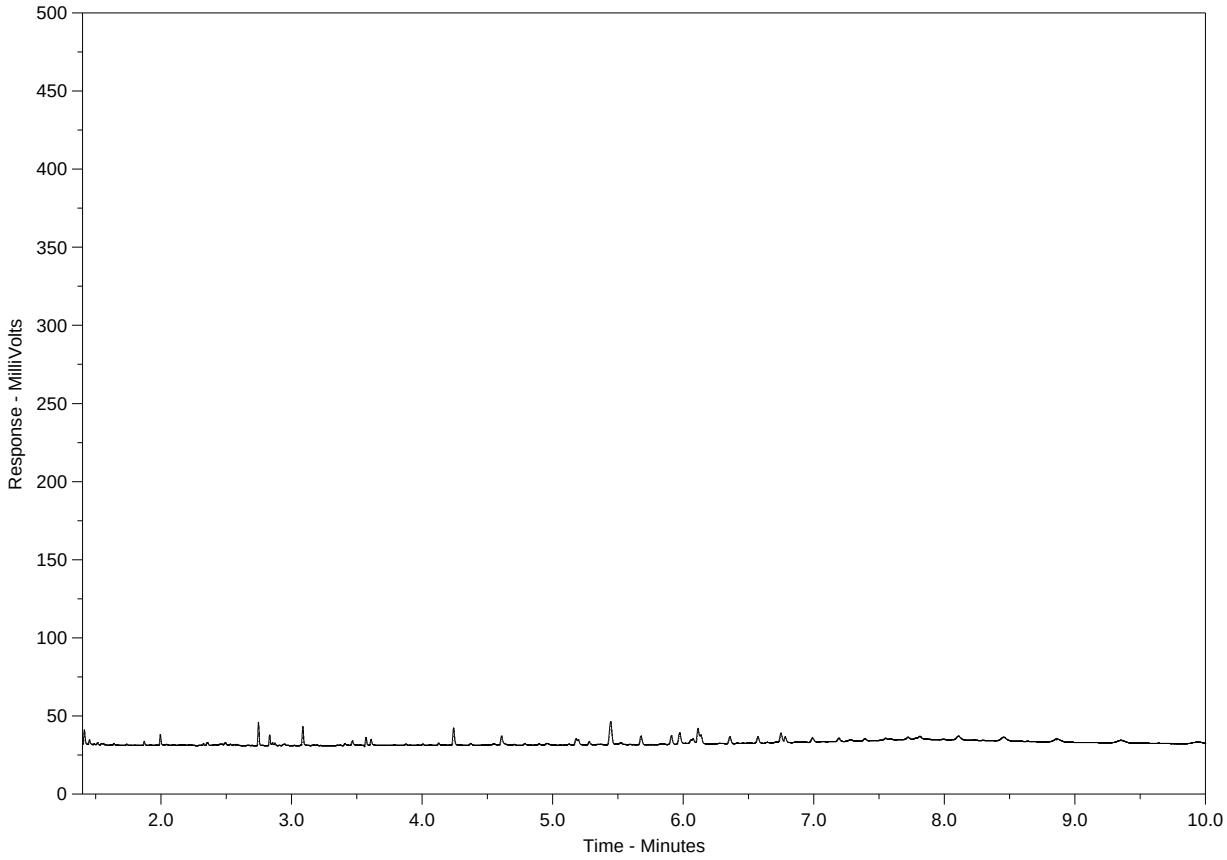
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-4
Client Sample ID: BC-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.

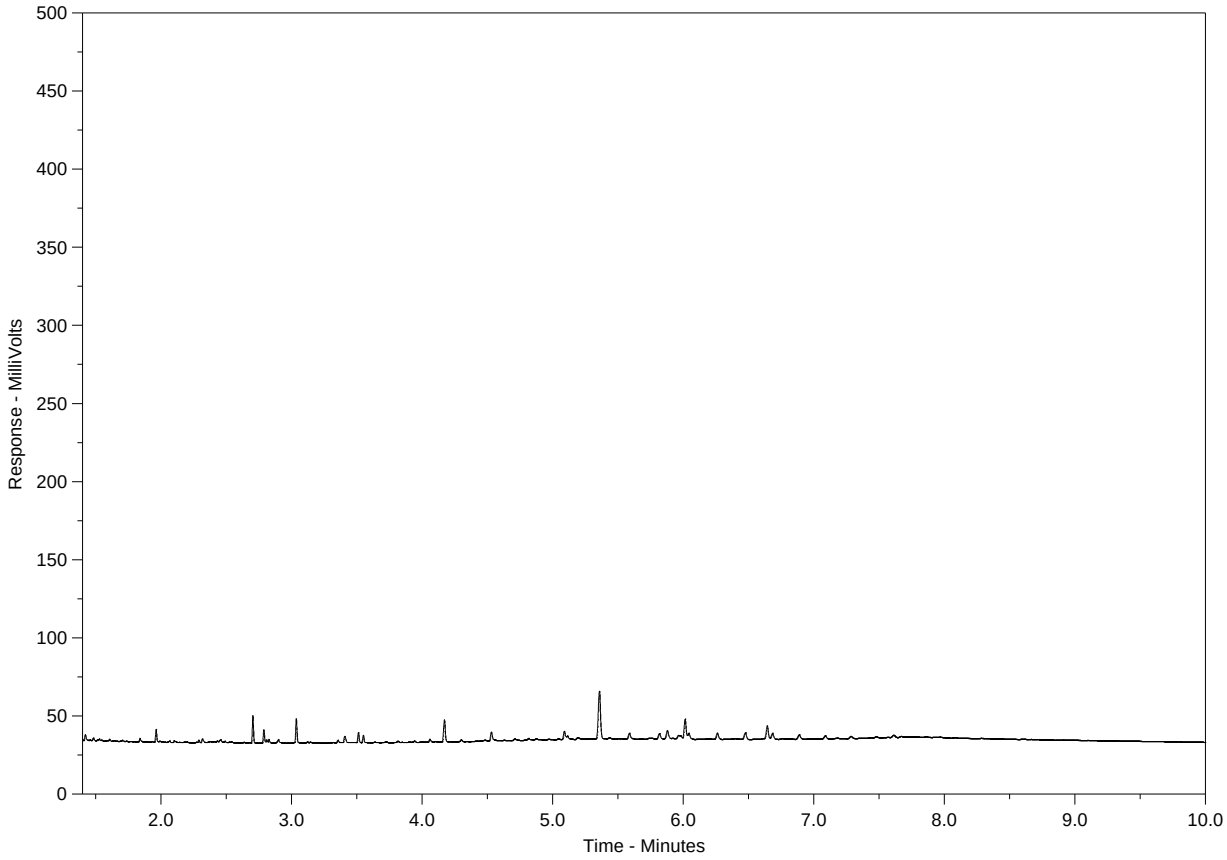
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-5
Client Sample ID: BC-MW12-05



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.

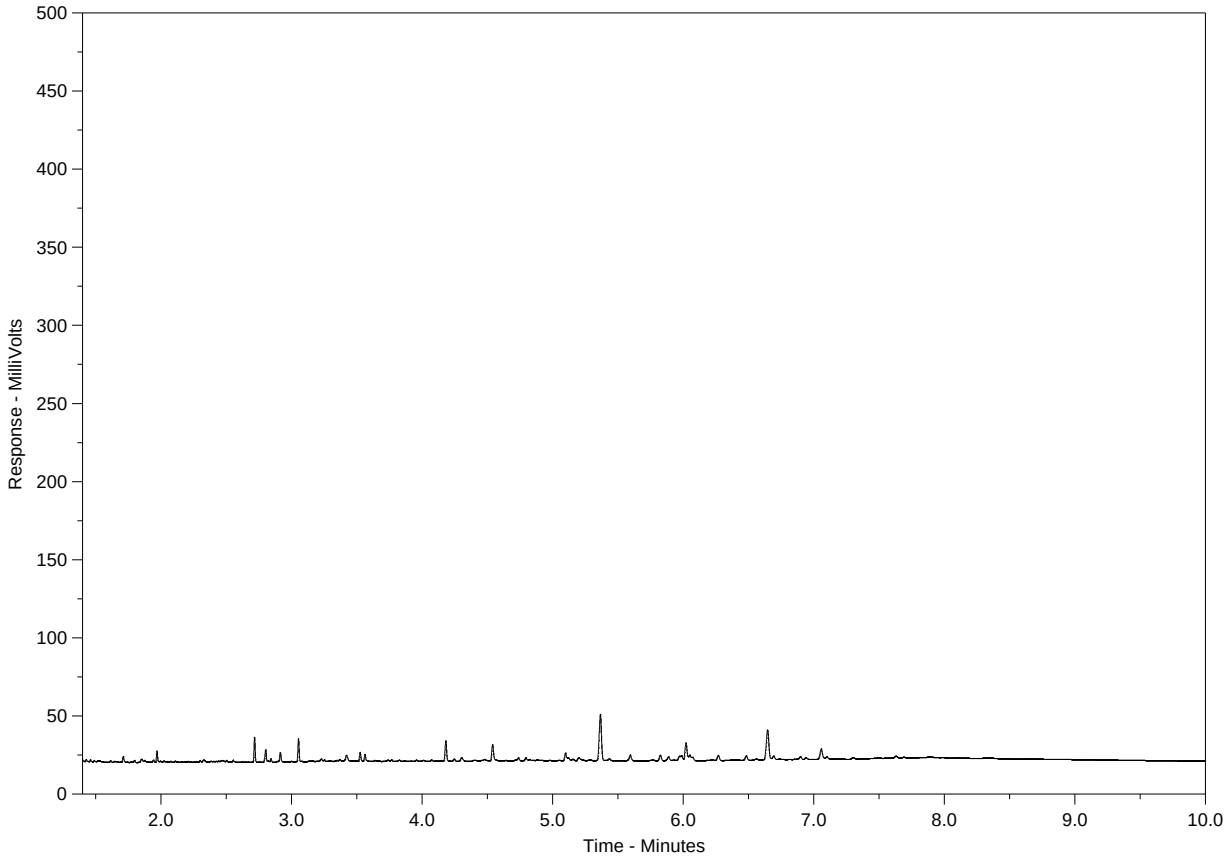
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-6
Client Sample ID: BC 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.

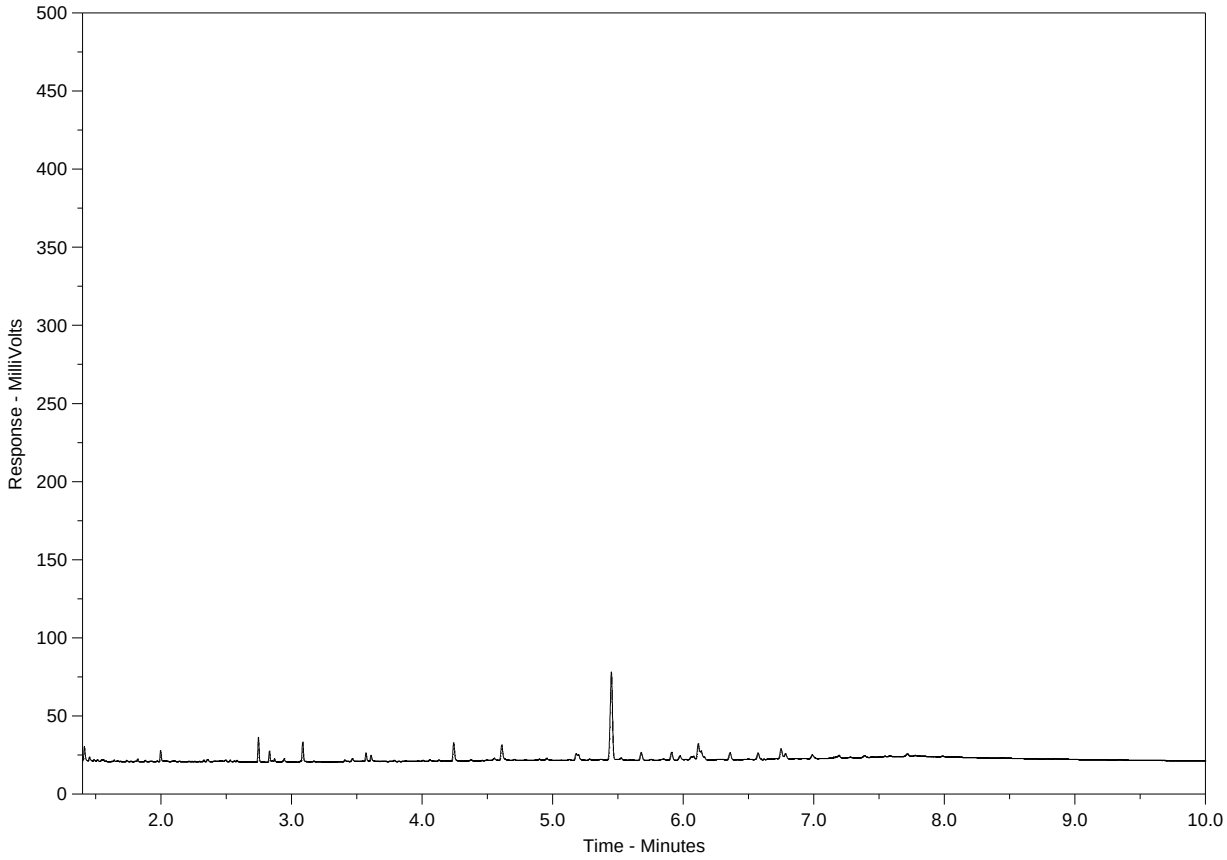
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-7
Client Sample ID: HC-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.

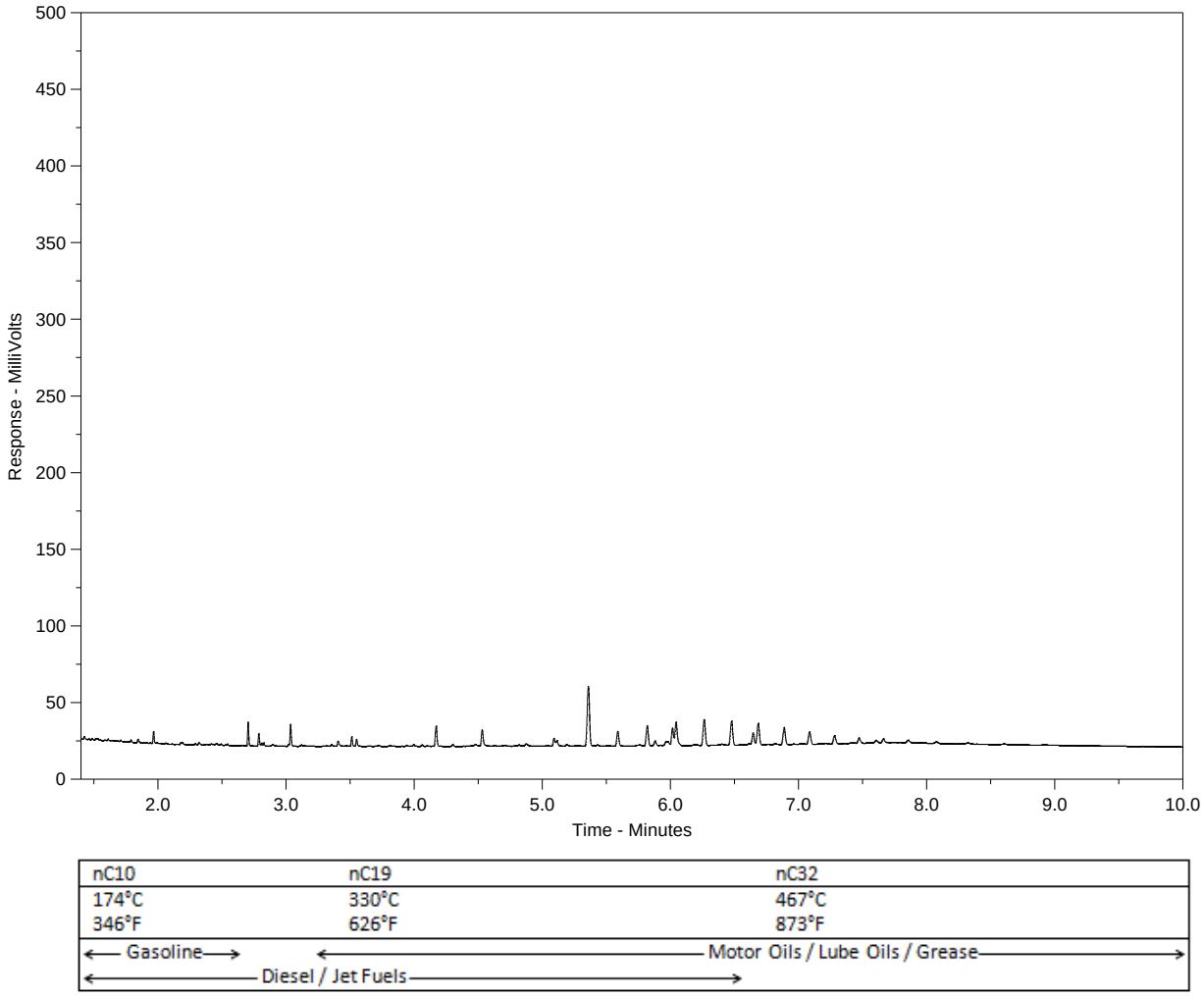
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-8
Client Sample ID: HC-MW12-02



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.

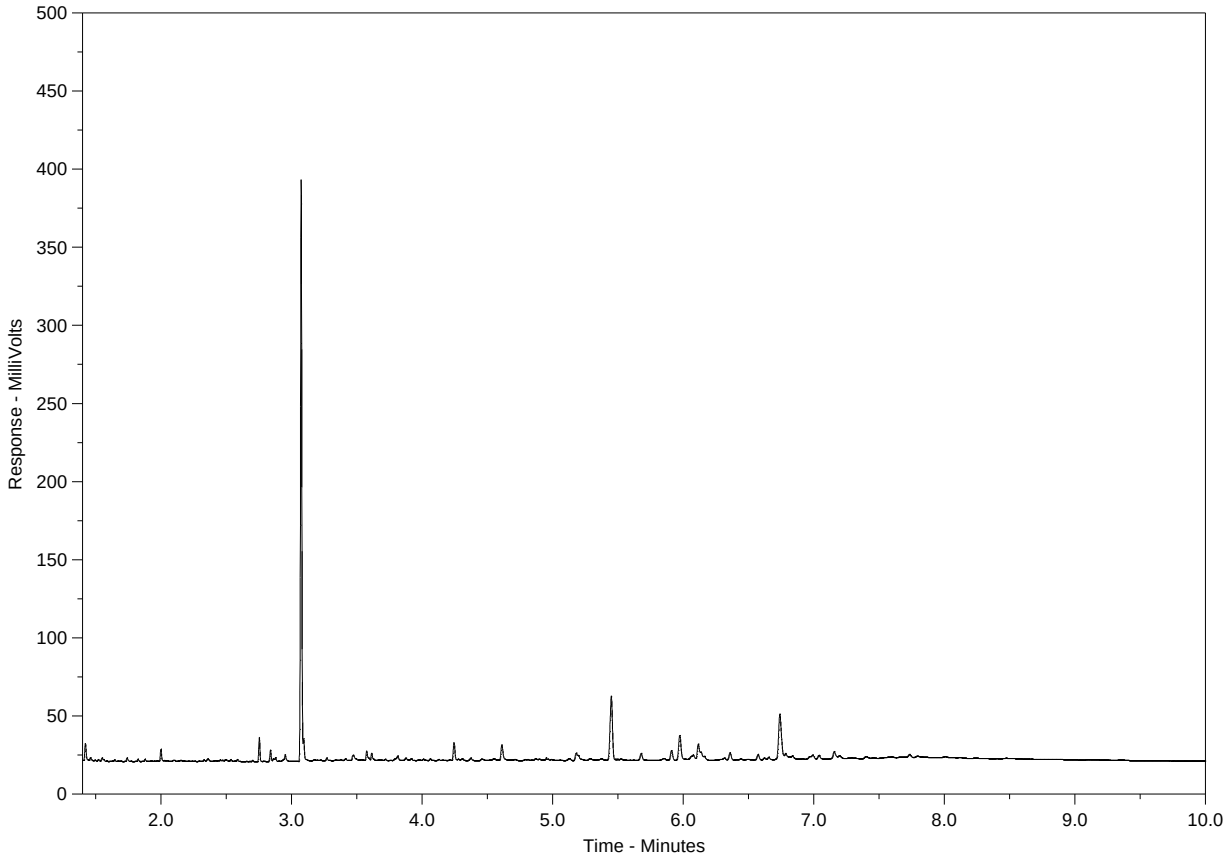
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-9
Client Sample ID: HC 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.

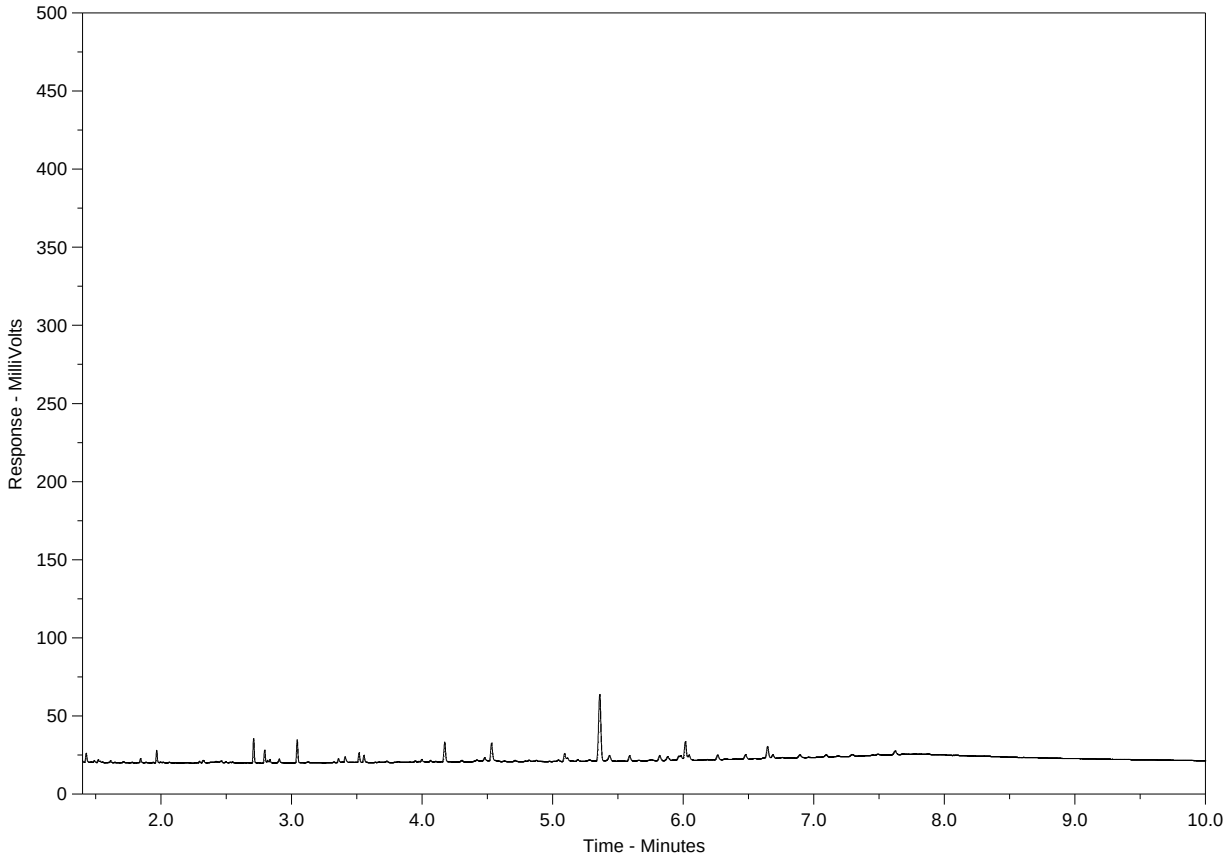
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-10
Client Sample ID: DB-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.

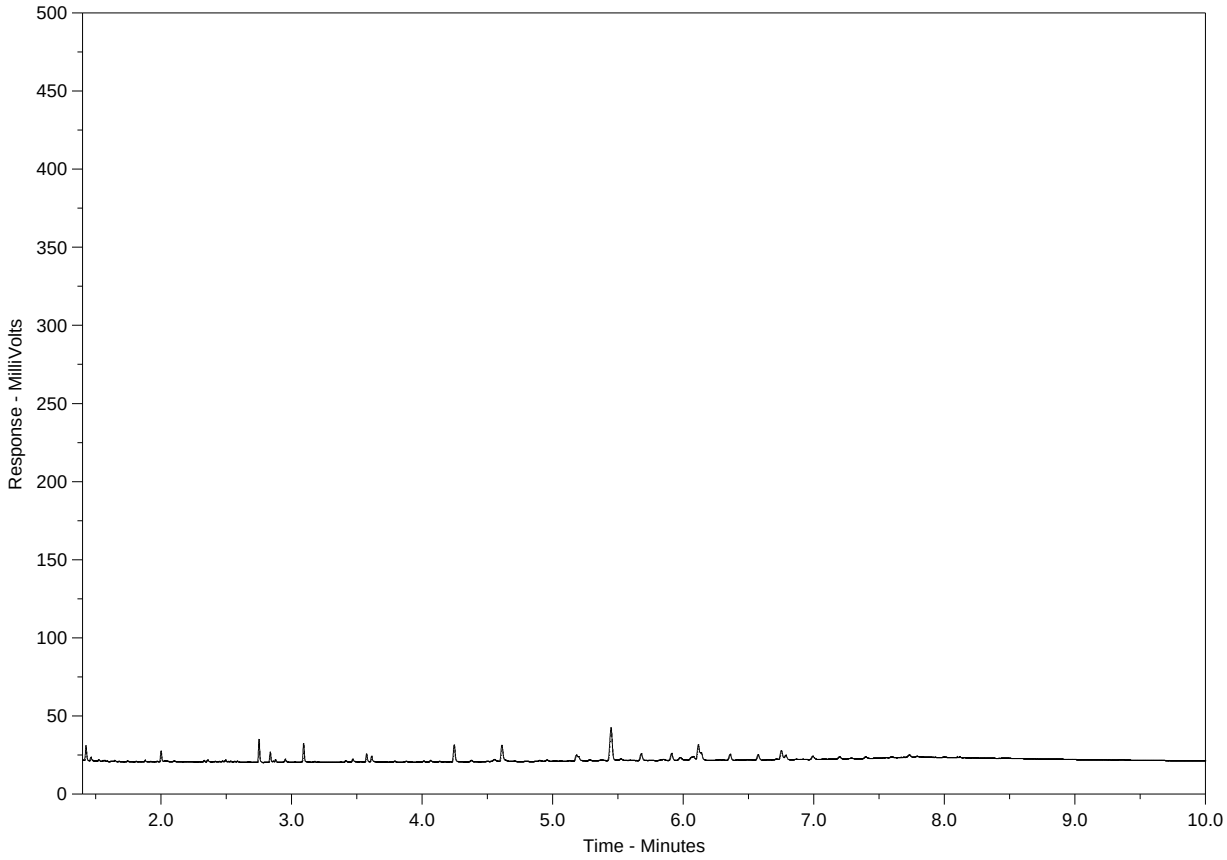
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-11
Client Sample ID: DB-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.

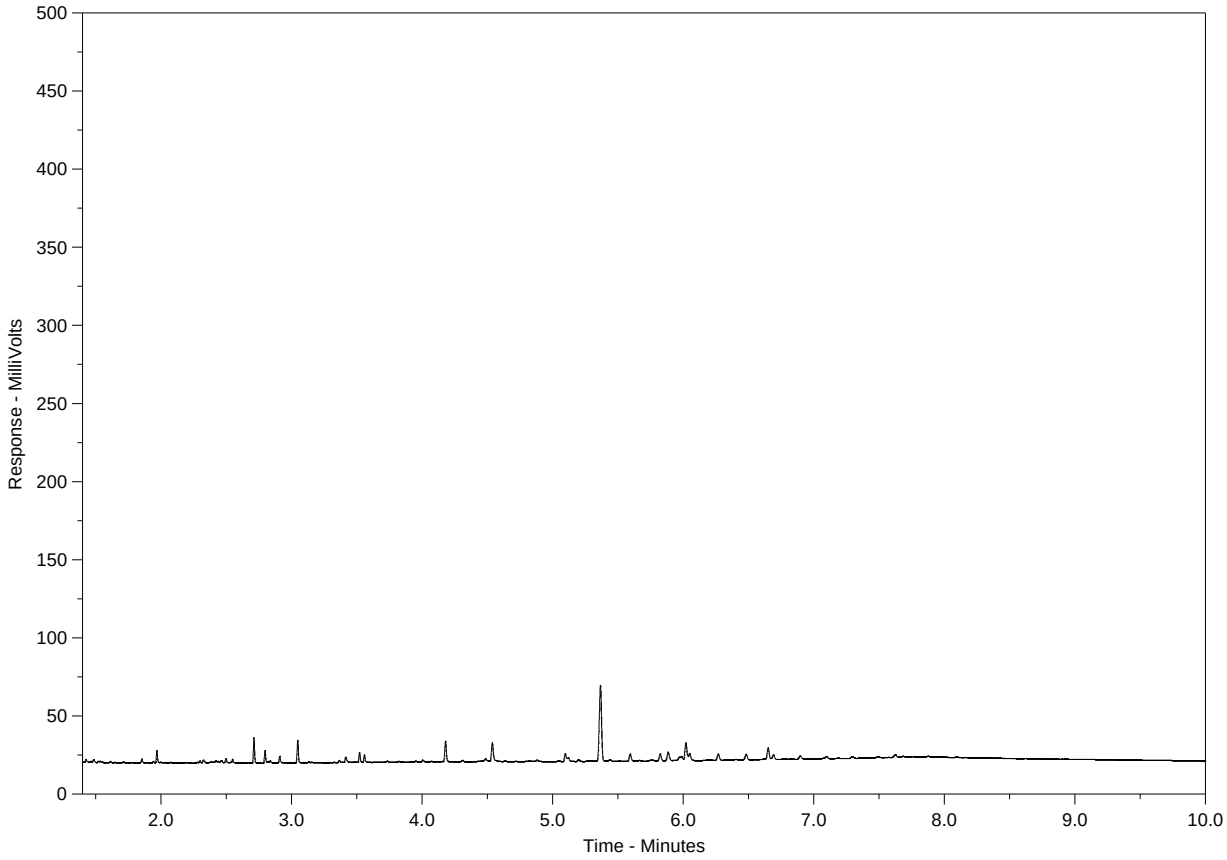
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-12
Client Sample ID: DB-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.

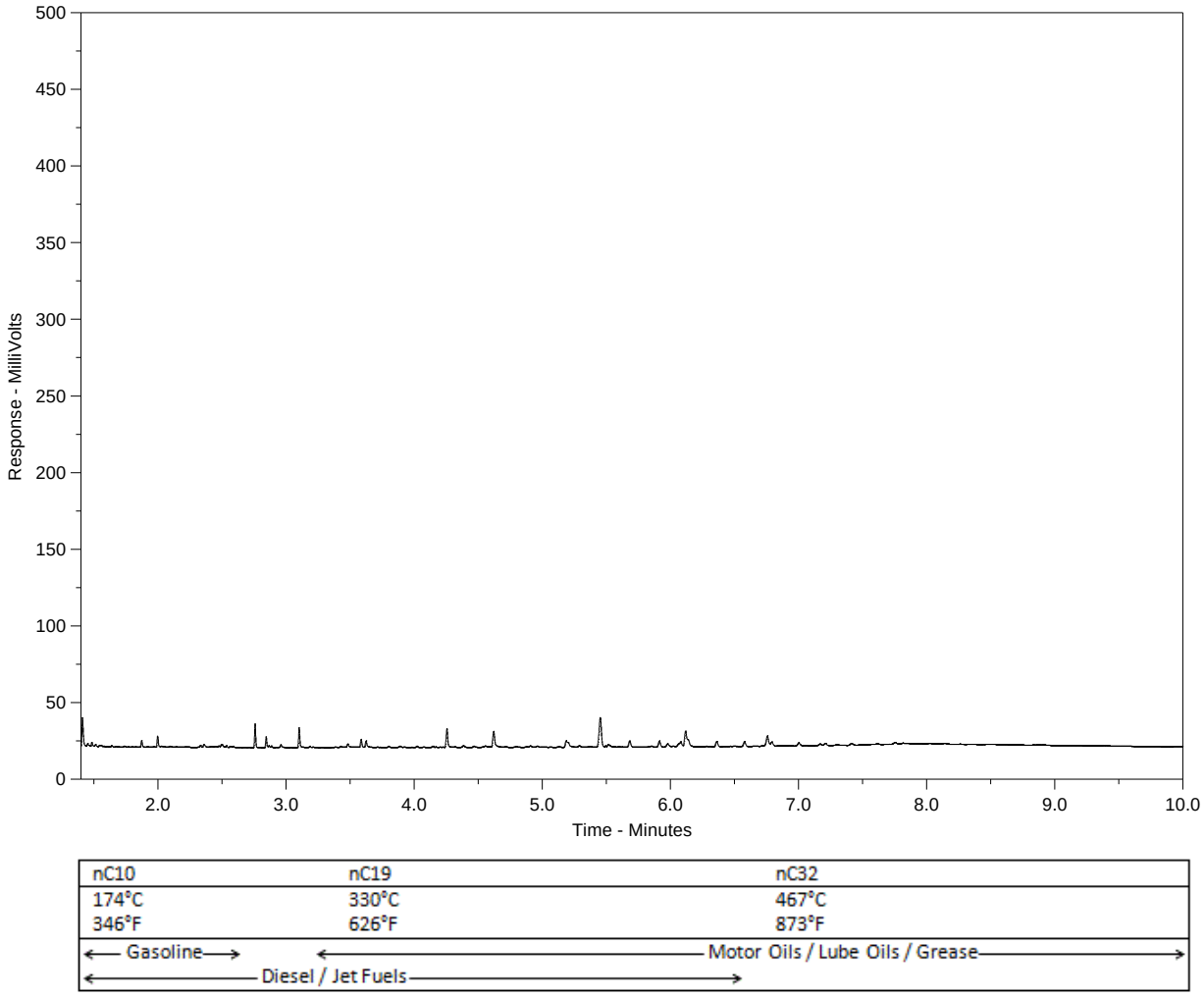
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-13
Client Sample ID: DB 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.

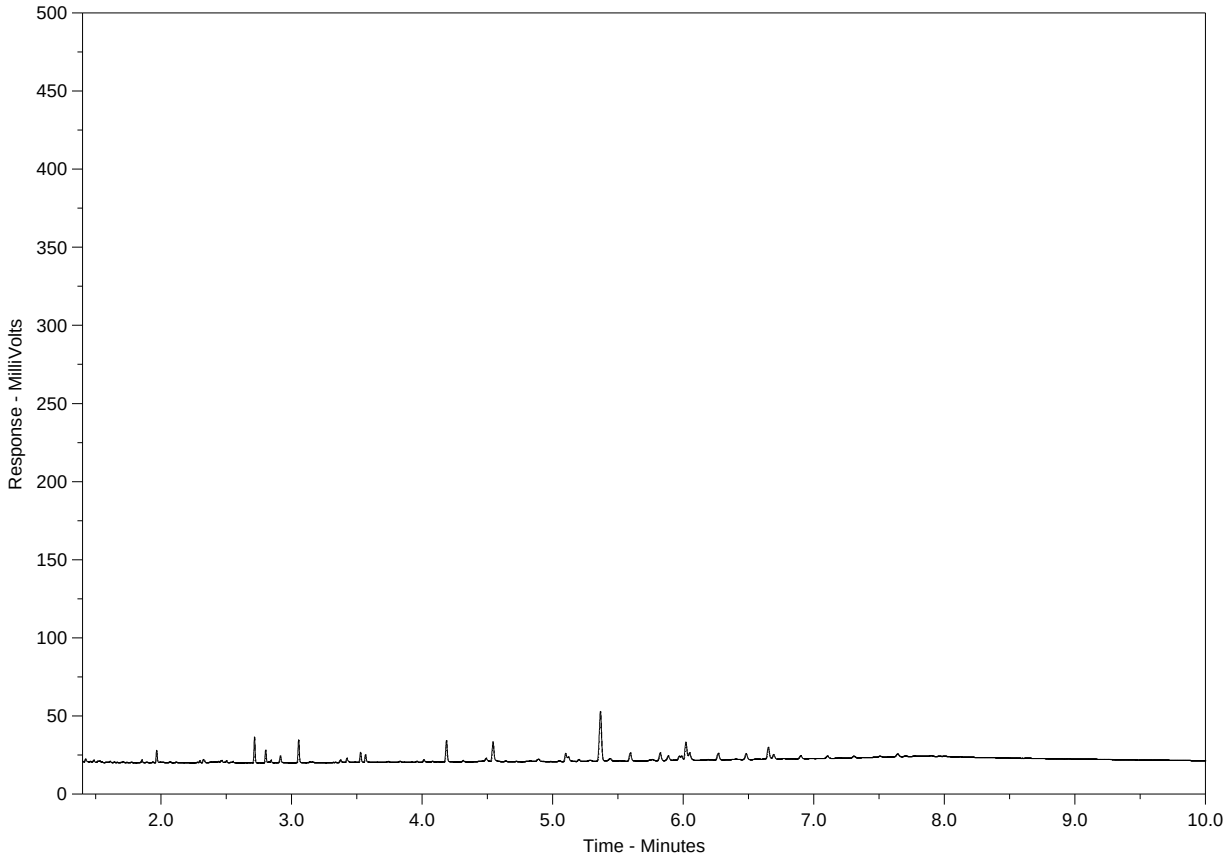
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-14
Client Sample ID: BU-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 →		

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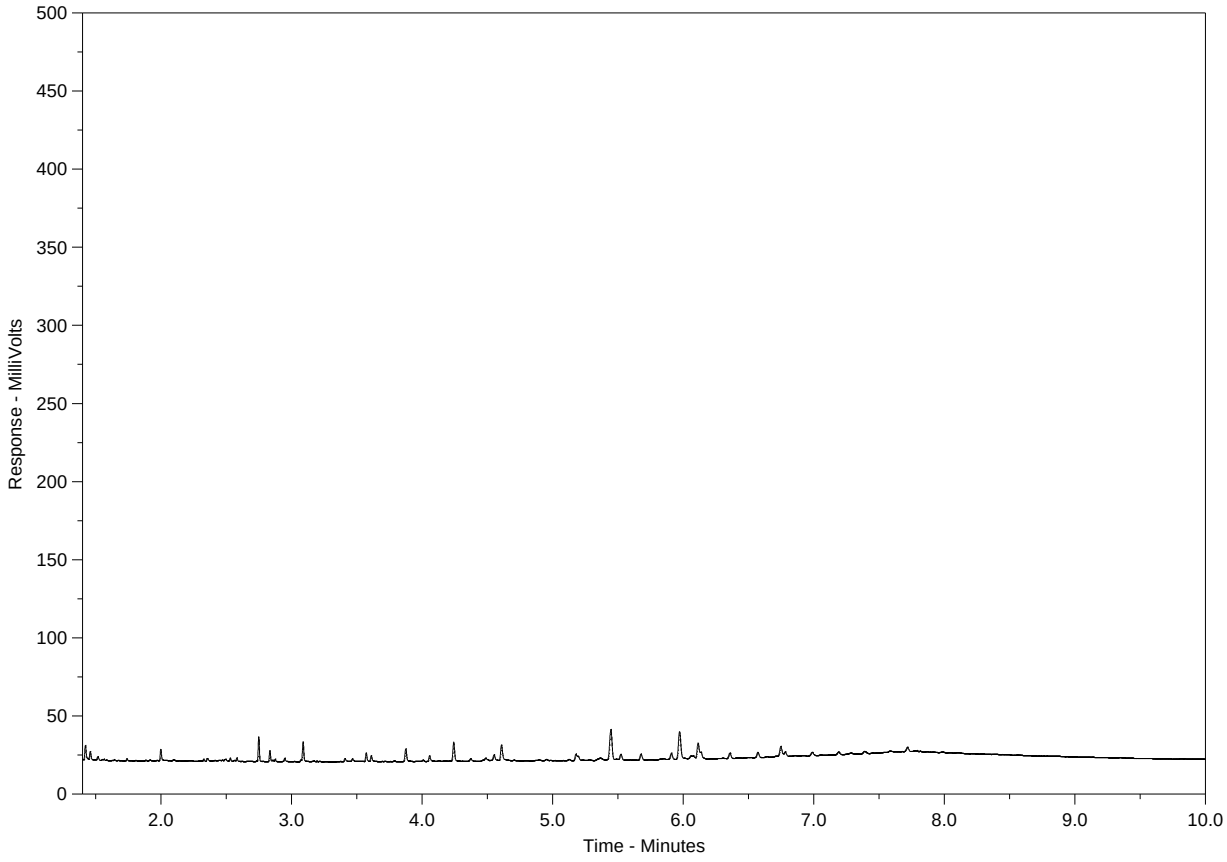
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-15
Client Sample ID: BU-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.

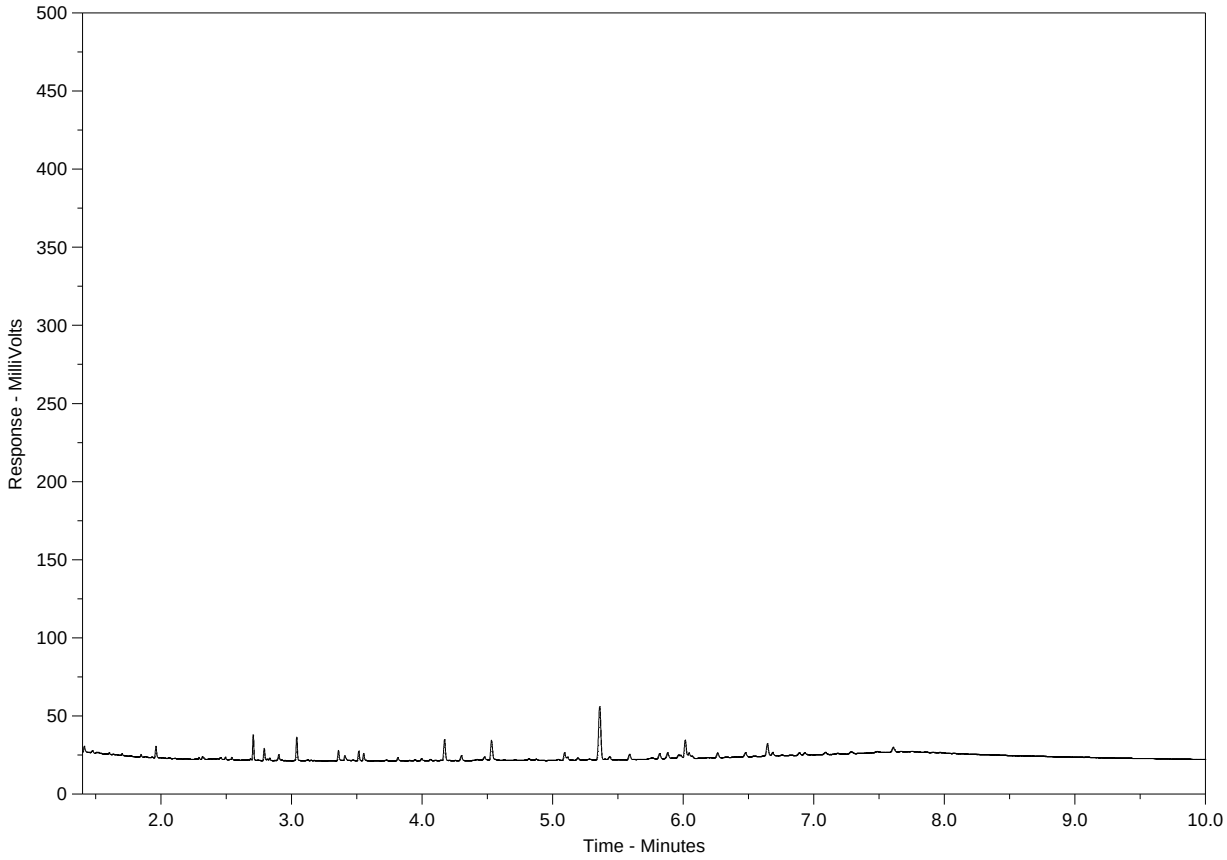
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-16
Client Sample ID: BU-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.

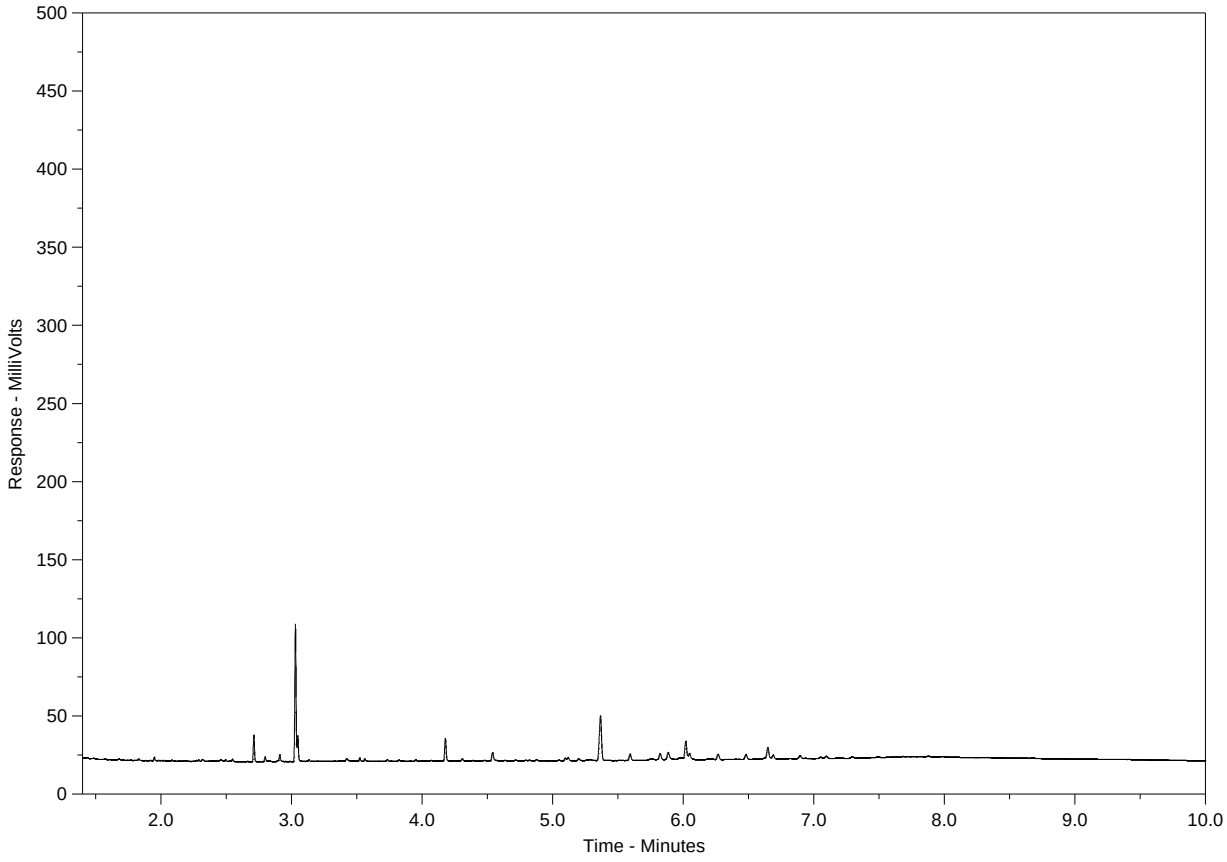
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-17
Client Sample ID: BU-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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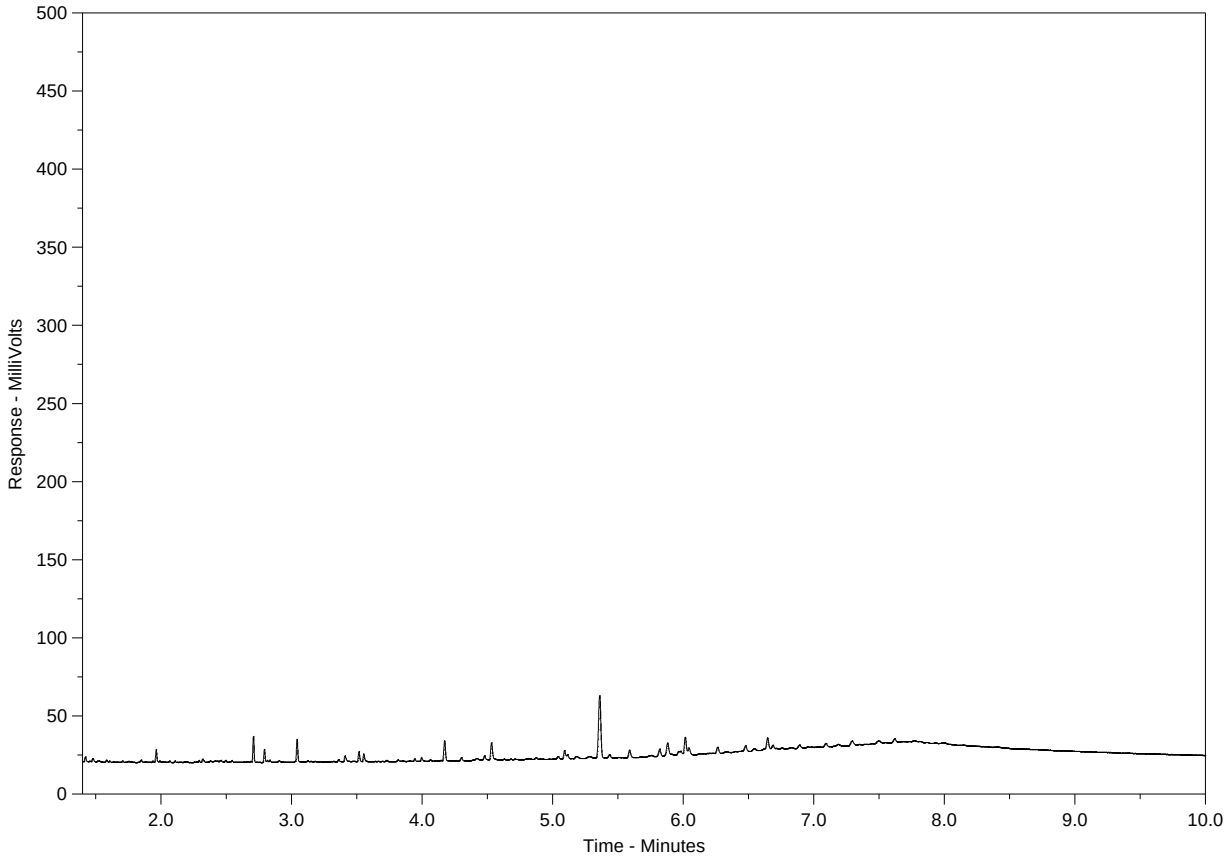
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-18
Client Sample ID: SC-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.

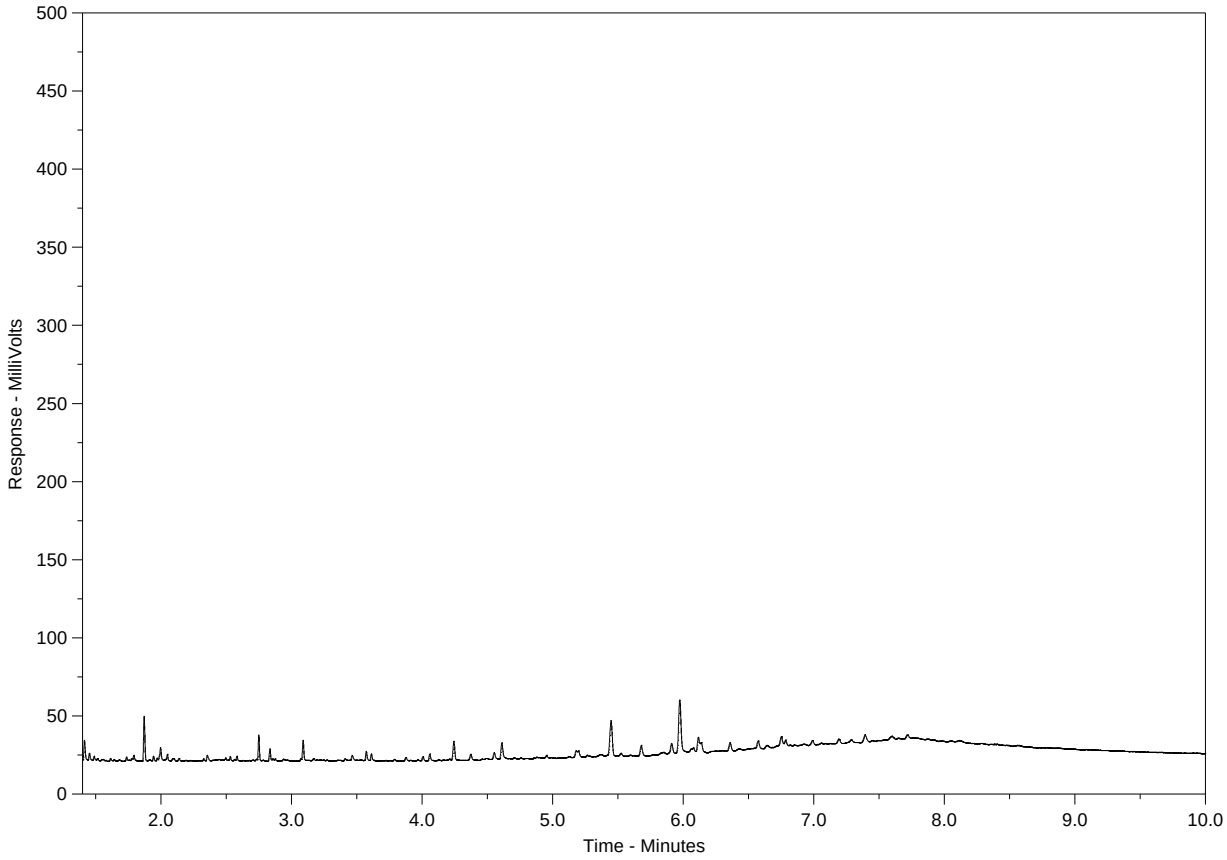
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-19
Client Sample ID: SC-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.

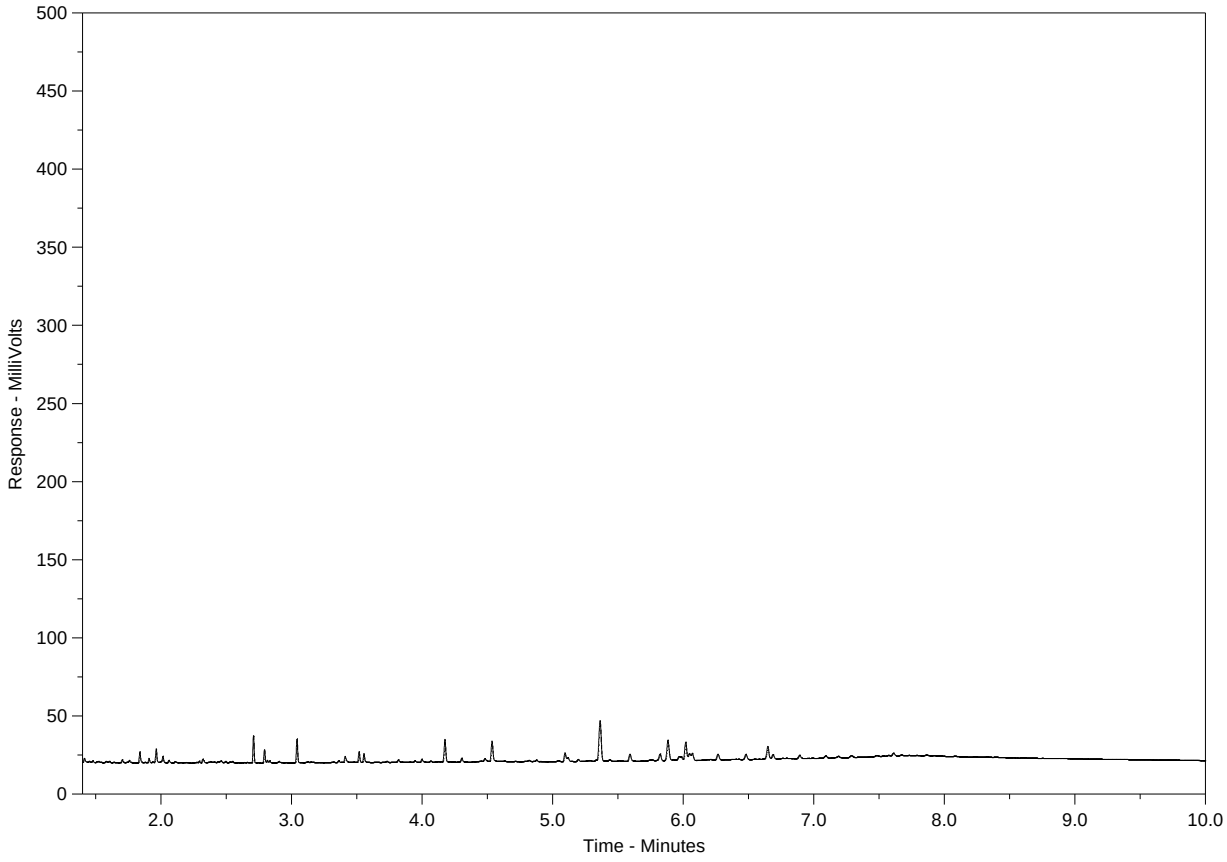
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-20
Client Sample ID: SC-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.

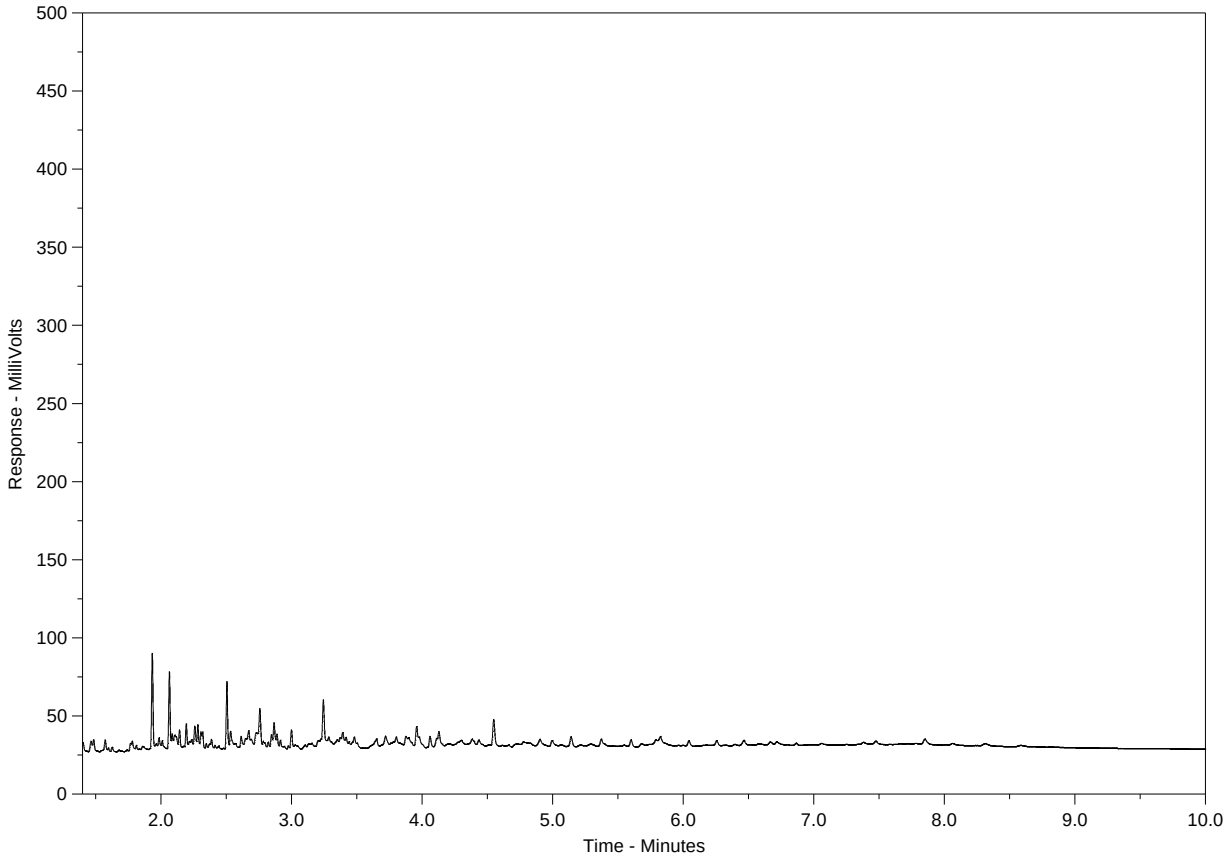
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

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: L1199825-21
Client Sample ID: SC 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.

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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:	201B 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 #: 11-1436-0073/1600	
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)	L1999825	ALS Contact:	Sampler:

Analysis Request

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

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
	DB Surface	24-Aug-12	9:30	Surface Water	X	8
	BU-MW12-01	23-Aug-12	15:45	Groundwater	X	8
	BU-MW12-02	23-Aug-12	17:20	Groundwater	X	8
	BU-MW12-03	23-Aug-12	16:40	Groundwater	X	8
	BU Surface	23-Aug-12	18:30	Surface Water	X	8
	SC-MW12-01	24-Aug-12	14:00	Groundwater	X	8
	SC-MW12-02	24-Aug-12	13:00	Groundwater	X	8
	SC-MW12-03	24-Aug-12	11:50	Groundwater	X	8
	SC Surface	24-Aug-12	14:40	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

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	24-Aug-12	19:00				°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:	201B 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 #: 11-1436-0073/1600	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)	L1199825	**ALS Contact:**	**Sampler:**

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
	BC-MW12-01	22-Aug-12	11:35	Groundwater	X	8
	BC-MW12-02	22-Aug-12	13:00	Groundwater	X	8
	BC-MW12-03	22-Aug-12	14:10	Groundwater	X	8
	BC-MW12-04	22-Aug-12	9:30	Groundwater	X	8
	BC-MW12-05	22-Aug-12	9:30	Groundwater	X	8
	BC Surface	22-Aug-12	15:20	Surface Water	X	8
	HC-MW12-01	22-Aug-12	17:00	Groundwater	X	8
	HC-MW12-02	22-Aug-12	18:15	Groundwater	X	8
	HC Surface	22-Aug-12	19:30	Surface Water	X	8
	DB-MW12-01	23-Aug-12	14:10	Groundwater	X	8
	DB-MW12-02	23-Aug-12	11:30	Groundwater	X	8
	DB-MW12-03	23-Aug-12	12:30	Groundwater	X	8

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

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

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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	24-Aug-12	19:00		24-Aug-12	19:50	7.1 °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.

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Australasia	+ 61 3 8862 3500
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South America	+ 55 21 3095 9500

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